Web-Assisted Tobacco Intervention in portuguese:

intentions to make behavioural changes and
behavioural changes

Luis Saboga Nunes, MPH

Thesis Committee:

Constantino Sakellarides, PhD
Vance Rabius, PhD
Luís Graça, PhD

THESIS

Presented in Fulfillment of the requirements for the degree
Doctor of Philosophy

Specialisation in Public Health
14 July 2011
“For my part

I know nothing with any certainty,

but the sight of the stars makes me dream”

Vincent Van Gogh
Abstract

The problem of how to support “intentions to make behavioural changes” (IBC) and “behaviour changes” (BC) in smoking cessation when there is a scarcity of resources is a pressing issue in public health terms. The present research focuses on the use of information and communications technologies and their role in smoking cessation. It is developed in Portugal after the ratification of WHO Framework Convention on Tobacco Control (on 8 November 2005). The prevalence of smokers over fifteen years of age within the population stood at 20.9% (30.9% for men and 11.8% for women). While the strategy of helping people to quit smoking has been emphasised at National Health Service (NHS) level, the uptake of cessation assistance has exceeded the capacity of the service. This induced the search of new theoretical and practical venues to offer alternative options to people willing to stop smoking. Among these, the National Health Plan (NHP) of Portugal (2004-2010), identifies the use of information technologies in smoking cessation.

Health and the importance of health literacy as a means of empowering people to make behavioural changes is recurrently considered an option worth investigating. The overall objective of this research is to understand, in the Portuguese context, the use of the Internet to help people to stop smoking. Research questions consider factors that may contribute to “intentions to make behavioural changes” (IBC) and “behavioural changes” (BC) while using a Web-Assisted Tobacco Intervention Probe (WATIP). Also consideration is given to the trade-off on the use of the Web as a tool for smoking cessation: can it reach a vast number of people for a small cost (efficiency) demonstrating to work in the domain of smoking cessation (efficacy)?

In addition to the introduction, there is a second chapter in which the use of tobacco is discussed as a public health menace. The health gains achieved by stopping smoking and the means of quitting are also examined, as is the use of the Internet in smoking cessation. Then, several research issues are introduced. These include background theory and the theoretical framework for the Sense of Coherence. The research model is also discussed. A presentation of the methods, materials and of the Web-Assisted Tobacco Intervention Probe (WATIP) follows.

In chapter four the results of the use of the Web-Assisted Tobacco Intervention Probe (WATIP) are presented. This study is divided into two sections. The first describes results related to quality control in relation to the Web-Assisted Tobacco Intervention Probe (WATIP) and gives an overview of its users. Of these, 3,150 answered initial eligibility questions. In the end, 1,463 met all eligibility requirements, completed intake, decided on a day to quit smoking (Dday) and declared their “intentions to make behavioural changes” (IBC) while a second targeted group of 650 did not decide on a Dday. With two quit attempts made before joining the platform, most of the participants had experienced past failures while wanting to stop. The smoking rate averaged 21 cigarettes per day. With a mean age of 35, of the participants 55% were males. Among several other considerations, gender and the Sense of Coherence (SOC) influenced the success of participants in their IBC and endeavour to set quit dates. The results of comparing males and females showed that, for current smokers, establishing a Dday was related to gender differences, not favouring males (OR=0.76, p<0.005). Belonging to higher Socio-economic strata (SES) was associated with the intention to consider IBC when compared to lower SES condition (OR=1.57, p<0.001) and higher number of school years (OR=0.70, p<0.005) favoured the decision to smoking cessation. Those who demonstrated higher confidence in their likelihood of success in stopping in the shortest time had a higher rate of setting a Dday (OR=0.51, p<0.001). There were differences between groups in IBC reflecting the high and low levels of the SOC score (OR=1.43, p=0.006), as those who considered setting a Dday had higher levels of SOC. After adjusting for all variables, stages of readiness to
change and SOC were kept in the model. This is the first Arm of this research where the focus is a discussion of the system’s implications for the participants’ “intentions to make behavioural changes” (IBC).

Moreover, a second section of this study (second Arm) offers input collected from 77 in-depth interviews with the Web-Assisted Tobacco Intervention Probe (WATIP) users. Here, “Behaviour Change” (BC) and the usability of the platform are explored a year after IBC was declared. A percentage of 32.9% of self-reported, 12-month quitters in continuous abstinence from smoking from Dday to the 12-month follow-up point of the use of the Web-Assisted Tobacco Intervention Probe (WATIP) has been assessed. Comparing the Sense of Coherence (SOC) scores of participants by their respective means, according to the two groups, there was a significant difference in these scores of non smokers (BC) (M=144.66, SD=22.52) and Sense of Coherence (SOC) of smokers (noBC) (M=131.51, SD=21.43) p=0.014. This WATIP strategy and its contents benefit from the strengthening of the smoker’s sense of coherence (SOC), so that the person’s progress towards a life without tobacco may be experienced as comprehensible, manageable and meaningful. In this sample the sense of coherence (SOC) effect is moderate although it is associated with the day to quit smoking (Dday).

Some of the limitations of this research have to do with self-selection bias, sample size (power) and self-reporting (no biochemical validation). The enrolment of participants was therefore not representative of the smoking population. It is not possible to verify the Web-Assisted Tobacco Intervention Probe (WATIP) evaluation of external validity; consequently, the results obtained cannot be applied generalized. No participation bias is provided. Another limitation of this study is the associated limitations of interviews. Interviewees’ perception that fabricating answers could benefit them more than telling the simple truth in response to questions is a risk that is not evaluated (with no external validation like measuring participants’ carbon monoxide levels). What emerges in this analysis is the relevance of the process that leads to the establishment of the quit day (Dday) to stop using tobacco. In addition, technological issues, when tailoring is the focus, are key elements for scrutiny. The high number of dropouts of users of the web platform mandates future research that should concentrate on the matters of the user-centred design of portals. The focus on gains in health through patient-centred care needs more research, so that technology usability be considered within the context of best practices in smoking cessation.
Key-Words

smoking cessation - cessação tabágica; internet and web assisted tobacco interventions – intervenções de base Web (internet) de apoio ao controlo do tabagismo; sense of coherence – sentido de coerência; consciencialização – empowerment; tailloring interventions – intervenções personalizadas; patient-centred care – cuidados de saúde centrados no cidadão; technological information systems – sistemas tecnológicos de informação e conhecimento; salutogenesis – salutogénese; health literacy – literacia em saúde.
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<th>Description</th>
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<tr>
<td>BC</td>
<td>Behavioural change to promote health</td>
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<tr>
<td>Dday</td>
<td>The day of a given cessation attempt during which someone tries to abstain totally from tobacco use</td>
</tr>
<tr>
<td>DGS</td>
<td>Direcção Geral de Saúde; Directorate-General of Health. Ministry of Health</td>
</tr>
<tr>
<td>ENSP-UNL</td>
<td>Escola Nacional de Saúde Pública – Universidade Nova de Lisboa</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FTND</td>
<td>Fagerström Test for Nicotine Dependence</td>
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<tr>
<td>FTQ</td>
<td>Fagerström Tolerance Questionnaire</td>
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<tr>
<td>HonCode</td>
<td>Health On the Net Foundation</td>
</tr>
<tr>
<td>IBC</td>
<td>Intentions to make behavioural changes to promote health</td>
</tr>
<tr>
<td>INS</td>
<td>National Survey for Health</td>
</tr>
<tr>
<td>NHP</td>
<td>National Health Plan (Portugal. MS. Plano Nacional de Saúde, 2004-2010)</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>OR</td>
<td>Odds ratio</td>
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<tr>
<td>P=</td>
<td>Pearson correlation</td>
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<tr>
<td>SES</td>
<td>Socio-economic strata</td>
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<td>SOC</td>
<td>Sense of Coherence</td>
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<tr>
<td>TPC</td>
<td>Specific Tobacco Prevention and Cessation programme</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>USDHHS</td>
<td>United States Department of Health &amp; Human Services</td>
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<tr>
<td>WATI</td>
<td>Web Assisted Tobacco Intervention</td>
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<td>WATIP</td>
<td>Web Assisted Tobacco Intervention in Portuguese</td>
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<tr>
<td>WATIP probe</td>
<td>Web Assisted Tobacco Intervention in Portuguese (<a href="http://www.parar.net">www.parar.net</a>)</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>WHO FCTC</td>
<td>WHO Framework Convention on Tobacco Control</td>
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<tr>
<td>WWW</td>
<td>World Wide Web (commonly called the Internet)</td>
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<td>95% CI</td>
<td>95% confidence interval</td>
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Definitions

In the course of this thesis, the terms “smoking cessation” and “management of tobacco addiction” are used interchangeably, as is the case with “cigarette smokers” and “tobacco users”.

Abstinence percentage. The percentage of smokers who achieve long-term abstinence from smoking. The most frequently used abstinence measure is the percentage of smokers in a group or intervention condition who were abstinent at a follow-up point that occurred 2, 6 or 12 months after the intervention (2).

Behavioural therapy. A psychotherapeutic approach aimed at identifying and modifying the behaviours associated with human problems (2).

Cared-for smoker. A smoker who has received at least one session of a structured, multi-session intervention (delivered by a stop-smoking adviser) on or prior to the quit date, who consents to be taken care of and who sets a quit date, is known as a “cared-for smoker” (1).

Care-for episode. At the point of attending one session of a structured, multi-session intervention, consenting to be taken cared of and setting a quit date, a user becomes a cared-for smoker and the care-for episode begins. This phase ends either when a client has been completely abstinent for at least the two weeks prior to the 12-month date or is lost to follow-up at that point, or when a 12-month follow-up reveals that a client has lapsed during the two weeks immediately prior to the follow-up and is therefore recorded as a non-quitter. Good practice dictates that, if the client wishes to continue to be taken care of after a lapse, care-for should be continued if it seems appropriate, but the client will not count as a 12-month quitter for the purposes of that care-for episode (3).

Continuous abstinence. This is based on whether study subjects were continuously abstinent from tobacco use since their quit day (1).

Consciencialização. The English word corresponding to consciencialização (conscientização) is awareness but it is deliberately not used here in order to demonstrate the proposed difference between awareness and the meaning that Paulo Freire attributed to consciencialização. For Paulo Freire the most needed thing is to promote consciencialização in PEOPLE. Using this approach here means that smoking cessation is possible through a process of education (to a life without tobacco) that is sustained by consciencialização. The smoker is in a unbalanced state between uncertainty and certainty. So provisional, sequential, step-by-step certitudes will ensure trust in the important uncertainty of “Will I ever be an ex-smoker?” For this there must be 1) information given to the smoker to help that individual “know that he or she knows” and to reinforce what the smoker already knows (once the salutogeneic perspective of the Generalized Resistance Resources has been activated); 2) awareness on the part of the smoker of what she or he does not yet know; and finally 3) the possibility for the smoker aiming at BIC or BC to produce knowledge in his or her life that does not yet exist.

Cost effectiveness. Quantified analysis of tobacco dependence programme costs relative to tobacco use related costs (2).

Dday. The day of a given cessation attempt during which a person tries to abstain totally from tobacco use with support, as part of an assisted quit attempt. Also refers to a motivational intervention, whereby a person commits to quit tobacco use on a specified day (2).

Efficacy and effectiveness. Efficacy is the outcome achieved from a treatment provided under near-ideal intentions to make behavioural changes & behavioural changes
circumstances of control (typically, in a research study). Efficacy studies involve recruitment of motivated participants, random assignment, intensive assessment and methods designed to keep participants in treatment (2). The purpose of the data monitoring system is to measure efficacy. To carry out the procedure, the number of successful 12-month quits submitted is used as the numerator and the number of smokers entering a cared-for programme (i.e. cared-for smokers) is the denominator (1). Such studies typically involve participants who do not seek out the study or treatment, and the treatment is delivered in a manner consistent with its likely use in real-world settings (2).

Environmental tobacco smoke (ETS). Also known as “secondhand smoke” (SHS). The smoke inhaled by an individual not actively engaged in smoking, but who is exposed to smoke from the lit end of a cigarette and the smoke exhaled by the smoker (2).

Empowerment. See consciencialização.

Higher intensity counselling. Refers to interventions that involve extended contact between clinicians and patients. It is coded according to the length of contact between clinicians and patients (more than 10 minutes). If that information is unavailable, the coding is based on the content of the contact between clinicians and patients (2).

Individualized interventions. Refers to tailoring an intervention to fit the needs of a particular smoker. For example, relapse prevention can be individualized according to information obtained about problems the patient has encountered in maintaining abstinence. See also Tailored Interventions (2).

Intensive interventions. Comprehensive treatments that may occur over multiple visits for long periods of time and may be provided by more than one clinician (2).

Intent-to-treat. Treatment outcome analyses that determine abstinence percentages based on all subjects randomized to treatment conditions, rather than on just those subjects who have completed the intervention or those who could be contacted at follow-up (2).

Internet (Web-based) interventions. Interventions delivered through the use of a computer. The smoker may navigate within a specific website to access general treatment and treatment information, or the smoker may interact with a program that delivers a tailored intervention (2).

Intervention. An action or programme that aims to bring about identifiable outcomes. In tobacco dependence treatment, the intervention can be clinical in nature and may consist of counselling and the use of medications. Also referred to as “treatment” (2).

Intratreatment social support. Refers to an intervention component that is intended to provide encouragement, a sense of concern, and empathic listening as part of the treatment (2).

IT. Information technology transmits and represents information (facts, data, or opinions) in any format – textual, numerical, graphic or audiovisual – and creates the hardware and software that process it (4).

Low-intensity counselling. Low-intensity counselling refers to interventions that involve contact between clinicians and patients that last between 2 and 10 minutes. If the information on length of contact is unavailable, it is coded, based on the description of content of the clinical intervention (2).

Motivation. Refers to a patient’s intention or resolve to quit. Motivation can be bolstered through actions, such as setting a quit date, using a contract with a specified quit date, reinforcing correspondence (letters mailed from clinical/study staff congratulating the patient on his or her decision to quit, or on early success), and providing information about the health risks
of smoking (2).

Motivational intervention. An intervention designed to increase the smoker’s motivation to quit (2).

Motivational interviewing (MI). A direct and patient-centred counselling method used to increase motivation and facilitate change (2).

Non-cared-for smoker. This is a smoker who receives no support or is given only brief or very brief advice and/or is merely supplied with leaflets, helpline cards or pharmacotherapy, and who does not set a quit date or consent to be taken care of. Examples may include smokers seen at a health fair or community event, during a general practitioners consultation or during a hospital stay, where a quit date is not set and a quit attempt is not made (1).

Point prevalence abstinence. Can be preferred because continuous abstinence data may underestimate the percentage of individuals who are abstinent at particular follow-up time-points, although some data suggest that these rates are similar. Most relapse begins early in a quit attempt and persists. A point prevalence measure taken at 6 months would certainly capture the great majority of those relapse events (1).

Point prevalence abstinence. Data based on tobacco use occurrence within a set time period (usually 7 days) prior to a follow-up assessment (1).

Product smoked. In this study, the terms “tobacco products” and “cigarettes” are used to refer to the products smoked; any product that contains tobacco and produces smoke is a smoked product, including cigarettes (hand-rolled or commercial), cigars and pipes. Pipes include shisha, hookah, narghile and hubble-bubble pipes (1).

Psychosocial interventions. Refers to intervention strategies that are designed to increase tobacco abstinence rates due to psychological or social support mechanisms. These interventions comprise counselling, self-help, and behavioural treatment, such as rapid smoking and contingency contracting (2).

Quit day (see Dday).

Relapse prevention. Various intervention strategies intended to prevent a recent quitter from returning to regular smoking (2).

Relapse. Return to regular smoking by someone who has quit. A distinction is sometimes made between “relapse” and a “lapse” (or a “slip”), which is a return to reduced smoking or a brief smoking period after quitting that falls short of a return to regular smoking (2).

Routine and manual smoker. A R/M smoker is one whose self-reported occupational identity is that of a routine and manual (R/M) worker, as defined by the National Statistics Socio-Economic Classification system. Smoking prevalence among those in the R/M socio-economic group is significantly higher than among people of other social levels. This has a major impact on the health and life expectancy of this group (1).

Secondhand smoke. Also known as environmental tobacco smoke (ETS). The smoke inhaled by an individual not actively engaged in smoking, but who is exposed to smoke from the lit end of a cigarette and the smoke exhaled by the smoker (2).

Self-efficacy. One’s beliefs about his/her ability to act successfully to achieve specific goals or influence events that affect one’s life (2).

Self-help. An intervention strategy in which the patient uses a non-pharmacologic physical aid to achieve abstinence from tobacco. Self-help strategies typically involve little contact with a clinician, although some strategies (e.g., reactive hotline/helpline) involve patient-initiated contact. Types of self-help materials include: pamphlets/booklets/mailings/manuals; videos; audios;
referrals to 12-step programmes; mass media, community level interventions; lists of community programmes; reactive telephone hotlines/help lines; and computer programs/Internet (2).

Self-reported 12-month quitter. A cared-for smoker who has achieved quit status at 12 months from his/her quit date and has reported this face to face or by telephone, text, email or postal questionnaire. The percentage of self-reported 12-month quitters is calculated to be the number of cared-for smokers who self-report continuous abstinence from smoking from day 1 (or other reference like 14) post-quit date to the 12 months follow-up point/ all treated smokers. Is calculated as being the number of “cared-for” smokers who self-report continuous abstinence from smoking from Dday to the 12-month follow-up point / all self-reported quitters (1).

Smoker. A smoker is a person who smokes a smoked product (1).

Smoking cessation (smoking cessation). This term is used to denote activities related to supporting smokers who want to stop using tobacco (1).

Social support. Non-medicinal support for the smoking cessation patient from someone who provides personal encouragement and empathetic listening. Tobacco dependence treatments include two types of social support: intra-treatment social support and extra-treatment social support (2).

Socio-economic status (SES). Position of an individual or group in a population, based on an index where several variables are considered, such as number of school years, employment condition, social isolation, life satisfaction referring to three dimensions (family, job and financial), social support, life meaningfulness and loneliness, income, education, or occupational categories (2).

Stop smoking. This is the preferred term to denote patient-directed communications relating to smoking cessation activity (1).

Tailored interventions. Tailored interventions are based on a dimension or a subset of dimensions of the individual (i.e., weight concerns, dependency, etc.). See also Individualized Interventions (2).

Tobacco dependence. Dependence on any form of tobacco, including, but not exclusive to, cigarettes, pipes, cigars and chewing tobacco (2).

Tobacco user. A person addicted to one or more forms of tobacco product (2).

TPC. Specific Tobacco Prevention and Cessation programme, developed for the Internet strategy addressed in this research. It comprises 10 steps, one for each of the 10 letters of the acronym ‘renasceres®’

Transdermal. Refers to delivery of a substance by absorption through the skin. Transdermal nicotine is often used as a synonym for “nicotine patch” (2).

Treatment. An action or programme that aims to bring about identifiable outcomes. For tobacco dependence, the treatment is generally clinical in nature and may consist of counselling and the use of medications. Also may be referred to as “intervention” (2).

Unaided quit attempts. Quit attempts made by patients, without the assistance of any clinical intervention or medications. Also known as “quitting cold turkey” (2).

Varenicline. INFARMED-approved, non-nicotine recommended smoking cessation medication. Its mechanism in terms of action is thought to be a function of its ability to serve both as a partial nicotine receptor agonist and a nicotine receptor antagonist. Available by
prescription only (2).

Vital signs. Standard patient measurements to assess the critical body functions, including blood pressure, pulse, weight, temperature and respiratory rate. The first step (i.e., the first “A”) to providing smoking cessation interventions is identifying smokers. Vital signs should be expanded to include tobacco use status (current, former, never) or an alternative universal identification system in patient records (2).

WATI_ Web Assisted Tobacco Intervention: this acronym has been used by the international community of practice mentored by different coordinators and authors of web applications to help people stop using tobacco.

WATIP (probe). Web Assisted Tobacco Intervention in Portuguese (www.parar.net), a probe that is the focus of this research, consisting of 10 steps to help smokers reaffirm their intention to quit or help them in their quitting progress. Each of the steps is represented by one of the 10 letters of the acronym “renasceres®”.

Web-based interventions. See Internet Interventions (2).

Weight/diet/nutrition. An intervention strategy designed to address weight gain or concerns about weight gain. Interventions receive this code if they teach weight/diet/nutrition management strategies, incorporate daily/weekly weight monitoring (for reasons other than routine data collection), require or suggest energy intake maintenance/reduction, and/or convey nutritional information/tips/counseling (2).

Withdrawal symptoms. A variety of unpleasant symptoms (e.g., difficulty in concentrating, irritability, anxiety, anger, depressed mood, sleep disturbance, and craving) that occur after use of an addictive drug is reduced or stopped. Withdrawal symptoms are thought to increase the risk for relapse (2).

Sources:


Contextualization

This thesis presents research developed in the context of the Doctorate in Public Health, with a Specialty in Public Health, at the National School of Public Health (New University of Lisbon), Portugal. Its focus is the data collected over a period of three years, following the design, development and project implementation of an Internet platform. A period of maturation and review has followed, based on the collection of comments by experts, while preparing for the public presentation of results.
Statement of original authorship

I certify that the work in this thesis has not previously been submitted for a degree nor submitted as part of the requirements for a degree.

I also certify that this thesis has been written by me. Any help that I have received in my research work, materials translation and preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of the candidate:

[Signature]

Luís Saboga Nunes

Luís Ângelo Saboga Nunes; sociólogo da saúde, mestre em saúde pública;
Em funções de docência na Escola Nacional de Saúde Pública, como assistente convidado
Acknowledgments

To Miguel the soul of this project.

This thesis is dedicated to my family; their love and encouragement kept me going in all difficult situations throughout this journey.

I express my gratitude to my supervisors, Professors Constantino Sakellarides (PhD), Vance Rabius (PhD) and Luis Graça (PhD) for the untiring support provided, and extend it to all colleagues and friends that supported this work throughout all its phases, particularly Pedro Aguiar (PhD), Margaret Whidden (PhD), Isabel Loureiro (PhD), Sylvan Lazarus (MD), Linda Ferry (PhD) and Drª Isabel Andrade

I want also to express my special gratitude to all of those that cannot be named here, but that have been the ultimate reason and motivation of this effort: those that while fighting nicotine addiction took the time to teach me how to build this project. Their patience and interaction with the portal, allowed me to unveil a small portion of the curtain that hide their pain and suffering that encapsulates their wish to experience life without tobacco.

To all of you: Thank you very much!
1. Introduction

“The conditions we deal with are more complex,
more social in nature and need deep understanding to be tackled
... a new understanding of ourselves and our bodies, which understand that bodies are not just biological
but social entities”

ILONA KICKBUSCH, 1986.
The problem of how to support “intentions to make behavioural changes” (IBC) and “behaviour change” (BC) when there is a scarcity of resources is a pressing issue in public health terms. This has led researchers to look for new strategies. The present research focuses on the use of information and communications technologies (ICT) and their role in health gains. It offers an analysis of the complementary potential of the Internet in smoking cessation.

1.1. Research Background

The World Health Organization (WHO, 2007) asserts that the prevalence of many of the diseases\(^1\) that currently affect people around the world could be considerably reduced. For this to be achieved, changes would need to be made in five categories\(^2\) of behaviour. These modifications would help to prevent premature death, disease and disability. The lifestyle alterations under consideration include behaviour started during adolescence and maintained throughout life. At the top of this list of categories is the use of tobacco.

The National Health Plan of Portugal 2004-2010 (NHP) (PORTUGAL. MS.S 2004) targets these matters as well as smoking cessation. Searching for tools and strategies that would facilitate support for smoking cessation in the shortest possible period is given priority among the health goals. Of the six strategies for facing this health issue, the use of the Internet is considered, as part of the NHP (2004-2010). This being so, this study focuses on the implementation of the first Portuguese smoking cessation tool that opts for the use of the Internet to reach would-be non-smokers. It searches for the answers to questions regarding the potential of the Internet to sustain a process and to encourage willingness to maintain “intentions to make behavioural changes” (IBC) and “behaviour change” (BC) among Portuguese-speaking smokers. It is considered to be a suitable complementary approach, an appropriate position between a clinical base and a public-health context concerning IBC.

\(^1\) The main such diseases are: cardiovascular disease, various types of cancer, chronic pulmonary disease, depression, violence, substance abuse, accidents, nutritional deficiencies, human immunodeficiency virus (HIV) / acquired immunodeficiency syndrome (AIDS) / sexually transmitted disease (STDs) and infection caused by parasites.

\(^2\) These are: violent behaviour, alcohol abuse or use of banned substances or those known to have nothing but harmful effects on health, detrimental practices involving poor diet or hygiene that cause diseases, sedentary lifestyles and sexual behaviours leading to unintended pregnancies or diseases.
1.2. Public health menace of tobacco use

Health is just one of the many areas that must be considered in relation to the fulfilment and satisfaction of societies’ and individuals’ expectations. Moreover, the price of the fulfilment of all those needs far exceeds the limited resources humans have.

Public health involves the endeavour of any organized and teleonomic action that aims at healthier communities. The teleonomic concept implies goal-direction which, for public health, is social negentropy. This reflects the ever-evolving process of fighting the degradation of the human race by adverse events or harmful substances like tobacco. This, in turn, implies that public health is a dynamic process and that it focuses on programmes, the bases for the goal-directedness of its endeavours. The means to achieving this are collective responsibility, proactive involvement of every empowered person and the community. For Edward Amory Winslow public health is considered to be:

\[
\text{the science and the art of ... the education of the individual ... and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health; organizing these benefits in such fashion as to enable every citizen to realize his birthright of health and longevity (WINSLOW, 1920, 183).}
\]

From this, complex web of disciplines and research, health policies and protection and promotion strategies, knowledge translation and public health regulatory initiatives, such as the definition of citizens’ rights and duties, comes the mainstream concentration of efforts and resources allocated to achieving healthier and happier communities. Nevertheless, with the arrival of a new century that brought with it a continuing rapid pace of distribution and use of human wealth, it became clear that the allotment of resources and efforts to achieve the goals on the public health agenda are insufficient to fulfil all these needs. This is due to the unfortunate situations that continue to pervade and compromise public health efforts. Among these conditions are the use of tobacco products.
1.3. Research context

For the last 30 years, the Portuguese health care system, based on a National Health Service structure, has been under severe stress as the result of growing needs. Financing chronic deficits and dealing with other challenges (like the training of professionals) remain obstacles to the provision of equality of access to medical care and promptness of support of the needs of the population. One of those needs is assistance with smoking cessation. Early in the new century Portugal ratified the WHO tobacco-control framework convention, and endorsed the idea of providing citizens with help to live without the harmful effects of tobacco.

In 2004, the first National Health Plan (NHP) set as its target a decrease of 50% in the number of smokers by the end of its time frame (2004-2010). However, in 2004, few health units (including health centres and hospitals) were delivering smoking cessation support in Portugal (44) and a total of only 50 health professionals (medical doctors, nurses, psychologists) from these health units were identified as active in smoking cessation (PORTUGAL. MS. DGS., 2004). This scarcity of resources may help to explain the fact that several of these health units (50%) had waiting lists that ranged from three weeks to two years (with an average waiting period of 113 days for those units which had waiting lists). A confirmatory study (Appendix 2, working paper one) set in 2005 the existence of waiting lists for smoking cessation in the country).

By 2006 the number of health units (including health centres and hospitals) delivering smoking cessation consultations in Portugal had increased to 101 and a total of 267 health professionals (general practitioners, nurses, psychologists) from these health units were identified as giving support for smoking cessation (PORTUGAL. MS. DGS., 2006). Nevertheless this increase in resources did not affect waiting times for access to consultations for smoking cessation, when compared with 2004; there was a waiting period of from 8 days to 24 months, with an average of 103 days for those units which had waiting lists (PORTUGAL. MS. DGS., 2006).
The fact that in clinics or hospitals with high standards and reputable services, the amount of time a smoker needed to wait (e.g. 24 months at Egas Moniz Hospital) is a clear indication of the difficulty of gaining access to a smoking cessation programme (Figure 1).

Two more detailed points need to be made in about the accessibility to smoking cessation support. In the first place, even if around 50% of health units do not report waiting lists, it remains true that, in both major urban centres of the country (Lisbon and Porto), the situation is deteriorating, with fewer services and longer waiting lists. Secondly, there are no waiting lists for smoking cessation consultations in several health units, but these clinics offer only restricted access to smokers (from other health-unit catchment areas there is no provision of support). More recently, an update of the data on waiting periods revealed that by the end of 2008 the length of time a person might expect to wait before being given a smoking cessation consultation in the context of the NHS, varied between two and 365 days (PORTUGAL. MS. DGS., 2010).

Smokers want to be told by their doctors that they should stop smoking. They also like to receive their help. However, international research reveals that only 34% of smokers have been instructed by their doctors to stop smoking and only 11.6% of smokers have been given counselling about the possible assistance available (BOYLE, GANDINI, LUIS SABOGA NUNES).

### Figure 1: Smoking cessations programmes in some health units: contact, schedule, coordination, waiting time (months).

<table>
<thead>
<tr>
<th>Hospital/Centro de Saúde</th>
<th>Contactos</th>
<th>Horários</th>
<th>Nome do Responsável</th>
<th>Tempo de Espera</th>
<th>Observações</th>
</tr>
</thead>
</table>
| H. Pedro Valentim, S. A. | Tel: 21 794 8000  
Fax: 21 791 111 | Seg-Dom 8h a 18h  
Sexta-Feira 18h a 20h | | 10 minutos | (1) |
| Hospital de Santa Maria | Tel: 21 799 0100  
Fax: 21 799 0126 | Quinta-Feira 12h a 14h  
Seg, Sex 14h a 18h  
Ter, Qua 14h a 16h  
Sexta-Feira 14h a 16h | | 6 minutos | |
| H. Egas Moniz, S. A. | Tel: 21 865 0000  
Fax: 21 865 0104 | De Seg-Dom 8h a 18h  
Sexta-Feira 14h a 18h | | 2 meses | |
| IPO Centro Regional de Oncologia de Lisboa S. A. | Tel: 21 729 3900  
Fax: 21 729 8222 | Segunda-Feira 8h a 17h  
Sexta-Feira 14h a 17h  
Terça-Quinta 8h a 13h | | 5 meses | |
| Hospital de Sants | Tel: 24 030 220  
Fax: 24 030 220 | Terça-Quinta 14h a 17h  
Segunda-Feira 14h a 17h  
Sexta-Feira 14h a 17h  
Sábado 8h a 13h | | 4 meses | |
| Hospital Nossa Senhora do Rosário, S. A. Barreiro | Tel: 21 204 7560  
Fax: 21 204 8408 | Sexta-Feira 14h a 18h  
Segunda-Feira 8h a 13h | | Não existe | |

Source: DGS, 2004 (names omitted).
ROBERTSON, et al., 2000). In the northern countries, a research carried out in Sweden, Norway, Finland and Iceland revealed that general practitioners perceived as critical barriers to engage in smoking cessation towards their patients, lack of training and time, among other issues (HELGASON, LUND, 2002). In Portugal, an even lower number of smokers (28%) have been recommended by their doctors to consider smoking cessation (EUROPEAN COMMISSION. EUROBAROMETER, 2010, Qd13a). In an ideal situation, in which all physicians in Portugal would become involved in advising their patients about smoking (with minimal intervention) between 81,329 and 162,659 people could receive help (MACEDO, PRECIOSO, 2004). This figure contrasts with the possible number of people interested in smoking cessation in this country. There are 10,658,828 inhabitants (Portugal. INE, 2010) and according to the 4th National Health Survey 2005-2006, (Portugal. INE, 2007) – 4th INS, 2005-2006) 20.9% of those aged 15 years or more (9,012,684) smoke (1,883,650). Since roughly 44.6% of smokers in Portugal would like to stop (BOYLE, et al. 2000), it can be estimated that more than 840,107 inhabitants would be interested in smoking cessation programmes. This is about ten times more people than those whom Manuel Macedo pointed out, as being supported in the ideal type of situation, in which every physician engages in smoking cessation with brief interventions. (In working paper two additional information help understand the context of health professionals’ smoking cessation support offered to their patients, Appendix 3).

One of the ways by which health professionals availability could be increased to help smokers quit smoking is increased health professionals training in smoking cessation. Although recognized by the NHP (2004-2010) as the first objective to consider, there is still no undergraduate training for health professionals in smoking cessation in Portugal. At the post-graduate level, only one institution, the Universidade Nova de Lisboa, Escola Nacional de Saúde Pública, (ENSP-UNL) offers a comprehensive training involving health professionals; this course is on the curriculum every second year. Besides this, pharmaceutical industries and the Administrações Regionais de Saúde provide occasional short and piecemeal, technical training. Most of these training programmes rely heavily on the use of medication, in the implementation of personalized face-to-face intervention strategies, and (apart from the training at the ENSP-UNL) none focuses on group support. Medications are effective to use in smoking cessation but they are expensive in Portugal, despite the recommendation by

intentions to make behavioural changes & behavioural changes
the NHP that they should become accessible at low cost. At the end of the time frame for the NHP (2004-2010) and after several efforts to have them included in the national health list of medications, they are not yet (2011) funded by the state. When assisting patients in choosing a product, clinicians should consider additional factors that tend to take up their available time. For example, the number of cigarettes smoked per day, level of dependence, advantages and disadvantages of each product, methods used for prior quit attempts and reasons for relapse, and the patient’s own product preference, are some of the aspects that need to be considered. In addition, behavioural counselling should be used in conjunction with all pharmacologic therapies, for coherent support, although this is also highly demanding in terms of time and resources.

1.4. **Overall objective**

Among the six strategies of the Portuguese National Health Plan (2004-2010), information technologies are referred as having a positive impact on smoking cessation support. Despite this, the only quit-line in existence in Portugal operates some hours per day, during working hours and from Monday to Friday. During weekends, and holidays (like summer holidays, Christmas time and Easter) there is no support available from the quit-line. This scarcity of opportunities to reach the quit-line, contrasts with the numerous moments when a smoker may be considering smoking cessation. These barriers to access to support can be overturned and a service can be provided that would be available 24 hours per day, seven days per week and 365 days per year. One way of doing this is to enlist the help of the most popular of information technologies, namely the Internet.

There are ongoing experiences in several parts of the world, of assisting smokers with the use of the Internet to help them to stop smoking (Appendix 8). When Internet smoking cessation support results are compared to the success rates of other smoking cessation programmes, it can be concluded that they are not inferior. Indisputably, long-term (≥6-month) quit rates observed with the various nicotine replacement therapy products, bupropion and varenicline are superior most of the time in 15 % to placebo effect (CAHILL, 2008; STEAD, et al., 2008; HUGHES, et al., 2007). These data derive from 145 different randomized-controlled trials. Quit rates from each of the methods is
approximately twice that of its corresponding placebo control treatment Arm. However, studies which consider the effect of tailoring advice on the Internet show promising results: high-tailored Internet support when compared with low-tailored can help smokers quit (33.6% compared to 27.4% respectively) (Figure 2).

Figure 2: Long-term (≥6 months) quit rates, cessation medication and Internet sites.

![Graph showing long-term quit rates](image)


Another aspect of the subject which must be taken into account relates to the social representation of smoking. For some, smoking is not a pathological condition. Consequently, many people question the need for the intervention of a health professional to help “fix” the “disorder” of smoking. Smoking cessation programmes are perceived by many smokers to associate smoking with pathological consequences (like coughing or bronchitis), whereas smokers do not ordinarily consider themselves to be sick. The erroneous belief that there is a lack of harm in the smoking habitus thus works against any feeling of need to go to a health unit to be “treated” or “cured” of smoking. That is why smoking cessation programmes should be provided also outside the health-care system, not identifiable with the medical establishment (as is the case with England or Brazil, that have a prolific national smoking cessation strategy based
on group techniques outside the health-care system - CHAMBERS, 2009; BRASIL. REDAÇÃO BEM PARANÁ, 2010; BRASIL. MINISTÉRIO DA SAÚDE, 2004).

These community-linked groups are mostly independent of health unit facilities. People could be made aware of smoking cessation in places where they live, work, play or relax. Nowadays the Internet is such an environment. It is used for amusement, for spending time with friends, for learning more about a vast range of topics or simply for relaxation. In this milieu, offering smoking cessation support would fit into the normal routine of a smoker’s day, and with the click of a mouse (in other words, with minimal expenditure of energy), it can favour health promotion initiatives. If this simple activity can have an impact that would encourage the Internet user to make even a little progress towards a life without tobacco, the consequences could be significant.

As stated before, the traditional main road to recovery from a disease includes the smoker’s contacting his or her health unit to make an appointment to see a general practitioner. Since “smoking cessation” is not considered an emergency in Portugal, a regular consultation will usually not be scheduled immediately; there will be a wait of one or more weeks. Once this appointment takes place, it demands the second major level of energy expenditure. Since, in Portugal, general practitioners’ normal consultations are offered during regular working hours, a smoker who needs to see his, must ask for leave of absence from work. If his health unit has a smoking cessation program with no waiting list, the first appointment may take place within a week of being requested. However, there might be a waiting list of up to 365 days. If the health unit has no smoking cessation support, usually this is the end road in the search for aid made by many smokers, using the NHS. As a result, some smokers proceed to alternative options that are not based on scientific research (acupuncture, for instance). The best chances for success in quitting are for the smoker who belongs to a health unit with a smoking cessation plan, but, it will take at least two weeks for him or her to receive support in a personalized face-to-face intervention smoking cessation programme. The differences in energy expenditure between smoking cessation strategies (e.g. between those using the telephone and health unit consultations within the NHS or Internet smoking cessation support) becomes an important issue to be considered at a time when people have varied and multiple demands to make on their resources.
Finding tools that would facilitate smoking cessation support in the shortest period of time is considered a key issue in the context of the health goals of Portugal. In these circumstances, this research focuses on the implementation of the first Portuguese smoking cessation tool that opts for the use of the Internet to reach would-be non-smokers in real world circumstances. It searches for the answer to questions regarding the potential of the Internet to sustain a process and to encourage willingness to maintain IBC and BC among Portuguese smokers, when no other support can be immediately obtained. The study considers in the overall objective, the opinions of smokers and their reactions to the idea of using the Internet to assist them in their IBC or BC.

1.5. Research questions

In this study the central research question is, “Can a customized interactive and tailored Web-based counselling tool (user-centric), contribute to conscientializar, empowering behavioural changes, such as the predisposition to smoking cessation (IBC) and the likelihood of stopping smoking (BC)?” To answer this question, individual scores are analysed, reflecting a significant increase in the predisposition towards and likelihood of taking up smoking cessation.

Specific research questions target Web Assisted Tobacco Intervention in Portuguese (WATIP) performance:

- What variables are to be considered relevant for the WATIP contribution to conscientializar (empowering behavioural changes) for the predisposition to smoking cessation (IBC)?

- What variables may lead a WATIP to support smokers likelihood of stopping smoking (BC) while they continue smoke free after 12 months of deciding their day of a given cessation attempt during which they abstain totally from tobacco use (Dday)?"

A third research question considers the amount of resources used in order to achieve results concerning IBC and BC:
- Is there a trade-off on the use of the Web as a tool for smoking cessation, as it can reach a vast number of people for a small cost (efficiency) demonstrating to work in the domain of smoking cessation (efficacy)”? What resources are used to obtain what results?

Understanding the thoughts and behaviour of people, in the context of their regular activity, in relation to the capacity of the information society to help them achieve IBC and BC is the chief intended outcome of this research. The effort to accomplish this has involved taking into consideration such particularities as socio-demographic determinants, smoking history, readiness to quit and stages of change in smoking cessation, conscientização of the type of smoker and nicotine dependence evaluation, motivation, self-efficacy and the sense of coherence.

1.6. Research approach

To achieve the objective stated above, an assessment of the health problems caused by the use of tobacco is made initially. Following this, a review of the different approaches to smoking cessation is carried out in an effort to understand their individual qualities. This poses several research concerns, such as the clarification of theory and models, in order to achieve a support pathway. The need to build a tool that uses the Internet to achieve such support led the researcher to implement a probe following strategies that encapsulated the mechanics of IBC and BC, while participants were living their everyday lives. The study considers the opinions of smokers and their reactions to the idea of using the Internet, as well as the specific utilization of the Internet to assist them in their IBC or BC.
1.7. **Outline of the report**

This thesis is a composite of eight distinct chapters. In this chapter one the construction of an argument for the research is presented, that is intended to clarify the use of the WATIP in context. Focusing on the implementation of the National Health Plan (NHP) of Portugal (2004-2010), a more comprehensive and wide-ranging evaluation of the situation is considered. A description is given of the length and characteristics of access to smoking cessation programmes at the NHS level.

After this introduction, chapter two opens with a discussion of smoking and health in relation to other major factors that undermine public health. The magnitude of what is at stake is assessed. Overwhelming evidence has removed any controversy about whether tobacco use causes ill health in human beings. However a review of how tobacco came progressively to be recognised as a health problem is set out here to demonstrate its proleptic relationship to the public health issue. The confrontation involving the social representations of smoking, its social identity, and the pinpointing of the stakeholders in influencing society about its use needs broader consideration, going beyond strict biological or physical hazard identification. The way in which a society organizes its resources for facing its menaces is exemplified by its handling of smoking cessation and of tobacco control in general. A further understanding of the tobacco menace is considered by looking at the main ingredients of “the weed”, including nicotine and carbon monoxide. This sets the stage for an explanation of why it is difficult for people to quit smoking; and this, in turn, is the basis for the search for mechanisms and instruments that may work together to help them abandon the habit.

Following these clarifications of the nature of the health problem, an assessment of its importance is made by analysing the epidemiology of tobacco use. The relevance of the distribution in a population of the use of tobacco requires a closer consideration of what makes individuals become strongly dependent. An exploration of patterns of behaviour emphasises that smoking cessation needs to be considered in real-life contexts. The benefits of abandoning smoking are clear today, but the difficulty of the endeavour is also manifest. Besides, there is a bewildering number of techniques for quitting...
available to smokers. Today, information and communication technologies (ICT), such as the use of the Internet, are being considered for sustaining quitting attempts.

The search for a paradigm and theory is discussed next and an explanation of the research model completes the rationale used to implement the research endeavour.

The third chapter presents not only the objectives, research questions, materials and methods of the research but also the Web-Assisted Tobacco Intervention in Portuguese (WATIP). Intended as an aid to sustaining “intentions to make behavioural changes” (IBC) and “behavioural changes” (BC) through smoking cessation, the WATIP is a probe which forms the centrepiece of this research.

The forth piece presents results of the WATIP probe use. First are described those related to quality control of the platform. Then a study of 2,133 WATIP users and a discussion of its implications for their IBC follows. Finally, results of the 77 in-depth interviews with smokers and users of the WATIP are presented. Here, “Behaviour Change” (BC) and usability of the platform are explored one year after IBC was declared.

The fifth chapter focus on the discussion of these concurrent results about the use of the WATIP. Finally conclusions and recommendations are proposed for further research, as new questions arise from the various aspects of this study.

References and appendices complement the body of information that aims to explore the role the Internet can play today in supporting Portuguese-speaking smokers who hope to stop using tobacco.
2. Literature review

"no âmbito da cessação tabágica ... fomenter-se-á um maior apoio a recursos que utilizam novas tecnologias de informação, ... através de portais específicos .... que possam ser usados na promoção da saúde e prevenção do tabagismo"

2.1. The health problem of tobacco use

Nicotine consumption, by means of tobacco products, has been attractive to human beings for many centuries (GATELY, 2001). Mayan society represented tobacco smoking in stone carvings that can be dated to as far back as 900 AD (ROBICSEK, 1978). The European encounter with tobacco was made in the early 15th century, after discoveries during journeys around Latin America. The tobacco plant found its way to Europe through Portuguese curiosity and trade. At the end of the 16th century, Portugal had its name printed on this page of history, since it was from Lisbon that Jean Nicot sent tobacco seeds to the French court. During the two following centuries, opinions were divided between praise of the excellent properties of tobacco and condemnation of the plant as a poison. There was sometimes even persecution (including the death penalty), for those who used it. In 1604, King James I of England published a diatribe against its use entitled *A Counterblaste to Tobacco* and taxed it heavily [4,000%] (JAMES I, 1616). He is just one of the many critics who could be mentioned as having reacted against the use of tobacco in the course of history. Nevertheless, Europe became a central platform for the worldwide dissemination of tobacco, with the help of trade routes opened up by the discoveries of the Americas. The plant’s attributed medicinal characteristics, combined with the pleasure and comfort it supposedly gave to its first European users, established a hearty welcome for tobacco on the Old Continent:

> Y esto mismo hacen en cualquier dolor que haya en el cuerpo y en cualquiera parte del porqué, siendo de causa fría y aplicadas como está dicho, lo quita y resuelve, no sin grande admiración. ... Esto es en suma lo que yo he podido colegir desta yerba tan celebrada llamada tabaco, que cierto es yerba de grande estimación por las grandes virtudes que tiene, como habemos dicho. (MONARDES, 1574).

One of the advocates of the use of tobacco as an aid to health was Nicolas Monardes, a Spanish doctor practising in the 16th century. He considered that tobacco could cure more than 35 sicknesses (MONARDES, 1574). During the 19th century the controversy roared, with scientific arguments being waged on both sides of a battlefield, about the benefits or health hazards of tobacco use. One of the clearest pieces of evidence of this is the publication by the editors of the medical journal *The Lancet* of comments on the matter by numerous medical authorities. During 1856-57, the opinions of 50 physicians were published on the topic of tobacco use. The editors concluded that tobacco "must
have some good or at least pleasurable effects; that, if its evil effects were so dreadful as stated the human race would have ceased to exist" (The Lancet, 1857).

At the beginning of the 19th century, the chief active ingredient in tobacco, discovered by Cerioli and Vauquelin, was named "Nicotianine" in remembrance of Jean Nicot (1530 - 1600). At the University of Heidelberg, Posselt and Reimann isolated the pure form of Nicotianine in 1928 and renamed it "Nikotin." By the middle of the 20th century the formula C10H4N2 was published (Robert, 1949). This opened the way for the understanding of nicotine pharmacokinetics. From the very beginning of research into this substance, it became evident that the nervous system was affected by nicotine (Svensson, 1987).

One seminal idea postulated by Langley and Dickinson is that “chemicals transmit information between neurons and that (sic) there are receptors on cells that respond functionally to stimulation by specific chemicals” (Langley, Dickinson, 1889, 424). Between the two great world wars of last century, research findings demonstrated that nicotine “was responsible for the compulsive use of tobacco products” (Armstrong-Jones, 1927, 18). Johnston strengthened the scientific conclusion about the association between tobacco and human addiction when, in 1942, he stated, "smoking tobacco is essentially a means of administering nicotine, just as smoking opium is a means of administering morphine"(Johnston, 1942, 742).

Although a source of controversy, tobacco quickly became a money-maker for governments and traffickers. In Portugal, tobacco products have always been heavily taxed: in 1681 duties in general (direitos aduaneiros) corresponded to 35% of the public revenue (receita pública) and tobacco taxes contributed 17% of those duties; in 1716 duties of every kind made up 32% of the revenue taken in by the government, and tobacco corresponded to 20% of this sum (more than the double the quintos do ouro do Brasil). In the mid 19th century, the income from tobacco taxes accounted for an eighth of the state's budget (Vasques, 2005). In the first five months of 2010 (January to May) tobacco revenues represented 22% of all indirect taxes excluding the IVA (587.8 million Euros) according to the Instituto de Financiamento de Agricultura e Pescas (Portugal. MFAP. IFAP, 2010). This represents an increase of 104.5% when compared to the same period in 2009. (It is important to note that direct taxes fell by

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10% while indirect taxes increased by 7.6% during this period.) The rise in these taxes related to tobacco is one of the most reliable: in 2007 the total amount received from taxes was 1,224.7 million Euros and in 2008 it had risen to 1,295.9 million Euros (+5.8%). In Portugal, in 1864, tobacco farming was prohibited (law of 12 May, 1864) when the government monopoly of tobacco sales was also brought to an end. However, in 2009 farmers were still receiving major incentives to grow tobacco in Portugal although a European Commission Directive of 2006 (Directive on Tobacco Products) determined that tobacco subsidies were to be phased out by 2010 throughout Europe (to be replaced by a different system of support for farmers within the European Union). The incentives which were put in place by the Insituto de Financiamento de Agricultura e Pescas in 2009 in Portugal show the important status tobacco held in the national economy: farmers received ninety times more financial help if they planted tobacco than if they grew fodder (€33 per ton being the subsidy a farmer received for some crops and €298 per 100 kg for a tobacco crop) (PORTUGAL. MFAP. IFAP, 2010).

In Europe, smoking consumption decreases by five to seven per cent for every ten per cent increase in the real price of cigarettes (GALLUS, et al., 2006). Portugal changed its policy and increased its taxes on tobacco products in 2008. The tobacco industry is very strongly opposed to increasing taxes, predicting that this may lead to increasing contraband business (WORLD BANK, 1999). It is a fact that the increase in the amount of tobacco seized was 4,828% higher in 2009 than in 2008 (PORTUGAL. MS. DGS., 2010). Nevertheless this is not a reason to accept the tobacco industry initiatives that are in violation of Portuguese regulations to combat this increase (SABOGA-NUNES, 2010). The tobacco price policy, mentioned as the fourth proposal of the Portuguese National Health Plan 2004-2010 to help smokers quit, is thus compromised by these manouvers (PORTUGAL. MS, 2004, Vol. 2).

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1 Luzerna, Sanfeno, Trevo, Tremoço/Tremocilha, Ervilhaca e outros produtos forrageiros similares, com exceção do feno e das couves forrageiras bem como de produtos que contêm feno. Por produtos forrageiros similares entendem-se as leguminosas herbáceas, gramineas herbáceas e trigo mole, trigo duro, centeio, cevada, aveia, milho, sorgo, trigo mourisco, painço e alpista colhidos em verde com a planta inteira e os grãos imaturos.

2 298,062 euros por 100 kg para o tabaco da variedade Virginia P. e 238,423 euros por 100 kg para o da variedade Burley P.
Tobacco use expansion in the world

The increased use of tobacco around the world was boosted by the two great wars of last century (followed by the wars in Korea and Vietnam). Portugal (with its colonial wars) became yet another country to experience an increase in smoking. Cigarette packs were part of the basic items that every soldier received when going into active service. With very aggressive campaigns, the tobacco industry encouraged social compliance with the acceptability of smoking and has managed to maintain adherence to the use of tobacco products down to the present day, profiting from globalized strategies. Unfortunately, the scientific study of the health consequences of tobacco consumption and the subsequent discoveries about its adverse effects were not followed by immediate public health measures to limit the damage, although the warnings were clearly stated. However, one breakthrough was Sir Richard Doll’s work (DOLL, HILL, 1950) on the harmful side effects of tobacco. Although not a pioneering work, it was nevertheless one that had a major public impact. Using a sample of 34,439 English medical doctors, the link between smoking and lung cancer was demonstrated again from an acceptable, respected, scientific point of view. At the same time, on the other side of the Atlantic, Wynder and Graham (1950), among others, came to similar conclusions. Some years later, the US Surgeon General (1964) published the first ever report presenting clear evidence of how smoking influences a number of aspects of human health. The Report of the Surgeon General's Advisory Committee on Smoking and Health became a landmark document. It states:

*The habitual use of tobacco is related primarily to psychological and social drives, reinforced and perpetuated by the pharmacologic actions of nicotine on the central nervous system. Nicotine-free tobacco or other plant materials do not satisfy the needs of those who acquire the tobacco habit* (USDHEW, 1964, 34).
Building knowledge about tobacco harm and addictiveness

In early public health documents on tobacco and human health (e.g. Surgeon General’s Report of 1964), the role of nicotine was considered to be more like that of cocaine and amphetamines than that of opiates and barbiturates. As the number of research studies increased, WHO proposed (also in 1964) that the term “dependence” should replace “habituation” and “addiction”, since they were misleading in the way the differences between drugs were presented. Over a period of 42 years, 30 reports were produced by the office of the US Surgeon General – the most influential public health agency in the world – about the effects of tobacco on humans.

