

# Towards health security



• • • • •

A discussion paper on  
recent health crises in the  
WHO European Region



# Towards health security

A discussion paper on recent health crises  
in the WHO European Region

Edited by: Gerald Rockenschaub, Jukka Pukkila and  
Maria Cristina Profili

# Abstract

This discussion paper examines recent threats to health security in the WHO European Region from communicable diseases, natural disasters, large-scale accidents, conflicts and complex emergencies and the potential future challenges from climate change. It reviews the lessons learned from past experience, the new framework offered by the revised International Health Regulations (2005), the need for strengthening health systems to manage crises and the importance of international partnerships for health security.

## **Keywords**

SECURITY MEASURES

DISEASE OUTBREAKS

NATURAL DISASTERS

EMERGENCIES

WAR

RISK ASSESSMENT – TRENDS

COMMUNICATION

DELIVERY OF HEALTH CARE – ORGANIZATION AND ADMINISTRATION

INTERNATIONAL COOPERATION

ISBN 978 92 890 2198 2

Address requests about publications of the WHO Regional Office for Europe to:

Publications

WHO Regional Office for Europe

Scherfigsvej 8

DK-2100 Copenhagen Ø, Denmark

Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the Regional Office web site (<http://www.euro.who.int/pubrequest>).

© World Health Organization 2007

All rights reserved. The Regional Office for Europe of the World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Where the designation “country or area” appears in the headings of tables, it covers countries, territories, cities, or areas. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The World Health Organization does not warrant that the information contained in this publication is complete and correct and shall not be liable for any damages incurred as a result of its use. The views expressed by authors or editors do not necessarily represent the decisions or the stated policy of the World Health Organization.

Text editing: David Breuer and Pamela Charlton

Design concept: Lars Møller

Layout: Phoenix Design Aid

Cover photos: WHO and Scanpix

Printed in Denmark

# Contents

|                                                                                                             |    |
|-------------------------------------------------------------------------------------------------------------|----|
| Acknowledgements                                                                                            | 4  |
| <i>Foreword</i>                                                                                             | 5  |
| Executive summary                                                                                           | 6  |
| 1. Introduction                                                                                             | 8  |
| Discussing health and security                                                                              | 11 |
| Scope of this discussion paper                                                                              | 13 |
| 2. Threats and challenges to health security in the European Region                                         | 15 |
| Communicable diseases                                                                                       | 15 |
| Natural and human-made disasters                                                                            | 24 |
| Conflicts and complex emergencies                                                                           | 36 |
| Potential future challenges from global changes                                                             | 38 |
| 3. A renewed framework for managing health security threats:<br>the International Health Regulations (2005) | 45 |
| National capacity                                                                                           | 46 |
| Broader scope                                                                                               | 46 |
| Defining a public health emergency of international concern                                                 | 46 |
| Notification                                                                                                | 46 |
| Recommendations and focal points                                                                            | 48 |
| Legally binding                                                                                             | 48 |
| WHO's role                                                                                                  | 48 |
| 4. The way forward                                                                                          | 49 |
| Lessons from past experience                                                                                | 49 |
| The regional agenda: strengthening health systems to manage crises                                          | 50 |
| 5. Working in partnership towards health security                                                           | 56 |
| Value added by WHO                                                                                          | 56 |
| The importance of partnerships                                                                              | 56 |
| Institutional capacity                                                                                      | 60 |
| 6. Concluding remarks: towards health security in Europe                                                    | 63 |
| References                                                                                                  | 65 |
| Annex 1. Selected international initiatives with health security dimensions                                 | 72 |

# Acknowledgements

The editorial coordination team received substantial input and technical contributions from several other technical programmes at the WHO Regional Office and would specifically like to thank the experts and main contributors listed below for their extensive work and for the invaluable insights they provided in their particular areas of work.

