Manual of good practices and procedures for a

Severe Influenza Pandemic

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This ***quick guide*** refers to the 80-page document "Preparedness and response to a severe influenza pandemic in a Macaronesian island", which is accessible in Spanish at http://www.plescamac.com/ (under "Publicaciones") and at http://ResilienceMaps.org. The 80-page document includes an index (pages 3-5) and a practical recap (VI), which may also be useful as an overview.

1. Rationale:

- Pandemic emergence mechanisms: (II.1 and II.2 in the main document)
  - Influenza viruses change genetically through 2 mechanisms: mutation and hybridisation.
  - Emergence of new varieties ("subtypes") and some human cases appear to be inevitable.
  - A pandemic emerges when a new subtype, to which most of the human population has no specific immunity, becomes easily transmissible. Several epidemic "waves" of differing severity unfold over 1-2 years, until the virus is not new for most of the human population and becomes a seasonal virus.
- Possibility of a severe pandemic: (II.3)
  - History shows 2-4 pandemics per century, at 9-50 year intervals. Some pandemics have been severe, with high overall mortality, and deaths in previously healthy young adults.
  - Present-day surveillance of influenza viruses at the animal-human interface shows a number of pandemic "candidates": animal-adapted viruses that have caused disease in humans, with different initial severity. Among them, A(H5N1) ("bird flu") is widespread and can be found in wild birds. The apparent death rate in humans is high, and the virus has diverged genetically so that now there are more than 20 varieties ("clades").
  - Laboratory research on ferrets has shown how A(H5N1) from birds can become transmissible among mammals through respiratory contact. Scientists do not know how its severity would change were it to become transmissible among humans.
- Impact of a severe pandemic: (II.4)
  - A severe pandemic would have direct effects: many cases of respiratory disease, a substantial proportion of them severe enough to require hospitalisation, and deaths (perhaps in previously healthy young adults). A spreadsheet may be used to build numerical scenarios (V.1 and VII.2).
  - Direct effects would secondarily cause preventive behaviours. In particular, the following should be anticipated:
    - Variable but great absenteesm, particularly relevant in health-care and other vital

services.

- Supply issues due to simultaneous demand for certain resources and to absenteeism in the transport network, both worsened by a tendency to stock-up and by systemic amplifying feedback.
- Difficulties in flexible and agile coordination among the many agents involved, and a certain degree of media distortion.

- Severe pandemics and other systemic crises: (II.4.d and VII.4)
  - Preparedness and response to a severe pandemic forces us to consider impacts and response elements that are in part specific to influenza (reducing infections, treating the ill) together with others that may be comparable to those from other severe systemic crises: those caused by deep economic trouble, climate crises, energy supply crises, etc.
  - All those situations, due to their intrinsic complexity, may benefit from simple tools that would facilitate prioritisation, make communication more effective even in a "noisy" environment, and help with reinforcement or redesign of vulnerable basic systems.

2. Aims of preparedness and response:

- Aims of the whole of society:
  - "Prevent": reduce infections, particularly in places where the infection rate is greatest, where respiratory contact is inevitable, or where activities vital for the whole of society are carried out.
  - "Treat": care for those ill from pandemic influenza and those with other important diseases.
  - "Cope": mitigate the consequences of socioeconomic disruption caused by absenteeism, supply issues and ineffective coordination.
- Aims in coordination:
  - Acquire and update situational awareness: "shared map".
  - Update aims (societal and within each organisation) and redesign systems if needed: "shared plan".
  - Delegate: distribute functions.
  - Communicate with other entities: ask for or give specific help, relying on shared vocabulary.
  - These aims would be approached with the combined use of OODA and SCIM, as follows.

3. OODA loop: (IV.2)

- Observation: monitoring rumours and information systems (pre-existent or designed for the pandemic), listing known-knowns and known-unknowns.
- Orientation: mapping priorities, threats, vulnerabilities.
- Decision: generating alternatives (map of possible actions), selection of alternatives (effectiveness, flexibility).

- Action: including requesting, facilitating and limiting others' actions.

