



D2.8

New Challenges and New Methods for Outbreak Communication Summary Report

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1. INTRODUCTION

The objective of work package 2 was to identify new challenges and new methods for outbreak communication by emphasizing the multivariate nature of the network in which different stakeholders operate and the ever growing diversity of channels to communicate the information. The seven reports comprising WP2 tackle the issue of outbreak communication from different angles and outline new methods that should be used and new challenges that must be overcome to achieve an efficient information flow. In order to stress the complementary nature of the different reports in WP2, we decided to divide them into four sections, which can be seen as different stages in the process of outbreak communication. Analogous to any communication process that requires a sender, a message, and a recipient, we begin by identifying the target population and its diverse communication requirements. Subsequently, we establish new methods that will allow an efficient flow of information and finally, we discuss the status of the global health security regime that should oversee this process as a whole.

The concept of target populations refers to groups and individuals that are identified as the recipients of a specific message. To some extent, what determines our message is the definition of our target population. Namely, while some messages intend to reach as many people as possible, and aim to the common denominator in order to reach a mass audience, other messages are narrowed down, focusing on a more specific sector or population. This is specifically true in the case of outbreak of a communicable disease, where our target population is extremely multifarious, from the intergovernmental organization to healthcare workers and professionals, and ultimately the general public (which in itself is most diverse). D2.1 deals with the mapping of diverse stakeholders in outbreak communication. The constant increase in healthcare stakeholders brings with it several new challenges, including the attempt to conceptualize and map different and diverse actors under a single theoretical concept. The attempt to map and characterize the different players in the outbreak communication net is twofold: first, it helps to recognize stakeholders that are usually not exposed, but nonetheless have a significant influence on policy makers; second, it promotes our understanding about the various roles stakeholders play and the degree of their accountability in the net.

After we have defined the target population, we need to recognize their specific communication requirements. D2.2 and D2.3 deal with the challenge of answering diverse information needs or demands of various stakeholders, emphasizing the difference between routine communication requirements versus outbreak and pandemic communication requirements. While D2.2 deals generally with the information needs of key stakeholders and their coordination with public health authorities, D2.3 analysis the specific views and perceptions of general practitioners' (GP's) communication requirements and investigates the reasons for poor compliance with vaccination programs in the 2009 influenza pandemic. Our understanding of different information that becomes available to various populations, and the way it corresponds to their needs, is the key to ensuring that effective messages reach the desired audience and achieve greater compliance with preventive measures. The understanding of GPs information needs is extremely important, since they serve an intermediate link between higher level stakeholders and the general public. The high accessibility

and credibility of GPs makes their information needs a substantial link in the overall communication process during a pandemic.

After recognizing the specific communication needs of our recipients, we need to respond to these needs by establishing new methods to communicate effective messages through the most suitable channels. The reports D2.4, D2.5 and D2.6 deal with diverse methods in the flow of communication. They emphasize the role of the new media as tools that open up new opportunities accompanied by new challenges. One of these important tools is an E-learning system for health workers that can rapidly disseminate information in case of a pandemic outbreak. D2.4 concerns with the legal, technical and scientific aspects of the application of the E-learning system. Moreover, the report suggests that the implementation of such a tool can promote active learning and skill acquisition leading to an effective transfer of theoretical knowledge and practical problem solving. Nevertheless, it seems that the tool which is likely to be most effective as a crisis communication tool is found in the new social media. D2.5 reviews the challenges and possibilities that stem from the ever growing human collaboration and the infinite diversity of sources via the social net. Organizations can no longer control the flow of information and it has been suggested that a unified public agenda is a relic of the past. Thus new platforms should be used to their fullest potential, to make sure that our understanding of outbreak communication is still relevant in the new technological reality. Other new platforms that seem to change the rules of the game are the formal and informal digital resources for infectious disease surveillance. Whereas traditional surveillance systems for infectious diseases are still currently used, new surveillance systems are being developed rapidly. These new surveillance systems can be classified into formal and informal platforms based on the nature of their input information. The formal systems use data from organizations such as hospitals and health agencies while the informal systems base their information largely on media outlets and internet reports. D2.6 examines the new sources of information in order to understand whether, or to what extent, these systems are capable of early detection and surveillance of infectious diseases. While the specific contribution of all these new platforms to surveillance is still debatable, they are constantly changing our understanding of human communication as a whole and, obviously, outbreak communication cannot be immune to these changes.

Finally, the last challenge we face relates to the newly established relationship between WHO that serves as the global healthcare security regime and different level stakeholders. This is reflected in the efforts to ensure compliance with the revised International Health Regulations (2005). D2.7 examines the role and performance of the World Health Organization (WHO) in light of the revised IHR (2005). The eight core capacities that were defined by WHO serve as a basis for understanding the aspect of outbreak communication collaboration on two levels. First, the report examines the actual implementation of the revised IHR in the case of the 2009 H1N1 influenza. Second, the report addresses the gaps that are not fully achieved and the gray areas are not completely defined in order to improve IHR' future implementation.

1.1 Validation Process of the WP2 Summary Report

The validation process for D2.8 focused on the extent to which D2.8 was able to represent diverse views and attitudes towards new methods and new challenges for outbreak communication in the age of globalization. Since D2.8 is a report integrating various tasks undertaken by a number of TELL ME partners, there is likely to be an inherent element of subjectivity in the reports. In accordance with the TELL ME protocol, we strived to obtain the views of a diverse panel of stakeholders in order to understand whether the main conclusions and recommendations correspond with their understanding of the new challenges facing outbreak communication.

The process followed two complementary paths. First, we approached various stakeholders with the purpose of getting their response to the content of D2.8. In order to account for the diversity of the final report, we approached both local and international stakeholders, both formal and informal. These included representatives from NGO's, patient associations, national public health authorities, public health scholars, bloggers and journalists from the mainstream media (for the complete list of stakeholders panel see appendix II). To obtain the views of these stakeholders, we sent both the D2.8 report and scheduled semi-structured interviews with the stakeholder panel, based on several pre-defined questions (see appendix III). The majority of questions dealt with the scope of the report and the extent to which it covers the content world of "outbreak communication". Particularly, we were interested in the panel's personal input based on their diverse professional experiences.

Second, the report was distributed to members of the consortium as well as members of the EAB. Here, the form of the feedback was much more 'open' thus we didn't ask specific questions (as in the validation process) but rather we were interested in a more general perspective regarding the content of D2.8, which resulted in additional improvement of the text.

Interestingly, the two comments that resonated throughout several panel member responses dealt with making the report more "reader-friendly" by presenting main recommendations as bullet points and stressing the importance of "bottom-up" flow of communication between the grassroots level and the international level.

Finally, all comments and remarks of the validation panel were integrated into the D2.8 final report. Some were integrated into the body of the report, some as an integral part of the general conclusions and recommendations and some were added to the appendix of D2.8.

2. TARGET POPULATION

2.1 Stakeholder Directory and Map

The first section deals with the new challenge of conceptualizing and identifying various stakeholders that operate in the complex healthcare communication net. This is especially challenging due to the diverse nature of different stakeholders that operate on different levels, ranging from the local to the global. We identify and map stakeholders in order to advance our ability to understand the flow of information under routine conditions as well as in times of crisis. Moreover, this report deals with stakeholders that usually are not exposed to or do not appear in the front lines of outbreak communication. Nevertheless, they have the power to initiate processes that influence policy-makers and public agenda. Finally, it is interesting to acknowledge the different ways in which stakeholders affect other actors in the net and are simultaneously affected by those actors.

After collating the data collected on the stakeholders, a chart was constructed showing the key groups of stakeholders in outbreak communication and immunisation (Fig. 1). With regard to the 'International organisations' and 'European associations', it should be pointed out that numerous organisations and associations are involved or become affected (directly or indirectly) during a pandemic outbreak. We have chosen to include those having direct influence and/or interest in the process of outbreak communication.

The following working definitions apply for the broad categories of stakeholders appearing on the chart (for a more detailed and expended list of outbreak communication stakeholders see Appendix I):

- International Organisation refers to any type of governmental or non-governmental organisation that operates on a global scale and comprises of various member (sovereign) states, adhering to international laws or treaties.
- European Association refers to any umbrella organisation that collectively represents various other national associations and industries that operate on European level.
- Media and Internet refers to any type of one-way or two-way communication channel used for broadcasting or narrowcasting any kind of information relevant to a communicable disease outbreak. This category also includes scientific journalists.
- Industry and Research refers to any type of business or enterprise involved in the chain process for immunisation, from manufacture to storage.



Fig. 1: Key groups of stakeholders involved in outbreak communication and the vaccination process.¹

Even before the 'communication' variable is inserted in the equation of a pandemic outbreak, it is clear that certain groups of stakeholders, particularly international organisations, are 'embedded by default' in strategies concerning the communication of messages to the public during an outbreak. Nonetheless, in a shared-power world where, according to Kettl (2002), no organisation 'contains' the problem, it becomes clear that the actions of these organisations alone are not sufficient for dealing effectively with challenges posed in outbreak communication, especially with respect to the uptake of vaccines. Therefore, the stakeholder analysis in the frame of outbreak communication has not only been useful for understanding the dynamics and relationships between different stakeholders, but also important to understand the role and potential each stakeholder has, for effectively becoming involved in the process.

Considering all the characteristics of the different groups of stakeholders outlined in the previous section, the Outbreak Communication System was formed (Fig. 2), a schematic representation of the network and active links between diverse stakeholder groups on international, national and local level. This infographic makes apparent the different types of stakeholders that have a role in outbreak communication, with potentially direct influence on the views or behaviour of the general public. More recently, with the development of new communication technologies (e.g. Twitter,

¹ WHO: World Health Organization, DG SANCO: Health and Consumers, DG ENTR: Enterprise and Industry, DG RTD: Research and Innovation, DG CONNECT: Communications Networks, Content and Technology, EMA: European Medicines Agency, ECDC: European Centre for Disease Prevention and Control, EDQM: European Directorate for the Quality of Medicines and Healthcare, WTO: World Trade Organization, UNWTO: World Tourism Organization, IFRC: International Federation of Red Cross and Red Crescent Societies, IOM: International Organization for Migration, OIE: World Organisation for Animal Health, UNICEF: United Nations Children's Fund, CPME: Standing Committee of European Doctors, UEMO: European Union of General Practitioners, EUPHA: European Public Health Alliance, HOPE: European Hospital and Healthcare Federation, PGEU: Pharmaceutical Group of the European Union, EVM: European Vaccine Manufacturers.

YouTube, Facebook etc.) also people from the general public have been empowered to communicate views or simply notify of any updates about an outbreak, with the sphere of influence extending far beyond stakeholders on the local or regional level.



The Outbreak Communication System of Stakeholders

Fig. 2: Stakeholders interconnections in outbreak communication.

In response to an emergency or a catastrophic event, stakeholder mapping is directly relevant to the planning and prioritisation of actions taken by decision makers and various other professionals. In addition, a complex field such as public health requires an interdisciplinary and cross-boundary approach to effectively address all issues. The salience of stakeholder mapping was evident in the

case of the most recent pandemic outbreak of influenza A (H1N1), when various European Agencies and Institutions (e.g. ECDC, EMA, HSC etc.) collaborated closely with the World Health Organization (WHO), creating a series of strategies to restrain the pandemic, almost within a month after WHO declared phase 6 (European Commission, 2010). A clear prioritisation of actions was achieved where international organisations were involved, from availability of vaccines to immunisation of groups higher at risk. At the national level, procedures were far more complicated, as more stakeholders took an active role at later stages, while conflict of interests between various key stakeholders might also have had an impact in the process. The different communication paths and interconnections between various stakeholders have been shown in Figure 2. Furthermore, the mapping of various national level stakeholders is critical when trying to reach the most marginalized populations. For example, the Roma people are a large, mobile population who are most often outside national structures and reach. Refugees and migrants can be best reached and listened to through their religious and cultural institutions.

When discussing non-institutional stakeholders, it is important to note that these distinctive groups are also concerned with the immunisation process. These groups include: general practitioners, healthcare experts, non-governmental organisations, opinion leaders, ethnic or minority groups, primary schools, and local political parties. Nevertheless, an interesting characteristic of noninstitutional stakeholders is their 'mixed opinions' regarding vaccination which can lead to negative perceptions and attitudes that can be difficult to reverse, while public opposition and skepticism toward a health intervention grows out of proportion. All these groups of stakeholders have a definitive, but less apparent, role in outbreak communication when it comes down to the implementation of strategies for public health. Hence, it is critical that national competent authorities and decision-makers are in a position to clearly perceive and realise the discontent or outrage certain public health policies or actions can bring for specific groups in the community.

In addition, the means of communication (i.e. internet, mass media, social media) and overall strategy designed by the Department of Health or other national competent authorities for communicating messages to the public, needs to be carefully planned with the support of various other entities responsible for the administration of vaccines, such as local health services, general practitioners and other professionals. It is evident that as we move from top to bottom, and with the aid of mass media, social media and the World Wide Web, the general public is connected with an increasing number of sources from where information can be drawn on the pandemic, strategies and preventative measures – including specific communications about immunisation. It is also the presence of the media and the internet that empower people to move on the opposite direction, and drastically influence decision-makers on a local, regional or even national level, based on the behavioural responses that become published through the various means of communication.

In this exercise of identifying and mapping stakeholders in outbreak communication, there is an attempt to approach this field from many different angles, and present in a comprehensive manner the diversity and range of key actors involved in the process. The challenge in this task is to identify stakeholders that usually are not exposed or do not appear in the front lines of outbreak communication, but nonetheless have enough power to influence decisions of policy-makers or behaviour of the general public. It is of particular importance to explore the ways that each stakeholder can affect and be affected, especially in the age of new social media. To this extent, we recognise the need for national public health authorities to make better use of the possibilities

provided in two-way communication. This could potentially be helpful in the direction that general public becomes more actively involved and engaged in the response phase of an outbreak, thus adopting rational behaviour and assuming responsibility for certain actions.

It has been suggested that accountability issues start from a level as high as that of member states, which tend to enter into voluntarily (instead of binding) commitments towards health (Gostin & Mok, 2009). Issues of accountability exist anywhere where there is a lack of a regulatory framework or where there are inefficient mechanisms to support an immediate intervention by a competent authority. For this reason, is paramount to define the roles and relationships between the different institutions and agencies, as well as the national public health authorities. On a second level this could translate into redefining the role of the state in relation to different stakeholders and entities deemed to be particularly important in outbreak communication (for a more detailed list of various outbreak communication stakeholders see appendix I).

A key recommendation for the mapping of stakeholders is to leave open the possibility that new entities or stakeholders might be introduced and be relevant in future pandemics. This could occur when the model of public-private partnerships progressively becomes established as the model that can effectively overcome particular challenges, especially in the vaccine supply chain. In such cases where specific roles are assigned to specific partners, it might be possible for public health authorities to engage more effectively with stakeholders operating on a national level. They could then decide on the strategy to be implemented together with all groups of stakeholders involved in the process. To achieve this, all different types of stakeholders need to be evaluated in terms of specific requirements and needs they might have with regard to information they receive and transmit during the most critical phases of a pandemic outbreak.

Recommendations:

- Non-institutional stakeholders should be engaged more effectively in the outbreak communication process. They are influential at the community level but may have mixed attitudes – thus producing conflicting messages – toward vaccination. They include general practitioners, healthcare experts, non-governmental organisations, opinion leaders, ethnic or minority groups, primary schools, and local political parties.
- Institutional stakeholders should be attentive and follow closely other stakeholders that have considerable influence on communication of messages to the general public, such as the mass media, anti-vaccine groups and opinion leaders in social media.
- There is a need to refine the roles of different stakeholders and entities in order to establish a regulatory framework to support immediate interventions by competent authorities at local and regional levels.
- Public health authorities should recognize that new and relevant stakeholders from the private sector and the community may appear in future pandemics. Thus there is a need to establish an appropriate model to effectively incorporate changes and better understand new dynamics formed between stakeholders.

3. COMMUNICATION REQUIREMENTS

3.1 Report on Stakeholder Communication Requirements

The effectiveness of any kind of health intervention depends on a structured set of external factors and criteria, which can vary according to the type of disease, perceived risk on community level, and attitudes towards the intervention. Similarly, the effectiveness in outbreak communications mostly relies on meeting the information needs or demands of various key stakeholders in the process. Communication in public health emergencies has multiple layers, and the landscape becomes even more complex in the case of infectious disease outbreaks, which have the potential of developing into pandemics. Hence, the second set of new challenges deals with the assessment of diverse communication requirements for different level stakeholders.

This exploratory research study on stakeholder communication requirements aimed at taking a closer look into the principles and mechanisms underlying multi-layered outbreak communication between institutional actors at both the national and international level, and non-institutional stakeholders. From the perspective of new challenges, it is important to keep in mind that the multi-layered nature of stakeholders correlates with the diversity of communication requirements. Namely, after identifying the various stakeholders, this typology should result in tailor-made information sets that best accommodate the different level communication requirements.

The analysis of the International Health Regulations (IHR) 2005, as the mandated standards for communication between WHO and Member States, is indicative of the fact that on an international level, sophisticated mechanisms are already in place for the exchange and flow of information. Communication requirements are clearly established between institutions (however there still remains some degree of competition between international level stakeholders). At this level, structured communications also extend by WHO toward other international or intergovernmental organisations. Together with European international agencies such as ECDC and EMA, the national public health authorities form part of a network coordinated by WHO, who define the type of information required by them. They also provide guidance on what type of feedback these authorities should expect in order to coordinate better the response actions on national, regional and local levels, to contain the spread of an infectious disease.

In the national context, the mass media is another key stakeholder group that plays a significant role is in the outbreak communication. The results of the study indicate that non-institutional actors perceive journalists to be a stakeholder group frequently disregarded in outbreak communication planning and response. Institutional actors instead, perceive the healthcare workers to be a group that merits more attention by public health authorities toward effective communication of messages. Characteristics of both journalists and healthcare workers are their immediacy and direct connection with the public, as well as their tendency to produce conflicting messages. Thus it is suggested that public health authorities put greater efforts to link more efficiently with these two groups in outbreak communication planning and response.

The emergence of new social media has not only changed the way people communicate with each other, but also produced a significant change in terms of people conceptualisation of information, as a commodity that no one could possess and is destined to be shared. This comes into direct conflict

with the core nature of national authorities, who are programmed by default to control the information flow and content during public health emergencies in order to operate at their best capacity. However this could pose a serious challenge in the efforts to create more transparency and build trust with the public². In fact, the public health authorities have to concentrate on two different types of media (traditional and social media) to form stronger collaborations and capitalise on their potential to reach the public more effectively.

It is clear from the results of this study that traditional media, especially television and radio, are still perceived to have the greatest influence and impact in the communication of messages, although not seen as the most credible sources. The public health authorities should take steps to work closer with traditional media and perhaps formulate a set of principles (in the form of best practices) about the type and format of information presented to the public. Early involvement of the media in this process (from the preparedness phase) would also contribute to increase the sense of responsibility as per their role, and clearly point to issues of accountability as regards making false or inaccurate statements. With regards to new social media, there is a need for public health authorities to capitalise on the presence of social media in people's daily activities and to emphasise timeliness in the exchange of information. It is important to explore further how these media could be used for monitoring in order to control the spread of rumours and misinformation that emerges on the Web More research is needed to explore any shifts in population behaviour from passively receiving to actively seeking information during infectious disease outbreaks, so that public health authorities, as centralised sources for information, could develop a cross-platform communication strategy, making extensive use of broadcasting methods and new social media, toward an effective participatory communication model to satisfy the information needs of various stakeholders.

There is evidence that social media are not yet considered by competent authorities and health professionals as the primary source for data collection This despite the fact that any type of information that arrives directly from the community level is essential. The same applies to the use of informal surveillance systems by the health authorities, such as the Google Flu Trends. The focus should be shifted to what extra benefits can be achieved for top-level decision-makers, for better systematising the information received from multiple sources at local level. This would help to tailor public health messages for different populations and target groups and would enable national public health authorities to view the outbreak not only in its global dimension, but also at its local dimension.

With reference to differences in communication requirements between institutional and noninstitutional actors, few significant differences were observed in the views expressed by the two groups. In the case of prioritisation of actions toward development of new systems for surveillance, it is noteworthy that the majority of non-institutional actors supported this view, while institutional actors did not consider this to be a main priority. This would suggest that institutional actors are largely satisfied with existing surveillance or monitoring systems for their information need. Interestingly, it has been suggested that the fact that institutional actors feel satisfied with the current systems can be seen as a lack of ability to deal with additional information. This is consistent with the fact that a plethora of surveillance networks exist already at this level. It is the non-

² It seems that a better understanding of the communication needs of different populations could help in anticipating the reluctance to vaccination during 2009 Influenza.

institutional actors that express a greater need to be informed through automated processes about how a disease develops and the associated risks. There is general agreement between stakeholders that most essential information to be made available from the onset of an outbreak is that of risk assessments, which will be specific to the disease. Moreover, within the communication strategy, there is a need to preserve the opportunity for a constant evolution of the message.

As regards stakeholders' perceptions of stakeholder groups that need to be considered in the outbreak communication process, institutional actors focused on the need to engage with healthcare workers, while the non-institutional actors perceived the journalists and media to be the priority. These findings are consistent with the results in another question where institutional actors saw health experts as the main source of producing contradictory messages with a consequence of breaking down public trust toward the government. Thus it would be a reasonable step for public health authorities to try and bridge this gap with healthcare workers and professionals.

Moreover, both institutional and non-institutional actors proposed risk assessments as the most useful and critical information to be made available for the general public. Updated pandemic risk assessments in the form of technical reports are particularly important as these are made available by highly credible sources (international health organisations or national competent authorities), generated in a timely manner. Drawing from experience of the H1N1 (2009) pandemic, the risk assessments produced by ECDC during this period contained comprehensive information and were written in a format and language that could easily be understood by a broader audience.

Despite the aforementioned differences in responses provided by institutional and non-institutional actors, as well as the clearly established communication requirements in cooperation and partnership between international organisations and national authorities, the information needs for the various groups of national and local stakeholders are part of a wider mechanism. This is built in the form of a densely interwoven communications web, where information flows at many occasions without specified recipients. In this case, the challenge for different groups of stakeholders is more relevant to identifying and selecting which type of information accommodates better their needs. At the same time it is clear that any action taken by them will have direct or indirect consequences for the local or global community, depending on the type of stakeholder. Furthermore, it is likely that understanding the communication needs of different stakeholders is part of the solution that could help us restore trust and confidence between public and experts, authorities, vaccine manufacturers, and the media. For example, non-institutional actors consider the development of new international systems for surveillance to be relatively high priority, as compared to institutional actors who perceived this to be the lowest of priorities. Considering their practical experience from infectious disease surveillance systems, institutional actors significantly value the information received from these systems and networks. On the contrary, non-institutional actors (e.g. universities, private institutions etc.) feel they receive too little information from these networks.

What becomes increasingly more critical in outbreak communication is the risk of exclusion of specific groups of society from the process. This could result either from the digital divide (in the case more information are made available through electronic means, e.g. the internet, social media etc.) or as a failure to understand the actual information needs of marginalised or disadvantaged groups that have limited capacity to voice their concerns. One of our findings suggested that healthcare providers are in a better position to provide information and advice to vulnerable groups

of society (e.g. children, older people, and women in pregnancy) as regards prevention and response to an infectious disease outbreak. This would be relevant to the context of combining both professional competence and local knowledge – as members of the community – which allows a deeper understanding of the social and cultural factors that shape people's concerns about the outbreak. Their central role at local level could better be established and/or reinforced through use of new social media where national public health authorities could be notified promptly of any concerns at local level, while the general public could be informed more accurately, openly and responsibly about latest developments of the outbreak. The stakeholders that responded in the survey did not consider this to be a priority for the development of new methods in outbreak communication. However, it is paramount to always consider the link between poor quality of information received with exclusion of certain groups from outbreak communication strategies. How could the outbreak communication be optimised, when certain local stakeholder groups and their information needs do not become priority?

Recommendations:

- Effectiveness in outbreak communication could increase through development of a communication model that integrates key elements from existing one-way and two-way means of communication (i.e. highly credible and influential).
- General practitioners and healthcare professionals are seen as the more appropriate and reliable actors to inform the more vulnerable groups of society about preventive measures in response to an infectious disease outbreak (e.g. vaccination).
- Public health authorities should reassess the needs and quality of information made available from the onset of an infectious disease outbreak to certain groups of a community such as healthcare workers, journalists, ethnic and minority groups.
- Epidemiological information from international surveillance should be made available to the wider scientific community in a more systematic way.
- Risk assessments should comprise a basic tool for communications with the general public, considering these are made available by credible sources, written in a clear language and format.

3.2 Reports on Health Care Professional Communication Requirements

The general aim of this section is to identify new challenges and new methods concerning outbreak communication. We address the communication requirements of health care professionals (HCP), who are one of the most important groups involved in contacting and communicating with at-risk patients. It seems that the challenge is twofold. The first challenge, similar to the stakeholder communication requirements, is to address HCPs who have unique information requirements that stem from their intermediary role between the higher level stakeholders and the general public. The second challenge is to understand the reasons that led to the low compliance with vaccination in 2009 H1N1 influenza. An answer to these two challenges should result in a new method for communication between Health Care Professionals and relevant stakeholders.

General practitioners(GPs)/family physicians play a key role alongside other health care professionals, since they are considered a regular and trusted provider at the entry point of health care (WHO 2008), and are highly accessible for a large population. We tried to find answers to several questions. These included how HCPs can be mobilized to become active partners rather than passive (and often critical) participant in the communication process, what are the communication channels most trusted by family doctors and how HCPs can be supported in reaching out to different patient groups? The research aims to provide information which would support a closer involvement of general practice in the decision-review process of pandemic strategies. In this way, feedback from live experience can better inform the process and provide valuable GP perspective on the anticipated impact of any proposed changes (Eizenberg, 2009). The specific objective of the research was to identify and describe opinions – positive or negative – experiences of GPs about the handling of the pandemic, including their suggestions and proposals for solutions.

In order to ensure that the different social and cultural environmental factors were represented in the survey, GPs from United States and different regions of Europe were included (see Figure 3). Regional diversity aimed to compare for similarities / differences taking into consideration not only factors, such as cultural background, but also the extent to which some regions of Europe were hit by the pandemic H1N1, and connections/emerging patterns from GP responses about communication requirements. In the invitations to the focus groups/interviews we tried to include GPs of different ages, gender, place of practice (urban/rural). The only strict criteria was that GPs needed to be practising during the H1N1 pandemic 2009/2010.



Fig. 3: Survey diversity - Investigated countries (in red)

GPs felt that national and local health authorities would have to handle the pandemic situation better in the future. Misleading media communication, focusing on sensationalism over science was one of the main problems during the 2009/2010 pandemic flu (having a negative influence on vaccine uptake). GPs found that health authorities informed them after conducting large media campaigns. Patients were alarmed and GPs had no professional, specific information or tools to handle the "hysteria". GPs require specific information about the disease, size of the epidemic, ways of prevention, side effects of preventative activities (including who takes the responsibility) and what to do when there are insufficient preventive measures available. In the United States, in terms of communication by the media, there was a general consensus that events were sensationalized and did more to confuse than to allay doubt. Some felt that many media reports generated anxiety and fear, often without a substantiated basis, which led to an overly heightened concern early in the evolution of H1N1 and a subsequent lack of sufficient concern when H1N1 turned out to be less

dangerous than feared. The core perception was that the overall media effect undermined the more consistent official public messages, leading to increased confusion and second-guessing of governmental efforts. When respondents were asked if they felt this contributed to the poor vaccine uptake, there was almost universal agreement that this was the case.

GPs from Eastern-European countries complained about the communication gap, while at the same time they felt under pressure from authorities. British GPs felt that the communication in the UK was overwhelming, and they found it difficult to extract the main messages. There were too many communication channels e.g. direct mails, meetings, e-mails with lots of links. The same problem was mentioned in the United States. There was a multitude of available websites covering the H1N1 pandemic and subsequent official recommendations. Almost all professional associations and societies covered H1N1, either through a link to CDC, creating their own content, or both. One area that was perceived somewhat differently among providers was the nature of the CDC recommendations. The majority interpreted them as guidelines, but others felt that they could not or should not deviate from them. The area that caused the most confusion was on recommendations addressing school closures.

GPs experienced many problems in the field of coordination among professionals. Different health care professionals had different opinions about risk and side effects of the vaccine, vaccination of pregnant women etc. In the UK, changes of the PHC system could lead to fragmented services and could damage this kind of coordination proposed. Lack of cooperation or not very effective collaboration between different levels of health authorities (national - regional – local) and between health authorities and GPs were mentioned as well as organization and logistics. A simpler vaccination plan, which is clearly communicated and consistent in regards to both providers and the public, would be required also by the United States GPs.

Recommendations:

- A simpler vaccination plan, which is clearly communicated and consistent in regards to both providers and the public, will be required in the future.
- GPs need to have specific information about the disease, size of the epidemic, ways of prevention, side effects of preventative activities (including who takes the responsibility) and what happens when preventive measures are limited.
- There is a need for more consistency at the expense of diversity. In 2009 influenza, there were too many communication channels e.g. direct mails, meetings, e-mails with lots of links, which didn't help GPs to crystallize a consistent message for the public.

4. METHODS FOR COMMUNICATING INFORMATION

4.1 Technical, Legal and Scientific Feasibility of an Online Course for Primary Care Staff

One of the new methods with which outbreak communication could be much more effective is a software learning tool that is tailored for primary care staff. In fact, one of the aims in TELL ME is to

develop an E-learning tool for health workers to rapidly disseminate information in case of a pandemic situation.

To achieve this goal, research was carried out on three levels:

- a. Legal information was collected on the continuing Medical Education system in the 27 European Union countries.
- b. Technical the best open-source LMS system was identified for the development of a prototype of E-learning that could be implemented across all 27 countries of the EU.
- c. Scientific the best training approach to deliver to health workers was identified of all the 27 countries of the European Union to ensure that transfer of the information necessary to coordinate a timely response to a critic event (pandemic).

A survey was conducted on the Continuing Medical Education (CME) system in the 27 EU countries. The Ministry of Health's website and CME national website for each country were examined. In addition, Internet searches were conducted using the Google browser with the following acronyms, keywords and phrases: "CME", "CPD", "continuing medical education", "continuing professional development", "accreditation" and "name of the country". The review was carried out also using PubMed combining the same keywords ("Education, Medical, Continuing", "accreditation", "European Union"). We included studies published from January 2008 to present. Articles were selected based on their title and abstract. Articles not in English were excluded from each country's Health Acts the most detailed information about regulation of the CME system was taken.

Based on the similarity across the CME systems of the 27 European Union countries, the results suggest that it could be possible to develop a protocol of E-learning, that could be consistently applied in different countries. Most countries have CME systems with similar accreditation systems, recognize distance learning and have mutually recognized credits because they belong to a common system (UEMS). However, a potential limitation is that most CME systems are targeted at medical doctors and, in the case of global events requiring organised actions (which is the focus of the TELL ME Project), different types of health operators would be expected to be involved and each one of them would have to match specific training requirements. Numerous health training activities are operating across the different countries which may need to be incorporated into each accreditation system and to be taken into account in a coordinated European action.

Based on a review of 35 E-learning platforms five were selected for more detailed assessment. These five platforms were frequently present in comparison to charts of benchmarks analysed from 2003 to 2011 and include: LRN (dotLRN), ILIAS, Dokeos, ATutor and Moodle. From a technical point of view, Moodle seems to be the LMS platform that best meets the TELL ME Project requirements for the following reasons:

- a. It is user-friendly.
- b. Manuals are available in all official languages of the 27 EU countries The findings of our report show that case-based learning is an effective instructional method for students, health professionals and it can be adapted to numerous and different teaching scenarios.
- c. Learning is improved when the new information is presented in a meaningful way such as when it is illustrated by cases with case-based multiple choice questions. Similarly, Cook

found that residents who completed web-based modules on clinical topics including casebased multiple choice questions had higher immediate post-test scores.

We confirmed that a case-based approach that actively requires learners to critically apply their knowledge improves learning. Consequently, it has been suggested that such a platform also should be evaluated on the basis of a 2-direction information exchange process. Additional criticisms have identified low quality studies evaluating the effectiveness of case-based/problem-based learning approaches. However, high-quality studies support the effectiveness and reliability of this learning approach. An important limitation is that most of the studies report results from case-based learning approaches applied to student learning, and therefore these results cannot be applied directly to adult professionals. Nevertheless, they could immediately apply the knowledge acquired in their daily practice to consolidate their learning curve and improve the effectiveness of the e-learning approach.

These considerations support the adoption of a case-based e-learning approach in TELL ME as it allows rapid and effective dissemination and updating of critical information necessary to efficiently react to infectious disease emergencies in Europe. In addition, it can promote active learning and skill acquisition by using clinical cases to recreate realistic clinical learning scenarios, which ultimately enable an effective transfer of the theoretical knowledge into practical problem solving. With that in mind, in order to create the conditions that would favor the medical staff adherence to the new tool, WHO would probably need to initiate some sort of reward mechanism. Moreover, it is important to strive to develop additional tools where the on-line access is limited or not widely used.

A large and active community of users and developers can assist with problem resolution (e.g., bugs), platform applications and help to identify strengths and weaknesses of the system. There should be availability of numerous functions, plug-ins and modules to customize the system. These expand the functionality and enhance the adaptive capability of the platform to any technical and/or cultural requirements of the 27 European Union countries involved in TELL ME project. This feature is directly related to the aims of the TELL ME Project as it enables a rapid and widespread dissemination of the information across the 27 European Union countries³.

Recommendations:

- Moodle seems to be the LMS platform that best meets the TELL ME Project requirements for online course for HCPs.
- E-learning allows a rapid and effective dissemination of critical information and it promotes active learning and skill acquisition by using clinical cases to recreate authentic scenarios.

4.2 New Social Media

Building on the notion of new communication technologies as a new method to dissimilate information, we covered the use of social media as a crisis communications tool. We show how social media encourage a culture of sharing and collaboration and analyse how this has manifested in previous emergencies to spread public health messages. From this perspective, it is important to

³ It has been suggested that these kinds of tools should not be limited to medical staff and in fact issues of public health should be opened to the general public.

outline the opportunities and challenges presented by the use of social media as a crisis communications tool. Social media is the latest vehicle to allow humans to collaborate and share information in the midst of a developing crisis, in order to achieve the mutual goal of survival. Additionally, the growing trend in users visiting social media sites to find out about the latest news is changing the ways that the public consume and process news. The participatory culture of the social web means that users are both content creators and active information seekers. Whilst uncertainty is an inevitable aspect of crisis situations, users themselves now employ social media to collect information from a variety of sources, in order to make informed decisions and understand risk.

As users seek to cross-verify and negotiate a variety of different sources, it is important for health authorities and other organisations to have a strong presence on relevant social media platforms in order to establish authority in crisis discourses as early as possible. Organisations are unable to control all content that is discussed on social media sites, but it is important for them to assert their presence and remain in tune with public sentiment, especially during a crisis. Users of social media rely on other users to help corroborate sources, but information from expert or official sources carry considerable weight on social media sites, especially when information verification is crucial, such as during an emergency. Whilst individual organisations will have individual priorities, a collective effort between organisational stakeholders in identifying key partnerships on social media would be highly beneficial in terms of making sure that good quality information spreads quickly, and unhelpful information is tackled early on.

As well as setting up their own accounts to disseminate information, organisations could also identify the most connected individuals within a social network and ask them to help spread a particular message more widely. If a sense of online community can be built with the public before a crisis happens, an organisation has the potential to efficiently amplify its message more widely, as key followers or sharers repost or re-tweet alerts to their own followers. Also, when communicating through social media sites in crises, organisations should be aware of what discussions are trending or a generating the most comments and should aim to speak to the public in a personable tone, whilst signposting them to helpful information and resources. Also, the decentralised and ephemeral nature of information needs of the community, which can in some cases change on an hourly basis. Organisations who want a presence during a crisis must also take established ownership of conversations and monitor trends on social media in real-time, in order to address the needs of all public users, not just the network built up prior to the crisis.

According to a 2011 U.K. study,⁴ the average U.K. user now considers the internet as their most important source for information. Notably, the study also found that *confidence* in the reliability of information found on the internet has also increased, as users tend to trust the internet as much as other forms of media. This may be explained by users' confidence in their ability to sift through and validate information on the internet. Information from other media sources cannot be validated so immediately—for comparison, a second newspaper must be bought, or a different radio or TV program must be waited for—and public responses to news or media opinion are not as rapidly available as they are online.

⁴ Available from: <<u>www.oii.ox.ac.uk/publications/oxis2011 report.pdf</u>>

The figure below demonstrates how it is now common practice for micro-bloggers to discuss breaking news and circulate new information almost instantly, well ahead of traditional forms of media.



Fig. 4: demonstration of how one social network, Twitter, can report news more rapidly than other types of media. <u>Andrés Silva Arancibia</u>, Source http://sixrevisions.com/

Some organisations are wary about using social media a communication tools. However, there are ways in which these networks and the messages posted on them can be analysed to plan an evidence-based response to a crisis. For example, Chew and Eysenbach's study showed that there are ways of analysing sentiment displayed on social media by categorising the context of messages shared. If organisations could analyse and interpret sentiment in real-time, then concerns or misinformation could be responded to with communications that reflect these tangible needs. Similarly, Christakis's work on Social Network Analysis (SNA) shows the potential of how analysing and identifying the people and their connections within a network, could lead to prevention strategies which limit the spread of any potentially harmful contagion, be it a disease or misinformation.⁵

During a public health emergency, there are a variety of organisations that disseminate health information updates, from World Health Organisation (WHO), ECDC or CDC, to the Health Protection

⁵ As it has been suggested during our validation panel, WHO must be open to the possibility that the next outbreak communication will happen mainly in the blogosphere. One of the scenarios is that during the next pandemic outbreak, people will create fake WHO identities in order to mislead.

Agency (HPA) in the U.K., national health organisations like the NHS, as well as local health authorities, healthcare professionals, emergency services, and the media.

The goal of many of these organisations is to protect public health and safety; however, their strategic objectives and resources will vary. Currently, social media may have little or no part in different organisations' overall crisis communication strategy. ⁶ Amanda Coleman, the Corporate Communications Director at Greater Manchester Police (GMP) has suggested that as a result of the 2011 summer riots in the UK, large organisations involved in crisis or emergency communication may need to rewrite their communication plans. Coleman argues that the public are able to "give immediate feedback on what they are seeing, can provide footage or photographs of incidents to help find those individuals involved, and can join with others to be a force for good."⁷ Police and other organisations should view the immediacy of this information as a resource, and could harness it to compliment their investigations.

Our understanding of a disease via social media channels alone gives a limited view of how an outbreak spreads. They inform us mainly of the spread of a disease amongst the segment of the population who use these platforms and or who feel compelled to self-report. Yet no traditional form of crisis surveillance gives a complete view of the developing situation either, and 'infoveillance' has the advantage of unparalleled rapidity in data collection; for this alone, it should not be overlooked. In addition, as the beginning of the report shows, there is regional variation in the uptake of social media and a one size fits all approach may not be appropriate. Nevertheless, users of social media remain a relatively an untapped resource of opinions, symptoms and data, which should be analysed and to help spread information that encourages protective behaviours. Palen et al claim that "The reach of the Internet expands opportunities for public involvement, where those geographically removed from the disaster—and therefore with the critical resources of time, money, electrical power, and working computers and telephones in hand can offer assistance." (2007, p 57)⁸ Unlike traditional media, like newspapers or television, analysts can gain an insight into the public's behaviours and opinions and can address this by responding to a quantifiable need. Social media users are compelled to share information, particularly during crisis situations, and this information could greatly aid evidence-based public health communication responses.

Social media facilitates the process of democratic and transparent exchange of knowledge, and its multitasking platforms encourage users to rapidly cross-reference and filter information from a variety of sources. There are some examples of how social media has been used in previous emergencies to engage the public and spread helpful information, but generally speaking, it has been applied in an inconsistent manner. A more integrative approach where organisations monitor and analyse users and the messages they post could ensure that these platforms are used to their fullest potential, to help formulate outbreak communications that are relevant, timely and transparent.

⁶ Available from: <<u>http://amandacomms1.wordpress.com/2011/08/14/the-social-media-lessons-of-the-past-seven-days/</u>>
⁷ Ihid.

⁸ Available from: <<u>http://www.cs.colorado.edu/~palen/palen_papers/palen-CACM.pdf</u>>

Recommendations:

- As users seek to cross-verify and negotiate a variety of different sources, it is important for health authorities and other organisations to have a strong presence on relevant social media platforms in order to establish authority in crisis discourses as early as possible. It is crucial that this presence is built before a crisis happens, so that trust can be established and the health authority is recognized as an authoritative source of advice and information during a crisis.
- Whilst individual organisations will have individual priorities, a collective effort between organisational stakeholders in identifying key partnerships on social media would be highly beneficial in terms of making sure that good quality information spreads quickly, and unhelpful information is tackled early on.
- As well as setting up their own accounts to disseminate information, organisations could also identify the most connected individuals within a social network and ask them to help spread a particular message more widely.
- Users of social media remain a relatively an untapped resource of opinions, symptoms and data, which should be analysed and to help spread information that encourages protective behaviours.

4.3 Digital Resources for Disease Detection

During the last few decades, emerging infectious diseases have become an increasingly important global public health problem. Examples of such outbreaks are the Severe Acute Respiratory Syndrome (SARS) originated from Asia in 2003, the Avian influenza H5N1, and the H1N1 2009 pandemic. Therefore, effective surveillance systems for early warning are crucial. Surveillance is defined by the US CDC as follows: "Public health surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health". Traditional surveillance systems involve clinical and laboratory diagnosis of the disease. Such surveillance systems require that the clinicians and laboratories report specified infectious diseases to the appropriate authorities, who confirm the disease and disseminate the information. In many countries systems are in place whereby reports are submitted electronically to a central health authority. This approach may help public health officials to rapidly identify problems and take action. While surveillance is not considered to be a new challenge, in the global era it has become even more acute. If globalization is characterized by the collapse of physical borders, then outbreaks are less constrained to a specific area, which results in a faster spread. This report reviews the current status of formal and informal infectious disease surveillance systems that use communication technology as a tool for early surveillance.

Formal surveillance systems for infectious disease outbreaks are those functioning within the health services. They need to be flexible, adapted to the characteristics of the potential biological agents. Non-specific syndromic surveillance, based on the reporting of signs and symptoms, rather than on diagnoses, has developed rapidly over the last decade. The reporting and follow-up procedures also need to be adapted to syndromic surveillance. It is still frequently difficult to define the kind of

action that needs to be taken in the event of a signal of an outbreak, especially in order to avoid numerous false alarms. It is clear that health care professionals at many levels will need to play a much more active role in disease surveillance than in the past⁹.

Syndromic-type surveillance systems, with sophisticated statistical algorithms, may be of limited value in the early detection of serious infectious disease outbreaks since the first cases probably will be diagnosed by alert physicians. However, they can play an important support for controlling the outbreak, once it has been detected. It will be most useful in providing timely, valid information for managing the outbreak and for risk communication. While resources should continue to be directed at improving such systems and enhancing clinical and laboratory surveillance, emphasis must be placed on training primary care and emergency room physicians to recognize the clinical features of infectious diseases with important outbreak potential.

Informal digital resources for disease surveillance are based on data obtained either from formal organizations or from media sources such as news reports on the Internet, mailing lists, and RSS (Really Simple Syndication) feeds. Examples of such informal digital resources are ProMED-mail, HealthMap and BioCaster. Informal digital resources are characterized by their ability of mining, categorizing, filtering, and visualizing online information regarding epidemics. Incorporating informal digital systems into existing formal systems may improve their performance. A study in the United States showed that combining information gathered from informal digital systems with information received from the Texas Influenza-Like-Illness Surveillance Network (ILINet) improved the ability of predicting hospitalizations due to influenza. Another study in the United States showed a good correlation between Google flu searches and emergency department influenza-like illness visits.

There has been impressive progress in the development of informal digital systems for disease surveillance. They could be widely used by the general public, as well as by health officials. Currently there is little prospective evidence that existing informal systems are capable of real-time early detection of disease outbreaks. Most systems accumulate a huge mass of information on a large variety of diseases, making it difficult to extract critical information. The challenge is to present critical information clearly and concisely and establish a response system to early warnings. Without such a system, early warning has no practical application. Such a response system should include triggers and decision criteria, which would lead to an appropriate and proportionate response to the threat.

Recommendations:

- Electronic syndromic surveillance systems can play an important support role for controlling outbreaks, once they have been detected. They are particularly useful in providing timely, valid information for risk communication.
- Valuable resources should continue to be directed at improving such systems and enhancing clinical and laboratory surveillance. However, training primary care and emergency room physicians to recognize the clinical features of infectious diseases with important outbreak potential should remain a priority.

⁹ It has been suggested that electronic networks for Influenza surveillance such as FluNet should be expended to other emerging disease threats.

• The main challenge for informal digital disease surveillance systems is to present timely, valid and critical information clearly and concisely in a way that can facilitate the management of an outbreak.

5. GLOBAL HEALTH SECURITY REGIME MANAGEMENT

5.1 The New Global Health Security Regime

In the earlier sections, we attempted to identify new challenges and new methods for outbreak communication; the last report is somewhat different. The objective of this section is to assess the World Health Organization's (WHO) global role as a central force in the health security regime, focusing on the question of outbreak communication. From this perspective, the challenge for a global organisation is in providing a globally applicable framework for the management of pandemic information and response, but also in allowing regional flexibility to cater for local customs, culture and circumstance. That challenge is often at odds, with more "local" guidance. Namely, how can WHO coordinate, monitor and evaluate outbreak communication on a national level?

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 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.

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.

Oshitani et al (2005) explained the communication role of the IHR as follows: "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)". 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 notes, "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 a number of tasks, of which the most important ones are to distribute information that comes from WHO to the relevant domestic agencies, to report to WHO about any health regarding information that can bear relevance on a global level and to provide WHO with feedback about national preparedness in case of an outbreak. Furthermore, the local NFPs can serve as a pipeline between WHO and local audience, helping to understand and communicate public opinion.

From the lessons of the SARS outbreak and in the spirit of IHR 2005, the WHO is central in guiding mass media campaigns to decrease disease transmission by informing the population and promoting preventive behavior. It is important to note that social media could potentially play a major role in these campaigns. 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).

Beside the question of the variety of communication channels, there is the question of how they are being used. This is the question of one-way flow versus two-way flow of communication. 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.

From an analysis of the Israeli response during the 2009 H1N1 pandemic, it seems that even when a varied number of communication channels were used, most of the information flow was one-way. The focus was on providing information to the population through various channels, but little attention was paid to feedback from the "bottom-up." This appears to have been the approaches of international organizations, when contending with informal anti-vaccination campaigns. Thus, although there was a greater usage of varied communication channels, this can be attributed to the emergence of new media rather than to the attempt to use those channels that could potentially provide feedback from the population. The key challenge of an efficient "bottom-up" flow of communication is to identify those individuals who can be champions at the grassroots level. Those 'grassroots stakeholders' that could help evaluate the message and disseminate information.

One of the most important core capacities that are yet to be developed is effective surveillance, particularly in resource-limited countries. Obviously, it is not 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).In the area of disease surveillance, there still appear to be many

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". It has been stated 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 the reduction of gaps between different countries. Thus, the ultimate goal of all member states should be to establish an efficient global surveillance system. Obviously, this cannot be achieved without the participation of every member state. From this aspect, it seems that success will depend on the increased commitment of industrialized countries, private sector and international agencies.

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 occur both at the international and national levels. This may require assistance from resource rich countries to those who possess fewer resources.

Recommendations:

- The WHO National Focal Points should be encouraged to provide feedback to the WHO.
- Cost-sharing of surveillance in an inter- and multi-country approach should be initiated in order to help countries with limited sources to comply with the basic requirements of the revised IHR.
- The information targeted at marginalized and disadvantaged groups should be based on their voice, tailored to their competencies, perceptions and health literacy level, using tools that are accessible to them.

6. CONCLUSIONS AND RECOMMENDATIONS

We have outlined the various new challenges faced in outbreak communication in the 21st century, and suggest several new methods that can be used to facilitate the flow of information among different stakeholders. We began by suggesting a concrete definition for the concept of "stakeholder" in order to establish a more comprehensive and accurate outbreak information net, which emphasizes the specific communication needs of different level stakeholders. Consequently, new methods for a rapid and effective dissemination of critical information were introduced, including E-learning, social media, formal and informal surveillance systems. Finally, we reviewed the new challenges that derive from the implementation of the revised IHR and the new methods that assess IHR requirements, in the shape of different core capacities.

While the individual reports from each task included specific conclusions and recommendations, in D2.8 we tried to draw conclusions on a more general level, focusing less on specifics and more on the general relationship between healthcare and communication technologies. It is safe to say that the notion that resonates most strongly throughout the different reports is that the concept of "outbreak communication" in the process of containment of a pandemic has developed (together

with the communication technologies) to such an extent that it almost threatens to overshadow the pure healthcare aspect of virus containment. Hence, it is not surprising that almost twenty percent of the results in a Google search for the term "pandemic outbreak" (yielding approximately 6 million entries), deal, in one way or another, with the concept of communication. This anecdotal evidence only highlights the cardinal role communication have come to play in the equation of pandemic outbreaks. While this role was defined in extent through the individual reports, we would like to look at "outbreak communication" through a more aggregative level.

Similar to Pythagoras' famous quote "be silent, or say something better than silence", mass communication can be portrayed as a double-edged sword (although it can be argued that silence is not an option here, not anymore). While new methods for outbreak communication better accommodate the requirements of different stakeholders, their indirect effect is a growing digital divide that marginalizes source limited stakeholders. Moreover, social media facilitate the process of democratization of information, helping users to access a wide plethora of sources and get a broader understanding of the crisis but simultaneously it gives a pseudo-authorized stage for misinformation. One can mention numerous conspiracy theories that were published in the blogosphere during the H1N1 2009 influenza, ranging from the "swine flu as a spin to the Conservatives fight over public health reforms" to the "swine flu as a hoax of the pharmaceutical companies". Although these examples should be treated as a minority that doesn't reflect the whole, these publications obviously did not help to increase the rate of vaccination. Another new aspect of outbreak communication is informal digital systems for disease surveillance that develop in a rapid rate. Alongside with the potential these systems have, this has not yet been translated into the ability to provide useful, timely and focused information. Generally, when depending mainly on informal input (mass communication and internet based information), we have to be aware of the possibility that these informal surveillance systems can easily underestimate or overestimate the danger of the pandemic, resulting mainly in "noise" which has a deleterious effect on early detection and containment.

It appears that the rapid changes that occur in the world of media technologies make it almost impossible to draw conclusions and suggest recommendations regarding future outbreak communication technologies. Trying to speculate about new methods for communication that will be available in future outbreaks is like trying to prophesy an unknown future. In order to stress that point, we can call to mind different 20th century outbreaks and the vast differences in the communication environment that characterize each one. While the public's majority got the information about the "Spanish Flu of 1918" mainly from newspapers, one of the factors that eventually made the "Asian flu of 1957" less devastating, than its potential, was the relatively new medium of television that helped to distribute information (several programs featured actors that demonstrated symptoms of the flu).

During the 2003 SARS outbreak, already television was considered somewhat archaic tool for transmitting information, and the internet and SMS technology were used extensively. Just six years later, during the 2009 "Swine flu" pandemic, SMS technology seemed almost outdated by different social networks. Why would one waste precious time sending individual text messages, when you could log in to an account from any laptop and distribute information to an unlimited number of people? Interestingly enough, in 2013, the convergent nature of smart phones makes the relatively new technology of laptops seem passé. More than anything, this short review emphasizes two

characteristics of communication technology that are essential for outbreak communication. First, we don't really know what the next phase of communication technology is. Second, we do know that the time gaps between these technological revolutions are getting shorter all the time. With that in mind, we should continue the efforts to develop better predictive models for the dynamics of the spread of infectious diseases. Simulation of likely scenarios can help to predict public responses, and guide the development of optimal surveillance and interventions.

In conclusion, as the individual reports suggest, the main challenge for outbreak communication is successfully identifying new methods that help us answer the communication requirements of diverse groups of stakeholders. Clearly we need to improve traditional channels of communication and establishing of new channels. The challenge for WHO (and possibly ECDC and CDC) as a global health authority should be to establish a global stakeholder's net, where information is transmitted rapidly and efficiently, and there is constant feedback. This stakeholders' map will assess different communication requirements of international, national and local actors. Finally, it is important to note that the primary challenge of this net could be the communication with the more peripheral actors that might not appear in the front lines of outbreak communication but serve as an information bridge to important stakeholders and have enough power to influence decisions of policy-makers and the public opinion.

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APPENDIX I

List of outbreak communication stakeholders

LEVEL	STAKEHOLDER
INTERNATIONAL	WHO
	OIE
	WTO
	UNWTO
	UNICEF
	IOM
	IFRC
	EDQM
EUROPEAN	ECDC
Institutions & Agencies	EMA
	EC – DG SANCO
	EC – DG RTD
	EC – DG ENTR
	EC – DG CONNECT
	EC - EAHC
EUROPEAN	EPHA / EUPHA / CPME / PGEU / UEMO / EFN / FVE / ASPHER /
Associations (Healthcare)	НОРЕ
EUROPEAN	EFPIA / GIRP / IFAH / EuropaBio / AVC
Associations (Vaccine-Industry)	
NATIONAL	Ministry of Health
	Surveillance Institute for Public Health
	Medicines Regulatory Agency
	Non-Governmental Organisations
	Religious and cultural institutions
REGIONAL / LOCAL	Prefectures / Municipalities/ Regional government (federal
	countries)
	Hospitals / Clinics
	Local / Regional nealth services
	Animai / veterinary nealth agencies
	Primary schools
	General Practitioners
	Ethnic / Minority / Religious groups
	Local political parties
	Opinion leaders
	Anti-vaccine groups
INDUSTRY	Vaccine manufacturers
	Vaccine wholesalers
	Vaccine exporters
	Hygiene products (e.g. masks, soaps etc.) manufacturers
MEDIA	Mass media (Broadcast & Print)
	Social media
	Science journalists

APPENDIX II

Stakeholders Validation Panel

Name	Description
Nedret Emiroglu	Deputy Director, Division of Communicable Diseases, Health Security and Environment, WHO Regional Office, Copenhagen, Denmark.
Eleonora Gvozdenovic	Professor of Medicine, Dept. of Infectious Diseases, University of Belgrade, Serbia
Antoine Flahault	Professor of Public Health at Descartes School of Medicine, Sorbonne Paris Cité, France
Jonathan Zenilman	Professor of Medicine, Chief, Infectious Diseases Division, Johns Hopkins Bayview Medical Center
Michael Hopmeier	Director, Unconventional Concepts Group, Washington, USA
Michel Setbon	Director of Research Emeritus, CNRS, France
Fabrice Carrat	Influenza Epidemiologist, France
Patrick Zylberman	Historian on Epidemics of Communicable Diseases, France
Chloe Sellwood	Pandemic Influenza Resilience Manager & Horizon Scanning Lead, NHS, London, UK
Xavier De Lamballerie	Emerging Pathological Viruses Division, Faculty de Médecine de Marseille, France
Dorit Nitzan Kaluski	Pediatrician, WHO Representative and Head of Country Office in Ukraine.
Roei Tzezna	Editor of the "Different Science" blog, Israel
Yaraon Asa	Editor of the "Reasonable Doubt" blog, Israel
Yaffa Shiraz	Health Journalist. Israel
Rami Grefat	General Practitioner, Israel

APPENDIX III

Interview Protocol with the validation panel

Introduction to the interview

We thank you for agreeing to be interviewed about the materials we sent you. We would like to ask you a few questions regarding the recommendations that arise from it. It is also important to clarify that we want to get feedback from you so feel completely free to speak your mind. Thank you for your cooperation.

Questions for representatives of NGO-Associations

- Cooperative issue what do you think of the recommendation in the report that the next epidemic crisis preparedness have to include a strategy that will enable more effective sharing of information among stakeholders both on a national level and on a global level?
- Exclusion of disadvantaged groups what about the recommendation that stakeholders on all levels should put special emphasis on the communicative needs of disadvantaged groups? Furthermore, would you agree that outbreak communication should reduce the knowledge gaps in society?

General physicians

• During the crisis in 2009, information was complex and contradictory which led the GPs to feel that they have the best tools to communicate the vaccine for the public. What do you think about this situation?

Questions to representatives of the Ministry of Health

- There is one recommendation that promotes the establishing of two-way communication between the public and the authorities by using social media. What do you think of this recommendation?
- Collaboration of stakeholders One of the recommendations of the report is the participation of different stakeholders at program evaluations for the public. Stakeholders who often are not exposed or not at the center stage of health communication, yet they have a great impact on public opinion. What do you think of this recommendation?
- One of the new methods to distribute information during an outbreak can be through software designed for health workers. The goal is to develop a tool for E-learning. Namely, online learning which allows transfer of information. What do you think about this recommendation?

- One of the questions that arise is how to help source limited countries with the funding of effective pandemic surveillance. One of the recommendations that comes up in the report is to create regulation that will allow equal burden between countries which have the ability and the countries with more limited resources what do you think about this recommendation?
- In order to establish effective communication channels between the member states and the World Health Organization, member states were asked to establish communication outlets aimed to sustain a communication channel with the World Health Organization (NFP). What are the considerations that should be taken in setting up such routine channels that will serve various stakeholders on the national and international levels?
- The main issues concerning pandemic outbreak response deals with the right balance between responding appropriately without creating panic. How do you think the public should be warned about an outbreak? And what are the ethical considerations to be taken into account when planning the response?

Questions for the press (traditional media and new media)

- Results indicate that traditional media such as television and radio are still perceived as having the greatest influence in shaping the public opinion, though not necessarily as the most reliable sources of information. This recommendation is that risk communication experts should be involved with shaping the messages which will increase the sense of its social responsibility and reduce considerably disinformation among the general public. What do you think of this recommendation?
- The report shows that while social media promotes the democratization of information it is not yet implemented in a consistent way among health authorities. It seems that the most effective outbreak communication should maximize the potential of social media platforms. How about this recommendation?
- One of the dilemmas that arise from the study is how to prepare better for the next crisis. One of the ideas is to conduct risk communication campaigns during routine - what do you think of this idea?

Questions for pharmaceutical companies

• What do you think of the recommendation in the report that the next epidemic crisis preparedness has to think of a strategy that will enable more efficient collaboration of various stakeholders who can fill specific roles both nationally and globally?

Questions for academics

• Another aspect is being addressed in the report, is the theme of "accountability". Namely, the absence of regulation or effective mechanisms to support and initiate an immediate intervention by a competent authority will create a situation where stakeholders that are not authorized to distribute messages will take this role. Hence, we recommend to better define the roles of the various stakeholders. Would you agree with this recommendation?

• Do you agree with the recommendation that health organizations on all levels should put special emphasis on the communicative needs of those disadvantaged groups and adjust both the specific messages and the general strategy in order reduce the knowledge gaps in society?

Questions to representatives of marginalized populations

- Another issue that emerges from the study, concerns the excluding of many groups from the communication process during a pandemic outbreak. Do you agree with the recommendation that health organizations on all levels should put special emphasis on the communicative needs of those disadvantaged groups and adjust both the specific messages and the general strategy in order reduce the knowledge gaps in society?
- What do you think of the recommendation in the report that the next epidemic crisis preparedness has to think of a strategy that will enable more efficient collaboration of various stakeholders who can fill specific roles both nationally and globally?