## **Directors**

Gudjón Magnússon, Director, Division of Health Programmes

Roberto Bertollini, Director, Special Programme on Health and Environment

Gérard Schmets, Acting Director, Division of Country Health Systems

## **Disaster Preparedness and Response**

Gerald Rockenschaub, Regional Adviser

Maria Cristina Profili, Desk Officer

Åsa Nihlen Holmblad, Project Officer

Ute Sylvia Enderlein, Emergency Health Coordinator

Geraldine McWeeney, Healthy Environment Programme Manager

Jukka Pukkila, Adviser

## **Vaccine Preventable Diseases and Immunization**

Nedret Emiroglu, Regional Adviser

John Spika, Medical Officer

## **Communicable Disease Surveillance and Response**

Roberta Andraghetti, Medical Officer

Caroline Sarah Brown, Technical Officer

## **Sexually Transmitted Infections/HIV/AIDS**

Srdan Matic, Regional Adviser

Jeffrey V. Lazarus, Advocacy and Community Relations Officer

## **Global Change and Health**

Bettina Menne, Medical Officer

Tanja Wolf, Statistician

## **External Cooperation and Partnerships**

Frank George, Regional Adviser

Svenja Herrmann, Associate Professional Officer

## **Hospital Services**

Enrico Davoli, Technical Officer

## **Tuberculosis Control**

Risards Zaleskis, Regional Adviser

## **Public Health Services**

Maria Haralanova, Regional Adviser

## **WHO Office, Pristina**

Skender Sylja, National Health Policy and Systems Officer

# Foreword

Health security is not a new topic, but it has recently taken on a new urgency for policy-makers and therefore for WHO. The WHO Eleventh General Programme of Work, 2006–2015, which sets out the broad directions for the future work of WHO, identifies strengthening global security as a key priority, supporting an integrated approach to a society-wide response to emerging and new threats to health, including disaster and conflict situations.

Health and security are the topic of World Health Day 2007 and the theme for a forthcoming world health report. During 2007 – the year when the revised International Health Regulations enter into force – the focus will be on global health security and on risks and dangers to health that have international dimensions. The world health report 2008 – the year that marks the 60th anniversary of WHO and the 30th anniversary of the Declaration of Alma-Ata, the first international declaration to underline the importance of primary health care – will focus on primary health care and its role in strengthening health systems, addressing the more personal dimension of health security.

In the European Region, a discussion paper on health security was presented to the WHO Regional Committee for Europe at its fifty-sixth session in September 2006. This initiated further analysis and strategic considerations of how to support Member States in strengthening preparedness measures for health threats with security implications and to ensure an effective and comprehensive health system response. The Regional Committee endorsed six strategic directions in the resolution on the future of the Regional Office towards 2020, one of which mandates WHO to lead the international response on health security in the European Region.

Health security is an intersectoral issue, and well-established coordination mechanisms involving government and nongovernmental institutions are essential at the country level. At the regional level, WHO collaborates closely with partners such as the European Commission and the European Centre for Disease Prevention and Control to address the international dimension, to build capacity, to compile

and share evidence and information and to ensure the cross-border interoperability of preparedness planning and health security response plans.

All these discussions have emphasized the importance of strengthening the preparedness of national health systems. Key recommendations include strengthening stewardship, implementing health systems preparedness planning as a continuous process with a multihazard approach, establishing sustainable crisis management and health-risk reduction programmes in health ministries and establishing multisectoral coordination mechanisms. The programmes should be in charge of health system preparedness planning and managing health crises so that the health sector can be ready to take a leading and coordinating role and technically guide other sectors facing a health crisis.

There is much at stake. Health crises and the human suffering they cause could jeopardize the progress made in strengthening health systems towards sustainable development and the achievement of the United Nations Millennium Development Goals. This is why preparedness planning is key.

This publication maps some of the major threats to health security in the WHO European Region and the challenges they represent for health systems. It provides some key facts and lessons from experience that policy-makers can put to good use. It is one step towards defining strategic options for fostering health security in the European Region.

A health system that anticipates the health needs of people affected by health crises can respond to them effectively, save lives and stop events from escalating into security crises. At the regional level, WHO will continue to work with its Member States to understand better the complexity of health security in the regional context and, through further consultations, explore effective ways to enhance health security. This publication contributes to that work.

