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Report of working group 1: Public health challenges

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ABSTRACT

There is a need to improve surveillance systems in order to recognise emerging threats, both in the community and in hospitals, in a timely manner. The laboratory arm of surveillance must be complemented by hospital and primary care components. We also need more training at all levels: undergraduate and postgraduate medical training, specialist training, as well as continuing professional development schemes. Core training programmes for infectious disease specialists and medical microbiologists must be established. The contribution of general practitioners, infection specialists, microbiology laboratories, and public health specialists/agencies to response systems should be defined as clearly as possible and should be either empirically based or derived from scenario-guided calamity models. The success of surveillance hinges on sufficient long-term resources and dedicated coordination. The European Centre for Disease Prevention and Control (ECDC) may assume this role. However, structural and administrative constraints of the diverse healthcare systems throughout Europe may represent an impediment to a harmonised response. Also, the funding of the ECDC cannot cover the operational demands. The ECDC may well work as a small coordinating unit; however, without a laboratory-based scientific status, it remains doubtful whether the ECDC will achieve the competence and authority needed for effective leadership in healthcare. The ESCMID, together with other national and international scientific societies, should put emphasis on the fact that infectious diseases have not received the necessary degree of attention from governments in the European region. The ESCMID should strengthen its role in harmonising and supporting the highest standards of training in the infection disciplines.

Keywords European Centre for Disease Prevention and Control, public health challenges, surveillance, training

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INTRODUCTION

Looking at life on earth with the eyes of an evolutionary ecologist, one cannot but notice that, among the larger mammals, no species is more abundant, more crowded, more exposed and more mobile than humans. This means that the human population currently represents the largest ecological opportunity for transmissible pathogens, which entails the worrying prospect of large-scale outbreaks of infectious diseases. To

predict, however, when and where new infectious diseases will emerge is impossible, and forecasting the dynamics of existing and re-emerging diseases involves huge uncertainties. This global insecurity is underlined by the *de novo* emergence and outbreaks in recent history of severe acute respiratory syndrome, avian influenza, West Nile virus infections, foot and mouth disease, and bovine spongiform encephalopathy crisis in the mid-1990s. Governments in Europe seem to share this concern, but it appears that the dimension of the potential health threat is not matched by the funding necessary for preparedness.

The ESCMID is the leading professional organisation for medical microbiology and the infectious disease speciality in Europe, and undertakes regular consultation with the various stakeholders

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in public health in order to determine what is needed to meet the challenges in the field of infectious diseases in the coming years. On the occasion of the ESCMID workshop 'Progress towards Meeting the Challenges in Microbiology and Infectious Diseases', participants from 24 countries, including delegates from the World Health Organization (WHO), from two Directors of the European Commission (Directorate General for Public Health and Consumer Protection and Directorate General for Research) and from the European Union of Medical Specialists addressed the public health challenges by attempting to answer seven pertinent questions that centred around the awareness, preparedness, scope of activities and necessary responses to the emerging and prevalent infectious disease threats in Europe. In the following, a consensus view of the delegates is given.

HOW TO IMPROVE SURVEILLANCE SYSTEMS TO RECOGNISE EMERGING THREATS IN THE COMMUNITY AND IN HOSPITALS IN A TIMELY MANNER

For effective identification of infectious disease threats, efficient surveillance structures must be in place. Surveillance programmes should be guided by clear objectives, with the focus on protecting or improving the health of European citizens. In considering improvement, the only questions that should be asked are those for which the answers lend themselves to tangible public health gains. The simplest conceivable surveillance structure would be laboratory-based, and should include a minimum data set identified by a catalogue of diseases, organisms and case definitions, which must take into account national priorities. Accession countries from eastern and central Europe face different infectious disease threats from the countries in the west. With faster disease diffusion brought about by free movement, trade and travel, surveillance systems in western European countries must adjust to these new demands. Standardisation and external quality assurance are important aspects of the surveillance cycle, in order to improve the specificity of the recorded information. However, attempts to achieve standardisation, harmonisation and specificity should not deter or exclude the participation of potential surveillance partners, as qual-

ity improvement of data is an ongoing process and can be achieved *en route*. At the same time, surveillance systems must also be sensitive to syndromes that lack in-vitro correlates but reflect clinical entities or may indeed represent new and unprecedented health events. It can thus be expected that no single approach will be sufficient, and the laboratory arm of surveillance must to be complemented by hospital and primary care components.

Hospital-based surveillance systems must be governed by the same principles that guide the choice of those implemented for community-acquired infections. Efforts that directly inform infection control measures should be prioritised. Most of the active (and, in fact, most work-intensive) surveillance should thus be targeted at types of infections that are more likely to be 'controllable', such as those caused by organisms with unstable equilibrium prevalence in hospitals. Feedback to the hospital practitioners is an essential component of surveillance, to complete the audit cycle. In Europe, different approaches to confidentiality have been identified. Most national surveillance systems follow the national nosocomial infection surveillance system of the Centers for Disease Control and Prevention in the USA and inform individual hospitals on their infection rates with respect to the overall national distribution in a confidential manner. Recent legislation in the UK obliges hospitals to provide methicillin-resistant *Staphylococcus aureus* proportions from blood culture isolates, which become accessible on a named basis to the public. It is clear that this type of information does not exactly reflect the quality of care provided by individual institutions as long as control for major confounders such as patient mix, disease severity and frequency of complicated interventions has not been carried out. Moreover, obligatory surveillance with construction of league tables introduces a differential set of bias, which differs from the bias inherent in voluntary reporting. The preferred structure for hospital surveillance and data feedback is a matter of debate and depends on the information desired. Vital for any scheme, however, is maintenance of confidence on the part of all network participants in the quality of data. At the same time, more efforts should be made to respond to the legitimate demand of the public for access to information about the risks of healthcare-associated infections.

HOW TO EFFECTIVELY MONITOR THE BURDEN OF INFECTIOUS DISEASE AND ANTIMICROBIAL RESISTANCE

Assessing the disease burden is a different objective and not a necessary component of any surveillance system. The usefulness of parameter estimation on the basis of widely available routine data should be evaluated with respect to in-depth epidemiological modelling for determining the burden of infectious diseases acquired in the community or in hospitals. These efforts to identify the human and economic costs of infections caused by antibiotic-resistant pathogens also appear to be beyond the remit of surveillance systems but represent a research question that must be urgently addressed.

WHAT ARE THE NEEDS OF GENERAL PRACTITIONERS, INFECTION SPECIALISTS, MICROBIOLOGY LABORATORIES AND PUBLIC HEALTH SPECIALISTS/AGENCIES FOR INFECTIOUS DISEASE SURVEILLANCE AND ALERT FOR EMERGING OUTBREAKS?

Mixed-structure surveillance systems rely very much on individual competence if early warning signs are to be identified. The epidemiological knowledge of healthcare providers, as well as the diagnostic specialist, is an important part of the skill mix. Room for improvement of the degree of competence in this area has been identified with respect to care and service providers for infectious diseases. Curative and diagnostic approaches in clinical practice are centred on individual patients for the benefit of the population. In the context of public health this concept is, however, reversed, and efforts are directed at the population to benefit the individual. It is therefore necessary to convey this alternative view more effectively through proper training at all levels, including training of undergraduate medical students and postgraduate master students, training of specialists and training within continuing professional development schemes. Core training programmes for infectious disease specialists and medical microbiologists devised by the European Board of Infectious Diseases and the European Union of Medical Specialists Section for Biopa-

thology have not taken these demands into full account. Public health agencies, on the other hand, must have staff members with sufficient clinical experience and laboratory expertise in order to identify the information required by healthcare practitioners, and to engage in a fruitful dialogue with them in order to improve the feedback and use of pertinent surveillance data.

WHAT SHOULD BE THE CONTRIBUTION OF GENERAL PRACTITIONERS, INFECTION SPECIALISTS, MICROBIOLOGY LABORATORIES AND PUBLIC HEALTH SPECIALISTS/AGENCIES TO RESPONSE SYSTEMS FOR THE CONTROL OF OUTBREAKS OF INFECTIOUS DISEASES?

Useful contributions to outbreak control efforts require an effective organisational structure and a set of simple predefined skills. Infectious disease specialists and public health agencies are not accustomed to these types of demands. Large gaps still exist in the capacity to respond to major outbreaks of infectious diseases, as was clearly revealed by the recent management of the severe acute respiratory syndrome threat. Much could be learned from specialists in disaster relief who are dealing with calamities in developing countries. Expanded training programmes such as the European Commission (EC)-supported European Programme for Intervention Epidemiology Training (EPIET) programme for field epidemiologists represent one way of filling this gap. A catalogue of functions should be developed for each player in the infection prevention and control programme. The role of response should be defined as clearly as possible and either empirically based or derived from scenario-guided calamity models.

DO WE NEED IMPROVED COOPERATION BETWEEN THESE PLAYERS FOR THEIR INTEGRATION INTO COMMON ORGANISATIONS AT THE LOCAL, NATIONAL AND INTERNATIONAL LEVELS? WHAT ARE THE 'BEST-PRACTICE MODELS'?

The success of surveillance and response activities largely hinges on proper long-term resources and

dedicated coordination. This has been learned from some of the well-functioning 'disease-specific networks' funded by the EC. Member states of the European Union (EU) have understood that a coordinated approach at the European level lacks the leadership of a common and accepted institute. As a consequence, European Council and Parliament decisions have now paved the way for a European Centre for Disease Prevention and Control (ECDC) that will assume exactly this role. However, structural and administrative constraints of the diverse healthcare systems throughout Europe may represent an impediment to a harmonised response in the case of an international outbreak. Another consequence of cultural diversity may be the discrepancy among nations in their capacity to prevent and control large-scale events with a public health impact. It therefore appears necessary to systematically determine each country's ability to cope with large-scale events via an inventory of the national surveillance and response capacity and a test of their operational effectiveness during international calamity exercises. Such exercises should identify the gaps in concerted responses and should provide a score by which the abilities of national public health systems can be evaluated. The results of this assessment should be made public, and should provide the basis for benchmarking by the EC.