Studies in this field have established beyond any doubt the dangerous connection between smoking and human health. However, as scientific concern has increased and the public health perspective on the negative effects of the use of tobacco has become clearer, a major plot, intentionally designed to increase the number of humans addicted to tobacco, has been orchestrated by the tobacco industry.

But a vast reversal in circumstances occurred with the litigation process against the tobacco industry that took place towards the end of last century. Under the Master Settlement Agreement, entered into in the USA in November 1998, participating cigarette manufactures were required to reveal internal documents and make the records available on the Internet. They also agreed to pay enormous fines and to restrict their advertising.

In Australia, Todd Harper argued that British American Tobacco’s

“document retention” policy must be questioned. It’s inconceivable that a company like this can be allowed to shred documents that can shed light on their role in Australia’s number one public health problem. These documents must have had crucial implications for public health (cited by SHAFELY, et al., 2009, 63).

These scientific documents and the research they reveal (HAMMOND, et al., 2009) establish the clear path of damage to human health taken by tobacco products. In the extraordinary legal manoeuvres outlined above, not only were documents disclosed
which clearly demonstrated the malfeasance of the tobacco industry, but political and money-laundering activities were uncovered, indicating ways in which the industry has worked to buy the compliance of key politicians and of scientific researchers. Shady schemes to manipulate public opinion about tobacco products have also been uncovered.

The industry attacks individuals, organizations and governments that are involved in clarifying the harm done by tobacco use, in various forms: *We must attack the anti-smoking groups and zealots more confidentially than in the past* (PMI, 1985).5

New marketing strategies are being used to sell tobacco, regardless of the known harm. Notably, these strategies also focus on younger potential smokers than ever before (children as young as eight or nine) as one international tobacco group states: “New smokers enter the market (Nigeria) at very early ages in many cases: as young as 8-9 years seems to be quite common” (BAT, cited by SHAFEY et al., 2009, 63).

According to Gary Faga, managing director for British American Tobacco in Malawi, opposition is assembled against governments and world organizations (like WHO) that do not facilitate the tobacco-industry endeavours to sell or produce tobacco: “The situation will worsen (in Malawi) if countries fail to team up with tobacco manufacturing companies to counter the WHO anti-smoking campaign” (FAGA, cited by SHAFEY, et al., 2009, 61).

Countless other references can be made to the *modus operandi* of the tobacco industry. Such a well-organized and powerful sector of so many economies in the world led C. Everett Koop, former U.S. Surgeon General, to write in 2007: “The chicanery of the tobacco industry is something you almost have to admire. They are ahead of us at every turn, and they have enormous resources... [Trying to fight Big Tobacco is] like using a muzzle-loading musket against a machine gun” (KOOP, cited by SHAFEY, et al., 2009, 63). The actual context of tobacco use by human beings is not favourable to public health endeavours.

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5 A case in point is the story of tobacco-industry whistleblower Jeffrey Wigand, told in the 1999 film *The Insider.*
Tobacco and its ingredients as a health problem

Both sources mentioned previously (scientific research and the tobacco industry) concur in establishing a definite, negative pattern concerning the effects of exposure to the chemicals in tobacco products. The harm the use of tobacco causes has been identified progressively during the last seven decades and is considered deadly in any form (WHO, 2006). Today it can be clearly demonstrated that tobacco affects two distinct groups of people: the users themselves, usually simply called “smokers”, although some people simply chew tobacco (WHO, IARC, 1986; USDHHS, 2006) and non-users submitted to environmental exposure, usually through involuntary inhalation of smoke (HULKA, 1986; CALHEIROS, 2006).

Many unborn babies are at risk, not only from second-hand smoke in the air, but from the fact that the chemicals in smoking mothers’ cigarettes, smokeless tobacco or some other product (in smoke-polluted air breathed in by their mothers) are passed on to the foetus (VAGLENOVA, et al., 2004).

Besides research focusing on the adverse consequences experienced by direct users of tobacco, evidence has accumulated more recently which has caused increased concern about the health hazards of environmental tobacco exposure or second-hand smoking (SHS) (WHO – IARC, 2002; USDHHS, 2006). In addition, people who are exposed to the tobacco plant itself, handling it in the fields or preparing it for sale as cigarettes, cigars or types of smokeless tobacco such as snuss, are also at risk (ADAM, et al., 1999; GHOSH, et al., 1986; KJARGARD, PEDERSEN, 1989).

Nicotine

Nicotine, the basic component of tobacco, is a super toxin. In its pure state it is one of the most dangerous substances known to man; less than 50 mg is enough to kill a person (HENNINGFIELD, LONDON, PÖĞÜN, 2009). It is more lethal than strychnine and three times deadlier than arsenic. The basic reason for nature’s production of nicotine is that it is the natural protection of the tobacco plant from being eaten by insects.
Nicotine is distributed throughout the plant, and when the plant material is processed and becomes part of tobacco delivery devices – pipes, cigarettes, water-pipes, chewing tobacco and the likes – its deadly effect is reduced on humans. From the nicotine contained in the cigarette (15-20mg), about 10% reaches the brain via the bloodstream (HESELTINE, RIBOLI, SHUKER, 1987, 4, CUMMINGS, 2006). During recent years, however, higher amounts of nicotine have been found in all major market categories of cigarette, rising by approximately 1.6% per year between 1998 and 2005 (CONNOLLY, ALPERT, WAYNE, KOH, 2007), although legislation aims at restricting the amount per cigarette to 1 mg, in certain countries like Portugal (Lei n° 37/2007, de 14 de Agosto) (PORTUGAL. MS. DGS., 2009).

The effects of nicotine on the central nervous system are crucial in the development of tobacco dependence and can be measured (FAGERSTRÖM, SCHNEIDER, 1989). Nicotine is an insecticide with a chemical signature close to that of the neurotransmitter acetylcholine. Because of this, when it enters in the brain, it “fits a host of chemical locks”, according to John Polito in “Nicotine Addiction 101, WhyQuit.Com” and takes “control over the flow of more than 200 neurochemicals”. Nicotine acts on certain existing receptors in the brain and the peripheral nervous system, causing stimulation or depression, depending, for example, on the intensity of inhalation. Nicotine also has psychoactive properties, which may cause changes in mood since it mobilises the body's fight-or-flight strategies, releasing adrenaline and serotonin. It reaches the brain within ten to fifteen seconds (JARVIS, 2004) after absorption through the lungs and/or mucous membranes of the mouth, nasal passages and throat, spreading through the bloodstream of the whole body. When nicotine reaches the brain's reward pathways, it produces dopamine. The gratifying sensation prompts users to repetition (USDHHS, 1988).

The short, medium and long-term uptake of nicotine urges the body to dull the sensitivity of the brain to acetylcholine, since nicotine’s toxicity compromises the capacity to manage neurochemicals. Nevertheless, in certain regions of the brain nicotine does not simply neutralise receptors to acetylcholine; it induces up-regulation, as a non-defined number of acetylcholine receptors are grown or activated. The paradox is that in other areas of the brain the opposite can occur, as the number, of either receptors or transporters, is diminished, thus compromising the reception of nicotine by the brain. These are different strategies that the body uses to fight against stress caused intentions to make behavioural changes & behavioural changes
by the intrusion of this toxin into the brain. The quantity of nicotine that is expected to regulate the “functioning” of the person, will determine a state of “normality” when the brain is under the influence of a specific amount of nicotine. This is how the nicotine addiction is established (JARVIS, 2004) by the genetic pattern of the nicotine user.

Nicotine causes several psycho-physiological changes to the body, especially in the cardiovascular, digestive, endocrine and central nervous systems, as well as in the skeletal frame and muscles, causing a stronger dependence (when compared to one brought on by the intake of heroin or cocaine). Nicotine also affects the bone marrow and the adrenal cortex, among many other consequences widely reported in the literature (USDHHS, 1988).

**Carbon monoxide**

Carbon monoxide (CO) is “a colourless, odourless toxic flammable gas formed by incomplete combustion of carbon” (CONCISE OXFORD ENGLISH DICTIONARY, 11th ed). Although carbon monoxide exhaled has uses in industry, if there is a high concentration of carbon monoxide in the air it may be lethal (HULKA, 1986, 135).

One of the sources of carbon monoxide is burning tobacco. Carbon monoxide has a great affinity for haemoglobin - which transports oxygen to the body’s blood cells - giving rise to the formation of carboxyhaemoglobin (COHb) by binding with the iron in haemoglobin and preventing it from functioning properly. Its combination with haemoglobin takes place 200 times faster than the combination of oxygen with haemoglobin (RØRTH, 1971). A non-smoker may have levels below 10 particles per million (ppm) of carbon monoxide exhaled in his or her expired air (equivalent to a blood carboxyhaemoglobin (COHb) of 2%). A smoker may have higher levels (e.g. 30 ppm of carbon monoxide exhaled, equivalent to 6% carboxyhaemoglobin (COHb)). The effect is harmful, reducing the ability of the blood to carry oxygen from the lungs to other parts of the human body (BLUMENTHAL, 2001). Carbon monoxide is associated with the development of ischemic heart disease, which is probably due to the interference with myocardial oxygenation and increased adhesiveness of platelets and fibrinogen levels (USDHHS, 1988). Negative consequences for peripheral circulation and an increased tendency to thrombotic events in the coronary arteries and cerebral
arteries may develop. This occurs since valuable haemoglobin is taken up by the carbon monoxide exhaled. Because of this “deficit”, compensation occurs; the body produces more haemoglobin. Smokers have higher haemoglobin levels than found in non-smokers. Because of this, packed cell volume is increasingly raised, augmenting whole-blood viscosity. But other consequences are documented as well. They include fatigue, chest pain in people with chronic heart disease, flu-like symptoms (with no fever) dizziness, weakness, headaches, sleepiness, nausea, vomiting, confusion, disorientation or even death (WALKER, HAY, 1999). Because of these serious consequences, legislation aims at restricting the amount of carbon monoxide per cigarette to 10 mg, in certain countries like Portugal (Lei nº 37/2007, de 14 de Agosto) (PORTUGAL. MS. DGS., 2009).

Other sources of damage in tobacco smoke

Every cigarette contains more than 4,000 substances (HENNINGFIELD, et al., 2009), many of them highly toxic. Among them are nicotine and carbon monoxide (both already discussed), as well as tar, ammonia, arsenic, benzene, cadmium, lead, aldehydes, hydrogen, cyanide, phenols or radioactive polonium (WHO, 2006). Several of these products are at the root of the damage that tobacco causes to any person in either of the two groups of people affected: users or those exposed to second-hand smoking (USDHHS, 1989).

The set of solid particles suspended in tobacco smoke is called tar. In its condensed form, tar is a brown and gummy substance, which causes yellowing of the fingers and teeth of smokers. The tar contains over 3,500 chemical substances, including 55 potent carcinogens, such as polycyclic aromatic hydrocarbons or nitrosamines (USDHHS, 1988). The International Agency for Research on Cancer (IARC) has evaluated them and concluded that there is "sufficient evidence for carcinogenicity", whether in laboratory animals or humans (HOFFMANN, HOFFMANN, 1997).

The combustion temperature of tobacco may reach 900°C during the smoker’s inhalation and about 600°C, in the intervals between these intakes of breath. This difference in temperature, associated with a higher or lesser presence of oxygen, makes this inhaled smoke qualitatively and quantitatively different from smoke released into
the atmosphere, and known as second-hand smoke. The latter type of smoke is more alkaline and contains smaller particles than the smoke inhaled directly into the lungs. Moreover, the concentration of some toxic substances in second-hand smoking is higher, which makes this environmental tobacco smoke more harmful to health than the smoke directly inhaled by the smoker (WHO, 2004).

To a greater degree than adults, children and adolescents are adversely affected by smoking and they are also more susceptible to harm from second-hand smoking than adults are. WHO estimates that between 200 and 300 million children and adolescents alive today will die prematurely because of tobacco-smoke pollution by other people (WHO, 2003). Almost half the children in the world breathe polluted air caused by tobacco smoke (WHO 2010). New evidence has broadened understanding of the way tobacco is causing damage to health, helping to demonstrate that the effects are not only long-term (as is the case with lung cancer), but also short-term.

After the release of the reports by the Royal College of Physicians (UK. THE ROYAL COLLEGE OF PHYSICIANS OF LONDON, 1962) and by the Surgeon General (USDHEW, 1964), some governments began to take steps to regulate tobacco products. Countries like Norway, Sweden, Finland, Denmark and Iceland have been long standing promoters of increasing efforts to educate citizens to reduce children's exposure to second-hand smoking (HELGASON, LUND, 2001; LUND, HELGASON, 2005).

As far as product regulation is concerned, in 1966, the Public Health Service in England announced that cigarettes with lower levels of tar and nicotine were less harmful to the health of smokers than were those with a higher tar and nicotine content (WHO, 2000). In 1967, the U.S. Federal Trade Commission (FTC) initiated a systematic evaluation with a standardized mechanical procedure, a “smoking” machine. Cigarettes were tested in a government laboratory and tar and nicotine content values were made known to tobacco users in order to develop their awareness of the dangers of those substances (WHO, 2000). Then the National Cancer Institute, under the direction of Dr. Gio Gori, initiated a search for safer cigarettes, with the support of the tobacco industry (SHOPLAND, 2001).
In 1971, the Royal College of Physicians in England recommended that the amount of tar and nicotine should be indicated on cigarette packs in order to encourage those who could not stop to change to cigarettes with lower levels of toxins, because, supposedly, “light” cigarettes were likely to be less harmful than others (UK. ASH, Sep. 2005). Today, according to European Directive n.º 89/622/CEE, it is mandatory to declare the levels of nicotine, carbon monoxide and tar in tobacco products. Portugal passed legislation in 2003 to comply with this regulation with Decreto-Lei n.º 25/2003 from the 4th of February. It also established a list of 14 messages to be printed on the outside of cigarette packs (e.g. “fumar mata”).

This strategy produced a side effect, in public health terms, that has undermined its initial goal. The industry started manufacturing cigarettes with lower levels of some of the harmful products and publicizing them as their “best products”. The basic message contained in this sales ploy was that the new cigarettes were better and safer products than the previous ones, increasing consumers’ confidence in them. Expressions like filter, light, slim were some of the positive terms associated with these marketing strategies (USHR, 2003, 1).

One impact of this was that a different pattern of cancer types was presented more regularly. The National Cancer Institute identified an increased risk of mortality (BURNS, BENOWITZ, 2001), as well as tumours that were located in deeper areas of the lungs (CHARLOUX, et al., 1997).

Regardless of the ways in which chemicals can be measured and the levels that may be set according to international standards - currently under review - there is no doubt today that all tobacco products are harmful to health (WHO, 2006b, 2007). Authoritative clarification of this came in 1981, when the U.S. Surgeon General stated that no cigarette is safe (USDHHS, 1981). The European Union has since then adopted a ban on the use of the terms “light”, “ultra light” and “mild”, “ultra-light “ and “low tar” in the labelling of these products (WHO, 2006, 2007), in an effort to end the misleading implications of such terms, as applied to cigarettes. In addition, the EU has established limits on the concentrations of tar (10 mg/cigarette), nicotine (1 mg/cigarette) and carbon monoxide (10 mg/cigarette) which may be sold in the EU (see also for Portugal, Lei nº 37/2007, de 14 de Agosto).
Attention should also be paid to products that are either not related to the tobacco plant, or that are instead produced when the plant is burned, or are added in the manufacturing process of tobacco products. The tobacco industry adds thousands of ingredients (DAUTZENBERG, 1996) to instruments for the delivery of tobacco – such as cigarettes – that are reputed to be seriously damaging to health. Among them are ammonia, benzene and polonium (GINZEL, 2010). There are also toxicants, produced during the smoking process by the chemical reactions occurring in the glowing tip of the cigarette. Between 92% and 95% of the pollutants and poisons that emerge from a cigarette are not visible in the vapour or gaseous phase of the product.

As with nicotine, carbon monoxide or tar, governments have tried to regulate these by-products with “Acceptable Daily Intake” (ADI) measures to protect individuals. Philip Morris International’s justification for introducing ingredients other than tobacco into their cigarettes is that they promote the safety of their products and prevent them from becoming addictive “because without them cigarettes would not be safe and induce addiction” (PMP, 2003, 5).

**Extensiveness of tobacco’s impact on health**

Tobacco is a socially accepted drug in most countries of the world, despite its negative impact on health. Today, not only lung cancer, but also other types of cancer are identified as consequences of its use. Among these are cancers of the oral cavity, the tongue, the salivary glands, lips, mouth, larynx, oropharynx, oesophagus and stomach, trachea, bronchus, kidneys, bladder, breast, urethra, pancreas, colon and cervix and leukaemia (WHO, 2008a).

In addition to cancer, there are numerous diseases that can be linked to tobacco. They include circulatory and chronic diseases (such as stroke, blindness, cataracts, periodontitis, aortic aneurysm, coronary heart disease, pneumonia, atherosclerotic peripheral vascular disease, chronic obstructive pulmonary disease (COPD), asthma and other respiratory disorders). In addition, conditions that affect bone structures and increase the risk of hip fractures are attributed to tobacco (Figure 3) (WHO, 2008a).
Smoking is more prejudicial for women than for men. Smoke affects the risk for coronary disease, when a female smoker also uses oral contraceptives (WHO, 2004). A woman who smokes has a greater risk than a non-smoking one of suffering an ectopic pregnancy, placenta previa, bleedings, precocious rupture of membrane, spontaneous abortion, or the premature birth of her child. Smoking can cause low birth-weight in the foetus and this may lead to perinatal mortality from a variety of illnesses. In addition, maternal smoking during pregnancy and a/or a smoky atmosphere in the homes of young babies have been widely associated with “cot death” or sudden infant death syndrome (SIDS), up to 25% of cases. Besides this, because of the smoking done by a mother, the growth of the foetus may be stunted and the child may become “retarded’ and affected by intellectual and behavioural deficiencies (USDHHS, 2001; USDHHS, 2004). There is evidence to suggest a causative link between second-hand smoking and brain tumours, lymphoma, asthma and leukaemia in children (USDHHS, 2006). The evidence of causation is sufficient to link second-hand smoking in children with middle-ear infection, respiratory difficulties, impaired lung function, as well as with lower respiratory illnesses (USDHHS, 2004).

**Figure 3: Some health consequences of the use of tobacco.**

<table>
<thead>
<tr>
<th>CANCERS</th>
<th>CHRONIC DISEASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larynx</td>
<td>Stroke</td>
</tr>
<tr>
<td>Oropharynx</td>
<td>Blindness, Cataracts</td>
</tr>
<tr>
<td>Oesophagus</td>
<td>Aortic aneurysm</td>
</tr>
<tr>
<td>Trachea, bronchus or lung</td>
<td>Periodontitis</td>
</tr>
<tr>
<td>Acute myeloid leukemia</td>
<td>Coronary heart disease</td>
</tr>
<tr>
<td>Stomach</td>
<td>Pneumonia</td>
</tr>
<tr>
<td>Pancreas</td>
<td>Atherosclerotic peripheral vascular disease</td>
</tr>
<tr>
<td>Kidney and Ureter</td>
<td>Chronic obstructive pulmonary disease (COPD), asthma, and other respiratory effects</td>
</tr>
<tr>
<td>Colon</td>
<td>Hip fractures</td>
</tr>
<tr>
<td>Cervix</td>
<td>Osteoporosis</td>
</tr>
<tr>
<td>Bladder</td>
<td></td>
</tr>
</tbody>
</table>

**REPRODUCTIVE EFFECTS**

- Reduced fertility
- Weight decrease
- Less milk for breastfeeding
- Nicotine 3x> in milk than maternal blood
- CO contamination
In adults, evidence indicates a causative association between second-hand smoking and stroke, nasal sinus cancer, breast cancer, atherosclerosis, chronic obstructive pulmonary disease (COPD), chronic respiratory symptoms, asthma, impaired lung function, and pre-term delivery (USDHHS, 2006). There is also sufficient evidence to link second-hand smoking in adults with nasal irritation, coronary heart disease, lung cancer, and such adverse reproductive effects in women as low birth weight (USDHHS, 2006). Smoking can maximize the effect of pathogens that trigger human susceptibility to sickness. Smoking initially boosts the immune system, but then depresses it. Changes in deoxyribonucleic acid (DNA) patterns are linked to prenatal tobacco exposure (BRETON, et al., 2009).

In the European Union alone, 650,000 people die annually from the direct consequences of tobacco use. In other words, one out of every seven deaths is caused by smoking. This means that half of regular smokers die because of their habit. On average, those who die have their life expectancy shortened by 15 years (WHO, 2008a, 20). Besides, during their entire lifetime, they experience lower levels of health and well-being, compared to non-smokers living in unpolluted environments. However, the problem of smoking also affects non-smokers who are exposed to second-hand smoking. More than 13 million people suffer severe chronic diseases due to the tobacco consumption around them. Every year 79,000 people die in the European Union due to second-hand smoke (EUROPEAN COMMISSION, 2007). The European Union estimates that 90–130 thousand million Euros are spent annually on to diseases and premature deaths caused by the harmful effects of tobacco.
Epidemiology of tobacco use

Prevalence of tobacco use throughout the world

Smoking is the largest single cause of premature death and illness in the world (WHO, 2002). Tobacco is believed to be the product that leads to most deaths in times of peace. It causes more victims than accidents, suicides, homicides, acquired immune-deficiency syndrome (AIDS) and drug use together (WHO, 2007). Of the total burden of disease, in industrialised countries, the World Health Report (2002) considers that 12% is due to tobacco (WHO, 2002).

There are few expectations that this situation will change for the better in the near future. Even when the current rates of decline in tobacco consumption in developed countries are taken into consideration, it is estimated that the number of tobacco users would still be expected to increase to 1.46 billion by 2025 (UN. ECOSOC, 2004). According to WHO, the number of smokers world-wide will increase even more, to reach 1.7 billion by 2020 (GUINDON, BOISCLAIR, 2003).

In 1999 the World Bank calculated that there were 1,250 million smokers in the world, two thirds of them in developing countries (WORLD BANK, 1999). The prediction at that time was that half of those smokers would die of the consequences of smoking (DOLL, PETO, BOREHAM, SUTHERLAND, 2004). The exception to the worldwide increase in tobacco consumption is the industrialized world, where legislation, tax policies, public campaigns, information and supportive services have made positive changes to the tobacco *habitus* (BOURDIEU, 1977) in the population as a whole. On the other hand, among the young adults of the developed countries, and especially among women, smoking prevalence has risen steadily. In developing countries the use of tobacco was rising by about 1.7% each year in the 1990s (WHO, 1996) and it is estimated that the number of cigarettes smoked in the developed countries trebled between 1970 and 2000 (WHO, *The Millennium Development Goals and Tobacco Control*, 2005). Approximately a third of the world’s adult population is still smoking (WHO, 2002b).
In 1998, it was estimated that tobacco had killed 3.5 million people in the world. By 2008, the number had risen to 5.4 million (WHO, 2008a). In the 20th century, tobacco killed 100 million people. It is estimated that in the 21st century the number might rise 10-fold: 1 billion lives might be at risk, if urgent action is not taken (MATHERS, LONCAR, 2006). Tobacco kills a human being every 6.5 seconds, through often painful diseases and with high costs for society. Smoking has other side effects as well, as it diverts money from people’s basic needs. In Bangladesh, the poor smoke twice as much as those who are better off and if 10 million Bangladeshi males stopped smoking and used 70% of the tobacco money thus saved to buy rice, 10.5 million children could be protected from malnutrition. On a smaller scale, the same applies in the USA and in Britain. Each year in the US, it is calculated that productivity lost due to tobacco-related deaths is 82 billion dollars (EFROYMSON, et al., 2001).

In 2000, of the total number of deaths in the European Union, 15% were caused by diseases due to smoking (PETO, et al., 2006). Each year 1.2 million deaths in the EU are caused by tobacco (WHO – 2001b). There are wide differences between countries in terms of smoking rates. In 2005 smoking prevalence in Europe was estimated to have stabilised at 28.6%, having been 28.8% in 2002 (WHO, 2007). In Greece the annual cigarette consumption per capita is 4,313 cigarettes, while in Sweden the number is less than a a quarter of that figure: 1,202. However, these statistics refer only to the number of smokers and do not include the users of other forms of tobacco, especially smokeless tobacco. Among the European Union countries, Finland is the one that has reduced the consumption of tobacco products most successfully during the past two decades. According to Eurostat (2001), this Nordic country managed to lower consumption by 30.9% between 1989 and 1997. Meanwhile in Germany, tobacco consumption rose during the same period by 11% (WHO, 2007).
Prevalence of tobacco use in Portugal

According to data from the Fourth National Survey for Health carried out in Portugal in 2005-2006 (Portugal. INE, 2007), 20.9% of those over 15 years of age who were surveyed were smokers (Table 1).

<table>
<thead>
<tr>
<th>Table 1: Weighted average rates (%) of smokers, non-smokers and ex-smokers in Portugal, by gender and age group.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smoker (%*)</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>Men and women</td>
</tr>
<tr>
<td><strong>Gender and age group</strong></td>
</tr>
<tr>
<td>Men</td>
</tr>
<tr>
<td>15-24</td>
</tr>
<tr>
<td>25-34</td>
</tr>
<tr>
<td>35-44</td>
</tr>
<tr>
<td>45-54</td>
</tr>
<tr>
<td>55-64</td>
</tr>
<tr>
<td>65-74</td>
</tr>
<tr>
<td>≥75</td>
</tr>
<tr>
<td>Women</td>
</tr>
<tr>
<td>15-24</td>
</tr>
<tr>
<td>25-34</td>
</tr>
<tr>
<td>35-44</td>
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<tr>
<td>45-54</td>
</tr>
<tr>
<td>55-64</td>
</tr>
<tr>
<td>65-74</td>
</tr>
<tr>
<td>≥75</td>
</tr>
</tbody>
</table>

* Percentages calculated based on weighted average sample; number of persons who answered. Source: Portugal. INE, 2007.

The Azores region had the highest rate of males who smoked regularly (31.0%), followed by Alentejo (29.9%). The Lisbon and Tagus Valley region had the highest rate of women who smoked regularly (15.4%), while the Algarve region (12.8%) was in second place.

Female smokers consumed an average of 13 cigarettes a day while males smoked 20 per day (MACHADO, NICOLAU, DIAS, 2009). Between 1970 and 2000, the number of cigarettes smoked in Portugal doubled from 8,873 million to 16,667 million units. The
annual consumption for each smoker rose to 2,079 cigarettes. However, well over half of the Portuguese population (63.0%) is predominantly made up of never-smokers.

There is a change in regard to the age when people start smoking. In 1995, 39% of smokers took up the habit between the ages of 18 and 24. In 1998, the prevalence of smoking among those between 24 and 34 and 35 and 45 – both male and female – was noted to have increased. This shows that in Portugal, unlike in other countries in Europe, many smokers start to smoke in early adulthood. An important number of young women or men start to smoke when they enter university.

There is a difference in the prevalence of smoking in Portugal; 30.9% of men and 11.8% of women smoke (Table 2). Though these levels are among the lowest in the European Union, at the same time they reveal characteristics that are of concern in public health terms, since the number of female and young adult smokers is on the rise.

<table>
<thead>
<tr>
<th>Non-smoker (%)</th>
<th>Ex-smoker (%)</th>
<th>Smoker (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>43.7</td>
<td>43.1</td>
</tr>
<tr>
<td>Women</td>
<td>86.1</td>
<td>81.3</td>
</tr>
<tr>
<td>Total</td>
<td>66.1</td>
<td>63</td>
</tr>
</tbody>
</table>


This is a common trend in Europe, especially in Northern and Eastern Europe, where there is a greater prevalence of smoking among females today than among males. In Sweden, 25% of young women and 18% of young men smoke. However, according to the available data, those who use snus (chewing tobacco), are not taken into consideration and most in this group are males.

From the results of the most recent health surveys, Portugal (Figure 4) is positioned in the early third stage of the smoking epidemic (adapted from LOPEZ, COLLISHAW, PIHA, 1994, 108); a slight decrease can be seen in the percentage of male smokers while there is an increase in smoking among women (from 9.5% in 1998/1999 to 11.8% in 2005/2006).
Portuguese men who have never smoked represent 43.1% of this gender group. Men form the highest percentage of ex-smokers (regular and occasional): 26.0%. In women, the rate of never-smokers is 81.3% and 6.9% are ex-smokers.

Figure 4: Portugal and the four stages of the tobacco epidemic.

Source: Adapted from LOPEZ, et al., 1994, 108.

**Benefits of smoking cessation**

Today smoking cessation is considered a priority. It is among the most beneficial and cost-effective interventions in clinical practice and the personal and social rewards are also well worth remembering (HUGHES, 2000). Within 20 minutes after someone smokes his or her last cigarette, the heart rate drops and the body begins a series of changes that will last for years; after twelve hours the carbon monoxide level in the blood is equivalent to that of a non-smoker; heart attack risk begins to drop two weeks to three months after quitting; four weeks after quitting and over the next nine months, coughing and shortness of breath decrease in severity; the added risk of coronary heart disease is half that of a smoker’s one year after quitting; stroke risk is reduced to that of a non-smoker five to fifteen years after quitting; lung cancer death rate is about half that
of a smoker ten years after quitting, as is the risk of developing cancers of the mouth, throat, esophagus, bladder and kidney. Finally, the risk of being stricken by coronary heart disease returns to that of a non-smoker fifteen years after quitting (USDHHS, 2004).

For society, the benefits of smoking cessation are important at several levels. For instance, in economic terms, the cost of healthcare associated with smoking-related diseases decreases. The indirect benefits include an increase in life expectancy in the population and a rise in productivity. Besides this, money formerly spent on tobacco becomes available to ex-smokers for spending on other items, offsetting tax revenue lost to the state. Another consideration is the cost of fires caused by smoking. In 2000, 10% of all deaths from fires in the world were due to fires started by cigarettes or smoking materials such as matches. One estimate suggests that the total annual financial cost of fires caused by smoking is $27 billion (WHO, 2004).

Some countries have engaged in calculating these costs in more specific terms. These countries include the United States of America, Sweden (BOLIN, LINDGREN, 2007), England (DONALDSON, 2007) and Germany (NEUBAUER, et al., 2006). The economic burden of cigarettes in the USA from 1995 to 1999 totalled $157.7 billion every year. Included in this figure are $75 billion in direct medical costs for adults (ambulatory care, hospital treatment, prescription drugs, nursing homes, and other types of care), about $82 billion in indirect costs from lost productivity, and $366 million for neonatal care. Every U.S. smoker absorbs $3,000 per year of the total cost to society of the country’s tobacco habit (USDHHS, 2004).

A calculation of the costs related to smoking in the European Union (EU) and European Free Trade Area (EFTA) is presented by The ASPECT (Analysis of the Science and Policy for the European Control of Tobacco) Consortium (ASPECT CONSORTIUM, 2004). ASPECT estimates that the total cost of smoking to the EU/EFTA countries for the year 2000 was between 97.7 and 130.3 billion Euros. This is the equivalent per capita (for both smokers and non-smokers) of 211-281 Euros, or between 1.04% and 1.39% of the Gross Domestic Product (GDP) for the region as a whole. According to

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6 The total cost of smoking is greater than indicated by those estimates that failed to take into account the costs of informal care, related to second-hand smoke, of diseases related to fertility and reproduction, and the social costs of unwanted nicotine addiction (ASPECT Consortium, 2004).
the World Bank, gross annual health-care costs attributable to smoking, in developed countries, are about six per cent to fifteen per cent of total expenditure on health (Jha, Frank, Chaloupka, 2000).

In the study “Carga e Custos da Doença Atribuível ao Tabagismo em Portugal” (Gouveia, et al., 2007) it is estimated that tobacco was responsible in Portugal for about 12,600 (11.7%) of all deaths in 2005. Since mortality is a poor indicator, as it ignores other consequences like morbidity and disability and does not consider the condition of people who are still alive, despite the effects on their health of tobacco-related use, more precise measurements are needed. WHO recommends the adoption of other indicators such as DALYs (Disability Adjusted Life Years). This value gives us the sum in years of potential life lost due to premature mortality. The same statistics provide an indication of the years lost because of disability. This Gouveia study estimates that in 2005 tobacco was responsible for a total loss of 146,000 years of human life.

The potential gains of stopping smoking are also important to consider. If all smokers in Portugal had given up the habit in 2005, there would have been 6,200 fewer deaths and, specifically, 51,000 fewer DALYs. Tobacco was responsible for 126 million Euros in expenditure on hospital admissions and 364 million Euros in out-patient care costs (medications, consultations in health centres and hospitals, as well as other costs, such as additional tests and diagnostic procedures). From this it can be concluded that if Portuguese smokers had stopped using tobacco, the health-care costs would have been reduced by 64 million Euros in hospital admissions and by 107 million Euros in outpatient care (Gouveia, et al., 2007).

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2.2. How do people quit?

Today smoking cessation is considered highly important, because of the reasons before presented. Among the most beneficial and cost-effective interventions (in clinical practice), it provides vitally interlinked personal and social rewards (Hughes, Stead, Lancaster, 2000). The advantages of stopping smoking, described above, represent some of the motives that are at the origin of people’s willingness to quit tobacco. However, they also provide the rationale behind public health efforts to implement strategies to contribute to effective smoking cessation (NICE, 2006). International guidelines emphasize the importance of smoking cessation (CEC, 2007). National agendas to fight morbidity and mortality have included curbing smoking among their primary goals. Through its National Health Plan, Portugal set itself the goal of lowering smoking prevalence by 50% by 2010 (Table 3), as “Of all these, priority will be given to interventions to decrease the consumption of tobacco ...” (Portugal. MS. Plano Nacional de Saúde, 2004-2010, 21).

Table 3: Priority targets for men and women, by age groups, for smoking prevalence in Portugal (2004-2010).

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Present situation</th>
<th>Goal 2010</th>
</tr>
</thead>
</table>
| % of daily smokers (15-24 years age) | Men=25  
Women= 10.5 | Men=13  
Women= 5 |
| % of daily smokers (25-44 years age) | Men=45.7  
Women= 17.1 | Men=23  
Women= 9 |
| % of daily smokers (45-64 years age) | Men=26  
Women= 4.2 | Men=17  
Women= 3 |
| % of daily smokers (65-74 years age) | Men=14.5  
Women= 0.7 | Men=11  
Women= 0.5 |


9 “Promover a acção intersectorial na prevenção ... com especial ênfase na alimentação saudável e no combate ao tabagismo”. In “Promoção de Estilos de Vida Saudáveis” is stated that there is a need of “participar na educação dos jovens, com a família e a escola, preparando-os para construírem a sua identidade e sentido para a vida, e identificarem e gerirem situações de conflito e de situações de risco (consumo de substâncias nocivas – tabaco, álcool e outras – alimentação inadequada, sedentarismo, comportamentos de risco, como sexuais, de condução rodoviária, de uso de violência)” in Portugal. MS, Implementação do Plano Nacional de Saúde: um roteiro estratégico para a Fase II – 2004/2006, pp. 13 e 15
It is recognized that promoting smoking cessation is the only way to reduce mortality and morbidity in Portugal in any significant way during the next ten to fifteen years (PORTUGAL. MS. PLANO NACIONAL de SAÚDE, 2004-2010, vol.1, 107).

**Quitting by willpower**

Most smokers who want to abandon the habit make five to seven attempts to quit before they do so successfully, and 50% of smokers eventually quit smoking (Giovino, et al., 1995). In Europe, three out of ten smokers have tried to give up in the last 12 months. Portugal and Greece are the countries with the lowest percentage of smokers who have attempted to quit (17%), while Lithuania, Latvia and Estonia are the states with the highest percentages (EUROPEAN COMMISSION. EUROBAROMETER, 2010). Ending the tobacco habit can be done by willpower alone, without any kind of help or support. When this is the case, abstinence rates are between 5% and 10%. Among self-quitters, 50% remain abstinent for two days and 33% for a week (Hughes, 1999). In Europe, one in every two smokers who tries to quit relapses before one week has passed and only 19% are smoke-free after two months. Of the Portuguese smokers who try to stop, 71% do not use any aid, while in England only 45% try to quit on their own with no help (EUROPEAN COMMISSION. EUROBAROMETER, 2010).

**Quitting with help**

Abandoning smoking is successful in between ten and twenty per cent of cases when self-quitters apply for help, such as coaching support (with no pharmacotherapy). When a variety of strategies is combined, 25% of self-quitters are abstinent at one year (Hughes, 2000). Self-help is characterized as the willingness of smokers to give up smoking on their own while using tools that deliver advice and information (e.g. self-help manuals). To determine the effectiveness of different forms of self-help materials, when compared with no treatment and with other minimal-contact strategies, Lancaster and Stead found that tailored materials are more helpful than standard materials (Lancaster, Stead, 2005b). There is a large variety of self-help tools and strategies. People using these aids have a long-term cessation likelihood of 5% (Curry, 1993). There are several options for receiving help (like brief or intensive interventions,
behavioural group support, aversive, cue exposure, nicotine fading, motivational rewards, weight control, pharmacotherapy or snus and other conventional or non-conventional therapies) (the context of health professionals’ brief interventions offered to their patients is explored in Appendix 9 and Appendix 3 working paper two).

Of the different kinds of assisted approaches to support those who decide to quit smoking, the National Health Plan of Portugal 2004-2010 identifies six different strategies (PORTUGAL. MS. PLANO NACIONAL de SAÚDE, 2004-2010, vol. 2)\textsuperscript{10}. One of them is by taking advantage of new information technology: quit lines and Internet portals. Self-help can be provided with these tools (e.g. quit lines and Internet portals).

**Quit lines**

Telephone cessation quit-lines (referred by the National Health Plan of Portugal (PORTUGAL. MS. PLANO NACIONAL de SAÚDE, 2004-2010, vol 2) for helping smokers to quit are in use in most of the countries in the European Union and in other areas of the world as well (e.g. Brazil, the USA, Australia, New Zealand, China, Taiwan, Hong Kong, Singapore, Thailand, South Korea). Between 1.1\% and 1.7\% of adult smokers have received tobacco-cessation services via state quit-lines in the United States (OSSIP-KLEIN, MCINTOSH, 2003), or through their personal health plans. Public health professionals are considering the contribution of technology to the broadening of assistance to more people more efficiently (ZHU, et al., 1996). In the USA, telephone-based assistance for smoking cessation has been shown to be effective (RABIUS, et al., 2007) for both young adults and older smokers (RABIUS, et al., 2004) and to be cost effective (MCALISTER, RABIUS, GEIGER, 2004a). Telephone-based assistance allows centralisation of cessation services, while enabling national distribution. In Sweden quitlines have demonstrated to be effective as an adjunct to the health care system and proactive quitlines focusing treatment were more effective for women than a reactive

\textsuperscript{10} 1) training of health professionals (HPs) to help them support their smoking patients when they try to quit.
2) giving emphasis to the development of smoking cessation consultations at National Health Service (NHS) clinics;
3) provision of medications at low cost;
4) taking advantage of new information technology: quit lines and Internet portals;
5) raising tobacco prices and taxes;
6) supporting the WHO Framework Convention on Tobacco Control.

\textsuperscript{1} luis saboga Nunes
treatment (Helgason, Tomson, Lund, et al., 2004; Bollemann, Gilljam, Lund, Helgason, et al., 2006).

There is now scientific recognition of this tool for helping smokers quit that started to be developed in the 1990s. Further studies have considered the effectiveness of quit-lines, using randomized trials (Lichtenstein, et al., 1996). A summary by the Cochrane Collaboration systematic review demonstrates that proactive telephone counselling helps smokers who are trying to quit, improving quit rates by over 50% (Stead, Perera, Lancaster, 2006).

In Portugal, there is a quitline (SOS – Deixar de Fumar 808 20 88 88) that has been active within the Instituto Nacional de Cardiologia Preventiva since April 2002. After four years of activity, it had registered 4,352 calls, with a success rate ranging between 10 and 25%. A reactive quit-line, it is operated by a group of four professionals (mainly psychologists) who provide this service. The months of greatest demand are April and May, October and November. This resource is only available during specific working hours in the afternoon (five times a week). It is not available in the evenings, mornings, at weekends or at holiday times (Pádua, 2005). Some other limitations also affect quit-lines. Although cost-effective, some are being shut down because of monetary constraints. A case in point is the most important quit-line in the world, of the American Cancer Society (ACS). It was closed before the end of 2009 due to economic difficulties experienced by this society.

Internet support

The use of communication technologies, such as the Internet, is a growing trend in societies today (World Bank, 2010). People involved in leisure activities, work environments and also in healthcare search and services, are moving faster towards a new paradigm in which information and communication technologies (ICTs) are vital components. This new paradigm could be defined, in the health field, as eHealth or interactive health communication. Interactive health communication is “the interaction of an individual - consumer, patient, caregiver or professional - with or through an electronic device or communication technology - to access or transmit health information or to receive guidance and support on a health-related issue” (Robinson, et
Consequently, as the Internet is an important tool in society today, it eventually contributes to public health promotion. It empowers public health professionals to deliver a wider range of assistance, at a lower cost per client, than the telephone can provide (COBB, GRAHAM, 2006). Internet use in the health sector contributes to an increase in effectiveness and efficiency. The eHealth concept has therefore been used to designate a wide range of tools on information and communication technologies that deal with assisting and enhancing prevention, diagnosis, treatment and the monitoring and management of health and lifestyle.

At EU level, eHealth was the focus in 2004 of a specific action plan, the eHealth Action Plan (EUROPEAN COMMISSION, EUR-LEX, 2004). It covers a number of aspects of the new eHealth approach and aims at widespread adoption of new information systems across the EU by 2010. The main goals are the reduction of waiting times and errors, taking advantage of the fact that four out of five doctors in the EU have an Internet connection and that a quarter of Europeans use the Internet for eHealth information (EUROPEAN COMMISSION, EUR-LEX, 2004). In strategic terms, the implementation and use of innovative eHealth technologies is the top priority of the European Strategy for Health Gains (PORTUGAL. ALTO COMISSARIADO DA SAÚDE, 2007).

There are several basic ingredients in this paradigm shift. The first is a faster rollout of high-speed (broadband) Internet access. In second place is an increase in accessibility of eHealth services to those groups in society which are the least likely to have easy Internet access, groups such as the elderly, the disabled or the unemployed (EUROPEAN COMMISSION, EUR-LEX, 2004). Eight out of ten Internet users have looked online for information about at least one out of 16 health topics (FOX, 2005). For people aged fifty or more, searching for health information is the third most popular online activity (JONES, FOX, 2009). In the European survey of activities carried out on the Internet for private purposes (for all ages) in 2008, health was the number one search theme reported in Portugal (EUROSTAT, ICT STATISTICS, 2008).

Among the themes related to health concerns that lead people to search the Internet are those identified in the World Health Report (WHO, 2002) as requiring individual attention. These include unhealthy diet, physical inactivity and tobacco and alcohol consumption, which are key risk factors for diseases that constitute a rapidly growing...
social and economic burden. Although efforts have been made to curb the impact of such practices, the direction in which societies are evolving is an on-going challenge for public health promoters. This is most definitely the case with tobacco use.

The magnitude of the problem, and particularly its evolution, can be demonstrated by an increase in tobacco use in younger groups (as was reported earlier in this thesis) and this shows that better wide-ranging strategies for prevention and cessation are needed. When the enormous extent of the problem of smoking is considered – with about six million people who use tobacco dying every year, around the world (WHO, 2009) – the perpetuation of consumption is a menace (keeping in mind that in Portugal, for example, at least 20.9% of the population is dependent on nicotine) (PORTUGAL. INE – 4th INS, 2005-2006). This thesis documents the burden of this tobacco epidemic in health terms. Accordingly, interventions to help people aim at IBC or BC need to reach large populations and must be accessible and sustainable. Besides this, they must be of low cost (GLASGOW, VOGT, BOLES, 1999).

At the same time as the EU eHealth Action Plan was being drawn up (in 2004), Portugal set in motion the implementation of the National Health Plan (NHP). Focusing on the need to improve eHealth solutions in the country, the first Portuguese NHP addressed the tobacco-control issue specifically, stating that “no âmbito da cessação tabágica ... fomenter-se-á um maior apoio a recursos que utilizam novas tecnologias de informação, ... através de portais específicos .... que possam ser usados na promoção da saúde e prevenção do tabagismo” (ACS (Alto Comissariado de Saúde) 2004, 108). In order to achieve this, Internet use throughout society is a key instrument.

The digital divide

The use of the Internet has been discussed in terms of its capacity to influence smoking prevalence because of its cost, reach and efficacy. With the increase of Internet use (by 380% in the last decade, 2000-2009) there are more than 1,730 million users in the world. In Europe, the Internet is available to 58% of the population (as of 2009) representing a growth of 298% in the last decade (ITU, 2009).
One of the issues discussed in reference to the Internet is its use and accessibility (related to the digital divide). It is claimed that low socio-economic status affects the use of the Internet. Nevertheless this digital division has decreased and the difference in the level of Internet use between those who belong to the highest strata in society and those of more deprived social and economic conditions, is now narrowing (LENHART, et al., 2003; PASTORE, 2001). Also the age groups in which the numbers of smokers are growing in Portugal are also the age groups in which the use of the Internet is highest. More than 87% of those aged between 16 and 24 are regular Internet users (PORTUGAL. INE., 2009).

In ten or more years from now, as this cohort moves on, computer literacy will bring about a greater use of Web-based resources, contrasting with the 47.3% of users in the same age group (35-44) today. If we take into account the increase in the number of Internet users in all age groups, we can expect that it will overgrow the corresponding natural growth of the cohort previously discussed. The gap between households which do not have Internet access and those which have between 2005 and 2009, is a predictor of a very quick closing at a rate of 11.7%. In 2009, 47.9% of households had Internet connection, and of these 96.4% used a broadband connection. The use rate of broadband in Portugal is one of the highest in the world, with an annual increase of 24.4% since 2005 (superior to the growth rate in the USA).

However, such a discussion focuses not only on Internet accessibility but also on the efficacy of using such means to reach populations. It is common – when considering smoking cessation strategies and tools – to include a discussion of their specific efficacy. Research on the efficacy of other approaches besides the Internet (referred to above) to help people with IBC or BC regarding cessation of tobacco use, reveals that they have an unknown impact on whole populations, since most of the time they rely on randomized clinical trials. Another peculiar aspect of these studies is that they focus on small samples (e.g. USDHHS, 2000a) mainly of self-selected, motivated participants, treated under ideal conditions (ABRAMS, et al., 1996; CURRY, et al., 1998).

There is a significant debate about the impact of smoking cessation interventions on populations. For Abrams et al. (1996), population impact is the result of “reach versus efficacy”. One study has considered this issue of impact of smoking cessation...
programmes (not using the Internet) and has concluded that there may be no more than seven per cent of smokers using programmes that are high in efficacy but also very expensive (clinic-based programmes USDHHS, 2000a). Nevertheless the U.S. Public Health Service emphasizes the cost-effectiveness of smoking cessation interventions (USDHHS, 2000a)

The Internet can play an important role because of the wide spectrum of people who can be reached and the low cost of doing so. There is a trade-off that needs to be assessed in interventions, between low reach, high efficacy with high cost and high reach with low efficacy, low cost, according to Cobb and colleagues. New interventions must “bridge the tradeoffs between reach, efficacy, and cost to reduce population smoking prevalence and disease burden more efficiently” (COBB, et al., 2005, 207). The use of the Internet as a tool for smoking cessation has been considered of high benefit, since it can reach a vast number of people for a small cost (efficiency) but has also been demonstrated to work in the domain of smoking cessation (efficacy).

Within the present study, this cost-benefit-to-population emphasis assumes a deeper cause for concern since the research was being carried out in a social context in which the Portuguese National Health System (NHS) aims to give free national support to the health needs of the population. As a result, smoking cessation interventions must be of an appropriate cost when lack of resources (already mentioned) is at stake. Besides, as in other cultural contexts, it is possible that there are more and more smokers searching the Internet for help to stop smoking. The updated Online Health Search Report revealed that in 2006, 9% of Internet users in the USA were looking for information on how to quit smoking in the USA (FOX, 2006). More than seven million Americans have used the Internet to find ways to quit the tobacco habit (FOX, FALLOWS, 2003). Cobb and colleagues have characterized Internet searchers for smoking-cessation information (COBB, GRAHAM, 2006) and Frisby and colleagues looked earlier at consumer behaviour and smoking cessation in relation to the Internet (FRISBY, et al., 2002). In Europe every month, most popular smoking-cessation websites are visited by 60,000-100,000 visitors (TUOMAALA, 2006). Most of them (76%) are current smokers, while 17% are recent quitters (non-smokers for less than a week). A small percentage (7%) had quit more than seven days before accessing a website. Interest in websites varies, since smokers are more usually attracted to information on how to quit and to medication which might
help them to do so, while ex-smokers search for information related to their ability to cope with withdrawal symptoms (Cobb, Graham, 2006).

**The Internet versus other interventions in Britain (estimated success rates)**

In an evaluation of smoking-cessation services in England, in which estimated success rates for a variety of intervention types were considered, online support was found to be the most effective intervention, ranging from 28% to 66% (along with closed-group support) (Table 4).

<table>
<thead>
<tr>
<th>Intervention type</th>
<th>Estimated four-weeks success rate range</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-to-one support</td>
<td>22%-52%</td>
</tr>
<tr>
<td>Couple/family support</td>
<td>Insufficient evidence (b)</td>
</tr>
<tr>
<td>Closed group support</td>
<td>32%-74%</td>
</tr>
<tr>
<td>Open (rolling) group support</td>
<td>Insufficient evidence (b)</td>
</tr>
<tr>
<td>Drop-in support</td>
<td>Insufficient evidence (b)</td>
</tr>
<tr>
<td>Telephone support</td>
<td>22%-51% (a)</td>
</tr>
<tr>
<td>Online support</td>
<td>28%-66% (c)</td>
</tr>
</tbody>
</table>

Table 4: *Intervention success rates: estimated success rate ranges for different intervention types.*

a) Indicates success range by intervention type from clients receiving no medication to those receiving nicotine replacement therapy, bupropion or varenicline; b) Indicates availability of little or no published research evidence regarding the efficacy of these intervention types and therefore insufficient available data to estimate four-week success rates; c) The indicative four-week success rates of online support combined with medication are not currently available. Source: Chambers, 2009, 15.

England is a unique case, however, since it is one of the very few countries in the world where a systematic approach to helping smokers quit is implemented, along with regular evaluations assessing the respective impact of the various types of support which are offered (Chambers, 2009).

**Web-Assisted Tobacco Interventions (WATI)**

To provide a designation for these Internet resources that aim to help people stop smoking, the acronym WATI (Web-Assisted Tobacco Interventions) was proposed by Peter Selby and Scott McIntosh. Since 2004 it has been used to describe a growing community of practice centred on this type of therapy (Norman, Huerta, 2006).
focus of WATIs is the development, study and implementation of technology-based interventions that support tobacco control (NORMAN, 2004).

The use of the Internet has been profitable in dealing with various types of groups, including promoting smoking cessation among methadone users (FINKELSTEIN, LAPSHIN, CHA, 2008). Various settings have also been the objects of research where the Internet was the means of delivering support for discontinuing tobacco use. In dental practice (HOUSTON, et al., 2008) and dental clinics on oral health-related information (HARRIS, CHESTNUTT, 2005) a statistically significant effect was found. In university settings, Hotta and colleagues demonstrated the efficacy of Web-assisted intensive smoking-cessation programmes, even in the case of a multiple-intervention approach (combining nicotine patches, Internet support delivered in a group format). Internet support was a key factor in the intervention (HOTTA, et al., 2007).

The Internet has also been used in a less substantive way and more as a support for delivery of research instruments. A comparison of Internet versus telephone-administered questionnaires, in a diverse sample of smokers, demonstrated the benefits and reliability of using the Internet (GRAHAM, PAPANDONATOS, 2008). Research on the effect of the WATIs has focused on large (national scope) impact outcomes (SAUL, et al., 2007), as well as on very specifically targeted groups, such as cardiac patients (DORNELAS, THOMPSON, 2007).