Nata Menabde  
Deputy Regional Director  
WHO Regional Office for Europe

# Executive summary

## A key priority

Health security is a key priority for WHO's Member States. It is the subject of World Health Day 2007 and of a forthcoming world health report. The year 2007 is when the revised International Health Regulations enter into force, and the focus is on global health security and on risks and dangers to health that have international dimensions. The WHO Eleventh General Programme of Work, 2006–2015, identifies strengthening global health security as a key priority for WHO's future work. The WHO Regional Committee for Europe, during its fifty-sixth session in September 2006, reviewed a discussion paper on health security and passed a resolution on the future of the Regional Office, endorsing six strategic directions for WHO's regional work towards 2020. One of these directions mandates WHO to lead the international response on health security in the European Region.

## A way towards health security in the WHO European Region

This publication builds on the health security debate initiated at the fifty-sixth session of the WHO Regional Committee for Europe in 2006. It aims to stimulate further consultations with Member States on how to support them in strengthening their preparedness measures against health security threats and in ensuring that their health systems respond effectively and comprehensively. The publication provides an overview of selected threats and regional challenges to health security based on what is most commonly included in the concept of health security in the current debate. Special consideration is given to threats resulting from or augmented by the ways in which countries and their populations interact internationally.

In the context of the European Region, the analysis focuses on the following public health areas:

- communicable diseases
- natural and human-made (technological) disasters

- conflicts and complex emergencies
- potential future challenges from global changes, particularly climate change.

The publication does not cover some specific aspects of health security, such as the socioeconomic determinants of health or the risk of accidental release of biological and chemical agents or radionuclear material or their deliberate use with the intention to harm human health.

## A case study approach

Several concrete examples document experiences from recent health crises in the WHO European Region in the public health areas mentioned above.

Some generic lessons learned emphasize the importance of engaging in health systems preparedness planning to respond to any potential health and security crisis and show clearly that weak and unprepared health systems can hamper the effective management of health crises.

Important concepts – such as strengthening stewardship, implementing health systems preparedness planning as a continuous process with a multihazard approach, establishing sustainable crisis management and health-risk reduction programmes in health ministries and establishing multisectoral coordination mechanisms – are effective strategies for preventing and mitigating future health security crises.

## A renewed framework for managing health security threats – the International Health Regulations (2005)

The revised International Health Regulations (2005), entering into force on 15 June 2007, provide a legal framework to help countries in protecting the health of their populations from any potential public health emergency of international concern and implementing the necessary measures to make the world more secure.



WHO has a unique international mandate from its 193 Member States to promote and support the International Health Regulations (2005) in the form of resolution WHA58.3 approved at the Fifty-eighth World Health Assembly in May 2005. WHO provides the International Health Regulations secretariat, has an International Health Regulations coordination programme that provides technical support to the States Parties (the countries bound by the International Health Regulations) for developing capacity and runs an alert and response operation underpinned by standard operating procedures. Partnerships with national institutions and national and international partners will maximize the benefit of strengthening surveillance and response.

### **A way forward for the Region – strengthening health systems to manage crises**

The WHO Regional Office for Europe works with its Member States to improve the readiness of their national health systems to minimize the health effects of crises. Strengthened, well-prepared and well-managed health systems can effectively contribute to preventing health events from triggering a security crisis. The safe hospitals initiative, designed to promote crisis preparedness planning in hospitals and primary care and emergency medical services, is a concrete example of the promotion of measures to reduce the vulnerability of health facilities.

Good governance involves well-functioning health information systems designed to facilitate and support health and multisectoral coordination, strategic and operational decision-making and risk communication strategies to reduce public fear and uncertainty.