WHAT SHOULD BE THE ROLE OF THE ECDC IN THE COORDINATION AND SUPPORT OF NATIONAL PUBLIC HEALTH POLICIES FOR THE PREVENTION AND CONTROL OF INFECTIOUS DISEASES? SHOULD THIS CENTRE OPERATE AS A SMALL COORDINATION OFFICE OR SHOULD IT INCORPORATE REFERENCE LABORATORY FACILITIES AND A NOVEL RESEARCH ORGANISATION?

Article 3 of the regulations of the European Parliament and of the Council establishing the ECDC describes the mission of the centre. In paragraph 2, it reads: 'Within the field of its mission, the Centre shall: (a) search for, collect, evaluate and disseminate relevant scientific and technical data; (b) provide scientific opinions and scientific and technical assistance including

training; (c) provide timely information to the Commission, the Member States, Community agencies and international organizations active within the field of public health; (d) coordinate the European networking of bodies operating in the fields within the Centre's mission, including networks arising from public health activities supported by the Commission and operating the dedicated surveillance networks; and (e) exchange information, expertise and best practices, and facilitate the development and implementation of joint actions.'

Several threats with regard to the organisational capacity of the ECDC become clear when contrasting the mission statement with other sources of information. Funding for the ECDC until 2008 is provided by the EC through the 2003–2008 programme on community action in the field of public health. It is foreseeable that this funding will not cover the operational demand should all aims covered by the mission statement be accomplished. Three hundred and fifty million euros have been earmarked by the EU for the 2003–2008 programme, which supplies co-financing not only for the dedicated surveillance networks for health threats and infectious diseases but also for many other types of public health initiatives, from chronic to lifestyle-associated diseases. On the financial scale, it becomes clear that consumer health and protection is not a priority of European governments, which spend annually in EU programs only 0.18 euros per capita for public health and 25 euros of agricultural subsidies per head of cattle.

When the number of tasks is reduced to a minimum, however, the ECDC may well work as a small coordinating unit. It would be able to identify existing expertise among the national institutes and thus distribute the tasks to specialists while keeping overall organisational control, thereby streamlining the efforts targeted at health threats. Effective fulfilment of this role depends on the willingness of national institutes to support the requests issued by the ECDC. There is no doubt that in cases of international emergencies, national institutes are supportive and will provide their expertise for this common goal. It will undoubtedly be more difficult to coordinate efforts targeted at endemic diseases. Here, the ECDC's requests may meet with more resistance if it has difficulties in offering the necessary co-funding, considering the tight financial

constraints under which academic and national institutes operate.

At the present stage of planning of the ECDC, it is not expected that there will be any laboratory facilities. This curtails the ability of the ECDC to provide scientific opinions and scientific and technical assistance, including training, as stipulated in the mission statement, unless scientific and technical expertise are restricted to epidemiology and data management alone. It will also not allow for the provision of reference data or the execution of quality assurance exercises. Most importantly, the restriction to data analysis only will preclude the ability to generate genuine research results based on in-vitro experiments. Without a laboratory-based scientific status, it remains doubtful whether the ECDC will achieve the competence and authority needed for effective leadership in concerted disease prevention and control efforts.

Moreover, there is a threat in the form of administrative and bureaucratic hurdles. The mission statement clearly states that, in the case of outbreaks of illness of unknown origin that may spread within or to the EU, the ECDC should act on its own initiative until the source of the outbreak is known. Nonetheless, the director and staff are accountable to a management board and will be guided by an Advisory Forum; together, these contain twice as many individuals as are working in the ECDC.

WHAT SHOULD BE THE ROLE OF SCIENTIFIC SOCIETIES SUCH AS THE ESCMID IN THE PREVENTION AND CONTROL OF INFECTIOUS DISEASES?

It is the role of the ESCMID to promote and support infection professionals throughout Europe.

With this remit in mind, it is clear that the ESCMID is dedicated to providing the necessary advocacy for the priorities set out in this article. The ESCMID, together with other national and international scientific societies, should emphasise the fact that infectious diseases, although recognised as a threat to European citizens, have not received the necessary degree of attention from governments in the European region. This lack of attention is in stark contrast to other areas of EU collaboration, such as free trade and agriculture, and poses a risk to the wellbeing of a large segment of the population in Europe. The ESCMID should strengthen its role in harmonising and supporting the highest standards of training in the infection disciplines. Not only has infectious disease epidemiology been identified as a neglected field in most curricula, but basic training in microbiology, infectious diseases and infection control as a whole is declining throughout European medical schools. This is a worrying trend. Continuing medical education and special professional development schemes must be devised to address the training needs for effective participation in epidemiological surveillance and outbreak control interventions. Thereby, the ESCMID could bridge the gaps between the different specialties involved in the management of infectious diseases from the bedside to population-based intervention. The ESCMID represents a unique partner that could serve as a forum for improving coherence, comprehensiveness and concerted action, and function as the advocate for infection disciplines that is needed today more than ever before.