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Evaluation of national pandemic management policies—A hazard analysis of critical control points approach

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ABSTRACT

Analyses of pandemic preparedness policies revealed weaknesses in control systems of European nations. This reinforces the need to support countries in their endeavours to prevent and contain pandemics. A Hazard Analysis and Critical Control Points (HACCP) was applied to a generic plan to identify weaknesses in pandemic management policies, in order to develop recommendations for improving national pandemic management systems. Policy components considered in our analysis are command and control, early case detection and disease surveillance, and community containment management. The main critical areas identified in national pandemic control were: communication systems among all institutions and levels involved in pandemic management, guidelines and regulations describing how key personal and institutions should operate during a pandemic, training and dissemination of information to health care personnel involved in outbreak management. The HACCP analysis highlighted the need for agreed communication structures, clear division of responsibilities and harmonised policy guidelines at all levels of pandemic management. Being prepared is the key to successfully coordinate and implement response measures when a pandemic emerges.

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1. Background

Improving Europe's preparedness for pandemic influenza is one of the top priorities on the agenda of international and national institutions for communicable disease control. The European Commission along with the European Centre for Disease Prevention and Control (ECDC) and the World Health Organization (WHO) are supporting countries to improve their national pandemic influenza preparedness. They regularly publish and update recommendations for national pandemic control systems [1,2] and conduct expert meetings and country visits to improve the ability of European nations to manage an influenza pandemic [3]. However, preventing and controlling emerging infectious diseases is a complex issue since many institutions at different administrative levels are involved in this process. Command and control structures to co-ordinate outbreak response, measures for early case detection and surveillance, preparedness of health care facilities and laboratories, as well as the ability of public health offices to install community containment measures or to maintain public services are part of national pandemic planning [4]. Different studies of national pandemic control systems have been conducted, e.g. by assessing the national preparedness status according to indicators generated from recommendations for good influenza preparedness [5,6]. These analyses give valuable information

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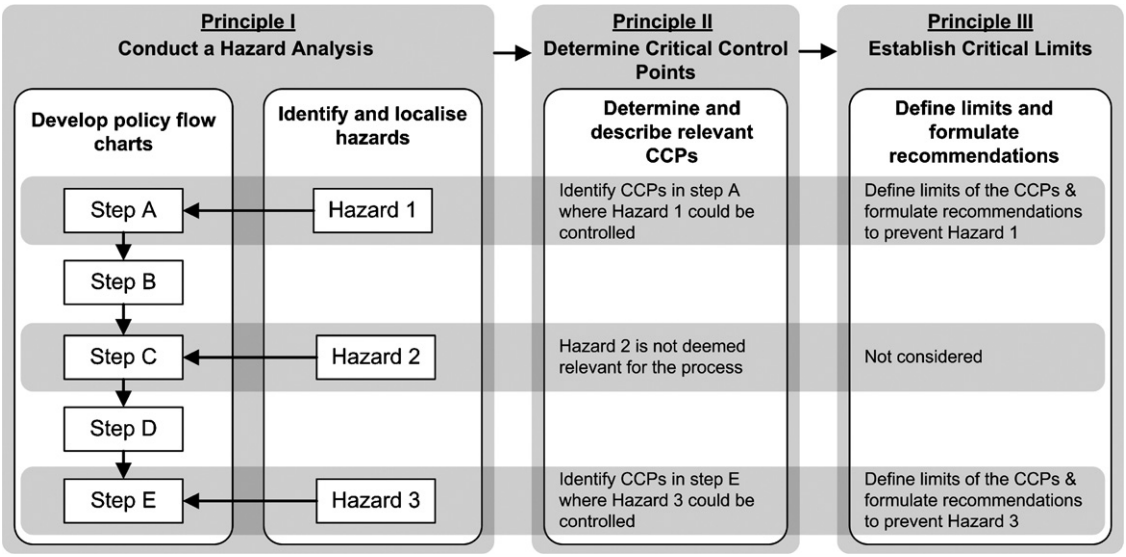

Fig. 1. The first three principles of a HACCP used for the evaluation of pandemic management systems.

about the preparedness status of nations by assessing which prevention and control measures are considered in the preparedness plans, yet such descriptive analyses give little information about the practicability of such response systems or about structural problems encountered within a management system.

We conducted a Hazard Analysis of Critical Control Points (HACCP) to analyse the structure of national pandemic management systems in order to identify weak points. The HACCP method is widely applied to monitor and evaluate potential hazards during food production processes and is increasingly used to analyse public health systems, since it allows the display and evaluation of complex operational sequences [7,8].

The aim of this study was to evaluate the structure of generic national pandemic prevention and control systems, in order to identify weaknesses in these systems, and to use this information for formulating recommendations to improve national outbreak management.

2. Method

2.1. The HACCP technique

The National Advisory Committee on Microbiological Criteria for Foods (NACMCF) developed guidelines for conducting HACCPs. Seven HACCP principles to identify, evaluate and control food safety hazards were framed: (i) conduct a hazard analysis, (ii) determine the critical control points (CCPs), (iii) establish critical limits, (iv) establish monitoring procedures, (v) establish corrective actions, (vi) establish verification procedures and (vii) establish record-keeping and documentation procedures [9]. Commonly, HACCPs are applied to analyse food production processes and to set up monitoring structures. As MacLehose [10] described, only the first three principles are applicable for evaluating public health systems (Fig. 1).

The HACCP begins with the first step (Principle I), where a hazard analysis is conducted. For this flowcharts showing the production or development processes in a step wise manner are drawn. These charts are graphical illustrations based on the successive steps involved in the manufacturing of a product or the evolution of a situation. The charts are reviewed and validated by experts. The next step (Principle II) is to identify and describe the critical control points (CCPs). A CCPs is a step in a process where hazards can be prevented, eliminated or reduced to an acceptable level [9]. For example, in food production, ingredients prone to bacterial contamination need to be heated to a certain degree. In this case, contaminated food would be the hazard and the heating procedure represents the CCP. For a HACCP, only those hazards are considered which have either severe consequences or occur frequently. Following the identification of the CCPs, the next step (Principle III) is to establish critical limits for these points, e.g. a range in which hazards would not occur, like a temperature range. These critical limits are used to formulate recommendations for improving the evaluated system.

2.2. Study conduct—applying HACCP in pandemic management

For Principle I documents on SARS and pandemic influenza management, published by WHO, ECDC and the Centre for Disease Control and Prevention, Atlanta (CDC), as well as Medline listed articles on pandemic preparedness and response were reviewed. Articles were searched via PubMed using the terms “SARS” and “Influenza” each in combination with: “policies”, “containment”, “management”, “control”, “preparedness” or “response”. Information gained from the literature was used to develop flowcharts for the following policy components: command and control, early case detection and disease surveillance and community containment measures. These components

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