**QuitNet and increase of quit rates with use**

One of the best-known web sites helping smokers to quit, QuitNet, has been examined in several real-world evaluations for intention to treat analysis (ITT). For Cobb and colleagues, "At the 3-month follow-up, a strict ITT analysis of those who were smoking at baseline yielded a 7-day point prevalence abstinence rate of 7%; among responders only, the point prevalence abstinence rate was 30%" in a general population of users (N = 1,501) (COBB, et al., 2005, 215). At six months (intention to treat analysis (ITT) and responders rates respectively), the quit rates were from 13.2% to 17% in a state population (Minnesota; N = 607) (SAUL, et al., 2007). At 12 months, in an employee population (intention to treat analysis (ITT) and responders rates respectively), the quit rates were 12.8% to 42.9% (N = 1,776) (GRAHAM, et al., 2007). There is nevertheless a
fluctuation in these quit rates: they increase when use of the website is augmented (COBB, et al., 2005).

In a meta-analysis, it was found that there was sufficient clinical evidence to support the use of Web and computer-based smoking-cessation programmes for adult smokers (MYUNG, et al., 2009). Internet-based assistance can offer both interactively tailored advice and social support, as online communities allow members to establish mutual contact.

**Internet, length and depth of intervention**

One of the first studies of an Internet programme to help smokers quit compared two groups in a randomized control trial. The study was carried out in 1987, using the CompuServe network. This programme tailored treatment to each individual participant's smoking history, progress towards quitting smoking and responses to questions posed by the computer system. With an ongoing, computer-stored discussion (forum), this research was developed with the interaction of 1,158 participants. Four groups were randomly created, in a two-by-two design. While half received the full version of the programme, half received a control version that lacked most features of the complete package. The results suggested that subjects were more likely to stay in the programme when they received the full version (quit rates at three months were respectively 7.5% vs. 2.9%, p<0.05). At six months, the difference was not significant. There was also a trend towards higher abstinence rates when the full version of the programme was used (SCHNEIDER, WALTER, O'DONNELL, 1990) (Figure 5, graph # 1).

In one randomized control trial adolescent smokers (aged 11-18) were randomly selected for a clinic-based, brief office intervention (BOI) of four individual counselling sessions. The other Arm was Stomp Out Smokes (SOS), an Internet home-based intervention (Figure 5, graph # 2). The 30-day, point-prevalence smoking abstinence rates for brief office intervention (BOI) and SOS were 12% versus 6% at week 24 and 13% versus 6% at week 36, with no significant treatment differences. Among participants who continued to smoke, Stomp Out Smokes (SOS) was associated with a significantly greater reduction in average number of days smoked than brief office intervention (BOI) (p=0.006). It was concluded that in this case more proactive,
personalized, patient-education components were needed when considering the Internet for adolescent smoking cessation (PATTEN, et al., 2006).

Adolescent and Internet interventions

The Internet has shown some usefulness in helping teenagers to quit smoking (KOO, SKINNER, 2003; MEIS, et al., 2002). In addition, it has been used for prevention. In a conjoint randomized control trial involving pupils from Grades 6 through 9 in school in Australia (n=2,077) and the United States (n=1,234) the young people evaluated Consider This, an Internet-based programme. In the end, only American children reported lower expectations for smoking in the future. The meagre results emphasise the need for further research into the domain of smoking prevention among kids with the use of the Internet, as consistent with the sparse results of other strategies (BULLER, et al., 2008).

Internet and coping strategies

François Etter, of the University of Geneva, developed one of the oldest Internet sites in Europe to help smokers quit. A randomized control trial focused on understanding the efficacy of two Internet-based, computer-tailored smoking cessation programmes. Both
programmes consisted of tailored, personalized support based on participants' characteristics. The experimental programme was derived from psychological and addiction theory. The modified programme was shorter and contained more information on nicotine replacement therapy and nicotine dependence, and less information about health risks and coping strategies. The results showed that abstinence rates at a baseline of current smokers were respectively 10.9% and 8.9% (odds ratio [OR]=1.24, 95% confidence interval [CI]1.08-1.43, \( p=0.003 \)) in the original and modified programmes, and 25.2% and 15.7% (OR=1.81, CI 1.51-2.16, \( p<0.001 \)) at a baseline of former smokers (Figure 5, graph # 3). There were statistically significant differences in quit rates among smokers in the contemplation stage, favouring the original programme (OR=1.54, CI 1.18-2.02, \( p=0.002 \)), but no between-group differences in quit rates were observed in smokers in the precontemplation (OR=1.07, CI 0.36-3.14, \( p=.91 \)) and preparation (OR=1.15, CI 0.97-1.37, \( p=.10 \)) stages of change (ETTER, 2005).

**Internet and user satisfaction in multiple interventions**

The use of nicotine patches is a growing trend among those who want to stop using tobacco. In a group of *Committed Quitters*, Strecher and colleagues developed a randomized control trial to assess the efficacy of an Internet-based, tailored behavioural smoking-cessation course and to evaluate user satisfaction. The study included smokers from England and the Republic of Ireland. Every one of the 3,971 subjects who purchased nicotine patches and logged on to a free Web-based behavioural-support programme was assigned to a Web-based tailored or non-tailored behavioural smoking-cessation support system (Figure 5, graph # 4). Participants in the tailored category had, in clinical and statistical terms, significantly higher continuous abstinence rates than the participants in the non-tailored category. Among the subjects who logged on to the treatment site at least once and scored continuous abstinence rates at 6 weeks, 29.0% were in the tailored group, whereas 23.9% were in the non-tailored list (OR=1.30; \( p=0.0006 \)); at 12 weeks continuous abstinence rates were 22.8% versus 18.1%, respectively (OR=1.34; \( p=0.0006 \)). Another variable studied was satisfaction; this was significantly higher in the tailored programme. (STRECHER, SHIFFMAN, WEST, 2005)
**Internet and multi-media**

The capabilities of the Internet have evolved since the very first programs. Today adding new features like videos is common. A randomized control trial study considered an intervention, using a video-based Internet site that presented current strategies for smoking cessation and motivational materials tailored to the user’s ethnicity, sex and age. This programme was called 1-2-3 Smokefree (Figure 5, graph # 5). Control subjects received nothing for 90 days and were allowed to access the programme after that period. In follow up, the cessation rate at 90 days was 24.1% for the treatment group and 8.2% for the control group (p=0.002). Using an intent-to-treat model, 12.3% of the treatment group members were abstinent, compared to 5.0% in the control group (p=0.015). These results suggest that incorporating video in this smoking-cessation programme via the Internet had a short-term efficacy (SWARTZ, et al., 2006).

**Smoking cessation and multicultural contexts**

Researchers have targeted the study of the effectiveness of WATIs. Evidence has been collected concerning implications for best practice in health-care settings in several countries such as Australia (MILLER, WOOD, 2003). In addition, cultural appropriateness has been pursued for Spanish-speaking participants (MUÑOZ, et al., 2006). The effectiveness of WATIs has also been demonstrated in countries in Europe, including the England and Ireland (STRECHER, SHIFFMAN, WEST (2005) and Switzerland (ETTER, 2005) with specific research protocols, using randomized control trials.

A randomized control trial was conducted with participants from 74 countries. Besides evaluating a standard smoking-cessation guide (the “Guía” arms 1 and 2), a modified programme was also assessed (arms 3 and 4). This involved the Guía+ITEMs (individually timed educational messages) and the Guía+ITEMs+a mood management course (Figure 5, graph # 6). Online follow-up assessments resulted in completion rates of 44%-54% at 1 month and 26%-30% at 6 months in studies 1 and 2. At 6 months, self-reported 7-day abstinence rates (where missing equals smoking) were 6% in arms 1 and 2, 10%-14% in Arm 3, and 20%-26% in Arm 4. The Guía+ITEMs context tended to have higher quit rates, which reached significance at the 12-month follow-up in Arm 3.
and at the 3-month follow-up in Arm 4. Aside from other conclusions, it is worth noting that this is one of the first studies following a randomized control trial procedure to include so many countries and to address specific language differences (English and Spanish) although interventions were similar in both languages (Muñoz, et al., 2006).

Internet, social stratification and medications

In a randomized control trial, smokers were arbitrarily assigned to receive either bupropion plus counselling alone, or, bupropion, counselling and 12 weeks of access to the Comprehensive Health Enhancement Support System for Smoking Cessation and Relapse Prevention (CHESS SCRP), a Website that provided information on smoking cessation as well as support (Figure 5, graph # 7). The number of times participants used this Website (CHESS SCRP) per week was related to abstinence at both the end of treatment (OR=1.79, 95% CI 1.25–2.56) and at a 6-month follow-up (OR=1.59, 95% CI 1.06–2.38). Rates of Website use did not differ by ethnicity, level of education or gender (all p >0.05). In sum, results suggest that participants used the Website CHESS SCRP frequently, Website CHESS SCRP use was related to success, but the outcome, in general, did not yield intergroup pay-off (Japuntich, et al., 2006).

American Lung Association programme on the Internet

Mermelstein and colleagues purposed to evaluate the effectiveness of the American Lung Association’s Not on Tobacco programme (NOT) with a Web-based adjunct, NOT Plus (Figure 5, graph # 8). A randomized control trial was implemented with a specially designed website for teens. After controlling for student gender, grade, race and baseline smoking rate, there was a marginally significant (p=0.06) condition effect at end-of-treatment and a significant effect at 3-month follow-up (p<0.05), favouring the NOT Plus arrangements. After 3 months, 7.1% of participants were abstinent for NOT and 13.8% for NOT + web, which is not statistically significant. About 57% of adolescents involved in the research visited the Web. The use of the website was associated with cessation significantly at end-of-programme (p<0.05), but not at 3 months (Mermelstein, Turner, 2006).
Internet and chat rooms

A cluster-randomized smoking cessation study (Figure 5, graph # 9) assessed an Internet programme combined with motivational interviewing, from smokers recruited from high schools. This investigation took place in real time and was carried out by a smoking-cessation counsellor, using a chat room. Woodruff and colleagues remark that “at the immediate post-intervention assessment those who participated in the program were significantly more likely than controls to report that they had abstained from smoking during the past week (p≤0.01), smoked fewer days in the past week (p≤0.001), smoked fewer cigarettes in the past week (p≤0.01) and considered themselves as former smokers (p≤0.05)” (WOODRUFF, et al., 2007: 1785). The number of attempts to quit was statistically significant at a one-year follow-up assessment (p≤0.05). There was no difference in abstinence rate between the intervention group (38%) and the control group (37%) at 12 months (WOODRUFF, et al., 2007). Reporting on a website with chat rooms, Cobb et al. (2005) found that 3-month quit rates among visitors were closely related to how many times the chat rooms had been visited.

Internet, level of utilization and impact

A large randomized control trial sampled eligible smokers visiting the American Cancer Society's Internet home page to receive access either to a static Internet site (the American Cancer Society’s) with quitting advice or to one of five interactive sites provided by cooperating research partners. Three-month follow-up surveys were conducted via online questioning with E-mail prompts or telephone calls, to assess quitting success follow-up. Data was provided by 54% of participants. Results showed no significant overall difference in cessation rates among participants assigned to the interactive or static sites. Large differences were found in the use of the five interactive sites. When these participants were grouped by level of use, a significantly higher reported 3-month cessation rate was observed among participants assigned to the more highly utilized sites than among those assigned to the less utilized sites, 12.2% vs. 10.2% of all randomized participants, 26.0% vs. 22.1% of followed participants p<0.05. “These findings show that interactive Internet sites yielding high levels of utilization can increase quitting success among smokers seeking assistance via the Internet” (PIKE,
A second evaluation revealed that no significant differences in cessation rates were present for those who used the interactive site when compared to those who used the static sites (13-month quit rates). The authors commented that “The possible influence of depression on the effectiveness of interactive Internet assistance requires further research with more complex indicators of depression to examine how they relate to specific processes and responses in Internet-assisted smoking cessation” (RABIUS, et al., 2008, 6).

Internet tailoring and in-depth tailoring

An indisputable goal of health promotion today is seen at various levels of public health endeavours - including smoking cessation - to develop and organise the efforts of those who agree to cement informed choices by individuals (WINSLOW, 1920). Implementing strategies that may help increase individuals’ consciencialização about its effects, in order to overcome those conditions, has an important part to play in the promotion of health. One of these strategies involves tailoring information.

At the EU level there is a call for Member States to develop national and regional ehealth strategies to respond to specific needs. The goals are three: “…. to improve citizens’ health by making life-saving information available … using eHealth tools; to increase healthcare quality and access by making eHealth part of… strategies; to make eHealth tools more effective, user-friendly and widely accepted …” (EUROPEAN COMMISSION, EUR-LEX, 2004).

11 The English word corresponding to consciencialização (conscientização) is awareness but it is deliberately not used here in order to demonstrate the proposed difference between awareness and the meaning that Paulo Freire attributed to consciencialização. For Paulo Freire the most needed thing is to promote consciencialização in PEOPLE. Using this approach here means that smoking cessation is possible through a process of education (to a life without tobacco) that is sustained by consciencialização. The smoker is in an unbalanced state between uncertainty and certainty. So provisional, sequential, step-by-step certitudes will ensure trust in the important uncertainty of “Will I ever be an ex-smoker?” For this there must be 1) information given to the smoker to help that individual “know that he or she knows” and to reinforce what the smoker already knows (once the salutogeneic perspective of the Generalized Resistance Resources has been activated); 2) awareness on the part of the smoker of what she or he does not yet know; and finally 3) the possibility for the smoker aiming at BIC or BC to produce knowledge in his or her life that does not yet exist. The following are the words of Paulo Freire that sustain the use of the concept consciencialização in the present context: “Dúvida (…) me inquieta mas também me devolve à incerteza, único lugar de onde é possível trabalhar de novo necessárias certezas provisórias (…) Sendo metódica, a certeza da incerteza não nega a solidão da possibilidade cognitiva. A certeza fundamental: a de que posso saber. Sei que sei. Assim como sei que não sei o que me faz saber: primeiro, que posso saber melhor o que já sei; segundo, que posso saber o que ainda não sei; terceiro, que posso produzir conhecimento ainda não existente (…) Saber melhor o que já sei às vezes implica saber o que antes não era possível saber. Daí a importância de educar a curiosidade” (FREIRE, 1996: 18-19, cited by APPLE, NOVOA, 1998: 138).
Initial trials of web-based WATIs have delivered encouraging results following their exploration of this means of delivering support. As these interventions have become more and more sophisticated, success rates in randomized control trial’s have also increased progressively. However, research has not made explicit what active components of these programmes are responsible for such results. In order to investigate these aspects, a randomized control trial was developed to identify active psychosocial and communication components of web-based smoking cessation intervention and to examine the impact of increasing the tailoring depth of smoking cessation. This research was developed with two health maintenance organizations (Group Health in Washington State and the Henry Ford Health System in Michigan), with 1,866 participants. Among other conclusions, it was agreed that “high-tailored success stories had a particularly significant impact on participants with less-than-college-graduate education (adjusted cessation rates of 39.9% for high-tailored success stories versus 25.6% for low-tailored success stories)” (Figure 5, graph # 11). The researchers concluded that the evolution of “rapidly changing interfaces, software, and capabilities of eHealth are likely to require such dynamic experimental approaches to intervention discovery” (STRECHER, MCCLURE, ALEXANDER, 2008, 8).

These characteristics are anchored by previous research in which tailoring has been examined. Among these studies, some have demonstrated that suiting interventions to the user has been more effective than non-tailoring. Rimer and Glassman (1999) provide an insight into the importance of printing materials that are specially adapted to fit the case in hand. Their research concerns the presentation of cancer risk information. Customizing information demands that the transmission of scientific and technical information be adapted to the level of understanding of the user and that the information be confined to what is needed in each person’s condition. The difference between tailored print communications (TPCs) and targeted communication materials is that the former are much more specific in their objectives, focusing on groups of persons with common characteristics (e.g. pregnant smokers). In the tailoring situation, information is customized to the specific individual. The individual receives personal, relevant and appropriate information that can be considered a proxy for the advice offered in the health professional person-to-person (p2p) relationship. Tailored print communications (TPCs) have been used to provide back-up material about smoking cessation and other
conditions such as cancer risks, dietary change, mammography, hormone replacement therapy and health-risk appraisal, as shown by Rimer and Glassman in their research (RIMER, GLASSMAN, 1999).

The degree and complexity of tailored information is related to the nature of the condition. Skinner and colleagues discuss the effectiveness of this strategy. Comparing tailored versus similar, non-tailored print or alternative interventions, tailored print communications (TPCs) have shown a superior characteristic: “The materials has (sic; have been) better remembered, read, and perceived as relevant and/or credible. TPCs are more effective in influencing health behaviours. In addition, TPCs are worthwhile as an adjunct to other components of intervention, such as self-help smoking-cessation manuals” (SKINNER, et al., 1999, 296).

Tailored print communications (TPCs) contribute to addressing behaviour-change interventions. In a meta-analysis review of literature focusing on the effects of tailoring that included 57 studies (N = 58.454), it was found that the effects of this type of intervention on health behaviour change were relevant in relation to such items as the “…(e) number of intervention contacts, (f) length of follow-up, (g) number and type of theoretical concepts tailored…” (NOAR, BENAC, HARRIS, 2007, 690).

Information and communications technologies allows a degree of interactive relationship that can be proximal to the traditional personalized face-to-face intervention (p2p) relationship (VELICER, PROCHASKA, FAVA, LAFORGE, ROSSI, 1999) which favours tailoring. The Internet can provide support for preventing relapse into smoking, with reactive or proactive tailored assistance to smoking cessation maintenance (BRANDON, HERZOG, WEBB, 2003; BROWNELL, et al., 1986). Kramish Campbell and colleagues found that targeting and tailoring for specific groups like pregnant women or mothers, among whom smoking is socially stigmatized, favours their health. Once the programmes have been prepared, the marginal costs of serving additional clients are low and the utilization of these tailored programmes indicates efficiency and effectiveness (KRAMISH, QUINTILIANI, 2006, KRAMISH, 2008).

Effectiveness in smoking cessation support was demonstrated in the multiple uses of telephone counselling, generic self-help materials and individually tailored smoking
cessation advice letters, in a prototype internet-based programme called i-QUIT (SUTTON, GILBERT, 2007).

In the forefront of genetic research, Internet-based resources have been implemented to improve smoking cessation treatment options, including treatment tailored by genotype. These initiatives have focused with success on increasing physicians' knowledge of genetics (SHIELDS, et al., 2005).

Victor Strecher and his team looked at 6-week and 12-week outcomes in smoking cessation in a study that reveals the benefit of web-based tailored behavioural support materials. The study used as a “denominator all subjects who logged-on to the treatment site at least once, continuous abstinence rates at 6 weeks were 29.0% in the tailored condition versus 23.9% in the non-tailored condition (OR=1.30; p=0.0006)” (STRECHER, SHIFFMAN, WEST, 2005, 685). At 12 weeks continuous abstinence rates were 22.8% versus 18.1%, respectively (OR=1.34; p=0.0006). It was also found that satisfaction with the tailored programme was significantly higher by comparison with the non-tailored one (OR=1.30; p=0.0006) (STRECHER, SHIFFMAN, WEST, 2005). At 6 weeks, 29.0% were continuously abstinent in the tailored group, whereas 23.9% were in the non-tailored list; at 12 weeks continuous abstinence rates were 22.8% versus 18.1%, respectively (OR = 1.34; p=0.0006).

Quit Coach, a personally tailored internet version of computer-generated letters of advice on smoking cessation, showed that a tailored system reported clinically and statistically significantly higher continuous abstinence rates in participants than those in the non-tailored project (BORLAND, BALMFORD, HUNT, 2004).

In health communications programming, activation patterns of smokers receiving tailored cessation messages show involvement of brain areas commonly implicated in self-related processing. Methods like neuro-imaging can contribute to the understanding of cognitive mechanisms underlying tailored message processing. It was found that “….in both blocked and event-related conditions, rostral medial prefrontal cortex and precuneus/posterior cingulate were engaged more during the processing of high-tailored smoking cessation messages than low-tailored smoking cessation messages” (CHUA, et al., 2009, 167).
There are, nevertheless, two studies that have not confirmed the difference between tailored and non-tailored interventions. In the case of Patten and colleagues (PATTEN, et al., 2006) the research favoured the control group (who were adolescents), with no emphasis on tailoring. In the second case, a randomized control trial of smokers visiting the American Cancer Society's Internet home page were given access either to a static Internet site offering quitting advice (the American Cancer Society’s) or to one of five interactive sites (PIKE, RABIUS, MCALISTER, et al., 2007, 4-month quit rates). This study revealed that no significant differences in cessation rates were present for those who used the interactive, tailored site when compared to those who used the static sites (13-month quit rates, RABIUS, et. al., 2008).

The already mentioned meta-analysis by Myung and colleagues (2009) could only rely on the four-month rates (PIKE, RABIUS, MCALISTER, et al., 2007) resulting from this research. Although the meta-analysis takes into account that the evidence generally finds higher quit rates for tailored, interactive interventions, the analysis was completed too early to include consideration of the American Cancer Society’s latest publication, referring to 13-month quit rates (RABIUS, et al., 2008).

However, the US Department of Health and Human Services in a reference guide for clinicians includes a “Recommendation: Tailored materials, both print and Web-based, appear to be effective in helping people quit. Therefore, clinicians may choose to provide tailored, self-help materials to their patients who want to quit” (USDHHS, 2008, 30).

Based on evidence that finds, and fails to find, higher quit rates or effectiveness in tailored, interactive interventions as distinct from targeted, relatively static interventions, state-of-the-art assessment of tailoring on the Internet in support of smoking cessation recommends, with some evidence to support it, that it is feasible to think of contributing to informed choices ... of individuals by this means. This is approximate to the personalized face-to-face intervention (p2p) relationship between a health professional and a smoker willing at IBC to become an ex-smoker in a clinical setting. Nevertheless, this is highly demanding in terms of time and human resources and, due to shortage of these and of supplies, tailoring informed choices is critical to
building support at the appropriate moment. In this context, new solutions focusing on the contribution of the Internet, have to be considered.

**General practice, Internet and group support**

One of the objectives of comparing different types of interventions is related to cost-analysis benefits when efficacy of treatments is developed in similar groups of smoking cessation seekers. The Research Centre for Prevention and Health at the University Hospital of Denmark conducted a randomized control trial in order to verify what improvements in smoking cessation interventions, could be implemented in general practice. In 2005, general practitioners in four municipalities of Copenhagen were invited to participate in a cluster randomized trial with three groups: Group A, referral to group-based smoking cessation counselling (national model in Denmark); Group B, referral to Internet-based smoking cessation programme (newly developed); and Group C, no referral (“do as usual”), as general practitioners in their health centres were supposed to continue giving advice on smoking cessation to their patients. These general practitioners were trained and highly motivated to deliver smoking cessation advice. Of the 1,518 smokers who were included, half returned a questionnaire at 1-year follow-up. The results demonstrated that the interventions by general practitioners had similar results to those of the other two interventions. The self-reported point abstinence was 6.7% (40/600), 5.9% (28/476) and 5.7% (25/442) in Groups A, B and C, respectively. In cluster analyses, no significant additional effect of referral to group-based (OR: 1.05; 95% CI: 0.6–1.8) or %-based smoking cessation programmes (OR: 0.91; 95% CI: 0.6–1.4) was present. This study is one of the first to compare these three types of intervention (general practitioners counselling, group and Internet support) and to conclude that there is no prejudice against stop-smoking seekers being referred to group support or to Internet support in primary health care settings (Pisinger, et al., 2010).

**Web-Assisted Tobacco Interventions in the European Union and the world**

The development of WATIs providing support is sustained by various types of interests, organisations and motives. Nowadays most European countries have websites in the national language that offer such support (Appendix 8).
Moving beyond incremental growth to quality criteria for support

The use of the Internet is a commonality in smoking-control endeavours. There are three areas in which this use has become regular: 1) searching for health information; 2) participation in support groups and 3) interaction either with health professionals or with static or tailored platforms that address many of the issues related to stopping using tobacco (CLINE, HAYNES, 2001). The continuous expansion of health information on the Internet involves two types of clientele: health professionals and the general population. Online health support groups, for instance, provide social support and information on a 24/7/365 availability basis. One value of the eHealth world is anonymity, which is good in itself but has the counter effect of exposing individuals to a bewildering variety of opinions and expertise (CLINE, HAYNES, 2001), as well as to benefits and dangers (ALAIN, et al., 1998).

The characteristic freedom of the World Wide Web has been misused in different ways. One is for malicious exploitation (undermining the real effects of tobacco use, as is attempted by the British pro-tobacco campaigning group, FOREST, at http://www.forestonline.org). A second type of exploitation is done with negative commercial intentions. Tobacco industries’ web sites to help smokers quit (see LING, GLANTZ, 2004) are a disguised attempt to thwart public health efforts. For example, the principal tobacco producer in the world, Philip Morris, owner of the Marlboro Man, maintains a website at http://www2.pmusa.com/en/quitassist/index.asp, ostensibly to help smokers stop.

Besides this, overseas companies use the Internet to sell various types of products to help smokers, without any scientific validation (See, e.g., http://www.stopsmokingherbs.com). Today the Internet is used in such different ways when the opportunity to market tobacco products and accessories to specific groups (e.g. women) is easier than before (ANDREWS, 2003). In addition, there is an intentional use of the Internet for positive commercial proposes, as, for instance, when pharmaceutical companies market their services and products. (See, e.g. http://www.chantix.com). The potential growth of such mechanisms can have a variety of impacts. A survey in the USA asked citizens about the best programme on the
Internet to assist people to stop smoking. The first and third choices were tobacco industry Internet programmes run by Philip Morris *Quitassist* and the R.J. Reynolds Tobacco Company (ETTER, 2006).

This is one example of how the issue of information quality on the Internet is also at stake (IMPICCIATURE, *et al*., 1997) today in the smoking-cessation domain. Several threats put into jeopardy the positive willingness of people searching for support in their endeavours to attain a better state of health.

The discussion of the quality of information has involved critics and defenders in fierce debate: some condemn the poor quality of Internet-based material (LATTHE, *et al*., 2000), while there is also the opinion that it has the same value as information conveyed by other media, such as television or radio (HELLAWELL, *et al*., 2000).

Another way of considering this issue is by taking an ethical perspective and examining the security risks the various media pose (QUIGLEY, 2007) In order to face this issue, several systems (EYSENBACK, *et al*., 2000; WINKER, *et al*., 2000) have been developed to establish quality criteria that could be used to guide the public (BAUER, *et al*., 2003). More than 98 different rating proposals for health sites exist (ANSANI, 2005) which present a vast range of different interests and standards. Besides the ranking systems, there are also initiatives that have, as a basic approach, seals of approval for which health-site candidates can apply. These criteria take into account not only website content (e.g. quality, reliability, accuracy, scope), but also form (e.g. design, aesthetics, interactivity, use of media), accessibility (e.g. fee for access, navigability, functionality), credibility of sources and confidentiality policy (KIM, *et al*., 1999). Among these initiatives, there are leading projects today that have been recognized as reflecting a large consensus in providing consistent information to Internet users:

- HON-code, Health on the Net is an accreditation system for health-related websites founded and maintained by a Swiss non-profit, non-governmental foundation (HEALTH ON THE NET FOUNDATION – HON Code, 2007) and is the oldest active organization to provide this service. It has been in operation since July 1996.
- E-Europe 2002 is a quality criteria provider for health-related websites initiated by the European Commission (EUROPEAN COMMISSION – e-Europe 2002) and is focused mainly on websites that have EU citizens as their targets.

- Hi-Ethics gathers principles that express the quality/value consensus of for-profit enterprises based in the USA. The initiative was set up by the Washington, D.C. law firm, Hogan and Hartson (KEMPER, 2001).

- eHealth ethics initiative was drawn up against a US background, as proposed by a research institute on bioethics in New York City (USA. IHEALTHCOALITION, 2010).

- URAC is an American, independent, non-profit organization aimed at promoting health-care quality through its accreditation and certification programmes, including standards for health-related websites (USA. URAC, 2010).

- MedCertain is an EC-funded project for the quality assessment of health-related websites (EUROPEAN COMMISSION - MEDCERTAIN, 2010).

- DISCERN is a questionnaire providing users with a way to assess the quality of information on health problems. DISCERN can also be used by authors and publishers as a guide to the standard which users are entitled to expect (UK. DISCERN, 2010).

- Wrapin is a scheme offering Worldwide Online Reliable Advice to Patients and Individuals (SWITZERLAND. WRAPIN, 2010).

- Criteria for Assessing the Quality of Health Information (Health Summit Working Group) is another system focused on bridging the gap between consumer information and quality criteria (AMERICAN PUBLIC HEALTH ASSOCIATION, 2010).

The multiple proposals for accreditation systems and recommendations about quality for health-related websites have raised issues concerning redundancy and gaps, particularly when smoking cessation websites are considered. Because of this, the need to clarify the criteria that should be considered in the domain of smoking cessation led to a research proposal in the context of the European Programme of Community Action in the field of public health (2003-2008). This Programme targets human health protection and public health improvement and was adopted on 23 September 2002 by the European Parliament and European Council for a 6-year period, 2003-2008. It was based on three general objectives: health information, rapid reaction to health threats and health promotion through addressing health determinants.
The importance of the use of the Internet for smoking cessation support, and the growth of this use, led The National Public Health Institute in Finland, KTL, supported by the Ministry of Social Affairs and Health, to develop a project under the aegis of the programme referred to above. The research group, which united several European research projects in Helsinki, aimed at drawing up elaborate guidelines for the development of web sites focusing on smoking cessation in Europe. This group was made up of Jakobina Arnadottir (Public Health Institute, Iceland), Sybille Fleitmann (Consultant, Tobacco Control, Germany), Hans Gilljam (Stockholm Centre of Public Health, Sweden), Bo Kolby (Danish Cancer Society, Denmark), Katerina Langrova (Czech Coalition against Tobacco, Czech Republic), Luis A. Saboga Nunes (New University of Lisbon, Portugal), Kawaldip Sehmi, (Quit UK, United Kingdom), Carl Simons (Stivoro, Netherlands) Inger Merete Skarpaas (Kreftforeningen, Norway), Mats Toftgård (Stockholm Centre of Public Health, Sweden) and Linda Valkna Quitline Estonia, Estónia).

Several meetings led to the adoption of a set of guidelines that are available today in two formats (in Web format and on paper) to guide teams that aim at promoting smoking cessation using the Internet (PATJA, TUOMAALA, HEIKKINEN, 2007).

2.3. Smoking cessation success factors

Besides socio-demographic determinants and smoking history, the National Health and Medical Research Council of the Commonwealth of Australia, identifies the factors consistently associated with higher abstinence rates in smoking cessation as “readiness to quit, high motivation, moderate to high self-efficacy and supportive social networks” (AUSTRALIA. NHMRC, 2000). Those factors that have a level III (evidence obtained from well-designed, non-randomised controlled trials or from well-designed cohort or case-control studies) are highly recommended for consideration in a smoking cessation approach. Smokers’ readiness to quit is referred to as having a Strength B indication, which means that there is fair evidence to support the recommendation that interventions take this factor into account (AUSTRALIA. NHMRC 2000, 2).
Socio-demographic determinants

Variables such as gender, age, education, income or occupation can play a major impact in smoking cessation (USDHHS, 1980, 302) as socio-demographic determinants. Women have harder time to stop smoking than men (Freund, et al., 1992). For every ten cigarettes less a woman smokes, her probability of quitting is 2.1 times higher. This is not so for men. Nevertheless men have 1.5 higher rate to stop then women. Divorced or widows are less successful in stop smoking than people that are married (Freund, et al., 1992). Having fewer friends and family members who smoke, are favourable to stop smoking (Marlatt, Curry, Gordon, 1988). For Barbeau as well as for Fernandez and colleagues, smokers who are poor, attempt to quit at the same rate as smokers who are not poor. Nevertheless, smokers who are poor are less likely to successfully quit smoking, compared to smokers at or above the poverty level (Barbeau, Krieger, Soobader. 2000; Fernandez, et al., 2006).

Smoking History

It is not only those who smoke heavily who will experience barriers to stopping, as even irregular and light smokers can be affected in their willingness to stop, mainly because of symptoms of dependence (DiFranza, et al., 2002). Several studies have shown that strong dependence on nicotine is a strong predictor of smoking cessation as an important impediment to cessation (Prokhorov, et al., 2001). Dependence symptoms are precursors of daily smoking (USDHHS, 1988). Previous quit attempts have an influence in smoking cessation rates, as more quit attempts favour smoking cessation (USDHHS, 1990; Norregaard, TonneSEN, Petersen, 1993). Less years of tobacco use (Matheny, Weatherman, 1998) as well as starting using tobacco in a latter period in life, are favourable to stop smoking (Chassin et al., 1990).
Readiness to quit and behaviour stages of change

The relevancy of BIC and BCs like smoking cessation are of high complexity and are today considered processes rather than discrete events (DIJKSTRA, ROIJACKERS, DE VRIES, 1998). Countless scientific efforts have been directed at understanding their specificities, particularly in such domains as readiness and willingness to quit, motivation and self efficacy (e.g. the Precede-Procede Model (GREEN, KREUTER, 1991), the Health Belief Model (ROSENSTOCK, 1974a) or the Protection Motivation Theory (ROGERS, 1975).

Behind these approaches there is a concern about the characteristics of the individual himself at the brink of BC. Among the models most often used to address the issue of smoking cessation, reference can be made to the Transtheoretical Model (DICLEMENTE, et al., 1991). Originally the Transtheoretical Model, also known as the Stages of Change Model, addressed smoking behaviour change (PROCHASKA, DICLEMENTE, 1983) in a six-step progressive approach. These stages define the position at which a person who is expected or expects to change behaviour, is positioned. These stages are precontemplation, contemplation, preparation, action, maintenance and termination (PROCHASKA, VELICER, 1997). There has not been unanimous agreement about the Transtheoretical model (TTM) and several critics have been noted (AVEYARD, et al., 2006; AVEYARD, et al., 2009; BRUG, et al., 2005).

As a result of this attempt to integrate several theories and perspectives, new efforts have been implemented like the I-Change Model (DE VRIES, MUDDE, 1998). The I-change model is intended to take into account both motivational and behavioural change. Instead of the six stages, proposed by the Transtheoretical model (TTM), researches have referred models with four stages characterizing those involved in these stages with increasing readiness to change as: immotives, precontemplators, contemplators and preparers (DIJKSTRA, ROIJACKERS, DE VRIES, 1998).

In a context of personalized face-to-face intervention relationship (e.g., a smoker and his general practitioner in the primary health-care setting) it is fundamental to understand how human beings prepare for BC in order to help them achieve changes
like smoking cessation. In this setting, decisions are made about which model (or models) could be used to achieve better results. Moreover, when considering the contribution of information and communication technologies to BC, careful attention should be given to the choice of the structural approach to be used. Once a choice is made at this point, reductionism hurts the attempt to fully understand BC. Nevertheless, for the sake of feasibility, this is a consequence that has to be accepted. Choose the stages of change component of the Transtheoretical Model (TTM), reformulated by the I-Change model has a practical approach to establishing a strategy for helping to better understand BIC in smoking cessation seekers.

Operationalisation of the Transtheoretical Model (TTM) has been carried out in different ways. Prochaska and colleagues have proposed a 20-item version scale to be used, in which 10 dimensions are considered (PROCHASKA, et al., 1988).

For the Commonwealth of Australia, the stage of change is assessed with one non-judgemental question. Today this practice in the Smokescreen Programme asks the patient whether she or he is willing to make a quit attempt at the present time or in the near future, such as within the next 30 days (AUSTRALIAN GOVERNMENT, DEPT. OF HEALTH AND AGING, 2004, 19). Dijkstra and colleagues have assessed readiness to change by confronting smokers with different goals with regard to smoking cessation. For preparers’ classification, the smoker agrees to a plan to quit within the next month. Contemplators agree to a plan to quit within the next six months (DIJKSTRA, ROIJACKERS, DE VRIES, 1998, 340). Another avenue that is used relates to the ongoing discussion concerning staging, as basic questions are used concerning the desire to change. Thyrian and colleagues use a simple question about whether or not people want to stop smoking. The answers provide a measure of insight into motivation to stop smoking as they indicate (a) yes, definitely, (b) yes, probably, (c) no, I would rather not, (d) no, definitely not (THYRIAN, et al., 2008).
Consciencialização of the type of smoker, nicotine-dependence evaluation and cigarette load

When a smoker is contemplating BIC, he or she is aware of the difficulties of stopping using tobacco (consciencialização). There are several barriers to smoking cessation that are manifest in different gradients of social, biological and psychological conditions (West, et al., 2001). One of these, the individual’s readiness to quit, referred to before, is in balance with the level of dependence, which is related to the powerful impact of nicotine intake on the brain (West, 2004). As was explained earlier, nicotine is a substance that triggers higher levels of dependence. About 87% of tobacco users become dependent (Woody, et al., 1993). However, it also determines maintenance of smoking patterns (Henningfield, London, Jaffe, 1987), failure in smoking cessation, withdrawal syndrome and relapse episodes (Hughes, et al., 1984).

It is not only those who smoke heavily who will experience barriers to stopping, as even irregular and light smokers can be affected in their willingness to stop, mainly because of symptoms of dependence (DiFranza, et al., 2002). Studies have shown that strong dependence on nicotine is a strong predictor of smoking cessation as an important impediment to cessation (Prokhorov, et al., 2001). Dependence symptoms are precursors of daily smoking (USDHHS, 1988).

For some researchers, on the other hand, (Farkas, et al., 1996; Abrams, et al., 2000) the smoker’s psychological readiness to quit is not as strong a predictor of smoking cessation as are indicators of dependence. Readiness to quit determines whether a person will try to quit but dependence on nicotine will determine success (Shiffman, 1996; West, 2004).

The implication of this interpretation will help tailor the advice to the condition, according to Chambers: “Tailoring stop smoking support for an individual starts with assessing their dependence on nicotine as this will have a bearing on the severity of the withdrawal symptoms they may experience, and therefore the intensity of support they require” (Chambers, 2009, 40). Understanding his or her dependence on nicotine will
prepare a person to face the hardship posed by smoking cessation. Being aware (consciencialização) of and ready to understand dependence can be important clues to managing a smoking cessation process successfully. Increasing knowledge creation about the hardship of the smoking cessation process allows a smoker to cope better with the withdrawal symptoms and thus makes it possible to contribute to the development of information conversion, using a measure of the strength of nicotine dependence.

This is a routine procedure in the personalized face-to-face intervention relationship smoking cessation support in a clinical setting. Usually it takes up to two to five minutes to fill in a questionnaire (or to verbally answer it). Ikard and colleagues were among the first researchers to draw up a scale, in order to understand nicotine dependence, as they tried to differentiate among types of smokers according to the different situations and conditions of tobacco use/dependence (Ikard, Green, Horn, 1969). For the International statistical classification of diseases and related health problems (ICD-10), dependence can be measured as a dichotomous variable (WHO, 1992). Nevertheless, considering the degree of nicotine dependence as a numeric continuous variable is of practical use and has been the preference in research. Between the different possible strategies, structured interviews are used, including the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) or the Composite International Diagnostic Interview Tobacco Module (WHO, 1994), known as the TTURC nicotine dependence inventory (Wellman, et al., 2006). Another route is the paper-and-pencil test and there are also self-test measures of nicotine dependence, like the Hooked on Nicotine Checklist (HONC) (DiFranza, et al., 2002) or the Fagerström Tolerance Questionnaire (FTQ) (Fagerström, 1978). More synthetic measures can be found, such as the short form of the FTQ and the Heaviness of Smoking Index (Pérez-Ríos, et al., 2009). These instruments are easily applicable testing systems (Kandel, et al., 2005). The FTQ correlates with other measures of nicotine dependence (like carbon monoxide, nicotine, and cotinine levels) and predicts success or tolerance to nicotine severity of withdrawal symptoms (Fagerström, Schneider, 1989).

The FTQ evolved in a version presented in 1991, with the name of the Fagerström Test for Nicotine Dependence (FTND), (Heatherton, et al., 1991). Made up of six elements, the FTND has one single factor, with an internal consistency of 0.61. This instrument produces a range of scores from zero to 10: the higher the score the higher
the level of dependence. There are several uses for this measurement, as in epidemiological population studies (FAGERSTRÖM, et al., 1996), in which FTND scores ranged from 5.15 to 6.55 in treatment samples, while ranging from 3.07 to four in population samples of current smokers. In addition, other researchers have found similar or lower results in population-based samples, ranging from 1.84 to 3.2 (ETTER, VU DUC, PERNEGER, 1999) (JOHN, et al., 2003).

The FTND is the most widely used instrument in clinical settings for addressing smoking cessation. As it provides a quantitative measure with six questions, for the score between 0-2 a Very Low dependence is estimated, 3-4 Low dependence, 5 Medium dependence, 6-7 High dependence and 8-10 Very High dependence. The questions are: 1. How soon after you wake up do you smoke your first cigarette? Within less than 5 minutes, 3 points; Within 6-30 minutes, 2 points; Within 31-60 minutes, 1 point; After 60 minutes, 0 points 2. Do you find it difficult to refrain from smoking in places where it is forbidden? No, 0 points; Yes, 1 point; Which cigarette would you hate most to give up? The first cigarette in the morning, 1 point; Any cigarette other than the first one, 0 points; 4. How many cigarettes per day do you smoke? 1 – 10, 0 points; 11 – 20, 1 points; 21 – 30, 2 points; 31 or more, 3 points ; 5. Do you smoke more frequently during the first hours after awakening than during the rest of the day? No, 0 points; Yes, 1 points; 6. Do you smoke even if you are so ill that you are in bed most of the day? No, 0 points; Yes, 1 point.

Cigarette load

The context of smoking history and cigarette load are recurrent information elements used at clinical smoking cessation support. The smoking pack year calculation is of high relevancy and predictive of disease. Eye maculopathy is strongly statistically associated with 40-pack year consumption (KHAN, et al., 2006). Calculating this measure helps establish a base line, integrating the load pack year recording into the smoker’s consciencialização process. The usefulness of this calculation is that since smokers have no immediate access to tests like spirometry, with this measure a screen test can suggest further improvements in order to prevent aggravation of the consequences of dis-ease conditions such as the chronic obstructive pulmonary disease (COPD). It is important to consider that smokers in the early stages of chronic obstructive pulmonary disease
(COPD) do not recognize its symptoms. If a process of consciencialização confronts them in a denial phase of their dis-ease, with this indirect measure their attention can be triggered. This tactic has been used by general practitioners to be selective in case finding, as smoking load helps select for spirometry screening as an aid to early chronic obstructive pulmonary disease (COPD) detection. In a study focusing the use of this screening as a measure to provide early detection of chronic obstructive pulmonary disease (COPD) it was found that one in every two ex-smokers or active smokers with a smoking load greater than 15 packs/year who were invited for spirometry screening, chronic obstructive pulmonary disease (COPD) showed up (56%). With a 28% diagnosis rate in this group, the spirometry screen had an important impact since it was possible to address this issue at an earlier stage of dis-ease development, instead of in the advanced stages (Masters, Tutt, Eades, 2006, 969). Pack years is also a smoking load tool used by epidemiologists. One pack year is equivalent to 7,300 cigarettes smoked (i.e. 20 cigarettes smoked per day for one year divided by 20)\textsuperscript{12} (Wood, 2005).

**Motivation**

The proximal predictor of BC that includes readiness or intention to change is associated with motivation to quit in several cognitive and behavioural theories (Prochaska, Velicer, 1988). If there is no BIC or readiness and willingness to try BC or even motivation to do it, change will be compromised since readiness and motivation are the immediate precursors of BC (West, 2004). To change behaviour, learning how to change becomes a key step towards success.

In operationalisation terms, motivation to quit can be assessed by different strategies and instruments, like measuring intention or the desire to quit (Thyrian, et al., 2008). The Washington State Pharmacy Association - WSPA (WSPA, n/d) proposes an eight-item scale. The Openness Conscientiousness Awareness Motivation is a measurement developed by Professor Robyn Richmond and colleagues, for the Smokescreen

\textsuperscript{12} A cigar is considered equivalent to 4 cigarettes and a cigarillo is considered equivalent to 2 cigarettes. Cigarillos are a small, thin type of cigar such as a Hamlet or Cafe Creme. One pack year is equivalent to 7300 cigarettes smoked (i.e. 20 cigarettes smoked per day for 1 year divided by 20). Loose tobacco estimates that 25 grams (1oz) has been approximated to the equivalent of 50 cigarettes. One Pipe is equivalent to two and a half cigarettes (Wood, 2005).
Programme (RICHMOND, *et al.*, 1991) and acknowledges the importance of registering the smoker’s own motivation when asked to rate the incentives and confidence regarding quitting which he or she has experienced. The Australian Department of Health and Aging undertakes the quest by asking patients to rate their motivation and confidence in quitting on a scale of 1 to 10 (AUSTRALIAN GOVERNMENT, DEPT. OF HEALTH AND AGING SMOKING CESSATION, 2004).

Assessing motivation and confidence in quitting can provide an insight into the barriers to quitting and can be used to initiate a discussion on how to enhance motivation or confidence (ROLLNICK, BUTLER, 1997). Duncan and colleagues feel that a measure of Self-Reported Confidence in Ability to Quit Smoking can be operationalised by rating people’s confidence in their ability to quit smoking on a 10-point scale, with 1 representing “not confident at all” and 10 representing “very confident” (DUNCAN, *et al.*, 1992). One composite index to understanding motivation to quit smoking is Richmond's measure based on a 10-point scale. The participant’s composite motivation score is calculated as the sum of the responses to a series of four questions: 1. Would you like to give up smoking if you could do so easily? (No = 0; Yes = 1); 2. How seriously would you like to give up smoking if you could do so easily? (0 = not at all; 3 = very seriously); 3. Do you intend to give up smoking completely in the next two weeks? (0 = definitely I won’t; 1 = probably I won’t; 3 = definitely yes); 4. What is the possibility that 6 months from now you will be a nonsmoker? (0 = definitely no; 1 = probably I won’t; 2 = probably I will; 3 = definitely yes) (RICHMOND, KEHOE, WEBSTER, 1993). With this set of questions a ratio scale of measurement can be obtained.

**Self efficacy**

Besides readiness and motivation or willingness to quit, smoking history and nicotine dependence, as well as self-efficacy, are among other basic elements to consider as affecting smoking cessation (AUSTRALIAN GOVERNMENT, DEPT. OF HEALTH AND AGING, SMOKING CESSATION, 2004, 3). When BC is at stake, interventions considering self-efficacy in smoking cessation are set to boost beneficiaries who have the personal
resources needed to pursue a certain goal. (BROWNING, THOMAS, 2005). According to Bandura’s social theory of learning, self-efficacy is a personal skill that is important for the control of everyday events, since it is the belief in the ability to succeed (BANDURA, 1977b).

At stake in self-efficacy is an expectation, a belief – even if it is not accurate – that a person has concerning his or her power to control life’s events. This is different from efficacy, which is more about competence or power to obtain something. These expectations determine people’s thinking and acting as well as the motivation and feelings they nurture concerning their behaviour (BANDURA, 1997a). People will be more inclined to start a BC like smoking cessation if they believe they can succeed. Conner and Norman (2005) suggest that many health behaviours such as non-smoking are dependent on one’s level of self-efficacy. In a longitudinal study, Carey and Carey (1993) followed smokers with high-level dependency on nicotine. The results showed that the success rate was higher for people with a strong sense of self-efficacy (CAREY, CAREY, 1993).

There are several ways to observe self-efficacy. Shorter measurement methods are used, such as the four-item self-efficacy test (STERLING, et al., 2007; AUSTRALIAN GOVERNMENT, DEPT. OF HEALTH AND AGING SMOKING CESSATION, 2004, 25), The Perceived Difficulty Scale [PDS] (STRECHER, et al., 1985) and a 1-item Perceived Ability Measure (PAM) (MUDDE, KOK, STRECHER, 1995). These instruments incorporate both generality and strength in different degrees, and results have confirmed that perceived self-efficacy for smoking cessation predicts outcomes as smoking cessation (DE VRIES, et al., 1998).

From what has been shown above, it may be said in summary that smoking cessation is not a spontaneous behaviour for a smoker. Because of this, planning of BIC or BC needs to be secured if we aim to help someone obtain relief from nicotine addiction. In order to achieve this, not only is it appropriate to consider such characteristics as readiness to quit, self-efficacy, motivation, nicotine dependence, socio-economic and other individual characteristics, such as the sense of coherence (that will be next explored), but a teleonomic process must be established in order to favour the necessary

consciencialização for the endeavour of smoking cessation. This is the negentropic
process. All these purport to lead to the establishment of a programme that, with the use of ICTs, could tailor relevant information that would be managed by knowledge translation processes connecting scientific knowledge and acumen with people’s willingness to engage in BIC or BC. In this way, a contribution could be made towards the achievement of the knowing person. For this to happen, human-centred health promotion is required as an implementation strategy. This will be explored in the following pages.

**Sense of Coherence**

Promoting health by the means of smoking cessation, is a dynamic process that focuses on peoples’ empowerment, in order to facilitate their control over their health and improve it (WHO, 1986). When considering the broad approach to public health set out in the Ottawa charter, a good theory, which would maximize its potential, was missing, since, as Ilona Kickbusch emphasizes, for the healthy society there is a need for a good theory (KICKBUSCH, 2006). Along with the pathogenic paradigm that influenced the concept of disease, have emerged a set of constructs regarding the promotion of health, as a major target and not simply as a cure for disease or prevention of illness. The way to a new paradigm was being marked along with these new research results. It was Aaron Antonovsky who would name such a paradigm salutogenesis, a composite of two words: salus (Latin for “health”) and genesis (Greek for “origins”) (ANTONOVSKY, 1979). Various scientific areas contributed to the emergence of this model (including theoretical inputs from the fields of medicine, sociology and psychology).

Aaron Antonovsky, a professor and investigator working with Louis Gutman at the Israel Institute for Applied Social Science in the programme leading to the Master’s degree in Public Health, and in the Department of Social Medicine at the Hebrew University of Jerusalem-Hadassah posed an unusual research question. Instead of focusing on traditional approaches, he asked, “Why do certain persons suffer less than others?”.
As one of the founders of the medical school at the Ben-Gurion University of the Negev, in 1974, he became Head of the Department of Sociology of Health of the Faculty of Health Sciences. His work focused on the sociological aspects of health and medicine in order to better grasp pathways to health promotion.

**The sense of coherence construct**

Antonovsky’s innovative way of looking at health (*ease*) and its menaces consequence (*dis-ease*) is not focused on building the perfect health condition (*ease*). It is not a recipe for a perfect world, but rather a *modus vivendi*, a way of living in this one with the potential for health (*ease*) which each person has, while being empowered to improve it. Antonovsky was not looking towards a state of a total or perfect health (besides the absence of *dis-ease*), but pointing a finger towards the natural condition of every human being: fighting the chaos of everyday life (entropy), managing stressors in a healthy (*ease*) way.

Thus, the point of departure is not the search for what is pathological (such as smoking), with a consequent focus on eliminating that particular “*disease*” from the affected body; it is not the elimination of all states of *diseases* until perfect health is attained. Instead it is the direction toward life (*salus*), the teleonomic perspective that every being has inscribed in his most basic behaviour. In this way, strengths are identified, the positive factors that allow individuals to use their resources to move to the next level of *ease* (well-being), despite prevailing conditions. In other words, how to stop smoking and maintain abstinence while facing stressors on an everyday basis, would be a positive viewpoint in the salutogenic paradigm. Life events are arranged by everyone according to specific frames and organized according to basic ideas of what life is, what others are and what things represent. Therefore, since life is basically *salus* or *vita*, and the opposite of it is *morbus* or *mors* (death), people in their struggle for survival search for those salutary elements that will enable their *salus*, which is their *ease* or well-being. This is the basis of the salutogenesis paradigm in the search for the origins of health. The departure point of the search for salutary factors, in terms of the information theory, is the search for negentropy.
Antonovsky’s salutogenesis paradigm (1979) is built upon the key concept of the *sense of coherence* (SOC) as the centre of life control (ANTONOVSKY, 1987). This construct proposes answers to the *salutogenic question* - considered as the motivational basis of any behaviour enacted and attitude held by an individual. The SOC, as a global orientation to the world, perceives it as *comprehensible, manageable* and *meaningful*. It is a central dispositional orientation in the lives of all human beings.

