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# Mass media and health promotion
## A campaign to promote flu vaccination among healthcare workers

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# Abstract

This thesis collects the researches carried out during the three years of PhD course on Multimedia Communication. Its general purpose was to explore and experiment the use of media in health promotion.

The first chapter illustrates conceptual assumptions belonging to the research field of the thesis: health promotion.

The second chapter presents a literature review about health promotion and mass media. Fifty studies, published between 2000 and 2014, on programs promoting positive health behaviors and implemented in western countries were included in the review.

The data analyzed provide a general overview of the available experiences in this field and represent a starting point to develop new programs that use new techniques and appropriate outcomes measures.

The third chapter presents an experimental study on a campaign promoting flu shot among healthcare workers (HCWs) in an Italian Academic Hospital in North-Eastern Italy (Azienda Ospedaliera Universitaria di Udine – AOUD) by a multimedia intervention. The campaign was planned, implemented and evaluated in terms of knowledge, attitude and practice (KAP) changes, among HCWs.

The final chapter reports the lessons learned from the literature review and the experimental study and gives recommendations for future research in the field of health promotion and prevention through mass media.

To my mother

*“Sei nell’anima e lì ti lascio per sempre”*

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# Acronyms

| | |
|---|---|
| WHO | World Health Organization |
| CDC | Centre of Disesase Control and Prevention |
| AOUD | Azienda Ospedaliero-Universitaria S. Maria della Misericordia di Udine |
| HCWs | Healthcare Workers |
| KAP | Knowledge Attitude Practice |
| ICT | Information Communication Technologies |

# 1

# Background

## 1.1 Research field

This paragraph presents some conceptual assumptions about health and health promotion, which are the research field of the thesis.
Good health is a basic human right, a resource for everyday life and an important dimension of quality of life. Health is essential for social development. In turn, political, economic, social, cultural, environmental, behavioral and biological factors can influence health.

### 1.1.1 Health promotion and health determinants

The World Health Organization (WHO) Constitution of 1948 defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and realize aspirations, to satisfy needs, and to change or cope with the environment (WHO 1948).
In this holistic understanding of health, the interplay among personal characteristics, social interactions, and living conditions influences individual and collective well-being (Breslow 2006).

## 1. Background

The range of factors that influence health status are known as determinants of health. Scientists generally recognize five determinants of health: biology and genetics (e.g. sex and age), individual behavior (e.g. smoking), social environment (e.g. discrimination), physical environment (e.g. overcrowding), and health services (e.g. access to quality health care) (U.S. Department of Health and Human Services 2009).

### 1.1.2 Public health and health promotion

Public health is the science and art of increasing health, prolonging life and improving the quality of life among populations through organized efforts (WHO 1998).

Health promotion is the process of enabling people to increase control over the determinants of health and thereby improve their health.

The Ottawa Charter for Health Promotion (1986) identified five health promotion actions: build healthy public policies, create supportive environments, develop personal skills, strengthen community action, and reorient health services (WHO 1986).

The main aim of healthy public policy is to create a supportive environment that makes health choices possible or easier for citizens.

In the pursuit of enabling people to lead healthy lives, government sectors concerned with agriculture, trade, education, industry, and communications need to take into account health as an essential factor when formulating policies (WHO 1988).

The Jakarta Declaration (1997) on Leading Health Promotion into the 21st Century confirmed health promotion as an essential element of health development and recognized its relevance for all countries.

Health promotion has to improve both the ability of individuals to take action, and the capacity of groups, organizations or communities to influence the determinants of health (WHO 1997).

Health promotion outcomes are changes in personal characteristics and skills, and/ or social norms and actions, and/or organizational practices and public policies, which are attributable to a health promotion activity.

Changes in the determinants of health are defined as intermediate health outcomes and changes in health status of an individual, group or population represent health outcomes. Health gain is a way to express improved health outcomes. It can be used to reflect the relative advantage of one form of health intervention over another in producing the greatest health gain.

In many cases, the assessment of a health promotion activity is complicated because of the difficulty to trace the pathway that links the intervention to health outcomes (for example, because of the technical difficulties of isolating cause and effect in complex real-life situations).

Therefore, most recent outcome models in health promotion distinguish between different types of outcomes and suggest a hierarchy among them (Nutbeam 1996).

### 1.1.3 Health promotion, prevention and health education

Disease prevention is another practice of public health. Preventive actions are defined as interventions directed to averting the emergence of specific diseases, reducing their incidence and prevalence in populations.

Prevention covers measures to prevent the initial occurrence of disease through early detection (primary prevention), to arrest its progress through appropriate treatment (secondary prevention) and to reduce its consequences once established (tertiary prevention) (WHO 1998).

Traditionally, prevention focuses on people at risk for specific diseases, therefore it is seen as a more medically oriented activity than health promotion.

Health promotion is defined more broadly than prevention, since it relates to measures that are not directed to a given disease or disorder, and is useful to increase overall health and well-being and involves the population as a whole in the context of everyday life. In other words, health promotion is based on the awareness that achieving health is a question not only of survival but also of qualifying existence. Health promotion try to increase or maintain basic abilities, and/or dispositions and/or well-being and/or fundamental psycho-physical states and processes, where subjects are healthy, or where (when unhealthy) the actions focus on the healty features of the subjects. Disease prevention try to stop, eliminate, postpone the emergence or development of those internal processes and

states that tipically cause manifest ill health, or future ill health and premature death (Tengland 2010a).

Even if health promotion and disease prevention are logically distinct notions, they are conceptually linked. It is not possible to prevent a disease without furthering or maintaining health (e.g. flu vaccination prevent influenza and at the same time help maintain health in vaccined population). So, disease prevention is one aspect of health promotion. Moreover, even if it is possible to promote health without preventing disease (e.g. a person might increase the agility without necessarily preventing future disease), it is usually the case that when we promote health we also prevent disease (e.g. adding calcium to diet increase the bone mass and, at the same time, reduce the future risk of osteoporosis). In practice, health promotion and prevention can hardly be distinguished: it is not common to find health promotion programs that are not associated with the reduction of future diseases or to the concepts of risk and disease transmission (Tengland 2010b).

Both health promotion and prevention deal with health education, which includes any combination of planned learning experiences that provide individuals and communities the opportunity to acquire information and the skills needed to promote and maintain good health (WHO 1998).

In this context, a critical point is “health literacy”, which is defined as the cognitive and social skills that determine the motivation and ability of individuals to gain access to, understand and effectively use information concerning healthcare, health promotion and disease prevention (WHO 2013).

Boosting health literacy permits to counterbalance strong external factors that stimulate unhealthy behaviours beyond the individual’s power, like an unhealthy social environment, the influence of industry, addiction, lack of information or low socio-economic status. Health literacy programmes could help to diminish the link between low cognitive abilities and bad health (WHO 2014).

Health literacy is rooted in the health promotion movement, with the aim to empower people as citizens, members of the workforce, consumers and patients so that they can better make decisions about their health and improve their skills in managing themselves.

Empowerment of people is a socio-psychological process through which individuals or social groups gain greater influence over the determinants of health and control over decisions and actions affecting their health.
Through empowerment, health literacy programmes contribute to democratizing the health care system and to achieving a stronger commitment to health and well-being in communities (WHO 2013). Furthermore health literacy processes imply the transmission and dissemination of information achievable through an effective communication (Nutbeam 2000).

## 1.2 Health promotion approaches

The complexity of health behavior determinants requires a multidisciplinary approach to effectively promote change, which further means that health communication is not an exclusively responsibility of the health sector and interventions need to incorporate expertise from a variety of professional backgrounds (Rimal et al. 2009).
Collaborative partnerships are a promising strategy for engaging people and organizations in the common purpose of addressing community-determined issues of health and well-being.
Social sciences (including sociology and psychology) are key disciplines that can help identify the most appropriate theories for each situation that aims at improving social and individual responsibility for health (Roussos et al. 2000).

### 1.2.1 Frameworks

Public health can refer to different frameworks to develop health promotion and prevention campaigns. Social marketing and PRECEDE-PROCEED systems are widely used.
Social marketing is the systematic application of marketing principles and techniques (also used to sell products to customers), to promote ideas, attitudes and behaviors for health implementation (Suarez-Almazor 2011).
The development and implementation of social marketing programs are based on the four P's: product (not an object but a behavior), price (not just monetary but involving also other personal resources), place (people do not have to go out to buy

products, because messages are intended to reach the target audience), and promotion (the way the above-mentioned products are presented).

The PRECEDE-PROCEED framework is an approach that considers individuals in the context of their community and social structures. Factors contributing to behavior change include: 1) predisposing factors (individual's knowledge, attitudes, behaviors, beliefs, and values before intervention that affect willingness to change) 2) enabling factors (factors in the environment or community of an individual that facilitate or hinder change) ; and 3) reinforcing factors (the positive or negative effects of adopting behaviors that influence continuing the behavior) (Green 1999).

### 1.2.2 Theories

Many theories and models exist in public health to develop, implement and evaluate health campaigns.

The Social Cognitive Theory describes behavior as influenced by personal, interpersonal and environmental factors. Environment is seen as a variable that reinforces individual behaviors, a place where an individual can watch the actions of others and learn the consequences of those behaviors (Bandura 1986).

The Theory of Planned Behavior is based on the idea that individuals' and society's intentions and attitudes are important predecessors to action and therefore to behavior change (Fishbein et al. 1976).

The Health Belief Model theorizes that the core components of behavior change are the beliefs and feelings about a specific health problem (Beker 1974).

The Communication-Persuasion Theory postulates that the communication process is the result of communication factors (source, message, channel, receiver and destination) and of steps that an individual must be persuaded to pass through to assimilate a desired behavior (McGuire 1984).

The Transtheoretical Model is based on a stage of change construct that tailors communication depending of the subjects' different levels of motivation or readiness to change (pre-contemplation, contemplation, decision/determination, action, maintenance) (Prochaska 1997).

Many health communication programs achieve the greatest impact by combining different theories and models which offer different perspectives on the intended audiences and on the steps that can influence their change.

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# 2

# Health communication and mass media

## 2.1 Communicate to promote healthy behaviors

Intervention efforts to change behaviors are communicative acts. The various kinds of health determinants and the necessity to convey health information to the population make communication essential in developing strategies for health promotion. Health promotion strategies that would develop and change lifestyles require a multidisciplinary approach and a joint action combining transdisciplinary points of view. When communication targets wide communities, a correct use of mass media is essential.

### 2.1.1 Health communication and mass media

Health communication is a growing important sector of health promotion (Parrot 2004) and a key strategy to improve health by disseminating messages through the media (print, radio, television, computer, Internet) or interpersonal channels (e.g. face-to-face interactions) using strategies based on communication science (Rimal et al. 2009).

Communicating a broad range of health messages to a wide variety of audiences is challenging and in this context the role of mass media is fundamental. Research demonstrated the effectiveness of mass media approaches in raising awareness,

stimulating the intended audience to seek information and services, increasing knowledge, changing attitudes and achieving some change in intentions and behaviors (Roser 1998).

Non-interpersonal channels of communication (such as television, radio, newspapers, billboards, posters, leaflets) have the potential to reach a large portion of the community and do not depend on person-to-person contact (Abroms et al. 2008; Wakefield et al. 2010).

Health communication through mass media can take many forms, such as risk communication about helping people to understand the nature and seriousness of a risk, persuasive or behavioral communication that persuade audiences to adopt an idea or a practice, entertainment education used to transmit persuasive messages about health through entertainment channels and vehicles, and media advocacy (i.e. the strategic use of mass media to advance a social or public policy initiative) (Centre for Health Promotion 2005).

## 2.2 State of the art on mass media and health promotion (2000-2014)

Public health programs focused on health promotion are in the agenda of European countries and need attention and investments to better understand how to make them successful. Mass media are among the tools used in programs aimed at influencing health knowledge, attitudes and behaviors of a large proportion of the community.

A literature review was carried out in order to assess the use of mass media in health promotion programs and to point out the strengths and the weaknesses of available experiences.

Fifty studies focusing on mass media health promoting campaigns were collected and reviewed.

The review highlighted the difficulty of finding definitive conclusions about mass media use in health promotion programs, due to the limited available experiences reported in scientific papers and to the lack of essential items/standards/outcomes to compare campaigns conducted with different methodologies, using a mix of media and targeting different intended audiences. To better understand the role of

mass media and their possible uses further researches, conducted with a standardized approach, are needed.

### 2.2.1 Review methods

A systematic search was conducted on available online literature. Publications were identified through searches of medical and scientific electronic databases using the following keywords combination: social marketing/media/health. The syntax was as follows:

- ("social marketing" OR ("social" AND "marketing") OR "social marketing") AND “media” for medical databases: MEDLINE (PubMed), CINAHL, COCHRANE CCTR (Central Register of Controlled Trials), EPPI-CENTRE TRoPHI (The Trials Register of Promoting Health Interventions), TRIP Database.
- ("social marketing" OR ("social" AND "marketing") OR "social marketing") AND “media” AND “health” for general scientific databases: SCOPUS (the search was limited to social sciences, psychology, art and humanities, neurosciences and multidisciplinary) and WEB OF SCIENCE (the search was limited to healthcare science services, psychology, communication, sociology, behavioral sciences, social issues, social sciences, telecommunication).