4. SCIM (simple critical infrastructure maps) model: (IV.1)

- Needs, not systems: If vital systems fail, needs still exist, which is why it is more useful to focus on needs and how to fulfill them. In some circumstances it will be possible to reinforce or prioritise certain systems. If they are vulnerable, if they become insufficient and fail, or if they need to be changed, say, to reduce infections – then they need to be complemented; or alternatives need to be designed, using strategies such as redesigning systems so they will use less resources, descentralisation, sourcing from more global or more local levels, stocking up before the crisis, repurposing existing resources, etc. (IV.1.c).
- Jurisdictional levels: Needs are fulfilled locally with respect to the individual, group or organisation; but part of the needed resources and decisions come from more distant levels. It is useful to consider as levels the individual, the household, the neighbourhood, the town, the island, the region, the country and the international level. If a given level fails, it is possible to search for solutions in other levels.
- Vital needs of individuals: Vital needs – those required to keep people alive – are prioritised above all other needs in order to minimize the number of deaths due to excessive heat and cold, hunger and thirst, preventable and treatable disease, and accidental or violent injuries.
- Needs of groups: Groups need workspace, transport, communication and ways to control the resources they share within the group. It is possible to function as a group if some of these elements are missing, compensating them with the other elements.
- Needs of organisations: Organisations – groups with a common goal that is external to the group – need a shared map of reality, including the organisation's aims, acceptable practices, etc. They need a shared plan, with various degrees of detail depending on the level within the organisation. They also need a way to add and replace their staff, especially critical staff such as directors and specialists.
- Needs of states: Since states are organisations bearing responsibility for the whole of a population within a territory, states' functions – borders and population, law and order, gaining and keeping international recognition, etc. – depend on their having effective organisations, which is why everything that is applicable to organisations is also applicable to states.

5. Using OODA/SCIM in different moments and scales: (IV.3)

- Population overview: At the onset of the pandemic – or before it starts – it is useful to thoroughly review all SCIM items in order to detect threats, vulnerabilities, and possible changes. This inventory will help planners draw the list of possible entities (individuals, groups and organisations) who will be in a position to cooperate in organising the best possible response given the circumstances.
- Within an organisation: Organisations have their own procedures refined by use, but a severe pandemic may force them to adapt to a radically different situation. Each organisation may draw a SCIM map for their territory and for the organisation itself, in order to reassess their priorities and redesign their activities. Health-care is a model for special cases, as seen later.

- Between organisations: Each organisation will be able to use the OODA and SCIM frameworks as a "simplified shared vocabulary", to communicate with other organisations, plan together, and request and offer resources and services.

6. Reduce infections: (V.2)

- Need: Reducing (or at least delaying) infections is needed to delay the wave (thus buying time to implement the other strategies), to reduce the number of cases at the peak of the epidemic wave (and with it the excessive point load on health-care and other systems) and, if possible, the total number of cases.
- Strategies – early, stacked and facilitated: Both history and mathematical models show the following strategies are effective if applied soon enough. No single one of them is sufficient on their own, but applying several of them simultaneously can achieve an important effect. (The strategy works like wearing two raincoats, both with holes but in different places, so that together they provide greater protection.) Organisations' and groups' missions should include facilitating these strategies for the whole of society's individuals, groups and organisations.
  - Isolation: Applies to individual with symptoms, for as long as symptoms last (7-10 days). This strategy is considered useful during the whole pandemic.
  - Quarantine: Applies to respiratory contacts of individuals with symptoms, for as long as incubation lasts (3-4 days). This strategy is not considered practical when there are many simultaneous cases (i.e. around the peak of each pandemic wave).
  - Reducing respiratory contacts: Considered essential in a severe pandemic. It includes canceling public events, sending students home, using asynchronous transfer, using communications instead of sharing workspace, adapting workflows to reduce or avoid respiratory contact, etc. Many of these strategies are by themselves disruptive and require facilitation and adaptations. There are strategies to decompress populations and to protectively relocate specialised staff.
  - Barriers: Are emphatically not a substitute for contact reduction. They include surgical facemasks, FFP2 (95% filtering), FFP3 (99%), washable facemasks (e.g. made with t-shirts according to published patterns) and screens like those used in banks between employees and customers. Those who are ill can wear facemasks to reduce the likelihood that they will infect the healthy around them, and healthy individuals may use them to reduce their own chances of becoming infected (which also protects others "downstream").
  - Hygiene: Entails practices such as coughing or sneezing in a sleeve, using disposable handkerchieves and disposing of them safely, frequently washing hands with soap and water or with alcohol-based products, and cleaning surfaces.
  - Vaccines: Present-day technologies would probably produce vaccines late in the pandemic and in smaller quantities than needed (globally and for each country). Distribution must be organised beforehand, pending final prioritization which should be based on scientific criteria and recent solid data.

