A new integrated Pandemic Threat Index

policy briefs

EXECUTIVE SUMMARY

Efficient communication among different stakeholders, including the public, is essential to mitigate the spread of epidemics. In order to prevent or minimize harm from emerging infectious diseases in the future, a mutual language among various players is needed. The first point to agree with, in order to prepare for a pandemic, is therefore a shared threat index for establishing **what** a pandemic is and **when** it has to be declared.

Within EU funded **TELL ME Project**, experience from 2009 A (H1N1) has been studied and three alternative risk communication scales for pandemics have been analysed: WHO revised pandemic phases (2013), CDC Pandemic Severity Index (2007) and Sandman's risk Scale (2007). Though each threat index is comprehensive, considering the practical tools they offer, their alert phases are very much oriented to different aspects.

Namely, the WHO's risk assessment of influenza virus with pandemic potential is based on the **geographical spread** of the threat, CDC pandemic index is **severity-based** and Sandman's communicational phases emphasize **public perception** of the risk. Subsequently, these three phase systems do not overlap but rather complement each other. We therefore recommend integration of the pandemic communication phase's threat index. The **TELL ME integrated threat index** phases consider geographical threat, severity and public risk perception.

BACKGROUND

TELL ME (Transparent Communication in Epidemics: Learning Lessons from experience, delivering effective Messages, providing Evidence) was a 36 month EU-funded collaborative project within 7th Framework Programme (GA 2787233) headed by a consortium of multi-disciplinary experts from prestigious institutions in countries. The objective of TELL ME was to identify new communication strategies for improving the effectiveness of the preventive measures undertaken during epidemics.

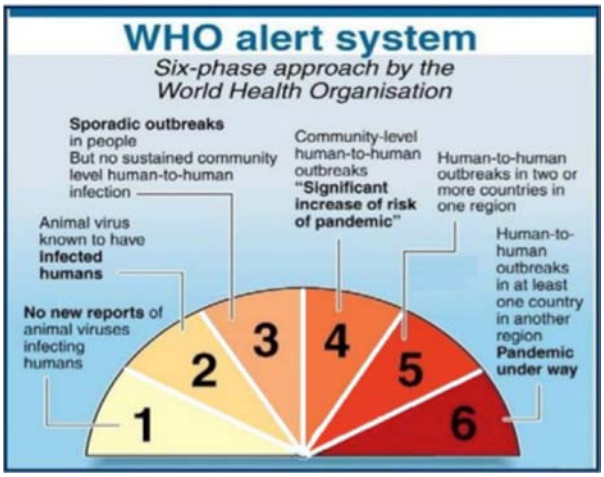

Figure 1: WHO six phase threat index (2005)

TELL ME experts focused on the 2009 A(H1N1) influenza outbreak as a **case study**, both as the first 21st century pandemic and as the first pandemic since WHO produced pandemic preparedness guidance.

In such crisis the 2005 WHO Global pandemic six-phases threat index, set following H5N1 bird flu and SARS crisis, showed its own limits. Considering only the geographical spread of the outbreak and using a professional language, it contributed to produce misunderstanding among international organizations, the media and the general public, with a boomerang effect on public trust towards health authorities. The WHO declaration of a global flu pandemic on June 11, 2009, raising the alert level to phase 6, did not imply severity, only pertained to the wide geographic spread of the new strain of flu virus and was not meant to cause alarm, but was necessary to start the implementation of preparedness actions (like the production of vaccines). Media and the public, however, interpreted this as a declaration of an impending catastrophe. The milder than expected evolution of the pandemic was taken by many as a proof that the declaration had been driven by economic interests.

Most people discovered that the criteria by which WHO declares a phase 6 pandemic, has little relevance to their daily routine. In the end, the lack of accessibility and relevance of the six-phase index to the intensity of the level of public concern led growing mistrust towards health authorities at general and WHO particularly.

To better define when a pandemic should be declare is not therefore an academic issue, but a keypoint in order to rebuild trust and improve preparedness.

APPROACHES AND RESULTS

While developing a set of guidelines for actors involved in the outbreak communication process, TELL ME project outlined the concept of a threat index as a practical tool. We critically examined different revisions of the WHO threat index: what it means, how it is used, to what extent it can confuse, from its first version in 1999 until its most recent modification in 2013. Based on lessons learned from H1N1 2009 pandemic, we presented three alternative risk communication scales: WHO revised pandemic phases (2013), CDC Pandemic Severity Index (2007) and Sandman's risk Scale (2007).

WHO revised pandemic phases (2013)

In 2013, in direct response to lessons learnt from the 2009 pandemic, WHO introduced a new approach to the influenza threat index, as a part of a Pandemic Influenza Revised Risk Management interim guidance document.
The previous six-phase system, which relies solely on geographic spread without any acknowledgement to the severity of disease, had been criticized for being inflexible and confusing.
A new four-phase system was proposed, in order to encourage national authorities to develop tailored risk management plans, which consider the situation at a local level.
The new WHO pandemic phases work on two complementary axes - the global phases and the local risk-based phases. The global phases - interpandemic, alert, pandemic and transition, describe the spread of the new influenza subtype. Hence, this global risk assessment derives directly from WHO surveillance efforts. However, Member States are advised to develop their own national-level risk assessment which is based on local threat index.
An interesting element of the revised WHO threat index is its emphasis on communication as a tool to understand public perception and develop an appropriate risk assessment.

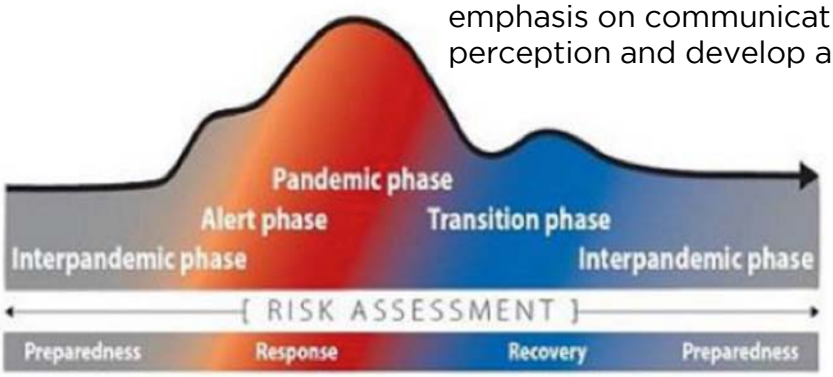

Figure 2: the 2013 WHO four-phase threat index

CDC Pandemic Severity Index (PSI)

To answer the need to communicate specific information to different level stakeholders (states, communities, businesses and schools), the CDC developed a Pandemic Severity Index (PSI). This threat index considers the **severity** of the potential pandemic and translates it to **specific guideline**s for individuals and communities. Adopted from an index that used to categorize hurricanes (the Saffir-Simpson Hurricane Scale), the PSI builds upon the knowledge of past pandemics to forecast the severity level of future pandemics based on mathematical models (Public Health Alert, n.d.) . Namely, this threat index focuses less on the geographical spread and more on the severity of the virus which is the fatality ratio, the percentage of deaths out of the total reported cases.

Unlike WHO's threat index, the PSI is ***relevant only to a situation of a pandemic***, the equivalent of phase 6 in the current phase system (or phase 4 in the revised index 2013). The scale introduces a classification of pandemics based on their severity, meaning that category 1 is the mildest (something like a seasonal flu) and category 5 is the most severe pandemic (equivalent to the 1918 influenza). However, the most significant feature of this threat index, is the guidance that follow each category, framing specific actions individuals and community should consider during a pandemic. The tool takes into account the fact that the amount of harm caused by pandemics can vary greatly, with that variability having an impact on recommended public health, school and business actions.
The biggest advantage of these guidelines is their simplification. Focus on potentially life-saving details is evidently missing from WHO threat index. Nevertheless, the real test for such guidelines is their level of implementation at an early stage of the pandemic: PSI's emphasis on pandemic phase highlights its dependence on external threat scales (such as WHO's index) to declare the pandemic by monitoring also the earlier stages.
This sort of specification could have been beneficial also during the preparedness stages.

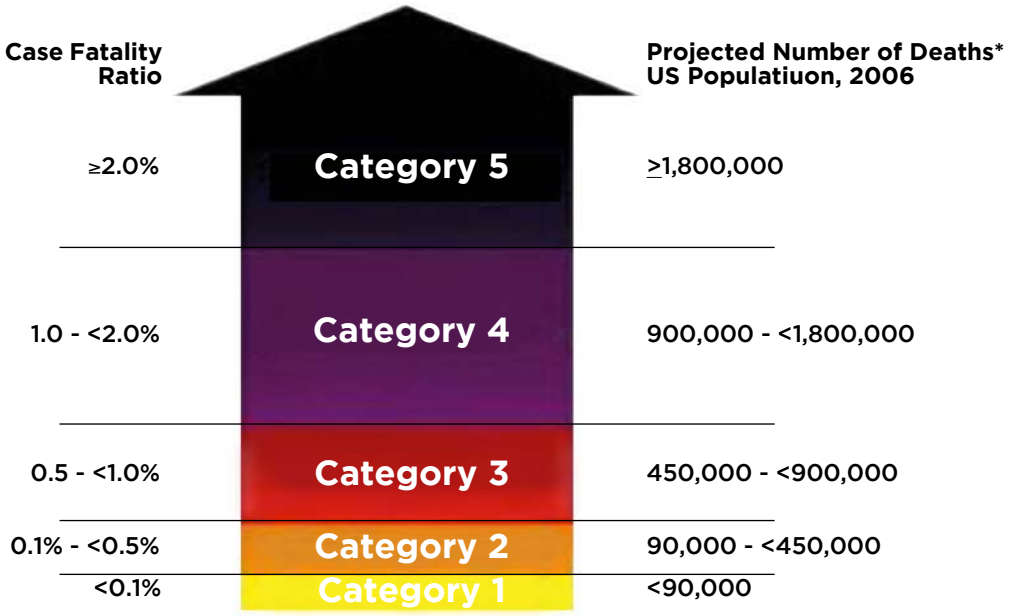

Figure 3: CDC pandemic severity index

*Assumes 30% illness rate and unmitigated pandemic without interventions

	Pandemic Severity Index		
Interventions by Setting	**1**	**2 and 3**	**4 and 5**
Home			
Voluntary isolation of ill at home (adults and children); combine with use of antiviral treatment as available and indicated	Recommend	Recommend	Recommend
Voluntary quarantine of household members in homes with ill persons (adults and children); consider combining with antiviral prophylaxis if effective, feasible, and quantities sufficient	Generally not recommended	Consider	Recommend
School			
Child social distancing –dismissal of students from schools and school-based activities, and closure of child care programs	Generally not recommended	Consider: ≤ 4 weeks	Recommend: ≤ 12 weeks
–reduce out-of-school contacts and community mixing	Generally not recommended	Consider: ≤ 4 weeks	Recommend: ≤ 12 weeks
Workplace/Community **Adult social distancing**			
–decrease number of social contacts (e.g., encourage teleconferences, alternatives to face-to-face meetings)	Generally not recommended	Consider	Recommend
–increase distance between persons (e.g., reduce density in public transit, workplace)	Generally not recommended	Consider	Recommend
–modify, postpone, or cancel selected public gatherings to promote social distance (e.g., stadium events, theater performances)	Generally not recommended	Consider	Recommend
–modify workplace schedules and practices (e.g., telework, staggered shifts)	Generally not recommended	Consider	Recommend

Figure 4: PSI intervention guidelines

Sandman's Risk Communication Phases

Neither WHO revised pandemic phases (2013) and CDC influenza severity index take into an account public concern, a keypoint in the complementary phase system proposed by Peter Sandman, an expert in risk communication, in 2007, who consider the impact of the location of the outbreak as well.
Unlike other public health risk systems that use colour coding to connote the risk assessment, Sandman's threat index uses a temperature code, highlighting the importance of teachable moments as a vehicle to focus public attention towards effective messages.
This approach is especially important if we consider outbreaks not merely as an immediate threat but also as an opportunity to educate people, and maybe help prevent or mitigate the next potential pandemic.

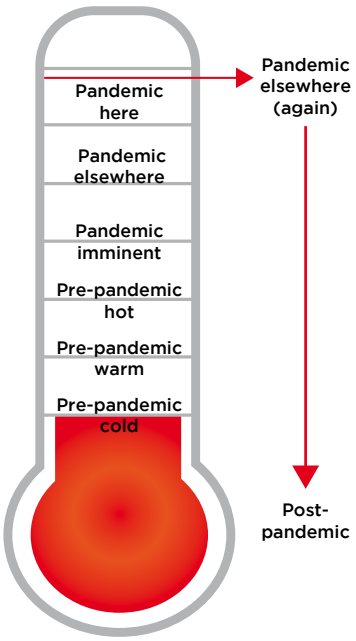

Figure 5:
Sandman's risk communication index (2007)

LEGENDA

- **Pre-pandemic cold** - is a quiet phase when the risk perception and the level of interest is so low that there is no possibility of communication on the issue.
- **Pre-pandemic warm** - communication about a potential risk, stressing the human-to-human infection or the new subtype virus danger, can be started in order to raise pandemic preparedness (posters, ads, ...).
- **Pre-pandemic hot** - official declarations or special media events with healthcare authorities (such as TV interviews) can educate people and initiate involvement in the potential emergency.
- **Pandemic imminent** - people are paying great attention in this time of great uncertainty, with the pendulum moving from a severe pandemic to a mild one. Preparedness messages have to be issued, shifting from arousing concern to validating people's rising fear, and guiding them through it.
- **Pandemic elsewhere** - more data are available and the severity of the pandemic can be better predicted. Optionally, it could be a good time to integrate CDC PSI so that different level of pandemics could be addressed with different messages.
- **Pandemic here** - overwhelming information should be translated into specific instruction for different level stakeholders. At this stage, the messages should emphasis on the heroes of the crisis but also on the victims.
- **Pandemic elsewhere (again)** - the pandemic wave moves away and it is a time to regroup .
- **Post-pandemic** - it is the phase when communication becomes crucial to help recover. Messages should illustrate different scenarios regarding the development of the next pandemic (that might arrive sooner than expected).

TELL ME INTEGRATIVE WHO THREAT INDEX

Alert phases in the three considered indexes rely on different aspects, each of them relevant for preparedness and response to pandemics: geographical spread of the threat, severity of the disease (and how to counteract it) and communication issues. These three phase systems do not overlap but rather complement each other, having unique objectives but different targets.

The immediate recipients of the WHO threat index are the Member States that under the revised IHR 2005 are affected by these phases in terms of border closures, trade restrictions and other global regulations. The global phases (inter-pandemic, alert, pandemic and transition) describe the spread of the disease around the world, but, as pandemic emerges, countries and communities face different risks at different times. In other words, by their definition, WHO's phases are global thus they cannot account for the local circumstances. This gap should be filled with CDC pandemic severity guidelines which constitute for the local and individual alert levels. These are more flexible phases that call for actions that could save lives by taking measured preventive steps.

Finally, Sandman's communication phases are directed towards media. This index is a practical tool to establish a channel with the public as it distances itself from professional definitions of threat and risk, to adopt a more common language which addresses different types of risk perception. Moreover, it is not merely a guideline that helps to construct effective messages but also an important tool that tries to predict the most suitable episodes during a crisis, which can serve as teachable moments. This approach is especially important if we consider outbreaks not merely as an immediate threat but also as an opportunity to educate people, and maybe help prevent or mitigate the next potential pandemic.

TELL ME INTEGRATIVE WHO THREAT INDEX

PANDEMIC COMMUNICATION PHASES		
Communication phase	WHO pandemic phase	CDC pandemic severity
1. Pre-pandemic cold	1 or 2	
2. Pre-pandemic warm (little public attention)	3	1
3. Pre-pandemic hot (teachable moment)	3 or 4	1
4. Pandemic imminent	4 or	2 or 3
	5	2 or 3
5. Pandemic elsewhere	6	4
6. Pandemic here	6	5
7. Pandemic elsewhere (again)	6	4
8. Post- pandemic	1 or 2 or	1
	3 or even 4 (for different strain)	

Figure 6:
Integrated TELL ME Threat Index

RECOMMENDATION

In summary, we recommend to connecting the three scales into a united and integrated pandemic communication phase's threat index. The integrated threat index phases will be designed to consider geographical threat, severity and public risk perception. This comprehensive index might be the solution for the shortcomings of the current WHO threat index, without missing its many advantages. It could offer the most practical tools for outbreak communication with different stakeholders, takes into account international, national and local risk assessments.