It was chosen not to limit publication status. Searches were updated to 1st September 2014.

The search produced 10571 documents. Selection was based on the following inclusion criteria:

- programs focused on health promotion and prevention delivered by mass media or multimedia campaigns;
- programs conducted in the period 2000-2014;
- programs reporting quantitative data on effectiveness;
- programs implemented in Europe, USA, Canada, New Zealand, Australia.

Exclusion criteria were:

- link to commerce: studying consumers preferences/behavior, influencing the purchase of products/services (even if health related), promoting professionals private practices (even if healthcare activities);

- focus on one phase of a campaign only (pilot, planning, evaluation studies, experiments)
- education of healthcare professionals;
- focus on the social system (i.e. family planning), environment, agriculture, medical tourism, civic education;
- focus on clinical topics (i.e. care, therapies, organ donation);
- presentation of qualitative data
- combined impact of multiple strategies without establishing the independent role and/or the unique effect of mass media components (data that cannot be identified);
- using an interpersonal approach (face to face contact, or telephonic conversation, focus group, peer-delivered education, peer-led activities, community health activities, family support, info points, stands, clinic visits) and/or not considering media as tools reaching a large number of people independently of person to person contact;
- focus on minority populations or ethnic subgroups (i.e. indigenous, aboriginals) with cultures different from the western one.

Documents were selected first by reading the titles and available abstracts and then by text analysis. Duplicates and papers, that did not meet the inclusion criteria, were not considered. Finally, 50 programs were included in the review.

The 50 programs, reporting quantitative data, were explored and classified according to:

- Media tools (technologies and methodologies): print (i.e. book/article, leaflet/brochure, billboard/posters, gadgets and all printed material), radio (i.e. cd, radio spot), television (i.e. TV film/movie/video/spot, display), computer (i.e. CD ROM, WEB-site, social networks), and their possible combinations. The "Media combination" category was used to include programs using more than one media.
- Health topic: tobacco control (i.e. smoking cessation and decrease), substance misuse (i.e. alcohol, drugs, doping), sexual health (i.e. HIV, Chlamydia), physical activity, chronic diseases (i.e. asthma, low back pain), mental health (i.e. depression, sexual abuse), cancer (i.e. breast, skin), obesity and overweight, and vaccinations.

- Target age group: children (0-12 years), adolescents (13-18 years), adults (19-64 years), aged (≥ 65 years). The "Multi target" category was used to include programs targeting more than one age group or when the target was not specified.
- Program duration: days (< 7 days), weeks (≥ 7 days - < 4 weeks), months (≥ 4 weeks - <12 months), years (≥1 year), not specified;
- Outcome categories: knowledge (campaign and/or message awareness, comprehension, remembering, recall), attitude (reactions, beliefs, intentions, motivations) and practice (behaviour change, health outcomes, impact).

Data analysis was performed using the statistical software SPSS, version 20 and the Chi-square test. Statistical significance was defined as $p \leq 0.05$. Studies reporting a statistically significant improvement in some of the proposed outcome indicators were classified as effective. A result was considered not effective when *p-value* resulted not significant or when it was not calculated.

### 2.2.2 Review results

We collected 50 studies distributed in 14 years: an average of 3.6 studies for year [range: 0 (in 2000 and 2012) - 12 (in 2008)].

All the programs were focused only on one health topic and most common campaigns resulted on tobacco control (28%, 14/50), substance misuse (18%, 9/50), physical activity (18%, 9/50), and sexual health (12%, 6/50). Remaining addressed topics were obesity and overweight (8%, 4/50), cancer (6%, 3/50), chronic diseases (4%, 2/50), mental health (4%, 2/50), and vaccinations (2%, 1/50).

A single media was used in the majority of the programs (58%, 29/50): television being the most used (26%, 13/50), followed by personal computer (16%, 8/50) and printed documents (14%, 7/50). Radio was the less used (2%, 1/50). Sixteen percent (8/50) of the programs used all media together, whereas 26% (13/50) adopted an approach based on a mix of media: print+TV (8%, 4/50), print+radio+TV (8%, 4/50), print+radio (4%, 2/50), radio+TV (4%, 2/50), print+TV+PC (2%, 1/50). Sixty eight percent (34/50) of campaigns were directed to a single age group. Adults (42%, 21/50) and adolescents (18%, 9/50) were the most frequently age groups involved in the programs. Few campaigns were dedicated to children (6%, 3/50) and aged people (2%, 1/50). Thirty two percent (16/50) of programs addressed two or more age groups: adults+aged (12%, 6/50),

adolescents+adults+aged (6%, 3/50), adolescents+adults (4%, 2/50), children+adults (2%, 1/50), in the 8% (4/50) the target was not specified.

Most campaigns lasted months (46%, 23/50) or years (38%, 19/50) whereas short term campaigns (with a duration $\leq$ 4 weeks) were rarely used: 6% (3/50) lasted weeks and 6% (3/50) days. Two studies did not specify the period of the campaign.

Thirty four out of 50 programs (68%) reported at least one statistically significant improvement in the chosen outcome indicators.

Appendix A.1.1 shows the distribution of programs and effective programs (presenting at least one significant improvement in the chosen outcome indicators) by topic, media and target.

Sixty two percent (31/50) of the studies evaluated the program impact on knowledge and 32.2% (10/31) reported at least one statistically significant improvement. Among them, 83.9% (26/31) measured campaign awareness [15.4% (4/26) were effective]; and 51.6 (16/31) measured message awareness [37.5% (6/16) were effective].

Fifty six percent (28/50) of the studies evaluated the program impact on attitude and 50% (14/28) reported at least one statistically significant improvement. Among them, 39.3% (11/28) measured reaction change [45.5% (5/11) of them were effective]; 46.4% (13/28) belief change [53.8% (7/13) were effective]; and 71.4% (20/28) intention change [50% (10/20) were effective].

Sixty four percent (32/50) of the studies evaluated the program impact on practice and 68.7% (22/32) reported at least one statistically significant improvement. Among them, 93.8% (30/32) measured behavior change [70% (21/30) were effective]; and 21.9% (7/32) measured health outcomes [42.8% (3/7) were effective]. Two studies measured the intervention impact but no statistically significant results were found.

Greater effectiveness can be seen in programs related to substances misuse (73.3%, 11/15) and tobacco control (58.3%, 14/24), in computer-based interventions (92.3%, 12/13) and in campaigns targeting adolescents (75%, 12/16) and adults (52.6%, 20/38).

Appendix A.1.2 shows the distribution of indicators with a statistically significant improvement according to outcome categories by topic, media and target.

A short description of the chosen indicators in the 50 selected programs is summarised in Appendix A.2, according to target, media used and outcome broad categories.

### 2.2.3 Discussion on review outcomes

Despite the long period considered by the literature review (from 2000-2014) the experiences on the use of mass media in health promotion and prevention, reported as a scientific paper evaluating the outcomes, are few: fifty in fourteen years.

The review highlighted the difficulty of comparing the studies and their results, due to the great variability of media used, intended audiences, methods adopted to implement the programs and to measure their results, and the small number of experiences for each topic.

It was not possible to find out clear evidences or definitive conclusions about mass media use in health promotion programs because of the lack of a standardized system to compare the different campaigns.

The review categorized the outcomes of health communication activities by the KAP process: knowledge, attitude and practice (Kaliyaperumal 2004). This classification helps to order the results of the analyzed programs that had adopted not standardized methodologies to evaluate effectiveness of the campaigns.

Nevertheless, to find clear evidences from the sum of health promotion and prevention programs using mass media is arduous.

The main goal of prevention programs is promoting healthy behaviors. The review showed that 69% of the considered programs persuaded people to change their behaviors, 32% of campaigns modified knowledge and 50% of them revised attitudes in intended audience. This confirms that mass media campaigns could produce positive changes or prevent negative changes in health-related behaviors in society (Wakefield 2010).

There were no evidences about a correlation between the effectiveness and the length of the program: effectiveness of long lasting (months or years) campaigns was similar to shorter (weeks) campaigns.

The reviewed studies focused on topics widely recognized as priorities in all countries (WHO 2014), such as smoke, substance misuse, physical activity and sexual health. However, only few papers reported emerging health problems such

as cancer, chronic diseases, mental health, vaccinations, although they have large impact on public health (WHO 2013) and could be addressed by mass media tools (French et al. 2010).

Tobacco control was the more frequent topic (28%) in the analysed campaigns. This could be due to the fact that smoking is the leading preventable cause of illness and premature death in the world (CDC 2003).

Programs for tobacco control had an impact on attitudes (e.g. smoking intention and motivation) among adolescents and adults (Lenert 2004; Wakefield 2006; Helme 2007; Gagné 2008; Durkin 2010; Richardson 2010; Vallone 2011). An impact was also found on behaviours such as smoking cessation and abstinence from tobacco among adolescents and adults (Lenert 2004; Klein 2005; Swartz 2006; Farrelly 2009; Helme 2007; Vallone 2011). A television campaign obtained an increase in the number of calls to an antismoking telephone, but the intended audience was not specified (Cotter 2008).

Among the programs on preventing substance misuse (18%), alcohol campaigns were known among adults (Vinci 2010; Perkins 2010). A computer-based campaign was successful in decreasing alcohol consumption in adolescents (Chiauzzi 2005), whereas another one, using a mix of mass media (print, radio and television) and targeting adults, was effective both in reducing alcohol use and in driving after drinking. The same campaign also reduced alcohol related crashes (Perkins 2010). A radio and television-based program was effective in decreasing the use of marijuana among adolescents (Palmgreen 2007).

Programs promoting physical activity (18%) were effective in increasing knowledge about physical activity and practice among children (Huhman 2005) and in increasing the beliefs on advantages of physical activity and the intentions to get physical exercises in adolescents and adults (Craig 2010). A campaign based on a mix of media, increased physical activity in adults (Sharpe 2009).

Sexual health campaigns (12%) focused on HIV, sex safety and sexual abuse. Computer-based programs increased, among adolescents, the awareness about HIV, the good opinion on messages on condom use and the intention to wait to have sex (Roberto 2007). Other campaigns on sexual education improved knowledge on HIV and beliefs in safe sex among adults (Bowen 2007) and

increased the number of Chlamydia tests among adolescents and adults (Wilkins 2007).

Two campaigns were successful in preventing cancer skin by increasing sun protection use, limiting sun exposure and decreasing sunburns (Lynch 2003; Dobbinson 2008).

In the field of chronic diseases, the program on asthma did not increase knowledge about asthma symptoms among adolescents, even if campaigns were known (Briones 2010).

In the field of mental health there was only a campaign that increased knowledge in depression symptoms and treatments among adolescents (Merritt 2007).

A program delivered through print materials obtained an increase of flu vaccinations rates among adults and elders (McCaul et al. 2002).

Concerning the media, the review shows that television was the most used media tool (26%) in health promotion and prevention programs whereas the computer was the most effective (87.5%), especially among adolescents. These findings confirm the literature reporting that a message combining different techniques (text, audio, still images, animation, video, or interactivity content forms) seems to be associated with greater success in health promotion programs (Thackeray 2008).

Regarding the intended audience, adults (42%) and adolescents (18%) were the most frequently involved groups in the campaigns, whereas in the one third of cases, programs were addressed to different age classes of population at the same time. These data are not in accordance with the literature reporting that new generations (6-18 years) are the recommended target in primary prevention because children and young people are more exposed to media, more receptive to environmental stimulus and more adaptable to change than adults (Roberts 2008; Schulz 2010).

## 2.3 Implication to practice

The scenario that emerges from the literature review on mass media use in health promotion can lead to some considerations.

First of all, mass media could have a large impact on health-related knowledge, attitudes and behaviors and should be better studied. This necessity faces with the difficulties caused by the heterogeneity of the existing campaigns.

## 2. Health communication and mass media

To establish the effectiveness of mass media, it is necessary to collect/carry out and compare an adequate number of studies testing the studied media, separately from other media, targeting the same well defined audience and evaluating the same goals.

The previously reviewed literature provides a general overview of the available experiences of health mass media campaigns, which could be used as a starting point to develop new programs.

Next studies should address important public health issues that have not been adequately considered up to now, such as cancer, chronic diseases, mental health, and vaccinations.

The fact that the computer resulted the most effective media calls for further experiments on computer/web-based communication to convey health information.

The outcomes classification used in the literature review (KAP) may be a useful pattern to standardize the design, implementation and evaluation of future campaigns. Campaigns should be systematically designed to impact on knowledge, attitudes and behaviors and the outcomes effects on these fields should be carefully analyzed and evaluated.

The contents of the experimental study presented in this thesis were established starting from these tips. A vaccination campaign for healthcare workers was created and evaluated.

# 3

# Experimental study: a flu vaccination campaign

## 3.1 Objectives and steps of the flu vaccination campaign

The experimental study was carried out from June 2013 to December 2014. It aimed to plan, implement and evaluate a multimedia campaign promoting flu shot among healthcare workers (HCWs) in a North-Eastern Italian Academic Hospital (Azienda Ospedaliero-Universitaria di Udine – AOUD).

The campaign goal was to increase HCWs adherence to flu vaccination in order to protect patients and avoid the interruption of essential health services in case of influenza epidemic.

Steps adopted to develop communication campaign were those suggested by the U.S. Department of Health and Human Services (National Cancer Institute, 2009):

- planning: definition of the health issue, communication objective, setting, audience, channels and message ;
- development and implementation: creation of tools and management of the program ;
- evaluation: assessment of outcomes.

The campaign was developed as part of a PhD research, therefore a limited budget was available. Activities were conducted on a smaller scale and using services available in the hospital including human resources (volunteers having the required

skills and time, such as physicians, nurses, technicians, video makers) and tools (printing materials, computer, etc).

## 3.2 Planning

During the planing phase of the flu vaccination campaign, the health problem, nosocomial influenza, was explored.
The communication-persuasion model was adopted as the theoretical framework to address the objectives of the communication: to change knowledge and attitudes about influenza and flu vaccination among HCWs and to increase flu vaccination rates in AOUD. Channels and tools to reach the intended audience (healthcare workers) were established. An evaluation plan to assess the impact of the campaign was predisposed (evaluation methods are described in 3.4).

### 3.2.1 Health issue: nosocomial influenza and flu shot

Influenza, the highly contagious acute viral infection of the respiratory tract, is an important public health problem that causes significant mortality particularly among the elderly and high-risk groups (WHO, 2002).
HCWs are at risk of occupational exposure to, and consequently at risk of illness from, influenza due to contact with patients who may carry the virus (Stott et al. 2002).
This fact implies that:

- HCWs may act as potential vectors for the transmission of influenza to vulnerable patients (the elderly, immuno-compromised patients, critically ill patients, and young children), for whom the infection may be particularly dangerous and associated with considerable morbidity and mortality (Salgado et al. 2002; Thompson et al. 2003);
- HCWs affected by influenza could discontinue the assistance (Sartor et al. 2002), with absenteeism peaks up to 30%-40%, resulting in severe staff shortages, with heavy work overload for those that remain healthy (Orr et al. 2000; Burls et al. 2006). This results in extra costs for the hospital due to overtime work and longer stays of patients (Matheny et al. 2007).

At the same time it is not sufficient for the HCWs to simply stay home from work when manifestly ill in order to prevent nosocomial transmission (Dash et al. 2004).

The most efficient means for preventing a significant number of influenza infections, and the resulting morbidity and mortality, is an annual pre-exposure vaccination of HCWs, which is associated with a reduction of morbidity and mortality among patients (Potter et al. 1997; Carman et al. 2000; WHO 2009).

HCWs are required to take influenza vaccine in order to protect themselves and to enhance patient safety (Wicker et al. 2009; Music 2012; Ahmed et al. 2014, Ministero della Salute 2014). Vaccination is highly effective in HCWs with minimal adverse effects. The evidence suggests that vaccination of HCWs is likely to be cost saving or, at the very least, highly cost-effective (Burls et al. 2006).

Despite recommendations by public-health authorities and studies demonstrating the dangers of flu and the benefits of vaccination (Wilde et al. 1999; Harper et al. 2004; Backer et al. 2006; Pearson et al. 2006; Bautista et al. 2006), the flu vaccination low rates among HCWs worldwide show no sign of significant improvement (Kroneman et al. 2003; Van Essen et al. 2003; Walker et al. 2006; McCallum 2006; Jennings 2006; Ajenjo et al. 2010).

The rate of acceptance of influenza vaccination remains poor in most of western countries, with only about 4%–40% coverage rates being achieved (McCallum 2006). Italy has among the worst results in terms of adhesion to these programs: 12,2% in 2006/2007 season and 10,9% in the 2007/2008 (Esposito et al. 2008; Bonaccorsi et al. 2013).

It is crucial to understand the reasons for accepting or declining flu shot (Hofmann et al. 2006). Literature identifies as reasons for acceptance: to protect themselves and to avoid illness, recognizing the seriousness of influenza virus and its complications and the efficacy of the vaccine (Nichol et al. 1997); to protect patients from influenza (Begue et al. 1998; Steiner et al. 2002; Lester et al. 2003); to avoid absenteeism at work because of illness (Nafziger et al. 1994); and to serve as a role model (Heininge et al. 2003).

The reasons for declining influenza vaccination include: to be concerned about side effects, such as getting an illness from the vaccine itself or having an allergic reaction (Weingarten et al. 1989), and to have doubts about the efficacy of the influenza vaccine and believe to be not at risk for influenza infection (Harbarth et al. 1998).

### 3.2.2 Communication objectives : promotion of flu shot among HCWs

Strategies to improve influenza vaccination uptake are required (Burls et al. 2006) and interventions to increase influenza vaccination uptake in healthcare settings are widespread. HCWs were generally invited to get vaccinated trough standard strategies or communication techniques, including written reminders in their monthly pay slips, posters or flyers across the hospital, letters or e-mails (Dey et al. 2001; Seale et al. 2012).

There were no reported experiences of wide and integrated employ of multimedia tools to educate HCWs about influenza vaccination, to promote the campaign and to reach higher rates of compliance (Hollmeyer et al. 2013).

Pilot studies regarding flu vaccination or other types of prevention on the general population and using multimedia tools were conducted with promising results (Peddecord et al. 2008), suggesting that this approach, used for health education, especially in the young, has a deep impact (Chapman et al. 2010).

Some reviews tried to determine which seasonal influenza vaccination campaign or campaign components in health care settings were significantly associated with increases in influenza vaccination among staff.

Few methodologically rigorous studies were published on how to successfully and sustainably raise influenza vaccine uptake rates among HCWs.

The literature revealed gaps in the appropriate design of effective influenza vaccination campaigns for health care personnel. Rigorously designed studies assessing the effect of various campaign components are needed (Lam et al. 2010).

However, some insights were suggested for a successful HCWs vaccination program (Lam et al., 2010; Hollmeyer et al. 2013):

- legislation/regulation: organize interventions involving changes in vaccination policy for health (e.g. promotion campaigns, mandatory vaccination) ;
- education/promotion: organize efforts to raise awareness about influenza and influenza vaccination (e.g. educational materials) ;
- role models: organize activities that involve leaders and/or senior staff to encourage vaccination ;
- better access to vaccine: provide free vaccine and apply strategies to allow easier access to vaccination (e.g. flexibility and worksite delivery) ;

- measurement/feedback: track vaccination rates and barriers in getting vaccinated, and finally disseminate the results.

No single component except perhaps mandatory vaccination, is capable of raising influenza vaccination rates in HCWs rapidly. Each factor should support another for a synergistic effect. The number of applied components appeared to be proportional to the increase in uptake. A successful program should contain as many elements as possible (Hollmeyer et al. 2013).

### 3.2.3 Theoretical framework : communication persuasion model

The theoretical framework of the study was the communication–persuasion model, which describes the steps that an individual must be persuaded to pass through to assimilate a desired behavior (McGuire 1984).

While cognitive theories and stage-step theories are suitable for long-term processes which traditionally are focused on small-scale and at-risk populations (Prochaska et al.1983), the chosen model is suitable for rapid mass media advertising (McGuire 1984; McGuire 1989).

The communication–persuasion model can be characterized as an input-output matrix that can be manipulated and measured to achieve a change. Five input factors (source, message, channel, receiver and destination) provide options for health practitioners to select and to manipulate. Thirteen output variables (tuning in, attending, liking, comprehending, generating, acquiring, agreeing, storing, retrieval, decision, acting, post action, converting) are a sequence of events that must take place in an order (1 to 13) and should be completed to reach the final stage operating a change. Interdependency between output and input factors influences the results of the communication process. Output factors describe how conscious and unconscious cognitive processes are influenced by communication. Paying attention to these steps ensure that the communication program plan addresses all the factors that determine whether a message is received and it is absorbed (Petty et al. 2002). The theoretical framework is illustrated in Appendix B1.1.

### 3.2.4 Setting, audience and channel definition

The 2013/2014 vaccination campaign was aimed at HCWs of AOUD (N=2910).

## 3. Experimental study: a flu vaccination campaign

Past flu vaccination campaigns used print material (letters, brochures, posters) to communicate importance, availability, place and time of vaccine shot. In the last years the hospital Prevention Service offered flu vaccine to HCWs in each ward in certain time slots to make it more accessible. Nevertheless vaccination coverage among AOUD HCWs was never more than 15%.
Until the campaign 2013-14 no multimedia tools to promote flu vaccination were developed in AOUD.
The 2013/2014 flu vaccination campaign maintained pre-existing tools (letters in pay slip and poster displayed in wards) but at the same time new tools were created : on-line spots delivered in the hospital intranet. Flu vaccine was given in predefined places of the hospital and offered in each ward.

### 3.2.5 Message plan

Following the features to design an effective message, suggested by evidence-based literature (Maibach et al. 1996), the message developed for flu vaccination campaign resulted:

- accurate: physicians and hygien experts on vaccinations reviewed the messages ;
- consistent: spots and posters gave the same main message, they had compatible colors and showed the same protagonists ;
- clear: messages were short (each statement presented just one key point) and simple (language was basic and contained as few technical terms as possible), recommendation was explicit (Have a flu shot!) and it was repeated ;
- relevant: the recommended action ensured health benefits such as the protection of themselves (ego-driven benefit), of patients (altruistic benefit), of colleagues (social benefit), and of relatives and friends (family-driven benefit) ;
- credible: HCWs delivering the messages were supposed to be perceived as trustworthy and expert, thanks to the similarity to the audience (in terms of demographics, educational background and workplace), familiarity with the subject matter (health topic) and presentation style (the majority of actors appeared in their uniforms) ;
- appealing: some AOUD HCWs were chosen as spot protagonists precisely to stimulate the curiosity of colleagues (intended audience).

The spots contained both a rational and an emotional appeal to capture the audience attention and to produce attitudinal and behavioral responses (Fishbein et al. 2003). The assumption was that, regarding health choices people look for rational and logical arguments (Rosselli et al. 1995) but they also make decisions based on emotions (Agrawal et al. 2006).

Messages reaching the audience on an emotional level bring out an emotional response (Dillard et al. 2000). Negative and positive emotional appeals were given to persuade people to adopt the new behavior (take flu shot).

Negative appeals (Brennan et al. 2010) were used to cause negative motivations to avoid influenza. In fact, the literature showed that perceived threat in the fear appeal motivated people to take protective measures (Ruiter et al. 2001), but the level of persuasion did not increase in proportion to the amount of fear used. Too aggressive scare tactics made people psychologically uncomfortable, inducing a maladaptive response to the message which could be wrongly understood or rejected. A moderate amount of fear is the most effective attitude changer (Hastings et al. 2004). Therefore, the fear appeal was very feeble: without terrorizing it focused on problems derived from not taking flu shot and it informed HCWs about the possibility of damaging themselves, the patients, colleagues, relatives and friends.

Several studies also suggested the use of positive appeals to reduce anxiety and to stress the positive gain from complying with the persuasive message (Lukic et al. 2009). In the spots the fear appeal was followed by two positive statements that focused on the benefits of vaccination, eliciting positive feelings such as responsibility and humor.

Assuming that a message works better if it provides the audience self-efficacy skills to solve the problem (Floyd et al. 2000), the spots ended emphasizing the solution to avoid influenza and its serious consequences.

Message planning and structure of influenza campaign spots are shown in Appendix B.1.2.

## 3.3 Development and implementation

The peviously planned message was conveyed by four on-line spots (30'') (Appendix B.2.2)

## 3. Experimental study: a flu vaccination campaign

HCWs were the protagonists of the spot. A group of volunteers was recruited among all professional categories: directors, physicians, surgeons, nurses, nursing assistants, physiotherapists. The general manager of the AOUD appeared in all the spots. Each spot had the same structure. It started with a rational appeal which presented scientific and statistic information about flu (e.g. "Every year millions of people get sick from flu") and an irrefutable fact for the audience (e.g. "Protecting patients is my duty!").

Then emotional appeals were used to evoke three feelings: 1) fear about the possibility of causing a problem (e.g. "I'm not going to put at risk the health of others!"); 2) responsibility (e.g. "My work is useful to others. I must do it with responsibility"); and 3) humor (e.g. "I get flu shot, otherwise they would not let me do this spot!").

Finally, introduced by the motivation to protect colleagues, patients, relatives and themselves (e.g. "Protect yourself"), the key message was given: the recommendation to take flu shot (e.g. "Have a flu shot!").

Two tools were created to promote the spots:

- a pop-up introducing the spots asking "What would you like to tell your colleagues?" (Appendix B.2.1)
- posters portraying the protagonists in the pieces of a puzzle with the message "Each piece is important. Have a flu shot!" and the instructions to receive the vaccination (days, time, place) (Appendix B.2.3)

A pre-campaign test on the intended audience was performed before the campaign implementation (the results will be presented in Paragraph 3.4, which describes the campaign evaluation).

The campaign promoting annual flu shot among HCWs was implemented in AOUD from 1 November 2013 to 31 December 2013.

The on-line spots were delivered in the hospital intranet. The pop-up appeared when opening the browser and the video started if the user clicked on the pop-up. The posters were displayed in all the wards.

## 3.4 Evaluation

Campaign effectiveness was assessed comparing data of pre and post test survey on intended audiences. Outcomes in knowledge, attitudes and practice were explored to define the campaign impact. Methods and results are described below.

### 3.4.1 Methods

A pre- and post-campaign survey to measure the intervention impact was planned.
Pre- and post-campaign questionnaires were developed. The pre-campaign test ("You and Flu") included 10 items focused on knowledge, attitude and practice. The pre-test questionnaire was tested in a group of HCWs (N=10). (Appendix C. 1.1)
The post-campaign test ("You after Flu") included 20 items focused on the same topics of the pre-test plus the campaign evaluation. (Appendix C. 1.2)
The sample size was calculated using the formula of estimating a single population portion, taking 15% proportion of 3% margin of error and 95% confidence level. The sample (tot=501) was obtained from the hospital HCWs population (tot=2910) by a stratified randomization (physician, residents, nurses, nurse assistants, technical staff, others). The demographic composition of the survey respondents is shown in Appendix C.1.3.
Both in pre- and post-test, the questionnaires were distributed to the same sample using drop-off methods (Lovelock et al. 1976): a staff of consultants and head nurses was organized to deliver and collect the questionnaire, encouraging the respondents to complete it.
Drop-off survey, which combines the advantages of the mail survey and the personally distributed questionnaires, was supposed to yield a high response rate for two reasons: 1) the bias caused by the characteristics of the interviewer and the variability in interviewers' skills is reduced by using self-completion questionnaires; and 2) the absence of an interviewer provides greater anonymity, increasing the reliability of responses (Lovelock et al. 1976).
Data collected from the questionnaires were entered in an Excel spreadsheet and were analyzed using the statistical software SPSS, version 20. Changes in the distribution of respondents' percentages (stratified by HCWs' age and occupation)

about the same items in pre-test and post-test survey were analyzed with the Chi-square test. Statistical significance was defined as $p \leq 0.05$.

Pre-test data were compared with post-test data to evaluate changes in knowledge, attitudes and behaviors among HCWs after the multimedia flu vaccination campaign.

Pre-post analysis showed how well the program met its communication objectives, providing evidence of successes and/or failures.

Output factors of the communication-persuasion model and Knowledge Attitude Practice (KAP) process (Kaliyaperumal 2004) were used to create the evaluation tool.

Data about vaccinated HCWs during the 2012-2013 and 2013-2014 flu campaign were provided by the hospital health prevention team, which has, for each hospital employee, an updated health profile including vaccinations.

### 3.4.2 Pre-test results

Pre-test questionnaire response rate was 92,6% (464/501). Distribution by occupation, age and gender of pre-test respondents were is shown in Table C.1.3. compared with characteristics of post-test respondents.

Pre-test survey assessed the familiarity with media among HCWs. Ninety-five percent (441/464) of the interviewed persons were aware of the hospital website, 93,3% (433/464) of e-mail, 80% (371/464) of social networks (Facebook, Twitter, Google+, Linkedyn, etc.), 77,4% (359/464) of streaming video (YouTube, Vimeo, ecc) and 73,9% (343/464) of Apps.

Results about multimedia use among HCWs are reported in Table C.2.1. The most used tools were the hospital website (92%, 427/464), with a daily frequency of 30,4% (130/427), and e-mail (89,9 %, 417/464) with a daily frequency of 58% (242/417).

In pre-test 50,9% (236/464) of respondents wanted to get information about vaccine safety, 26,5% (123/464) about influenza mortality in hospitalized population, 25,2% (117/464) about the protection of relatives from flu and 13,4% (62/464) required in-depth information on other topics (e.g. vaccine effectiveness, side effects).

The pre-test questionnaire asked to express agreement with some sentences:

- related to beliefs about influenza and flu vaccination, aiming to understand intended audience knowledge on the topic (Appendix C, Table C.2.3);
- related to the resistance factors in getting flu vaccination, aiming to determine intended audience attitudes through flu vaccination (Appendix C,Table C.2.4).

Intention to get vaccinated in the 2013/2014 season was tested in pre-test. Before the campaign 13,1% (61/464) of HCVs expressed intention to get vaccinated, 72,0% (334/464) declared no intention to get vaccinated and 14,9% (69/464) did not have any idea.

In pre-test 29,5% (137/464) of interviewed respondents reported to have been vaccinated at least once in the last five years and 8,6% (40/464) in the 2012/2013 season.

### 3.4.3 Post-test results

Post-test questionnaire response rate was 83,2% (417/501).

Post-test showed the intended audience exposure to the flu vaccination campaign through the HCWs' awareness: 93.8% (391/417) of respondents reported to know that a campaign to promote influenza vaccination had taken place in hospital, 5.8% (24/417) claimed not to know if a campaign had been organized, and 0.5% (2/417) thought that hospital had not organized it.

92.3% (361/391) of HCWs recalled to have seen the posters and 24.3% (95/391) recalled the letter in the pay slip.

Another reaction to the campaign, measured by post-test, was the search for information about influenza and flu shot by the intended audience. 29,9% (117/391) of the respondents stated to be motivated by vaccination campaign in collecting information on vaccine safety [70,9% (83/117)], on protection of relatives from flu [41,0% (48/117)], on influenza mortality in hospitalized population [17,1% (20/117)] and on other topics (e.g. vaccine effectiveness, side effects) [4,3% (5/117)].

The campaign spots were seen by 59.6% (233/391) of AOUD HCWs and all of them remembered that they contained short messages by colleagues. 94,8% (221/233) of HCWs saw the spots in the hospital website, 19,3% (45/233) also on social networks, and 12% (28/233) on mobile devices.

Post test identified the intended audience reactions and understanding of materials.

Liking and acceptance of spots, expressed in a 0-10 scale (where 0 is no liking/acceptance and 10 is the maximum level of liking/acceptance), are shown in Appendix C, Table C.3.1.

In post-test questionnaire, HCWs who knew about the campaign were asked to express agreement with some sentences:

- related to beliefs about influenza and flu vaccination, aiming to understand level of knowledge after the campaign (Appendix C, Table C.3.2);
- related to the resistance factors in getting flu vaccination, aiming to determine attitudes on flu vaccination after the campaign (Appendix C, Table C.3.3).

Intention to get vaccinated in the next season (2014-15) was tested in post-test: 63,4% (248/417) of respondents reported no intention to get vaccinated, 36,6% (143/417) expressed intention to get vaccinated, 6,2% (26/417) did not have any idea.

13,7% (57/417) of HCWs in post-test expressed intention to get vaccinated in current influenza season.

Regarding the influence of the campaign on the decision of HCWs (who had seen the spots) to get or not to get vaccinated in the current season, 47,8% (187/391) of them reported that the campaign had not had any influence on their decision, 28,4% (111/391) referred a little influence, 22,8% (89/391) a moderate influence and 1% (4/391) a total influence.

### 3.4.4 Campaign impact

Campaign impact was measured with KAP outcomes comparing pre and post-questionnaires answers reported by HCWs.

Agreement with sentences expressing beliefs about influenza and flu vaccination was considered as a knowledge indicator (K outcome). Statements obtaining a statistically significant difference in percentage distribution of all respondents of pre-test and post-test were those related to:

- Not believe in vaccine efficacy [$p<0.0001$]: stratified by age and occupation, the increasing trend remained statistically significant among age groups 36-55 [$p<0,001$], 46-55 [$p<0,001$], > 56 [$p<0,05$], and among physicians [$p<0,01$], residents [$p<0,05$], nurses [$p<0,001$] and nurse assistants [$p<0,001$];

- Not consider flu as a serious problem [p<0.0001]: stratified by age and occupation, the increasing trend remained statistically significant among age groups 18-35 [p<0,001], 45-55 [p<0,05] and among nurses [p<0,01], nurses assistants [p<0,001], and technical staff [p<0,001];
- Think not to get sick [p<0.001]: stratified by age and occupation, the increasing trend remained statistically significant among age group 18-35 [p<0,01] and among physicians [p<0,05] and technical staff [p<0,01].

All data about this item (beliefs about influenza and flu vaccination) are shown in Table C.4.1 and Table C.5.1. There was no statistically significant change in agreement with thinking of not to be part of a high-risk group between HCWs pre-test and post-test answers.

The first indicator explored that concerned attitudes (A outcome) was the disagreement with sentences expressing resistance factors in getting flu vaccination. Statements obtaining a statistically significant difference in percentage distribution of all respondents of pre-test and post-test were those related to being against the vaccines [p<0.0001]: stratified by age and occupation, the increasing trend remained statistically significant among age group 36-45 [p<0,01], among nurses [p<0,05] and among technical staff [p<0,0001].

All data about this item (resistance factors in getting flu vaccination) are shown in Table C.4.2 and Table C.5.2.

There were no statistically significant changes in agreement with statements about not having time to get vaccinated, not having contacts with patients and be afraid of needles between HCWs pre-test and post-test answers.

Another attitude indicator was the intention to get vaccinated. There was a statistically significant difference in percentage distribution of all respondents of pre-test and post-test about intention to get vaccinated in the next year [p<0,0001]: stratified by age and occupation, the increasing trend remained statistically significant among age groups 18-35 [p<0,0001], 36-45 [p<0,0001], 46-55 [p<0,0001] and among physicians [p<0,01], residents [p<0,01], nurses [p<0,0001], nurse assistants [p<0,05] and technical staff [p<0,0001].

All data about this item (intention to get vaccinated) are shown in Table C.4.3 and Table C.5.3.

Getting vaccination was the indicator of behavior change (P outcome). Differences of percentage of HCWs reporting that they were vaccinated against flu in pre-test and post-test questionnaires were statistically significant [p<0,05]: stratified by age and occupation, the increasing trend remained statistically significant among age group 18-35 [p<0,05] and among nurses [p<0,05].
All data about this item (getting vaccination in flu season campaign) are shown in Table C.4.4 and Table C.5.4.
Interviewed HCWs that declared to have had flu in the 2013-14 season were 13,7% (57/417) and 94,7% (54/57) of them had not got vaccinated; 86% (49/57) of HCWs who had had flu stayed at home losing working days [mean=4,9 days (S.D.=2.7 days; range 1-15 days)]
35,2% (19/54) of HCWs who had not got vaccinated and had flu regretted not having done it.
Finally, from the data provided by the hospital Prevention Department, the percentage of HCWs vaccinated against flu in the 2013-2014 season was 7,6% (221/2910), and 5,6% (164/2910) in the 2012-2013 flu season (p<0,005).
The increase in vaccination rate was statistically significant for physicians [2013: 18,1% (115/636) vs 2012: 13,2% (84/635); p<0,05] and for residents [2013: 16,2% (51/314) vs 2012: 4.4% (14/317); p<0,001], whereas for the others HCWs (e.g. nurses, physiotherapists, nursing assistants) it was not statistically significant.

## 3.5 Discussion on campaign outcomes

The experimental study with respect to campaign awareness obtained that almost all HCWs knew that the hospital had organized a campaign to promote flu vaccination (93.8%). This confirms the utility of mass media and multimedia to disseminate health information and to support campaigns aiming to produce positive changes or prevent negative changes in health-related behavior across large populations (Wakefield et al. 2010).
Although in pre-test survey almost all HCWs declared to use website, only half of post-test respondents saw the videos, which are the new tool used in the 2013-14 campaign. Indeed, posters remained the tool that reached most of the interviewed HCWs (92.3%). This confirms that print material, as posters and leaflets, have a relevant role to support, enforce and promote multimedia and innovative media

campaigns. On the other hand, the fact that the hospital website was not much viewed by HCWs becomes a problem considering that leadership is investing in implementing dissemination of procedures, protocols, and guidelines through the hospital Intranet. There is still much to do to inform and train HCWs in the use of Intranet.

The World Wide Web is a suitable channel to conduct persuasive interventions because it combines two features of effective health communication:

- the mass media advantages: capacity to economically and rapidly reach large audiences, instantaneously update and disseminate information, combination of the audio/visual benefits of television with the self-paced benefits of print media (Roberts 1985)
- the interaction of interpersonal channels: information could be managed by the audience. In the case of videos, users have the possibility to choose to see or not to see the contents and to influence the speed of information by stopping, slowing down, or rewinding parts of it (Cassell et al. 1998).

Those who saw the spots on social networks or received them on mobile devices were very few, even if web-based interventions, compared to non-web-based ones, are more effective in achieving the knowledge and/or behavior change (Wantland et al. 2004).

According to marketers, the receiver has the greatest impact on the effects of communication activity. Tailored health communication is proven to enhance message relevance (Hawkinsly et al. 2008). Vaccination campaign spreads a message matched to the needs of the audience (protection) and related to the recipient life context (working environment). Vaccination campaign is also targeted (Kreuter et al. 2003): separate audience segments (physician, nurse, etc.) benefit from a shared message.

The more appreciated features of the spots were clarity and presence of several and known HCWs. A source of information similar to the audience (in terms of lifestyles, profession and educational background) appears credible and known people seem friendly (Tormala et al. 2006).

Studies show that people are more likely to adopt a behavior if it is an accepted practice in their social circle and collective social practices are a product of social interaction, hence the importance to involve both the sender and the receiver of

health communication in a participatory process promoting healthy changes. The active collaborative transaction with the sender, allows the receiver to well internalize the message. Interactivity, related to the user's control of the content and form of the communication, is a communication attribute with a great power to improve health promotion (Fotheringham et al. 2000; Neuhauser 2001).

Behavioral studies suggest that the adoption of a desired behavior can be predicted by people knowledge and attitudes (Fishbein et al. 1976). Therefore, an important step toward influencing behavior is the analysis and the definition of intended audience characteristics and needs (knowledge about the identified topic, beliefs/values, interests, behaviors) (Slater 1996).

Pre-campaign survey outcomes suggested that HCWs were not well informed about the vaccine or its effectiveness. Only one third of interviewed HCWs strongly believed in vaccination efficacy and was sure that without flu shot they could get sick, about half of respondents had no doubts that flu is a serious problem and was totally conscious to be part of an high risk group.

Misconceptions about the effectiveness and safety of vaccination were identified also in the literature. HCWs think that the vaccine does not work and/or do not realize to be at high risk of getting influenza, becoming potential sources of infection for patients (Begue et al. 1998; Steiner et al. 2002; Stephenson et al. 2005; Lester et al. 2003; Wodi et al. 2005; Takayanagi et al. 2007; Abramson et al. 2008).

The low vaccination rate among HCWs may be associated with fear of adverse reactions, belief that vaccine could cause flu, perception of lack of vaccine effectiveness, doubts about the protection granted by the vaccine, belief that influenza is not a serious threat. (Weingarten et al. 1989; Manuel et al. 2002; Lester et al. 2003; Maltezou et al. 2008; Hollmeyer et al. 2009). This shows insufficient knowledge of HCWs about flu and flu vaccination (Martinello et al. 2003).

The campaign reached a statistically significant outcome in changing beliefs about vaccine efficacy, about the consideration that flu is a serious problem and about the possibility of getting sick without flu shot. However, there were no changes in thinking not to be part of a high-risk group. The stratification by age and occupation revealed that the best outcome in knowledge was obtained with regard to belief in vaccine efficacy, especially among HCWs over 36 years and among

physicians, residents, nurses and nurse assistants. This was an interesting result for an increase in vaccination rates among HCWs, because also the literature reports that hospital employees accept vaccination if they have more evidence of vaccine effectiveness and detailed information about side effects (Akinosi et al. 2002). Moreover, the awareness of being a potential source to transmit influenza to patients is associated with vaccine receipt (Mehta et al. 2008).

These findings suggest that short persuasive messages (used in the campaign) should be combined with more detailed explanations about the vaccine safety and effectiveness. Successful vaccination campaigns include three key phases: notification, education, and vaccination. Notification was characterized by the communication of key messages through various media: individual invitations, letters in the pay slip, e-mail messages, memos, and posters in well-traveled areas. Education included staff in-service sessions, conferences, and educational films. Vaccination was characterized by readily accessible free vaccine using mobile vaccination carts and "walk-in" vaccination clinics (Hofmann et al. 2006).

Elements of resistance in getting flu vaccination were modified by the campaign among all HCWs, in particular among the nurses, the technical staff and the 36-45 age group. The data of the survey showed a success of the campaign in changing attitudes among nurses, who are generally considered a critical group for their low vaccination rates (Harbarth et al. 1998; Martinello et al. 2003; Bautista et al. 2006: Esposito et al. 2007). At the same time the data stressed the difficulty of persuading physicians and young HCWs to accept the vaccine. Perhaps that among these groups, the organization of educational training with clinical leaders could have more success. The literature indicates that programs may need to be profession-sensitive as well as specific in their approach because attitudes concerning influenza vaccination differe largely between occupational categories (Harbarth et al. 1998; Saluja et al.2005; Esposito et al.2007). Understanding audiences and organizing educational efforts based on their wants and needs (also giving personalized information) to remove the barriers in changing behavior is very important for an effective health communication (Frati et al.2010). Health promotion activities should be based on the "art" of understanding what will help people make healthy choices and positive changes to achieve better lives, without

considering people as passive recipients of policies which tell them what to do or coercing them into doing it (French et al. 2010).

Although the literature demonstrated that in certain cases time is as an important reason behind HCWs' failure to be vaccinated (Simeonsson K et al. 2004), in this experimental study not having time to get vaccinated was not a motivation for no adherence among AOUD HCWs, both in pre and in post-test. This suggests that the strategy to offer flu shot in all the wards, implemented in the hospital in the last years, may be effective. The resistance factors of not to be in contact with patients and to be afraid of needles were not important points to be modified in a future flu vaccination campaign in AOUD.

The reported intention to get vaccination in the next season was statistically significantly increased in post-test survey in all occupational groups and in HCWs with an age between 18 and 55 years. This intention should be tested in practice, when AOUD vaccination rate for the season 2014-2015 will be available.

Percentages of AOUD HCWs reporting to get vaccinated in the 2013-2014 (13,7%), compared with the previous season (8,6%) increased in a statistically significant way, in particular among nurses and the 18-35 age group, even if the total absolute number of self-reported vaccinated personnel (57/417) remained very low.

Finally, data provided by the hospital Prevention Department showed a statistically significant increase in vaccination rate in all hospital population (N=2910): from 5,6% in 2012-2013 to 7,6% in 2013-2014.

In conclusion, the multimedia campaign seems to have had success with regard to all KAP outcomes, but the vaccination rate is still very far from the goal standard of almost 80% of vaccinated HCWs, which allows prevention of flu dissemination among hospital patients (CDC, 2013).

# 4

# Conclusions

## 4.1 Emerging needs

The lessons learned from the Udine university hospital influenza campaign highlighted some issues which should be explored in future studies:

1) Mass media, in particular those based on web techniques, should be better studied as effective tools to convey health information. Complementary policies using interpersonal techniques should be considered to maximize mass media communication effects.

2) Intended audience of mass media campaigns often are heterogeneous groups that can vary greatly in terms of healthcare knowledge, educational level, and living environment. These variations may influence the educational needs of the audience and this problem could be overcome by a more targeted and personalized education. As recommended by literature health promotion interventions should be flexible and designed to allow individuals to tailor the intervention to their specific needs.

3) It is necessary to better know and careful evaluate the impact of health communication techniques on human behavior. This is particulary true when the goal is to set up a campaign involving HCW.

## 4.2 Future perspectives

Today health promotion is a high priority in the public health agenda of many countries (WHO 2014) but much more could be done to explore and improve the role of health communication.

Evidences collected in this thesis stress that the quality of health promotion could be enhanced by information:

- able to be delivered to mass audience ;
- able to include interpersonal policies (such as counseling, educational sessions) ;
- personally engaging, interactive, tailored.

These characteristics could be better achieved thanks to the growth of ICT which gives new opportunities, such as e-health and m-health.

The term "e-health" describes the use of emerging technologies (in particular Internet) to enhance health and health care (e.g. information websites/networks, telemedicine services, kiosks) (Eng 2002).

An extension and an integral component of e-health is "m-health" that indicates the use of mobile and wireless telecommunication and multimedia technologies in health and health care (e.g. mobile phones, tablets, personal and wearable technologies) (Istepanian 2004).

Those tools are low-cost and effective sources of health promotion interventions (Dehn 2000) and their promising impact are linked to features of information customization, enhanced user control, interactivity, and social networking (Neuhauser et al. 2003).

E-health channels could be used to encourage the adoption of healthy behaviors, by delivering highly tailored messages and maximizing the active involvement of the user in the design and dissemination of information through feedback mechanisms (Neuhauser et al. 2010).

E-health applications could have a broad reach across heterogeneous populations but at the same time could adapt to the specific interests and communication orientations of different users (Hesse et al. 2007) who are enabled to ask questions, receive answers, and also to respond to questions initiated by the computer system such as in interpersonal communication (Kreps et al. 2010).

Given the technological advances, the possibility to deal with intelligent systems, smart environments and robotics, appears to be more and more realistic in the next future.

Ambient Assisted Living solutions comprise products and services that combine ICT and social environments with the aim to improve and increase the quality of life (Pieper et al. 2011).

Social robots, embodied agents able to interact and communicate with humans by following social behaviors and rules attached to its role (Fong et al. 2003), are employed to aid caregivers and to assist individuals with physical and/or cognitive deficits (Feil-Seifer et al. 2005).

Advances in this field could have applications in health promotion. Systems capable of monitoring, motivating, sustaining, personalizing user healthy behaviors and activities (Okamura et al. 2010) and providing companionship to increase health and psychological well-being could be implemented (Verschure et al. 2011).

ICT and robotics, integrated in human lives, can be powerful allies to improve health conditions and are promising to achieve a triple win: a better quality of life for citizens, innovation and growth for a competitive industry and more sustainable healthcare systems for society (Tapus et al. 2007).

Finally, in order to offer contextually tailored information, public health research should give great importance to the impact of communication actions. Campaign effects evaluation is a very difficult phase because self-reported indicators of change may be not real or because the effects of the communication activity are difficult to be isolated. In fact a campaign could wind up with a contamination of information coming from other sources (e.g. activities addressing the same problem and giving similar messages or the diffusion of opposed information). To understand the role of unconsciousness and emotions in preferences, motivations, and decisions regarding health promotion actions, traditional research methods (interviews, questionnaires, focus groups) are generally used. Marketers have already understood that this kind of research is not enough to understand audience preferences and behaviours because people may not fully explain their experience when explicitly asked. For this reason neuromarketing, which evaluates the neurophysiologic effects (e.g. eye movements, changes in skin color, neural activity) of communication by neuroscience methods and neuroimaging tools,

could be proposed as a new way to analyze cognitive process in social marketing targets and the efficacy of communication (Fisher et al. 2010).

Having in mind both the limits and the opportunities available at the moment in the use of communication strategies targeted to health promotion and prevention, one essential aspect to improve the culture and knowledge of the communication tools is to increase sharing and comparison of the existing experiences, best practices, and research results. Development of research networks and engagement of policy makers, public health professionals and citizens seems to be necessary for future developments.

# A

# Appendix
# Review on mass media and health promotion

# A.1 Review outcomes

## A.1.1 Distribution of programs and effective programs (presence of at least one chosen indicator significantly improved) by topic, media and intended audience

| | | N. PROGRAMS Tot = 50 | | N. EFFECTIVE PROGRAMS Tot = 34/50 (68%) | |
|---|---|---|---|---|---|
| | | % | N | % | N |
| TOPIC | Tobacco control | 28 | 14/50 | 78.6 | 11/14 |
| | Substances misuse | 18 | 9/50 | 88.8 | 8/9 |
| | Physical activity | 18 | 9/50 | 44.4 | 4/9 |
| | Sexual health | 12 | 6/50 | 66.6 | 4/6 |
| | Other topics | 24 | 12/50 | 58.3 | 7/12 |
| MEDIA | TV | 26 | 13/50 | 61.5 | 8/13 |
| | PC | 16 | 8/50 | 87.5 | 7/8 |
| | Print | 14 | 7/50 | 71.4 | 5/7 |
| | Radio | 2 | 1/50 | 100 | 1/1 |
| | All media together | 16 | 8/50 | 62.5 | 5/8 |
| | Media combinations | 26 | 13/50 | 61.5 | 8/13 |
| INTENDED AUDIENCE | Adults | 42 | 21/50 | 66.6 | 14/21 |
| | Adolescents | 18 | 9/50 | 100 | 9/9 |
| | Children | 6 | 3/50 | 66.6 | 2/3 |
| | Aged | 2 | 1/50 | 0 | 0/1 |
| | Multi target | 32 | 16/50 | 56.2 | 9/16 |

### A.1.2 Distribution of indicators with a statistically significant improvement (presence of at least one chosen indicator significantly improved) according to outcome categories by topic, media and intended audience.

| | | KNOWLEDGE 32% (10/31) | | ATTITUDE 50% (14/28) | | PRACTICE 68,7% (22/32) | | TOT. 50,5% (46/91) | |
|---|---|---|---|---|---|---|---|---|---|
| | | % | N | % | N | % | N | % | N |
| TOPIC | Tobacco control | - | 0/6 | 70 | 7/10 | 87.5 | 7/8 | 58.3 | 14/24 |
| | Substances misuse | 60 | 3/5 | 50 | 2/4 | 100 | 6/6 | 73.3 | 11/15 |
| | Physical activity | 14.3 | 1/7 | 33.3 | 2/6 | 42.8 | 3/7 | 30 | 6/20 |
| | Sexual health | 40 | 2/5 | 66.6 | 2/3 | 66.6 | 2/3 | 54.5 | 6/11 |
| | Other topics | 50 | 4/8 | 20 | 1/5 | 50 | 4/8 | 42.8 | 9/21 |
| MEDIA | TV | - | 0/6 | 57.1 | 4/7 | 85.7 | 6/7 | 50 | 10/20 |
| | PC | 100 | 2/2 | 100 | 5/5 | 83.3 | 5/6 | 92.3 | 12/13 |
| | Print | 66.6 | 4/6 | - | 0/4 | 33.3 | 1/3 | 38.5 | 5/13 |
| | Radio | - | 0/1 | - | - | 100 | 1/1 | 50 | 1/2 |
| | All media together | 16.6 | 1/6 | - | 0/2 | 66.6 | 4/6 | 35.7 | 5/14 |
| | Media combinations | 30 | 3/10 | 50 | 5/10 | 55.5 | 5/9 | 44.8 | 13/29 |
| INTENDED AUDIENCE | Adults | 33.3 | 5/15 | 57.1 | 8/14 | 77.7 | 7/9 | 52.6 | 20/38 |
| | Adolescents | 50 | 2/4 | 66.6 | 4/6 | 100 | 6/6 | 75 | 12/16 |
| | Children | 33.3 | 1/3 | - | 0/1 | 50 | 1/2 | 33.3 | 2/6 |
| | Aged | - | 0/0 | - | 0/1 | 0 | 0/1 | 0 | 0/2 |
| | Multi target | 22.2 | 2/9 | 33.3 | 2/6 | 57.1 | 8/14 | 41.4 | 12/29 |

# A.2 Review evidences by intended audiences, media type, and outcomes

| AGE TARGET | MEDIA | KNOWLEDGE | | ATTITUDES | | PRACTICE | |
|---|---|---|---|---|---|---|---|
| | | Statistically significant | Not significant | Statistically significant | Not significant | Statistically significant | Not significant |
| ADULTS/ AGEDS | PRINT | Asthma (Briones 2010) and alcohol (Vinci 2010) campaigns. Message on doping issues (James 2010). | Message on asthma symptoms (Briones 2010). Anti alcohol campaign (Ricciardelli 2008) | | Perceived negativity of excessive drinking (Ricciardelli 2008). Doping necessity in physical activity (James 2010). | Take flu shot (McCaul 2002). | Go to the doctor with asthma sympthoms and amelioration of asthma symptoms (Briones 2010). |
| | RADIO | | Campaign and message on anti alcohol (Surkan 2003). | | | Discuss with children about alcohol (Surkan 2003). | |
| | TV | | Campaigns and message on tobacco dangers (Vallone 2011; Durkin 2008), on diet/physical activity (Berry 2009) and on nutrition (Wardle 2001). | Admit cigarette companies negative action (Richardson 2010) Quit smoking (Vallone 2011; Richardson 2010). | Admit tobacco dangers (Durkin 2008; Richardson 2010). Intend to quit smoking (Murphy-Hoefer 2008; Durkin 2008). Interests about nutrition (Wardle 2001) | Try to quit smoking (Vallone 2011). | Modify smoking habits (Wakefield 2008). |
| | PC | Messages on HIV (Bowen 2007). | | Have safe sex (Bowen 2007). Get physical activity (Plotnikoff 2005). Stop smoking (Lenert 2004). | | Tobacco abstinence (Lenert 2004). Smoking cessation. (Swartz 2006) Ameliorations in Body Mass Index and Metabolic Equivalent with physical activity. (Plotnikoff 2005) | |
| | PRINT + RADIO | | Campaign on breast cancer (Page 2005). | | | | Take preventive measures for breast cancer (Page 2005). |
| | PRINT + TV | Messages on sexual abuse (Rheingold 2007). | Campaign and messages on physical activity (Peterson 2005). | | Take information about physical activity (John-Leader 2008). Intention to be more active. (Peterson 2005; John-Leader 2008) | Prevent behaviors towards sexual abuse (Rheingold 2007). | Be physically active (John-Leader 2008). |
| | RADIO + TV | | Campaign and messages on tobacco dangers (Durkin 2010). | Agreement with tobacco dangers (Durkin 2010). | Quit smoking (Durkin 2010). | | |
| | PRINT + RADIO + TV | Campaign on drinking and driving (Perkins 2010). | Campaign on smoking dangers (Gagné 2008). | Agreement with negative correlation of drink and driving (Perkins 2010). Agreement wih smoke dangers (Gagné 2008). | | Alcohol consumption (Glider 2001) Not driving after drinking and decrease of alcohol related crashes (Perkins 2010) | |
| | ALL MEDIA TOGETHER | | Campaign and message on physical activity (Sharpe 2009). Campaign on parent-child communication about sex (Davis 2013). | | | Speak about sex and visit a sexual education website (Evans 2009). | Be physically active and lose weight (Sharpe 2009). |

## A.2 Review evidences by intended audiences, media type, and outcomes

| AGE TARGET | MEDIA | KNOWLEDGE | | ATTITUDES | | PRACTICE | |
|---|---|---|---|---|---|---|---|
| | | **Statistically significant** | **Not significant** | **Statistically significant** | **Not significant** | **Statistically significant** | **Not significant** |
| ADOLESCENTS | PRINT | Message on depression symptoms and treatments (Merritt 2007). | Campaign on depression (Merritt 2007). | | Believe in depression treatments efficacy (Merritt 2007). | | |
| | TV | | Antitobacco campaign (Wakefield 2006). | | Believe in smoke dangers (Wakefield 2006). | Decrease smoking (Farrelly 2009) and marijuana use (Carpenter 2011). | |
| | COMPUTER | Message on HIV (Roberto 2007). | | Attitudes through smoking (Helme 2007), condom use and waiting to have sex (Roberto 2007). | | Resistance to smoking (Helme 2007).<br>Alcohol consumption (Chiauzzi 2005). | |
| | RADIO + TV | | | Attitudes through marijuana use (Palmgreen 2007). | | Decrease of marijuana use (Palmgreen 2007). | |
| | ALL MEDIA TOGETHER | | Antitobacco campaign and messages (Klein 2005). | | Intention to quit smoking (Klein 2005). | Try to quit smoking (Klein 2005). | |
| CHILDREN | PRINT + RADIO | | Campaign on physical activity (Bellows 2011). | | Request information about physical activity (Bellows 2011). | | Be physically active (Bellows 2011). |
| | ALL MEDIA TOGETHER | Campaign on physical activity (Huhman 2008) . | Campaign on physical activity (Huhman 2005). | | | Be physically active (Huhman 2005). | |

## A. Review on mass media and health promotion

| AGE TARGET | MEDIA | KNOWLEDGE/AWARENESS | | ATTITUDES/INTENTIONS | | PRACTICE/BEHAVIORS | |
|---|---|---|---|---|---|---|---|
| | | Statistically significant | Not significant | Statistically significant | Not significant | Statistically significant | Not significant |
| CHILDREN + ADOLESCENTS | PRINT + TV | | Campaign on physical activity (Peterson 2008). | | Intention to be more active (Peterson 2008). | | Be physically active (Peterson 2008). |
| ADOLESCENTS + ADULTS | PRINT | | Campaign on sexual healt/HIV (Bull 2008). | | Intention to use the condom (Bull 2008) | | Condom use (Bull 2008). |
| | ALL MEDIA TOGETHER | | Campaign on chlamydia test (Wilkins 2007). | | | Chlamydia test uptake (Wilkins 2007). | Chlamydia notifications (Wilkins 2007). |
| ADOLESCENTS + ADULTS/AGEDS | ALL MEDIA TOGETHER | | | | Attitudes trough low back pain prevention (Werner 2008). | | Surgical procedures for disc erniation and sikness days from low back pain (Werner 2008). |
| | PRINT + RADIO + TV | | Campaign on physical activity (Craig 2010). | Be more physical active (Craig 2010). | | Be physical active (Craig 2010). | |
| | TV | | | Get a suntan to prevent cancer skin. (Dobbinson 2008) | | Use of sun protections, limiting exposure to sun and decrease of sunburns (Dobbinson 2008). | |
| NOT SPECIFIED | TV | | | | | Call antismoking thelephone (Cotter 2008). Use of sun protection (Lynch 2003). | |
| | PC | | | | | | Weight losing (Carter-Edwards 2009). |
| | PRINT + TV + PC | Message on correct quantity of sugar in soda (Barragan 2014). | Campaign on soda consumption (Barragan 2014). | | Attitudes through daily consumption of soda (Barragan 2014). | | |

# B

## Appendix
## Campaign planning and implementation

# B.1 Campaign planning

## B.1.1 Theoretical framework of influenza campaign: communication-persuasion matrix (adapted from McGuire 1989)

| | | | COMMUNICATION INPUT FACTORS | | | | |
|---|---|---|---|---|---|---|---|
| | | | SOURCE | CHANNEL | MESSAGE | RECEIVER | DESTINATION |
| | | | Udine University Hospital | Intranet and posters | Have a flu shot! | HCWs | Increasing flu vaccination rates |
| COMMUNICATION OUTPUT FACTORS | TUNING IN / ATTENDING PAYNG | Population exposed and attention given to the campaign. | COMMUNICATION IMPACT<br><br>Knowledge, attitudes and practice through influenza and influenza vaccination among healthcare workers of Azienda Ospedaliera Universitaria S. Maria della Misericordia | | | | |
| | LIKING | Liking and relevance given to the campaign. | | | | | |
| | COMPREHENDING | Understanding of the message. | | | | | |
| | GENERATING | Thoughts generated by the message. | | | | | |
| | ACQUIRING | Acceptance of the change and acquisition of the appropriate skills to act on the message. | | | | | |
| | AGREEING / STORING / RETRIEVAL | Agreement with the message, storing on the memory and ability to retrieve it when needed. | | | | | |
| | DECISION | Decision to take flu shot. | | | | | |
| | ACTING | Behaving as decided: take flu shot. | | | | | |
| | POST ACTION | Integration of the behavior into habits. | | | | | |
| | CONVERTING | Encouraging or advising others to take flu shot. | | | | | |

## B.1.2 Message planning and structure of AOUD influenza campaign spots

| | | HCWs VACCINATION CAMPAIGN 2013-14 | | | |
|---|---|---|---|---|---|
| | | **POP-UP:** "What would you like to tell your colleagues?" | | | |
| | | ↓ **SPOT 1** | ↓ **SPOT 2** | ↓ **SPOT 3** | ↓ **SPOT 4** |
| **RATIONAL APPEAL** | SCIENTIFIC INFORMATION | Every year thousands of healthcare workers get sick from flu. | Every year millions of working hours are lost due to the flu. | Every year thousands of patients die because of flu complications. | Every year millions of people get sick from flu. |
| | MOTIVATION | Vaccine is safe and effective. | My job is at flu risk. | Protecting patients is my duty. | I don't want to pass the flu to my family and to my friends. |
| **EMOTIONAL APPEAL** | FEAR | Why waste time fighting against fever and cold? | When the going gets tough... I can't stay home sick! | We don't want to put them in danger... they trust us! | I'm not going to put at risk the health of the others! |
| | RESPONSIBILITY | My work is useful to others… I must do it with responsibility. | My colleagues don't have to bear the stress due to my absence. | I chose to defend life and I go all the way. | People who love me deserve to be protected. |
| | HUMORISM | I get flu shot… otherwise they will not let me do this spot! | We do not "influence" each other! | A mosquito bite hurts more than the flu shot | Flu? I know it... I avoid it! |
| **CONCLUSION** | MESSAGE | Protect yourself… | Protect your colleagues… | Protect your patients… | Protect your family… |
| | KEY MESSAGE | Have a flu shot! | | | |

## B.2 Campaign development and implementation

### B.2.1 Pop-up appearing during the flu campaign when opening the AOUD intranet browser

### B.2.2 A scene of the on-line spot delivered by AOUD intranet during the flu campaign

### B.2.3 Posters exposed in AOUD wards during the flu campaign


# C

# Appendix
# Campaign evaluation

# C.1 Survey

## C.1.1 Pre-test "You & Flu"

**1. Gender**
□ Male □ Female

**2. Age**
□ 18-35 □ 36-45 □ 46-55 □ ≥ 65

**3. Occupation**
□ Physician □ Resident □ Nurse □ Nurse assistant □ Technical staff □ Other

**4. Occupation area**
□ Mediacal area □ Surgical area □ Other

**5. Did you get vaccination at least once in the past five years?**
□ Yes □ No

**6. Did you get vaccination in the last year (2012-13)?**
□ Yes □ No

**7. How much do you agree with this statements about influenza and flu shot?**

| | Strongly agree | Mildly agree | Mildly disagree | Strongly disagree |
|---|---|---|---|---|
| I don't believe in vaccine efficacy | □ | □ | □ | □ |
| Influenza isn't a serious problem | □ | □ | □ | □ |
| I don't get sick | □ | □ | □ | □ |
| I'm not part of a high-risk group | □ | □ | □ | □ |
| I don't believe in vaccine efficacy | □ | □ | □ | □ |
| I'm against the vaccines | □ | □ | □ | □ |
| I have no time to get vaccinated | □ | □ | □ | □ |
| I have no contacts with patients | □ | □ | □ | □ |
| I'm afraid of needles | □ | □ | □ | □ |

**8. How often do you use these tools?**

| | Daily | Weekly | Monthly | Never |
|---|---|---|---|---|
| Hospital website | □ | □ | □ | □ |
| E-mail | □ | □ | □ | □ |
| Social networks (e.g. Facebook) | □ | □ | □ | □ |
| Streaming video (e.g. You Tube) | □ | □ | □ | □ |
| App | □ | □ | □ | □ |

**9. Are you going to get vaccination this year (2013-14)?**
□ Yes □ No □ I don't know

**10. What topics would you like to receive information about?**
□ Vaccine safety
□ Influenza mortality in the hospitalized population
□ Opportunity to protect relatives from flu
□ Other topics _____

## C.1.2 Post-test "You After Flu"

**1. Gender**
□ Male □ Female

**2. Age**
□ 18-35 □ 36-45 □ 46-55 □ ≥ 65

**3. Occupation**
□ Physician □ Resident □ Nurse □ Nurse assistant □ Technical Staff □ Other

**4. Occupation area**
□ Mediacal area □ Surgical area □ Other

**5. Did you get vaccination this year (2013-14)?**
□ Yes □ No

**6. Was a campaign promoting flu shot organized in the hospital where you work in the past months?**
□ Yes □ No □ I don't remember

**7. If you answer "yes" to the question 6, what tools were used to promote influenza vaccination?**
□ Posters □ Spots □ Letter in pay slip

**8. If you answer "yes" to the question 6, how much do you agree with this statements about influenza and flu shot, after having seen the campaign?**

| | Strongly agree | Mildly agree | Mildly disagree | Strongly disagree |
|---|---|---|---|---|
| I don't believe in vaccine efficacy | □ | □ | □ | □ |
| Influenza isn't a serious problem | □ | □ | □ | □ |
| I don't get sick | □ | □ | □ | □ |
| I'm not part of an high-risk group | □ | □ | □ | □ |
| I don't believe in vaccine efficacy | □ | □ | □ | □ |
| I'm against the vaccines | □ | □ | □ | □ |
| I have no time to get vaccinated | □ | □ | □ | □ |
| I have no contacts with patients | □ | □ | □ | □ |
| I'm afraid of needles | □ | □ | □ | □ |

**9. If you answer "yes" to the question 6, has the campaign led you to search information about influenza and flu vaccination?**
□ Yes □ No

**10. If you answer "yes" to the question 9, what topics do you seek informations about?**
□ Vaccine safety
□ Influenza mortality in the hospitalized population
□ Opportunity to protect relatives from flu
□ Other topics _____

**11. If you didn't get vaccination, do you think that you could do it?**
□ Yes □ No

**12. If you answer "yes" to the question 6, has the campaign affected your decision to get vaccination?**
□ Totally

## C. Campaign evaluation

□ Moderate
□ A little
□ Nothing

**13. If you answer "yes" to the question 6, have you encouraged some colleagues to get vaccination after having seen the campaign?**
□ Yes □ No

**14. Are you going to get vaccination this year (2014-15)?**
□ Yes □ No □ I don't know

**15. If you answer "Spots" to the question 7, where have you seen the spots?**
□ In the hospital website
□ On social networks
□ Fowarded on mobile devices by friends/colleagues

**16. If you answer "Spots" to the question 7, what were the spots about?**
□ The story of a patient infected in hospital
□ A cartoon with virus "raining"
□ Short messages by colleagues
□ Graphs and numbers about damages and costs of nosocomial influenza

**17. If you answer "Spots" to the question 7, could you give an evaluation about these features? (0-10)**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Humor and informality | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Efficacy | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Ethics | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Presence of several HCWs | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Graphics | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Clarity | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Presence of known people | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Tune with my ideas | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |

**18. Have you had the flu this year?**
□ Yes □ No

**19. If you answer "Yes" to the question 18, have you been absent from work because of flu?**
□ Yes □ No

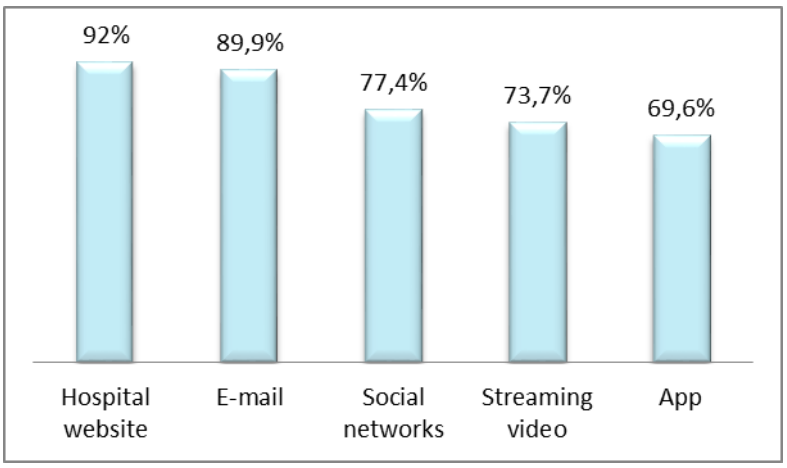
**20. How many days? _____**

### C.1.3 Pre and post-test respondents stratified by occupation, age and gender

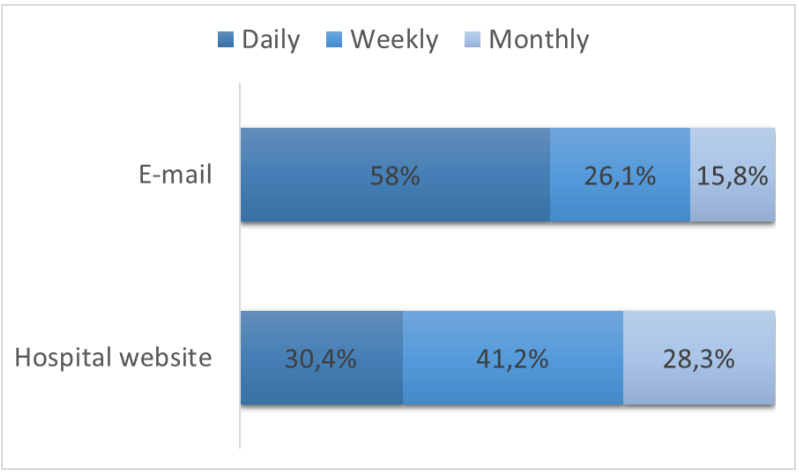
| | | PRE-TEST (N=464) | | POST-TEST (N=417) | |
|---|---|---|---|---|---|
| | | N | % | N | % |
| OCCUPATION | Physician | 102 | 22,0 | 90 | 21,6 |
| | Residents | 29 | 6,3 | 30 | 7,2 |
| | Nurses | 224 | 48,3 | 199 | 47,7 |
| | Nurse assistants | 81 | 17,5 | 76 | 18,2 |
| | Technical staff | 24 | 5,2 | 18 | 4,3 |
| | Other | 4 | 0,9 | 4 | 1,0 |
| AGE | 18-35 | 119 | 25,6 | 133 | 31,9 |
| | 36-45 | 163 | 35,1 | 122 | 29,3 |
| | 46-55 | 152 | 32,8 | 131 | 31,4 |
| | ≥56 | 30 | 6,5 | 31 | 7,4 |
| GENDER | Male | 126 | 27,2 | 112 | 26,9 |
| | Female | 338 | 72,8 | 305 | 73,1 |

## C.2 Pre-campaign outcomes

### C.2.1 Percentage of use among AOUD HCWs for single multimedia tool [tot. respondents=464]




### C.2.2 Frequency on the use of hospital website [tot=433] and e-mail [tot=371] among AOUD HCWs



### C.2.3 Pre-campaign agreement with statements expressing beliefs about influenza and flu vaccination [tot=464]

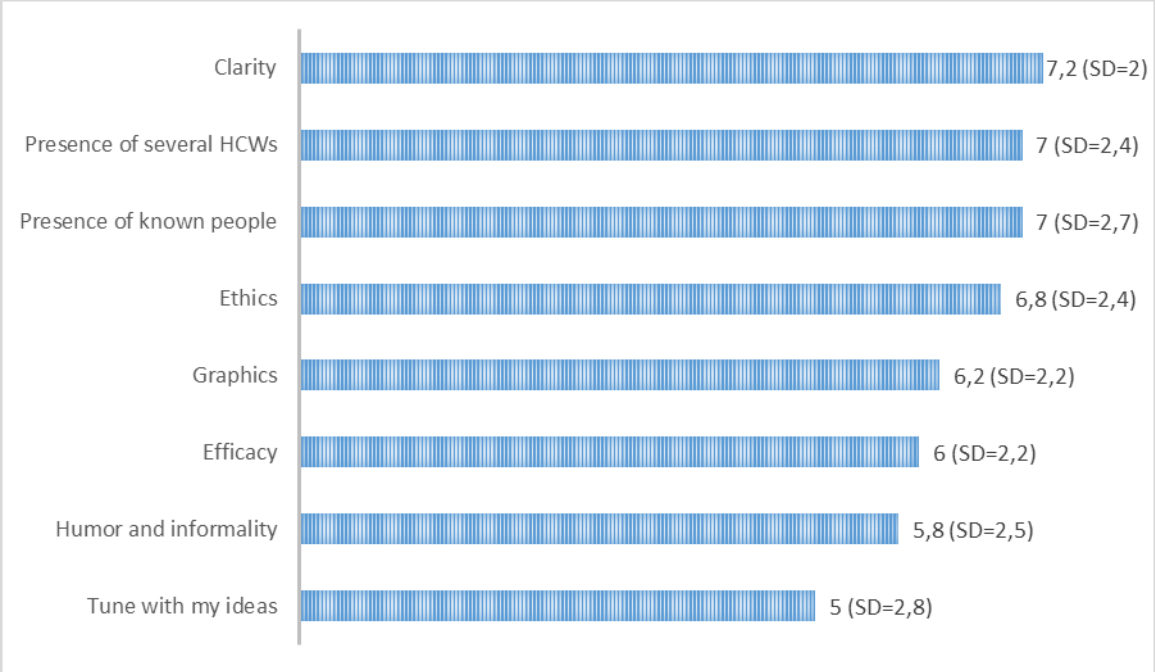
| BELIEFS | | Strongly agree | Mildly agree | Mildly disagree | Strongly disagree | Not expressed | Tot. |
|---|---|---|---|---|---|---|---|
| Not believe in vaccine efficacy | N | 33 | 128 | 130 | 161 | 12 | 464 |
| | % | 7,1 | 27,6 | 28,0 | 34,7 | 2,6 | 100,0 |
| Not consider flu as a serious problem | N | 30 | 81 | 137 | 191 | 25 | 464 |
| | % | 6,5 | 17,5 | 29,5 | 41,2 | 5,4 | 100,0 |
| Think not to get sick | N | 43 | 90 | 171 | 134 | 26 | 464 |
| | % | 9,3 | 19,4 | 36,9 | 28,9 | 5,6 | 100,0 |
| Think not to be part of a high-risk group | N | 61 | 66 | 51 | 260 | 26 | 464 |
| | % | 13,1 | 14,2 | 11,0 | 56,0 | 5,6 | 100,0 |

### C.2.4 Pre-campaign agreement with statements expressing resistance in getting flu vaccination [tot=464]

| ATTITUDES | | Strongly agree | Mildly agree | Mildly disagree | Strongly disagree | Not expressed | Tot. |
|---|---|---|---|---|---|---|---|
| Be against the vaccines | N | 35 | 117 | 108 | 188 | 16 | 464 |
| | % | 7,5 | 25,2 | 23,3 | 40,5 | 3,4 | 100,0 |
| Not having time to get vaccinated | N | 11 | 33 | 79 | 315 | 26 | 464 |
| | % | 2,4 | 7,1 | 17,0 | 67,9 | 5,6 | 100,0 |
| Not having contacts with patients | N | 39 | 19 | 24 | 348 | 34 | 464 |
| | % | 8,4 | 4,1 | 5,2 | 75,0 | 7,3 | 100,0 |
| Be afraid of needles | N | 6 | 16 | 39 | 377 | 26 | 464 |
| | % | 1,3 | 3,4 | 8,4 | 81,3 | 5,6 | 100,0 |

## C.3 Post-test results

### C.3.1 Mean and standard deviation of liking and acceptance of flu campaign spots expressed by HCWs in a scale 0-10 (where 0 is no liking/acceptance and 10 is the maximum level of liking/acceptance)



### C.3.2 Post-campaign agreement with statements expressing beliefs about influenza and flu vaccination [tot=391, no missing answers]

| BELIEFS | | Strongly agree | Mildly agree | Mildly disagree | Strongly disagree | Tot. |
|---|---|---|---|---|---|---|
| Not believe in vaccine efficacy | N | 14 | 44 | 191 | 142 | 391 |
| | % | 3,6 | 11,3 | 48,8 | 36,3 | 100,0 |
| Not consider flu as a serious problem | N | 12 | 37 | 130 | 212 | 391 |
| | % | 3,1 | 9,5 | 33,2 | 54,2 | 100,0 |
| Think not to get sick | N | 25 | 46 | 176 | 144 | 391 |
| | % | 6,4 | 11,8 | 45,0 | 36,8 | 100,0 |
| Think not to be part of a high-risk group | N | 50 | 56 | 55 | 230 | 391 |
| | % | 12,8 | 14,3 | 14,1 | 58,8 | 100,0 |

### C.3.3 Post-campaign agreement with statements expressing resistance in getting flu vaccination [tot=391, no missing answers]

| ATTITUDES | | Strongly agree | Mildly agree | Mildly disagree | Strongly disagree | Tot. |
|---|---|---|---|---|---|---|
| Be against the vaccine | N | 21 | 61 | 121 | 188 | 391 |
| | % | 5,4 | 15,6 | 30,9 | 48,1 | 100,0 |
| Not having time to get vaccinated | N | 6 | 19 | 94 | 272 | 391 |
| | % | 1,5 | 4,9 | 24,0 | 69,6 | 100,0 |
| Not having contacts with patients | N | 38 | 17 | 28 | 308 | 391 |
| | % | 9,7 | 4,3 | 7,2 | 78,8 | 100,0 |
| Be afraid of needles | N | 3 | 13 | 30 | 345 | 391 |
| | % | 0,8 | 3,3 | 7,7 | 88,2 | 100,0 |

## C.4 Campaign impact in different age groups

### C.4.1 Increasing trend of expressed disagreement with sentences about beliefs on influenza and flu vaccination in post-test survey stratified by HCWs age group compared with pre-test results (statistical significance *p<0,05*)

| | Strongly agree | | Midly agree | | Midly disagree | | Strongly disagree | | p-value |
|---|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST | |
| AGE 18-35 | | | | | | | | | |
| Not consider flu as a serious problem | 5 | 4 | 30 | 6 | 36 | 46 | 45 | 63 | p<0,001 |
| | 4,3% | 3,4% | 25,9% | 5,0% | 31,0% | 38,7% | 38,8% | 52,9% | |
| Think not to get sick | 13 | 4 | 26 | 10 | 45 | 62 | 35 | 43 | p<0,01 |
| | 10,9% | 3,4% | 21,8% | 8,4% | 37,8% | 52,1% | 29,4% | 36,1% | |
| AGE 36-45 | | | | | | | | | |
| Not believe in vaccine efficacy | 13 | 4 | 44 | 12 | 43 | 63 | 61 | 40 | p<0.001 |
| | 8,1% | 3,4% | 27,3% | 10,1% | 26,7% | 52,9% | 37,9% | 33,6% | |
| AGE 46-55 | | | | | | | | | |
| Not believe in vaccine efficacy | 14 | 6 | 45 | 12 | 41 | 65 | 45 | 41 | p<0,001 |
| | 9,7% | 4,8% | 31,0% | 9,7% | 28,3% | 52,4% | 31,0% | 33,1% | |
| Not consider flu as a serious problem | 14 | 3 | 21 | 18 | 48 | 37 | 57 | 66 | p<0,05 |
| | 10,0% | 2,4% | 15,0% | 14,5% | 34,3% | 29,8% | 40,7% | 53,2% | |
| AGE $\geq$ 56 | | | | | | | | | |
| Not believe in vaccine efficacy | 2 | 0 | 6 | 3 | 3 | 13 | 16 | 13 | p<0,05 |
| | 7,4% | 0,0% | 22,2% | 10,3% | 11,1% | 44,8% | 59,3% | 44,8% | |

### C.4.2 Increasing trend of expressed disagreement with sentences about attitudes (resistance in getting flu vaccination) in post-test survey stratified by HCWs age group compared with pre-test results (statistical significance *p<0,05*)

| | Strongly agree | | Midly agree | | Midly disagree | | Strongly disagree | | p-value |
|---|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST | |
| AGE 36-45 | | | | | | | | | |
| Be against the vaccine | 15 | 10 | 44 | 13 | 39 | 28 | 62 | 68 | p<0.01 |
| | 9,4% | 8,4% | 27,5% | 10,9% | 24,4% | 23,5% | 38,8% | 57,1% | |

### C.4.3 Comparison between percentages of HCWs respondents stratified by age groups with regard to intention to get vaccinated in pre and post-test survey (statistical significance *p<0,05*)

| AGE | 18-35 | | 36-45 | | 46-55 | | >56 | |
|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST |
| Yes | 14 | 43 | 20 | 53 | 15 | 34 | 12 | 13 |
| | 24,6% | 75,4% | 27,4% | 72,6% | 30,6% | 69,4% | 48,0% | 52,0% |
| No | 84 | 76 | 128 | 66 | 107 | 90 | 15 | 16 |
| | 52,5% | 47,5% | 66,0% | 34,0% | 54,3% | 45,7% | 48,4% | 51,6% |
| Don't know | 21 | 14 | 15 | 3 | 30 | 7 | 3 | 2 |
| | 60,0% | 40,0% | 83,3% | 16,7% | 81,1% | 18,9% | 60,0% | 40,0% |
| p-value | p<0,0001 | | p<0,0001 | | p<0,0001 | | p=n.s. | |

### C.4.4 Comparison between percentages of HCWs respondents stratified by age groups with regard to self-reported vaccination practice in pre and post-test survey (statistical significance *p<0,05*)

| AGE | 18-35 | | 36-45 | | 46-55 | | >56 | |
|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST |
| Yes | 8 | 22 | 13 | 13 | 13 | 16 | 6 | 6 |
| | 26,7% | 73,3% | 50,0% | 50,0% | 44,8% | 55,2% | 50,0% | 50,0% |
| No | 111 | 111 | 150 | 109 | 139 | 115 | 24 | 25 |
| | 50,0% | 50,0% | 57,9% | 42,1% | 54,7% | 45,3% | 49,0% | 51,0% |
| p-value | p<0,05 | | p=n.s. | | p=n.s. | | p=n.s. | |

## C.5 Campaign impact in different professionals groups

### C.5.1 Increasing trend of expressed disagreement with sentences about beliefs on influenza and flu vaccination in post-test survey stratified by HCWs by occupation compared with pre-test results (statistical significance *p<0,05*)

| | Strongly agree | | Midly agree | | Midly disagree | | Strongly disagree | | p-value |
|---|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST | |
| PHYSICIANS | | | | | | | | | |
| Not believe in vaccine efficacy | 6 | 0 | 15 | 5 | 23 | 34 | 57 | 42 | p<0,01 |
| | 5,9% | 0,0% | 14,9% | 6,2% | 22,8% | 42,0% | 56,4% | 51,9% | |
| Think not to get sick | 9 | 3 | 16 | 9 | 31 | 43 | 41 | 26 | p<0,05 |
| | 9,3% | 3,7% | 16,5% | 11,1% | 32,0% | 53,1% | 42,3% | 32,1% | |
| RESIDENTS | | | | | | | | | |
| Not believe in vaccine efficacy | 0 | 2 | 3 | 1 | 8 | 2 | 17 | 25 | p<0,05 |
| | 0,0% | 6,7% | 10,7% | 3,3% | 28,6% | 6,7% | 60,7% | 83,3% | |
| NURSE | | | | | | | | | |
| Not believe in vaccine efficacy | 20 | 10 | 70 | 27 | 74 | 96 | 55 | 55 | p<0,001 |
| | 9,1% | 5,3% | 32,0% | 14,4% | 33,8% | 51,1% | 25,1% | 29,3% | |
| Not consider flu as a serious problem | 12 | 6 | 47 | 20 | 78 | 69 | 73 | 93 | p<0,01 |
| | 5,7% | 3,2% | 22,4% | 10,6% | 37,1% | 36,7% | 34,8% | 49,5% | |
| NURSE ASSISTANTS | | | | | | | | | |
| Not believe in vaccine efficacy | 4 | 2 | 29 | 9 | 21 | 43 | 22 | 16 | p<0,001 |
| | 5,3% | 2,9% | 38,2% | 12,9% | 27,6% | 61,4% | 28,9% | 22,9% | |
| Not consider flu as a serious problem | 11 | 3 | 16 | 11 | 15 | 20 | 33 | 36 | p<0,001 |
| | 14,7% | 4,3% | 21,3% | 15,7% | 20,0% | 28,6% | 44,0% | 51,4% | |
| TECHNICAL STAFF | | | | | | | | | |
| Not consider flu as a serious problem | 1 | 0 | 5 | 0 | 14 | 3 | 4 | 15 | p<0,001 |
| | 4,2% | 0,0% | 20,8% | 0,0% | 58,3% | 16,7% | 16,7% | 83,3% | |
| Think not to get sick | 3 | 0 | 7 | 0 | 8 | 2 | 6 | 16 | p<0,01 |
| | 12,5% | 0,0% | 29,2% | 0,0% | 33,3% | 11,1% | 25,0% | 88,9% | |

### C.5.2 Increasing trend of expressed agreement with sentences about attitudes (resistance in getting flu vaccination) in post-test survey stratified by HCWs by occupation compared with pre-test results (statistical significance *p<0,05*)

| | Strongly agree | | Midly agree | | Midly disagree | | Strongly disagree | | p-value |
|---|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST | |
| NURSE | | | | | | | | | |
| Be against the vaccine | 20 | 13 | 70 | 39 | 60 | 70 | 66 | 66 | p<0,05 |
| | 9,3% | 6,9% | 32,4% | 20,7% | 27,8% | 37,2% | 30,6% | 35,1% | |
| TECHNICAL STAFF | | | | | | | | | |
| Be against the vaccine | 2 | 0 | 11 | 0 | 5 | 1 | 6 | 17 | p<0,0001 |
| | 8,3% | 0,0% | 45,8% | 0,0% | 20,8% | 5,6% | 25,0% | 94,4% | |

### C.5.3 Comparison between percentages of HCWs respondents stratified by occupation with regard to intention to get vaccinated in pre and post-test survey (statistical significance *p<0,05*)

| | Physicians | | Residents | | Nurse | | Nurse assistants | | Technical staff | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST | PRE | POST | PRE | POST |
| Yes | 27 | 44 | 9 | 18 | 18 | 48 | 5 | 16 | 2 | 16 | 0 | 1 |
| | 38,0% | 62,0% | 33,3% | 66,7% | 27,3% | 72,7% | 23,8% | 76,2% | 11,1% | 88,9% | 0,0% | 100,0% |
| No | 57 | 37 | 13 | 12 | 176 | 140 | 63 | 54 | 22 | 2 | 3 | 3 |
| | 60,6% | 39,4% | 52,0% | 48,0% | 55,7% | 44,3% | 53,8% | 46,2% | 91,7% | 8,3% | 50,0% | 50,0% |
| Don't know | 18 | 9 | 7 | 0 | 30 | 11 | 13 | 6 | 24 | 18 | 1 | 0 |
| | 66,7% | 33,3% | 100,0% | 0,0% | 73,2% | 26,8% | 68,4% | 31,6% | 57,1% | 42,9% | 100,0% | 0,0% |
| p-value | p<0,01 | | p<0,01 | | p<0,0001 | | p<0,05 | | p<0,0001 | | p=n.s. | |

### C.5.4 Comparison between percentages of HCWs respondents stratified by occupation with regard to self-reported vaccination practice in pre and post-test survey (statistical significance *p<0,05*)

| | Physicians | | Residents | | Nurse | | Nurse assistants | | Technical staff | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PRE | POST | PRE | POST | PRE | POST | PRE | POST | PRE | POST | PRE | POST |
| Yes | 12 | 14 | 7 | 10 | 16 | 29 | 3 | 3 | 2 | 1 | 4 | 4 |
| | 46,2% | 53,8% | 41,2% | 58,8% | 35,6% | 64,4% | 50,0% | 50,0% | 66,7% | 33,3% | 50,0% | 50,0% |
| No | 90 | 76 | 22 | 20 | 208 | 170 | 78 | 73 | 22 | 17 | 4 | 4 |
| | 54,2% | 45,8% | 52,4% | 47,6% | 55,0% | 45,0% | 51,7% | 48,3% | 56,4% | 43,6% | 50,0% | 50,0% |
| p-value | p=n.s. | | p=n.s. | | p<0,05 | | p=n.s. | | p=n.s. | | p=n.s. | |

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