7. Treat the ill: (V.3)

- Staff: Prepare reinforcement and substitutions (unemployed, retirees, students, those with similar knowledge areas – and, further into the pandemic, the "likely immune"), protocolisation and cross-training (several people learn the basic frequently used skills), and tutoring (requesting advice from those with more knowledge and experience).
- Supplies and services: Hospitals, for example, are organisations with specific needs. This includes services (sterilisation, internal transport, etc.) and supplies (essential medication and products like oxygen, infrastructure elements, etc.) to a grand total of at most 50-100 critical items. It is possible to find or design substitutions for some of these items and, in any case, to compute needed quantities as a function of the population and of how long the supply crisis might last.
- Information, triage and transport: These are everyday functions of health-and-transport call-centers. It is possible to design complementary or alternative systems, to be activated in an emergency situation, with identical protocols but with multiple distributed access points. Transport may be complemented with help from social cooperation.
- Health-care centers general actions: Draw up numerical scenarios with expected volumes of cases categorised according to severity and urgency, and with a range of levels of health-care worker absenteeism. "Sectorise" (define zones within the health-care center) to avoid contagion from patients with respiratory illness, set up barriers, delay elective surgery, deliver health-care by phone when possible, lodge health-care workers outside their homes, etc.
- Primary care, outpatient clinics and emergency rooms: (See previous point on general actions.) Empower home-care, design/test/deploy self-applicable protocols, and support organisation of care among neighbours (including calling for professional health-care).
- Hospital admissions and surgery: (See previous point on general actions.) Create hospital networks, and specify hospitals with different functions (respiratory, convalescents, etc.).
- Surveillance and research: Collect and centralise minimalist but useful data, complete research protocols (or participate in wider networks) to assess the effectiveness and best use of promissing medications such as inmunomodulators (statins and other generics), etc.

8. Cope with disruption – health-care system specifics: (V.4)

- Disruption is the set of second and third order effects, caused by high case volumes, by the interest in reducing the number of weekly infections, and by supply issues. In itself, disruption can be an additional cause of deaths, on top of influenza. (II.4)
- From the health-care system perspective, the goals – together with reducing infections and treating the ill – are reducing disruption in the health-care system itself and making appropriate recommendations and requests to other sectors within society to reduce theirs.
- Individuals: Draw a SCIM-Individual map for patients and health-care workers, to guarantee that their needs are covered in terms of protection from too hot & too cold, hunger & thirst, disease & injury.
- Groups: Draw a SCIM-Group map for health-care teams, making adaptations and substitutions as appropriate in workplaces (consider changing the location of outpatient

clinics), transport and communications, and resource control.

- Organisations: Review the necessary structures in health-care organisations (comitees and networks) so that they will be able to update their situational maps, action plans, substitutions in case of illness, etc. – with agility. Review contacts with other organisations, with which cooperation will be necessary.

9. Summary:

- History, laboratory science and surveillance all show that a severe influenza pandemic – one with potential for very high levels of deaths and disruption – is a real possibility.
- In such a pandemic, excess deaths would be caused by the disease itself and also by the disruption of vital systems. Some effects of a severe pandemic are shared by other (non-pandemic) causes of severe global systemic disruption.
- Strategies are outlined for agile cooperation, in order to minimise infections, organise health-care and meet the vital needs of individuals, groups and essential organisations.

10. Some reference documents:

- http://www.msc.es/ciudadanos/enfLesiones/enfTransmisibles/pandemia/home.htm (Spanish and English).
- http://www2.gobiernodecanarias.org/sanidad/scs/content/33572f5b-df21-11de-abad-f78c69e03620/PlanPandemiaGripeCanarias2009-2.pdf (Spanish).
- http://www.gobcan.es/boc/2006/113/001.html and http://www.gobcan.es/boc/2009/086/pda/006.html (Spanish).