**The dis-ease / ease health continuum**

Throughout their lives people confront a variety of tasks shaped by biological, historical and psychosocial forces; the more successful they are in resolving these tasks, the more likely they are to maintain or improve their places on the health dis-ease/ease continuum (ANTONOVSKY, 1987, 3). The SOC is a significant determinant of such success and plays a major role in health promotion (ANTONOVSKY, 1987, 19). At one of the extremities of this continuum is *dis-ease* (disfunctionality) and at the other extreme is *ease* (maximum functionality). People move on this continuum experiencing more or less ease in their everyday lives (SABOGA-NUNES, 1999).

The assumption is that everybody is in a permanent state of heterostasis - in other words, of imbalance, disorder or instability (ANTONOVSKY, BERNSTEIN, 1986; ANTONOVSKY, 1987, 130). Everyone is submitted to pressure toward increasing entropy as the “*prototypical characteristic of the living organism*” (ANTONOVSKY, BERNSTEIN, 1986, 2). Instead of considering homeostasis (of the biomedical model, CANNON, 1939) or self regulated processes (the prevalent perspective during the time A. Antonovsky started to reflect about his theory), every effort in life is concentrated on moving toward heterostasis management (NOACK, 1997, 95).

There are different approaches to the problem of people being swept along in the river (a metaphor often used by Antonovsky that compared life to a river (ANTONOVSKY, 1987a, 90). The “river” could be the smoking behaviour: they can be rescued before drowning, they can be prevented from entering the river by fences or walls, they can be taught how to swim and be rescued before exhaustion. The possibilities vary according to the many health models and theories (for better health or less disease) that can be implemented. From the salutogenic perspective, what is also important is to understand...
that people can be in the water and yet survive with their particular skills. It is therefore important to understand how the personality disposition that Antonovskyy called the sense of coherence (SOC) allows people to fare in the water, some managing better than others, since life is an imbalanced state. The normal condition is not balance and health (in the sense of the WHO definition of health) but imbalance, which leads to suffering and sometimes to dis-ease.

This is the context in which Antonovskyy utilizes the concept of entropy, stemming in a trans-disciplinary move from the science of thermodynamics. The question is then how to contribute to counteracting this natural law of degradation. This is called negentropy, or negative entropy, where a system can reorganize itself again, a characteristic that Antonovskyy attributes to humans, as complex systems in the midst of other systems: “The human organism is a system and, like all systems, it is at the mercy of the power of entropy” (ANTONOVSKY, 1993a, 7). Consequently ease (or health) is a permanent building process, as it can be jeopardized by a process of loss and degradation (dis-ease). “The salutogenic approach regards the battle towards health as permanent and never quite successful” (ANTONOVSKY, 1993a, 10). So it is with smoking cessation. Once a smoker, someone will have to re-build his life every day, in an effort to move towards more order, while facing the call to return to nicotine intake, which would lead to entropy increase. Doing that would result in increased degradation, or entropy in life. A pattern of dependency that can be triggered by a friend’s cigarette is enough to make some people obey the urge to resume smoking. This is just one of many examples that could be referred to in the permanent negentropic approach of smoking cessation.

General resistance resources

Following this approach, Antonovskyy researched for factors that were connected to the ease pole of the continuum (dis-ease/ease), looking for what was contributing to the health condition of individuals. He called these factors Generalised Resistance Resources (ANTONOVSKY, 1987, 28), because they are present generally at the disposal of humans, in different types of conditions. They contribute to reinforcing a person’s resistance to facing the stream of life, which promotes negentropy and so they are called resistance. These generalised resistance resources, help to make sense out of the countless stressors that a person is submitted to. This is what originates the personal
SOC. In 1987, A. Antonovsky characterized stressors as Generalised Resistance Deficits (1987a). This meant that the move to the ease pole was geared with life experiences that strengthened the SOC, while negative experiences would lead to the other, dis-ease pole, which weakens the SOC. In this way Generalised Resistance Deficits contributed to increasing the amount of entropy and Generalized Resistance Resources worked to increase the amount of negentropy, i.e. to increase the SOC which “orchestrates this battle-ground of forces promoting order or disorder” (ANTONOVSKY, 1987a, 164). From a pathogenic behaviour model, in which lifestyles are considered as direct causes of disease and death (ANTONOVSKY, 1984b) a change can be considered in the context of the salutogenic model (Table 5).

In order to cope well, people’s “readiness and willingness to exploit the resources that they have at their potential disposal” (ANTONOVSKY, 1984b, 121) is critical. It is the same with stopping smoking; it is essential to believe that the input from one's environment and the feedback, is information and not “noise” or, in simple words, that life makes sense. This is called “comprehensibility” (ANTONOVSKY, 1987, 16). The belief that stimuli make sense, are ordered, structured and predictable is essential but not sufficient for the individual to cope well and stop smoking. One not only has to know the rules for stopping smoking but must also have confidence in the resources at one's disposal.

One has to reject the idea that the cards of life are stacked against one and that consequently one can never stop. The stimuli, or the stressors, are always there, making demands. But if one is persuaded that a variety of appropriate resources to meet these demands are available, then that person can cope well and stop smoking. This second component of the SOC is defined as “manageability” (ANTONOVSKY, 1987, 17). To believe that one understands what it means to stop smoking and that one can manage its process is not enough.

The motivational element is crucial. One must wish to cope with the dependency and stop smoking. One must see the demands posed by the stimuli as making sense emotionally. The stimuli may be painful and sad, like the deprivation of nicotine in the brain. One can fall into despair or be determined to continue the struggle. This third component of the SOC is called “meaningfulness” (ANTONOVSKY, 1987, 18).
Table 5: An overview comparing the basic aspects of the salutogenic model with the pathogenic.

<table>
<thead>
<tr>
<th>Assumption regarding</th>
<th>Pathogenic Model</th>
<th>Salutogenic Model</th>
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<td><strong>Self-regulation of the system</strong></td>
<td>Homeostasis</td>
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<tr>
<td><strong>Definition of health and disease</strong></td>
<td>Dichotomy</td>
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<tr>
<td><strong>Scope of the concept of health</strong></td>
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<td><strong>Causes of health and disease</strong></td>
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<td><strong>Effect of stressors</strong></td>
<td>Potentially promoting disease</td>
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</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>Implementation of effective remedies (“magic bullets”)</td>
<td>Active adaption, risk reduction and resource development</td>
</tr>
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*Heterostasis: Imbalance, instability, the opposite of homeostasis. Source: NOACK, 1997, 95.

A model for behaviour-change pathways

The concept of entropy (RIFKIN, HOWARD, 1980), although pessimistic, sustains the approach of A. Antonovsky to health promotion and has the merit of unveiling a pathway to ease. We live in a world that is short of resources for satisfying every human being’s needs. As a result, without proper management of existing resources, the natural consequence is non-sustainability, increased chaos and/or annihilation of life. Information and energy are examples of these resources.

In sociological terms, tobacco use is one prized mechanism for fighting social entropy (in a first stage), before it is used to regulate physical and psychological entropy (after addiction to nicotine has been established). Many of those who take up the use of tobacco do it for a reason that can be expressed in the equation of the number of friends who no longer will go along, because a person refuses to use tobacco (BAKER, BRANDON, CHASSIN, 2004). Tobacco is thus a social negentropy aid, used in order to protect the user from becoming an outcast from his or her tribe. The imprint of this fight for inclusion is so strong that few apprehend, in the long run, that they are increasing their lives’ entropy at the same time, while information (that does not make sense) about the real effects of using tobacco has very little or no impact on the real consequences of their choices. There is a lack of consciencialização about the condition. They realize too late that they are addicted to nicotine: in order to fight the chaotic state of their bodies in
need of nicotine (knowledge creation), they need a permanent dose to keep up with a minimum of entropy (bearable and manageable) triggered by unending withdrawal symptoms. Once the Self reaches this awareness (with knowledge creation, when consciencialização occurs), very often the individual is ready to consider quitting and return to the previous state of non-smoker. At this stage, information is a critical power source in the move in the direction of smoking cessation. Moreover it is knowledge.

To achieve this, an individual’s teleonomic approach can assume two different pathways, which may overlap each other but have different starting points. One of these means that, through energy, it is possible to reverse that situation created by smoking. The expenditure of energy is the clue; willpower, for instance, can be said to be the solution. Another alternative focuses on negentropy, i.e., the activation of resources (such as making sense of information) that will help that person reverse progressively from a state of smoking, while fighting the degradation of his life started with tobacco use. This is not an easy process however. From all behaviours that can be reported impinging on a move to the dis-ease end of the continuum dis-ease/ease, smoking is one of the most pervasive and complex, as was made clear elsewhere in this thesis.

This is why a smoking cessation process that is sustained in its essence by the first of these premises – energy – may lead the individual to a state of exhaustion (e.g. compromising his or her mental health with depression or burnout), bringing about a relapse, as she or he concentrates his energy on the pursuit of the goal. Relapse can thus be considered a consequence of the depleted energy process.

The issue to be considered, then, is that instead of approaching smoking cessation from the standpoint of energy use (e.g., mental energy to maintain one’s decision not to smoke) it could be considered a complementary approach where the Generalized Resistance Resources (GRR) are activated (salutogenic perspective). Everyday life experiences determine the SOC (Arrow A). Comprehensibility, manageability and meaningfulness are precursors of an individual’s actions. If these life experiences are comprehensible, manageable and meaningful this will generate (Arrow B) GRR, which in turn will shape new life experiences (Arrow C) that contribute to well-being (at the ease pole of the continuum). These experiences are based on sources of Generalized Resistance Resources (GRR) (Arrow D) which are events or perceptions without a pre-

intentations to make behavioural changes & behavioural changes
established pattern: they can be used and mobilized, depending on the building up of SOC that everybody experiences (Figure 6).

There is another pathway, which can be triggered by (Arrow E) sources of Generalized Resistance Deficits (GRD) which are implicated in their development (Arrow F) which shape negative life experiences, leading the affected person to the pole of dis-ease, when tension management has been unsuccessful (Arrow G). This leads to increased entropy.

These are the three components of what the sense of coherence (SOC) represents: comprehensibility, manageability and meaningfulness, the core of health promotion conceptualisation in this approach to stopping smoking.

Figure 6: Research model: sense of coherence and the dis-ease/ease continuum.
The sense of coherence, then, can be defined formally as: “a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli (need to smoke) deriving from one's internal and external environments are structured, predictable and explicable; (2) the resources (for smoking cessation) are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement – it pays to stop smoking” (adapted from ANTONOVSKY, 1987, 40) (emphases not in original).

The importance of this paradigm is shown by the inclusion of this perspective in the WHO Health for All guidelines. Concerning, for instance, the prevention and use of tobacco this is what is proposed:

Proposed strategies: A sense of coherence, where life is experienced as comprehensible, manageable and meaningful, is a great health resource for all people. Health is created if people are confident that life makes sense emotionally, and that they have adequate resources (mental, physical, emotional, social and material) to meet whatever demands are placed on them. As outlined above, this sense of coherence must be built up from infancy and childhood through a range of family, kindergarten and health care experiences. Policies that have an immediate effect on young people, as well as on the settings in which they learn, work, live or spend leisure time, should be oriented towards strengthening this sense of coherence (WHO, 1997, 28-29).

The emphasis is given to the “environments [that are] created that help people to gain a sense of coherence and cope with stressful situations and events” (WHO, 1997, 29).

The recognition by the WHO of Antonovsky’s proposal emphasizes the relevance of his own words, written ten years earlier, which highlighted “an orientation towards strengthening the sense of coherence (SOC), so that life might be experienced as comprehensible, manageable and meaningful. Health is created if people are confident that life makes sense emotionally and that they have adequate resources (mental, physical, emotional, social and material) to meet whatever demands are placed on them” (ANTONOVSKY, 1987, 19).

The sense of coherence construct is one of the contributions that the salutogenic paradigm has sustained, while responding to the public health goal of fostering healthier citizens and communities. For some researchers, salutogenesis is in itself equal to health promotion (FREIDL, RÁSKY, NOACK, 1995, 16). The significance is that a shift from the risk-factor-oriented pathological approach to the SOC that plays a major role in the
search for negentropy, has made relevant the pursuit of strategies that will help people move closer to the pole of maximum ease.

**Empirical foundation of the sense of coherence construct**

Empirically, the salutogenesis paradigm was developed and applied by measuring the sense of coherence (SOC) by using Antonovsky’s “The Orientation to Life Questionnaire” [OLQ] (ANTONOVSKY, 1987). This questionnaire is designed according to the Guttman’s facet-technique (SHYE, GUTTMAN, 1978). Based on the notion of a Cartesian space, the researcher specifies facets (A. Modality; B. Source; C. Demand (subject); D. Time) of what is to be measured and the important elements in each facet. In this case, the following elements (facets) of the stimuli are specified: the Modality stimulus facet impels the respondent X to react to an instrumental, cognitive or affective stimulus, which as a Source was originated in an internal, external (or both) environment(s). The stimulus poses to the subject the specific nature of Demand that can be a concrete, diffuse or abstract solicitation, as it is Time referred into the past, present or the future. Each item is thus the result of a particular combination of one element in each facet and one SOC dimension. The SOC facet (the response mode) consists of three components: comprehensibility, manageability and meaningfulness.

Every item is limited to expressing one of these components. This facet, thus, is the response mode of the respondent to a given stimulus. Consequently, a questionnaire item may ask “To what extent do you perceive stimulus X as comprehensible?” A mapping sentence presents the facets and their elements succinctly in regard to the entire organization of the 29 items anchored around a semantic differential of two points. As an example of this, let us consider item 17: “Your life in the future will probably be full of changes without you knowing what will happen next.” This is a comprehensibility item with profiles A2, B3, C3, D3. As a cognitive stimulus (“your knowing”) it originates in both the internal and external environments, poses an abstract demand and refers to the future.

There are eleven items used to measure the constructs of comprehensibility, ten items for manageability and eight items measuring meaningfulness. These three dimensions form a unique general factor (ANTONOVSKY, 1993b) and register a basic attitude in the
sense of a dispositional orientation.

The scale is available in 34 languages (ERIKSSON, 2005). It was used for the first time in Portugal with a simple translation in its abbreviated version (with 13 items) in 1994 (GEADA, 1994).

Its full validation in Portuguese (Questionário Orientação para Viver - QOV) occurred in 1999 (SABOGA-NUNES, 1999) with the complete questionnaire, with all 29 items. This process of validation (n= 643) assessed several characteristics of the instrument, such as its reliability. Its internal consistency is of a high level (Cronbach’s Alpha 0.83 to 0.90) (QOV) in line with the range of results found in the original version (Cronbach’s Alpha 0.84 to 0.93) (Orientation to life questionnaire - OLQ).

In order to test the concept of the sense of coherence, convergent validity has established comparisons with similar constructs. If high correlations are identified this might indicate a weak level of independence.

On the other hand, very weak correlations might indicate no convergent validity. Convergent validity, along with other constructs like locus of control external /internal (Questionário Orientação para Viver - QOV r= +0.36; Orientation to life questionnaire - OLQ r= +.39) show a moderate correlation; self-perceived health, correlation (QOV r= +0.31) also has a moderate value; discriminatory validity was established with the anxiety test which shows a discriminant validity (QOV r=-0.27; Orientation to life questionnaire - OLQ AA r=-.21) as well as with isolation (QOV r=-0.45) and stress (QOV r=-0.23).

For Antonovsky, SOC stabilizes in adulthood. In a test of this assumption a test-retest of the scale showed stability between time one and time two, in the Portuguese validation research study (QOV r=0.88).
Empirical studies on the sense of coherence (SOC)

SOC and self-perceived health

There are several components that contribute to health which can be found in the various dimensions of human life. One of these is a subjective state of health. SOC is associated in several research studies with good self-perceived health (Sanden-Eriksson, 2000). In a study carried out in Finland involving 1,976 individuals, over a period of four years, with two collections of data, it was found that a strong SOC predicted good health in women and men. This research demonstrated that SOC can be interpreted as an autonomous internal resource contributing to a favorable development of subjective state of health (Suominen, Helenius, Blomberg, Uutela, Koskenvuo, 2001).

Searching for the relationship between SOC and physical health, Poppius and colleagues concentrated on the risk of coronary heart disease (CHD) in a sample of 4,405 middle-aged working men in a variety of occupations. This prospective study (with a follow-up period of eight years) looked at total cholesterol, systolic blood pressure and body-mass index. The authors concluded that SOC had a salutogenic effect among white-collar workers (Poppius, Tenkanen, Kalimo, Heinsalmi, 1999).

Quality of life is another feature that is positively correlated with a strong SOC (Julkunen, Ahlstrom, 2006; Karlsson, Berglin, Larsson, 2000; Motzer, Stewart, 1996), since SOC contributes to less fatigue or mental problems such as depression, loneliness and anxiety (Carstens, Spangenberg, 1997; Karlsson, et al., 2000). Oral health-related quality of life and the importance of high SOC was also found in a recent study (Savolainen, et al., 2005). Wainwright and colleagues found a strong SOC to be associated with a 20% reduction in risk of all-cause mortality (Wainwright, et al., 2008). Research focusing on burnout (Gilbar, 1998), distress in cancer patients and their partners (Gustavsson-Liljus, et al., 2007), hypertension (Julkunen, 2001), coronary artery bypass surgery (Karlsson, Berglin, Larsson, 2000), heart disease surviving cardiac arrest (Motzer, Stewart, 1996), drinking and physical exercise (Kuupelomaki, Utriainen, 2003), type-2 diabetes (Sanden-
ERIKSSON, 2000), tackling the increasing rates of diabetes (KOUVONEN, et al., 2008), delaying the onset of cancer (POPIIUS, et al., 2006) dyslipidaemia and triglyceride levels and impaired well-being, clinical visits and medical symptoms (SVARTVIK, et al., 2000) are just some of the variables that are influenced by SOC. These studies concur in emphasizing the salutogenic perspective, revealing that a strong SOC has a positive impact on a healthy condition.

**SOC and physical health: the case of the natural killer cell activity**

Along with these examples of the physical impact of the SOC, it is relevant to consider that physical resources trigger responses that enforce ease (health). The question is one of how to understand how they can be triggered. One research study is looking into the natural killer cell activity (NKCA) that is fundamental to the optimal functioning of the immune system. Natural killer cells (a type of cytotoxic lymphocytes) play a critical role in the ease of the innate immune system, since they combine in the rejection of tumours and cells infected by viruses, as they contribute to killing cells by apoptosis. Under the leadership of the Department of Environmental and Preventive Medicine of Japan, research has been done on the link between SOC and natural killer cell activity (NKCA) in smokers. A higher SOC and never-smoking status was, significantly, observed to contribute to a higher level of natural killer cell activity (NKCA). In subjects with a higher SOC, natural killer cell activity (NKCA) in never-smokers and ex-smokers was significantly higher than in present-smokers in subjects with a lower SOC. Natural killer cell activity (NKCA) only in never-smokers was significantly higher than that in present-smokers. Multiple regression analysis demonstrated that SOC and smoking were significantly correlated to natural killer cell activity (NKCA). The authors commented that “SOC may be an important psychological modifier in determining the relationship between cellular immunity and smoking cessation. The reduced NKCA with lower SOC in present smokers, whose association seems to be produced not through daily life stress, must be dealt with …” (NAKAMURA, et al., 2001, 197).
**SOC and psychological health**

This transition between physical health and psychological health, mentioned above, projects light onto other dimensions of health where the SOC has shown relevance. Life is submitted constantly to all sorts of stressors. Managing stressors is related to the SOC. One of the stressors that can have a high impact on health is moving from one home to another. Researching its impact and the possible moderating effect of SOC on mood, as well as the immunizing effects of anticipated voluntary housing relocation, led Lutgendorf and colleagues to find that the SOC has a buffer effect on the impact of relocation and on natural killer cell activity (NKCA). Compared with the control group, movers showed decreased positive mood and natural killer cell activity (NKCA). SOC moderated the relationship between positive mood, which modified the relationship of moving with natural killer cell activity (NKCA). Low SOC movers had the poorest natural killer cell activity (NKCA) while high SOC movers’ natural killer cell activity (NKCA) was less compromised. In this way SOC demonstrated a salutogenic contribution to immune function in older adults facing stressful life transitions such as residential relocation (LUTGENDORF, et al., 1999).

**SOC and coping with stressors**

For more than a decade, consistent results have indicated that SOC correlates positively with low perceived and experienced stress and the ability to cope with it (BOWMAN, 1996; GUSTAVSSON-LILIUS, et al., 2007). Since smoking has a negative effect on the ease condition, it is appropriate to consider the role SOC can play in favouring healthy behaviours (e.g. not using tobacco). Confirmatory or non-confirmatory data can help to elucidate the extent of such a relationship.

**SOC and health behaviours**

When considering the differing results of research, it can be observed that the models vary as there are basically two approaches. Either the link between SOC and health is articulated by adaptative flexible coping resources (GLANZ, MASKARINEC, CARLIN, 2005) or the health behaviour is a mediator between SOC and health (SURTEES, et al., 2003). The relationship between SOC and Health or SOC and health behaviours is
seldom combined in the same research model (Neuner, et al., 2006). However Savolainen and colleagues integrated both perspectives in a study on oral behaviours which included health and health behaviour as dependant variables, showing that SOC is related to better health (oral health) and healthy behaviours (healthy oral behaviours) (Savolainen, et al., 2005).

Antonovsky claimed that the smoking habit was associated with a low SOC, since people react to stress more easily by smoking if they have a low SOC (Antonovsky, 1988, 153). Igna and colleagues found that current-smokers had a lower mean of SOC and that confounding variables, such as gender, had no statistically significant influence on these results. Known as the Anglo-Scandinavian Cardiac Outcomes Trial, this research had a longitudinal perspective with a two-year follow-up, involving 841 hypertensive participants (women 22.1% at baseline, and 697 (women 23.0%) participants at the follow-up (Igna, Julkunen, Ahlström, 2008). Smoking behaviour was also highly correlated negatively with SOC in another study (Poppius, et al., 1999).

**SOC and mortality**

Strong SOC is related to lower mortality and a never-smoking status (Surtees, et al., 2003). Never-smokers have a higher SOC than smokers (Wainwright, et al., 2007).

**SOC, gender and smoking**

Some SOC studies have focused on restricted samples. Nevertheless is relevant to broader research results with national emphasis, i.e. larger samples. This poses a question about the real extension of the validity of research when considering whole populations. Several examples, using samples that are national in scope, are consistent with the results already referred to. One of these is the study based on the Finnish sub-sample of the Anglo-Scandinavian Cardiac Outcomes Trial (ASCOT), which examined prevention of coronary heart disease and vascular events by blood pressure and cholesterol-lowering therapy. The study monitored changes in health-related quality of life during a two-year follow-up of this Finnish sample. The significance of this research is two-fold. First it demonstrates that in a national sample (where participants
had similar smoking levels), there were no gender differences in SOC levels. Secondly, lower levels of SOC were associated with smoking behaviour. This is a confirmatory aspect of SOC theory, establishing that a lower SOC is related to smoking habits. According to the researchers, “this study confirmed that a strong SOC seems to act as a safeguard against negative lifestyle factors such as smoking” (Julkunen, Ahlstrom, 2006, 999). In another study, Antonovsky’s theory was confirmed since smoking behaviour was found to be related to smoking among teenagers who expressed low SOC (Glanz, et al., 2005). People with strong SOC can be better prepared to resist external social influences or their own curiosity related to experiments with tobacco. A recent study explored the relationship between SOC and adolescents’ behaviour and lifestyles (including their use of tobacco) in Portugal. The results demonstrated that adolescents with strong SOC were better protected against smoking (Nunes, A. K, 2008). This may support the argument that SOC is strongly linked to smoking behaviours (Glanz, et al., 2005) and thus strengthening SOC in adolescent years will diminish smoking (WHO, 1997, 28-29).

**SOC, social class, education and smoking**

Evidence suggests that SOC contributes to health as it influences healthy lifestyle choices. Nevertheless, confounding variables need to be assessed according to their role within this association. Considering social class and education, interference was found in participants with higher SOC values: they were 28% less likely to be current smokers (OR 0.72, 95% CI, 0.58 to 0.89) (Wainwright, et al., 2007). These results may contribute to the design of future health promotion interventions.

**SOC, pregnancy, premature birth and smoking**

Agneta Abrahamsson and Goran Ejlertsson claim that there is theoretical, pragmatic appropriateness in focusing on a salutogenic perspective to prevent smoking during pregnancy and in antenatal care. This is seen as a pertinent basis for encouraging pregnant women to stop smoking. A significant difference in SOC scores between smoking and non-smoking women affected indicators of health. Women who relapsed to smoking showed a lower level of SOC than others, particularly in the manageability component. Making smoking easier to understand for women, discussing smoking as a
way of coping, and encouraging the development of each woman's own capacity and motivation to stop smoking, enhance the SOC (ABRAHAMSSON, EJLERTSSON, 2002). A mother’s SOC score at an early gestational stage is an important indicator for threatened premature birth (SEKIZUKA, 2009).

What has been presented thus far are some research examples indicating that SOC can continue to be considered within the context of salutogenic research and smoking-related issues. A better understanding of its role will contribute to clarifying how it is possible to move incrementally towards the ease side of the continuum dis-ease/ease in the everyday life of individuals when smoking cessation is given consideration.

**Conclusion**

In this chapter, the use of tobacco is considered as a threat to the well-being of individuals and societies. Efforts to understand the real extent of the harm done by tobacco have progressively changed social awareness of the need to support smoking cessation.

Portugal is a country with 1.6 million smokers, according to estimate. It has ratified the WHO Framework Convention on Tobacco Control and recent legislation addressed new problems about changing the way the culture of smoking is viewed. Although tobacco consumption has been decreasing in some segments of the population, smoking increase that has been verified among women as well as among males in the 35-44 age bracket. This deserves particular attention as well as the prevalence of smokers within the population aged over 15 is 20.9% - according to the 4th National Health Survey 2005-2006 (PORTUGAL. INE, 2007).

In spite of this negative scenario, there have been some positive manifestations that the situation is improving. During the last decade, public awareness of the benefits of stopping smoking, as a health gain strategy, has started to correspond to the National
Health Service’s (NHS) willingness to help. There is a trend towards a rise in the number of people who want to stop smoking, as is shown by the greater number of people declaring themselves to be ex-smokers at the time of the last national health survey (2005) as compared with the figures gathering during the previous one (1998).

Reports about where to find smoking cessation help at the national-health level were produced for the first time in 2004. These exposed a new dimension of the problem; the demand for smoking cessation support was higher than the offer of services to help. Scarcity of resources identified a difficulty of access in the structure of these services. Although the NHS is the main health-care provider in a country where it has been agreed that health care should be universal, during the last 30 years it has been under severe stress, due to growing needs. One expression of these needs is the length of waiting lists for care, including smoking cessation. Lack of resources (financial and human) remain the main obstacles to improving, equal-opportunity access to a support system that can respond rapidly to the health needs of the population. Though recognised as interventions of high cost-effectiveness, services to break the tobacco habit do not register high on the scale of needed development. It must be acknowledged that, if it lacks adequate support, a process of this kind is very often a road to failure and trauma.

In order to help smokers to quit, several possibilities are identified within the framework of the first NHP of Portugal, 2004-1020 (PORTUGAL. MS. PLANO NACIONAL de SAÚDE, 2004-2010, vol. 2). These include training health professionals, providing medication, new information technologies such as quit-lines and Internet portals, along with increased taxation and stronger legislation (Appendix 1).

In this context, the main objective of this research is to understand the contribution of new information technologies, mainly by defining the role of Internet Portals, to help people take into their own hands decisions concerning their health, including smoking cessation. Web Assisted Tobacco Interventions (WATIs) currently provide a point of reference for research within eHealth in general, but no research has been developed to assess their cultural appropriateness to a society like that of Portugal. Can this approach alleviate stress for over-worked Portuguese health professionals in their daily routine and activities? Can these solutions contribute to the centeredness of support, so that no
person speaking Portuguese is alienated because of his or her health condition or problem while using such tools?

Considerations about health and innovation, oblige decision-makers to consider the effectiveness and cost of interventions. There are some obvious advantages in the use of the Internet in smoking cessation, as WATIs can reach large numbers of people and their capacity to be repeated is something to be considered. Nevertheless, research is needed into cultural reactions to the use of these web resources. It is also true that the range of capabilities available within the Internet has not yet been fully studied and the potential of this tool therefore needs research. It is true that the trend today is for more and more health professionals to have Internet links on their desks, and there has already been a noticeable benefit from the installation of Web-based infrastructure. More and more households are connected to the Internet and it seems likely that the Internet will, in the near future, be regarded as a commodity in countries like Portugal, just like as the telephone came to be in the last quarter of the twentieth century.

A new paradigm is needed today in the field of smoking-cessation in the public health domain. Measures such as charting smoking habits, informing would-be quitters about supportive resources, increasing knowledge about the effects of tobacco use and of quitting, promoting reduction of smoking prevalence, are some of the elements of this new paradigm. The focus is to reinforce social and professional sensitivity, implementing negentropic measures that contribute to the improvement of social stability and personal well-being. Even though the credibility of the expertise associated with health information on the Internet has been the subject of debate, mechanisms have been created to assure the public about quality control that protects their Web-based interactions with eHealth solutions. HonCode is just one of the international quality assurance undertakings that advise Internet users about the quality of their sealed-user web protocols. Submission to international peer-review is a standard base nowadays for quality control, and gives Internet-based interventions a new dimension when compared to programmes based on health professional activity in their local areas.

Although access to these web-based resources is unquestionable practical today, from a statistical point of view, there is an overall demand for a shift from clinical to public health orientation regarding smoking cessation. This change in direction has resulted in
a dearth of theory-driven research into brief, intensive interventions and the use of medications, as the basic approach to treatment. Recent emphasis on efficacy (in public health terms) demands a research climate that searches for extensive results (when evaluating such treatment packages as minimal interventions in relation to therapeutic components in smoking cessation). Not only clinical trials have difficulty to demonstrate the public impact of such interventions, but the high cost of the large samples needed for the assessment of each contribution is a major handicap to such research. Questioning the cost of these interventions (e.g. intensive interventions) because they are more expensive and reach fewer smokers than self-help and minimal clinical interventions do prompts exploration of alternatives. The group-based smoking cessation intervention is merely one of these. On the other hand, nervousness about cultural inappropriateness has meant that the development of such options in the context of health professional support for smoking cessation in Portugal has not been favoured.

During the last two centuries, public health administration has had to face major changes and has witnessed new threats to human well-being. One of these is tobacco use. Today, at the brink of societal challenges never experienced before by humanity, public health continues to be a web of innovation and resourceful questioning in the search for viable solutions. The time frame and the nature of problems may be of a different scope, but there is the same need for immediate and adequate solutions; these remain components that cannot be negotiated. Response to risks, such as the health consequences of tobacco exposure, mobilise not only practitioners but theoreticians, planners, governments and administrators dealing with the allocation of resources, to reverse this negative impact. New paradigms and theories need to be put to the test as innovation leads the way to adequate responses to these challenges. Salutogenesis with the construct of the sense of coherence, along with other indicators need to be tested in an environment that uses the Internet to deliver support to smoking cessation. Socio-demographic determinants, smoking history, readiness to quit and stages of change, nicotine dependence, motivation and self efficacy are considered in this quest. This is going to be explored in the next chapter of this thesis.

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3. Objectives, materials and methods
The previous chapter introduced this study in context. The aims of the research were presented and an assessment was made of the epidemiology and the health problems associated with tobacco use. The benefits of smoking cessation were indicated. Also were considered the scientific proposals for curbing these adverse effects, namely the theoretical paradigm and the research model in the context of the research issues. The justification of the research was established particularly because there is a growing need in supporting smoking cessation while few resources are made available. The contribution of Information Technology (IT) that can be utilized in addressing the problem supporting smoking cessation (the WATIP) was presented.

There is a trend, at both national and international levels, suggesting that information technologies can be used as a lever in public health strategies to curb the impact of disease and promote health. Nevertheless, in national terms, this perspective was not considered in Portugal until the Web-assisted tobacco intervention, parar.net probe (WATIP), was developed in the context of this research in order to help people who demonstrate intentions to make behavioural changes (IBC) as well as behavioural changes (BC). This was the first WATI to target individual Portuguese smokers over the age of thirty. As stated in Chapter Two, this trend has been notable in other cultural settings than the Portuguese, and in other domains than those of public health and health promotion. It is also argued that the use of information technologies to promote health IBC is more than a matter of encapsulating in technology traditional techniques for stimulating health behaviour change. Theory and scientific consensus should supplement this exploration with a new emphasis on what works. This is the goal of the third chapter of this research report.

Here the rationale that was applied to the research and to finding answers in the original quest is explained. The following section provides an overview of the methods which have been used – a qualitative as well as quantitative approach – and the reasons for the choices which have been made. After this presentation, the overall survey from which the researcher drew his conclusions about the implementation of WATIP is investigated.
The choice of the conditions of IBC and BC in individuals who are smoking was strategic because of the prevailing difficulties for these people of receiving support and help.

**WATIP user-centric approach**

The development of the WATIP probe followed a tailoring approach as a means of reaching Portuguese-speaking web users. The WATIP portal is based on a cognitive and behavioural approach. It ultimately supports a relapse-prevention strategy while focuses on increasing the user’s *conscienzialização* for his or her IBC. It promotes autonomy and independent management of the BC process. The overall exploratory question is: “What knowledge management performance can a WATIP tool have regarding support to IBC and BC with its 24/7/365 window of opportunity?”

There are several suggested methods of looking at the evaluation of smoking cessation approaches. One of these is to consider both process and outcome measures. “*Process measures are designed to assess those variables that are affected by treatments and that influence outcomes ... outcome measures include attempts at quitting and abstinence success. Withdrawal symptom severity and concomitants of cessation attempts, ..., may be viewed as outcomes as well*” (USDHHS, 2000c, 100).

Process measures can target specific change mechanisms that are expected to happen. If an intervention aims at providing coping skills, a process measure might look at the person’s ability to anticipate and generate appropriate responses to stressors and circumstances that are expected to occur. If an intervention is intended to promote cessation by reducing withdrawal symptoms, then a withdrawal evaluation instrument can be used as a process measure (USDHHS, 2000c).
3.1. Global objectives

As the WATIP should lead the user to a decision (about smoking cessation) and to behaviour change, three main objectives are considered:

A) assess WATIP quality and conformity to national and international standards of good practice in smoking cessation;

B) consider the WATIP impact on knowledge management, by three primary approaches for measuring its effects (Leavitt, 2003):

1) One approach is value mapping; this assesses what behaviour is supposed to be correlated with what output. These first stages of efficacy assessment focus on the outcome of participation, i.e. if the efforts that have been made actually make a difference. One way of doing this is by running semi-controlled experiments comparing two otherwise similar groups and considering how different the results are for the two groups, taking into account the amount of knowledge management participation that was involved.

2) The value of success stories about the endeavour is a second way to obtain an idea of the effectiveness of the programme, since it is not possible to measure all the intangible value originated by knowledge management (such as the connections between people, the sense of affiliation and belonging). One way of doing this is by inviting the participants to estimate how much of the knowledge management process contributed to their success.

3) In third place, the achievement of the stages of knowledge management maturity can be evaluated. It is important to consider if the knowledge management experience leads to a higher level of performance, or which factors may be preventing or delaying such improvements.

C) Focus on aspects of the WATIP performance (resources versus results/outcomes) in the process of IBC or BC related to smoking cessation.
3.2. Specific objectives

The following are the specific objectives of this study on the performance and usability of the WATIP:

- **A.1.** Submit the WATIP to evaluation to assess conformity to national standards of good practice (Comissão Nacional de Protecção de Dados).

- **A.2.** Submit the WATIP to evaluation to assess conformity to national and international standards of good practice in information and communications technologies (Associação Portuguesa de Software).

- **A.3.** Submit the WATIP to peer evaluation to assess quality and conformity to national and international standards of good practice in smoking cessation (Health On the Net Foundation code of conduct (HonCode) / Switzerland).

- **B.1.1.** Explore socio-demographic determinants that influence the outcome in terms of predisposition to stop smoking within the WATIP context like gender, age, number of school years, employment condition, social isolation, life satisfaction referring to three dimensions (family, job and financial), social support, life meaningfulness and loneliness.

- **B.1.2.** Evaluate the smoking patterns of a sample of Portuguese-speaking Web users.

- **B.1.3.** Understand how stages of change determine the outcome of a customized, interactive stop-smoking web counseling tool like WATIP.

- **B.1.4.** Evaluate the nicotine dependency score as a key variable in the use of the WATIP.

- **B.1.5.** Explore how motivation and self-efficacy to stop smoking that characterizes those who search the Internet for help can be sustained with a tailored Web-based approach like WATIP.

- **B.1.6.** Understand the influence of sense of coherence in the process of IBC or BC.

- **B.2.1.** Determine what are the characteristics that sustain a relationship with a WATIP and are responsible for BC, i.e. people’s opinion of the use of the Internet concerning the implementation of a WATIP project.
• B.2.2. Gauge whether WATIP promotes reinforcement of self-control and positive self-care in action process (content analysis) about smoking cessation (BC).

• B.3. Explore whether or not the WATIP helps would-be quitters of tobacco smoking make decisions about BC compatible with their goal (establishing a Dday).

• C. Explore dimension of WATIP efficacy and efficiency.

3.4. Methodology

To answer these questions, individual scores reflecting a significant increase in the predisposition towards and likelihood of taking up smoking cessation are analysed. To gain a better understanding of the answer, extensive research, carried out by gathering data, and also by making personal contact with the WATIP users, was undertaken via the Internet (Arm one of this study), followed by in-depth interviews of a sample of users one year after the demonstration of their IBC, their establishment of a Dday (Arm two of this study).

Participants

The WATIP portal was introduced to the public at www.parar.net in April 2006. This study uses data collected from that time until January 2008. Launched with no advertising and based on person-to-person, Web-based information process dissemination, it was accessed by 3,601 people. There was no active recruitment; web users were attracted to the programme by month-to-month provision of information or general internet Google-type searching. Tags such as “cessação tabágica”, “parar de fumar on-line”, “deixar de fumar on-line” were the identifiers of the portal that drew people to it on Internet search engines. Those who voluntarily searched for support on the Internet and enrolled at www.parar.net became the participants aiming at IBC or BC.
Accepting participants indiscriminately from the WWW was set as criterion in order to exclude the intrusion of sub-sets of the population of smokers in the WATIP. It could thus be determined whether or not conformity to the targeted population had been achieved in real-world conditions. This method was used in preference to avoid to risking the input of distorted views about the program’s internal coherence. On the other hand, opting for a natural approach, in which the point of departure was the real-world condition of smokers, was the preferred strategy for coming to terms with the understanding of a base-line use of the WATIP. This would, it was felt, enable better translation to real world conditions of the effects of the use of the Internet in smoking cessation. Some biases were taken into account but they were considered in the post-data collection analysis.

For the second-Arm component, the number of participants to recruit was calculated in advance in such a way as to achieve saturation. For this reason 77 interviews were undertaken, to explore the aims of the study long after the interaction with the WATIP took place (at least 12 months).

**Criteria for inclusion**

The people taking part in this study were all Portuguese-speaking www users. The pre-conditions for participation were being interested in smoking cessation and electronically signing the informed consent protocol, after reading the conditions and agreeing with all of the clauses in the contract. Information for all participants who contacted the platform explained the objectives of this research. Subsequently they signed the informed consent declaration by activating the specific identifier of their agreement. The informed consent specification is necessary in order to provide tailored feedback to the user. If someone refuses to supply information it is impossible to reach the objective of the WATIP. After this stage, agreement to comply with the gradual approach of the programme by progressing willingly through the different stages of information and knowledge management admitted the user to every subsequent stage of progress. The user was guaranteed that at any time, he or she could abandon the
programme, and that, if he or she so wished, all his or her data could be erased from the database.

**Procedures**

Once inside the WATIP information protocol, the participants manipulated it freely, with no reward or other type of remuneration for time and resources used in their participation. Following a stage-by-stage procedure towards ehealth literacy, triggered by answers to closed and open questions, the WATIP generates in a story-telling mode, tailored information about the smoking-cessation journey. The implementation of these procedures is characterized by seven general features:

- preparation of research instruments, the process of writing the tailored and interactive contents of the WATIP;
- submission of the WATIP platform to the Comissão Nacional de Protecção de Dados;
- submission of the WATIP platform to the Associação Portuguesa de Software;
- submission of the WATIP platform to the quality-control agency, seeking approval and the seal of international accreditation: Health On the Net code of conduct (HonCode);
- arrangements for the implementation of data collection;
- monitoring of interactions with WATIP of quantitative and qualitative scope, as structured interviews;
- preparation of data-collection coding and further analysis.

(1) **Preparation of research instruments**

A set of research tools was prepared as the components of the platform intended to sustain the participants’ IBC and BC process. These are materials relating to socio-economic strata classification (SES); motivation; stages of change; social support; sense of coherence; relapse story board; smoke overload; nicotine dependency score; readiness and willingness to change. They are presented in Appendix 6.
After the researcher had written the contents of all the steps of the WATIP, he submitted them to a community of practice. These contents, structured according to the acronym “Renasceres”, give substance to a ten-step process of making progress in smoking cessation, in which each step carries the participant through different stages towards the goal (Appendix 5). For example, before the stage at which the participant would be able to decide on his/her Dday, comes the stage with the questions and algorithm related to the degree of nicotine dependence. Because of this, it is not possible for the participant to make further progress in the process, without defining his or her degree of nicotine dependence.

The WATIP is a composite of two sources of information. When combined, they allow information and knowledge management of a tailored smoking-cessation administration process, based on a user-centric approach (BOCK, 2004). It is aimed at leading the person to aim towards the ease pole of the dis-ease/ease continuum.

On the one hand, there is a source of information which includes advice on how to help and sustain IBC in smoking cessation. This embodies a standing reserve favouring smoking cessation support, which is given by the WATIP. These best practices are internationally established and have been shown to be relevant when tailored to a specific case, the smoker who enrolls in the smoking cessation programme. A second source of information - one that originates in the person interacting with the WATIP - is developed through the WATIP stages. This enframing progression occurs as the user takes various decisions such as activating the next levels of knowledge management processes, answering questions and participating in and complying with the personalised process.

Presented sequentially, the process is structural, with an eliteracy approach (Figure 7). Before login, information about demographics, smoking history and cigarette load are inserted. Then, access to the WATIP is open to registered web users who can enter the portal with a self-chosen login name and a password (first phase). If it is the first time the user has interacted with the platform, she or he is prompted to follow each of the 10 stages that leads to establishing a Dday (stage 9). During these stages the smoker loads the portal with information concerning smoking history (second phase), comprehensibility, manageability and the meaningful nature of life events, motivation,
dependence on nicotine or self-efficacy. The user is also invited to provide information that allows clarification of stages of change that together develop an interactive tailoring process.

If the WATIP user needs to halt the interaction temporarily, then after coming back to it and logging in, he or she will be prompted to go to the last registered stage, which means that it will be easy to continue, without loss of time.

Each phase of the programme is presented in an interactive format and various tools assist smokers in a) progressing from one phase to the other, b) answering the questions on-line and receiving immediate tailored feedback, and c) setting a DDay for smoking cessation. A quitting guide provides users with evidence-based information about smoking cessation. The user can print every tailored phase of the programme and this will constitute, at the end, her or his story of the process towards a life without tobacco.

Figure 7: Visual aspect of the WATIP platform.

Source: Research study

The task of the WATIP is to support self-efficacy while unveiling a set of conditions that can facilitate the user’s willingness to change by enabling a first small step: establishing a DDay. The responsibility for change lies with the WATIP user (motivation enhancement therapy, MET, MILLER, et al., 1995). Acceptance of small shifts in attitude as worthy of a first
step in BC is in accordance with principles of motivational interviewing, a mechanism that is commonly used to address smoking cessation\(^{14}\) (ROLLNICK, MASON, BUTLER, 1999). An action plan is proposed within the context of a holistic lifestyle perspective (where various aspects of life are interrelated).

(2) Submission of the WATIP platform to the Comissão Nacional de Protecção de Dados

On April 2006, submission of a formal request was made to the Comissão Nacional de Protecção de Dados (CNPD) for the use of www.parar.net. The CNPD is the Portuguese Data Protection Authority. It is an independent body, with authority throughout the whole nation. Endowed with the power to supervise and monitor compliance with the laws and regulations in the area of personal data protection, the CNPD screens material that is published or broadcast (in any form) for adherence to strict guidelines for the protection of human rights and fundamental freedoms. It safeguards the guarantees enshrined in the country’s constitution and legal system.

(3) Submission of the WATIP platform to the Associação Portuguesa de Software

Since the preparation of the WATIP necessitated the preparation of applications to allow its use on the Internet, this program was submitted to the Associação Portuguesa de Software (ASSOFT). The ASSOFT has, among its several goals, the promotion of the legality, quality and integrity of software and both assures the user and protects the producer from liability.

The WATIP portal not only gathers information from the user (the activity under the protection of the CNPD) but sends back processed information to the user’s computer as he or she progresses through the programme. This kind of activity could be used to make unethical use of the computer link by inappropriate monitoring, spyware and virus propagation.

\(^{14}\) Motivational interviewing, besides maintaining rapport, focuses on the acceptance of small shifts in attitude as indicating readiness to start BC, and also leads the user to become concerned over risks and about avoiding increasing resistance, promoting self-efficacy and responsibility and viewing his or her lifestyle holistically, each aspect usually effecting the other (ROLLNICK, MASON, BUTLER 1999, 141).
To promote better knowledge of security and data control, the ASSOFT has close links with several other international and national organizations such as the BSA (Business Software Alliance), the SIIA (Software and Information Industry Association), the European Commission, Europe Software Publishers’ Association and the NCSA (National Computer Security Association). In Portugal, ASSOFT is a partner of the Comissão Sectorial para as Tecnologias da Informação and of the Conselho Nacional da Qualidade.

It was found that, because of these links and interactions, ASSOFT should be the choice when selecting the technological environment of the WATIP, especially since it could also be used not only by Portuguese citizens but by users living in countries other than Portugal which have Portuguese as their language of communication.

(4) Submission of the WATIP platform to international quality accreditation (HonCode)

The development of Internet portals that deal with specific health issues is on the rise all over the WWW, for the most diverse reasons. In order to establish quality-assurance criteria, protecting Internet users (from misconduct, manipulation or schemes to obtain money dishonestly) as well as assuring the implementation of best practices derived from correct scientific knowledge translation, the Health On the Net Foundation code of conduct (HonCode) was created in Switzerland.

The HonCode is a widely recognized institution in the area of online quality health information. It has extended its worldwide connections to include the World Health Organization (WHO) and the United Nations (UN), where it has consultative status on the Economic and Social Council of the United Nations (ECOSOC). The collaboration with other countries is also noteworthy, as it has ties with the French National Authority for Health (Haute Autorité de Santé - HAS), which chose HonCode to be the official certifying body for all French health websites. The HonCode enables the identification of sites of quality and confidence, thus contributing towards the general improvement of trustworthy information on websites, as well as helping the user in his or her search for health information.
Essentially, any initiative on the Internet focusing on health, that aims at transparency and accepts external scrutiny or evaluation can be submitted for peer review to this Geneva-based international organization. Inspectors look into the origins of the advice, complementarity, privacy, justifiability, transparency or advertising policy of the initiative. Within these broad areas, other assessments take place, to consider the guarantee that no violation of users’ rights and interests is present. In addition, accessing compliance with the latest and best evidence base on the topic is a prerequisite of accreditation by HonCode. After verifying conformity to all of its conditions, HonCode awards to the health initiative a certificate of quality, shown on the Web for a period of twelve months. After this period, an automatic scrutiny is made, to re-evaluate the site or portal, checking for any failure to conform to the requirements. If the HonCode criteria continue to be satisfied, the seal of approval is validated for a further year.

By means of this procedure, any user can verify conformity to best practices. HonCode seals set the stage for user protection. The seal attribution is not in the hands of the portal web manager. Under the direct control of Geneva headquarters, a HonCode script is used to either give or withdraw the seal from the portal.

(5) Procedures for the implementation of data collection

WATIP is also a protocol for data collection on the Web which gathers information after every participant has registered. A number of questions (closed and semi-open) are intended to draw answers regarding smoking patterns, IBC and BC. This process was implemented by the researcher, while developing the portal contents, in cooperation with a student of aerospace engineering attending the Instituto Superior Técnico de Lisboa, Portugal. The undertaking included the setting up of the web domain (www.parar.net), the construction of Active Server Pages for the WATIP web portal, their installation in a server, the creation of e-mail accounts (info@parar.net; admin@parar.net) and Access and Structured query language data base infrastructures for data collection. The WATIP probe had a front-end and back-office utility to manage users’ progress and other related website tools.

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The researcher also prepared the second Arm of this study that is based on a sample of subjects who had been evaluated at entry for socio-demographic characteristics and tobacco use as well as other characteristics, as listed before. These users were contacted after (at least) twelve months, by phone, to follow up the outcome of WATIP use. For this, an in-depth, structured interview was prepared, in which self-reported answers to smoking habits (abstinence or continuation of smoking), established the pattern of BC after WATIP use (Appendix 7). The involvement of one research assistant to record and transfer to paper the interviews, aided in this process. The following chapter considers data collected by means of the WATIP and by phone between April 2006 and January 2008.

(6) Monitoring of interactions with WATIP and data collection

After electronically signing an informed consent document, the participant goes to the first stage of the WATIP platform where the programme starts. From this point onwards, the participant has to move pro-actively to every new stage of the programme, assuming total control of the process. If, for convenience, the user has to interrupt the programme and logout of the WATIP platform, later on, after the user logs in again, the platform will prompt the user to the stage where she or he was before logout. In this way the interactivity is sustained, to match the continuity of the process. The back-office allows the manager of the portal to follow the progress of the user at every stage.

(7) Preparation for data coding collection

A database established at the server of the WATIP probe collected all information. In Access format originally, this database was transformed into one with an SPSS 11.5 format (used for all coding and data analysis and for building several indices, such as those covering socio-economic strata classification (SES); motivation; stages of change; social support; sense of coherence; relapse story board; smoke overload; Fagerström’s nicotine dependency score; readiness and willingness to change).
(8) Procedures for attracting participation

This study did not offer any monetary rewards as incentives to participants. The delivery of information referring to the benefits of this research as the achievement of better strategies to help people with smoking cessation was argued to be sufficient encouragement for people to participate.

Type of study

According to Last (2001), research in the domain of epidemiology involves the study of people under certain conditions. The objective here is to address decision-making processes related to the identified cases. This study type considers smoking cessation incidence and factors associated with nicotine dependants exposed to the website and determinants related to the outcome. It is a population case-control study, since there is full coverage of cases occurring in the population being studied (users of the WATIP probe). All ascertained cases during a given time period (April 2006 and January 2008), are included in the study. Controls are non-incident cases in the population. More specifically, since cases and controls are selected from among subjects in a cohort study, the term "nested case-control study" is more applicable to this research design type (MEIRIK, 2010). Data was collected on those individuals with the WATIP and the groups are compared, in order to identify whether or not the two groups demonstrate differences in other characteristics (e.g. socio-economic strata classification (SES); motivation; stages of change; social support; sense of coherence; relapse story board; smoke overload; nicotine dependency score; readiness and willingness to change).

The epidemiological method has an advantage in that it accepts multiple implications (causality) in a study of a condition. The perspective of the analysis can be enlarged, allowing fuller understanding of factors. The possibility of undertaking a study of this type allows maximisation of evidence when it is not possible to use experimental designs (FLETCHER, FLETCHER, 2005). When considering the research questions proposed above, it is felt that this is the most feasible and the strongest type of research that can be applied.
Both quantitative and qualitative methodologies were used (multi-method approach). There were two evaluation points: at entrance (Arm 1) and one year after the Dday had been set by a sample of participants (Arm 2). This allowed the researcher to understand the influence of the WATIP on the progress of the short-term and medium-term participant.