### **A partnership approach towards health security**

Owing to the growing complexity of health security challenges, an effective response requires the close collaboration of governments, international organizations, civil society, the private sector and other partners. WHO will continue to promote effective partnerships for health and closely collaborate with the European Centre for Disease Prevention and Control and the European Commission to enhance health

security at the pan-European level. As part of the humanitarian reform of the United Nations System, WHO's important role in emergencies is increasingly recognized, especially as the lead agency of the United Nations Inter-Agency Standing Committee Global Health Cluster for the coordination of the humanitarian health response.

### **Value added by WHO**

In collaboration with other partners and institutions, WHO has established global mechanisms to mobilize quickly a well-established network of experienced international experts to respond to emergencies and communicable disease outbreaks. The establishment of a joint regional platform for the timely mobilization of international expertise and resources will be instrumental in improving the operational aspects of future crisis response operations.

WHO has a permanent presence in 29 countries in the European Region. The goal of this country presence is to enable the entire Organization to support countries in reaching their national health goals, to contribute to global and regional public health action and to draw on the experience of each country in building public health knowledge that can benefit the rest of the world. Under the leadership of the heads of WHO country offices and supported by all levels of WHO, the country offices are WHO's key mechanism for pursuing its technical cooperation with health ministries.

### **Conclusions**

Evidence needs to be compiled and the lessons learned need to be promoted and increasingly become lessons applied. Health systems preparedness plans should reflect and integrate examples of effective response to reduce the vulnerability of the health sector to potential hazards and threats.

Further consultations with Member States are needed to identify and jointly agree on priority areas for collaboration and intervention and eventually to agree on developing a regional strategy for health security.

# 1. Introduction

This publication examines global health problems, the challenges they bring and how the international community should respond to them over the next decade.



The WHO Eleventh General Programme of Work, 2006–2015, approved at the Fifty-ninth World Health Assembly in May 2006 by resolution WHA59.4, defines seven priority areas as constituting a global framework for a future health promotion strategy – a WHO global health agenda (1,2). One of these seven priorities is “building individual and global health security”, supporting an integrated approach to a society-wide response to emerging and new threats to health, including disaster and conflict situations.

In the European Region, a discussion paper on health security was presented in September 2006 at the fifty-sixth session of the WHO Regional Committee for Europe. This initiated further analysis and strategic considerations of how to support Member States in strengthening preparedness measures for health threats with security implications and to ensure an effective and comprehensive health system response. The Regional Committee

endorsed six strategic directions in resolution EUR/RC56/R3 on the future of the Regional Office towards 2020 (3). The fifth strategic direction, outlined in this publication, mandates WHO to lead the international response on health security in the European Region.

The 2005 update of the Health for All European policy framework (4) concludes: “We are no longer in a situation where one common prescriptive strategy can address the rapidly changing reality of every Member State”. This is particularly relevant to the often unpredictable and even unknown (“emerging”) threats to health security. The WHO Regional Office for Europe country strategy “Matching services to new needs” is therefore especially appropriate in the context of health security challenges (5).

The unprecedented technological innovation and economic development of the past century have brought improved living standards and longer lives to most of the people living in the WHO European Region, which includes both Europe and central Asia. Nevertheless, with the exception of smallpox, these developments have not eliminated – or necessarily decreased – threats to human health and security. In recent years, the European Region has faced numerous events that put at risk the health and security of people and societies. Some of these events have triggered public health emergencies with cross-border consequences; others have had a more local, but still severe, impact on affected communities.

Several Member States of the WHO European Region have faced a dramatic political and socioeconomic transition since the early 1990s. Although most people in the Region regard this transition as a predominantly positive development, it has nevertheless left individuals, communities and health systems in many countries with insecure environments and insufficient resources and capacity to cope with health security challenges (6,7).

The crises in south-eastern Europe in 1991–2002 were a traumatic experience that reshaped the perception of security both in Europe and globally. Violent conflicts in the heart of Europe demolished security arrangements and the sense of safety in European societies. The lessons learned from the response to the health challenges posed by the conflicts in south-eastern Europe have significantly influenced the international approach to health assistance in later conflicts and post-conflict situations around the world (8–11).

In the European Region, more than 300 000 people have perished in violent conflicts and almost 100 000 from natural and human-made (technological) disasters during the past 15 years (12), and the number of natural disasters seems to be increasing. Much of this increase has now been credibly attributed to global climate change, and the increase is predicted to continue. The task of estimating and predicting the health effects of global climate change is very complicated and is only just beginning. At the same time, the health effects of some earlier disasters, most notably those of the Chernobyl nuclear disaster 21 years ago, are still being studied.

Humanitarian emergencies, including natural and human-made disasters, conflicts and complex emergencies, constitute what has traditionally been considered the main threat to health security worldwide. Within the traditional categories of health threats, such as epidemic-prone diseases and natural and technological health hazards, there are scenarios of new or re-emerging threats, such as an influenza pandemic or the accidental release or deliberate use of biological and chemical agents or radionuclear material, creating a sense of insecurity and a climate of fear and posing new challenges to national health systems and governments.

Some communicable diseases, such as severe acute respiratory syndrome (SARS) and influenza, have the potential to cause sudden, large-scale harm to the health and welfare of entire populations, including those in high-income countries such as western Europe.

These and other epidemic-prone diseases have therefore been generally considered as threats to health security. Other communicable diseases, such as HIV disease and tuberculosis (TB), add significantly to the overall disease burden globally and in parts of the European Region. In 2000, the United Nations Security Council declared HIV disease, with its potential for near-exponential transmission among young and able people, to be a security issue (13). “Securitizing” HIV raises some serious ethical concerns, however. TB is an example of a disease for which the increasing incidence of multidrug-resistant cases is potentially becoming a health security issue. The eradication of communicable disease threats such as smallpox in the 1970s and poliomyelitis and measles targeted for elimination may paradoxically create novel threat scenarios if the public health capacity required at the national and international levels is not maintained.

Food safety and food security, access to safe water, clean air and affordable energy supply are also intimately linked to health in a number of ways. Nevertheless, this publication does not discuss further the extent to which they are considered health security issues.

Although chronic conditions related to such lifestyle factors as smoking, drinking, an unhealthy diet, unsafe sex, insufficient physical activity or obesity bring much more suffering, disability and loss to the people of the European Region than do communicable diseases, they do not have a direct health security dimension. Other threats to public health are also closely linked to individual behaviour, such as suicide, interpersonal violence, road crashes and accidents at work and at home. Public health recognizes well the link between the health of individuals, communities and countries and their safety and the security of their living environments. The question of whether these are health security issues is worth further discussion.

Policy-makers are challenged to develop and implement strategies that identify and deal with the priority risks, address uncertainties, mitigate the perceived risk and enhance people’s sense

of security and health (14). WHO's mandate is to support its Member States in fulfilling these expectations by implementing resolutions of the World Health Assembly and WHO regional committees (Box 1).

Well-prepared health systems, strengthening the capacity of health and related sectors and improving international coordination can effectively contribute to reducing avoidable morbidity and mortality resulting from health

security threats – the core objective of WHO's work in health crises. Investing in health can truly help to build a safer future.

WHO's main function is to assist governments in strengthening their health systems and in coordinating international health work. WHO's governing bodies determine its work: the World Health Assembly at the global level and the regional committees at the regional level. Box 1 lists the most relevant WHO resolutions and documents on health security in recent years.

### **Box 1. Recent WHO resolutions and documents related to health security, 1998–2006**

#### **2006**

WHA59.1 Eradication of poliomyelitis  
WHA59.2 Application of the International Health Regulations (2005)  
WHA59.19 Prevention and control of sexually transmitted infections: draft global strategy  
WHA59.22 Emergency preparedness and response  
WHA59.26 International trade and health

EUR/RC56/9 Rev. 1 Enhancing health security: the challenges in the WHO European Region and the health sector response

#### **2005**

WHA58.1 Health action in relation to crises and disasters, with particular emphasis on the earthquakes and tsunamis of 26 December 2004  
WHA58.3 Revision of the International Health Regulations  
WHA58.5 Strengthening pandemic-influenza preparedness and response  
WHA58.15 Draft global immunization strategy  
WHA58.29 Enhancement of laboratory biosafety

EUR/RC55/R4 The Health for All policy framework for the WHO European Region: 2005 update  
EUR/RC55/R7 Strengthening national immunization systems through measles and rubella elimination and prevention of congenital rubella infection in WHO's European Region  
EUR/RC55/R8 Strengthening European health systems as a continuation of the WHO Regional Office for Europe's Country Strategy "Matching services to new needs"  
EUR/RC55/R9 Prevention of injuries in the WHO European Region

#### **2004**

WHA57.14 Scaling up treatment and care within a coordinated and comprehensive response to HIV/AIDS  
  
EUR/RC54/R3 Environment and health

#### **2003**

WHA56.19 Prevention and control of influenza pandemics and annual epidemics  
WHA56.20 Reducing global measles mortality  
WHA56.25 The role of contractual arrangements in improving health systems' performance

WHA56.28 Revision of the International Health Regulations

WHA56.29 Severe acute respiratory syndrome (SARS)

WHA56.30 Global health-sector strategy for HIV/AIDS

EUR/RC53/R2 Progress in implementing the WHO Regional Office for Europe's Country Strategy "Matching services to new needs"

EUR/RC53/R3 Update of the regional Health for All (HFA) policy framework

## **2002**

WHA55.11 and WHA55.11 Corr.1 Health and sustainable development

WHA55.15 Smallpox eradication: destruction of variola virus stocks

WHA55.16 Global public health response to natural occurrence, accidental release or deliberate use of biological and chemical agents or radionuclear material that affect health

EUR/RC52/R2 Certification of the European Region of WHO as a territory free from indigenous wild poliovirus

EUR/RC52/R6 Fourth Ministerial Conference on Environment and Health

EUR/RC52/R8 Scaling up the response to tuberculosis in the European Region of WHO

EUR/RC52/R9 Scaling up the response to HIV/AIDS in the European Region of WHO

## **2001**

WHA54.10 Scaling up the response to HIV/AIDS

WHA54.14 Global health security: epidemic alert and response

EUR/RC51/R6 Poverty and health – evidence and action by WHO's European Region

EUR/RC51/R7 Health and Sustainable Development World Summit on sustainable development

## **2000**

WHA53.1 Stop Tuberculosis Initiative

WHA53.12 Global Alliance for Vaccines and Immunization

WHA53.14 HIV/AIDS: confronting the epidemic

EUR/RC50/Inf.Doc./4 *Disaster preparedness in the European Region – progress report*

EUR/RC50/R3 Poliomyelitis eradication

EUR/RC50/R5 The WHO Regional Office for Europe's Country Strategy "Matching services to new needs"

## **1999**

EUR/RC49/R4 Environment and health

EUR/RC49/R6 Necessary public health action on natural disasters and emergencies and international cooperation for emergency preparedness

## **1998**

EUR/RC48/R5 Health for All Policy Framework for the European Region for the 21st Century

A51/21 *Environmental matters: climate change and human health – WHO participation in the interagency climate agenda. Report by the Director-General*

Source: Governance (15).



## Discussing health and security

The WHO Constitution (16) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. It further states that the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being, that the achievement of any State in the promotion and protection of health is of value to all and that the health of all peoples is fundamental to the attainment of peace and security.

More than half a century later, the United Nations Secretary-General's High-level Panel on Threats, Challenges and Change (17) offered the same type of link between health and security in 2004 when defining a threat to international security as "any event or process that leads to large-scale death or lessening of life chances and undermines States as the basic unit of the international system".

After the USSR dissolved, international political debate suggested a paradigm shift from the traditional concept of national security – where the central actor is the state – towards a wider human security approach, where the individual and the community are in focus. The United Nations Development Programme *Human development report 1994* (18) discussed the concept of human security in the world which, since the United Nations was founded, has been recognized as comprising two components: a world "free of want" and "free of fear". