D2.7

The New Global Health Security Regime

1st Reporting period
WP2 New challenges and new methods for outbreak communication

Responsible Partner: HU
Contributing partners: CSSC, CEDAR3

Due date of the deliverable: M11 (December 31st 2013)
Actual date of submission: M14 (March 6th 2013)

Dissemination level: PU

PROJECT FULL TITLE	Transparent communication in Epidemics: Learning Lessons from experience, delivering effective Messages, providing Evidence.
PROJECT ACRONYM	TELL ME
	Collaborative Project funded under Theme HEALTH.2011.2.3.3-3 "Development of an evidence-based behavioural and communication package to respond to major epidemics outbreaks"
GRANT AGREEMENT	278723
STARTING DATE	01/02/2012
DURATION	36 months

D2.7 "The New Global Health Security Regime"

Task: **2.7**

Leader: **HU –** Other contributors: **BMJ, CSSC**

Table of Contents

EXECUTIVE SUMMARY

Background

International public health cooperation is essential to mitigate the spread of epidemics. In order to prevent or minimize harm from emerging infectious diseases in the future, it may be necessary to impose measures that constrain national sovereignty. This encouraged the World Health Organization (WHO) to revise the International Health Regulations (IHR, 2005). These regulations have strengthened WHO's position as a central global force with authority and accountability in the field of international health. The trend towards a global health security regime is likely to change the traditional approaches to outbreak communication. However, there are still many questions that remained unanswered regarding whether the WHO eventually will be legitimate as a supranational public health authority.

Health organizations value the importance of using communication strategies in the management of infectious disease crises, in order to improve the compliance of the public with public health recommendations. It is important to examine the attention they give the subject in their written reports and the actual implementation of the strategies during the 2009 influenza pandemic.

Objectives

The objectives of this task were to review the transformations that the IHR underwent until its current formulation in 2005 and to review the role and performance of WHO during 2009 H1N1 pandemic in light of the revised IHR. We investigated the eight core capacities defined by the IHR. The overall aim of this document is to highlight the 8 core capacities defined by WHO, as they are reflected through the revised IHR (2005)..This will serve as a basis for understanding the communication aspects of the collaboration between WHO and national agencies during the 2009 influenza pandemic. Our objective was to review to what extent the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) reports addressed the issue of health communication strategies, such as risk communication, social marketing and one-way versus two-way flow of communication. We asked how these ideas appeared in the reports and how they were actually implemented in the case of the 2009 H1N1 influenza, according to the international organizations' reports. We completed our analysis with an empirical case study of Israel, examining how the instructions and theories were implemented in the member states.

Methods

In the first section of this task, we reviewed papers, official documents and reports and evaluated the various aspects of the implementation of the revised IHR (2005) during infectious disease crises.

In the second section, we conducted two studies. In the first, we compared the CDC and WHO reports from 2005 and 2009 to examine what lessons were learned regarding the use of the health communication strategies of risk communication, social marketing and one-way versus two-way flow of communication. In the second study, we conducted 73 semi-structured interviews with stakeholders from Israel, including policy makers, journalists and healthcare workers. The aim of the interviews was to find out how the communication strategies and theoretical dimensions from the reports were implemented in the field, using Israel as a case study.

Findings

The revised IHR provide an important mechanism for controlling international infectious disease crises and significantly improve the coordination between the WHO and member states than was apparent prior to their implementation. However, the revised IHR require considerable investment by the member states. As a result, their implementation remains incomplete, particularly in countries with more limited resources. In the second part of this task, we found that the revised IHR provided impetus to health organizations to give special attention to the matter of coordination and communication between member states. This subject received special attention in the reports, which provided instructions on how to use specific update and monitoring channels. However, it seems that while these channels worked on the international level, more specific instructions and guidance were needed on the national level. The instructions were mostly "top-down", and there seems to be a need for more attention to be dedicated to their implementation in individual member states. There is some evidence that the states need more feedback on their concerns regarding lack of information or misunderstandings and adaptations required at the local level.

Conclusions

The revised IHR has provided a comprehensive basis for international collaboration during infectious disease crises and has strengthened the role of the WHO as the supranational health authority. This is particularly relevant for timely exchange of information and risk communication. Nevertheless, many countries have not yet been able to achieve the core capacities required by the revised IHR. This may require assistance from resource rich countries to those which possess fewer resources.

From our study on communication aspects, there is evidence that there is a need to ensure that the goals of a vaccination program must be clearly defined as the first essential step in formulating effective communication strategies. It is advisable to use the most up-to-date theoretical literature and theoretical dimensions in planning communication strategies. These theoretical dimensions should be transformed to practical applications and implemented in different programs. There may sometimes be a gap between the instructions on the international level and their implementation in the member states. While many instructions and theoretical dimensions were successful on the international level, the Israeli case study showed that sometimes the implementation by a member state may be incomplete. A strategy of two-way communication between the WHO and the member states could be advantageous. The use of new social media has opened new opportunities for communicating feedback "from the bottom up" and efforts should be made to strengthen this area.

1. INTRODUCTION

Since international public health cooperation is essential to mitigate the spread of epidemics, the control of infectious diseases is not only a national issue. This was dramatically demonstrated during the severe acute respiratory syndrome (SARS) epidemic (Fidler & Gostin, 2006). In order to prevent or minimize harm from emerging infectious diseases in the future, it may be necessary to impose measures that constrain national sovereignty and are inherently global (Heymann, 2006). This was one of the forces encouraging the World Health Organization (WHO) to formulate the revised International Health Regulations (IHR, 2005). In fact, these regulations have strengthened WHO's position as a central global force that has the authority and accountability to act against international health related risks (Ijaz et al., 2012). Although it is clear that the trend is towards a global health security regime which is likely to change the traditional approaches to outbreak communication, there are still many questions that remained unanswered regarding whether the WHO eventually will be legitimate as a supranational public health authority.

This document is divided into two main sections. The first deals with the International Health Regulations and their implementation during infectious disease crises. The second section deals with communication aspects of infectious disease crises, including a case study of some of these aspects in one member state during the 2009 influenza pandemic.

2. THE INTERNATIONAL HEALTH REGULATIONS

In order to tackle some of those questions, we briefly review the different transformations the IHR underwent until its current formation (2005). We have reviewed the role and performance of WHO during 2009 H1N1 pandemic in light of the revised IHR. Finally, we investigated the eight core capacities defined by the IHR. It is important to note that this document will serve as a basis for understanding the cooperation between WHO and Member States. In the second half of our report, we will focus on the communicational aspects of the collaboration between WHO and national agencies during the 2009 pandemic, through an Israeli case study.

2.1. Background to the IHR

In 1951, the International Sanitary Regulations (ISR), were adopted by the World Health Organization and focused on six communicable diseases requiring coordinated international measures to control their transmission between countries. (Hardiman 2012) Member countries have made use of the constitutional provision that permits the Health Assembly to adopt regulations concerning sanitary and quarantine requirements and other procedures designed to prevent the international spread of disease (Tucker, 2005). In 1969, the ISR were renamed the International Health Regulations (IHR) (Hardiman & Wilder-Smith, 2007). The IHR are an international legal instrument that is binding on member states of WHO (essentially all countries in the world [Wernli et al., 2011]). Their aim is to help the international community prevent

and respond to acute public health risks that have the potential to cross borders and threaten people worldwide.

In 1995, it was decided that there was a need to revise the IHR. The revised IHR were adopted in 2005, and came into force in June 2007. Hardiman (2012) describe them as "a legally binding global framework to support national and international programs and activities aimed at preventing, protecting against, controlling, and providing a public health response to the international spread of disease". They deal with the actions to be taken during public health emergencies and strengthening of national public health infrastructure.

The new IHR (2005) covers a wide spectrum. This includes case definitions of diseases, the definition of a public health emergency of international concern (PHEIC), and the definition of public health risks. There is considerable emphasis on collaboration between organizations. At the country level, the IHR (2005) are supported by the designation of a national focal point (NFP). NFPs are national centers, and they play a central role in conducting the communications aspects of the IHR, both within the countries and internationally.

The mechanisms for advice and oversight of national capacity development include a number of components. These include a national roster of experts that can be called upon immediately to deal with any crisis, special emergency committees to manage the response to the crisis, review committees to monitor progress and review lessons learned from the event and global support through policy development at the World Health Assembly (WHA) and regional committees of the WHO (Andrus et al., 2010).

The member states need to strengthen the existing national structures and resources to meet their core capacity requirements with regard to surveillance, reporting, notification, verification, response and collaboration activities and activities at designated airports, ports and ground crossings (Katz et al., 2012; May, Chretien & Pavlin, 2009). At the local level, it is recommended that the capacities be expanded to detect events involving disease or death above expected levels for the particular time and place in all areas within the country and report all available essential information immediately to the public health authorities. At the community level, reporting shall be to local community health-care institutions or the appropriate health personnel. At the primary public health response level, reporting shall be to the intermediate or national response level, depending on organizational structures MacDonald et al., 2011). The essential information includes clinical data, laboratory results, sources and type of risk, numbers of human cases and deaths, conditions affecting the spread of the disease and the health measures employed.

At the intermediate public health response levels the capacities need to confirm the status of reported events and to support or implement additional control measures, assess reported events immediately and, if found urgent, to report all essential information to the national level. The criteria for urgent events include serious public health impact and/or unusual or unexpected nature with high potential for spread. This is particularly important for suitable risk communication to the public (Hollmeyer et al., 2012). It is recommended that the capacities should include the ability to assess all reports of urgent events within 48 hours and notify WHO immediately through the IHR National Focal Point.

Public health response capacities should include measures to rapidly implement control measures required to prevent domestic and international spread. This includes specialized staff, laboratory analysis of

samples, logistical assistance, on-site assistance for local investigations. There should be direct communication between senior health for implementing control measures, and direct liaison with other relevant government ministries. Communication should include hospitals, clinics, airports, ports, ground crossings, laboratories and other key operational areas. Clear procedures should be in place for the dissemination of information and recommendations received from WHO.

As regards influenza pandemics, the revised IHR (2005) regulates the WHO as an organization that serves as a coordinating center at two levels. On the first level, WHO addresses questions of efficient global monitoring of the pandemic. On the second level, WHO serves as a communication center which simultaneously creates global messages and serves as a relay station which receives, examines and validates information. In order to fully understand WHO's role in light of the new IHR regulations, one must focus on the main revisions the document underwent at both levels. Thus, we emphasize the main differences between the revised IHR (2005) and its former versions in order to highlight WHO's new defined role. Subsequently, we will not only discuss the formal legal authority IHR grants WHO but also its de facto function during the H1N1 pandemic of 2009.

2.2. The Revised IHR and Core Capacities

The eight core capacities represent the ability and the will of WHO and the Member States to comply with the revised IHR 2005 (Hollmeyer et al., 2012). It seems that achieving these capacities is an essential global objective but also it is an opportunity to examine our progress towards our mutual goal and, most importantly, it is a chance to raise questions in order to improve the IHR's implementation (Andraghetti from PAHO/ WHO).

2.2.1. National legislation

Martin et al., (2010) investigated the extent to which laws across Europe support or constrain pandemic preparedness planning (2010). The results demonstrate wide differences across Europe in the extent to which national pandemic policy and pandemic plans have been integrated with public health laws. There seems to be significant differences in "legislation and by law, the extent to which borders could be closed to movement of persons and goods during a pandemic and access to healthcare of non-resident persons" (Martin et al., 2010). This can have harsh consequences of planning and preparations on all levels (Kim et al., 2012). Moreover, the revised IHR (2005) holds special challenge for federalist nations (Australia, Canada, Germany and India) because "it imparts national obligations onto what is traditionally a state and local function" (Katz & Kornblet, 2010; Wilson et al., 2008). . In this case, the success of IHR (2005) rests upon the ability of these nations to find a balance between public health regulatory in the authority of the local government opposing the authority of the national government (Wilson, von Tigerstrom & McDougall, 2008).

2.2.2. Policy and financing

The first question that rises on the subject of policy and financing is whether the WHO can establish a situation in which there is an equality of burden among the member states. While trying to establish this formula one must keep in mind that some country's burden is much heavier than others'. Namely, the distribution of financing must be as equal as possible but also take into an account the limited abilities some of the countries are facing with. While developed countries take of granted sanitation, hospitals and professional doctors, source limited countries sometimes have to make hard cuts in order to face WHO's minimum requirements. However, in the global age surveillance problems thousands of miles away, become very quickly our surveillance problem. If pandemics won't be contained at the area of their outbreak they will travel to our doorstep. Hence, the question should be not whether developed countries should help limited resources countries but how they can help (or to what extent). The bottom line is that efficient global surveillance is a shared interest of all member countries (McNabb, 2010).

2.2.3. Coordination and NFP communications

"To establish effective communication channels, the IHR (2005) request each member state to designate a National Focal Point and WHO to designate IHR Contact Points at its headquarters or regional offices as operational links for urgent communication concerning the implementation of the IHR (2005)" (Oshitani et al., 2005). It can be argued that National Focal Points (NFPs) represent the commitment member states have towards the IHR (2005). A successful establishment of NFPs indicates intention for global cooperation and communication with WHO and other member states. Thus, it is not surprising that the majority of member states successfully established NFPs. As Hardiman notices, "NFPs are national centers, not individual persons, that occupy a critical role in conducting the communication aspects of the IHR, within their countries and internationally" (2012). These centers have number of tasks, of which the most important ones are to distribute information that comes from WHO to the relevant domestic agents, to report to WHO about any health regarding information that can bear relevance on a global level and to provide WHO with feedback about the national preparedness in case of an outbreak and, with WHO's coordination to ameliorate national capacity. Furthermore, the local NFPs can serve as a pipeline between WHO and local audience, helping to understand and communicate public opinion.

However, not all NFPs work accordingly to the standard which goes along with the spirit of the revised IHR (2005). To improve these NFP's activity, WHO initiate courses and workshops on which we will elaborate in the human resources section. It is import to note that after the 2009 N1H1 influenza there have been raised some critique against the level of collaboration between WHO and some NFPs. Low et al., illustrate this notion through the Singaporean example (2011). The claim is that while the Singaporean NFP provided WHO with timely information, the IHR NFPs were not responsive. This lack of information led Singapore NFP to explore alternative sources of information which obviously should not happen in times of a severe outbreak. It seems that these sorts of discrepancies should be resolved immediately in order to establish a more efficient and valid way to communicate during crisis.

2.2.4. Surveillance

One of the most important core capacities that are yet to be achieved is improving surveillance, and in some cases establishing a surveillance system, in resource limited countries. Obviously, not always it is merely a technological question and, in fact, the 'heart' of every good surveillance system is communication. "It is the speed of communication which is most critical to contain or stamp out an outbreak, save lives and prevent misery" (Kant & Krishnan, 2010) Although a variety of surveillance systems has been established around the world it seems there are still a lot of technological gaps between developed countries and resource limited countries (Campbell et al., 2012). As Quandelacy et al. (2011), note "many resource-limited countries still lack access to appropriate electronic surveillance systems, which may limit their ability to rapidly detect outbreaks and other health events that affect resource poor countries and the international community. Apparently, the assessment shows that IHR 2005 "constitutes a major advance in global surveillance from what has prevailed in the past" (Baker & Fidler, 2006). In this aspect, WHO's agenda should focus on reduction of gaps between different countries. Thus, the ultimate goal of all member states should be one; to establish an efficient global surveillance system. Obviously, this cannot be achieved without the participation of every state in this effort.

2.2.5. Response

The main question that incorporates different issues regarding response to pandemic outbreak deals with the acuteness or severity of WHO and member state's reaction. Namely, how do we act? What is the critical mass for declaring an outbreak? How we alert the public without arousing panic. It is important to note that, in the aftermath of 2009 H1N1 influenza, one of the voices against WHO's response made the case that WHO overestimated the severity of the outbreak resulting in a mass panic. However, it seems that in the early stages of an outbreak when solid and verified information is sparse it is better to exaggerate than to underestimate. This brings about the public health paradox; while "failure to move aggressively in the early stage of pandemic influenza can have catastrophic consequences, actions that prove to have been unnecessary will be viewed as draconian and based on hysteria (Gostin, 2004). Along with Gostin (2004) recommends it safe to claim that what should characterize a wise response is not only its severity but also its ethical code and considerations (2004).

2.2.6. Preparedness

The discourse around the concept of preparedness focuses on different elements. First, we must consider preparedness on the global level, considering WHO, CDC and ECDC and all member states as a complex network that must achieve and maintain an open communicational channel in order to assess questions of surveillance and coordination (Azziz-Baumgartner et al., 2009). Moreover, we need to expand initiatives that include WHO's conferences, workshops and courses to help different agents to specialize in working together in WHO in light of IHR 2005. On the national level, we talk about two-way preparedness. Namely, working with regional agents in order to establish blessed partnerships such as MECIDS and MBDS but also achieving high preparedness level in communication with the public. Communication with the public should be based on risk communication; working with communication researchers in order to understand public opinion and assess the issues that are relevant for each specific sub-group. These tailored interventions should promote pro-health initiatives not merely in times of outbreaks but on a regular basis. Although it is not always completely understood what is the appropriate role of each agent in this network, "responding

to infectious disease threats is every State's prerogative, and inter-State collaborations…are essential to secure global public health preparedness" (Bhattacharya, 2007).

2.2.7. Risk communication

In accordance with the lesson of SARS outbreak and the spirit of IHR 2005, WHO's determined position is that massive mass media campaigns should be used in order to decrease transmission, inform the population, promote hygiene (sick people should be monitored and health should keep distance). It is important to note that social media could potentially play a major role in these sorts of campaigns, helping the message get through not only via traditional channels but also through the new media. Even more important, Information should be communicated in a transparent, accurate and timely manner" (WHO global conference on SARS: where do we go from here? (Summary Report, Kuala Lumpur, 2003, in O'Malley, Rainford & Thompson, 2009). It seems that some of these lessons were implemented into risk communication during H1N1 2009 influenza outbreak. Following the Mexican Pandemic Plan, "a program of social mobilization was implemented through a multifaceted mass media saturation campaign featuring visual representations and a previously developed and tested message icon, "promi", to address Mexico City's heterogeneous population and literacy rates" (Bell et al., 2009).

Nevertheless, there are still some questions remained unanswered. If WHO is responsible for the messages produced and distributed during an outbreak, is it also include risk communication? If it is, what is the best platform to achieve effective results? Will the WHO be in any way responsible for distributing or monitoring messages that are being used for different interventions? Will such messages be homogeneous or will they be culturally tailored for different member states? What happens if a state does not agree with the message and wants to produce other messages? It is important to note that there is relatively very little research on the effectiveness of risk communication during times of crisis and this could very well be the missing link on the way to achieving better surveillance and faster containment.

2.2.8. Human resources

It is not surprising that staff shortages sometimes prove to be a significant cause for surveillance shortfalls (Chretien, 2010). This equation becomes much more significant when we are speaking about third world countries, where training and qualification of experts and medical staff sometimes falls short. One of the most successful WHO's initiatives are medical trainings and workshops that can improve the capability of domestic professionals to face health hazards successfully (Otto et al., 2011). It is important to note that a great deal of the training focuses not only on medical training but also on communicational training thus opening a channel of communication can sometimes contribute to efficient surveillance just as good medical experts.

2.2.9. Laboratory capabilities

According to the declaration of the "World Health Assembly in 2005 that urged its member states to strengthen national laboratory capacity for human and zoonotic influenza" (Wetheim, 2010), it is self evident that member states laboratories should strive for the highest standards (Najjar-Pellet, 2013). The objectives for the "laboratory strengthening program was to enhance laboratory facilities; ensure availability of necessary equipment; build human resource capacity by teaching, training and mentoring; and ensure quality laboratory management and testing" to comply with international standards (Wetheim, 2010). The Tanzania Field Epidemiology and Laboratory Training Program (TFELTP) serves as a good example of cooperation on the national and international levels that can bring about change and establish laboratory capacities that correspond with the IHR 2005. Although the program is not perfect and there is still room for improving "in-country teaching capacity for the program, as well as a career path for graduates" (Mmbuji, 2011), it shows that with relatively small economical investment countries can establish a surveillance system by upgrading their laboratory capabilities. Nevertheless, there is still more guidance needed to achieve the standard that the spirit of the revised IHR strives for.

2.3. The IHR and the H1N1 pandemic of 2009

The major differences between the 2005 International Health Regulations (IHR) and its earlier versions operate on three different axes. The substantial changes include "containment at the border [as opposed to] containment at the source of the event, shifts from a rather small disease list required to be reported, to all public health threats; and shifts from preset measures to tailored responses with more flexibility to deal with the local situations on the ground" (Andrus et al., 2010).

The H1N1 influenza pandemic of 2009 tested the capacities of countries to detect, assess, notify and report events as required by the 2005 International Health Regulations (IHR). As detailed in the IHR, the World Health Organization drew on official reports from Member States as well as unofficial sources (e.g. media alerts) to quickly report and disseminate information about the appearance of the novel influenza virus (Briand, 2011). The pre-existing Global Influenza Surveillance Network for virological surveillance provided crucial information for rapid development of a vaccine and for detection of changes in the virus.

Building on the experience from epidemics in India, Paraguay and China, the IHR seeks to contain at the source of the event and not at the border which bound to increase humanitarian and economical crises. This change becomes critical when speaking of limited sources countries and areas that normally cannot effectively treat and contain the outbreak (Kandun, 2010). One of the most effective ways in which WHO can immediately initiate a response is by managing expert groups and comities that can be called to begin the surveillance in any part of the world. Obviously, the emphasis is on developing areas that historically were connected with several outbreaks. This global reserve force is likely to save lives and monitor the outbreak as close to its source as possible but also it can prevent significant economical damages to countries with limited means.

Although Mexico was relatively quick in reporting the outbreak of influenza in 2009, by then the epidemic had already spread to the US. Thus, there was little chance, if any, to contain the epidemic at the source of the event. The response to the H1N1 influenza outbreak underscores the importance of countries developing real-time, comprehensive clinical surveillance in order to rapidly identify outbreaks that might

occur (Wilson, Brownstein & Fidler, 2010). However, complying with the 2005 IHR's surveillance and response obligations Mexico did cooperate in receiving global help that precipitated the monitoring of the outbreak (Chan et al., 2010).

Despite the requirements of the IHR, there remain a number of gaps in the global surveillance for infectious diseases that at least in part derive from the inability of source limited countries to successfully monitor and report the outbreak prior to its wide spread. The second major difference between the revised IHR 2005 and its former versions is a transition from a relatively short list of pandemic threats (smallpox, cholera, plague and yellow fever) to a considerably less constraining definition of health threats. Namely, IHR introduced a new surveillance system for all diseases and health threats that may constitute a "public health emergency of international concern" (Edelstein et al., 2012). This very broad definition urges countries to report on any threat that might constitute as an emergency of "international concern". It seems that this extension of WHO's authorization was one of the reasons that led to an efficient surveillance assessment of the 2009 H1N1 influenza (Paterson et al., 2012). The former outlook that constituted the short list held the assumption that WHO must devote extraordinary public health resources to tracking and preparing a response [depending on the estimated] risk that the outbreak will reach…in the case of serious illness.

Nevertheless, the extent of transmission and therefore the severity of the disease may be unclear during the early stages of a pandemic. For example, "infection in Mexico was already widespread by late April 2009 when the link was made between the unusual cases of pneumonia reported in March and April and a novel strain of influenza" (Lipsitch et al., 2011). Accordingly, the new openness that the IHR 2005 initiate regarding what should be defined as a "public health emergency" may result in an efficient surveillance and a quicker assessment of the pandemic (Toboy, 2010). Yet, some scholars see the elusive definition of a pandemic as a disadvantage. Doshi (2011) claims that WHO never defined pandemic influenza. This point seems to be rather controversial because this notion implies that potential conflicts of interest and doubts about proportionality of response can intervene with WHO's judgment. Doshi (2011) has stressed that it is important to notice that during the pandemic caused by H1N1 virus the definition derived from "pandemic phase" definitions rather than a pandemic influenza definition.

The third shift in surveillance and assessment of a pandemic threat as it appears in the IHR 2005 deals with the flexibility of WHO's guidelines. There is a clear departure from the strict general measures to identifying the unique situation and then addressing a tailored solution. This change of thought raises questions regarding WHO's ability to provide rapid solutions and responses to challenges that occur. 2009 H1N1 serves as a good example for working with tailored methods thus the identification of the pandemic occurred almost simultaneously in Mexico and in US but obviously each country needed a different kind of monitoring. While Mexico needed building an effective and adaptable frameworks for disease surveillance, US whom has the monitoring of CDC needed much less global support.

Another aspect of the uncertain nature of the occurrence of pandemics and their management was evident in the relationship between the IHR (2005) and the WHO pandemic alert system. Although there seem to be some controversy surrounding the application of WHO's influenza pandemic alert system during the H1N1 influenza pandemic (Wilson, Brownstein & Fidler, 2010), it remains a good example of WHO's ability to assess and evaluate the situation and treatment during the outbreak. To avoid the polemic, we will just mention the authorization of WHO director-general to determine various alert phases in order to stimulate governments to prepare for or respond to a pandemic. In accordance with the IHR (2005), this authority

has to do with the unexpected nature of pandemic outbreaks that require rapid assessment and change of strategy.

WHO's function as a producer and transmitter of information, in the context of the revised IHR (2005), can be examined during H1N1 2009 outbreak. As mentioned earlier, the revised IHR designated WHO as the central player in times of pandemics and other international health crises. This marks a communication shift from a short list of obligatory reports that are passed between WHO and national agencies to a "global partnership and collaboration; human rights, obligation, accountability, and procedures of monitoring" all of which are a part of WHO's wider responsibility (Andrus et al., 2010). WHO's task is to establish a global communication in order to spread information to all countries; either directly to people or through intermediary agents such as health organizations, governments and news agencies. The information varies from areas of outbreaks, the nature of pandemic, guidelines, validation of data, availability of a vaccine, surveillance and containment.

Generally speaking, WHO identifies five essential guidelines for effective outbreak communication based on the experiences of several countries to disease outbreaks: build trust, announce early, be transparent, respect public concerns and plan in advance (Condon, 2009). In the case of SARS, China was criticized for not reporting the outbreak quickly enough, which led to new reporting requirements under IHR (2005). In case of the 2009 H1N1 epidemic, Mexico and US followed the new regulations and reported to WHO as soon as they detected a problem. This helped WHO to declare a public health emergency of international concern within 48 hours of laboratory confirmation that the viruses were in face a new strain (Condon & Sinha, 2009). After the surveillance began, the communication between WHO and member countries was very effective and matched the spirit of the new IHR.

According to the IHR (2005), as Katz acknowledges "the state party and WHO shall continue to communicate in a timely fashion about the notified event (2009), including sharing updated detailed public health information on the notified event (case definitions, laboratory results, source and type of risk, number of cases and deaths) . Moreover, WHO has developed a secure website which distributes timely information about public health events and emergencies among state parties. The overall agreement is that on the level of information WHO and Member States did a very good job in containing constant line of communication. Thus, the Member States inform WHO about new cases, laboratory results and concerns, while WHO validates and issues recommendation with the goal of mitigating the pandemic.

Nevertheless, some raise the point that although the dissemination of information was mostly successful overall, it was still relatively slow. For example, although there was sharing of clinical experience via networks of clinicians set by WHO and other organizations, the first large-scale quantitative analysis of risk factors for hospitalization was published online, almost 4 months after the data were gathered (Wilson, Brownstein & Fidler, 2010). Obviously, in the case of a larger scale pandemic, this delay could prove itself much more critical. Furthermore, the IHR (2005) emphases on matters of global coordination and communication, between WHO and the member states, resulted in an effective channels that provided instructions and specific updated. Nevertheless, it seems that on the national level, "the instructions were mostly 'top-down', with little attention to their implementation in the member states, feedback regarding lack of information or misunderstandings and local adoptions that were needed. The last point can be exemplified through a case study of communication coordination in Israel during the H1N1 pandemic. Some of the findings point to a gap between the trust Israeli journalists and bloggers had towards reports coming directly from WHO as opposed to reports coming from Israeli Ministry of Health. This discrepancy

suggests that maybe there is need for closer monitoring of the reception of messages not only on the global level but also on the national level.

A good illustration of a collaborative effort on the national level that applies IHR (2005) guidelines is MECIDS (Middle East Consortium on Infectious Disease Surveillance). This surveillance network includes ministry of health officials from Israel, the Palestinian Authority and Jordan and serves as a forum for the exchange of information on the infectious disease crises. "The MECIDS partners invited representatives from WHO to conduct a workshop on IHR (2005) implementation in November, 2007" (Gresham et al., 2009). As a result, there was a higher level understanding of IHR procedures for communication with WHO. This collaboration was expressed in shared lessons and mutual press releases during the H1N1 2009 pandemic. Another example of a surveillance networks is MBDS (the Mekong Basin Disease Surveillance cooperation). This network includes Cambodia, China, Lao People's Democratic Republic, Myanmar, Thailand and Vietnam. Similar to MECIDS, this collaboration proved itself especially effect in areas previously considered problematic. The information sharing among the countries and WHO was cited as a special strength (Moore & Dausey, 2011).

2.4. Challenges of global surveillance and the H1N1 pandemic

The H1N1 2009 pandemic highlighted the differences in the surveillance and response capacities between different countries. Furthermore, it is likely that many countries will have difficulty complying with the IHR minimum core capacity requirements by the deadline set (Davies, 2012). Developing countries may not have the necessary resources for complying with these requirements and will need outside assistance in order to achieve them.

An equitable solution must be found to solve the problem of sharing the benefits of research based on the transfer of virus samples from less developed countries to the richer countries (Aldis, 2008). Equity in access to vaccine during pandemics is another issue which needs to be resolved (Fidler, 2003). Several programs aim to improve public health surveillance and response in developing countries by addressing specific disease control needs. "The WHO's Integrated Disease Surveillance and Response Strategy (IDSR), which is being implemented in all 46 member states of the WHO's African Regional Office and in the Integrated Disease Surveillance and Response Project in India, are examples of general crosscutting public health and response improvement programs that have originated in developing countries" (Nsubuga, 2010).

2.5. Potential violations of the IHR (2005) and the H1N1 pandemic

Despite WHO's determination that travel advisories and restrictions were not necessary, many countries used such measures in responding to the outbreak. Other countries implemented restrictions on pork products exported by countries affected by 2009-H1N1 cases even though WHO and the World Animal Health Organization (OIE) repeatedly stated that such restrictions were not justified. Controversies also arose from the isolation or quarantine of individuals and groups arriving from, or associated with, 2009-H1N1-affected countries—policies that were also inconsistent with WHO recommendations.

The 2009-H1N1 outbreak highlighted the potential the revolutionary change in international law the IHR(2005) represent, but it also revealed problems that require immediate attention. Stronger global health security will require strategic advances in the implementation of, and compliance with, the IHR(2005). Without such advances, the problems seen during the 2009-H1N1 outbreak may multiply exponentially if the world community faces a more dangerous influenza virus or some other virulent microbial surprise. (11) Although the global community generally adhered to the IHR (2005), supported WHO recommendations, and participated in unprecedented levels of information sharing, there are still areas in which nations may be withholding information or make unilateral decisions that do not support the language or spirit of the revised IHR (Katz, 2009). Certain member states that recommended against traveling to North America or prohibition on pork trade although WHO didn't issue such recommendations.

2.6. Requirements of the IHR and the sovereignty of the state

It seems that there is almost an inherent conflict between the revised IHR (2005) and the sovereignty of the state. In this aspect, each member state willingly passes on a great deal of its authority to WHO. IHR (2005) introduced a new surveillance system for all diseases and health threats that may constitute a "public health emergency of international concern" (Anema et al., 2012). It seems that the new surveillance system uses such an inclusive definition of a health crisis that it hard to imagine a health issue that does not fall into this definition (especially with the increase of western tourism that makes physical borders much more elusive). This raises the question of where we draw the border between the requirements of the IHR and the sovereignty of the member states. Obviously, some of the revisions in the IHR can be traced to China's late reports about SARS' outbreak, yet there seem to be a need for some sort of high road between the over inclusive definition that appears in IHR (2005) and the pandemic short list that appeared in its previous versions.

2.7. Conclusions

The revised IHR has provided a comprehensive basis for international collaboration during infectious disease crises. This is particularly relevant for timely exchange of information and risk communication. Nevertheless, many countries have not yet been able to achieve the core capacities required by the revised IHR. These deficiencies are exemplified on the international level, as well as on the national level, through the cooperation between different local agencies. This may require assistance from resource rich countries to those who possess fewer resources. The application of the IHR in the 2009 H1N1 influenza outbreak, illustrated some of the deficiencies in the implementation of the IHR. In the review of the core capacities required by the IHR, we identified the challenges in order to achieve these capacities. In the second part of our report, we'll focus on Israel as a case study in order to review to what extent the ideas that appear in the revised IHR 2005 were implemented in the case of the 2009 H1N1 influenza. The concept of WHO as a supranational health authority is still evolving.

3. COMMUNICATION AND INFECTIOUS DISEASE CRISES

3.1. Introduction

When the H1N1 pandemic emerged in 2009, the health organizations (e.g. WHO and CDC) did not have to operate in a vacuum. Previous health regulations and insights from previous influenza epidemics guided the risk management of the H1N1 influenza episode and the strategies used to communicate it to the public. All the procedures that were followed by the international health organizations (CDC and WHO) were documented in final reports summarizing their activity during the 2009 influenza outbreak.

In recent years governments and health organizations around the world have come to agree that the two conceptual strategies of risk communication and social marketing play a critical role in national programs to prevent and confront the disease of influenza (Allen Catellier & Yang, 2012; Lee & Kotler, 2011). These conceptual strategies are widely used in communication strategies and draft guidelines. In addition to those two conceptual strategies, the literature has shifted in recent years to the study of two-way communication strategies, which take feedback from the public into consideration, rather than one-way communication, in which information flows from "top to bottom," directly from the addresser to the public.

This chapter presents a systematic review of the CDC and WHO reports and regulations for communicating the 2009 H1N1 influenza. We also review these reports in comparison to previous procedures that were followed in 2005. We wish to compare between the theoretical dimensions that were in use in 2005 and those used to 2009..

Our objective was to review to what extent the WHO and CDC reports addressed the issue of health communication strategies, such as risk communication, social marketing and one-way versus two-way flow of communication. We examined how these ideas appeared in the reports and how they were actually implemented in the case of the 2009 H1N1 epidemic, according to what the international organizations reported. We completed our analysis with an empirical case study of Israel, in order to examine how the instructions and theories were implemented in the member states. Despite the fact that Israel is a country with specific characteristics, we can learn from this case study how the theory was implemented.

3.2. Methods

For the first part of this study, reports were collected in October 2012 using the search engines of the WHO and CDC websites. We also used Google Scholar, searching for the keywords "communication" and "risk communication." Fifteen reports were located.

The analysis contained two steps. Firstly, we divided the reports into 2005 and 2009. Three of them were from 2005 while the other 12 were from 2009. Then we reviewed the reports by subject: coordination, and three communication strategies: risk communication, social marketing and one-way versus two-way flow of communication. Finally we made a comparison between 2005 and 2009. We analyzed each communication strategy according to the different theoretical dimensions, as will be explained below. We were specifically interested in whether lessons from 2005 were implemented in the communication strategies of 2009. We were also interested to find out whether subjects that appeared in 2005 were also common in 2009. We

were particularly interested in seeing whether responses changed as a result of the Severe Acute Respiratory Syndrome (SARS) epidemic.

In the last stage we conducted 73 semi-structured interviews in Israel. Eight of them were with policy makers and the other interviews were with stakeholders – five journalists from Israel's biggest news media corporations, 11 health bloggers and 49 healthcare workers (25 nurses and 24 medics). The aim of the interviews was to find out how the communication strategies and theoretical dimensions from the reports were implemented in the field, using Israel as a case study. The interview guidelines included questions regarding attitudes towards the epidemic and the vaccine, barriers, trust, empowerment, responsibility and communication.

Table 1: The two steps of the analysis

	What we compared
First Step	A comparison between the coordination and three communication strategies, including their theoretical dimensions, in 2005 and 2009.
Second Step	A comparison between the guidelines in the reports according to the theoretical dimensions and the Israeli case study

3.3. Findings

3.3.1. Communication and coordination between organizations and governments

The analysis focused on the organizations' communication strategies. However, one of the themes that emerged from the reports was the strong emphasis on risk management of the epidemic and the vaccine and coordination between the international organizations and the member states. While risk management and coordination issues filled a large part of the reports, there was very little reference to communication strategies.

In 2005 the International Health Regulations (IHR) were enacted and came into force in 2007, in order to ensure competent surveillance and detection systems to monitor the emergence of epidemic outbreaks in the world. These regulations specified to member states how and when to report on new cases of influenza, monitor the spread of the disease and coordinate between the international health organizations and the member states (Katz, 2009).

Both in 2005 and 2009 the international health organizations instructed the member states to report on any change in morbidity that could signal the emergence of an epidemic in certain areas. The member states were required to establish a national IHR focal point for communication with WHO, meet core capacity requirements for disease surveillance, inform WHO of any incident and respond to additional requests for information by WHO. The important theme that emerges from analyzing these instructions is that emphasis was more on the issue of time than on the process of providing the information. Instructions were given on the importance of providing the information in a timely manner, as fast as possible. However, instructions on how to pass on the information between the international health organizations and the member states were not evident.

Despite the international regulations and instructions, we found in the reports that the member states received few specific instructions on how to fulfill those regulations. It appears that the communication and coordination between the international health organizations and the member states was "top-down" – from the organizations to the member states. It was not "bottom-up," allowing the member states not just to pass on reports about the emergence of the epidemic, but also to give feedback. In addition, there was no segmentation between the member states – all received the same instructions and regulations.

The lack of specific instructions for different member states emerged also from the interviews we conducted with policy makers in Israel. A senior health official explained that the decision of who would communicate the features of the epidemic and need for the vaccine to the public and which instructions would be given was made by the Israeli Ministry of Health, without any instructions or intervention from WHO: *"There were no [instructions from WHO]... They [the Ministry of Health] controlled the guidelines... one of the senior officials at the Ministry of Health instructed them."* Another senior health official added: *"There were many recommendations from international organizations that were sent to all [the member states]... It wasn't specific to Israel... It was mainly about epidemiological issues... not how to communicate."*

3.3.2. Risk Communication

The risk communication approach to emerging infectious disease (EID) draws on the theoretical concepts of health promotion communication, crisis communication and environmental or technological risk communication. The risk perception of a flu epidemic and vaccine is related to the theoretical dimensions of trust, empowerment and uncertainty. All these theoretical dimensions will be explained and discussed in the chapter below.

3.3.2.1. Maintaining trust among governments and stakeholders

Trust is an important factor of risk communication, especially on health issues. The literature shows that without trust in the organization that wants to promote the healthy behavior, in this case the influenza vaccine, it will not be adopted by the public and other stakeholders who are part of the process (Allen Catellier & Yang, 2012; Cvetkovich & Lofstedt, 1999; Earle & Cvetkovich, 1995; Lofstedt, 2005). Therefore, it is important to conduct evaluation studies in order to understand whether trust was achieved.

One of the aims that the international organizations set upon the outbreak of the 2009 epidemic was to establish trust with the public and the other stakeholders. The CDC reports from 2009 indicate that communication strategies to establish trust were implemented in the procedures. During the early days of the outbreak, and even afterwards, the release of information was fast, on a 24-hour cycle, with frequent updates by the consistent use of a core group of spokespersons. The declared goal was not only the need to be as transparent as possible, but also to maintain credibility and be a trusted source of information for the public and the member states (CDC, 2011a). However, it is important to stress that since no evaluation studies or other public/healthcare workers' opinion studies were conducted, we could not find out whether this goal was achieved.

While the important matter is the lack of evaluation studies, it emerged also from the interviews that we conducted, that the international organizations were considered a trustworthy source of information by Israeli policy makers, healthcare workers and the media. However, it is important to keep in mind that these interviews reflect only an Israeli case study, and should not be generalized to other member states. The policy makers mentioned that every instruction the WHO gave the member states was followed unequivocally. Questions may have emerged from time to time, but they were mostly about the clarification of processes and not expressions of distrust, as a senior health official explained: *"We had direct contact with the WHO... We followed the instructions of the WHO and the CDC."* .

Healthcare workers and journalists also expressed trust in the international organizations. Medics and senior nurses used WHO and CDC publications as sources of information for treating patients, alongside the local publications of the Israeli Ministry of Health, which will be discussed below: *"We could find information in the World Health Organization"* (a medic); *"The quoting of external sources like CDC and WHO... It's correct and valid... It adds a dimension of validity... The CDC updated its information daily* (a medic)*; "I used the CDC website a lot"* (a senior nurse). Most of the journalists stated that the international websites were a major source of information, while the bloggers specifically relied on them.

While we did not interview members of the general Israeli public, the sense of trust in the international organizations reflected a differentiation between them and the local health organizations. While the international organizations maintained high levels of trust among the interviewees, a different picture emerged when discussing the Israeli Ministry of Health. While a high number of medics expressed trust in the Ministry of Health, few nurses and journalists expressed distrust on some issues. A senior nurse explained that the Ministry of Health was perceived as a political organization motivated by political interests and not the public good

Another salient theme of distrust that emerged from the interviews referred to a possible conflict of interests the health organizations had in relation to the vaccine. The interviewees claimed that there were strong suspicions that the pharmaceutical companies affect the health organizations' decision to buy vaccines. The major fear that the interviewees represented was that the international health organization' assessments were not based solely on epidemiological data, but on commercial interests.

A health journalist explained that this could reduce the public's faith in the Ministry of Health: *"There was a sense of conspiracy... some people thought that the vaccines were not needed and had been bought for no reason."* This matter did not only compromise trust in the local health organization, but also in the international organizations. However, mistrust of the international organizations focused only on that issue and was not general.

3.3.3. Empowerment of the public

In this chapter, we discuss the differences between empowerment of the public to make decisions about risks for itself and the authorities' exercise of power (Covello, Peters, Wojtecki, & Hyde, 2001). While empowerment plays a key role in communicating health issues, it received little attention as a communication strategy in the influenza reports we analyzed before 2009. The declared goal of the reports in 2005 was to help the public manage its expectations. It was clear that the public needed information to inform its own decisions about vaccination and to know the reasons for the vaccine not being generally available. In order to identify the public's concerns , focus groups were created (NHS, 2005b). However, we are unable to report exactly what was learned from those focus groups, as we could not locate more information about them in the reports. Another question was the timing issue of matching vaccine availability with perceived public needs.

In the reports from 2009, we did not find explicit references to empowerment as a stated goal. Most of the instructions concerned "providing information" and "delivering it to households" (CDC, 2011b, p. 4). As in 2005, the focus was to pass the information to the public as quickly as possible. However, the goal of passing the information focused on knowledge and not an empowering the public. We could not find explicit references to focus groups or even surveys that could help the organizations know on which issues the public needed empowerment.

A group that can play a key role in empowering the public during an epidemic outbreak is the healthcare workers, especial primary care providers (CDC, 2011a, 2011b). The healthcare workers mediate the health instructions to the public and can adapt the treatment and message to their needs. However, there are reports in the literature that while healthcare workers can help mediate the message for the public to comply with the instructions, not all of them are competent to do so (Lasser et al., 2008; Maurer & Harris, 2010). Therefore, it was important to identify the instructions that were given to healthcare workers.

It appeared, both in 2005 and 2009, that the instructions for healthcare workers were mainly procedural, with little consideration of communicating the disease and the vaccine to the public. Healthcare workers received instructions regarding who to vaccinate, when, and how the vaccine works (CDC, 2011a, 2011b). They did not receive instructions on how to contend with fears, questions, and skepticism.

This point also emerged from the interviews we conducted with Israeli healthcare workers. While most of them showed a high degree of knowledge of the instructions, who needed to be vaccinated according to the health organizations, and how to do it, they claimed that they received no guidance on how to communicate the vaccine. A nurse explained that the general impression was that the public should be forced to take the vaccine and that this process lacked active communication: *"In our meetings... we were instructed on how to behave when a patient comes in..."* Other nurses added: *"We had a written procedure... what we needed to know, who would get it... we did not know how to get to people" (a senior nurse). "We were instructed that we should vaccinate and that's it, goodbye" (a nurse). "We received instructions from above and nothing more" (a nurse). "There were just general instructions" (a senior nurse).* The same picture appeared also with the medics: *"We received only general instructions on how to treat patients... we did not get instructions about communicating the vaccine" (a medic). "We dealt mainly with... who needs to get a vaccine and at what age... not communication"* (a medic).

3.3.4. Facing situations of uncertainty and giving answers to the "unknowns"

The 2009 H1N1 pandemic flu created a situation of uncertainty. Unpredictability as to the development of a pandemic creates a situation of uncertain risk which needs to be communicated to the public. It is necessary to inform the public not only about the conditions of uncertainty but also when, why and under what circumstances they occur (Frewer, 2004; Frewer et al., 2003; Mebane, Temin, & Parvanta, 2003; Rudd, Comings, & Hyde, 2003). Two questions related to uncertainty were addressed by the international health organizations in the 2009 reports (CDC, 2011b; WHO, 2009). One related to the epidemic and the other to the vaccine, both of which were new in 2009. We learned from the reports that uncertainty over both the epidemic and the vaccine were being dealt with together.

In 2005, the international organizations tried to plan in advance how to confront and communicate future influenza pandemics (NHS, 2005a, 2005b) The assumptions were that susceptibility to the pandemic influenza subtype would be universal, the clinical disease attack rate would be high and so would the number of hospitalizations and deaths. Other assumptions related to the duration of the pandemic, secondary infections and risk groups, and fatal infections (NHS, 2005a). Based on these assumptions, the international health organizations had to decide how to communicate the 2009 H1N1 epidemic to the governments and the public, when its severity was not yet known.

Another aspect of uncertainty that appears in the reports refers to the vaccine itself. Many questions were raised regarding the safety of the vaccine and its ability to prevent the disease. This also caused a large part of the public not to get vaccinated. Other uncertainties related to the vaccine included availability, safety, efficacy and priority group distribution. We checked whether the organizations dealt with the matter of uncertainty.

The international organizations argued that the emergence of the 2009 epidemic presented many communication challenges. The international organizations reported that *"the emergence of a novel pandemic H1N1 (pH1N1) influenza strain presented many communication challenges for public health officials. There were 'unknowns' about the disease, such as severity and spread, during the initial stages"* (CDC, 2011b, p. 1). The 2009 reports argued that communication routes were pre-established in order to cope with the uncertainty and to pass the information in a timely manner to the member states and the governments. This was the solution that the international organizations applied to confront issues of uncertainty. The conclusion that appeared in the reports was that despite the uncertainty that characterized the early stages of the epidemic, the system responded fast to solve those issues. This solution was found to be useful to deal with uncertainties until the epidemic progressed and more facts were known (CDC, 2011b). While this reflects reference to the matter of uncertainty, the theoretical dimension and recommendations available in the literature were not implemented in the communication strategy.

In the interviews we conducted in the Israeli case study, it emerged that the issue of uncertainty bothered the policy makers for the whole period of the influenza. Among the policy makers, the theme that emerged focused on the vaccine itself and not the epidemic in general. An Israeli policy maker explained that in the first stages of the disease, when important decisions (e.g. buying the vaccine) needed to be made, few answers were received from the international health organizations: *"One of the central dilemmas was what was going to happen. We were in a serious condition of uncertainty and the dilemma... was how much to*

invest in this uncertainty... and how to move forward." Another health official added that while the WHO recommended the vaccine, there was still information missing: *"We knew what other countries were doing and what the WHO recommended... there were moments that we felt that we were going to miss the train and there would be a shortage of vaccines."*

Among the healthcare workers we identified two groups. The first group consisted of healthcare workers who followed the instructions regarding the epidemic and the vaccine, without being bothered by uncertainties. This group included most of the medics and some of the nurses. However, the important group was the second one, which followed the health organizations' instructions with a feeling of ambivalence, as they felt many questions had been left unanswered. *"On the one hand, we received instructions to vaccinate people, but we still had questions about this process... there were many unknowns... how could I vaccinate someone and convince him when I myself had doubts?"* asked a nurse.

3.3.5. Communicating the vaccine as the only option or providing information on other alternatives?

In this chapter we examined the communication process for the prevention of the H1N1 influenza in 2009. We checked whether the vaccine was the only option recommended by the international organizations or whether other alternatives were presented with full information. It must be stressed that we did not deal with the epidemiological question whether the alternatives were a good solution or not. In this report we deal only with the question of communicating them.

The reports did not ask this question specifically, but rather we posed it ourselves. We found that this question could not be fully answered by the reports we examined. However, we can assume that the vaccine was presented as the only option. We are basing this assumption on several factors. First, the reports we analyzed referred frequently to the knowledge that the public, healthcare workers and others had about the vaccine. In addition, we found few references to other solutions, besides medications for people who already suffered from influenza symptoms (CDC, 2011b).

Further support can be gathered from the interviews we conducted with Israeli healthcare workers and policy makers. They argued that a large part of the guidance they received was about the importance of the vaccine: *"Most of the time in the teaching session they talked about the vaccine"* (a nurse)*. "We received some instructions about how not to infect others, not to sneeze on your hand, but it was not presented as a solution"* (a nurse). *"No alternative [solution] was presented"* (a medic)*. "The vaccine was the only relevant solution at that time" (*policy maker).

3.4. Social Marketing

The question of the epidemic and its vaccine connects to the field of social marketing, whose purpose is to change the habits, behaviors and lifestyles of various target audiences. Social marketing deals with barriers that the public has when trying to adopt a new behavior, such as compliance with the influenza vaccine (Lee & Kotler, 2011). Those barriers relate to subjects that were discussed above (e.g. mistrust). This chapter will discuss the theoretical dimensions that can help lower those barriers: stakeholder inclusion, identification of subpopulations and segmentation.

3.4.1. Stakeholder inclusion

The question of inclusion relates to the part stakeholders, such as healthcare workers, communication experts and the public itself, play in communicating the health messages (Duffy & Thorson, 2009; Holmes, Henrich, Hancock, & Lestou, 2009; Kotalik, 2005; Uscher-Pines, Chernak, Alles, & Links, 2007). We examined what part these stakeholders took in communicating the message of the epidemic and the vaccine. While it must be noted that healthcare workers are not a homogeneous group within or between different countries, it is important to understand their potential role in the communication process.

As mentioned in the chapter on risk communication, there was no reference to public inclusion in the reports for 2009 that can teach us about this process, unlike 2005, when focus groups were conducted. The CDC sometimes conducted polls in order to make sure that the messages were clear, but no inclusion methods were mentioned (CDC, 2011b). Both in 2005 and 2009 healthcare workers played the greatest part of the three groups of stakeholders. However, even their part was small. The process in 2009 was similar to what the reports from 2005 revealed. It was based on the assumption that healthcare providers obtain information from a variety of sources including their regional public health unit, provincial health organization and professional associations. The process of developing influenza epidemic plans necessitated conversations and collaboration with healthcare workers.

However, from an analysis of WHO and CDC reports, while most of the communication routes were pre-established and allowed for the rapid exchange of information between key partners during the epidemic, there was little inclusion during the development of those communication routes. After the communication routes were established, there was little further collaboration with healthcare workers. After the first wave of passing information to the healthcare workers, an evaluation process was initiated in order to understand their attitudes. Based on this evaluation, some programs were changed and others were created, as can be seen from the following quote:

> "Frontline care providers were another group that found the pandemic plan insufficient in the first wave of the pandemic. They requested that information applicable to primary care settings be disseminated in a timely manner. After the first wave... collaborated with family physicians to develop 'Pandemic H1N1: Fast Facts for Front-line Clinicians,' which frontline health-care workers found helpful" (CDC, 2011b, p. 3).

As mentioned in the risk communication chapter, even these programs were apparently not sufficient, while even the international organizations reported conflicting results regarding healthcare worker participation (CDC, 2011b).

In the interviews we conducted in Israel, the general image that the healthcare workers presented was quite similar. They argued that there were inclusion processes, but they did not always find them helpful. When asked whether they were included and consulted on how to communicate the epidemic and the vaccine to the public, a great many of them answered in the affirmative. They reported staff meetings and other conversations in which they were asked for their ideas. However, they claimed that they could not identify any change. A nurse explained: *"We had meetings every once in a while... They presented what they knew and what the procedures were... They asked if we thought that things should be changed... There was discussion and some argued and provided other suggestions... Most of the time, we had the notion that we still didn't have the full picture... Afterwards... I had no clue what they did with it."*

Designing communication strategies for promoting the epidemic and the vaccine requires expertise in communication. A part of the communication process is working with the media, which is an important channel of communication between the organizations and the other stakeholders. Therefore, we checked the reports for consultations with communication experts, such as journalists, bloggers and others. Consultations with communication experts regarding the design of the communication strategies were found in the reports.

In the interviews we conducted, the Israeli journalists, and especially the bloggers, expressed their need for participation in the process. Most of them agreed that because they played a key role in passing on the message, they could make an important contribution to the process, as explained a health journalist: *"If you allow the media people to participate... and explain and hear... no one will say that they don't care about public health... We need to work together, to think together, how to pass the information on to the public... We can represent our side in the process, which is important."* While the journalists had some cooperation from the local Israeli organizations, bloggers argued they were completely left out: *"We had only the press releases from the website [of the Ministry of Health]... We didn't work at all with Israeli sources. Just from abroad... We sometimes needed to, but had no address"* (an Israeli health blogger)*.* A minority of the journalists argued that they should not have been involved in designing the messages, out of the fear that their function as "democracy's watchdogs" would be compromised.

3.4.2. Identification of subpopulations and risk groups

Vaccination and communication strategies need to be based on a clear delineation of the goal - e.g. limiting the spread of the disease or trying to prevent individual cases, a public health or a clinical outcome. The goal must be stated at the beginning, while the other steps derive from this goal. However, we couldn't find in the reports a clear-cut goal that defined the other stages in the process, but rather general goals about preventing the pandemic.

One of the subjects that is supposed to be the second step, after defining the general goal, is identifying risk groups. Identification of subpopulations and risk groups was very clear, in both the 2005 and 2009 influenza reports. Subpopulation refers to any part of the general public that should get different treatment because of a variety of reasons, such as language, cultural diversity and others. The people in these groups are not necessarily in risk groups. They are just members of groups that need special attention from the authorities. Some of these subpopulations are risk groups (e.g. pregnant women, children). The distinction between risk groups and other subpopulations is that the international health organizations recommend risk groups be advised more than others to take the vaccine. As part of the risk assessment, risk groups were identified. Identifying risk groups with incomplete information in an atmosphere of uncertainty, a situation that characterized the early stages of the influenza outbreak, is bound to result in some degree of poor decision making.

It appeared from the reports of 2005 and 2009 that subpopulations and risk groups were targeted. Among different subpopulations that are mentioned in the various reports we could find school children, children in daycare, homeless people in shelters and even cultural communities (e.g. aboriginal). However, it was not always reported how those subpopulations were determined. One of the strategies that were mentioned was holding information sessions with local community partners and cultural organizations in

order to identify these groups (CDC, 2011b). However, on the international level it was almost impossible to identify other strategies. The risk groups, however, that were advised to get the vaccination, were identified easily in the reports (WHO, 2009).

3.4.3. Segmentation: choosing the channels and tailoring the messages

Identification of the subpopulations and risk groups is only the first part of the broader process of segmentation, adapting the channels of communication and specific messages that suit these groups' attitudes and needs. As we describe in more detail below, we found the process of segmentation in 2005 and in 2009 quite partial. The identification of subpopulations and risk groups, as described above, was not fully documented. The segmentation of channels, as will be explained below, used a variety of communication options, but focused on the broad selection of channels and less on how they were used. There was little evidence of segmentation of the message in the reports, mainly with general claims about "message targeting." We will now describe each of the segmentation steps, while explaining the meaning of channels and messages.

As mentioned before, another part of the segmentation process is adopting the communication channels that fit the subpopulations' needs and attitudes. In that respect, we found the discussion about communication channels as part of the segmentation process to be richer in 2009 than in 2005. In 2005, perhaps because initially the epidemic was not considered dangerous, or because there were less media channels than today, the subject of channels of communication for specific subpopulations was merely discussed (NHS, 2005a).

In the reports for 2009 there was an extensive discussion about this subject. There is extensive reporting of the use of different channels of communication, from television to the web, in order to communicate with every group of the public. Specific communities who needed cultural sensitivity were addressed by their special communication channels, such as public leaders and local newspapers (Brownstein, Freifeld, Lawrence, & Madoff, 2009; CDC, 2011b). Many examples are given in the reports for using various channels as part of the segmentation process. Some of them are worth mentioning: public leaders among aboriginal communities in Australia, local newspapers of culturally sensitive communities in Canada and even web-based tools and social media among young people around the world.

Despite the fact that we did not make a content analysis of the different channels, in the interviews we conducted in Israel it emerged that most of the channels that were chosen by the Israeli Ministry of Health were traditional mass media channels. One of the senior health officials explained the process of working with the traditional mass media channels: *"I took all the health journalists and vaccinated them... One of them even took a video of himself and broadcast it... We communicated with them regularly."*

The last and most important factor of segmentation refers to the messages themselves. Both in 2005 and 2009 the situation was similar. In this chapter we will differentiate between subpopulations and specific risk groups. In general, we have found very general instructions and reports about the segmentation of messages. The reports declare special populations that were targeted with specific prevention and control messages (CDC, 2011b), key messages that were provided to specific groups (CDC, 2011a), and the placement of articles geared to specific audiences (WHO, 2009). There was no discussion about the content of these messages and how they were designed. However, it appeared that the segmentation in messages

27

focused on subpopulations in general and not on specific risk groups. Very few examples were given of targeting messages to vulnerable groups in settings such as schools, daycare centers, universities and others. However, even in these cases there were no claims about designing the message.

3.5. Communication flow

The last part we examined in the reports was the implementation of the strategies mentioned above in the media. Here we focused on the use and content of mass media and new media in general and social media in particular. We checked whether the flow of information was one-way, from "top-down," or also considered feedback from the "bottom-up." We analyzed this theoretical dimension on four different levels. First, we checked the strategy of intimidation as part of a one-way flow of communication. Second, we examined the general use of the communication channels, while the third step focused on the variety of channels. In the fourth step we examined the contents of the reports and their sources.

3.5.1. Intimidation as a result of the media coverage, but not a strategy

In the face of uncertainty surrounding a health situation, the media sometimes uses a strategy of intimidating the public (Holmes, et al., 2009). This might be a result of messages designed by the health organizations who want to encourage the public to comply with the recommendations by presenting them with the possible detrimental results of not adopting the healthy behavior. It might also be a result of the media's tendency to sensationalize in the interest of viewership ratings.

The international health organizations declared clearly in the reports that the general aim was not to intimidate the public (CDC, 2011a, 2011b; WHO, 2009). Therefore, we cannot point to a strategy of intimidation. Mass messages focused on the importance of the vaccine and on recommended behaviors. However, we could not find in the reports the rationale that stood behind the messages, in order to ascertain whether they really were not part of an intimidation strategy. What we found was that the international organizations reported daily on the spread of the epidemic, including statistics about fatalities. This reporting cannot be considered a strategy of intimidation. It must be considered part the reporting process itself, as will be explained below.

In a content analysis of how the media covered the H1N1 epidemic around the world, 70% of the articles were found to be factual – providing facts and helpful information. The report came to the conclusion that proactive engagement with the media by international and national public health authorities resulted in factual, non-alarmist reporting of the first stages of the 2009 H1N1 epidemic (Duncan, 2009).

Was the media's reporting truly factual, and non-alarmist, in the Israeli case as well? While we did not conduct an empirical content analysis of the reports in Israel, we can talk about perceptions of two of the three parties in the reporting process: the policy makers, as one of the sources for the information, and the journalists, as the reporters to the public. Since we did not conduct interviews with the public, we cannot draw conclusions about its perceptions.

In the interviews we conducted with journalists from major media organizations in Israel , they expressed the perception that their coverage of the epidemic was always factual. They claimed they did not use intimidation as a strategy, but preferred to refer to "true human interest stories." By this definition, they referred to all the stories that dealt with people who might have died because of the virus. A journalist explained: *"We sometimes reported about people with masks, because it's interesting... It's journalism... Sometimes there were uncertainties and 'hysterics' that we reported, but it was pure facts about what had happened."* It is noteworthy that the bloggers claimed the journalists used a strategy of intimidation, while insisting that they reported factual information from different sources.

From the point of view of the policy makers, the journalists' reporting process was not always factual and was sometimes intimidating. One policy maker referred to the press releases that were sent to the media organizations every day: *"I once took a journalist and told him to take a random press release and to see what it said. He took one... He found a simple, two-line, quite informative press release, about a suspicious case of H1N1... I told him: 'Now, have a look at the report on this press release'... He took the headlines: 'Pandemic! Fear!' A full red page... I told him: 'Are we the ones making people hysterical or is it the media?'"* Therefore, we can conclude that if there was intimidation, it was a result of the media coverage, and not an intentional strategy by the international or national health organizations.

3.5.2. Focusing on the one-way flow of communication

Beside the question of the variety of communication channels available, there is the question of how they are being used. This is the question of one-way flow versus two-way flow of communication, which we posed and which did not appear in the reports. A one-way communication flow describes the process of passing information from the "top-down," directly from the addresser to the public, with little, if any, feedback. On the other hand, a two-way communication flow also considers the information that is being passed from the "bottom-up," such as feedback, worries, objections and problems (Sandman, 1994). While examining this theoretical dimension we checked whether the use of communication channels for risk communication focused more on providing the information or sharing it, and whether the new and social media focused on the feedback that these channels allow the public, or were being used merely as another channel for passing on information. It was important to analyze the flow of communication, due to the recommendations in the literature that suggests a shift from a one-way flow of communication, that had many disadvantages, to a more participatory two-way flow of communication.

From the first part of the report and the low level of participation, we could conclude that the focus was on a one-way flow of communication. From the point of view of media use, we believe the following paragraph represents how the international organizations perceived the communication flow – as one-way:

> *"CDC provided a steady stream of information to audiences across the spectrum: from the public to pharmacists to laboratory technicians to international partners and countries around the globe. Information provided by the CDC reached a myriad of audiences through a variety of channels including but not limited to: a 24-hour information hotline, press briefings for the media, dissemination through health alert networks, daily postings (including video and audio podcasts) to the CDC 2009 H1N1 web site, regular updates on Facebook and Twitter, and further outreach by partners and partner organizations to their own audiences, just to name a few channels"* (CDC, 2010, p. 1)*.*

Another part of the feedback that represented a two-way flow of communication that was not mentioned in the reports is how the international health organizations responded to discussions on social networks. In a previous report by the partners (Tell-Me, 2012), it was mentioned that discussion on Twitter and Facebook regarding the epidemic outbreak was lively, including 500 unofficial groups dedicated to this subject, with the largest one containing more than 10,000 users (CDC, 2009). This also emerged from the interviews we conducted, when journalists, bloggers and even healthcare workers reported many questions, intimidating stories and unchecked facts appearing on the web.

However, we could not locate in the reports how these were treated. In one report by the CDC, 16.2% of the YouTube videos on the web were classified as misleading. Themes in the misleading videos included anti-vaccination messages, conspiracy theories about man-made H1N1 virus, government propaganda and exaggerated H1N1 risks (CDC, 2011b). The answer to these was promoting CDC videos. It was not clear how, if ever, these videos responded to others which were marked as "misleading." In addition, we could not locate any reference to "non-official campaigns" that attacked the vaccine and other actions by the official organizations.

3.5.3. Variety of channels: Old paradigms

Another important aspect that we decided to analyze in this chapter is how the international health organizations (WHO, CDC) used the different communication and media channels. In this chapter we examined the extent of the type of channels used, but not how they were used. During previous epidemics, the health organizations used only a small number of traditional mass media communication channels. In 2009, it appears from the reports that there was much more diversity in media channels. Alongside the traditional mass media channels, there was also wide use of new and social media. The international organizations regularly updated websites with the latest information on the epidemic, as well as their Facebook and Twitter accounts. However, it seems that not all the member states used these media channels on the national level.

In the interviews we conducted in Israel, it appeared that while the use of traditional mass communication channels was high, other options were barely used. Journalists and bloggers argued that the official Israel Ministry of Health website was not updated regularly. If information was not provided by the policy makers themselves, it could not be accessed through Israeli sources – only international ones. In addition, Twitter and Facebook were not used to convey information.[1]

3.5.4. Main sources of information in the media

The international health organizations asked who the main people or sources were that provided information to the public through the media channels. A simple content analysis of the coverage of the epidemic found that 28% of the articles mentioned WHO as a main source of information, while another 24% quoted national health organizations as main sources. This adds up to 52% of the articles dealing with official sources (Duncan, 2009).

---

[1] The Israeli Ministry of Health's Facebook account was opened in January 2012.

In the Israeli case, it was mentioned before that bloggers did not have access to official Israeli policy makers as a source of information. According to them, the only available option was to use the Israeli Ministry of Health website – but it was not updated regularly. Therefore, in order to get information from official sources, they had to use the international organizations' official websites, which they found helpful. Journalists used the Ministry of Health spokespersons, the international organizations and other officials from the hospitals and health funds. Other sources were families of fatalities.

Table 2: Summary of findings: Theoretical dimensions and their implications in the 2005 and 2009 reports.

Theoretical dimension	The 2005 reports	The 2009 reports
Communication & Coordination	IHR were regulated. High emphasis on risk management, less on communication. The focus is on coordination at international level.	High emphasis on risk management, less on communication. The focus is on coordination at international level.
Risk Communication		
Trust	Trust was defined as an important factor. Trust was achieved by providing information in a timely manner.	Trust was defined as an important factor. Trust was achieved by providing information in a timely manner.
Empowerment	Empowerment of the public received little attention. Focus groups were used, but little details are given about them.	Empowerment receives very little attention. The focus is on "delivering information." The instructions for healthcare workers were only procedural and did not deal with how to empower the public.
Uncertainty	Planning in advance to confront some assumptions regarding the epidemic and the vaccine.	The international organizations did not deal with situations of uncertainty, besides providing new information as fast as possible.
Communicating the vaccine	The vaccine was communicated as the only option.	The vaccine was communicated as the only option.
Social Marketing		
Inclusion	Healthcare workers were partly included, but we found no evidence for the inclusion of the public and communication experts.	Healthcare workers were partly included, but we found no evidence for the inclusion of the public and communication experts.

Theoretical dimension	The 2005 reports	The 2009 reports
Identification of subpopulations and risk groups	Identified and reported.	Identified and reported.
Segmentation	Despite the identification of subpopulations, there was little information about communication channels and tailoring.	Various channels were segmented in order to address subpopulations, but not all risk groups. The messages were tailored only partly to specific groups.
Communication Flow		
Intimidation as a result	-	70% of the content in the media was factual and non-alarmist.
One-way flow of communication	-	The focus was on providing a steady stream of information from "top-down" with little consideration of feedback.
Diversity of channels	-	Various channels were used, but in a one-way flow of communication
Main sources	-	52% of the sources in the media were health officials from the international and national organizations.

Table 3: Summary of findings: The theoretical dimensions mentioned in table 2 compared to their implication in the Israeli case study.

Theoretical dimension	The Israeli case study
Communication & Coordination	A lack of specific instructions at local level.
Risk Communication	
Trust	The international organizations were perceived as trustworthy most of the time by all of the interviewees. The interviewees argued that there was a possible conflict of interests.
Empowerment	Healthcare workers had no instructions about how to communicate the epidemic to the public and deal with fears and worries.
Uncertainty	Policy makers argued that some dilemmas regarding the vaccine remained unsolved at the beginning.
Communicating the vaccine	Healthcare workers perceived the vaccine as the only option.
Social Marketing	
Inclusion	Healthcare workers in Israel argued that some inclusion steps were taken, but they did not feel fully included.
Identification of subpopulations and risk groups	-
Segmentation	The focus was on mass media and general messages.
Communication Flow	

Theoretical dimension	The Israeli case study
Intimidation as a result	Policy makers and bloggers found the media coverage intimidating. Journalists thought that the media coverage was informative.
One-way flow of communication	-
Diversity of channels	-
Main sources	While journalists had the policy makers as sources, the bloggers argued that they used only the international organizations' websites.

4. DISCUSSION

In this chapter we presented a systematic review of reports written by WHO and CDC discussing the communication of the H1N1 2009 influenza. Our objective was to review how much of the international health organizations' reports were devoted to key health communication strategies. We gave special attention to four common strategies known in the literature: coordination and communication between organizations and governments, risk communication, social marketing and one-way versus two-way flow of communication. We analyzed the reports on two levels. First with a comparison between 2005 and 2009, and then with an empirical case study of Israel, using semi-structured interviews with 73 policy makers, healthcare workers and journalists.

According to the objectives above, we can divide our main findings into four categories. As a result of the IHR that were enacted in 2005, the international organizations gave special attention to the matter of coordination and communication between them and the member states. This subject received special attention in the reports, which provided instructions on how to use specific update and monitoring channels. However, it seems that while these channels worked on the international level, some more specific instructions and guidance were needed on the national level. The instructions were mostly "top-down," with little attention devoted to their implementation in individual member states. The states did not receive feedback from the organizations on their concerns regarding lack of information or misunderstandings and adaptations required at the local level.

In the section on risk communication, we examined the reference and implementation of four theoretical dimensions: trust, empowerment, uncertainty and communicating the vaccine as the only option among other solutions. The international organizations declared that maintaining trust was one of their primary objectives. Regular updates were given and credible sources were used in order to achieve this goal. The credibility and trust of the international organizations and national governments were not documented in the reports we reviewed. However, in the interviews we conducted we found some doubt on this question, specifically perceptions of gaps between the stated policy and the procedures that were actually followed. Special attention was given to a possible conflict of interests regarding the promotion of the vaccine. In addition, the interviews revealed possible gaps between the trust in the international organizations compared to the national governments. Regarding the theoretical dimension of empowerment, it seemed that it received more attention in 2005 than in 2009. Uncertainty and communicating the vaccine compared to other solutions were subjects that rarely appeared in the reports. While the international organizations were aware of the lack of information and "unknowns," the only declared solution was based on timing – providing the information fast. In addition, we could not find any other solutions to the influenza that were communicated, besides the vaccine, which received special attention.

In the section on social marketing, we examined the reference and implementation of two main theoretical concepts: the inclusion of stakeholders and the segmentation process, including the identification of subpopulations and risk groups, using communication channels and tailoring risk messages. While the inclusion of the public and communication experts received no attention in the reports, we found that healthcare

workers were included in some of the stages. However, it seemed that the inclusion of healthcare workers occurred only in some of the member states and on a limited level, as emerged from the interviews we conducted with the Israeli healthcare workers. Regarding the segmentation process, it was clear from the reports that the emphasis was on communication channels – where to address subpopulations and risk groups. The international organizations showed a varied use of different communication channels, from mass media to new and social media. However, we found little attention to tailoring messages to specific risk groups, as the interviewees in our empirical analysis sometimes noted.

Last, in the section on one-way versus two-way flow of communication, we examined the reference and implementation of three theoretical dimensions: the use of intimidation in the media, the flow of communication in the various communication channels and the identity of the main sources that appeared in the media. The stated policy in the international organizations' reports was not to use a strategy of intimidation, but to provide useful and factual information. However, in the interviews we conducted, the policy makers and some of the bloggers perceived the Israeli media reports as intimidating. It must be noted that it does not mean that the organizations used a strategy of intimidation, but that the coverage itself was perceived as intimidating. In addition, even when a number of communication channels were used, most of the information flow was one-way, with a focus on providing information to the masses in diverse channels, and little consideration to feedback from the "bottom-up." This is true also concerning the international organizations' contention with informal anti-vaccination campaigns. Little consideration was given to these campaigns, which came from the "bottom up," while the official information stayed the same.

In the comparison between the reports from 2005 and 2009, we found very little change in the perceptions and implementation of theoretical dimensions. There was greater use of diverse communication channels, but this can be a result of the emergence of new media. The perception of a one-way flow of communicated still dominated their use, as they were new evolvements of mass media.

Another gap that was found was between the instructions and guidance on the international level and their implementation in the member states. While the instructions were often perceived as very clear on the international level, the case study of Israel taught us that this was not always the case at the local level. It is important to stress that one of the main conclusions from the current analysis is that WHO and CDC's recommendations regarding communication strategies were not always based on evidence and evaluation studies, and therefore were not always valid.

5. CONCLUSIONS

The current chapter leads us to four main conclusions and recommendations. The first recommendation relates to the necessity of establishing the goal of the vaccination program as the first essential step in formulating effective communication strategies in order to clarify that the vaccination program has two main purposes one for protecting the individual and one for protecting the public. As in many cases, the first step defines the strategy that is needed in order to define and follow the other steps.

The second refers to the importance of using the most up-to-date theoretical literature and theoretical dimensions in planning communication strategies. These theoretical dimensions should be transformed to practical applications and implemented in different programs. We refer to theoretical dimensions that received little attention in the reports, such as uncertainty, empowerment, two-way flow of communication and others.

The third conclusion relates to the gap between the instructions on the international level and their implementation in the member states. While many instructions and theoretical dimensions were successful on the international level, the Israeli case study suggests that sometimes the diffusion to the member states was incomplete. Therefore, in future epidemics, it is recommended not just to give general instructions on building local guidelines, but to be more involved in their implementation.

The last conclusion refers to the flow of communication as part of the strategy. Most of the communication process that was found in the reports, both between the international organizations and the member states and between them and the healthcare workers and the public, was one-way. This occurred even though diverse communication channels were used, including new and social media that opened new opportunities for communicating feedback "from the bottom up." Therefore, it is recommended to give more emphasis to the two-way flow of communication and its value in informing communication strategies.

REFERENCES

Aldis, W. (2008). Health security as a public health concept: a critical analysis. *Health Policy and Planning*, 23, 369-375.

Allen Catellier, J. R., & Yang, Z. J. (2012). Trust and affect: how do they impact risk information seeking in a health context? *Journal of Risk Research*, 1-15. doi: 10.1080/13669877.2012.686048

Andrus J. K., Aguilera X., Oliva O., & Aldighieri S. (2010). Global health security and the International Health Regulations. *BMC Public Health*. Dec 3;10 Suppl 1:S2.

Anema, A., Druyts, E., Hollmeyer, H. G., Hardiman, M. C., & Wilson, K. (2012). Descriptive review and evaluation of the functioning of the International Health Regulations (IHR) Annex 2. Globalization and Health.

Azziz-Baumgartner, E., Smith, N., Gonzalez-Alvarez, R., Daves, S., Layton, M., Linares, N. (2009). National pandemic influenza preparedness planning. *Influenza and Other Resipatory Viruses*, 3, 189-196.

Baker, M. G., & Fidler, D. P. (2006). Global public health surveillance under new international health regulations. *Emerging Infectious Diseases*, 12(*7*), 2006.

Bell, D. M., Weisfuse, I. B., Hernandez-Avila, M., del Rio, C., Bustamante, X., & Rodier, G. (2009). Pandemic influenza as 21st century urban public health crisis. *Emerging Infectious Diseases*, 15 (*12*), 1963-1969.

Bhattacharya, D. (2007). An exploration of conceptual and temporal fallacies in International Health Law and promotion of global public health preparedness. *Journal of Law, Medicine & Ethics*, 35(4), 588-598.

Briand S, Mounts A, Chamberland M. (2011). Challenges of global surveillance during an influenza pandemic. *Public Health*. 125(5), 247-256.

Brownstein, J. S., Freifeld, B., Lawrence, C., & Madoff, M. D. (2009). Digital Disease Detection - Harnessing the Web for Public Health Surveillance. *The New England Journal of Medicine*, 360(*21*), 2153-2157.

Campbell, T. C., Hodanics, C. J., Babin, S. M., Poku, A. M., Wojcik, R. A., Skora, J. F., et al. (2012). Developing open source, self-contained disease surveillance software applications for use in resource-limited settings. *BMC Medical Informatics and Decision Making, 12:99* doi: 10.1186/1472-6947-12-99.

CDC. (2009). Symptoms of H1N1 (Swine Flu). Retrieved 11 December 2012, from http://www.youtube.com/watch?v=0wK1127fHQ4

CDC. (2010). *The 2009 H1N1 Pandemic: Summary Highlights*. Atlanta: CDC.

CDC. (2011a). *2009 H1N1 - Overview of a Pandemic*. Atlanta: CDC.

CDC. (2011b). *Communication Strategies for the 2009 Influenza A (H1N1) Pandemic*. Atlanta: CDC.

Chan, E. H., Brewer, T. F., Madoff, L. C., Pollack, M. P., Sonricker, A. L., Keller, M., et al. (2010). Global capacity for emerging infectious disease detection. *PNAS*, 107(*50*), 21701-21706.

Chretien, J., Yingst, S. L., Thompson, D. (2010). Building public health capacity in Afghanistan to implement the International Health Regulations: A role for security forces. Biosecurity and Bioterrorism: Biodefense Strategy, *Practice, and Science*, 8(*3*),277-285.

Covello, V. T., Peters, R. G., Wojtecki, J. G., & Hyde, R. C. (2001). Risk communication, the West Nile virus epidemic, and bioterrorism: responding to the communication challenges posed by the intentional or unintentional release of a pathogen in an urban setting. *Journal of Urban Health*, 78(*2*), 382-391.

Cvetkovich , G., & Lofstedt , R. E. (1999). *Social trust and the management of risk*. London: Earthscan Publications

Davies, S. E. (2012). The challenge to know and control: Disease outbreak surveillance and alerts in China and India. *Global Public Health*, 7(*7*), 695-716.

Davies, S. E., Youde, J., & Parker, R. (2012). The shared responsibility of disease surveillance. *Global Public Health: An international journal for research, policy and practice*, 7(*7*), 667-669.

Doshi, P. (2011).The elusive definition of pandemic influenza. Bull World Health Organ [online]. 2011, vol.89,n.7[cited 2013-03-10], pp. 532-538 . Available from: <http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0042-96862011000700014&lng=en&nrm=iso>. ISSN 0042-9686. http://dx.doi.org/10.2471/BLT.11.086173.

Duffy, M. E., & Thorson, E. (2009). *Emerging trends in the new media landscape. In J. C. Parker & E. Thorson (Eds.), Health communication in the new media landscape*. New York: New York: Springer Publishing Company.

Duncan, B. (2009). *How the media reported the first days of the pandemic (H1N1) 2009: Results of EU-wide media analysis*. Stockhold: ECDC.

Earle , T. C., & Cvetkovich , G. (1995). *Social trust: toward a cosmopolitan society.* Westport , CT: Praeger.

Edelstein, M., Heymann, D. L., Giesecke, J.,& Weiberg, J. (2012). Validity of International Health Regulations in reporting emerging infectious diseases. *Emerging Infectious Diseases*, 18(*7*), 1115-1120.

European Commission, Executive Agency for Health and Consumers. SHIPSAN TRAINET [cited 2012 May 1]. http://www.shipsan.eu/trainet/

Fidler, D. P. (2003). Emerging trends in International Law concerning global infectious disease control. *Emerging Infectious Diseases*, 9(*3*), 285-290.

Fidler, D. P., & Gostin, L. O. (2006). The new International Health Regulations: An historic development for International Law and Public Health. *Journal of Law, Medicine & Ethics,*34(1), 85-94.

Frewer, L. (2004). The public and effective risk communication. *Toxicology Letters*, 149, 391-397.

Frewer, L., Hunt, S., Brennan, M., Kuznesof, S., Ness, M., & Ritson, C. (2003). The views of scientific experts on how the public conceptualize uncertainty. *Journal of Risk Research*, 6, 75.

Gostin, L. O. (2004). Pandemic influenza: Public health preparedness for the next global health emergency. *The Journal of Law, Medicine & Ethics,* 32(4), 565-573.

Gresham, L., Ramlawi, A., Briski, J., Richardson, M., & Taylor, T. (2009). Trust across borders: Responding to 2009 H1N1 influenza in the Middle East. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 7 (*4*), 399-404.

Hardiman, M., C.,& Wilder-Smith, A. (2007). The revised International Health Resulations and their relevance to travel medicine. *Journal of Travel Medicine*, 14 (*3*), 141-144.

Hardiman M., C. (2012). World health organization department of global capacities, alert and response: World health organization perspective on implementation of International Health Regulations. *Emerg Infect Dis. 18(7)*, 1041-1046.

Heymann, D. L. (2006). SARS and emerging infectious diseases: A challenge to place global solidarity obove national sovereignty. *SARS and emerging infectious diseases*, 35(*5*), 350-354.

Hoffman, S. J. (2010). The evolution, etiology and eventualities of the global health security regime. *Health Policy and Planning*, 25, 510-522.

Holmes, B., Henrich, N., Hancock, S., & Lestou, V. (2009). Communicating with the public during health crises: experts' experiences and opinions. *Journal of Risk Research*, 12(*6*), 793-807. doi: 10.1080/13669870802648486

Hollmeyer, H., Hayden, F., Mounts, A., & Buchholz, U. (2012). Review: interventions to increase influenza vaccination among healthcare workers in hospitals. *Influenza and other Viruses* DOI: 10.1111/irv.12002.

Ijaz, K., Kasowski, E., Arthur, R. R., Angulo, F. J., & Dowell, S. F. (2012). International Health Regulations-what gets measured gets done. *Emerging Infectious Diseases*, 18(*7*), 1054-1057.

International Civil Aviation Organization. Cooperative Arrangement for The Prevention of Spread of Communicable Disease through Air Travel (CAPSCA) [cited 2012 May 1].http://www.capsca.org

Jin, J., & Karackattu, J. T. (2011). Infectious diseases and securitization: WHO's dilemma. *Biosecurity and Bioterrorism: Biodefense Strategy, Practive, and Science*, 9(*2*), 181-187.

Kant, L., & Krishnan, S. K. (2010). Information and communication technology in disease surveillance, India: A case study. BMC Public Health.

Katz, R. (2009). Use of revised international health regulations during influenza A (H1N1) epidemic, 2009. *Emerging Infectious Diseases*, 15(*8*), 1165-1170.

Katz, R., & Komblet, S. (2010). Comparative analysis of national legislation in support of the revised international health regulations: Potential models for implementation in the United States. *American Journal of Public Health*, 100 (*12*), 2347-2353.

Katz, R., Hate, Vibhuti, Komblet, S., & Fischer, J. E.(2012). Costing framework for International Health Regulations (2005), *Emerging Infectious Diseases*, 18(*7*), 1121-1127.

Kim, S, Y., Lee, Y., Myongsei, S., & Hahm, K. (2012). Developing a tool for assessing public health law in countries. *Asia Pacific Journal of Public Health*, 24(*5*), 867-871.

Kandun, I. N., Samaan, G., Santoso, H., Kushadiwijaya, H., Juwita, R., Mohadir, A., et al. (2010). Strengthening Indonesia's field epidemiology training programme to address International Health Regulations requirements. Bull World Health Organ [online]. 2010, vol.88, n.3 [cited 2013-03-10], pp. 211-215 . Available from: <http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0042-96862010000300015&lng=en&nrm=iso>. ISSN 0042-9686. http://dx.doi.org/10.1590/S0042-96862010000300015.

Kool, J. L., Paterson, B., Pavlin, B. I., Durrheim, D., Musto, J., & Kolbe, A. (2012). Pacific-wide simplified syndromic surveillance for early warning of outbreaks. *Global Public Health*, 7(7), 670-681.

Kotalik, J. (2005). Preparing for an influenza pandemic: Ethical issues. *Bioethics*, 19, 422-431.

Lee, N. R., & Kotler, P. (2011). *Social Marketing Influencing Nehaviors for Good* (Fourth Edition ed.). Thousand Oaks, California: SAGE Publications, Inc.

Leventhal, A., Ramlawi, A., Belbiesi, A., Sheikh, S., Haddadin, A., Husseini, S., et al. (2013). Enhanced surveillance for detection and management of infectious diseases: Regional collaboration in the Middle East. *Emerging Health Threats*, 6, 1-7.

Leitmeyer K. (2011). European risk assessment guidance for infectious diseases transmitted on Aircraft—the RAGIDA project. *Euro Surveill.* 16:pii=19845.

Lipsitch, M., Finelli, L., Heffeman, R. T., Leung, G. M., & Redd, S. R. (2011). Improving the evidence base for decision making during a pandemic: The example of 2009 influenza A/H1N1. *. Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 9(2), 89-115.

Lofstedt , R. E. (2005). Risk management in post-trust societies London: Palgrave Macmillan

Low, C. L., Chan., P. P., Cutter, J. L., Foong, B. H., James, L., & Ooi, P. L. (2010). International health regulations: Lessons from the influenza pandemic in Singapore. *Short Communication*, 39 (*4*), 325-327.

MacDonald, E., Aavitsland, P., Bitar, D., & Borgen, K. (2011). Detection of events of public health importance under the international health regulations: a toolkit to improve reporting of unusual events by frontline healthcare workers. BMC public health, 11(1), 1-9.

Martin, R., Conseil, A., Longstaff, A., Kodo, J., Siegert, J., Duguet, A. M., ... & Coker, R. (2010). Pandemic influenza control in Europe and the constraints resulting from incoherent public health laws. BMC Public Health, 10(1), 532.

May, L., Chretien, J., & Pavlin, J. A. (2009). Beyond traditional surveillance: applying syndromic surveillance to developing settings- opportunities and challenges. *BMC Public Health*, 9, 241-252.

McNabb, S. JN. (2010), Comprehensive effective and efficient global public health surveillance. *BMC Public Health*, 10(1), 53-60.

Mebane, F., Temin, S., & Parvanta, C. (2003). Communicating anthrax in 2001: A comparison of CDC information and print media accounts. *Journal of Health Communication*, 8, 50-82.

MEDIA CONSULTA International Holding AG. (2010). The Importance of Social Media during a Crisis. Report prepared for the European Commission's Directorate-General for Health and Consumers. Retrieved 07 May 2012 from http://ecdc.europa.eu/en/publications/Publications/101007%20Importance%20of%20Social%20Media%20for%20Member%20States_hm.pd

Moore, M., & Dausey, D. J. (2011). Response to the 200—H1N1 influenza pandemic in the Mekong Basin: surveys of country health leaders. [Electronic Version]. BMC Research Notes, retrieved December 01, 2012.

Najjar-Pellet, J., Machuron, J. L., Bougoudogo, F., Sakandé, J., Sow, I., Paquet, C., & Longuet, C. (2013). Clinical Laboratory Networks Contribute to Strengthening Disease Surveillance: The RESAOLAB Project in West Africa. *Emerging health threats journal*, 6.

NHS. (2005a). *NHS pandemic influenza plan*: US department of health.

NHS. (2005b). *UK Influenza pandemic contigency plan*. London: Uk health department.

Nsubuga, P., Nwanyanwu, O., Nkengasong, J., Mukanga, D., & Trostle, M. (2010). Strengthening public health surveillance and response using the health systems strengthening agenda in developing countries. BMC Public Health, 10(Suppl 1), S5.

Paterson, B. J., Kool, J. L., Durrheim, D. N., & Pavlin, B. (2012). Sustaining surveillance: Evaluating syndromic surveillance in the Pacific. *Global Public Health*, 7(7), 682-694.

O'Malley, P., Rainford, J., & Thompson, A. (2009). Transparency during public health emergencies: from rhetoric to reality. Bulletin of the World Health Organization, 87(8), 614-618.

Oshitani, O., Ailan, L., Roces, M. C., Sian, D. T., Ken, C., & Kiedrzynski, T. (2005). Implementing the new international health regulations in the Pacific-challenges and opportunities. *Pacific Health Surveillance and Response*, 12(*2*), 135-143.

Otto, J. L., Baliga, P., Sanchez, J. L., Johns, M. C., Gray, G. C., Grieco, J., ... & Blazes, D. L. (2011). Training Initiatives within the AFHSC-Global Emerging Infections Surveillance and Response System: Support for IHR (2005). BMC public health, 11(Suppl 2), S5.

Quandelacy, T. M., Johns, M. C., Andraghetti, R., Hora, R., Meynard, J., Montomery, J. M., et al., (2011). The role of disease surveillance in achieving IHR compliance by 2012. *Biosecurity and Bioterrorism: Biodefense Strategy, Practive, and Science*,9 (*4*), 408-412.

Rudd, R., Comings, J., & Hyde, J. (2003). Leave no one behind: Improving health and risk communication through attention to literacy. *Journal of Health Communication*, 8, 104-115.

Sandman, P. (1994). Risk communication. In R. A. Eblen & W. R. Eblen (Eds.), *Encyclopedia of the Environment* (pp. 620-623). Boston, MA: Houghton Mifflin.

Tell-Me. (2012). D2.5 New social media: BMJ group.

Taboy, C., Chapman, W., Albetkova, A., Kennedy, S., & Rayfield, M. (2010). Integrated Disease Investigations and Surveillance planning: a systems approach to strengthening national surveillance and detection of events of public health importance in support of the International Health Regulations. BMC public health, 10(Suppl 1), S6.

Tucker, J. B. (2005). Updating the International Health Regulations. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 3(*4*), 338-347.

Uscher-Pines, L., Chernak, E., Alles, S., & Links, J. (2007). College and university planning for pandemic influenza: a survey of Philadelphia schools. *Biosecurity and bioterrorism : biodefense strategy, practice, and science*, 5(*3*), 249-254. doi: 10.1089/bsp.2007.0023

Wamala, J. F., Okot, C., Makumbi, I., Natseri, N., Kisakye, A., Nanyunja, M., et al. (2010). Assessment of core capacities for the International Health Regulations (IHR[2005]) – Uganda, 2009. BMC Public Health, 10.

Wernli, D., Haustein, T., Conly, J., Carmeli, Y., Kickbusch, I., & Harbarth, S. (2011). A call for action: The application of the International Health Regulations to the global threat of antimicrobial resistance. *PLOS Medicine*, 8(*4*), 1-6.

Wertheim, H. F., Puthavathana, P., Nghiem, N. M., Van Doorn, H. R., Nguyen, T. V., Pham, H. V., ... & De Jong, M. D. (2010). Laboratory capacity building in Asia for infectious disease research: experiences from the South East Asia Infectious Disease Clinical Research Network (SEAICRN). PLoS medicine, 7(4), e1000231.

Wilson, K., McDougall, C., Fidler, D. P., & Lazar, H. (2008). Strategies for implementing the new International Health Regulations in federal countries. *Bulletin of the World Health Organization*, 86 (*3*), 215-220.

Wilson, K, Brownstein J. S., Fidler, D. P. (2010). Strengthening the International Health Regulations: lessons from the H1N1 pandemic. *Health Policy Plan*. Nov;25(6):505-9. Epub 2010 Jul 1.

Wilson, K., Brownstein, J. S., & Fidler, D. P. (2010). Strengthening the international health regulations: Lessons from the H1N1 pandemic. *Health Policy and Planning*, 25, 505-509.

Wilson, K., Von Tigerstrom, B., & McDougall, C. (2008). Protecting global health security through the International Health Regulations: requirements and challenges. Canadian Medical Association Journal, 179(1), 44-48.

World Health Organization. Constitution of the World Health Organization. Basic documents, forty-seventh edition. Geneva: The Organization; 2009.

World Health Organization. International Health Regulations 2005, 2nd ed. Geneva: The Organization; 2008 . http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf

World Health Organization. Ports, Airports and Ground Crossing Network [cited 2012 May 1]. https://extranet.who.int/pagnet/

World Health Organization. International Sanitary Regulations; World Health Organization regulations no. 2. World Health Organ Tech Rep Ser.1951;41:1–100.

World Tourism Organization. Tourism Emergency Response Network (TERN) [cited 2012 May 1]. http://rcm.unwto.org/en/content/about-tourism-emergency-response-network-tern-0