The goal was to provide information that would help bolster or refute the hypothesis about the relationship between an exposure (Web Assisted Tobacco Intervention in Portuguese - WATIP) and an outcome (willingness to undergo a programme of smoking cessation establishing a Dday). The population was a cohort exposed to the website, and the research unit was the web surfer.

An Internet-based literacy system - WATIP - was built to facilitate behavioural changes reinforcing predisposition to stop smoking (IBC). Systems development was considered to be a research activity. It was argued that as a process it was characterized by different stages, such as engagement with social activists and stakeholders, elicitation of requirements, information systems development, technological assessment and assessment of the usability and effectiveness of an intervention until a probe could be used in a real-world situation, which in this case is the WATIP to be accessed on the WWW.

The choice of this design allowed the inclusion in the study of a wide range of individuals from different parts of the Portuguese-speaking community, so that their interaction with the WATI could take place in a more natural way. The option for a real-life approach was selected. The researcher did not interfere in the process of interaction with the WATIP, although participants were followed up very closely by means of the platform back-office. In the second Arm, the option for semi-structured interviews by phone was used with the intention of giving the least possible attention to the participants, looking carefully at the usability process.

The option for a probe-type approach also helped to build a pattern of how users of the WATIP behaved. Probes go beyond classic user study techniques, which focus on either what people say (questionnaire and interviews) or what they do (observation studies).
Here there was a triangulation of techniques in which being as little intrusive as possible was the rule to be followed. It was possible, on the usability side, to consider how WATIP ‘customers’ made use of the platform and to determine how the initial design or objective may have been inadequate for these people’s needs outside the “laboratory” setting, where the subjects of the study (programme users in this case) have the opportunity to register what they do without being disturbed by being under permanent observation (USDHHS, 2010).

The design of this research is rooted in three of the nine criteria that are commonly considered in public health and epidemiological research and that were characterized by Austin Bradford Hill (WEED, 2000). These are consistency, strength of association, as well as coherence, plausibility and analogy.

By consistency, the persistent finding of an association between the exposure and the outcome, in multiple individuals, from different places with different life circumstances, as well as different latitudes and geographical backgrounds is identified. The first objective is to tackle confounding variables and assess whether or not chance is affecting the statistical associations that can be seen between variables. The second criterion is strength of association. With two dimensions (magnitude of the association and the statistical strength), it is considered that chance would be better controlled, since an explanation is proposed. With weak associations, the plausibility of the interference of confounding variables might increase. For the criteria of coherence, plausibility and analogy, this study explores the outcomes of the process of IBC or BC related to smoking cessation. The primary aim of the study was to assess coherence and conformity to national and international standards of good practice in smoking cessation, after submitting the WATIP to evaluation.
Instruments

The research instruments were questionnaires with closed and open questions, making a total of 110 variables to be measured (Appendix 6). Diagnostic tools included items on smoking history, SES data gathering to determine the socioeconomic conditions of participants, with the Questionário Orientação para Viver - QOV questionnaire to weigh up each participant’s sense of coherence (SOC), Fagerström Test for Nicotine Dependence - FTND, (HEATHERTON, et al., 1991) to measure dependence, the stages of change (PROCHASKA, DiCLEMENTE, 1983), and motivation and self-efficacy items to apprehend factors associated with IBC.

For the second-Arm a qualitative research component dimension was added with structured interviews, to explore the aims of the study (Appendix 7).

Variables

To collect the information, seven groups of questions were prepared. One group gathered the registration identification material. The second group focused on socio-demographic characteristics. The third dealt with smoking exposure. The fourth considered stages of change and Richmond motivation evaluation. The fifth asked questions about the sense of coherence (SOC). The sixth carried out Fagerström nicotine-dependence evaluation. The seventh group asked questions about readiness and willingness to change (IBC and BC), while other variables were matters for the eighth group, collected by the means of the interview. The operationalisation and coding of information were prepared with the help of a database, created according to the order of information presented (Appendix 6 and Appendix 7).

Ethical issues

The development of this research followed best practices. Whenever the instruments used for this work were not prepared by the researcher himself, clarification is provided about the sources or about other authors. One of the instruments used in this study was
developed to measure the participants’ SES. The others are translations and adaptations, by the author (the Richmond scale of motivation to stop smoking) or Portuguese version of Aaron Antonovsky’s life-orientation questionnaire that was validated by the author and measures the sense of coherence (SOC) (SABOGA-NUNES, 1999). All the participants took part in the study willingly.

All methods, procedures and technical approaches had (1) to contribute to the safeguarding of participants’ rights - concerning their privacy, autonomy, well-being, freedom and dignity – (2) and to conform to the scientific criteria that are the basis of a study of this kind. The implementation of the WATIP was submitted to three distinct ethical scrutinies, as reported earlier in this chapter. The bodies to which the WATIP was held responsible are: Comissão Nacional de Protecção de Dados, Associação Portuguesa de Software and Health on the Net Code of Conduct (HonCode).

WATIP, assessment of quality and conformity to good practice: Comissão Nacional de Protecção de Dados

The interaction with the Comissão Nacional de Protecção de Dados (CNPD) lasted for about six months and during this time issues relating to the specificity of this request were dealt with. There was some concern about the algorithms use of the names and e-mail addresses of the participants. To clarify this, it was necessary to describe in detail the user-centric approach and the tailoring process needed for personalization and data feedback used by the WATIP.

Collecting personal data by means of this WATIP was a problematic issue. Explaining the way in which the platform operated meant resolving some specific matters that were not normally experienced in the evaluation processes of more traditional requests received by this commission.

Another issue concerned the amount of time during which databases retain information. An explanation of the concept of “smoking cessation,” which operates according to a golden rule of a twelve-month period of abstinence, after the Dday, clarified the need to retain data for this length of time, something unusual for the revision board of the commission.

luis saboga nunes
A discussion about the informed consent model presented and justified the details of the contract established between the end-user and the WATIP, before any information protocol began to collect data. This needed revision too; details were added about the authorship of the WATIP.

In addition, the commission dealt with the understanding of the final aim of the programme, since there was a suspicion that its main objective was to sell medications or services to smokers. Assurance that there was no reference to any medication or purchasable service settled the issue; the WATIP is intended to be used in the context of a public service and is not a mean of marketing any goods or services.

Once the clarification of issues raised had been made and the respective fees were paid, the compliance by the WATIP to the national regulations was testified by the code 1081/2006.

**Associação Portuguesa de Software**

Since the building of the WATIP obliged the development of specific applications of Information and knowledge management on the Internet, it was submitted to the Associação Portuguesa de Software (ASSOFT). The ASSOFT has, among its many goals, the promotion of the legality, quality and integrity of software. The WATIP was certified, assuring the user of a secure environment that does not pose any threat, something that is a critical issue regarding Internet protection of active dual systems. The WATIP software carries the ASSOFT registration protocol code 1314/D/06.

**HonCode international quality accreditation**

The final assessment of quality and conformity to good practice took place through interaction with the Foundation HonCode, the Geneva home-based institution for evaluation of health web sites. The process of accreditation of the WATIP went through several stages, focusing on different issues (Figure 8).
As regards Principle 2 (complementarity), the reason for providing information on the portal needed to be more specific, making clear the identity of the organisation behind the WATIP. The potential for being more than a pilot study was stated.

Figure 8: Overview of seal of accreditation by HonCode of the platform www.parar.net.
Source: www.parar.net

Although the target audience (within the age group 30-49) implicitly oriented the development of the WATIP, the reviewers required that this be clearly indicated on the portal.

More clarification had to be provided about compliance with Principle 4 (attribution), to make clear where the information came from. Since the main goal of the WATIP portal is to tell the story of an individual’s smoking cessation experience, information and data management details were regarded as the participants’ attributes. The presentation of information was dependent on the communication process (tailoring) of the portal; on the other hand, the format used for presenting other information - such as the bibliography - followed the usability criteria (as being presented in a different section of the portal instead of in the current information-processing mode).

Another issue was related to the date of the latest modification of the portal web pages: the HonCode reviewers indicated that it should be included on every page of the portal. It was argued that this kind of presentation would compromise usability criteria, since modifications to every page occur every time the user interacts with the tailoring process. For this reason, the date is on the front page of the portal and is not needlessly repeated on every page.

After all these issues had been settled, the accreditation seal, with the protocol number HON13918, was applied to the WATIP portal and a descriptive listing of the WATIP added to MedHunt, Health On the Net's medical search engine, available at: http://www.hon.ch/cgi-bin/update.pl?HON13918 (Figure 9).
Figure 9: Overview of accreditation registration by HonCode of the platform www.parar.net.

Source: Health on the Net Foundation (http://www.hon.ch/cgi-bin/update.pl?HONI3918)
Data analysis

This study draws from a primary quantitative analysis of the WATIP platform, which includes written material generated by the participants’ online written answers to questions. The process continues with analysis of semi-structured phone interviews of a sample of web users of the WATIP. These interviews were recorded and content analysis was implemented to draw conclusions concerning the users’ opinion 12 months after setting the Dday. Data analyses were performed using the Statistical Package for Social Sciences program – SPSS, 11.5, for Windows. After data coding and standardization, several sets of analyses were developed on the basis of exposure to the intervention (cases and controls), gender, SES, sense of coherence as well as other characteristics like self-efficacy or stages of change (immotives, precontemplators, contemplators and preparers).

Chi-square tests ($\chi^2$ test) were used to gauge statistical significance of differences between groups of participants with a level of 5%. Receiver-operating characteristic analysis was used to consider whether self-reports measurements provided good diagnostic accuracy for distinguishing between different groups of participants. The presentation of data refers to every event which took place in the research activity, and the information that is available corresponds to the acceptance of participants for involvement in this study.

Principal component analysis with Varimax rotation was used to assess for factors of such scales as the FTNT and Sense of Coherence Scale. Groups of participants were examined regarding factors such as self-efficacy expectations or smoking behaviour using multivariate analyses of variance (MANOVAs). First taking into consideration each dependent variable, the interactions of demographic and other variables (such as gender, age, education SES) with the stage of change were tested. After this procedure, whenever a significant interaction ($p < 0.05$) was found, the analyses were stratified taking into consideration the demographic variable. If no statistical significance was found the interaction was eliminated from the analysis. Then demographics were
included in the analyses as covariates until they proved to have no significant main effect (p>0.05) on the dependent variable. The MANOVA contrast procedure was used in case a main effect of the stage was significant, in order to recall the computation of contrasts between the groups of WATIP participants.

Longitudinal analyses were performed to search for the influence of readiness to change on IBC, SOC, self-efficacy and motivation considered at the first phase of the research as predictive of quitting behaviour (measured after 12 months). One binary outcome measure was used: 12-month abstinence from tobacco use, continuously abstinent from tobacco use since quit day.

A logistic regression analyses to predict quitting behaviour was performed in relation to these variables (stage of change, SOC, self-efficacy, motivation). Demographic factors were included in the model as covariates. Searching for differences between WATIP user’s status lead to testing whether precontemplators had quit more than immotives, or contemplators had quit more than precontemplators, and whether preparers had quit more than contemplators. In each comparison, the latter group functioned as the reference group. This same approach was implemented with the other constructs such as the SOC.
4. Results
Arm 1: Intention to make Behavioural Changes (IBC)

In the previous chapter, the methodology and the outcome of the submission of WATIP platform to ethical and quality control institutions was presented. Now it shall be proceeded with the evaluation of the smoking patterns of a sample of Portuguese-speaking Web users of the WATIP. The focus is on socio-demographic characteristics and tobacco use, as well as other factors potentially associated with Intentions to make Behavioural Changes (IBC). Arm one of this study considers data that were collected by means of the WATIP probe between April 2006 and January 2008 concerning the IBC of 3,601 participants.

Sample and group description of cases and controls

The objective of this study is to gather feedback from members of the public concerning smoking cessation intentions and the use of the Internet, using the WATIP probe. From the population of Portuguese-speaking Web users, searching for help to engage in IBC, of 3,601 participants who were given access to the portal, 1,488 (41.2%) did not complete initial eligibility criteria (Figure 10).

Participants enrolled by clicking a link to register and signing a human subject consent protocol. Sequentially a baseline survey, with a further link leading to the stages of the WATIP, provided immediate access at no cost. The number of individuals who used the Website (having registered and followed the stages up to the Sense of Coherence [SOC] evaluation) was 2,113; they are considered the population at risk. From these, 1,463 persons exposed to the Web portal (step 1) took a decision to set a quit date (Dday), which is the outcome of IBC, while 650 exposed individuals did not set a quit date. So, 1,463 participants displayed a predisposition to begin smoking cessation and a likelihood of stopping smoking, as manifested by an IBC. These are the cases. On the other hand, 650 people who were registered in the portal but were not exposed to the
quit date, did not go further than stages 1-12 (the break point: (B) 1-12) which are the controls.

Figure 10: Overview of study flowchart of the population in the platform www.parar.net

Most of the participants made contact with the WATIP by searching the web (31.3%), and by receiving information provided at different sites or by various initiatives. The third category of how they came into contact with the platform is the web forwarding.
generated by other Internet sources. One example of this is the Portal da Saúde, which refers to the platform with an active link under ‘tobacco resources’. A small number of the participants were informed by their doctors (2.5%).

**Socio-demographic determinants**

As table 6 shows, of the 2,113 study participants, 1,163 (55%) were males. Although the target age group was 30-49 (N=1283), participants ranged from 16 to 71 years of age. The WATIP did not exclude users outside its target group (or for other characteristics).

<table>
<thead>
<tr>
<th>Socioeconomic status variables categories</th>
<th>Count: absolute frequencies</th>
<th>Percentages: relative frequencies (%)</th>
<th>Gender (males): relative frequencies (%)_s_46_gen</th>
<th>Gender (females): relative frequencies (%)_s_46_gen</th>
<th>IBC Dday (cases): relative frequencies (%)_s_32_end</th>
<th>IBC Dday (controls): relative frequencies (%)_s_32_end</th>
<th>Descriptive statistics of numerical variables (N=)</th>
</tr>
</thead>
<tbody>
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<td><strong>Gender</strong></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
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<td>.6</td>
<td>.3</td>
<td>.3</td>
<td>.9</td>
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<td>22.0</td>
<td>20.4</td>
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</tr>
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<td>7.4</td>
<td>7.5</td>
<td>7.5</td>
<td>7.2</td>
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</tr>
<tr>
<td>6-60 y age</td>
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<td>2.1</td>
<td>1.1</td>
<td>1.5</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td><strong>School years</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-read &amp; write</td>
<td>12</td>
<td>.6</td>
<td>.6</td>
<td>.5</td>
<td>.4</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>2-4 years</td>
<td>16</td>
<td>.8</td>
<td>1.3</td>
<td>.1</td>
<td>.6</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>3-9 years</td>
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<td>14.7</td>
<td>18.2</td>
<td>10.3</td>
<td>13.5</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td>4-12 years</td>
<td>888</td>
<td>43.3</td>
<td>45.5</td>
<td>40.6</td>
<td>43.9</td>
<td>42.0</td>
<td></td>
</tr>
<tr>
<td>5-more than 12 y</td>
<td>833</td>
<td>40.6</td>
<td>34.3</td>
<td>48.4</td>
<td>41.6</td>
<td>38.4</td>
<td></td>
</tr>
<tr>
<td><strong>Unemployment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-the last 2 years</td>
<td>108</td>
<td>6.5</td>
<td>5.5</td>
<td>7.6</td>
<td>6.2</td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td>2-more than 1 year</td>
<td>88</td>
<td>5.3</td>
<td>4.8</td>
<td>5.9</td>
<td>5.2</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>3-less than 1 year</td>
<td>142</td>
<td>8.5</td>
<td>7.4</td>
<td>9.8</td>
<td>8.9</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>4-no</td>
<td>1330</td>
<td>79.7</td>
<td>82.3</td>
<td>76.7</td>
<td>79.6</td>
<td>80.3</td>
<td></td>
</tr>
<tr>
<td><strong>Live alone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-yes</td>
<td>239</td>
<td>14.3</td>
<td>13.8</td>
<td>14.9</td>
<td>14.9</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>2-no</td>
<td>1429</td>
<td>85.7</td>
<td>86.2</td>
<td>85.1</td>
<td>85.1</td>
<td>88.6</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study

The mean age was 37 (mode 33 years). The target group is the best represented of all age groups (60.4%). The second best represented group (29.7%) is that of the participants aged between 20 and 29 (N=628). The majority of the participants (87.8%) were from Portugal. Brazil (10.3%) was the country of origin of the second largest
group. All countries from the Portuguese-speaking nations are represented, except Timor. A small number of participants were from other countries where Portuguese is not the national language. Germany, France, Belgium, Luxembourg, the Netherlands, the United Kingdom, Puerto Rico, Cape Verde and Mozambique were each represented by 0.1% of the participants. Participants from Angola and the USA represented 0.2 per cent. Most participants had received 12 years of school education (43.3%). Eight in every ten of the WATIP users were employed at the time of registration (79.7%). Only 14.3% were living alone.

The female participants felt more unsatisfied with their family generally ($\chi^2=20.75; df=1; p<0.000$), although 19.6% and 26.8% of all participants, respectively, felt strongly satisfied or very satisfied with their family.

About the same order of results characterizes the participants’ satisfaction with their work; 8.9% and 17.0% were either extremely happy or very happy with it. One in every three of the participants was either very unsatisfied or strongly unsatisfied with their financial condition (15.8% and 15.7% respectively). About two in every three said that they had social support outside their home setting (65.8%) and there was an equivalent distribution about meaningfulness of time, as 18.4% and 18.8% (respectively) disagreed or strongly disagreed that it was hard for them to occupy their time. In this group of web users, there was a small feeling of loneliness, as only 13.4% and 17.3% felt strongly lonely or very alone. In order to make the relevance of the socioeconomic characteristics of these subjects more comprehensible, an index was built to characterize the socio-economic status (SES). Several variables were considered, such as number of school years, employment condition, social isolation, life satisfaction referring to three dimensions (family, job and financial), social support, life meaningfulness and loneliness. The mean of the SES value is 31.7 (range is 23 units) and the standard deviation is 3.2. As Table 7 shows, about two in every ten participants belonged to the lower SES (18.5%). About one in every ten participants belonged to the higher SES (12.3%).
The results of comparing males and females showed that, for current smokers, establishing a Dday was related to gender differences, favouring females (respectively 7% of difference, odds ratio [OR]=0.76, 95% confidence interval [CI]0.63-0.91, \( p<0.005 \)). A statistical difference was found concerning IBC, favouring higher number of school years (OR=0.70, CI 0.54-0.89, \( p<0.005 \)). The place of origin of the user of the WATIP (Portugal or Brazil) made no influence (OR=0.86 CI 0.64-1.18, \( p=.37 \)). Belonging to higher SES was associated with the intention to consider IBC (when compared to lower SES condition) (OR=1.57, CI 1.30-1.89, \( p<0.001 \)) (Table 8).

Table 7: Frequencies, percentages, means, medians and standard deviations on socioeconomic status (SES) of WATIP participants (cross-relationships between gender and condition - cases and controls).

<table>
<thead>
<tr>
<th>SocioEconomic Status variables categories</th>
<th>Count: absolute frequencies</th>
<th>Percentages: relative frequencies (%)</th>
<th>Gender (males): relative frequencies (%)_s_46_gen</th>
<th>Gender (females): relative frequencies (%)_s_46_gen</th>
<th>IBC Dday (cases): relative frequencies (%)_s_32_end</th>
<th>IBC Dday (controls): relative frequencies (%)_s_32_end</th>
<th>Descriptive statistics of numerical variables (N= 2112)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES_Index</td>
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<td></td>
<td></td>
<td></td>
<td>s_sesr (N= 2112)</td>
</tr>
<tr>
<td>1- high SES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean: 31.7</td>
</tr>
<tr>
<td></td>
<td>390</td>
<td>18.5</td>
<td>20.4</td>
<td>16.1</td>
<td>23.0</td>
<td>8.6</td>
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</tr>
<tr>
<td>2- middle</td>
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<td>69.1</td>
<td>69.4</td>
<td>62.3</td>
<td>84.5</td>
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</tr>
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<td>3- low SES</td>
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<td>12.3</td>
<td>10.5</td>
<td>14.4</td>
<td>14.7</td>
<td>6.9</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study
Table 8: Multivariate odds of IBC and gender, years of tobacco use, country of origin, unemployment, living alone, family-work-finances satisfaction, social support, time usefulness, feeling of loneliness and SES of WATIP participants (frequencies, percentages, OR, 95% CI, p values).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>cases freq</th>
<th>cases %</th>
<th>controls freq</th>
<th>controls %</th>
<th>OR</th>
<th>95% CI</th>
<th>p value</th>
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</thead>
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<tr>
<td>Gender</td>
<td>0 male</td>
<td>775</td>
<td>52.9</td>
<td>388</td>
<td>59.7</td>
<td>0.758</td>
<td>0.629</td>
<td>0.913</td>
</tr>
<tr>
<td></td>
<td>1 female</td>
<td>688</td>
<td>47.1</td>
<td>262</td>
<td>40.3</td>
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<td></td>
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<td>Years of tobacco use</td>
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<td>353</td>
<td>53.8</td>
<td>0.990</td>
<td>0.821</td>
<td>1.194</td>
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<tr>
<td></td>
<td>1 ≥ than16</td>
<td>694</td>
<td>47.2</td>
<td>297</td>
<td>46.2</td>
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<td>Country of origin</td>
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<td>89.2</td>
<td>573</td>
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<td>0.868</td>
<td>0.636</td>
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<td></td>
<td>1 Brazil</td>
<td>154</td>
<td>10.8</td>
<td>62</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Number school years</td>
<td>0 ≤ 4 years</td>
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<td>14.5</td>
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<td>0.543</td>
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<td>36.2</td>
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<td>63.4</td>
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Source: research study

Smoking behaviour and smoking history

Almost all participants smoked cigarettes (98.1%) and Marlboro was the most often smoked brand of cigarettes (22.1%). The mean smoking rate was 21 cigarettes per day (SD of 10 cigarettes) and the average number of smoking years was 17 (SD 9 years). The smoking load had a mean of 23.7 (SD 20). The first category, of cigarette packs a
The case of www.parar.net

year (equal or inferior to 20), characterised 61% of participants. One quarter of participants had a smoking load of between 21 and 40 (Table 9). One in every four of the participants had not tried before to quit while 28.2% had registered one previous quit attempt. Two quit attempts were experienced by 18.5% of participants, while 12.1% had tried 3 times before to get rid of cigarettes.

Table 9: Frequencies, percentages, means, medians and standard deviations in tobacco type, brand, number of cigarettes, years of smoking and smoking load of WATIP users (cross-relationships between gender and condition - cases and controls).

| Smoking pattern status variables categories | Count: absolute frequencies | Percentages: relative frequencies (%) | Gender (males): relative frequencies (%), 46, gen | Gender (females): relative frequencies (%), 46, gen | IBC Day (cases): relative frequencies (%), s_32_end | IBC Day (controls): relative frequencies (%), s_32_end | Descriptive statistics of numerical variables (N=)
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Source: research study

The largest number of smokers smoked on no specific occasions, while 21% connected smoking with stressful situations. Friends (19.5%) were the next context in the use of cigarettes (Table 10). Most participants acknowledged little pleasure in their smoking dependence; 53% reported that on a scale of between zero (no pleasure) and 10 (maximum pleasure) their selection was between zero and two.

intention to make behavioural changes & behavioural changes
The perception of dependence on nicotine was high - more than 50% reporting levels of between 8 and 10 on a scale of between 0 (no dependence) and 10 (maximum dependence). Physical dependence on cigarettes was perceived as being even higher than that on nicotine - more than 68% would report levels of between 8 and 10 on a scale of zero (no dependence) and 10 (maximum dependence). About 9 in every 10 WATIP users did so on their own initiative - fewer than 11% tried it on someone else’s advice (Table 11).
Table 11: Frequencies, percentages, means, medians and standard deviations in readiness and willingness to change, including pleasure in smoking, perceived dependency on nicotine, physical dependency and source of willingness to participate in the WATIP (cross-relationships between gender and condition - cases and controls).

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<th>Gender (females): relative frequencies (%/s_46_gen)</th>
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</table>

Source: research study

There was no significant association between the IBC and the quantity of cigarettes smoked by the users of the WATIP. Nevertheless, the fewer previous quit attempts that were made in the past, the less prone the users were to establish a Dday (OR=0.49, CI 0.37-0.66, p<0.001). Pleasure in smoking was positively associated with IBC (OR=0.74,
Rates of IBC did not differ by number of years of tobacco use and number of cigarettes smoked per day (respectively OR=0.990; CI 0.82-1.12, p=.91 and OR=0.97; CI 0.79-1.18, p=.76) (Table 12).

Table 12: Multivariate analysis: IBC as a function of number of cigarettes, pleasure in smoking, previous quit attempts, self-perceived dependence of nicotine, locus of control for the decision to smoking cessation of WATIP participants (frequencies, percentages, OR, 95% CI, p values).

<table>
<thead>
<tr>
<th>Variable (IBC)</th>
<th>Categories</th>
<th>cases</th>
<th>Controls</th>
<th>Odds Ratio (OR)</th>
<th>95% Confidence Interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cigarettes _50unr2</td>
<td>0≤ 20 units</td>
<td>1,012</td>
<td>453</td>
<td>69.8</td>
<td>0.970</td>
<td>0.795</td>
</tr>
<tr>
<td></td>
<td>1&gt; 20 units</td>
<td>451</td>
<td>197</td>
<td>30.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasure in smoking _74P7R2</td>
<td>0 no or little pleasure</td>
<td>708</td>
<td>200</td>
<td>59.0</td>
<td>0.740</td>
<td>0.583</td>
</tr>
<tr>
<td></td>
<td>1 pleasure</td>
<td>665</td>
<td>138</td>
<td>41.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous quit attempts _79P2R2</td>
<td>0 ≤ 2 ≤ 2</td>
<td>985</td>
<td>296</td>
<td>81.7</td>
<td>0.499</td>
<td>0.375</td>
</tr>
<tr>
<td></td>
<td>1 &gt; 2 ref</td>
<td>443</td>
<td>63</td>
<td>18.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>self physic dependence _93P3R2</td>
<td>0 &lt; = 7</td>
<td>448</td>
<td>74</td>
<td>32.2</td>
<td>0.970</td>
<td>0.722</td>
</tr>
<tr>
<td></td>
<td>1 &gt; = 8 ref</td>
<td>979</td>
<td>149</td>
<td>67.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus of contr decision _96_P1</td>
<td>0 other decision</td>
<td>154</td>
<td>28</td>
<td>12.3</td>
<td>0.866</td>
<td>0.567</td>
</tr>
<tr>
<td></td>
<td>1 personal ref</td>
<td>1273</td>
<td>195</td>
<td>87.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: research study

### Readiness to quit and behaviour stages of change

Readiness to change was assessed by confronting smokers with possible goals with regard to smoking cessation. Smokers were divided into four groups: *preparers* (PR) were those who were ready to make a decision about smoking cessation. *Contemplators* (C) were those who planned to stop in the next three months. Those who were planning smoking cessation in the future (more than three months) were considered *precontemplators* (PC). *Immotives* (I) where those smokers who were not willing to take any action in the next twelve months. As table 13 shows, more than one in every two smokers (59%) who used the WATIP were preparers, and they were planning to quit “now”.

Contemplators, *Planning to quit some time in the future (within three months)*, represented 31% of the total of participants. Precontemplators, *Planning to quit some time in the future (within one year)* and immotives, *Planning to quit some time in the future (more than one year)* represented 10% (respectively 7.9% and 2.4%).

Luis Saboga Nunes
The above-noted distribution of smokers indicates that immotives are less ready to consider an IBC by setting a Dday (79.5%) than contemplators (81.4%) or preparers (90%). Whereas precontemplators are more likely not to set a quit date than immotives (respectively 72.3% and 79.5%) they are nevertheless less interested than contemplators are (81.4%) (p <0.001).

Table 13 Frequencies, percentages, p in Stages of Change and gender, IBC, school years, age groups, number of smoking years, number of cigarettes per day, previous quit attempts, FTNDP of WATIP participants (χ² and T-tests).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stages of readiness to change</th>
<th>N= 1650</th>
<th>p</th>
<th>χ²</th>
<th>p Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immotives</td>
<td>Precontemplators</td>
<td>Contemplators</td>
<td>Preparers</td>
<td>Immotives</td>
</tr>
<tr>
<td>Count: absolute frequencies (%)</td>
<td>39</td>
<td>130</td>
<td>512</td>
<td>969</td>
<td>58.7</td>
</tr>
<tr>
<td>Percentages: relative frequencies (%)</td>
<td>2.4</td>
<td>7.9</td>
<td>31.0</td>
<td>58.0</td>
<td>42.0</td>
</tr>
<tr>
<td>Gender (males): relative frequencies (%)</td>
<td>59.0</td>
<td>43.8</td>
<td>48.4</td>
<td>58.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Females (%)</td>
<td>41.0</td>
<td>56.2</td>
<td>51.6</td>
<td>42.0</td>
<td>40.0</td>
</tr>
<tr>
<td>IBC Dday (cases): relative frequencies (%)</td>
<td>79.5</td>
<td>72.3</td>
<td>81.4</td>
<td>90.0</td>
<td>42.359</td>
</tr>
<tr>
<td>IBC Dday (controls) (%)</td>
<td>20.5</td>
<td>27.7</td>
<td>18.6</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>School Years: relative frequencies (%)</td>
<td>S_41R2</td>
<td>12.8</td>
<td>10.9</td>
<td>12.3</td>
<td>16.4</td>
</tr>
<tr>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 4 years</td>
<td>87.2</td>
<td>89.1</td>
<td>87.7</td>
<td>83.6</td>
<td></td>
</tr>
<tr>
<td>Age groups: relative frequencies (%)</td>
<td>S_45_2G2 &lt; 24 years</td>
<td>12.8</td>
<td>10.0</td>
<td>9.8</td>
<td>11.6</td>
</tr>
<tr>
<td>≥ 24 years</td>
<td>87.2</td>
<td>90.0</td>
<td>90.2</td>
<td>88.4</td>
<td></td>
</tr>
<tr>
<td>Number of years tobacco use relative frequencies (%)</td>
<td>S_48TYR 1 ≤ 10 years</td>
<td>28.2</td>
<td>36.9</td>
<td>29.3</td>
<td>31.9</td>
</tr>
<tr>
<td>2 11-20 y</td>
<td>30.8</td>
<td>39.2</td>
<td>42.6</td>
<td>43.3</td>
<td></td>
</tr>
<tr>
<td>3 21-30 y</td>
<td>12.8</td>
<td>11.5</td>
<td>21.1</td>
<td>17.1</td>
<td></td>
</tr>
<tr>
<td>4 31-40 y</td>
<td>25.6</td>
<td>8.5</td>
<td>6.4</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>5 &gt;40 y</td>
<td>2.6</td>
<td>3.8</td>
<td>.6</td>
<td>.4</td>
<td></td>
</tr>
<tr>
<td>Number of years tobacco use (mean)</td>
<td>S_48TY</td>
<td>21</td>
<td>17</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Number of cigarettes relative frequencies (%)</td>
<td>S_50UNR4 1 less 10</td>
<td>10.3</td>
<td>16.9</td>
<td>14.6</td>
<td>12.7</td>
</tr>
<tr>
<td>2 11-20</td>
<td>43.6</td>
<td>51.5</td>
<td>53.5</td>
<td>56.7</td>
<td></td>
</tr>
<tr>
<td>3 21-30</td>
<td>25.6</td>
<td>22.3</td>
<td>22.7</td>
<td>21.6</td>
<td></td>
</tr>
<tr>
<td>4 31 more</td>
<td>20.5</td>
<td>9.2</td>
<td>9.2</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Number of cigarettes (mean)</td>
<td>S_50UNI</td>
<td>26</td>
<td>21</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Previous quit attempts relative frequencies (%)</td>
<td>S_79_P2 P2_ (mean)</td>
<td>1.6</td>
<td>1.7</td>
<td>1.9</td>
<td>2.2</td>
</tr>
<tr>
<td>FTNDP S_91FRE0 (mean)</td>
<td>5.7</td>
<td>5.1</td>
<td>5.0</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>S_29SUM (mean)</td>
<td>119.0</td>
<td>127.9</td>
<td>128.1</td>
<td>129.4</td>
<td></td>
</tr>
</tbody>
</table>
| Source: research study

The above-noted distribution of smokers indicates that immotives are less ready to consider an IBC by setting a Dday (79.5%) than contemplators (81.4%) or preparers (90%). Whereas precontemplators are more likely not to set a quit date than immotives (respectively 72.3% and 79.5%) they are nevertheless less interested than contemplators are (81.4%) (p <0.001).
Age, number of school years, number of cigarettes smoked per day, previous quit attempts and the value of nicotine dependence (FTNDP) were not significantly associated with readiness to stop, at the level of the stages of change. There were more preparers participants who engaged in IBC than those who are contemplators (OR=0.25, CI 0.14-0.43, p<0.001) (Table 14).

Table 14: Multivariate analysis: IBC as a function of two stages of change among WATIP participants (frequencies, percentages, Odds Ratios, 95% CI, p values).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>cases</th>
<th>Controls</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>freq</td>
<td>%</td>
<td>freq</td>
<td>%</td>
<td>(OR)</td>
<td>Lower</td>
</tr>
<tr>
<td>Prochaska</td>
<td>S_PT2G</td>
<td>0 contemp</td>
<td>1338</td>
<td>67.1</td>
<td>637</td>
<td>32.9</td>
</tr>
<tr>
<td></td>
<td>1 action</td>
<td>125</td>
<td>89.1</td>
<td>13</td>
<td>10.9</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study

The table 15 shows the percentages of smokers in each stage before they set quit dates. In general, the higher the readiness to quit, the higher the percentage of smokers who aimed at IBC (contrast IM = PC < C < PR).

Table 15: Three pairwise comparisons of the four subsequent stages of readinesses to change, to assess the predictive power of the stages assessed before IBC of WATIP participants. IM = immotives; PC = precontemplators; C = contemplators; PR = preparers, percentages, OR, 95% CI, p values.

<table>
<thead>
<tr>
<th>readiness to change stages</th>
<th>%IM</th>
<th>OR</th>
<th>95% CI</th>
<th>%PC</th>
<th>OR</th>
<th>95% CI</th>
<th>%C</th>
<th>OR</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC Dday S_32_ENR</td>
<td>8.0</td>
<td>0.67</td>
<td>0.28-1.60</td>
<td>30.4</td>
<td>1.68*</td>
<td>1.07-2.62</td>
<td>70.1</td>
<td>2.05**</td>
<td>1.50-2.78</td>
<td></td>
</tr>
<tr>
<td>School Years S_41R2</td>
<td>7.9</td>
<td>1.19</td>
<td>0.40-3.56</td>
<td>30.3</td>
<td>0.87</td>
<td>0.47-1.61</td>
<td>70.0</td>
<td>0.71*</td>
<td>0.52-0.97</td>
<td></td>
</tr>
<tr>
<td>Pleasure S_74P7R2</td>
<td>7.5</td>
<td>1.19</td>
<td>0.55-2.56</td>
<td>29.1</td>
<td>1.25</td>
<td>0.83-1.87</td>
<td>67.6</td>
<td>1.22</td>
<td>0.98-1.52</td>
<td></td>
</tr>
<tr>
<td>Previous quit attempts S_79P2R2</td>
<td>8.0</td>
<td>0.99</td>
<td>0.43-2.24</td>
<td>30.4</td>
<td>1.13</td>
<td>0.72-1.75</td>
<td>70.1</td>
<td>1.23</td>
<td>0.96-1.55</td>
<td></td>
</tr>
<tr>
<td>Success to stop today S_94PSR2</td>
<td>8.0</td>
<td>0.58</td>
<td>0.23-1.47</td>
<td>30.4</td>
<td>1.02</td>
<td>0.57-1.80</td>
<td>70.1</td>
<td>4.34**</td>
<td>3.26-5.77</td>
<td></td>
</tr>
<tr>
<td>SOC S_29TIP2</td>
<td>7.8</td>
<td>0.36**</td>
<td>0.16-0.78</td>
<td>29.9</td>
<td>1.37</td>
<td>0.83-2.22</td>
<td>68.8</td>
<td>0.81</td>
<td>0.62-1.05</td>
<td></td>
</tr>
</tbody>
</table>

* p<0.05     **p<0.001 Source: research study

On the educational level, the contrast is not so big (IM = PC = C < PR). Previous quit attempts and pleasure in smoking did not make any difference to the stages of change.
(IM = PC = P = PR). The self-efficacy variable led preparers to score significantly higher than contemplators.

**Consciencialização of the type of smoker and nicotine dependence evaluation**

Heaviness of smoking rate, a measure of nicotine dependence, was operationalised by using the six items of the Fagerström test for Nicotine Dependence in Portuguese (FTNDP), which is a translation and adaptation to Portuguese by the author from the original FTNDP (HEATHERTON, et al., 1991) (Table 16).

<table>
<thead>
<tr>
<th>Smoking pattern status variables categories</th>
<th>Count: absolute frequencies (%)</th>
<th>Gender (males): relative frequencies (%):_46_gen</th>
<th>Gender (females): relative frequencies (%):_46_gen</th>
<th>IBC Day (cases): relative frequencies (%):_32_end</th>
<th>IBC Day (controls): relative frequencies (%):_32_end</th>
<th>Descriptive statistics of numerical variables (N =)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First cigarette after waking up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3- &gt; than 60 minutes</td>
<td>397</td>
<td>23.6</td>
<td>22.4</td>
<td>25.0</td>
<td>23.6</td>
<td>23.3</td>
</tr>
<tr>
<td>2- 31-60 minutes</td>
<td>569</td>
<td>33.8</td>
<td>35.9</td>
<td>31.4</td>
<td>34.0</td>
<td>32.5</td>
</tr>
<tr>
<td>1- 6-30 minutes</td>
<td>374</td>
<td>22.2</td>
<td>22.6</td>
<td>21.8</td>
<td>22.0</td>
<td>23.3</td>
</tr>
<tr>
<td>0- &lt; 6 minutes</td>
<td>343</td>
<td>20.4</td>
<td>19.2</td>
<td>21.8</td>
<td>20.3</td>
<td>20.8</td>
</tr>
<tr>
<td>Difficult not to smoke in forbidden places</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no</td>
<td>1063</td>
<td>63.2</td>
<td>66.0</td>
<td>59.9</td>
<td>63.4</td>
<td>61.7</td>
</tr>
<tr>
<td>1- yes</td>
<td>620</td>
<td>36.8</td>
<td>34.0</td>
<td>40.1</td>
<td>36.6</td>
<td>38.3</td>
</tr>
<tr>
<td>Cigarette more difficult not to smoke</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- any other</td>
<td>593</td>
<td>35.3</td>
<td>34.1</td>
<td>36.5</td>
<td>35.7</td>
<td>32.5</td>
</tr>
<tr>
<td>1- first in the morning</td>
<td>1090</td>
<td>64.7</td>
<td>65.9</td>
<td>63.5</td>
<td>64.3</td>
<td>67.5</td>
</tr>
<tr>
<td>Number of cigarettes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- &lt; 11</td>
<td>211</td>
<td>12.6</td>
<td>10.9</td>
<td>14.5</td>
<td>12.5</td>
<td>12.9</td>
</tr>
<tr>
<td>1- 11-20</td>
<td>789</td>
<td>46.9</td>
<td>45.3</td>
<td>48.7</td>
<td>47.2</td>
<td>45.0</td>
</tr>
<tr>
<td>2- 21-30</td>
<td>481</td>
<td>28.6</td>
<td>29.8</td>
<td>27.2</td>
<td>28.9</td>
<td>26.7</td>
</tr>
<tr>
<td>3- &gt; 30</td>
<td>202</td>
<td>12.0</td>
<td>14.1</td>
<td>9.6</td>
<td>11.4</td>
<td>15.4</td>
</tr>
<tr>
<td>Smoking in the morning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no</td>
<td>1225</td>
<td>72.8</td>
<td>73.9</td>
<td>71.5</td>
<td>72.3</td>
<td>75.8</td>
</tr>
<tr>
<td>1- yes</td>
<td>458</td>
<td>27.2</td>
<td>26.1</td>
<td>28.5</td>
<td>27.7</td>
<td>24.2</td>
</tr>
<tr>
<td>Smoking when sick</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no</td>
<td>762</td>
<td>45.3</td>
<td>50.3</td>
<td>39.5</td>
<td>45.3</td>
<td>45.4</td>
</tr>
<tr>
<td>1- yes</td>
<td>921</td>
<td>54.7</td>
<td>49.7</td>
<td>60.5</td>
<td>54.7</td>
<td>54.6</td>
</tr>
</tbody>
</table>

Source: research study

This questionnaire assesses smoking habits, such as time of first cigarette, time of the day, difficulty of not ‘lighting up’ in places where it is prohibited or when the smokers...
were sick. The minimum possible score is zero and the maximum is 10 (where zero = very low dependence and 10 = very high dependence).

As table 16 shows, one in every five of the users smoked a cigarette less than six minutes after waking up (20.4%). Twenty-four per cent would smoke their first cigarette of the day within one hour after waking. Nevertheless, for 64.7%, the first cigarette in the morning was the hardest to give up. For one third of the smokers it was hard not to smoke in forbidden places, such as hospitals, offices or public buildings (36.8%), and 54.7% affirmed that they continued to smoke even when sick in bed.

At baseline, the average of the FTNDP was 5.00 (SD=2.3) (Table 17). The items are not skewed in this population, as there is not a tendency for responses to be invariably chosen by more than half of the participants at either one of the extreme poles.

<table>
<thead>
<tr>
<th>Smoking pattern status variables categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: absolute frequencies</td>
</tr>
<tr>
<td>Percentages: relative frequencies (%)</td>
</tr>
<tr>
<td>Gender (males): mean</td>
</tr>
<tr>
<td>Gender (females): mean</td>
</tr>
<tr>
<td>IBC Day (cases): mean</td>
</tr>
<tr>
<td>IBC Day (controls): mean</td>
</tr>
<tr>
<td>FTNDP score</td>
</tr>
<tr>
<td>1-</td>
</tr>
<tr>
<td>2-</td>
</tr>
<tr>
<td>3-</td>
</tr>
<tr>
<td>4-</td>
</tr>
<tr>
<td>5-</td>
</tr>
<tr>
<td>6-</td>
</tr>
<tr>
<td>7-</td>
</tr>
<tr>
<td>8-</td>
</tr>
<tr>
<td>9-</td>
</tr>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

The missing values in these items were not considered problematic as more than two thirds of participants did submit their information. There were no differences between groups in IBC regarding the high and low levels of the FTNDP score (OR=0.96, CI 0.73-1.27, p=.79) (Table 18).
The internal consistency of the FTNDP presented a value of 0.65 (FTDNP: $\alpha = 0.65$). The internal consistency coefficient could not be improved by removing items.

Table 18: Multivariate analysis: IBC as a function of time after waking up for first cigarettes, difficulty in refraining from smoking in certain places, categories of cigarettes smoked per day, attitude to smoking in the morning, and when sick, of WATIP participants (frequencies, percentages, OR, 95% CI, p values).

<table>
<thead>
<tr>
<th>variable</th>
<th>Categories</th>
<th>cases freq</th>
<th>cases %</th>
<th>controls freq</th>
<th>controls %</th>
<th>Odds Ratio (OR)</th>
<th>95% Confidence Interval Lower</th>
<th>95% Confidence Interval Upper</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fagerström score s_91F2</td>
<td>0 low fager</td>
<td>651</td>
<td>44.5</td>
<td>101</td>
<td>45.4</td>
<td>0.965</td>
<td>0.733</td>
<td>1.269</td>
<td>0.798</td>
</tr>
<tr>
<td></td>
<td>1 high fager</td>
<td>806</td>
<td>55.5</td>
<td>126</td>
<td>54.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First cigarette after waking up up s_85F1R</td>
<td>0 ≥ 60 min. ref</td>
<td>344</td>
<td>23.7</td>
<td>54</td>
<td>23.3</td>
<td>1.020</td>
<td>0.738</td>
<td>1.408</td>
<td>0.905</td>
</tr>
<tr>
<td></td>
<td>1 &lt; 60 min.</td>
<td>1,113</td>
<td>76.3</td>
<td>173</td>
<td>76.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoke after waking up s_85F12</td>
<td>0 ≥ 5 min. ref</td>
<td>1,157</td>
<td>79.7</td>
<td>183</td>
<td>79.2</td>
<td>1.034</td>
<td>0.738</td>
<td>1.448</td>
<td>0.845</td>
</tr>
<tr>
<td></td>
<td>1 &lt; 5 min.</td>
<td>299</td>
<td>20.3</td>
<td>44</td>
<td>20.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult in refraining from smoking in forbidden places S_86_F2</td>
<td>0 no ref</td>
<td>925</td>
<td>63.4</td>
<td>138</td>
<td>61.7</td>
<td>1.078</td>
<td>0.814</td>
<td>1.429</td>
<td>0.590</td>
</tr>
<tr>
<td></td>
<td>1 yes</td>
<td>531</td>
<td>36.6</td>
<td>89</td>
<td>38.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette most difficult not to smoke S_87_F3</td>
<td>0 first in the morning ref</td>
<td>520</td>
<td>35.7</td>
<td>73</td>
<td>32.5</td>
<td>1.155</td>
<td>0.863</td>
<td>1.545</td>
<td>0.332</td>
</tr>
<tr>
<td></td>
<td>1 any other</td>
<td>936</td>
<td>64.3</td>
<td>154</td>
<td>67.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking in the morning S_89_F5</td>
<td>0 no</td>
<td>1,052</td>
<td>72.3</td>
<td>173</td>
<td>75.8</td>
<td>0.832</td>
<td>0.606</td>
<td>1.142</td>
<td>0.255</td>
</tr>
<tr>
<td></td>
<td>1 yes ref</td>
<td>404</td>
<td>27.7</td>
<td>54</td>
<td>24.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking when sick S_90_F6</td>
<td>0 no</td>
<td>660</td>
<td>45.3</td>
<td>102</td>
<td>45.4</td>
<td>0.995</td>
<td>0.756</td>
<td>1.309</td>
<td>0.975</td>
</tr>
<tr>
<td></td>
<td>1 yes ref</td>
<td>796</td>
<td>54.7</td>
<td>125</td>
<td>54.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: research study
Motivation and Self efficacy and Intention to make Behavioural Changes

Motivation and Self-Efficacy are examined in the context of the IBC. Motivation for quitting was assessed by asking if the participant would consider progressing to BC “now” or in “the future”. Those who reported that they would make the move “now”, did indeed confirm their IBC (61.2%) by setting a Dday, compared to those who had visualised their plans to quit smoking as being in the “future” (58.9%) OR=2.30, CI 10.74-3.05, p<0.001).

Self-efficacy reflects the confidence smokers have in their ability to stop smoking. In this research, self-efficacy was assessed using an item that was measured on a 10-point scale and could be scored from no probability of stopping (0) to maximum probability (10) (Table 19). After analysis of these responses, this item was transformed into a dichotomous variable where high motivation was attributed to persons who selected six or higher from the scale of possibilities offered in the questionnaire.

Table 19: Frequencies, percentages in terms of self-efficacy of WATIP participants (cross-relationships between gender and condition - cases and controls).

<table>
<thead>
<tr>
<th>Smoking pattern status variables categories</th>
<th>Count: absolute frequencies</th>
<th>Percentages: relative frequencies (%)</th>
<th>Gender (males): % s_46_gen</th>
<th>Gender (females): % s_32_end</th>
<th>IBC Dday (cases): % s_32_end</th>
<th>IBC Dday (controls): % s_32_end</th>
<th>Descriptive statistics of numerical variables (N =)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-perceived probability of stopping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>s_94_p5 (N= 1650)</td>
</tr>
<tr>
<td>0- no probability</td>
<td>156</td>
<td>9.5</td>
<td>8.5</td>
<td>10.5</td>
<td>9.0</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>1-</td>
<td>155</td>
<td>9.4</td>
<td>8.5</td>
<td>10.4</td>
<td>8.6</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>2-</td>
<td>241</td>
<td>14.6</td>
<td>14.9</td>
<td>14.2</td>
<td>14.0</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>3-</td>
<td>210</td>
<td>12.7</td>
<td>12.1</td>
<td>13.4</td>
<td>12.7</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td>4-</td>
<td>118</td>
<td>7.2</td>
<td>7.6</td>
<td>6.6</td>
<td>7.1</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>5-</td>
<td>290</td>
<td>17.6</td>
<td>17.5</td>
<td>17.6</td>
<td>17.8</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>6-</td>
<td>116</td>
<td>7.0</td>
<td>7.0</td>
<td>7.1</td>
<td>7.8</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>7-</td>
<td>119</td>
<td>7.2</td>
<td>7.2</td>
<td>7.2</td>
<td>7.2</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>8-</td>
<td>100</td>
<td>6.1</td>
<td>6.9</td>
<td>5.1</td>
<td>6.6</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>9-</td>
<td>45</td>
<td>2.7</td>
<td>2.7</td>
<td>2.8</td>
<td>3.0</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>10- maximum probability</td>
<td>100</td>
<td>6.1</td>
<td>7.0</td>
<td>5.0</td>
<td>6.3</td>
<td>4.7</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study
Females in the study did not differ from men in their attitude to smoking cessation. Those who demonstrated higher confidence in their likelihood of success in stopping in the shortest time had a higher rate of setting a Dday (OR=0.51, CI 0.36-0.73, p<0.001). This is confirmed when users of the WATIP considered whether they were motivated to enter a smoking cessation programme immediately or in the future.

Those who were willing to try smoking cessation immediately, in the short run, were prone to establish a Dday when compared with those who made plans for the future (OR=2.30, CI 1.74-3.05, p<0.001) (Table 20).

It was hypothesized that less confident smokers would be less inclined towards IBC as setting a quit date demands a certain level of self-confidence. The majority of participants who engaged in IBC and set a Dday, had higher levels of motivation than average (30.8%) while most participants who did not engage in IBC presented lower levels of motivation (81.4%) (OR=0.51, CI 0.36-0.72, p<0.001). As this hypothesis proved to be correct it was not ruled out that smokers’ self-efficacy in the ability to quit determines their IBC when considering a Dday.

**Table 20: Multivariate analysis: IBC, as a function of success in stopping, of WATIP participants (frequencies, percentages, OR, 95% CI, p values).**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>cases</th>
<th>controls</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>freq</td>
<td>%</td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Success in stopping today</td>
<td>S_94P5R2</td>
<td>0&lt;=0-5</td>
<td>988</td>
<td>81.4</td>
<td>0.364</td>
<td>0.727</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1&gt;=6-10</td>
<td>439</td>
<td>18.6</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Stop</td>
<td>S_95P6_R</td>
<td>0 now</td>
<td>877</td>
<td>81.7</td>
<td>0.514</td>
<td>0.364</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 future</td>
<td>550</td>
<td>38.3</td>
<td>1.000</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Source: research study
Sense of Coherence and Intention to make Behavioural Changes

Sense of coherence was assessed with a 29-item closed questionnaire (Questionário Orientação para Viver - QOV) (SABOGA-NUNES, 1999). The frequency distributions of the SOC scores followed a Normal distribution and the values ranged from 32 to 197. The mean was 128 (SD 25). The Cronbach alpha measure of internal consistency was 0.92.

A direct factorial analysis was performed, generating the within-groups correlation matrix, so as to partial out between-groups variances and co-variances; the first analysis was run on this matrix.

An exploratory maximum-likelihood factor analysis, with communalities estimated by multiple correlations, produced five factors with eigenvalues > 1. Assuming correlated factors, an Oblimin rotation was requested but failed to converge. However an orthogonal, Varimax rotation did converge.

The exploratory maximum-likelihood analysis was fixed to three factors. The resulting structure matrix is presented in table 21. The SOC items loading highest among the factors are given in table 22. Factor one accounted for 33% of the total variance and had a value of 9.5.

In factor one of the items, 11 had loadings over 0.5. All meaningfulness items loaded >0.5 on this factor and on no other. There were also four manageability items with as high loadings on factor one and negative, albeit lower, loadings for the comprehensibility items, No. 10 and No. 17.
Table 21: Total variance explained (by 3 factors) of the factor structure of orientation to life questionnaire - OLQ.

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>1</td>
<td>9.503</td>
<td>32.770</td>
<td>32.770</td>
</tr>
<tr>
<td>2</td>
<td>2.281</td>
<td>7.864</td>
<td>40.634</td>
</tr>
<tr>
<td>3</td>
<td>1.445</td>
<td>4.981</td>
<td>45.615</td>
</tr>
<tr>
<td>4</td>
<td>1.068</td>
<td>3.684</td>
<td>49.299</td>
</tr>
<tr>
<td>5</td>
<td>1.049</td>
<td>3.616</td>
<td>52.915</td>
</tr>
<tr>
<td>6</td>
<td>.917</td>
<td>3.162</td>
<td>56.077</td>
</tr>
<tr>
<td>7</td>
<td>.894</td>
<td>3.081</td>
<td>59.159</td>
</tr>
<tr>
<td>8</td>
<td>.807</td>
<td>2.782</td>
<td>61.941</td>
</tr>
<tr>
<td>9</td>
<td>.765</td>
<td>2.637</td>
<td>64.578</td>
</tr>
<tr>
<td>10</td>
<td>.748</td>
<td>2.578</td>
<td>67.156</td>
</tr>
<tr>
<td>11</td>
<td>.729</td>
<td>2.514</td>
<td>69.671</td>
</tr>
<tr>
<td>12</td>
<td>.677</td>
<td>2.334</td>
<td>72.005</td>
</tr>
<tr>
<td>13</td>
<td>.658</td>
<td>2.268</td>
<td>74.273</td>
</tr>
<tr>
<td>14</td>
<td>.617</td>
<td>2.128</td>
<td>76.401</td>
</tr>
<tr>
<td>15</td>
<td>.581</td>
<td>2.040</td>
<td>78.405</td>
</tr>
<tr>
<td>16</td>
<td>.554</td>
<td>1.909</td>
<td>80.315</td>
</tr>
<tr>
<td>17</td>
<td>.549</td>
<td>1.894</td>
<td>82.209</td>
</tr>
<tr>
<td>18</td>
<td>.537</td>
<td>1.851</td>
<td>84.060</td>
</tr>
<tr>
<td>19</td>
<td>.528</td>
<td>1.821</td>
<td>85.881</td>
</tr>
<tr>
<td>20</td>
<td>.509</td>
<td>1.756</td>
<td>87.637</td>
</tr>
<tr>
<td>21</td>
<td>.479</td>
<td>1.651</td>
<td>89.288</td>
</tr>
<tr>
<td>22</td>
<td>.469</td>
<td>1.618</td>
<td>90.906</td>
</tr>
<tr>
<td>23</td>
<td>.452</td>
<td>1.559</td>
<td>92.465</td>
</tr>
<tr>
<td>24</td>
<td>.431</td>
<td>1.487</td>
<td>93.952</td>
</tr>
<tr>
<td>25</td>
<td>.398</td>
<td>1.374</td>
<td>95.326</td>
</tr>
<tr>
<td>26</td>
<td>.353</td>
<td>1.219</td>
<td>96.545</td>
</tr>
<tr>
<td>27</td>
<td>.342</td>
<td>1.178</td>
<td>97.724</td>
</tr>
<tr>
<td>28</td>
<td>.336</td>
<td>1.157</td>
<td>98.881</td>
</tr>
<tr>
<td>29</td>
<td>.325</td>
<td>1.119</td>
<td>100.000</td>
</tr>
</tbody>
</table>

Source: research study

Factor two had a value of 2.3 and counted for 8% of total variance. Eight items had loadings over 0.5. All comprehensibility items loaded >0.5 on factor two and one (No. 05), loaded on factor three. Two manageability items loaded >0.5 on factor two. Factor three had an eigen value of 1.4 that counted for 5% of total variance; two items loaded >0.5 (one manageability and one comprehensibility). Several other items loaded on all three factors <0.5 (Nos. 01, 02, 03, 04, 09, 25).
Table 22: Varimax-rotated factor structure of the orientation to life questionnaire - OLQ -SOC items, based on the within-groups correlation matrix in order of increasing loadings (Total Variance Explained by 3 factors N = 2133).

<table>
<thead>
<tr>
<th>orientation to life questionnaire - OLQ items</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dimensions</td>
</tr>
<tr>
<td>SOC 17-2333</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 10-2331</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 05-1221 - R*</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 06-1221 - R*</td>
<td>Manageability+</td>
</tr>
<tr>
<td>SOC 26-1211 *</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 24-2333</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 02-1111</td>
<td>Manageability</td>
</tr>
<tr>
<td>SOC 09-1222 *</td>
<td>Manageability</td>
</tr>
<tr>
<td>SOC 12-2232 *</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 03-1322</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 21-3122 *</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 15-1112</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 01-1312 - R</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 25-3131 - R*</td>
<td>Manageability</td>
</tr>
<tr>
<td>SOC 18-3211</td>
<td>Manageability+</td>
</tr>
<tr>
<td>SOC 29-3122 *</td>
<td>Manageability+</td>
</tr>
<tr>
<td>SOC 19-2122 *</td>
<td>Comprehensibility *</td>
</tr>
<tr>
<td>SOC 04-1222 - R*</td>
<td>Meaningfulness#</td>
</tr>
<tr>
<td>SOC 20-1113 - R</td>
<td>Manageability+</td>
</tr>
<tr>
<td>SOC 08-2331 *</td>
<td>Meaningfulness#</td>
</tr>
<tr>
<td>SOC 23-1223 - R</td>
<td>Manageability+</td>
</tr>
<tr>
<td>SOC 08-1212 *</td>
<td>Meaningfulness+</td>
</tr>
<tr>
<td>SOC 27-1313 - R</td>
<td>Manageability+</td>
</tr>
<tr>
<td>SOC 13-3322 - R</td>
<td>Manageability+</td>
</tr>
<tr>
<td>SOC 16-1312 - R*</td>
<td>Meaningfulness#</td>
</tr>
<tr>
<td>SOC 22-2333</td>
<td>Meaningfulness#</td>
</tr>
<tr>
<td>SOC 14-2132 - R</td>
<td>Meaningfulness#</td>
</tr>
<tr>
<td>SOC 07-3322 - R</td>
<td>Meaningfulness#</td>
</tr>
<tr>
<td>SOC 11-1313 - R</td>
<td>Meaningfulness#</td>
</tr>
</tbody>
</table>

Source: research study

The Euclidean distances between the factors and the SOC components were generated across subjects and then the distances were analyzed with the ALSCAL procedure (SPSS, release 11.5; Norusis/SPSS Inc., 1993). This is reproduced in Figure 11. The positions of the dimensions meaningfulness and comprehensibility are very close.
Manageability is positioned roughly halfway between meaningfulness and comprehensibility.

Figure 11: Configuration of SOC components and factors in three-dimensional space, derived through ALSCAL and based on Euclidean distances (meaningfulness; comprehensibility; manageability) Individual differences (weighted) Euclidean distance model.

<table>
<thead>
<tr>
<th>Meaningfulness items</th>
<th>Manageability items</th>
<th>Comprehensibility items</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 7, 8, 11, 14, 16, 22, 28</td>
<td>2, 6, 9, 13, 18, 20, 23, 25, 27, 29</td>
<td>1, 3, 5, 10, 12, 15, 17, 19, 21, 24, 26</td>
</tr>
</tbody>
</table>

Source: research study

An Independent-Samples T Test was performed to compare means for the two groups: the cases and controls. Ideally, for this test, the subjects should be randomly assigned to these two groups, so that any difference in response related to IBC is searched for, such as variables like SOC. Next it will ensure that differences in other factors are not masking or enhancing a significant difference in means according to the outcome condition. Comparing the SOC scores of participants by their respective means, according to the two groups, there was a significant difference in the scores for SOC (IBC) (M=129.34, SD=24.61) and SOC (IBC) (M=125.68, SD=27.09) conditions; t(2111)= 3.075, p=0.002 (H₀ is rejected (α ≤ 0.05 confidence level).

Several variables and indices were used to assess outcome in the relationship with SOC. The variables which were retained were those which had a significant association with the SOC, such as smoking history, measured in numbers of years of tobacco use, number of cigarettes smoked per day, pleasure in smoking, perspective on immediate smoking cessation and on setting up a Dday. Indices used were SOC, smoking load and nicotine dependence (FTNDP).
Results of cross-tabulation in table 23 showed that a smoking history of a greater number of years of tobacco use than average, a more significant smoking load, more pleasure in smoking and higher perspective on immediate smoking cessation are connected with higher levels of SOC (respectively OR=1.46, CI 1.21-1.77, \(p<0.0011\), OR=1.33, CI 1.09-1.62, \(p=0.006\), OR=1.29, CI 1.05-1.59, \(p=0.01\), OR=1.37, CI 1.07-1.73, \(p=0.01\)). The higher the level of dependence on nicotine the lower the SOC of participants (OR=0.64, CI 0.52-0.80, \(p<0.001\)).

The relationship between SOC and IBC was significant \((p<0.001)\). There were differences between groups in terms of IBC regarding the high and low levels of the SOC score \((OR=1.35, CI 1.11-1.64, \(p<0.001\)): those who considered setting a Dday had higher levels of SOC

![Table 23: Various sub groups and sense of coherence multivariate odds of SOC and years of tobacco use, smoking load, pleasure, success in stopping now, Fagerström and IBC of WATIP participants (frequencies, percentages, means, SD, frequencies and percentages according to SOC levels, OR, 95% CI, p values).](source: research study)
After considering several variables, presented in Table 24, that had expressed an association with the SOC besides those related to smoking history, a model adjusted for gender was developed. A next step considered a logistic regression model in which all variables that showed association were considered, while controlling for gender. The variables that were kept were satisfaction with the family and work conditions (respectively OR = 1.45, CI 1.12-1.09, \( p = 0.009 \) and OR = 1.70, CI 1.28-2.25, \( p < 0.001 \)), feelings about how hard it is to occupy time (OR = 1.75, CI 1.30-2.34, \( p < 0.001 \) and SES (OR = 0.26, CI 0.18-0.38, \( p < 0.001 \)).

Table 24: SOC multivariate odds of SOC and results from logistic regression models of the variables in the study associated with gender, age groups, school years, family-work-finances satisfaction, unemployment, time usefulness, SES of WATIP participants (SD, OR, 95% CI, \( p \) values) unadjusted, adjusted for gender and adjusted to all variables.

<table>
<thead>
<tr>
<th>Independent</th>
<th>Unadjusted OR</th>
<th>Adjusted for gender</th>
<th>Adjusted for all variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-Males ref 1-Females</td>
<td>0.81</td>
<td>0.68</td>
<td>0.98</td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- ≤ 24 ref 1- ≥ 25</td>
<td>1.67</td>
<td>1.25</td>
<td>2.20</td>
</tr>
<tr>
<td>School years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- ≤ 4 ref 1- ≥ 5</td>
<td>1.57</td>
<td>1.23</td>
<td>2.01</td>
</tr>
<tr>
<td>Family satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- low ref 1- high</td>
<td>3.40</td>
<td>2.73</td>
<td>4.23</td>
</tr>
<tr>
<td>Work satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- low ref 1- high</td>
<td>3.77</td>
<td>2.97</td>
<td>4.77</td>
</tr>
<tr>
<td>Financial satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- low ref 1- high</td>
<td>3.39</td>
<td>2.56</td>
<td>4.47</td>
</tr>
<tr>
<td>Unemployment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- yes ref 1- no</td>
<td>2.04</td>
<td>1.89</td>
<td>2.61</td>
</tr>
<tr>
<td>Difficulty to occupy time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- agree ref 1- disagree</td>
<td>4.22</td>
<td>3.33</td>
<td>5.33</td>
</tr>
<tr>
<td>SES Index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- high SES ref 1- low</td>
<td>0.18</td>
<td>0.15</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Source: research study

Multiple regression analyses showed that SOC remained significant for the outcome variable of IBC when adjustments were made for all variables (gender, school years, satisfaction with the family, work and finances, condition of unemployment in the last two years, feeling about how hard it is to occupy time, SES, smoking history of higher numbers of years of tobacco use, smoking load, pleasure in smoking, perspective on immediate smoking cessation and level of dependence on nicotine).
A highly significant relationship ($p<0.001$) was found between IBC and stages of readiness to change. A highly significant relationship was also identified between types of IBC; there were differences between groups in IBC reflecting the high and low levels of the SOC score (OR=1.43, CI 1.01-1.94, $p=0.006$), as those who considered setting a Dday had higher levels of SOC. After adjusting for all variables, stages of readiness to change and SOC (see table 25) were kept in the model.

Table 25: Distribution of the Dday in different sub-groups, multivariate odds and results from logistic regression models of the variables in the study associated with SOC, financial satisfaction and stages of change of WATIP participants (frequencies, percentages, means, SD, OR, 95% CI, OR $p$ values and logistic regression $p$ value).

<table>
<thead>
<tr>
<th>IBC Dday</th>
<th>Count (%)</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>SOC</th>
<th>Count (%)</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>OR $p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S_32_EMR</td>
<td></td>
<td></td>
<td></td>
<td>0 - low ref</td>
<td>638 30.2</td>
<td>98.19</td>
<td>13.82</td>
<td>410 28.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 - high ref</td>
<td>1475 69.8</td>
<td>141.17</td>
<td>17.00</td>
<td>1053 71.8</td>
</tr>
<tr>
<td>Financial satisfaction</td>
<td>S_104ae2</td>
<td>0 - low ref</td>
<td>1174 70.4</td>
<td>123.71</td>
<td>24.57</td>
<td>991 69.7</td>
<td>183 74.4</td>
<td>1.407 0.973 2.034</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 - high ref</td>
<td>494 29.6</td>
<td>140.26</td>
<td>23.09</td>
<td>436 30.3</td>
</tr>
<tr>
<td>Stages of readiness to change</td>
<td>S_95p6cp</td>
<td>0 contempl ref</td>
<td>512 34.6</td>
<td>128.08</td>
<td>25.30</td>
<td>423 32.4</td>
<td>89 49.5</td>
<td>1.407 0.973 2.034</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 preparers ref</td>
<td>969 65.4</td>
<td>129.44</td>
<td>25.18</td>
<td>877 67.6</td>
</tr>
</tbody>
</table>

Source: research study
Arm 2: Smoking cessation and Behaviour Change (BC)

In the previous section, are presented the results of Arm one that considers data that were collected by means of the WATIP probe. An evaluation is given of the smoking patterns of a sample of Portuguese-speaking Web users of the WATIP potentially associated with Intentions to make Behavioural Changes (IBC). A second Arm is now added, focusing on users’ Behaviour Change (BC) one year after WATIP use. With in-depth structured interviews, self-reported answers about smoking patterns (e.g. abstinence or continuous smoking behaviour), an understanding of the link between IBC and BC after WATIP use has been obtained. Data that was collected by telephone and digitally recorded (using land lines and mobile phones) was accepted for consideration; it was then assessed for statistical and content analysis.

Sample and group description of cases and controls

The objective of this study is to gather feedback from WATIP users concerning BC related to smoking cessation intentions and the use of the Internet along with the WATIP probe. From the population of WATIP users searching for help to engage in IBC, there were 1,463 cared-for smokers under scrutiny. A cared-for smoker is considered to be someone who has received at least one session of a structured, multi-session intervention prior to the quit date, who consents to be taken care of and who also sets a quit date. The cared-for smokers displayed a predisposition towards smoking cessation and a likelihood of stopping smoking. This is the outcome of IBC.
It was from cared-for smokers that a sample was selected for interview. The individuals to be interviewed were randomly chosen from a set of participants who met four conditions:

- He/she had set a Dday a minimum of 12 months before the interview took place;
- had provided the researcher with a valid phone number (either mobile or landline);
- had verified that this phone was registered with one of Portugal’s phone companies;
- had agreed that the interview would be recorded.

A random selection of 232 cases was made from the set of participants who had engaged in IBC. Following five attempts to establish contact with every participant by telephone (by trying to reach them in the morning, afternoon and on three occasions in the evening), 37.5% (n= 87) had still not answered and no further attempt was made to contact them. One in every ten of the participants (n=23) had not given their contact number or had supplied the wrong phone number (9.9%). Thirty-nine participants (16.8%) asked to be called later without listening to the introduction, in which an explanation of the reason for the call was clarified. Nine interviewees (3.8%) refused to be interviewed after the goal of the phone call was made clear. One interviewee refused to be recorded. There were technical problems in establishing contact with mobile phones while in the process of recording, with losses of interview for 17 participants (7.3%). Forty-one WATIP users answered and were interviewed during the first tentative telephone enquiry (17.7%) while 12 participants who had asked to be called later, were interviewed during the second attempt to talk to them (5.1%). Two participants answered at the third exploratory call, while one participated in the course of the fifth such call.

In total, 77 interviews were obtained and these form the basis of the users’ evaluation of the WATIP as well as of their BC experience. They were recorded and content analysis produced the raw data that is the foundation of Arm two of this study.

From the people exposed to the WATIP who took a decision to set a quit date (Dday), 25 self-reported to be 12-month quitters (which are the cases). The percentage of self-reported, 12-month quitters is calculated as being the number of ‘cared-for’ smokers who self-reported continuous abstinence from smoking from Dday to the 12-month
follow-up point/all self-reported quitters. The abstinence percentage is 32.9%, which is the outcome of BC.

In this context, 51 participants were smoking (67.1%) at the time of the evaluation interview. These are the controls. In order to understand the characteristics of these WATIP users, based on the data collected by the platform, a number of considerations will be taken into account in the description of this sample of interviewees.

**Socio-demographic determinants**

As Table 26 shows, of the 77 study participants, 47 (61%) were males. Although the target age group was 30-49, (n=50), participants ranged from 22 to 66 years of age.

### Table 26: Distribution in different sub-groups, gender and cases and controls of WATIP participants (frequencies, percentages, means, medians, SD).

<table>
<thead>
<tr>
<th>Socioeconomic status variables categories</th>
<th>Count: absolute frequencies</th>
<th>Percentages: relative frequencies (%)</th>
<th>Gender (males): relative frequencies (%),,46_gen</th>
<th>Gender (females): relative frequencies (%),,46_gen</th>
<th>BC: (cases): relative frequencies (%),,stat2g</th>
<th>BC: (controls): relative frequencies (%),,stat2g</th>
<th>Descriptive statistics of numerical variables (N=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>s_46_gen (N=77)</td>
</tr>
<tr>
<td>1-Males</td>
<td>47</td>
<td>61.0</td>
<td>64.0</td>
<td>58.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Females</td>
<td>30</td>
<td>39.0</td>
<td>36.0</td>
<td>41.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>s_45_2y6 (N=77)</td>
</tr>
<tr>
<td>1- &lt; 20 y age</td>
<td>16</td>
<td>20.8</td>
<td>17.0</td>
<td>26.7</td>
<td>20.0</td>
<td>26.0</td>
<td>216</td>
</tr>
<tr>
<td>2- 20-29</td>
<td>29</td>
<td>37.7</td>
<td>31.9</td>
<td>46.7</td>
<td>32.0</td>
<td>23.5</td>
<td>35.3</td>
</tr>
<tr>
<td>3- 30-39</td>
<td>21</td>
<td>27.3</td>
<td>31.9</td>
<td>20.0</td>
<td>4.0</td>
<td>15.7</td>
<td>25.5</td>
</tr>
<tr>
<td>4- 40-49</td>
<td>9</td>
<td>11.7</td>
<td>14.9</td>
<td>6.7</td>
<td>3.9</td>
<td>2.1</td>
<td>3.9</td>
</tr>
<tr>
<td>5- 50-59</td>
<td>2</td>
<td>2.6</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
<td>2.1</td>
</tr>
<tr>
<td>6- ≥ 60 y age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>s_45_id (N=77)</td>
</tr>
<tr>
<td>School years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean: 36</td>
</tr>
<tr>
<td>1- read &amp; write</td>
<td>1</td>
<td>1.4</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
<td>Std. D: 9.8</td>
</tr>
<tr>
<td>2- 4 years</td>
<td>5</td>
<td>6.8</td>
<td>9.1</td>
<td>3.4</td>
<td>66.7</td>
<td>52.1</td>
<td>Min-Max: 104</td>
</tr>
<tr>
<td>3- 9 years</td>
<td>26</td>
<td>35.6</td>
<td>40.9</td>
<td>27.6</td>
<td></td>
<td></td>
<td>35.4</td>
</tr>
<tr>
<td>4- 12 years</td>
<td>41</td>
<td>56.2</td>
<td>47.7</td>
<td>69.0</td>
<td></td>
<td></td>
<td>s_41ses (N=73)</td>
</tr>
<tr>
<td>5- more than 12 y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean: 22.6</td>
</tr>
<tr>
<td>Unemployment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Std. D: 1.1</td>
</tr>
<tr>
<td>1- the last 2 years</td>
<td>2</td>
<td>2.8</td>
<td>4.7</td>
<td></td>
<td>12.5</td>
<td>10.6</td>
<td>Min-Max: 10.6</td>
</tr>
<tr>
<td>2- more than 1 year</td>
<td>3</td>
<td>4.2</td>
<td>2.3</td>
<td>6.9</td>
<td>87.5</td>
<td>78.7</td>
<td>17.0</td>
</tr>
<tr>
<td>3- less than 1 year</td>
<td>8</td>
<td>11.1</td>
<td>14.0</td>
<td>6.9</td>
<td>8.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4- no</td>
<td>59</td>
<td>81.9</td>
<td>79.1</td>
<td>86.2</td>
<td>91.7</td>
<td>83.0</td>
<td>s_100hes (N=72)</td>
</tr>
<tr>
<td>Live alone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean: 103</td>
</tr>
<tr>
<td>1- yes</td>
<td>10</td>
<td>13.9</td>
<td>16.3</td>
<td>10.3</td>
<td>64.0</td>
<td>58.8</td>
<td>s_101hes (N=72)</td>
</tr>
<tr>
<td>2- no</td>
<td>62</td>
<td>86.1</td>
<td>83.7</td>
<td>89.7</td>
<td>36.0</td>
<td>41.2</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

The mean age was 38 (mode, 36 years). The target group was the best represented (65.0%) of all the age groups. The second-best represented group (20.8%) was that of
participants between 20 and 29 years of age (N=16). Most participants had received 12 years of school education (47.7%). Eight in every ten of the WATIP users were employed at the time of registration (81.9%). Only 13.9% were living alone.

Women and men did not differ about feelings of satisfaction with their family, their work or their financial condition. About two in every three said that they had social support outside their home setting (69%) and there was an equivalent distribution about meaningfulness of time: 22.2% and 23.6% (respectively) disagreed or strongly disagreed that it was hard for them to occupy their time.

There was a slight feeling of loneliness, as 5.6% and 16.7% reported feeling very lonely or very alone (Table 27).

Table 27: Frequencies, percentages, means, medians and standard deviations in socioeconomic status (SES) of WATIP participants (cross-relationships between gender and condition - cases and controls).

<table>
<thead>
<tr>
<th>SocioEconomic Status variables categories</th>
<th>Count: absolute frequencies</th>
<th>Percentages: relative frequencies (%)</th>
<th>Gender (males): relative frequencies (%): males gen</th>
<th>Gender (females): relative frequencies (%): females gen</th>
<th>BC (cases): relative frequencies (%): cases</th>
<th>BC (controls): relative frequencies (%): controls</th>
<th>Descriptive statistics of numerical variables (N =)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES_Index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1- high SES</td>
<td>26</td>
<td>33.8</td>
<td>40.4</td>
<td>23.3</td>
<td>32.0</td>
<td>33.3</td>
<td>s_sesr</td>
</tr>
<tr>
<td>2- middle</td>
<td>41</td>
<td>53.2</td>
<td>42.6</td>
<td>70.0</td>
<td>52.0</td>
<td>54.9</td>
<td>s_ses</td>
</tr>
<tr>
<td>3- low SES</td>
<td>10</td>
<td>13.0</td>
<td>17.0</td>
<td>6.7</td>
<td>16.0</td>
<td>11.8</td>
<td>Mean: 30.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Median: 31.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Std. D.: 6.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Min-Max: 20-44</td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

In order to make the importance of the socioeconomic characteristics of these subjects more easily understood, it should be stressed that, as table 27 shows, the mean of the SES value was 30.7 (range was 22 units) and the standard deviation was 6.0. About one in every ten participants belonged to the lower SES (13%). About one in every three participants belonged to the higher SES (33.8%). The results showed that smoking cessation was not related to any socio-demographic variable in this sample.
Smoking behaviour and smoking history

Almost all the participants smoked cigarettes (97.4%) and Marlboro was the most often-smoked brand of cigarette (29.9%). The mean smoking rate was 20 cigarettes per day (SD of 8 cigarettes) and the average number of smoking years was 18 (SD 9 years). The smoking load had a mean of 22.3 (SD 6). The first category of cigarette packs per year (equal or inferior to 20) characterized 62% of participants. One quarter of the participants had a smoking load of between 21 and 40.

One in every four of the participants had not previously tried setting a Dday for quitting by means of the WATIP, while 26.4% had registered one previous quit attempt. Two quit attempts had been attempted by 20.8% of participants, while 9.7% had tried three times before, to get rid of cigarettes. The majority of the smokers associated smoking with stressful situations and with being in the company of friends (26.3%). (See table 28.)

Table 28: Frequencies, percentages, means, medians and standard deviations in previous quit attempts and context of smoking of WATIP participants (cross-relationships between gender and condition - cases and controls).

<table>
<thead>
<tr>
<th>Smoking pattern status variables categories</th>
<th>Previous attempts</th>
<th>Smoke more often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: absolute frequencies</td>
<td>Percentages: relative frequencies (%): males</td>
<td>Gender (males): relative frequencies (%): cases</td>
</tr>
<tr>
<td></td>
<td>Count: absolute frequencies</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>19</td>
<td>26.4</td>
</tr>
<tr>
<td>1</td>
<td>19</td>
<td>26.4</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>20.8</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>9.7</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>2.8</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>6.9</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>2.8</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>52.6</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>52.6</td>
</tr>
<tr>
<td>10 or more</td>
<td>3</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>26.3</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>26.3</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>19.7</td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

Most participants showed very limited pleasure in their smoking dependence; 59.2% reported that on a scale of between zero (no pleasure) and 10 (maximum pleasure) their intentions to make behavioural changes & behavioural changes
selection was between zero and two (Table 29). The perception of dependence on nicotine was high, as more than 50% would self-report levels of between 8 and 10 on a scale of between 0 (no dependence) and 10 (maximum dependence).

Table 29: Frequencies, percentages, means, medians and standard deviations in readiness and willingness to change including pleasure in smoking, perceived dependency on nicotine, physical dependency and source of willingness to participate in the WATIP (cross-relationships between gender and condition - cases and controls).

<table>
<thead>
<tr>
<th>Readiness to stop</th>
<th>Count: absolute frequencies</th>
<th>Percentages: relative frequencies</th>
<th>Gender (males): relative frequencies (%), 46_gen</th>
<th>Gender (females): relative frequencies (%), 46_gen</th>
<th>IBC Day (cases): relative frequencies (%), stat2g</th>
<th>IBC Day (controls): relative frequencies (%), stat2g</th>
<th>Descriptive statistics of numerical variables (N =)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasure in smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no pleasure</td>
<td>8</td>
<td></td>
<td>11.3</td>
<td>50.0</td>
<td>50.0</td>
<td>8.3</td>
<td>13.0</td>
</tr>
<tr>
<td>1-</td>
<td>16</td>
<td></td>
<td>22.5</td>
<td>50.0</td>
<td>50.0</td>
<td>12.5</td>
<td>10.9</td>
</tr>
<tr>
<td>2-</td>
<td>18</td>
<td></td>
<td>25.4</td>
<td>62.5</td>
<td>37.5</td>
<td>12.5</td>
<td>28.3</td>
</tr>
<tr>
<td>3-</td>
<td>3</td>
<td></td>
<td>4.2</td>
<td>55.6</td>
<td>44.4</td>
<td>16.7</td>
<td>30.4</td>
</tr>
<tr>
<td>4-</td>
<td>10</td>
<td></td>
<td>14.1</td>
<td>33.3</td>
<td>66.7</td>
<td>8.3</td>
<td>2.2</td>
</tr>
<tr>
<td>5-</td>
<td>3</td>
<td></td>
<td>4.2</td>
<td>90.0</td>
<td>10.0</td>
<td>25.0</td>
<td>6.5</td>
</tr>
<tr>
<td>6-</td>
<td>3</td>
<td></td>
<td>4.2</td>
<td>66.7</td>
<td>33.3</td>
<td>8.3</td>
<td>2.2</td>
</tr>
<tr>
<td>7-</td>
<td>2</td>
<td></td>
<td>2.8</td>
<td>33.3</td>
<td>66.7</td>
<td>8.3</td>
<td>2.2</td>
</tr>
<tr>
<td>8-</td>
<td>8</td>
<td></td>
<td>11.3</td>
<td>50.0</td>
<td>50.0</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>9-</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10- max. pleasure</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.2</td>
</tr>
<tr>
<td>Self perceived dependency on nicotine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no dependency</td>
<td>1</td>
<td></td>
<td>1.4</td>
<td>2.3</td>
<td>12.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-</td>
<td>1</td>
<td></td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-</td>
<td>3</td>
<td></td>
<td>4.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-</td>
<td>1</td>
<td></td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-</td>
<td>3</td>
<td></td>
<td>4.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-</td>
<td>6</td>
<td></td>
<td>8.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-</td>
<td>14</td>
<td></td>
<td>19.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-</td>
<td>20</td>
<td></td>
<td>27.8</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>8-</td>
<td>15</td>
<td></td>
<td>20.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-</td>
<td>8</td>
<td></td>
<td>11.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10- max. dependency</td>
<td>1</td>
<td></td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self perceived physical dependency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>0- no dependency</td>
<td>1</td>
<td></td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-</td>
<td>1</td>
<td></td>
<td>1.4</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-</td>
<td>2</td>
<td></td>
<td>2.8</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>3-</td>
<td>4</td>
<td></td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td>5-</td>
<td>6</td>
<td></td>
<td>4.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-</td>
<td>14</td>
<td></td>
<td>19.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-</td>
<td>21</td>
<td></td>
<td>29.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-</td>
<td>15</td>
<td></td>
<td>20.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-</td>
<td>11</td>
<td></td>
<td>15.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10- max. dependency</td>
<td>15</td>
<td></td>
<td>20.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Origin influence to stop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 other</td>
<td>15</td>
<td></td>
<td>20.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 personal decision</td>
<td>57</td>
<td></td>
<td>79.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)
The perception of physical dependence on cigarettes was self-perceived as even higher than that of dependence on nicotine; 77% self-reported levels of between 8 and 10 on a scale of zero (no dependence) to 10 (maximum dependence). About 8 in every 10 participants who used the WATIP did so on their own initiative. Only 21% did so on someone else’s advice.

There is no significant association between the BC and the numbers of cigarettes smoked by this sample. Rates of BC did not differ by pleasure in smoking, previous quit attempts or any other variables considered (Table 30).

### Table 30: Multivariate analysis: IBC as a function of number of cigarettes, pleasure in smoking, previous quit attempts, self perceived dependence of nicotine, locus of control for the decision to smoking cessation of WATIP participants (frequencies, percentages, OR, 95% CI, p values).

<table>
<thead>
<tr>
<th>Variable (IBC)</th>
<th>Categories</th>
<th>cases</th>
<th>controls</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cigarettes</td>
<td>$\leq 20$ units $^{ref}$</td>
<td>22</td>
<td>38</td>
<td>2.509</td>
<td>.643 - 9.78</td>
<td>0.175</td>
</tr>
<tr>
<td></td>
<td>$&gt; 20$ units</td>
<td>3</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasure in smoking</td>
<td>$0$ no or little pleasure $^{ref}$</td>
<td>8</td>
<td>24</td>
<td>0.458</td>
<td>0.164 - 1.28</td>
<td>0.133</td>
</tr>
<tr>
<td></td>
<td>$1$ pleasure $^{ref}$</td>
<td>16</td>
<td>22</td>
<td>0.742</td>
<td>0.245 - 2.25</td>
<td>0.598</td>
</tr>
<tr>
<td>Previous quit attempts</td>
<td>$0$ $\leq 2$</td>
<td>17</td>
<td>36</td>
<td>0.742</td>
<td>0.245 - 2.25</td>
<td>0.598</td>
</tr>
<tr>
<td></td>
<td>$1$ $&gt; 2$ $^{ref}$</td>
<td>7</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>self physical dependence</td>
<td>$0$ $\leq 7$ $^{ref}$</td>
<td>10</td>
<td>15</td>
<td>1.524</td>
<td>0.551 - 4.21</td>
<td>0.416</td>
</tr>
<tr>
<td></td>
<td>$1$ $&gt; 8$ $^{ref}$</td>
<td>14</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus of contr decision</td>
<td>$0$ other $^{ref}$</td>
<td>3</td>
<td>12</td>
<td>0.417</td>
<td>0.105 - 1.65</td>
<td>0.203</td>
</tr>
<tr>
<td></td>
<td>$1$ personal $^{ref}$</td>
<td>21</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

### Readiness to quit and stages of change in smoking cessation

Readiness to change was assessed by confronting smokers with possible goals with regard to smoking cessation. Smokers were divided into 4 groups: preparers were those who were ready to make a decision about smoking cessation. Contemplators were those who planned to stop in the next 3 months. Those who were planning smoking cessation in the future (more than 3 months) were considered precontemplators. Immotives where those smokers who were not willing to take any action within 12 months.
More than one in every two smokers (52.8%) in this sample were preparers and they were planning to quit “now” (Table 31).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stages of readiness to change</th>
<th>s_95 p6 (%)</th>
<th>s_95p6cp stages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: absolute frequencies (N)</td>
<td>Immotives</td>
<td>Precontemplators</td>
<td>Contemplators</td>
</tr>
<tr>
<td>Percentages: relative frequencies (%)</td>
<td>3</td>
<td>5</td>
<td>26</td>
</tr>
<tr>
<td>Gender (males): relative frequencies (%)</td>
<td>4.2</td>
<td>6.9</td>
<td>36.1</td>
</tr>
<tr>
<td>Females (%)</td>
<td>33.3</td>
<td>80.0</td>
<td>42.3</td>
</tr>
<tr>
<td>BC (cases): relative frequencies (%)</td>
<td>66.7</td>
<td>20.0</td>
<td>57.7</td>
</tr>
<tr>
<td>BC (controls) (%)</td>
<td>33.3</td>
<td>80.0</td>
<td>42.3</td>
</tr>
<tr>
<td>School Years: relative frequencies (%)</td>
<td>100.0</td>
<td>80.0</td>
<td>69.2</td>
</tr>
<tr>
<td>Age groups: relative frequencies (%)</td>
<td>100.0</td>
<td>100.0</td>
<td>96.2</td>
</tr>
<tr>
<td>Number of years tobacco use (mean)</td>
<td>15.0</td>
<td>15.4</td>
<td>19.7</td>
</tr>
<tr>
<td>Number of cigarettes</td>
<td>66.7</td>
<td>80.0</td>
<td>53.8</td>
</tr>
<tr>
<td>Number of cigarettes</td>
<td>33.3</td>
<td>20.0</td>
<td>19.2</td>
</tr>
<tr>
<td>Previous quit attempts</td>
<td>26.7</td>
<td>22.0</td>
<td>21.3</td>
</tr>
<tr>
<td>FTNDP S_91FRE0 (mean)</td>
<td>1.0</td>
<td>1.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Source: research study (Arm 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contemplators, Planning to quit sometime in the future (within 3 months), accounted for 36.1% of the total number of participants. Precontemplators, Planning to quit sometime in the future (within a year) and immotives, Planning to quit sometime in the future (more than one year), made up 11.1% (respectively 6.9% and 4.2%).

Luis Saboga Nunes
The distribution of smokers in table 31 indicates that there were 39.5% of preparers, 30.8% of contemplators and 20% of precontemplators among those who stopped smoking (the cases) in this sample. The above-noted distribution of participants’ intentions to make behavioural changes & behavioural changes indicates that no influence on the quitting status is determined by the four stages of change (Table 32). In addition, gender, age, number of school years, number of cigarettes smoked per day, years of tobacco use, previous quit attempts and the SOC were not significantly associated with position in the stages of change. Prepares had, nevertheless, a lower level of nicotine dependence (M=3.8) when compared to contemplators (M=4.8) or pre-contemplators (M=5.8) (p=0.01).

Table 32: Multivariate analysis: IBC as a function of two stages of change among WATIP participants (frequencies, percentages, Odds Ratio, 95% confidence intervals, p values).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>cases freq</th>
<th>cases %</th>
<th>controls freq</th>
<th>controls %</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prochaska</td>
<td>S_PT2G</td>
<td>0 contempl</td>
<td>22</td>
<td>30.6</td>
<td>50</td>
<td>69.4</td>
<td>0.147</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>1 action</td>
<td>3</td>
<td>75.0</td>
<td></td>
<td>1</td>
<td>25.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

Consciencialização of the type of smoker and nicotine dependence evaluation

Heaviness of smoking operationalised by using the six items of the Fagerström test for Nicotine Dependence in Portuguese (FTNDP) assesses smoking habits, such as daily time of first cigarette, time of day when most likely to smoke, difficulty of not smoking in places where it is prohibited and difficulty refraining from smoking when sick. The minimum possible score was zero and the maximum was 10 (where zero = very low dependence and 10 = very high dependence).

As table 33 shows, one in every five of the users smoked a cigarette less than 6 minutes after waking up (28.0%). Twenty-five percent would smoke their first cigarette of the day within an hour after waking up. Nevertheless, for 62.7% the first cigarette in the morning was the hardest to give up.
For one third of the smokers it was hard not to smoke in forbidden places, such as hospitals, offices or public buildings (26.7%) and 46.7% affirmed that they continued to smoke even when sick in bed.

The average of the FTNDP was 4.24 (SD=2.3). There were no differences between groups in BC regarding the high and low levels of the FTNDP score (OR=2.21, CI 0.81-6.08, \( p=0.119 \)), but a difference was found related to smoking in bed when sick, as those who did not stop smoking (the controls) were prone to smoke more in bed than those who did eventually stop smoking’ (OR=6.31, CI 2.03-19.67, \( p=0.001 \)) (the cases) (Table 34).

### Table 33: Frequencies, percentages, means, medians and standard deviations in time after waking up of first cigarettes, difficulty not to smoke in certain places, categories of cigarettes smoked per day, condition of smoking in the morning and when sick of WATIP participants (cross-relationships between gender and condition - cases and controls).

<table>
<thead>
<tr>
<th>Smoking pattern status variables categories</th>
<th>Count: absolute frequencies</th>
<th>First cigarette after waking up</th>
<th>Gender (males): relative frequencies</th>
<th>Gender (females): relative frequencies</th>
<th>BC (cases): relative frequencies</th>
<th>BC (controls): relative frequencies</th>
<th>Descriptive statistics of numerical variables (N=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First cigarette after waking up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3- &gt; than 60 minutes</td>
<td>13</td>
<td>17.3</td>
<td>17.8</td>
<td>16.7</td>
<td>8.0</td>
<td>22.4</td>
<td>85.51 (N=75)</td>
</tr>
<tr>
<td>2- 31-60 minutes</td>
<td>22</td>
<td>29.3</td>
<td>33.3</td>
<td>23.3</td>
<td>36.0</td>
<td>26.5</td>
<td>86.62 (N=75)</td>
</tr>
<tr>
<td>1- 6-30 minutes</td>
<td>19</td>
<td>25.3</td>
<td>22.2</td>
<td>30.0</td>
<td>24.0</td>
<td>26.5</td>
<td>87.63 (N=75)</td>
</tr>
<tr>
<td>0- &lt; 6 minutes</td>
<td>21</td>
<td>28.0</td>
<td>26.7</td>
<td>30.0</td>
<td>32.0</td>
<td>24.5</td>
<td>88.64 (N=75)</td>
</tr>
<tr>
<td>Difficult in refraining from smoking in forbidden places</td>
<td></td>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no</td>
<td></td>
<td>73.3</td>
<td>77.8</td>
<td>66.7</td>
<td>80.0</td>
<td>69.4</td>
<td>89.65 (N=75)</td>
</tr>
<tr>
<td>1- yes</td>
<td>20</td>
<td>26.7</td>
<td>22.2</td>
<td>33.3</td>
<td>20.0</td>
<td>30.6</td>
<td></td>
</tr>
<tr>
<td>Cigarette most difficult not to smoke</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- any other</td>
<td>28</td>
<td>37.3</td>
<td>42.2</td>
<td>30.0</td>
<td>44.0</td>
<td>34.7</td>
<td>90.66 (N=75)</td>
</tr>
<tr>
<td>1- first in the morning</td>
<td>47</td>
<td>62.7</td>
<td>57.8</td>
<td>70.0</td>
<td>56.0</td>
<td>65.3</td>
<td></td>
</tr>
<tr>
<td>Number of cigarettes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- &lt; 11</td>
<td>10</td>
<td>13.3</td>
<td>17.8</td>
<td>6.7</td>
<td>16.0</td>
<td>12.2</td>
<td>91.67 (N=75)</td>
</tr>
<tr>
<td>1- 11-20</td>
<td>42</td>
<td>56.0</td>
<td>51.1</td>
<td>63.3</td>
<td>60.0</td>
<td>53.1</td>
<td></td>
</tr>
<tr>
<td>2- 21-30</td>
<td>16</td>
<td>21.3</td>
<td>20.0</td>
<td>23.3</td>
<td>24.0</td>
<td>20.4</td>
<td></td>
</tr>
<tr>
<td>3- &gt; 30</td>
<td>7</td>
<td>9.3</td>
<td>11.1</td>
<td>6.7</td>
<td>14.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking in the morning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no</td>
<td>56</td>
<td>74.7</td>
<td>75.6</td>
<td>73.3</td>
<td>80.0</td>
<td>71.4</td>
<td>92.68 (N=75)</td>
</tr>
<tr>
<td>1- yes</td>
<td>19</td>
<td>25.3</td>
<td>24.4</td>
<td>26.7</td>
<td>20.0</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td>Smoking when sick</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0- no</td>
<td>40</td>
<td>53.3</td>
<td>60.0</td>
<td>43.3</td>
<td>80.0</td>
<td>38.8</td>
<td>93.70 (N=75)</td>
</tr>
<tr>
<td>1- yes</td>
<td>35</td>
<td>46.7</td>
<td>40.0</td>
<td>56.7</td>
<td>20.0</td>
<td>61.2</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)
### Table 34: Multivariate analysis: IBC as a function of time after waking up for first cigarettes, difficulty in refraining from smoking in certain places, categories of cigarettes smoked per day, attitude to smoking in the morning, and when sick, of WATIP participants (frequencies, percentages, OR, 95% CI, p values).

<table>
<thead>
<tr>
<th>variable</th>
<th>Categories</th>
<th>cases</th>
<th>Controls</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fagerström score s_91fret2</td>
<td>0 low fager(^{ref})</td>
<td>17</td>
<td>24</td>
<td>2.21</td>
<td>0.806 to 6.08</td>
<td>0.119</td>
</tr>
<tr>
<td></td>
<td>1 high fager</td>
<td>8</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First cigarette after waking up s_85f1r</td>
<td>0 ≥ 60 min.</td>
<td>2</td>
<td>11</td>
<td>0.300</td>
<td>0.061 to 1.57</td>
<td>0.122</td>
</tr>
<tr>
<td></td>
<td>1 &lt; 60 min.(^{ref})</td>
<td>23</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoke after waking up s_85f2r2</td>
<td>0 ≥ 5 min.</td>
<td>17</td>
<td>37</td>
<td>0.689</td>
<td>0.238 to 1.99</td>
<td>0.491</td>
</tr>
<tr>
<td></td>
<td>1 &lt; 5 min.(^{ref})</td>
<td>8</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult in refraining from smoking in forbidden places S_86_F2</td>
<td>0 no(^{ref})</td>
<td>20</td>
<td>34</td>
<td>1.76</td>
<td>0.557 to 5.59</td>
<td>0.331</td>
</tr>
<tr>
<td></td>
<td>1 yes</td>
<td>5</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette most difficult not to smoke S_87_F3</td>
<td>0 first in the morning(^{ref})</td>
<td>11</td>
<td>17</td>
<td>1.479</td>
<td>0.552 to 3.95</td>
<td>0.435</td>
</tr>
<tr>
<td></td>
<td>1 any other</td>
<td>14</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking in the morning S_89_F5</td>
<td>0 no(^{ref})</td>
<td>20</td>
<td>35</td>
<td>1.600</td>
<td>0.502 to 5.10</td>
<td>0.425</td>
</tr>
<tr>
<td></td>
<td>1 yes</td>
<td>5</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking when sick S_90_F6</td>
<td>0 no(^{ref})</td>
<td>20</td>
<td>19</td>
<td>6.316</td>
<td>2.028 to 19.67</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>1 yes</td>
<td>5</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

---

**Motivation, self efficacy and Behavioural Changes**

There are no differences between less or higher motivation and the smokers’ BC.

Self-efficacy reflects the confidence smokers have in their ability to stop smoking and is scored from *no probability of stopping* (0) to *maximum probability* (10). After analysis of these responses, this item was transformed into a dichotomous variable where high motivation was attributed to persons who selected six or higher from the scale of possibilities offered in the questionnaire.

Self-efficacy does not differentiate between female and male when smoking cessation is taken into consideration (OR=0.38, CI 0.13-1.10, *p*=0.71). When users of the WATIP considered whether they were to enter a smoking cessation programme “now” or “in the future”, those who were willing to try smoking cessation immediately were found to be...
no more likely to stop in the short term, than those who delayed setting a cessation date (OR=1.73, CI 0.64-4.75, \( p=0.278 \)) (Table 35).

### Table 35: Multivariate analysis: IBC as a function of success in stopping of WATIP participants (frequencies, percentages, OR, 95% CI, \( p \) values).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>Cases</th>
<th>controls</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success in stopping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>today</td>
<td>0&lt;=0-5</td>
<td>14</td>
<td>19.7</td>
<td>37</td>
<td>0.378</td>
<td>0.130 1.104  0.71</td>
</tr>
<tr>
<td></td>
<td>1&gt;=6-10 ref</td>
<td>10</td>
<td>14.1</td>
<td>10</td>
<td>0.141</td>
<td></td>
</tr>
<tr>
<td>Stop</td>
<td>0 now</td>
<td>15</td>
<td>39.5</td>
<td>23</td>
<td>0.739</td>
<td>0.637 4.751  0.278</td>
</tr>
<tr>
<td></td>
<td>1 future ref</td>
<td>9</td>
<td>27.3</td>
<td>24</td>
<td>0.727</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

### Sense of Coherence and Behavioural Changes

Sense of coherence was assessed with the use of a 29-item closed questionnaire (Questionário Orientação para Viver - QOV). The frequency distributions of the SOC scores followed a Normal distribution and the values ranged from 80 to 192. The mean was 136 (SD 22). The Cronbach alpha measure of internal consistency was 0.91.

An Independent-Samples T Test was performed to compare means for the two groups: the cases (those who stopped smoking) and controls (those who continued to smoke). Comparing the SOC scores of participants by their respective means, according to the two groups, there was a significant difference in the scores for SOC (BC) (\( M=144.66, SD=22.52 \)) and SOC (BC) (\( M=131.51, SD=21.43 \)) conditions; \( t(76)=2.51, p=0.014 (H_0 \) is rejected (\( \alpha \leq 0.05 \) confidence level).

Several variables and indices were used as outcome in assessing the relationship with SOC. The variables retained were smoking history, measured in numbers of years of tobacco use, number of cigarettes smoked per day, pleasure in smoking, perspective on immediate smoking cessation and perspective on setting up a Dday. Indices used were SOC, smoking load and nicotine dependence (FTNDP).
Results of cross-tabulation in Table 36 showed that a smoking history of a greater number of years of tobacco use than average is connected with higher levels of SOC (respectively OR=7.03, CI 1.45-34.04, \( p=0.007 \)). No differences were found related to smoking load, more pleasure in smoking and higher perspective on immediate smoking cessation, or levels of dependence on nicotine.

<table>
<thead>
<tr>
<th>Number of years tobacco use</th>
<th>Count</th>
<th>%</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>Low SOC freq</th>
<th>Low SOC %</th>
<th>High SOC freq</th>
<th>High SOC %</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0- ≤ 16 yrs</td>
<td>41</td>
<td>53.2</td>
<td>131.07</td>
<td>24.25</td>
<td>12</td>
<td>85.7</td>
<td>29</td>
<td>46.0</td>
<td>7.034</td>
<td>1.454-34.04</td>
<td>0.007</td>
</tr>
<tr>
<td>1- ≥ 16 yrs</td>
<td>36</td>
<td>46.8</td>
<td>142.63</td>
<td>19.58</td>
<td>2</td>
<td>14.3</td>
<td>34</td>
<td>54.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)

To overturn the \textit{habitus} of smoking, three levels of achievement could be decided upon by the individual. These are \textit{comprehensibility}, \textit{manageability} and \textit{meaningfulness}, which constitute the core of the construct of the \textit{sense of coherence}. This is the basis for the construction of the dynamic interrelatedness of the SOC components (Table 37).

<table>
<thead>
<tr>
<th>Component</th>
<th>Type</th>
<th>Comprehensibility</th>
<th>Manageability</th>
<th>Meaningfulness</th>
<th>Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Stable</td>
</tr>
<tr>
<td>2</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Rare</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Pressure to move up</td>
</tr>
<tr>
<td>4</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Pressure to move up</td>
</tr>
<tr>
<td>5</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Pressure to move down</td>
</tr>
<tr>
<td>6</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Pressure to move down</td>
</tr>
<tr>
<td>7</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Rare</td>
</tr>
<tr>
<td>8</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Stable</td>
</tr>
</tbody>
</table>

Source: ANTONOVSKY, 1987

From the results of Arm 2, of those who stopped using tobacco, 84.0\% belonged to prediction type 1 in terms of SOC. This means that successful WATIP users who achieved smoking cessation scored high in relation to the three components of the SOC (Table 38).
Table 38: Percentage per SOC type of WATIP users of Arm 2.

<table>
<thead>
<tr>
<th></th>
<th>Soc Types % T8SOC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>E_STAT2G BC status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 non smokers</td>
<td>84.0</td>
<td>4.0</td>
</tr>
<tr>
<td>1 smokers</td>
<td>54.9</td>
<td>25.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>64.5</td>
<td>18.4</td>
</tr>
</tbody>
</table>

Source: research study (Arm 2) type 3 is missing and the interview does not belong to a BC case but to a IBC

A more detailed description of these results where a triangulation is made between Arm 1 and Arm 2 of this research, make explicit the interrelatedness of the SOC three dimensions.

SOC type 1

BC_02: José, from Cascais, male, 56 years

José, 56 years of age, living in Cascais, is one of the WATIP users who were interviewed (Arm 2 of study). In this exchange he reported that he had successfully stopped using tobacco. After data analysis, José presents a type 1 profile of the SOC. José was going through a period of unemployment, playing a social role in which life experiences of consistency may be absent and a reasonable underload-overload balance may not provide the experience of social participation. Nevertheless, he demonstrated a strong SOC, in which high comprehensibility, meaningfulness and manageability were experienced. This could be considered a critical element favouring his success in smoking cessation (BC) one year after he decided on a Dday and used the WATIP to help him in the process.

It is important to see how positive about himself José is, as he refers to the Dday. The degree of compromise with himself and the relevancy of the meaningfulness he attributes to life decisions are shown by his own words:
The case of José is an example of the interrelatedness between health professionals (HP) and patients interested in smoking cessation. The health unit of the health professional assisting José in his dis-ease management had a waiting list of 12 months. In this context José was informed by his health specialist, an otorhinolaringologist, of the existence of the WATIP: “Tomei conhecimente através da Drª Clara Capucho numa consulta de "Voz e Tabaco" no Hospital Egas Moniz”. José is a long-time smoker (34 years) and he is one example of the influence of the Portuguese colonial wars on the implantation of the smoking habitus, as he puts it himself:

José is highly dependent on nicotine and this is confirmed by his smoking: “Utilizo mais o tabaco de manhã, depois de me levantar (uma vez feita a higiene e tonado o pequeno almoço) e apos o almoço e jantar”. He has tried before to stop but a weak moment contributed to a return to smoking: “em 1981 deixei de fumar de durante 5 anos, nem uma "passa". Mas, após esse período com umas brincadeiras com cigarrilhas em espanha, acabei voltando a fumar regularmente”.

José scores high in all three dimensions of the SOC, which is an example of a type 1 profile. He his one of the 84.0% of those with this type of profile who changed their behaviour (BC) and stopped smoking, as reported one year after the use of the WATIP.

---

15 Emphasis provided for texts written by WATIP users. No corrections of original texts have been made. The user's own written words have been preserved exactly as they were set down (despite grammatical errors or spelling mistakes).
SOC type 2

BC_05: Sara, from Amadora, female, 32 years

WATIP: Internet search; SES: middle, unemployed; Smoking history: 20 cigarettes/day, 15 years of smoking, 3 trials
Self-perceived nicotine dependence: 10 on a scale of 0 (no dependence) to 10 (maximum dependence);
Cigarette dependence: 10 on a scale of 0 (no dependence) to 10 (maximum dependence);
Willingness to stop: 6 on a scale of 0 (no will) to 10 (maximum willingness);
Pleasure: 0 on a scale of zero (no pleasure) to 10 (maximum pleasure);
Stage of Change: Contemplator;
FTND: 7 on a scale of 1 (no dependence) to 10 (maximum dependence);
Self-efficacy: 1 on a scale of zero (no self-efficacy) to 10 (high self-efficacy);
SOC score: 115 (M: 136); SOC: type 2, smoker after 1 year

Sara is a woman who found the WATIP by doing an Internet search. Although she did set a Dday, she was not able to stop smoking. She presents a type 2 profile of the SOC. According to Antonovsky (ANTONOVSKY, 1987, 19) this is a very rare pattern and is found among 25% of those who have not stopped smoking (as compared to those who did stop, only 4% present SOC type 2 in this study). Sara combines low comprehensibility status with high manageability. High manageability is strongly contingent on high comprehensibility. Resources are available to Sara to meet the demands of smoking cessation. These take into account that she has a compromised picture of what those demands are. Life conditions for Sara are entropic and unpredictable.

Unlike José, who started to smoke in the stressful situation during the colonial war, Sara took up the habit along with a friend (female) when she was only 12. She felt very bad about it, but she persisted and continued to smoke, especially after she become totally hooked at the age of 14. She is one example of the influence of social pressure on the implantation of the smoking habitus, as she puts it in her own words:

“fumei o meu primeiro cigarro aos 12 anos na companhia de um amaiga e soube-me horrivelmente mal. depois continuei na secundária mas fumava esporaduicamente. só aos 14 anos é q comecei a fumar a valer e comecei com sg filtro. sentia a cabeça a rodar e mal disposta. desde então nunca mais larguei”

Sara has a high level of awareness of her addiction (self-reported to be 10). She presents one of the highest FTNDP scores of WATIP users (7). She is so hooked that as soon as she wakes up she starts smoking her cigarettes:

luis saboga nunes
mal acordo, bebo um copo de leite e vou fumar um cigarro. depois vou ao café e fumo outro. trabalho e ai não fumo. na hora de almoço fumo 3 cig. qd acabo o trabalho vou ao café e fumo um cig. no restante da noite fumo mais ou menos uns 5 cig.

There is a very critical expression in Sara’s comments on the WATIP platform when she says that she made a quit attempt for some time when she “started to believe in the persons around her”. For Sara, smoking appears to be a way to demonstrate her autonomy, and since she does not want to be “parva” she returned to smoking. Her various problems have led her to relapse, before using cigarettes “compulsively”:

deixei de fumar completamente em 2001 em setembro. isto deveu-se ao facto de eu começar a acreditar nas pessoas e não sentir mais necessidade de me esconder atrás do cig. isto durou 3 meses. até que eu achei que estva a ser parva, pois toda a minha vida obedeci a pessoas e tentei demarcar-me e voltei a fumar. em 2001 tive medo de me dar algum acioa e deixei de fumar durante 1 mês, mas os nervos atacaram e voltei. em 2003 fiquei 3 meses somente a fumar 1 cig por dia. em 2004 voltei a fumar compulsivamente

Sara is suffering from her condition, as she writes that “quero ser livre. quero ser feliz. quero ser EU”. The comments Sara makes about her Dday demonstrate a deep feeling about life: she wants to be free, she wants to be happy. Finally, she says, she wants to be HERSELF. She feels out of control, and the rare pattern of SOC type 2, with a low overall score in terms of SOC (115) could contribute to setting her apart from José, who had a SOC score of 192. Sara and José are both unemployed. Nevertheless, José has stopped smoking while Sara continues to smoke. It cannot be ruled out that SOC could have contributed to this difference.

SOC type 3

IBC_2967: Rui, from Ponte da Barca, male, 41 years

WATIP: I; SES: middle, unemployed; Smoking history: 30 cigarettes/day, 25 years of smoking, 0 trial;
Self-perceived nicotine dependence: 10 on a scale of 0 (no dependence) to 10 (maximum dependence);
Cigarette dependence: 9 on a scale of 0 (no dependence) to 10 (maximum dependence);
Willingness to stop: 0 on a scale of 0 (no will) to10 (maximum willingness);
Pleasure: 0 in a scale of zero (no pleasure) to 10 (maximum pleasure);
Stage of Change: Contemplator;
FTND: 5 on a scale of 1 (no dependence) to 10 (maximum dependence);
Motivation: 2 (where 1 = low motivation and 3 = high motivation);
Self-efficacy: 0 on a scale of zero (no self-efficacy) to 10 (high self-efficacy);
SOC score: 117 (M: 136); SOC: type 3

type 3 is missing and the interview does not belong to a BC case but to a IBC
Rui lives in the north of Portugal, in Ponte da Barca, and presents a type 3 profile of the SOC. He is one example of those who did not set a Dday. The combination of high comprehensibility with low manageability leads to strong pressure to change. The direction of the move is determined by the sense of meaningfulness. If Rui would care enough about the situation he is in and believe that he understands the problem of how to confront smoking cessation, he could find strong enough motivation to seek out resources. Without such motivation, Rui with low manageability, ceases to respond to stimuli, as the world is full of entropic input. Rui gives a “0” score in his willingness to stop.

Rui has been smoking since a very early age and is one example of the influence of friends on the implantation of the smoking habitus: “Com o grupo de colegas de escola/vizinhos aos 6 anos, um deles tirava os cigarros aos pais e escondiamos para dar umas "passas". Fazia-o para pertença ao grupo”. Rui has a high consciousness of his addiction (self-reported to be 10):

_Logo de manhã, café cigarro(s), durante a viagem de carro(35 minutos) para o trabalho(3/4 cigarros). A meio da manhã(caf cigarro). Almoço(antes e depois-2/3cigarros). A partir da tarde, final do atendimento ao público (ocorre às 15 horas),no trabalho e à noite(deitar), fumo cerca de 20 cigarros._

Rui’s previous quit attempt did not match opportunity and implementation of smoking cessation: “Pensando, que ainda não era a "hora" ideal para o fazer, e "arranjando" sempre motivos para não deixar de fumar: ou porque era altura de muito trabalho (existência de pressão), ou de exames escolares, etc...”

Rui is thus one of the WATIP users who did not set up his Dday and who postponed using the programme. Maybe this was not the right moment for him to aspire to a life without tobacco and a type 3 profile and low SOC score may have contributed to ruling out a Dday when he used the WATIP.
SOC type 4

BC_59: Daniel, from Funchal, male, 31 years

WATIP: F(friend); SES: middle, employed; Smoking history: 20 cigarettes/day, 9 years of smoking, 2 trial;
Self-perceived nicotine dependence: 8 on a scale of 0 (no dependence) to 10 (maximum dependence);
Cigarette dependence: 8 on a scale of 0 (no dependence) to 10 (maximum dependence);
Willingness to stop: 6 on a scale of 0 (no will) to 10 (maximum willingness);
Pleasure: 5 on a scale of zero (no pleasure) to 10 (maximum pleasure);
Stage of Change: Contemplator;
FTND: 3 in a scale of 1 (= no dependence) to 10 (= maximum dependence);
Motivation: 3 (1 = low motivation and 3 = high motivation);
Self-efficacy: 2 on a scale of zero (no self-efficacy) to 10 (high self-efficacy);
SOC score: 113 (M: 136); SOC: type 4, non smoker after 1 year interview. IBC_213, BC_59, 9762A63D9A18Z87D8Z6C

Daniel, who reported in his interview that he had successfully stopped using tobacco, presents a type 4 profile of the SOC, which is a rare situation. Daniel has a low comprehensibility and manageable status but scores a high value on meaningfulness. He shows strong spirit, deeply engaged in his search for a way to achieve smoking cessation, understanding and resources. Even if there was no guarantee of success, there was a chance. In addition, this is what Daniel did: he set a Dday and put his energy to the service of his desire. In addition, he acted. Daniel is positive about himself. While living in Funchal, Madeira, he found out about the WATIP through a friend. He expressed his decision about the Dday, the degree of compromise with himself and the relevance of the meaningfulness of his aspirations in these terms: “Que seja um começo de uma nova vida”. The implantation of the smoking habitus, is socialized “em idas ao café e nas saídas à noite, depois do almoço e ao final da noite dependendo se for a tomar uns copos à noite”. He has tried before to quit but this earlier attempt did not coincide with the right moment since “era altura com muito trabalho e com mais stress no dia a dia”. Daniel belongs to very small group of users who presented the type 4 profile of the SOC, among the interviewees (Arm 2 of study).
SOCl type 5

BC_47: Joana, from Celourico da Beira, Braga, female, 49 years old

WATIP: o; SES: middle, employed; Smoking history: 20 cigarettes/day, 20 years of smoking, 0 trial;
Self-perceived nicotine dependence: 8 on a scale of 0 (no dependence) to 10 (maximum dependence); Cigarette
dependence: 8 on a scale of 0 (no dependence) to 10 (maximum dependence);
Willingness to stop: 10 on a scale of 0 (no will) to 10 (maximum willingness);
Pleasure: 5 on a scale of zero (no pleasure) to 10 (maximum pleasure);
Stage of Change: Contemplator;
FTND: 4 on a scale of 1 (no dependence) to 10 (maximum dependence);
Motivation: 2 (1 = low motivation and 3 = high motivation);
Self-efficacy: 2 on a scale of zero (no self-efficacy) to 10 (high self-efficacy);
SOC score: 140 (M: 136); SOC: type 5, smoker after 1 year

Joana, from Celourico da Beira, got in to contact with the WATIP by seeing it mentioned in a magazine (Revista Única). She reports in her interview that she is still a smoker. With a type 5 profile of SOC, there is a centrality of meaningfulness (which is of a low value) as Joana shows a high level in terms of comprehensibility and manageability. She considers that she has a high level of dependency (a value of 8) but her FTDNP score is of a medium value (4). She does not give many details in her written commentaries, stating, for instance, that she does not remember how she started to use cigarettes “Não me recordo bem. Talvez em convívio com amigos”. She has a regular smoking pattern, “Normalmente fumo igualmente durante todo o dia”.

SOCl type 6

BC_01: Victor, from S. João do Estorial, Male, 45 years

WATIP: HP; SES: middle, employed; Smoking history: 12 cigarettes/day, 23 years of smoking, 0 trial;
Self-perceived nicotine dependence: nd on a scale of 0 (no dependence) to 10 (maximum dependence);
Cigarette dependence: nd on a scale of 0 (no dependence) to 10 (maximum dependence);
Willingness to stop: nd on a scale of 0 (no will) to 10 (maximum willingness);
Pleasure: nd on a scale of zero (no pleasure) to 10 (maximum pleasure);
Stage of Change: Contemplator;
FTND: nd on a scale of 1 (no dependence) to 10 (maximum dependence);
Motivation: nd (1 = low motivation and 3 = high motivation);
Self efficacy: nd on a scale of zero (no self-efficacy) to 10 (high self-efficacy);
SOC score: 103 (M: 136); SOC: type 5, smoker after 1 year

Victor is one of the few participants who used the WATIP but did not answer the questions that were not obligatory (nd: no data). Therefore, it is not possible to draw a very precise profile of Victor, except to note that it was through his health professional
that he made contact with the WATIP. Living in the great Lisbon area, Victor did not stop using tobacco, but reduced the number of cigarettes he smoked. He has a type 6 profile of SOC: high comprehensibility, low manageability and meaningfulness.

SOC type 7

BC_19: José M, from Maia, Male, 22 years

WATIP: IS; SES: high, unemployed; Smoking history: 10 cigarettes/day, 4 years of smoking, 2 trial;
Self-perceived nicotine dependence: 6 on a scale of 0 (no dependence) to 10 (maximum dependence);
Cigarette dependence: 7 on a scale of 0 (no dependence) to 10 (maximum dependence);
Willingness to stop: 7 on a scale of 0 (no will) to 10 (maximum willingness);
Pleasure: 3 on a scale of zero (no pleasure) to 10 (maximum pleasure);
Stage of Change: Contemplator;
FTND: 1 on a scale of 1 (no dependence) to 10 (maximum dependence);
Motivation: 2 (1 = low motivation to 3 = high motivation);
Self efficacy: 2 on a scale of zero (no self-efficacy) to 10 (high self-efficacy);
SOC score: 114 (M: 136); SOC: type 7, non smoker after 1 year

José M. is one of the youngest participants to have used the WATIP. He lives in the north of the country, in Maia. He got to know the WATIP through an Internet search and showed a strong willingness to stop, even if he presents low self-efficacy. He has a rare SOC profile, according to Antonovsky; his low level of comprehensibility is combined with a high manageability status and a low meaningfulness (ANTONOVSKY, 1987, 21). José M. was not very strongly hooked on smoking by the time he used the WATIP. He makes it clear that he smokes more “Durante a parte da tarde, depois do almoço até ir embora do trabalho. Acontece-me frequentemente quando saio a noite para estar com os amigos, fumar + do que durante o resto do dia todo.”.

The profile of low meaningfulness can help understand how José M. started his smoking habitus. It was not due to peer pressure, but happened in an unnatural way, as he says; he uses the word “esquisita” when describing it:

Comencei a fumar uma vez que ia para a empresa, e como todos os dias, antes fui ao café para tomar 1 café... E nesse dia por acaso deu-me 1 vontade esquisita de fumar... E comprei 1 maço. A partir dai tinha + 19 cigarros para fumar... E como não me senti preso e me comecei a habituar e sentir bem, continuei... Antes desta etapa tb tive uma fase no 7º Ano que fumei durante cerca de 1 ou 2 meses 1 cigarro por dia, mas deixei devido à minha melhor amiga ter ficado magoada cmg. Passado estes anos voltei a fumar...
José M. demonstrates high sensitivity, which in a sense is expressed by the frequent connection he draws between his feelings and love relationships and the use of tobacco. Stopping using tobacco was part of the demonstration of his feelings toward girlfriends. Therefore, every time a girl would end a relationship with him, José M. would use cigarettes to express his estrangement from that relationship: “Em ambas as vezes que deixei de fumar, foi devido a uma rapariga (2 raparigas diferentes) que na altura gostavamos 1 do outro, e ela n gostava q eu fumasse. Voltei a fumar em ambas as vezes qd elas terminaram cmg!!!”

José M. expresses a high level of manageability, but low comprehensibility might be exteriorized in a statement that is somehow difficult to understand: “Não vou voltar a deixar que uma mera rapariga que nem me merece volte a estragar a minha saúde, e talvez todo o resto que acompanha o acto de fumar...”

Moving to the next type of SOC, of those who stopped smoking by means of the WATIP, no one is found with a profile type 8 of SOC. Only WATIP users who continue to smoke have this profile. A case in point is that of Maria, from Madeira.

SOC type 8

BC_31: Maria, from Funchal, Livramento, Ponta do Sol, Female, 31 years

WATIP: I; SES: middle, employed; Smoking history: 20 cigarettes/day, 15 years of smoking, 2 trial;
Self-perceived nicotine dependence: 8 on a scale of 0 (no dependence) to 10 (maximum dependence);
Cigarette dependence: 8 on a scale of 0 (no dependence) to 10 (maximum dependence);
Willingness to stop: 7 on a scale of 0 (no will) to 10 (maximum willingness);
Pleasure: 3 on a scale of zero (no pleasure) to 10 (maximum pleasure);
Stage of Change: Contemplator;
FTND: 3 on a scale of 1 (no dependence) to 10 (maximum dependence);
Motivation: 2 (1 = low motivation and 3 = high motivation);
Self-efficacy: 4 on a scale of zero (no self-efficacy) to 10 (high self-efficacy);
SOC score: 95 (M: 136); SOC: type 8, smoker after 1 year

Maria had a low score in each of the components of SOC. She started to use tobacco when she was attending school and moved from one school to another: “Comecei a fumar na escola. Quando mudei de escola, podia fazer coisas novas, que ninguém das pessoas que já me conheciam me iria criticar. Porque tinha curiosidade, porque achava que era giro, porque achava "porreiro"”.

luis saboga nunes
She is a compulsive smoker, spending her day smoking: “ao início do dia, após o café, fumo o primeiro cigarro. Ao final da tarde, quando tenho que trabalhar, nas pausas do trabalho, após as refeições”. She has a low level of nicotine dependence and demonstrate low motivation. She is a social smoker, using tobacco in situations where smoking is the habitus: “Quando estava com a minha família, com o meu namorado, onde existem muitos fumadores. Nos serões de Verão, em que as noites são longas…”

Maria is a type 8 in terms of SOC. She has a very low SOC score (95) when compared, for instance, with the opposite, type 1, exemplified by José, as mentioned earlier (he has a SOC score of 192). For Maria it is not to be ruled out that this difference might have contributed to her continuing to be a smoker after the quit attempt she made with the contribution of the WATIP.

**Internet use**

Nowadays the use of the Internet is a way of finding solutions to health issues. In order to understand how the participants had used the Internet, they were asked if (compared with people of their age) they thought it contributed to improving health (e_35) and maintaining health (e_34). Answers were presented on a scale on which 1 corresponded to total agreement and 7 corresponded to total disagreement. Agreement was declared by the participants; 60.3% agreed, strongly agreed or totally agreed that the Internet contributed to the improvement of their health and 50.7% stated that it contributed to maintaining their health. One in every two of the participants had discovered solutions on the Internet to problems related to health (48.6% answered that they agreed, strongly agreed or totally agreed to the question e_30). In this context 73.2% were accustomed to looking on the Web for sources of information about health (v_20) and 77.6% had access to sources of health information. The Internet was searched in this way regularly by 64.9% of the participants who used it to gain access to health information (e_17). The vast majority considered that the Internet could help them make choices about their health (87.8%) (e_16) (Figure 12).
Two other open questions followed. These investigated whether or not the WATIP had received “global evaluation as worthy to be continued” and examined the programme’s “use of functions like printed materials”. In this context, 38.8% of respondents gave a positive evaluation of the WATIP as being worthy of being continued, without any further specification. A second group (44.9%), also affirmed the worthiness of the WATIP. The people in this group were more precise in justifying why they were answering this way; they thought this project should be continued in order to support smokers, since it “awakens realisation of smoking cessation problems” (6.1%), “increases motivation” (4.1%), is “beneficial for the smoker” (2%), and is carried out in “the way of the smoker” (2%). The only critical issue mentioned was that the WATIP was not sufficiently publicized (2%).

In order to help generate social support for the WATIP participants, printing cards were added as a function of the programme. These cards could be given away to friends or relatives with personalized data like the name and the Dday of the participant. Regarding the “printing of the cards”, 44.4% printed and gave away the cards, while
33.3% did not print them. The rest of the participants either saved the information in their computers to read after using the platform, put it in their car or took further personal notes while using the WATIP (22.3%)

Overall feelings towards the WATIP were then tested by asking such closed questions as “Can we refer to your experience in our quadro de honra (honor roll)?”, “Can we contact you again in the future to find out how you are getting on?” or “Do you want us to erase your data from our database?” With these queries, an approach to the global perception of the project assessed the estrangement, the affective closeness or distance that the user developed toward the platform and that was registered in his or her memory, a year after the experience with the WATIP. Considering the use of the platform in a process of deconstruction the *habitus* of smoking would help improve understanding of the role WATIP played in smoking cessation. Recovering this perception from the individual subjectivity, and as the *habitus* is dependent on history and human memory (BOURDIEU, 1977), it is considered that assessing the users’ feelings about the WATIP 12 months after its use was of definite value.

Two in every three participants (71%) agreed to be listed on the honour roll of the WATIP and no participant refused to be contacted later or demanded that his/her information be deleted from the database. This would establish a positive memory recall of the platform in the tentative process of smoking cessation.

Of those who were still smoking one year after deciding to quit, and who had stopped using the WATIP, 42.4% had done so because of lack of willpower. The next most frequent reason for stopping using the platform was “personal circumstances” (12.1%). In addition, 12% had given up trying to stop smoking and had consequently abandoned the WATIP programme.

The use of the WATIP probe demanded a high level of motivation and participation, with no reward or payment. For these reasons, abandoning connection with the WATIP was easy to do. On the other hand, continuing to use it was largely dependent on intrinsic motivation. In this context it was asked whether, during the interactive process, the idea of giving up using the WATIP had occurred to the users. Overall, 43.9% of
these people had been totally against leaving the platform in favour of another type of support than WATIP (e_14r2opt) (Figure 13).

Figure 13: Opinions of WATIP users obtained by interview one year after IBC concerning opting out to other services than WATIP (e_14r2), activities within the range of user (e_07r2), self-control over life decisions (e_09r2), autonomy (e_03r2), meaningfulness and sense making, “renasceres” acronym as mnemonic(e_13r2), ten-step structure (e_04r2).

The next issue that was examined was the perception of the WATIP users’ capacity to implement the suggestions and advice that were offered during the interactive process. This advice involved activities estimated to be within the range of ability of every user (e_07r2). For every two participants in three, the answer was that they found the WATIP activities and suggestions compatible with their capacity to put them into practice (74.5%). Six participants (12%) remarked that the suggestions were beyond their limits. A number of participants were neutral on this issue (14.5%). Nevertheless, this had no impact on the quitting status of the WATIP users.

The next question focused on self-control over life decisions and the non-disruptive role of the WATIP. The WATIP contributed to maintaining a high level of control in life (e_09r2) for the majority (63.5%) of the participants, while 9.6% had no particular
opinion about this and 26.9% stated that they disagreed. In addition to self-control, the issue of autonomy was evaluated, regarding the way life was managed during the process of smoking cessation (e_03r2). Almost all the participants felt that the platform allowed them to maintain their autonomy while involved in the process of smoking cessation (91.7%).

It was asked if the suggestions and counsel given by the WATIP were considered meaningful and made sense to the users. Eight in every ten (80%) agreed that there was a perceptible meaning and that a purpose was seen in the way the platform had been prepared and in which guidance was provided.

Two last questions in this assessment of the use of the platform were related to the structure and the details of the acronym as mnemonic. For 84% of the WATIP users the acronym was helpful in organising the process of smoking cessation (e_13r2) and 88.1% were satisfied or highly satisfied with the ten-step structure of the WATIP (e_04r2) contained in the word “renasceres”.

**WATIP strengths, weaknesses, opportunities and threats**

A content analysis was drawn related to the strengths, weaknesses, opportunities and threats about the use of the WATIP. The first set of data analyses draws from general, open questions. It is based on information offered freely by the participants in the study while answering the first two open questions: “What do you remember about the WATIP, either positive or negative?” Then the second and third open questions specifically asked: “What are the negative aspects of the WATIP?” and “What are the positive aspects of the WATIP?” The answers to these questions result in a content analysis process, which is the basis of the following SWOT analysis.

From the conceptual analysis of responses associated with the use of the WATIP, 80 occurrences of comments in a SWOT analysis characterised the strengths of the programme. Several categories are identified from among those remarks: 15% referred to the layout as good and 3% emphasised the appealing and interesting appearance of the WATIP, referring particularly to the colours and emotive images. Characteristics
such as the dark colours of the platform were not referred to negatively by any of the interviewees, as these colours represent the process of quitting tobacco use, and thus send a message of detachment. They symbolise the announcement of the end of a period of life during which cigarettes have been “dear” company. The idea – not explicitly expressed – emphasises this process of burying a part of the person’s life and starting a new one, a life without tobacco. This is the basic meaning of the word “Renaceres” (to be born again) that stands for the step process of the WATIP. This structuring of the WATIP was emphasised by 18% occurrences, who noted that it is a good acronym to remember. The computer technique used was highlighted by 10% of the occurrences people surveyed, while the tailoring and monitoring of participants’ quitting process was what was remembered and expressed in 10% of the comments. Some ancillary options, such as the smoking cessation guides dealing with several issues like nutrition and obesity control, or the leaflets, were described as important by 13% of those surveyed. Some people revealed the importance they attributed to the characteristics of autonomy and privacy (3%) provided by the WATIP. For 8%, the platform played a role in increasing their optimism related to smoking cessation, while 5% emphasised the impact of the ideas and philosophy of the WATIP. An equal number of references considered it to be a good initiative (5%).

A second dimension of the conceptual analysis recognised the WATIP’s weaknesses, again using the SWOT analysis, as six categories were identified by 27 occurrences of remarks. Two main areas were classified: external weakness related to the use of the WATIP and internal characteristics of the system. The lack of willpower on the part of users to stop smoking, following advice provided by the platform, is remarked on in 56% of all references. This is the most important weakness identified. There were 15 references to it as it was considered to be an external component that may contribute to a reduction in the usefulness of the WATIP. Other items were also noted and considered internalities. In five responses (19%) the steps were regarded as difficult to do, while three remarks (11%) referred to the length of the text as overwhelming. The last two categories represented, respectively, 8% and 3% of occurrences and were related to difficulties with WATIP use (the need for closer monitoring and personal implementation of the nutritional advice).
The use of WATIP has revealed some opportunities in the current context of BC in smoking cessation. From the analysis of 34 occurrences, several categories can be identified as offering interesting possibilities. The first such opportunity identified is seen to lie in the fact that the WATIP provides “easy access” (35%) to smoking cessation, and to follow-up of users who want to stop smoking. It allows a smoker to seek an “alternative to the use of medications” (18%) as a variety of functions contributes to preparing the smoker to face the process of quitting (also 18%). Among those who used medication, 46.2 % used chewing gums, 23.1% Zyban and 30.8% patches. Of the 13 people who used medication, 11 participants (84%) reported side effects in response to an open question. They noted experiencing anxiety (30%), throat irritation (20%), weight gain (10%), insomnia (10%), allergies (10%) and somnolence (10%). The use of medication had not made a difference to quitting smoking: no statistical association was found between such use and becoming a non-smoker. The next category that was emphasised in users’ comments is the relevance of the psychological approach that is used; 12% of occurrences indicated that this approach had improved the users’ ability to deal psychologically with withdrawal symptoms. The various measures and algorithms that are used can contribute to a better knowledge of a person’s condition; 6% stated that the WATIP had helped them, through the advice received, to be clearer about the conditions they were going to face while on the journey to freedom from nicotine. The WATIP also prevented relapses: 12% of the occurrences noted that the platform can play a supportive role (Figure 14).

On the basis of threats found in the SWOT analysis, 14 types were identified from 42 occurrences. The highest number of comments was related to the danger of people postponing their decisions or pausing in their smoking cessation process, and thus demonstrating unwillingness to quit smoking because of the issues presented in the WATIP (8 responses, corresponding to 20% of all comments).
The next most important category involved personal situations that posed a threat to people’s continuing to use the WATIP: there were six such occurrences (14%). The third factor that could jeopardize the use of the WATIP was mentioned on five occasions, and related to the fact that the platform demanded contact with a health professional so that participants could have a physical check-up before continuing with the programme (12%). Four remarks were associated with each of the categories of
“giving up trying to stop smoking” and “discouragement” (each representing 10%). The next category of criticism suggested that the portal was understaffed (three comments, representing 7%). Stress and difficulty in getting through the first 15 days after Dday were referred to as having an impact. Each of these comments occurred twice (2%). Finally, remarked on once in each case, the categories of “Internet not accessible to all”, “difficulties with the portal” (such as difficulty with enrolment or with printing the materials), “lack of time” to follow the platform and its steps, “doubt about the programme” and “friends smoking” each accounted for 1% to 2% of the reasons identified as threats to people’s engagement with the WATIP.
5. Discussion
web-assisted tobacco interventions
5.1. Recruitment

This research data analysis, developed in two arms, deals with the first exploratory examination of Internet use to support would-be Portuguese-speaking non-smokers. In this context specific methodological and ethical issues in Internet-mediated research are related to the choice of the design that is opted for (WHITEHEAD, 2007). This choice includes the settings for the research, the identification of participants’ exposure measures (DANAHER, et al., 2006), recruitment (GRAHAM, et al., 2006) and ensuring the freedom from contamination of control groups (ETTER, 2006). It is not rooted in previous research outcomes, results or population parameters; instead it was designed as a stand-alone process aimed at bringing about clarification of the issue referred to above.

The people who were targeted as potential participants were WWW users of a specific age group (30-49 years) interested in smoking cessation. This criterion was defined before the programme’s structure and contents were developed, and before data collection began. Recruitment of participants (AN, et al., 2006) in any research study is a critical issue and when it considers ehealth behaviour change programmes, discussion has resulted in several perspectives. Some define active recruitment that depends on e-mails or forums (KOO, SKINNER, 2005), face-to-face conversations or mailings (BARANOWSKI, et al., 2003), or on newspaper advertisements, amongst several other strategies (TATE, JACKVONY, WING, 2003).

Behaviour change initiatives on the Internet have also used waiting lists (TATE, et al., 2003) for recruitment, as these lists form an important element of (and make an impact on) the prevalence of a condition. At the beginning of this research process, waiting lists were considered for recruitment as these were composed of individuals interested in smoking cessation, people who needed to wait for help to become available within the NHS services. This option was abandoned, however, because of the difficulty of gaining access to these lists with all the necessary details (with up-dated postal addresses or
telephone numbers of individuals). Moreover health units had no electronically registered waiting lists for smoking cessation.

The enrolment of participants (2,113) was therefore not representative of the smoking population in Portugal or of web surfers in the country, as there are no known parameters for establishing a representative approach. It is not possible to verify the WATIP evaluation of external validity; consequently the results obtained cannot be applied generally. No participation bias (according to which an evaluation of the participants is assessed in terms of differences between them and a population of interest) is provided. Accepting participants indiscriminately from the WWW was set as criterion in order to exclude the intrusion of sub-sets of the population of smokers in the WATIP. The results determined conformity to the targeted population had been achieved in real-world conditions. This programme is sensitive to the age range of the group to whom it was addressed and this contributed to minimising participation bias.

Nevertheless, the WATIP population did not replicate real-world conditions. National statistics, for instance show a much greater difference between male and female smokers, in Portugal (3 males to one female), a proportion that is not found in these results (about one male to one female).

For the second-Arm component, the number of participants to recruit was calculated in advance in such a way as to achieve saturation. A base line was set at triple the average sample size for qualitative research in computing human interaction found in the study by Barkhuus and colleagues (intended to be fourteen cases) (BARKHUUS, RODE, 2007). For this reason 77 interviews were undertaken, to explore the aims of the study and to provide enough volunteer participants to reach saturation, they were carried out to help interpret the emotions, the attitudes and objective behaviours that were residual, in other words, those that had been retained long after the interaction with the WATIP took place (at least 12 months - which was considered enough time to prevent distortion by the personal motives of interviewees in the answers they gave). It could be argued that one of the limitations of interviews is that people will say what they want to say and not necessarily what actually happened in their situation. There is also the possibility that interviewees may express opinions just because they consider them to be acceptable to the interviewers. Interviewees’ perception that fabricating answers could benefit them
more than telling the simple truth in response to questions is a risk that weighs against using interviews in research (PREECE, J., et al., 2000). Other possible objections are related to people’s varying levels of capacity to express themselves, to put into accurate words what they really mean. In some cases a researcher’s perception of what has been said is open to question. Nevertheless, interviews remain an important way to collect information, and therefore the interview is the chosen instrument used in the second Arm of this study, setting the stage for understanding BC, as linked to the use of the WATIP.

In order to deal with some of these possible negative side effects, semi-structured interviews were used. These allowed clarification or explanations, offered naturally by the interviewees. In addition, all interviews were recorded, allowing more than one researcher to undertake coding and evaluation, for confirmatory analysis.

In this context, it was found that this real-life approach produced some heterogeneity among participants in relation to such variables as gender, latitude origin, SES, smoking load and other characteristics of smoking history. Less or lesser heterogeneity is found regarding variables such as type of tobacco carrier (as most of the participants smoked cigarettes) age groups (which supports the argument for the target group chosen for the WATIP) or years of school education.

The option for a real-life approach was selected as it was thought that this would also help to deal better with the Hawthorne effect; it is well-known that any human-centred research will interact with his effect (MACEFIELD, 2007). The nature of the pursuit in study meant that it was important to ensure that this effect would not easily become a confounding interaction (RICE, 1982). The aim was that the observation process should be as unintrusive as possible. The researcher did not interfere in the process of interaction with the WATIP, although participants were followed up very closely by means of the platform back-office. In the second Arm, the option for semi-structured interviews by phone was used with the intention of giving the least possible attention to the participants, looking carefully at the usability process.

With the interviews, new comprehensibility would lead the researcher to focus on BC. Since this process of data collection was put into action more than 12 months after the
interaction with the WATIP, it is argued, with Crabtree and Rodden, that the individuals surveyed had no special or particular reason to respond in such a way as merely to please the researcher (CRABTREE, RODDEN, 2004). Besides this, as the authors referred to here point out, specially designed research can better control this effect in settings like the workplace and home, simply because when in these environments people have better things to do than impress or worry about the researcher. Because of this the Hawthorne effect can be diluted in the research process. The option for a probe-type approach also helped to build a pattern of how users of the WATIP behaved. Probes go beyond classic user study techniques, which focus on either what people say (questionnaire and interviews) or what they do (observation studies). Here there was a triangulation of techniques in which being as little intrusive as possible was the rule to be followed. It was possible, on the usability side, to consider how WATIP ‘customers’ made use of the platform and to determine how the initial design or objective may have been inadequate for these people’s needs outside the “laboratory” setting, where the subjects of the study (programme users in this case) have the opportunity to register what they do without being disturbed by being under permanent observation (USDHHS, 2010).

The design of this research was rooted in three of the nine criteria that are commonly considered in public health and epidemiological research and that were characterized by Austin Bradford Hill (WEED, 2000). These are consistency, strength of association, as well as coherence, plausibility and analogy.

For the criteria of coherence, plausibility and analogy, and while focusing on a tertiary intervention based on tailored WATIP support, this study explored the outcomes of the process of IBC or BC related to smoking cessation. The primary aim of the study was to assess quality and conformity to national and international standards of good practice in smoking cessation, after submitting the WATIP to evaluation. For the new area of research that is laid claim to in this study, it is expected that the findings that come to light will not contradict basic known scientific evidence and principles already accepted by the scientific community, since coherence is the principal criterion.

The evaluation by the Comissão Nacional de Protecção de Dados (CNPD) took six months, which is considered too long amount of time in the context of the information…
society. The innovative way of presenting this support with the use of the Internet was beyond the range of issues usually dealt with by the CNPD. This customarily facilitates a discussion about best practices and public health in cooperation with other sciences, social domains and technology, and the prevailing social status quo. Existing regulations are sometimes inapplicable, in certain instances, to the new challenges the information society now poses. In the case of the WATIP, the first challenge was that of assessing the capacity of the program to protect the identity of the users, as even e-mails were considered critical sources of information. Ownership of information had an important bearing on how this issue was handled. Generally speaking, information is considered to belong to the health professional and not to the user (as in a user-centric approach). This fact did not favour the approval of a tailoring process which needed personalization of data feedback through the use of the Internet. Another issue was related to the suspicion that the WATIP’s main objective was to sell medications or services to smokers. The perspective of a non-profit public service was not easily understood. This may be why the CNPD delayed sending an answer regarding accreditation.

In contrast to this, the process of accreditation of the WATIP by the Foundation HonCode, the Geneva-based institution for evaluation of health websites, followed a normal course by analogy with its handling of applications concerning other web initiatives. Evaluation of websites is the core activity of this organization and all issues were dealt with promptly. The accreditation seal, with the protocol number HON13918, was applied to the WATIP portal, and in the succeeding years this has been renovated. Although submitting web initiatives to external evaluation is not a common practice for health websites in Portugal, this process can help guide the public and could be considered as a strategy for emphasising a user-centric approach. The reason why HonCode Health on the Net was chosen among other accreditation organisations is based on several considerations: E-Europe 2002 (European Commission – e-Europe 2002) is focused mainly on websites that have EU citizens as their targets. As has been shown in the previous section, more than 10% of WATIP users are not from the EU. MedCertain is an EC-funded project for the quality assessment of health-related websites (EUROPEAN COMMISSION - MEDCERTAIN, 2010) but it was not in full operation when WATIP was ready to be reviewed. As for Hon-code, it is the oldest active organisation to provide these services, in operation since July 1996; Hi-Ethics (KEMPER, 2001) is...
focused on for-profit enterprises and based in the USA. The WATIP not only is a non-for-profit initiative, but its scope is beyond the limits of the USA’s territory. These are the reasons why eHealth (USA. IHEALTHCOALITION, 2010) and URAC (USA. URAC, 2010) initiatives were not also considered; DISCERN (UK. DISCERN, 2010) demands a very pro-active initiative from users and is not always easy to operationalise. Also it does not provide the questionnaire for evaluation in the language of the WATIP users; Wrapin is more focused on issues out of range of direct evaluation of web sites (SWITZERLAND. WRAPIN, 2010), while the Criteria for Assessing the Quality of Health Information (Health Summit Working Group) (AMERICAN PUBLIC HEALTH ASSOCIATION, 2010) is also not a common and ready-to-use system based on the user-centric approach.

The design of this research is rooted in the other two criteria commonly used in public health and epidemiological research: **consistency** and **strength of association**. By **consistency**, the persistent finding of an association between the exposure and the outcome, in multiple individuals, from different places with different life circumstances, as well as different latitudes and geographical backgrounds is identified. The first objective is to tackle confounding variables and assess whether or not chance is affecting the statistical associations that can be seen between variables. The second criterion is **strength of association**. With two dimensions (magnitude of the association and the statistical strength), it is considered that chance would be better controlled, since an explanation is proposed. With weak associations, the plausibility of the interference of confounding variables might increase.

The criteria of **consistency** and **strength of association** are considered by the second global objective focused on the evaluation the smoking patterns of the population of WATIP users who made decisions about predisposition to smoking cessation (IBC) or achieved behaviour change (BC). This global objective was divided into specific objectives focused on the evaluation the smoking patterns according to socio-demographic determinants, smoking history, readiness to quit and stages of change in smoking cessation, consciencialização of the type of smoker and nicotine dependence evaluation, motivation and self-efficacy. All of these are relevant to judge in association to smoking cessation procedures (NHMRC, 2000). Finally, **the sense of coherence** was
considered as a critical variable to assess in the context of IBC and BC in order to understand its weight in relation to smoking cessation.

5.2. Socio-demographic determinants

There are factors that affect IBC and BC related to smoking cessation. Socio-demographic determinants play a role in these differences. For Barbeau as well as for Fernandez and colleagues, smokers who are poor attempt to quit at the same rate as smokers who are not poor. Nevertheless, smokers who are poor are less likely to successfully quit smoking, compared to smokers at or above the poverty level (BARBEAU, KRIEGER, SOOBADER. 2000; FERNANDEZ, et al., 2006)

In this study it was found that WATIP users who belonged to the low SES level, attempted to quit less (IBC) when compared to smokers on high SES levels (OR=1.57, CI 1.30-1.89, \( p < 0.001 \)) Also, comparing males and females showed that establishing a Dday by current smokers was related to gender differences, favouring females (respectively 7% of difference, OR=0.76, CI 0.63-0.91, \( p < 0.005 \)).

Some differences that are found between WATIP results and those of other research studies may be the consequence of the way SES measurement was implemented. Some studies consider the amount of money earned or number of school years, in order to assess social characteristics which may help to define poverty levels among other features. A composite index of several variables was used (including number of school years, employment condition, social isolation, life satisfaction referring to dimensions like family, job and finances, social support, life meaningfulness and loneliness). These variables were aimed at better defining the user’s social position in a social contextual analysis. So taking into account a more precise characterization of users may help researchers to discover the influence that SES may play, in order to clarify what prevails in the establishment of IBC as the Dday.
In Arm two of this study, BC related to smoking cessation was evaluated amongst a sample of WATIP users questioned after one year of their IBC had been decided on. In this stage of analysis SES did not distinguish those who quit from those who did not quit smoking. This was also the case when gender and other socio-demographic determinants were taken into consideration.

5.3. Smoking history and cigarette load

The smoking history of the users of the WATIP does differ from other research results focusing on Portugal. The mean smoking rate is 21 cigarettes per day (SD of 10 cigarettes) and the mean number of smoking years is 17 (SD 9 years). It was found that this group of WATIP users smoked about 6 more cigarettes per day than the average current smokers in Portugal (mean is 15.5), and 7 more cigarettes than in the EU27 countries (average 14.4) (EUROPEAN COMMISSION. EUROBAROMETER, 2010, 30).

The smoking load for the WATIP group of users had a mean of 23.7 (SD 20). The first category of cigarette packs a year (equal or inferior to 20) characterized 61% of participants. One quarter of participants had a smoking load of between 21 and 40. In a study that evaluated smoking load in a group of lung cancer patients in the north of Portugal (in the oncology unit of the Hospital Sousa Martins), it was found that the smoking loads varied between 26.8 and 36.4 (MOREIRA, 2009). Although there are no national evaluations for the smoking load in Portugal, smoking load did not affect the IBC or BC of WATIP participants, which means that heavier cigarette smokers presented similar results to lighter smokers.

Next in the search of the components of smoking history, the focus was put on measuring previous quit attempts. Two or more smoking cessation attempts seemed to favour a smoking cessation process (CDC, 2003). In this study it was found that 81.7% had made 2 or fewer quit attempts in the past (0 quit attempts, 25%, 1 quit attempt
28.2%). The fewer previous quit attempts that were made in the past, the less prone the
users were to establish a Dday (OR=0.49, CI 0.37-0.66, \( p<0.001 \)) which is in line with
previous research.

Another element of the study focused on the hedonistic dimension – pleasure in
smoking – as one of the basic reasons why people smoke. In adolescence, pleasure is
disassociated with the risk of smoking as the person focuses, for example, on
emancipated behaviour. Later on, the feelings might change, as from the pleasure of the
risk the smoker moves on to the risk of the pleasure of smoking. For WATIP
participants, pleasure in smoking is positively associated with IBC (OR=0.74, CI 0.58-
0.93, \( p<0.05 \)) but not with BC. Rates of IBC and BC did not differ by number of years
of tobacco use and number of cigarettes smoked per day (respectively OR=0.990 CI
0.82-1.12, \( p=.91 \) and OR=0.97 CI 0.79-1.18, \( p=.76 \))

5.4. Readiness to quit and stages of change in smoking cessation

In this research, smoking cessation is considered as a process (DIJKSTRA, ROIJACKERS,
DE VRIES, 1998) during which smokers become motivated to change, decide to change
on a certain Dday (IBC) and manage to implement behaviour change (BC). Between the
several models that have been developed to monitor and recognize stages, the I-Change
Model builds upon four stages that characterize those involved with increasing
readiness to change as immotives, precontemplators, contemplators and preparers
(DIJKSTRA, ROIJACKERS, DE VRIES, 1998).

This triggers a teleonomic process that is goal-directed by the operation of a programme
in which information management assures a progression in terms of stages of change
toward Action related to IBC and BC. The idea of a progression was included in the
WATIP to help build an intervention on smoking cessation. Then the process of
consciencialização supports progression from one stage to the other.
This research is in line with other conclusions, like those of Dijkstra and colleagues, since moving from one stage to the other can be a result of a “….process information on smoking and smoking cessation” (Dijkstra, Roijackers, De Vries, 1998, 340). Before considering action toward BC, the meaningfulness of the BIC can be strengthened by information processing leading to decision-making. The outcome of this is the setting up of the Dday. Being willing to take a decision is the basis of the very last stage determining BC. (Figure 15).

The development of an approach such as that involving the stages of change, in a cross-sectional comparison, favours the possibility of assigning a smoker to a certain stage with a predictive value in regard to BIC or BC to this condition.

This can be assessed at a later point in time (DiClemente, et al., 1991), and will help strengthen the support for preparers in an effort to convey resources (e.g. time and support) for sustaining their move towards Action. This research, which investigated the predictive validity of stages of change, concluded that self-reported readiness to change was predictive of quitting behaviour.

The distinctions between immotives and precontemplators and between contemplators and preparers were predictive of quitting. So were the results in the WATIP participants, and it is important to note that such a support system (e.g. a WATI programme) needs to be sensitive to the degree of a smoker’s consciencialização and preparedness, in order not to miss the particular moment at which the high motivation coincides with available support. This predictive value, although related to IBC, was nevertheless not found to be related to BC where the predictive aspect of quitting prevalence was absent.
Nevertheless, the distribution of smokers indicates that there were 42% of preparers, 31% of contemplators and 20% of precontemplators among those who stopped smoking (BC) in the context of the WATIP use. This is a decrease when compared with those who established a Dday; the distribution of smokers indicates in Arm 1, that immotives are less ready to consider an IBC or setting a Dday (79.5%) than contemplators (81.4%) or preparers (90%). This is in line with other research results where the predictive power of the stages declined with the length of the period under observation, mainly in reference to a measure of intention, like the IBC considered here (DiClemente, et al., 1991). Even if intention to quit is the proximate cognitive predictor of behaviour, its
power declines, nevertheless, “with the amount of time that intervenes between measurement of intention and observation of behavior” (AJZEN, 1988, 115).

5.5. Consciencialização of the type of smoker and nicotine dependence evaluation

Consciencialização of the difficulties of stopping using tobacco is a positive element in surmounting barriers to smoking cessation. The powerful impact of nicotine intake on the brain (WEST, 2004) has led to the definition of the level of dependence, which can determine maintenance of smoking patterns (HENNINGFIELD, LONDON, JAFFE, 1987), failure in smoking cessation, withdrawal syndrome and relapse episodes (HUGHES, et al., 1984).

Dependence on nicotine as a strong predictor of smoking cessation (PROKHOROV, et al., 2001) is one of the basic aspects to be considered when planning to tailor advice about smoking cessation since dependence on nicotine will determine success (SHIFFMAN, 1996; WEST, 2004): “Tailoring stop smoking support for an individual starts with assessing their dependence on nicotine as this will have a bearing on the severity of the withdrawal symptoms they may experience, and therefore the intensity of support they require” (CHAMBERS, 2009, 40).

Measuring of the strength of nicotine dependence can contribute to the development of information conversion to increase knowledge creation about the hardship of the smoking cessation process. Here the degree of nicotine dependence was measured as a numeric continuous variable built up with the Fagerström Test for Nicotine Dependence (FTND), (HEATHERTON, et al., 1991).

In epidemiological population studies (FAGERSTRÖM, et al., 1996), FTND scores ranged from 5.15 to 6.55 in treatment samples, while ranging from 3.07 to four in population samples of current smokers. In addition, other researchers have found similar or lower
results in population-based samples, ranging from 1.84 to 3.2 (Etter, Vu Duc, Perneger, 1999) (John, et al., 2003).

The original studies of the FTND presented one single factor, with an internal consistency of 0.61 (Heatherton, et al., 1991). There is conformity of results with this study in the context of the WATIP as the internal consistency of the FTNDP score presented a value of 0.65, with one single factor. A similar value was found in research done recently in Portugal by Ferreira and colleagues where a value of 0.66 was found for the internal consistency of the FTND scale (Ferreira, et al., 2009).

The average result of FTNDP, which is 5.00 (with SD=2.3), for those WATIP users who established a Dday (IBC) was not different from those who did not do so in Arm 1. The group (BC) that was later studied in Arm 2, one year after establishing a Dday, presented a slightly different average value of 4.24 (SD=2.3). This value did not differentiate those who stopped from those who did not stop using cigarettes. The value for those who used the WATIP is about double when compared with the study by Ferreira and colleagues that focused on a group of smokers in one health-care unit in the North of Portugal. Here the result was 2.5. The difference between this study and other studies is in line with previous research; Fagerström and colleagues note that “dependence is much stronger in smokers seeking help to stop smoking than in the total population of smokers” (Fagerström, et al., 1996, 55). This could be a sign that higher dependence could lead people to seek help to stop smoking. It is seen as a confirmation of some of the conclusions of previous studies that have shown that highly dependent smokers are less likely to succeed at quitting (Fagerström, Schneider, 1989) and that quitting percentages are higher among less dependent smokers compared with the other types of smokers (Venters, et al., 1990).

Over all, there is an indicator here of selective quitting, where unaided quit attempts favour those who have lower levels of dependency. This needs further research. The findings need to be considered in more depth, as remaining highly dependent smokers may be in need of more intensive interventions like the one that is proposed here with the WATIP.
5.6. Motivation and self efficacy

Besides smoking history, nicotine dependence, readiness and motivation or willingness to quit, as well as self-efficacy, are among the measures considered as affecting smoking cessation in this study. When a person aims at behaviour change (BC), learning how to change becomes a key issue in attaining success. The proximal predictor of BC that includes readiness or intention to change is associated with motivation to quit (Prochaska, Velicer, 1996; Stockwell, 1996).

Having the personal resources needed to pursue a certain goal (Brown, Thomas, 2005) is associated with self-efficacy, and this was a quality that was meant to be achieved with the WATIP in the context of IBC related to smoking cessation. Motivation and self-efficacy are set to boost beneficiaries in smoking cessation. The self-perception that one can achieve specific goals (Locke, 1996) favours personal achievement in a goal-setting ambience. The WATIP is built in such a way that achieving small goals is something that can be seen to improve self-efficacy, whereas dealing with massive and complex demands might deplete success self-perception (Latham, Edwin, 2002). WATIP users are more inclined to start a BC like smoking cessation if they believe they can succeed. It is crucial to consider that those who manifested higher confidence in their likelihood of success in stopping (IBC) in the shortest time had a higher rate of defining a Dday (OR=0.51, CI 0.36-0.73, p<0.001), and it is not ruled out that smokers’ self-efficacy in the ability to quit determines their IBC when considering a Dday. In addition, a difference was found related to those who had higher motivation when they were compared to participants who did not engage in IBC and presented lower levels of motivation OR=0.51, CI 0.36-0.72, p<0.001. This is in line with previous research that found that nicotine dependence, self-efficacy and intention to quit are strong predictors of the propensity to quit (Hyland, et al., 2006).
5.7. Sense of coherence

The sense of coherence constitutes the epicentre where intentions to make behavioural changes (IBC) and behaviour change (BC) to promote health are anchored in this research. This is based on two assumptions. First, the origins of health, i.e. salutogenesis (the basic paradigm on which the sense of coherence is tie up to) excludes the use of tobacco by humans. Nevertheless, secondly, it is an overwhelming task to change this centuries-old human *habitus*, even when all the strategies that have been reported earlier would receive the utmost support by society. When Marcel Mauss re-defined the concept that was used by such ancient philosophers as Aristotle, he gave it new meaning in terms of social functioning. He pointed out specifically that *habitus* are aspects of culture that are laid on the body and constitute recurrent activities, not only of individuals but also of groups (MAUSS, 1934). The objectification of social structure has an impact on individual subjectivity, making the *habitus*, in the sense of Pierre Bourdieu’s theory, isomorphic within the structural conditions that prevailed over its origin. In this context, Pierre Bourdieu gave new impetus to the concept by defining the *habitus* as dependent on history and human memory (BOURDIEU, 1977). In this sense, it could be argued that smoking became part of society’s structure; the person who is smoking does not deconstruct his or her *habitus*, by thinking about its derivation and contradictory status in relation to the healthy origins of his or her life. Smoking has become socialized and integrated into individuals attitudes to life all over the world, trespassing in almost all cultures. It is a structure of the mind representing a social fact. As a codification of experiences, the smoking *habitus* responds to complex situations or set of stimuli (SCOTT, MARSHALL, 1998).

How can this powerful structure be overturned and successful input be brought to bear on the lives of humans in search of the fundamentals of health?

For the many possible answers this question could elicit, it was decided to consider the *sense of coherence* in this research. Changing the social upper structure of the problem
will bring fatigue and exhaustion of energy and resources, when not all stakeholders hold fast to a common objective. As long as contradictory messages are disseminated in opposition to the health promotion agenda, and the *habitus* of smoking is reinforced, special emphasis should be focused on the subjective level, taking issue with the subjectivity that humans attribute to the meaning of their actions (such as smoking and smoking cessation). To overturn the *habitus* of smoking, three levels of achievement must be decided upon by the individual. These are *comprehensibility*, *manageability* and *meaningfulness*, which constitute the core of the construct of the *sense of coherence*.

The sense of coherence (SOC) is considered by Antonovsky to be the centre of life control (ANTONOVSKY, 1987). Understanding how it contributes to the quest for health in the context of smoking cessation was considered vital in this research. In Antonovsky’s own words, we may ask, “*What shapes one’s ability to swim well*” in the course of a process of smoking cessation (ANTONOVSKY, 1987, 90)? This is all about heterostasis management, or in other words, negentropy.

The measurement of the SOC was carried out with the validated instrument *Questionário Orientação para Viver - QOV*. It showed high internal consistency (with the Cronbach’s Alpha of 0.92 (IBC) and 0.91 (BC)) which is within the range of the values of the original English version of the questionnaire (orientation to life questionnaire - OLQ), with Cronbach’s Alpha between 0.84 and 0.93, or with the validated version in Portuguese (Cronbach’s Alpha of 0.83 and 0.90).

The data from this research do not exclude that the SOC has an influence over IBC (OR=1.35, CI 1.11-1.64, *p*<0.001). In both arms of this study it was found that the groups taking steps toward health promotion such as deciding on a Dday (IBC) or participants who were non smokers after one year following their decision (BC), had higher average levels of the SOC than those who did not decide on their Dday or who continued to smoke a year after taking their decision to stop smoking (*α* ≤ 0.05 confidence level). The results of the factorial analysis are in line with the original proposal, confirming that the three dimensions form a unique general factor (ANTONOVSKY, 1993c) and register a basic attitude in the sense of a dispositional orientation.
Because of these results, the discussion can be taken a step further. The interrelatedness of the SOC has three dimensions, since, for Antonovsky, life experiences are “characterized by consistency, participation in shaping outcome, and an under-load-overload balance” (ANTONOVSKY, 1979, 187) and contribute to the development of the links between generalized resistance resources (GRR) and the SOC. The GRR add to comprehensibility, meaningfulness and manageability setup.

What needs to be discussed is if indeed and how these three components are inextricably intertwined. What emerges from empirical research is that the intercorrelations among the components, although very high, are not perfect. Therefore, situations can be conceived when a person scores high in one component but does not do it in other components. As Antonovsky notes, there can be situations where “one might find oneself in a social role that, although it provides life experiences of consistency and a reasonable underload-overload balance, does not provide the experience of participation in shaping outcome because one’s potentials are ignored” (ANTONOVSKY, 1987, 20). In this way, certain types could lead to a score high on the scale of comprehensibility and manageability components but low in meaningfulness of the SOC, for example. This is the basis for the construction of the dynamic interrelatedness of the SOC components (Table 37).

From the results of Arm 1 it can be seen that most of those who decided on a Dday were positioned in prediction type 1. As for Arm 2, the differences are even higher; of those who stopped using tobacco, 84.0% belonged to prediction type 1 in terms of SOC. This means that successful WATIP users who achieved smoking cessation scored high in relation to the three components of the SOC (Table 38). A qualitative analysis of data is of assistance in the discussion of the relevancy of such conditions, favourable to BC. The other types of the SOC represent less impact in smoking cessation.

Antonowsky claims that the merit of this discussion related to the SOC profiles “is that it suggests that the three components of the SOC are, though all necessary, of unequal centrality. The motivational component of the meaningfulness seems most crucial” (ANTONOVSKY, 1987, 22).
In this context, the role that a WATIP can play is in contributing to increasing the motivation, thus taking up the meaningfulness component, which seems most crucial. As stated earlier, different types of SOC seem to result in outcome in smoking cessation which require different labels. For the committed WATIP user there are gains in understanding and resources. Since high manageability is contingent on understanding, comprehensibility seems to be next in importance. WATIP can play a specific role as a standing reserve, constituting a set of resources at a smoker’s disposal to help him or her in the endeavour of stopping smoking. Meaningfulness will therefore not be lessened or coping efforts weakened.

### 5.8. WATIP and the role of the Internet in smoking cessation

The third global objective of this Study was to investigate the effect the Internet has, through the WATIP, on smokers, in relation to their success in terms of IBC. It is an attempt to find a baseline for the usability of a WATIP and to examine first impressions and opinions. While the results of the fist Arm, which have been discussed, are based on information gathered by the WATIP probe in order to produce input about users’ IBC regarding smoking cessation, the second Arm gathered information related to BC one year after the use of the platform. This is the focus of the discussion that gauges whether or not WATIP promotes life negentropy by the means of including a technology of information and knowledge management. At the same time, it evaluates people’s opinion of its use as a reinforcement of self-control and positive self-care in their action process towards smoking cessation. In order to achieve this, 77 in-depth interviews were implemented with the cooperation of WATIP users.

Data analyses draws from general open questions. The discussion of the answers to these questions is the result of a content analysis process, which is the basis of the SWOT analysis presented earlier.
Main strengths include the layout of the WATIP. User’s reference to colours and emotive images considered them attractive. These colours represent the process of quitting tobacco use, and thus send a message of detachment. They symbolise the announcement of the end of a period of life during which cigarettes have been “dear” company.

As for weaknesses, user’s lack of willpower was considered an external component that may contribute to reducing the WATIP usefulness. In addition, references were made that need to be further considered in order to simplify in some instances the texts, considered long (11% of occurrences for this dimension). Usability issues were raised that need a closer consideration as some of the WATIP tools where not perceptible in their function and use (e.g. cards).

WATIP opportunities were linked to “easy access” (35%) to smoking cessation. Seen as an “alternative to the use of medications” (18% of occurrences) it is to be noted that 75% of the users that where interviewed did not use medications. According to these exploratory results, it is not excluded that the program can play a role preparing smokers to face the process of quitting (12% of occurrences indicated users’ ability to deal psychologically with withdrawal symptoms).

Several threats like postponing decisions or pausing in a smoking cessation process, because of the issues presented in the WATIP (eight occurrences, corresponding to 20% of all comments) or personal situations (14% of occurrences) need to be considered. The contact with a health professional so that participants could have a physical check-up before continuing with the programme emerges in this group of treats to the use of the WATIP (as 12% of occurrences were identified). Although it is mandatory to the user to get into contact with his/her general practitioner, in order to inform about the decision to stop smoking while using the WATIP, in some instances it seems to compromise using the programme. Technicalities were referred such as in the enrolment process or with printing of materials, situations that are critical in some instances. Although using the WATIP proved to be feasible in several computer configurations it is relevant to consider that some conditions might need to be considered even thought they represent a very small amount of occurrences for this group of users. Nevertheless as small as this
number might me, when considering the high numbers of Internet users, an increase of this threat may affect a significant number of people using the WATIP.

5.9. The role of information and knowledge management

Time plays a major role in the discussion of negentropic processes such as the determination of a goal, clarification of the teleonomic aspects of information, and knowledge management. The goal of the WATIP is to lead a smoker towards IBC and BC within a certain span of time. One way to evaluate the efficacy of the WATIP is to measure the time between the use of the platform and the manifestation of IBC and BC. The greater the interval between the two events (interaction with the WATIP and declaration of an IBC and BC), the less the enframing of information and knowledge management procured by the WATIP has contributed to negentropy.

Another method of conveying the essence of information as negentropic is for information to be measured in such a way as to articulate the relationship between the entropic differentials in a system. If it is possible to express a negative entropic differential between time 1 and time 2, it could be argued that information has contributed to negentropy. According to Skyttner, “Information can be measured in terms of decisions and its presence can be demonstrated in reply to a question. The question is posed because of lack of data when choosing between certain possibilities; the greater the number of alternatives, the greater the uncertainty” (SKYTTNER, 2001, 136).

In order to calculate the negentropic potential of the WATIP, it was assumed that the time distance between a decision and an action should be close to the direction processed by the information. For this to be user-centred, each smoker was asked to make a decision about his or her own Dday, the major focus of the WATIP platform during this stage of activity (IBC).
Making a decision to set a Dday was put in a context of multiple (infinite) choices, but supported by tailored information about the smoking cessation support offered by the WATIP. In this way a 10-day window between the delivery of customised information-related nicotine-dependence assessment and the Dday was set as the maximising time frame within which to elicit negentropic action related to smoking cessation. Nevertheless, this optimisation of energy needed for decision-making did not block the user’s total freedom of choice; he or she continued to be in charge of life decisions, irrespective of the tailored process of the WATIP. This would establish in closed terms the negentropic action that would be taken. If the Dday decision were established within the suggested time frame referred to, it was thought to contribute to information and knowledge management favourable to negentropy.

If the decisions were taken after the suggested date, it would be assessed as having compromised the memory recall of information related to the advantages and difficulties of smoking cessation and, in the short term, as having undermined the ability to activate the general resistance resources (GRR) that are among the objects of the WATIP platform. In this way the length of time (in days) between the suggested date and the real decision of the user was measured.

Seventeen per cent (17.1%) established their Dday within a period of 0 days of their interaction with the WATIP. About half (42.1%) considered the ideal time frame to be one of fewer than 10 days between their interaction with the WATIP and the establishment of their Dday. Thirty per cent (30.3%) set their Dday within a time frame of between 11 days and 31 days, while 10.5% decided after more than 32 days of interacting with the platform that they would consider stopping smoking (Figure 16).

With this measure it is not ruled out that the WATIP may have contributed to negentropy, favouring the users in a process of knowledge management compatible to the process of smoking cessation. The WATIP is intended to contribute to negentropy with its identity as a standing reserve that will lead to IBC and BC. It is organised in such a way as to support the process of information interpretation, conversion and processing by the contribution of the “renasceres” acronym and mnemonic.
The intention is to encourage action towards IBC which is ultimately supposed to lead to smoking cessation. In Arm one of study 68.5% of those who used the platform (N=2113) achieved IBC status. This is the potential that the WATIP has for the contribution it makes to smokers’ IBC. Several features have been considered as contributing to or as having had a negative or no influence on this process, which have been dealt with in the previous discussion.
5.10. Confiding of WATIP self-reporting information

In the second Arm of the study the BC process is targeted – manifested by smoking cessation. Information was gathered one year after WATIP users’ IBC, i.e., their Dday decisions. Collecting trustworthy and reliable information is one of the concerns of any researcher.

This study sets triangulation of different sources of information. For this to happen, information gathering is matched to participants’ unique data, such as personal telephone numbers. Asking for personal phone numbers (mobile or landlines) may be viewed as inappropriate in a setting like the WWW. Moreover, the WATIP asks for this information before the interactive process is initiated (as optional information). This may be regarded as amounting to the intrusive and can lead to rejection by some participants, jeopardising the possibility of future information validation.

Assessing the trustworthiness of participants’ self-reported answers to questions is critical in assuring that information tailoring attains its goal. Tailoring can only be effective when accuracy of self-reporting is present. A strategy is therefore used for implementing the trustworthiness test of information gathered through the WATIP probe, focusing on consistency of input. It is assumed that if people invariably report the same information on different occasions, congruence of information is maximized, assuring reliability of data. Two indicators are used in separate stages of the WATIP during the interaction process. These are based on two assumptions:

- If participants do not answer one question correctly, it is probable that they will be consistent in not answering other questions correctly;
- Being consistent will be a pattern rather than an accident, and therefore the same reliability (or lack of reliability) will be seen on more than one occasion.

A double validation process takes place in the WATIP, focusing on two sets of information: the birth date of each participant and the number of cigarettes smoked by
that person. On several occasions, the same questions are posed, and it is expected that consonance in answers will be shown.

The birth date is considered critical information, as it is often used in several Internet queries (as for recovery of a lost password). Failure to report date of birth correctly is an “error” commonly employed by a web user in the process of protecting identity. People can be reluctant to reveal their birth dates as Internet experts counsel avoidance of disclosing such information on the Net (Leebow, 2001). The WATIP guarantees the user data protection, and this establishes a setting in which trust and confidence will lead to consistent tailoring support. The WATIP uses birth dates as a tracking system for following the participant in the database entries. Failing to provide correct birthdates can undermine the validity of the IBC tailoring process, as information that is relevant for people of a particular age group may not be appropriate for those of another age group.

It is assumed that if a person avoids disclosing her or his birth date he or she might also follow a pattern of lack of transparency in other exchanges of information. This would mean that the date of birth that is registered might be misleading. Since the user is not aware that asking for the birth date is something that will happen again in the WATIP, it is appropriate to establish that when carelessness or evasiveness occurs again, memory of the first-date registration, such as the birth dates, will have vanished and a different date might eventually be registered. The opposite will take place when the correct birth date is registered, since consistency in providing other entries is more likely to be shown.

This is asked for at the registration point (before starting the tailored process) and also within the platform, after log-in. A sufficient length of time and number of activities is given for the user to forget what information he or she delivered at the beginning – such as not reporting the correct birth date. Registration entries of birth dates were not congruent for 309 participants (14.6%) out of the total of 2,113 who were being examined in this study as they did not report the same date of birth in the WATIP on two different occasions. Nevertheless the histogram of the total number of days of difference between the two dates of birth (Figure 17) showed a quasi-perfect normal distribution into two subsequent categories of answers. Almost two thirds of these
participants (n=309) gave the correct year of birth, when answering the questions, but reversed months and days. For example, participant IBC-52 registered as a birth date 07-08-1981 but, on the next occasion gave the date as 08-07-1981. With the pattern found, it was hypothesized that this was too “perfect” to be a random error of participant input. A further analysis was undertaken, looking at the way the platform was registering this information, and it was noticed that for unknown reasons the data entry Portuguese format was not being followed; the day-month-year formula was being abandoned in favour of the alternative system of month-day-year, related to the geographical location of the user.

It was assumed that the exchanging of days for months, in those cases where the recorded year was the same, should be considered a technical glitch and not necessarily a result of the user’s intention to report different birth dates.

Figure 17: Pattern of days of discrepancy between birth-dates, assessed at two widely-separated times of interaction with the WATIP and histogram.

Source: research study (Arm 1)

After further testing for this discrepancy, the final number of participants who registered very different birth dates was found to be 54. It is believed that, among the 2,113 users of the WATIP, 2.6% of participants failed to record their birth dates correctly on either the first or the second occasion when they were asked to do so.

A second assumption is that if someone fails to supply information accurately in one situation, this might indicate a pattern of behaviour – a repeated or random mistake in the interactive process. This is the case in point with the number of cigarettes smoked by day - accessed more than once. Because this is not an exact measurement, the second question about the number of cigarettes smoked is answered in an interval drop-down menu. Thus congruence between proximal measurements of cigarettes smoked will allow assessment of the validity of the information entered into the WATIP. Of the
smokers who answered the question about the number of cigarettes they smoked, and said they smoked between zero and 10 cigarettes per day, 86.7% had answered consistently.

For those who smoked between 11 and 20 cigarettes daily, the level of consistency was reported in 92.9% of the answers. Among smokers of between 21 and 30 cigarettes per day, 62.4% were consistent in their responses. Finally, among smokers who smoked 31 or more cigarettes daily, 71.8% reported their cigarette levels consistently (kappa=0.71, \( p<0.001 \), 95% confidence interval) (Table 39).

<table>
<thead>
<tr>
<th>S_88_F4 » number of cigarettes</th>
<th>S_50URR (category of the number of cigarettes)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ( \leq 10 ) Count</td>
<td>183</td>
<td>211</td>
</tr>
<tr>
<td>1 ( 11-20 ) Count</td>
<td>41</td>
<td>789</td>
</tr>
<tr>
<td>2 ( 21-30 ) Count</td>
<td>1</td>
<td>481</td>
</tr>
<tr>
<td>3 ( \geq 31 ) Count</td>
<td>2</td>
<td>202</td>
</tr>
<tr>
<td>Total Count</td>
<td>227</td>
<td>1683</td>
</tr>
</tbody>
</table>

Kappa = 0.71; \( p=0.000 \) Source: research study (Arm 1)

The two groups of participants (those who were consistent and those who were not consistent) did not differ in gender \( (\chi^2=0.040; \ df=1; \ p=0.84) \), SES \( (\chi^2=0.041; \ df=1; \ p=0.84) \), IBC \( (\chi^2=0.089; \ df=1; \ p=0.76) \) or SOC \( (\chi^2=0.479; \ df=1; \ p=0.49) \). These results help to clarify disparities between self-reported information in the WATIP and the degree of trustworthiness of information input.

With this incursion into the confiding of WATIP self-reported information it is appropriate to discuss one of the limitations of this research. Self-reporting of smoking and of smoking cessation as the status of being either a smoker or an ex-smoker is not confirmed by biochemical validation. Instead each participant reports, for the first
condition, the number of cigarettes he or she is smoking every day. For the status of being an ex-smoker, one year after using the platform, a direct question was asked in the indepth interview, to the users who had gone through the IBC process described earlier in the study, Arm 2. In this matter, some researchers argue for the validity of self-reports, as constituting a reliable method of measuring cigarette consumption (Mak, Loke, Lam, Abdullah, 2005). However, there is lack of unanimity about this as self reports may not be accurate. Recall may be flawed or rounding up of numbers of cigarettes such as “18” or “29” may become an issue for researchers (Perez-Stable, et al., 1992).

Measuring nicotine consumption and cigarette smoke exposure as accurately as possible can be carried out by assessing carbon monoxide levels or levels of serum cotinine which is a principle metabolite of nicotine and considered the best available biochemical measure of nicotine consumption. Research has revealed that cotinine increases with cigarette consumption linearly, up to about 25 cigarettes per day, but for heavier smokers the relationship ceases to be linear and self-reports might underestimate cotinine level (Siahpush, et al., 2008).

As important as this finding might be, feasibility of certain type of studies can not rely on such tests. After giving careful attention to this issue, the Society for Research on Nicotine and Tobacco, Subcommittee on Biochemical Verification, has indicated that for data collection using such means as the WWW, mail or telephone, the participant’s self-reports are considered accurate, and the precision gained by biochemical verification may not even be regarded - in the case of such studies - as an add-on value (Myung, et al., 2009). This study falls into this category. Nevertheless, despite this stand, careful attention was paid to this issue in order to explore cultural application of such a proposal.

In working paper three (Appendix 4) the reliability of self-reporting and carbon monoxide exposure were assessed in comparative terms, and it was concluded that Portuguese-speaking participants (n=10824) were reporting their levels of cigarette consumption with high accuracy rates (75% of smokers identified as self-reporting correctly their number of cigarettes they were smoking per day (by carbon monoxide validation - diagnostic accuracy [area under the curve (AUC) =0.723, p<0.0001). It is
assumed that, in general, the participants did not under-report their cigarette consumption, while a validation by carbon monoxide measurement confirmed self-reports overwhelmingly. Truthfulness in this respect is critical for the interpretation of the data collected, since it provides a measure of the level of confidence that can be attributed to self-reports. Systematic under-reporting would threaten the use of the WATIP in smoking-cessation support, since the interaction is based solely on self-reporting by participants.

Although, in the wider Portuguese context, an assessment of the kind made here has never been carried out to determine the equivalence between self-reports and the biochemical validation of the number of cigarettes smoked - before the working paper three (Appendix 4) - these results confirm the trend that has been found in other studies (WAGENKNECHT, 1992).

A second dimension of this issue is related not to the measure of cigarette consumption but to the accuracy of smoking cessation reporting. As discussed before, there are good reasons not to exclude the possibility that self-reporting by participants of the study is accurate. Therefore it is assumed that the results (of quit rates of 23.9%, abstinent participants at 12 months) obtained through the use of the WATIP or from the contributions of the interviews conducted in Arm 2, deserve to be taken into consideration. Identification as abstinent means continuous abstinence. In other words, it means that the subjects of the study had been continuously abstinent from tobacco use since their Dday\textsuperscript{16}.

One way of looking at this is by analogy with other studies that have used the Internet to support smoking cessation endeavours. The results of the WATIP are not isolated but have some commonality with these research undertakings. Myung and colleagues have supplied a meta-analysis of effects of smoking cessation programmes vs. control in a random-effects meta-analysis of randomized controlled trials (Figure 18). Although

\textsuperscript{16} Point-prevalence abstinence is accepted as a preferred measure, because continuous abstinence data may underestimate the percentage of individuals who are abstinent at particular follow-up time points. Most relapse begins early in a quit attempt and persists. A point-prevalence measurement, taken at six months, would certainly not capture the great majority of those relapse events. But this was not the chosen approach for the research under consideration, as a more conservative measure was estimated as better able to clarify the long-term potential of the WATIP.

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these results cannot be compared with the type of findings developed in this study, the overall conclusion is that of

*a notable effect on smoking cessation for Web-and computer-based smoking cessation programs ... The programs increase the smoking cessation rate about 1.5 times more than in the control group and obtain an abstinence rate at 12-month follow-up of 9.9%. We found sufficient clinical evidence to support the use of Web-and computer-based smoking cessation programs for adult smokers (Myung, McDonnell, Kazinets, Seo, Moskowitz, 2009, 935).*

Source: Myung, McDonnell, Kazinets, Seo, Moskowitz, 2009, 935
These results are in line with recent evaluation of smoking-cessation services in Britain. When estimated success rates for a variety of intervention types were considered, online support was found to be the most effective intervention, ranging from 28% to 66% (Table 12). As was noted before, England is one of the very few countries in the world where a systematic approach to helping smokers quit is implemented, along with regular evaluations assessing the impact of different types of interventions (UK Department of Health, 2009).

As similar outcomes are obtained within the results, it is not ruled out its contribution to smoking cessation, until further studies investigate the principles set out here concerning the WATIP. Nevertheless – and this will be explored later in the recommendations – caution must be strongly advised, since this research is not comparable to some of these studies which are based on randomized control trials.

### 5.11. Resources

It is common – when considering smoking cessation strategies and tools – to include a discussion of their specific efficacy and efficiency. However several approaches which focus on the efficacy of smoking cessation interventions have an unknown impact on whole populations, since most of the time they rely on randomized control trials. Another peculiar aspect of these studies is that they concentrate on only small samples (e.g. USPHS, 2000), mainly of self-selected, motivated participants, treated under ideal conditions (Abrams, et al., 1996; Curry, Grothaus, McAfee, Pabiniak, 1998).

The same is true with the use of Web-based smoking-cessation interventions, as research must come to terms with similar questions. But real-life evaluations, like the one produced with this research, while dealing with a similar issue, follow a different approach. Even so, considering the results obtained with the WATIP in regard to IBC and BC, it is explored if it can work in the domain of smoking cessation (efficacy). It is also considered the amount of resources used in order to achieve these results. Is there a
trade-off to be gained by the use of the Web as a tool for smoking cessation, demonstrating that it can reach a vast number of people at a small cost (efficiency)?

**WATIP and efficacy**

The overall exploratory questions that were posed were, “Does it make any sense to use a tool like the WATIP? Does it provide any benefits in terms of BIC or BC related to smoking cessation?” These questions introduced the discussion about the efficacy of the WATIP: does this platform work in the domain of smoking cessation?

The portal was intended to achieve two objectives: assisting health professionals with their task and help reinforce decisions to stop smoking. The protocol for this research established what results were expected to be achieved\(^\text{17}\): at the end of the course it was expected that 3% of Web users who registered with the WATIP would be active on the database, would follow a personal stop-smoking approach, deciding on a Dday and had stopped. From the results that were obtained, it appears that 40.6% of those who follow the WATIP programme made a tentative quit attempt. (Of the 3,601 users of the platform who fulfilled eligibility criteria, 1,463 displayed a predisposition to undertake smoking cessation and the likelihood of stopping smoking). On the other hand, 650 people did not demonstrate these positive characteristics. This results in a ratio of 2.5 in terms of favouring manifestations regarding IBC.

In the end, of those who were interviewed one year after using the WATIP, 23% referred to themselves as ex-smokers. As was discussed earlier these values are in range with other research results. For example, Etter found abstinence rates to be respectively 25.2% and 15.7% (OR=1.81, CI 1.51-2.16, p<0.001) in baseline for former smokers, in original and modified programmes on the WWW (Etter, 2005); Strecher and colleagues found that of all subjects who logged on to the treatment site at least once, continuous abstinence rates at 6 weeks were 29.0% in the tailored condition versus 23.9% in the non-tailored condition (OR=1.30; \(p=0.0006\)); at 12 weeks continuous abstinence rates were 22.8% versus 18.1%, respectively (OR=1.34; \(p=0.0006\))

\(^{17}\) By analogy to brief interventions [BI] success of 3.8% (at twelve months) within the general practitioner’s setting (Kottke, et al., 1988).
According to Hughes, when a variety of strategies is combined, 25% of self-quitters are abstinent at one year (Hughes, 2000). In Britain online support was found to be the most effective intervention, ranging from 28% to 66% (Table 12) (UK Department of Health, 2009).

These figures do not rule out the possibility that such an intervention could demonstrate some efficacy. Nevertheless several precautions, have to be summarized. Placing side by side the resources used in the person-to-person (personalized face-to-face intervention) approach and those used with the WATIP must include taking into consideration a broader spectrum of issues than those considered here. The results obtained with the WATIP platform concerning either IBC or BC, have not been controlled and a different research design (such as an randomized control trial) is needed before one can fully understand the real efficacy of this WATIP.

**WATIP and efficiency**

Considering efficiency may lead to a discussion of costs of such a provision of support to smoking cessation. Reflection on the small cost of the use of the Web in smoking cessation is not a trivial matter as it establishes the need for a comparative study. One such equivalence that could be examined would be the extent of human resources needed to support a traditional smoking cessation process, as distinct from those involved in using the WATIP. However, extreme caution should be used when making this comparison, since the impact of human interaction on a person-to-person (personalized face-to-face intervention) basis can never be compared precisely to the interaction established with a web protocol, even with such specific tailoring as provided by the WATIP. Nevertheless, for practical reasons, this comparison will be undertaken in order to achieve some idea of what small cost could mean in this context and if any may exist.

According to the Direcção Geral da Administração e Emprego Público, Posições Remuneratórias por Carreiras, the Tabela Salarial 2010 do Sindicato dos Médicos, the Tabela Salarial 2010 do Sindicato dos Médicos.
and the Portaria 1553-c / 2008 31/12 da Tabela Salarial da Carreira de Enfermagem, a general practitioner receives €17.317 per hour for a 35h per week programme and €27.235 per hour for a 42h per week basis. For a registered nurse working on a 35h per week programme, the salary is €8.704 per hour and on a 42h per week is €10.422/hour. For a technical assistant working on a 42h per week basis the salary is €7.627 per hour.

According to the The Portuguese Directorate-General of Health which produced a “Circular Normativa” under the title “Programa-tipo de actuação em cessação tabágica Nº: 26/DSPPS” (PORTUGAL. MS. DGS., 2007) “cada fumador deverá realizar entre quatro a seis consultas médicas com uma duração média de vinte minutos”.

In these circumstances every smoker is likely to need about 100 minutes (an average of 5 consultations, each of a duration of 20 minutes). A general practitioner would receive between €29 and €46 to offer support for smoking cessation per person. The document which provides this information does not state the amount of time needed by a registered nurse to perform all the necessary tasks that are specified in the checklists to which it refers. Nevertheless, for practical reasons, it can be assumed to be 100 minutes. If this is indeed so, it could mean a cost of between €14 and €17 per smoker. In this situation it would be necessary to count on having between €43 and €63 per smoker to deliver support for smoking cessation (including the general practitioner’s and nurse’s salaries).

For the user of the WATIP platform the amount of time estimated for going through each of the ten steps of the programme is 30 minutes per step. During those steps, similar variables to the ones that are collected by the nurse and evaluated by the general
practitioner, specified earlier, gather the necessary information. The relevant exception concerns evaluation of medications, which is not thought out by the WATIP.

The manager of the WATIP platform needs 2.5 minutes per user to manage his/her progress. If one takes into account some exchange such as answering questions or giving any other kind of support, the time spent per user does not exceed 5 minutes when handling regular issues (since automatic replies are generated for the most common questions).

If the 3,601 people who were the subject of this research, and who used the portal, are taken into consideration, it can be calculated that about 9,002 minutes were needed to provide the necessary support for the progress of these users from one step to another. If this management had been carried out by a general practitioner it would have cost between €2,597.55 and €4,085.25. If a nurse had supervised the same procedure, the cost would have been between €1,508.7 and €1,563.3. Nevertheless, since this is an administrative task and does not need health expertise, the calculations can be made on the basis of an overall cost of €1,144.05.

If these same 3,601 people had been given support by regular, planned SNS services, including guidance by general practitioners and nurses, the cost would have been between €154,843 and €226,863.

One of the basic characteristics of the WATIP is that this tool uses the Internet to develop a process of personalized knowledge management that can reach thousands of people simultaneously, at any time of the day, on any day of the year, with its 24/7/365 window of opportunity. This adds weight to the argument on behalf of the efficiency of such a tool as well as being a reminder of the broad catchment area that is under consideration.

Reaching a more complete understanding of the real implications of a web-assisted tobacco intervention in the Portuguese context was something taken into consideration during the preparation of the WATIP. Particular thought was given to the trans-cultural capability and adaptability of this instrument, with the possibility that it could be used by people in other parts of the “global village” (KICKBUSCH, 1986, 321) speaking the
same language (people such as emigrants, and populations in Brazil or other Portuguese-speaking countries like Angola or Mozambique).

The objective of this research was to explore the WATIP’s contribution to healthy lifestyles, where the centre of attention is BC, while democratization of knowledge about smoking cessation is harnessed. The results obtained set up an agenda for discussion in the Portuguese context of the usefulness of bringing the salutogenic paradigm into play into smoking cessation endeavours. While exploring the dimensions of comprehensibility, manageability and meaningfulness an effort was implemented to bring relevant knowledge to the user level. The process of knowledge translation went through a variety of stages aimed at presenting relevant components in simple words to help users of the WATIP implement their own processes of smoking cessation.

Usually this knowledge is in possession of the health professional, who delivers it when time is available – usually focusing on the prescription of medication. A great deal of interest today surrounds the use of medications to support smoking cessation. As was mentioned previously, although this might be an important aspect of helping smokers quit, since the Portuguese health system fails to give coverage to smoking cessation medications, this may nevertheless build up one more difficulty for the smoker to get rid of tobacco.

As a result, smoking cessation interventions must be of a compatible cost when lack of resources (noted earlier) is at stake. While the WATIP does not involve participants in the use of any sort of medications, for the reasons given above, it follows an approach that has been referred to in the literature as one of the highest importance for smoking cessation, i.e. a behavioural change approach:

*Although a combination of behavioural and pharmacological treatment produces the best outcomes, behavioural treatments alone can also be effective. It is critically important that a wide range of interventions be used both in general to support tobacco cessation and specifically to support those who wish to quit tobacco use even where medication is not available (LANDO, 2002; WHO, Policy recommendations for smoking cessation and treatment of tobacco dependence, Tools for public health, 2003, 51).*
These arguments do not rule out the possibility that such an intervention could demonstrate some efficiency. If this is indeed so, the impact of such a programme could be considered positive (ABRAMS, et al., 1996).
6. Conclusions and recommendations
At the beginning of this century, the Portuguese government established the goal of cutting the incidence of smoking by half by 2010 (PORTUGAL. MS. PLANO NACIONAL de SAÚDE, 2004-2010, vol. 2). In order to do this, a basic strategy (one of several plans) was established: that of giving help to smokers who wanted to quit. Several ways of helping smokers to quit are identified within the framework of the first National Health Plan of Portugal, 2004-1020. These include the use of information technologies such as Internet portals. Finding innovative tools that will facilitate smoking cessation support in the shortest period of time, is considered a key issue in the context of the health goals of Portugal.

In light of the above, this research has focused on the implementation of the first Portuguese smoking cessation tool that opts for the use of the Internet to reach would-be non-smokers at www.parar.net. It has searched for the answers to questions regarding the potential of the Internet to sustain a process and to encourage willingness to maintain Intentions to make Behavioural Changes (IBC) and Behavioural Changes to promote health (BC), when no other support can be immediately obtained.

Following the development of the Web Assisted Tobacco Intervention in Portuguese (WATIP), this research concentrated on the feasibility of the programme and receptivity to Internet use. An assessment of quality and conformity to national and international standards of good practice in the context of smoking cessation was implemented by submitting the WATIP to evaluation to the Comissão Nacional de Proteção de Dados, (A.1.) the Associação Portuguesa de Software (A.2.) and the Health On the Net Foundation code of conduct (A.3.). The last-named of these organisations was responsible for awarding its seal of quality and international accreditation to the WATIP.

Outcomes of the process of IBC or BC related to smoking cessation of a tailored intervention were explored. Could this system lead a person, in real-life situations, to a decision (about smoking cessation) measured by her or his willingness to establish a Dday? This constitutes the first major step in behaviour change, and was designated, in this study, by the expression Intentions to make Behavioural Changes to promote health (IBC).
An assessment of the practicability and likely impact of putting the Web-Assisted Tobacco Intervention Probe into practice is divided into two sections. The first describes explicit results related to quality control in relation to WATIP and gives an overview of a study of WATIP users. Of these, 3,150 answered initial eligibility questions. In the end, 1,463 met all eligibility requirements, completed intake, decided on a day to quit smoking (Dday) and declared their IBC. A second targeted group of 650 did not decide on a Dday.

More people who interacted with the platform took a decision regarding their IBC than those who did not do so. Of the users of the platform who fulfilled eligibility criteria, 1,463 displayed a predisposition to undertake smoking cessation and a likelihood of stopping smoking. On the other hand, 650 people did not demonstrate these positive characteristics. The ratio (2.5) was favourable to decisions concerning smoking cessation, and therefore the potential of the WATIP is also seen as positive.

The study compared two otherwise similar groups and looked at how different the results were for the two groups, taking into account the amount of knowledge management participation that had been involved. In order to examine the impact of this process and interpret the outcome, three approaches for measuring the effects of knowledge management (Leavitt, 2003) where utilized. The first one value mapping (B.1.1.), assesses what socio-demographic characteristics were associated with the output (IBC).

Differences were found regarding gender: females were more in favour of IBC than men. School years also made an impact on results; more years in school tended to favour a positive outcome. It was also found that low SES had a negative impact on IBC.

While one in every four of the WATIP users (B.1.2.) had not previously tried to quit, the higher the number of previous quit attempts, the better the outcome was in terms of IBC. Studying the smoking history of the WATIP participants also revealed that the more pleasure there is in smoking, the less prone smokers are to commit themselves to
IBC. The number of cigarettes or years of smoking made no difference to this situation, among those using the programme.

Assessment of smokers’ readiness to change demonstrated that the higher the readiness to quit (B.1.3.), the higher was the percentage of smokers who aimed at IBC. The level of smoking, measured with the Fagerström test for Nicotine Dependence (B.1.4.) had no influence in the outcome.

In groups with higher confidence in their likelihood of stopping in a short time, a higher rate of deciding on a Dday was noticed (B.1.5.). This was confirmed when users of the WATIP considered whether or not they were motivated to try smoking cessation in the short run. Those who stated their determination to set a quit date were more likely actually to establish a Dday than those who said they could not make such arrangements until some time in the distant future. These stages of efficacy assessment focused on the outcome of participation, trying to establish whether or not the efforts that had been expended actually made a difference.

As this hypothesis, involving the smokers’ attitudes to abandoning their habit proved to be correct, it was not ruled out that smokers’ self-efficacy in the ability to quit determines their IBC when considering a Dday. The importance of sense of coherence in IBC was made clear by the figures showing that those who had a higher SOC tended to set a Dday more predictably than those who had lower levels of SOC (B.1.6). In addition, it was confirmed that a one-dimensional scale, is capable of measuring for SOC.

To obtain a more detailed understanding of the role the Internet plays, through the WATIP, in assisting those smokers who succeed in terms of IBC, a second Arm of research was added. It was built around 77 in-depth interviews that were carried out, using a randomly chosen sample of users who had decided on their Ddays while using the WATIP. These users were contacted one year after their interaction with the platform.

Here, “Behaviour Change” (BC) and the usability of the platform are explored in relation to the situation a year after IBC was declared. A percentage of 32.9% of self-
reported, 12-month quitters in continuous abstinence from smoking from Dday to the
12-month follow-up point of the use of the WATIP has been assessed. The abstinence
percentage is thus 32.9%, which is the outcome of BC (Table 40).

This was the second value mapping (B.2.1) that was performed with a view to
discovering what characteristics (as in the use of the WATIP) were associated with the
outcome of smoking cessation referred to in this study as Behaviour Change (BC). The
assessment focused on BC achievement. In other words, the aim was to find out if the
efforts that had been made had actually had an impact, so that the user stopped smoking.
This second piece of research compared two otherwise similar groups and examined the
differences in the results they had produced. This study took into account socio-
demographic determinants, smoking history, nicotine dependency, self-efficacy,
motivation, stages of change and sense of coherence.

Of all variables considered as contributing to this outcome, only smoking in bed when
sick established a difference among isolated variables. SOC was identified as a variable
that contributed to BC in this group of users. Higher SOC favoured stopping.

WATIP promoted reinforcement of self-control and positive self-care in action process
(B.2.2.) about smoking cessation (BC), as would-be quitters of tobacco smoking make
decisions about BC compatible with their goal (establishing a Dday) (B.3.). Users’
opinions about the programme’s success in helping them and their implementation of
measures like the length of time between the information-management process of the
WATIP and the user’s decision concerning the setting of a Dday contributed to clarify
the role played by the WATIP. It was found that the majority of users felt that the way
the programme operated was compatible with the kind of information management
favourable to their ease. In other words, it offered a useful approach to compliance with
best practices in healthy living.

This thesis gauges the role that public health can play in order to maximize the potential
of stop-smoking initiatives that focus on the use of the Internet for such a purpose. The
shift from a “clinical” to a “public health” orientation, already referred to among
smoking-cessation methods (LICHTENSTEIN, GLASGOW, 1992, 518), demands a
complementary move. The trade-off (C) extended to other instruments, such as the use

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of the Internet, considered in terms of the support it can achieve in relation to IBC or BC regarding smoking was explored.

In this situation, the main objective of this research was to understand the contribution of new information technologies, mainly by defining the role of Internet portals, to help people take into their own hands decisions concerning their health, including smoking cessation. Web Assisted Tobacco Interventions (WATIs) currently provide a point of reference for research within eHealth in general. This is the first research that has been developed to assess the cultural appropriateness of a WATIP to a society like the Portuguese.

<table>
<thead>
<tr>
<th>Study 4</th>
<th>Intentions to behavioural changes (IBC)</th>
<th>Behavioural changes in smoking (BC)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>arm 1 (N=3601)</td>
<td>arm 2 (n=77)</td>
</tr>
<tr>
<td></td>
<td>68.5%: users of the platform achieved IBC status</td>
<td>32.9%: abstinence (smoking cessation last 12 months)</td>
</tr>
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</table>

**Objectives**

<table>
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<th>Component</th>
<th>direction</th>
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<tr>
<td><strong>socio-demographic determinants</strong></td>
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<tr>
<td>females</td>
<td>favour</td>
<td>gender</td>
<td>no difference</td>
</tr>
<tr>
<td>(OR=0.76, CI 0.63-0.91, p &lt; .005)</td>
<td></td>
<td>number of school years</td>
<td>no difference</td>
</tr>
<tr>
<td>higher number of school years</td>
<td>favour</td>
<td>SES</td>
<td>no difference</td>
</tr>
<tr>
<td>(OR=0.70, CI 0.54-0.89, p &lt; .005)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>higher SES</td>
<td>favour</td>
<td>Previous quit attempts</td>
<td>no difference</td>
</tr>
<tr>
<td>(OR=1.57, CI 1.30-1.89, p &lt; .000)</td>
<td></td>
<td>pleasure</td>
<td>no difference</td>
</tr>
<tr>
<td><strong>smoking history</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>more previous quit attempts</td>
<td>favour</td>
<td>stages of change</td>
<td>no difference</td>
</tr>
<tr>
<td>(OR=0.49, CI 0.37-0.66, p &lt; .001)</td>
<td></td>
<td>readiness to quit and</td>
<td>no difference</td>
</tr>
<tr>
<td>more pleasure</td>
<td>favour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(OR=0.74, CI 0.58-0.93, p &lt; .05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>readiness to quit/stages of change</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>preparers than contemplators</td>
<td>favour</td>
<td>IM = PC &lt; C &lt; PR</td>
<td>no difference</td>
</tr>
<tr>
<td>(OR=0.25, CI 0.14-0.43, p &lt; .001)</td>
<td></td>
<td>readiness to quit contrast</td>
<td>no difference</td>
</tr>
<tr>
<td><strong>nicotine dependence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTNDP</td>
<td>no differences</td>
<td>FTNDP</td>
<td>no differences</td>
</tr>
<tr>
<td>(OR=0.96, CI 0.73-1.27, p &lt; .79)</td>
<td></td>
<td>those not smoke in bed</td>
<td>favor</td>
</tr>
<tr>
<td>(OR=6.31, CI 2.03-19.67, p &lt; .001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>motivation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stop smoking immediately</td>
<td>favour</td>
<td>stop smoking immediately</td>
<td>no difference</td>
</tr>
<tr>
<td>(OR=2.30, CI 1.74-3.05, p &lt; .000)</td>
<td></td>
<td>motivation</td>
<td>no difference</td>
</tr>
<tr>
<td>motivation</td>
<td>favour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(OR=0.51, CI 0.36-0.72, p &lt; .001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>self-efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>confidence</td>
<td>favour</td>
<td>high SOC</td>
<td>favour</td>
</tr>
<tr>
<td>(OR=0.51, CI 0.36-0.73, p &lt; .000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>sense of coherence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high SOC</td>
<td>favour</td>
<td>high SOC</td>
<td>favour</td>
</tr>
<tr>
<td>non adjusted</td>
<td>(OR=1.35, CI 1.11-1.64, p &lt; .0001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>high SOC</td>
<td>favour</td>
<td>significant difference in the scores for SOC (IBC)</td>
<td>favour</td>
</tr>
<tr>
<td>adjusted</td>
<td>(OR=1.43, CI 1.01-1.94, p &lt; .006)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>significant difference in the scores for SOC (IBC) (M=129.34, SD=24.61) and SOC (IBC) (M=125.68, SD=27.09)</td>
<td></td>
<td>(M=144.66, SD=22.52) and SOC (IBC) (M=131.51, SD=21.43)</td>
<td></td>
</tr>
<tr>
<td>conditions; t(2111)=3.075, p=0.002</td>
<td></td>
<td>conditions; t(76)=2.54, p=0.014</td>
<td></td>
</tr>
</tbody>
</table>

Source: research study (Arm 2)
Exploratory conclusions consider that this approach may alleviate stress for over-worked Portuguese health professionals in their daily routine and activities as well as empowering them. The WATIP also contributes to the citizen-centeredness of support, facing the challenge of innovation in health.

In view of these specific results, and after considering the overall findings of the two studies in this research undertaking, it is not ruled out the potential of a WATIP to play a role in health promotion, when smoking cessation is targeted.

Nevertheless several issues and limitations have been identified that need to be reconsidered as they may pose critical developments of such interventions. These will be considered in the next section of the recommendations.
Recommendations

Some of the limitations of this research have to do with self-selection bias and sample size (power), which are crucial factors in any claim of causality when dealing with disease management, its prevention or health promotion. Most studies aimed at evaluating health benefits on a population basis, use specific procedures and expect causal conclusions. Such procedures are not compatible with the conditions and development of this research. There are no expectations concerning causal findings; it is simply not possible to reach such conclusions by inferring that the WATIP intervention will have a significantly measurable effect on the general population by reducing the burden of disease (caused by the act of smoking) when compared to an alternative procedure. Since the randomized assignment of exposure was not a precondition of the usability of the platform, it is acceptable for the groups being compared to be different in respect to other factors, apart from the variable under scrutiny. These biases must then be considered in terms of confounders. Some of these have been addressed already.

If, in further research based on other types of studies, such as randomized control trials, there are subsequent repetitions by different individuals with different characteristics, in different settings, different calls in procedural protocols and different exposure opportunities, then there will be the possibility of considering the decrease of impacts of confounding variables. In this way, the increased knowledge that results obtained are consistent, coherent and expected, may raise the level of confidence in such instruments as the WATIP.

It is recommended that a long-time process of real-life evaluation be introduced in order to follow the behaviour of the WATIP users more closely while assessing outcomes related to their literacy. This will help in the analysis of usability issues prior to the use of the WATIP in order to guarantee that all functions are within the range of the participants’ capacity to use them.
Further review of the WATIP layout should suggest alternatives that allow reconsideration of web functions so that users may experience a more sensitive website ambience for the several hours of interaction that each one of them spends on-line. New research could explore the relevance of changing layout in search of an increase in users being able to persevere to the end of the programme. In order to simplify layout as well as conform to the probe choice, through which the WATIP would keep open the minimum options needed to implement the support for smoking cessation, some tools were excluded on purpose. The absence of chat rooms or instant multiple messaging between users of the WATIP might also imply a need for further research. Reconsideration of the option of not making available such tools should be re-assessed in other experiments closely related to tailored platforms such as the WATIP, in the Portuguese context.

Another recurrent issue which needs further research related to WATIP is the inclusion of a social networking dimension. When the WATIP platform was implemented some popular social networks (like YouTube) had just been created and others did not yet exist (like Twitter). Availability of social networking tools was sparse. Today these capabilities have become more sophisticated and various networking sites have become very popular. Users can broadcast to a wide range of viewers about victories or failures in different aspects of these users’ lives and it is logical to suppose that this type of communication could be considered for inclusion as an online support community in the smoking cessation domain.

Moreover, Web 2.0 tools like SecondLife and other virtual worlds also offer potential venues to consider for association with the WATIP. The conjunction of these tools, through which virtual face-to-face interaction may potentiate the support smokers can receive, is a new field of research. An evaluation of these types of tools and their contribution to smoking cessation needs to be further studied, as stand-alone options, or as forming components of a web of alternatives that include WATIP, contributing to moving users towards the ease pole of the dis-ease / ease (health) continuum.

In order to guarantee articulation between the WATIP and health professionals, each user is asked to contact his or her health professional for a health check-up. If this is not done, it is recommended, at present, that this person should not continue with the
programme. Although it is considered a golden rule in the research/implementation plan, that an health professional must be informed of the user’s intentions regarding smoking cessation and that a health evaluation should be carried out, it was found that this obligation became a road block. Therefore this needs to be reassessed, because of the widely observed eagerness on the part of smokers to make further progress in the WATIP stages.

Another recommendation is related to the text and the number of questions it asked the users to answer. Some users said these were too numerous or too long. Although this was a reaction limited to a small number of users, further research might nevertheless consider reducing the number of questions to those really needed for the WATIP objectives to be achieved. As an example, following the indications presented that those users were trustworthy, the repetition of control questions may now be considered irrelevant; not repeating them will be of benefit to the user.

Regarding accessibility issues, W3C (World Wide Web Consortium) norms should be re-considered within this context as, for instance, the WATIP is not prepared to deal with users with hindrances to accessibility, such as vision difficulties. When the program is being revised, adverse and discriminatory limitations to WATIP use should be overcome. There are, in addition, other technological issues that are key elements for scrutiny. These concern people with certain conditions like pregnancy or with alcohol or drug dependency. As these issues were not taken into account in the tailoring process of the WATIP, future research should concentrate on such matters as these, which relate to user-centred design in this WWW approach to smoking cessation.

In order to encourage the smoker’s involvement in managing his or her own health, information and communication technologies focused on care providers must give place to information and communication technologies that are user-centred. The gradient of management and control of material from various types of information systems can be examined in several stages. Initially, systems have focused on the health-care providers, with each supplier building and managing his or her information. No interaction exists between these providers and the people being dealt with, as they are not a part of this supply process. Information is kept under the control of the health professional, who considers it as his or her exclusive property. The introduction of microcomputers and

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their proliferation in health services, led to the implementation of multiple-storage systems of information with little or no compatibility. In the following stages of this situation, there were attempts to find ways to share information from system to system, (as, for example, from the databases of medical and administrative services) to obtain basic statistics, or to indicate where additional examinations were needed or to keep track of the prescription of medications. In Portugal the recognition that the person may be informed or can have access to his or her personal records, collected on the information and communication technologies platforms, if he or she requests it specifically, is in its infancy. There have been developments related to these issues, such as telemedicine services, and the sharing of information between providers is increasing, but systems that centralize information, make it available and manageable by the individual, and facilitate its consultation from different access points, are in an embryonic stage.

Besides the problem of lack of standardization in order to allow comparability and accuracy of criteria, interoperability of information and participation by users in information management have become pressing issues in the spectrum of information technologies. As was referred to, the culture of restricting information sharing prevails and this has hindered the relocation of the WATIP in the interoperable terms of the RIS (Rede Informática da Saúde), raising social, political and organizational questions. This problem of interoperability could not be addressed within the scope and limits of this study, not only for reasons of practicability but because of the novelty of the matter. This issue is now even more important as something to be addressed in future research, as Web 3.0 tools become more and more a part of the new Internet configuration. The goal that is set for tailoring online searching and requests to users’ specific preferences and needs, makes Web 3.0 basically about openness. This indicates that a change is happening in the traditional Web 2.0 paradigm, according to which independent silos harbour programs and their information, such as Facebook, SecondLife or MySpace. The ability to roam with portable identity and personal data presents the basic issue of resolving interoperability issues, as Web 3.0 is about roaming with no limits from database to database, program to program. Since Web 3.0 applications can run on any device like a palm computer, mobile phone or a larger computer, moving the WATIP to such an environment calls for new research.
A cultural shift in the appraisal of information ownership is a process that society will have to develop. Proposals like the one this research has scrutinized (the WATIP) will explore deeper levels of the user-centred approach of ease (health) management. Improving the position of the smoker on the dis-ease/ease (health) continuum by directing him or her towards the ease pole with such aspirations as smoking cessation will find new challenges as well as new solutions in the world. In this context, the public health establishment can continue to respond to – and be – a convenient context for research, exploring approaches to the new conditions of contemporary society, that “… are more complex, more social in nature and need deep understanding to be tackled… a new understanding of ourselves and our bodies, which understand that bodies are not just biological but social entities" (KICKBUSCH, 1986)
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web-assisted tobacco interventions


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8. Appendices
Appendix 1  Regulatory legislation

Appendix 2  Working paper One

Appendix 3  Working paper Two

Appendix 4  Working paper Three

Appendix 5  WATIP
Technology probes and user-centeredness
Web Assisted Tobacco Intervention in Portuguese (WATIP)
WATIP features

Appendix 6  Research study first arm: research tools; Socio-economic strata classification (SES); Motivation; Stages of Change; Social Support; Sense of Coherence; Relapse story board; Smoke overload; Nicotine dependency score; Readiness and willingness to change and health literacy.

Appendix 7  Research study arm two: research tools; Socio-economic strata classification (SES); in-depth structured interview.

Appendix 8  WATI’s in Europe and other International Smoking Cessation Programmes on the WWW

Appendix 9  Quitting with help
web-assisted tobacco interventions

Luis Saboga Nunes
Ninguém sabe tudo, assim como ninguém ignora tudo.
O saber começa com a consciência do saber pouco
(enquanto alguém actua).

É sabendo que se sabe pouco
que uma pessoa se prepara para saber mais...

O homem, como um ser histórico, inserido num permanente
movimento de procura,

faz e refaz constantemente o seu saber.”

Paulo Freire, 1974.47
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