

WORK PACKAGE 2: THREAT ANALYSIS, SURVEILLANCE & DIAGNOSTICS

Research summary

Authors

The first two parts (Threat analysis and Analysis of current risk assessment and surveillance) were conducted by a team from the Public Health Agency of Sweden (FoHM), including Ms Anna-Lena How, Dr Lisa Brouwers, Dr Anders Tegnell, Margot Einöder-Moreno, and Hanna Merk. They were assisted by Dr Göran Bucht from the Swedish Defence Research Agency (FOI).

The third section (Review of existing diagnostic technologies) was conducted by Dr Anne-Sophie Piette, Dr Olga Vybornova and Dr Jean-Luc Gala, from Université catholique de Louvain (UCL), Belgium.

Work overview

This work stream was divided into three distinct parts:

- 1) Threat analysis: conduct a risk and threat analysis based on a review of relevant literature, and to determine the most likely and useful scenarios for pandemic preparedness and response.
- 2) Analysis of current risk assessment and surveillance: analysis of systems, practices and technologies used in these areas, and existing gaps through four country case studies (Sweden, Ireland, England and the USA) and expert input.
- 3) Review of existing diagnostic technologies: examination of currently available diagnostic technologies in Europe, identification of current gaps and possible solutions.

Summary of findings

The first part of this work stream identified four different scenarios exploring the possible impacts of a range of different pathogens: pandemic influenza, emerging non-influenza respiratory disease (such as SARS/MERS CoV), weaponised smallpox, and vector-borne Venezuelan equine encephalitis. For each of these diseases narrative scenarios were constructed, following a timeline on different geographic scales, in order to support the identification of current threats and gaps in the following phases of the PANDEM project. Both structured interviews and open-ended discussions among experts and stakeholders

did gain from focusing around these scenarios which provided a common frame and made discussions more concrete. Scenarios highlighted the need for collaboration between actors and different sectors for effective pandemic management, and were used in subsequent work to test thinking around gaps and solutions across surveillance, governance and communications. The four disease-centric scenarios were complemented with two additional scenarios: one highlighting issues regarding governance, including legal and ethical issues, and a one highlighting issues regarding ICT and social media.

In the second body of work, both good examples and gaps in surveillance practices were highlighted. Good practice in surveillance and risk assessment was found to consist of making unknown diseases and syndromes notifiable, ICU surveillance, expert collaboration across different networks (e.g. veterinary and public health), information sharing and risk assessments via ECDC and WHO, compiling lessons learned at EU level, strong local capacity, standardised processes at national level, and disease investigation along the lines of the UK's First Few 100 cases procedure. Across all different areas, having procedures and teams prepared was deemed essential. Possible areas for innovation and further work included developing better tools for analysing, interpreting and presenting big surveillance data, maintaining up to date expert networks, educating clinicians about rare diseases, training for outbreak investigation, agreements for better information sharing, automating collection of some types of surveillance data, and personnel management to prevent burnout during an outbreak. Improved understanding of local cultures for global missions and assessing baseline community-level data for pandemic comparison were also found to be important.

The third review identified important research and innovation needs to improve diagnostic capacities for pandemic-prone pathogens and build capacity for pandemic management. Findings covered possible improvements in five main categories: sample transport, laboratory capacity (infrastructure, equipment and diagnostic tests), information management (sample tracing, LIMS and result communication), training and laboratory networks.

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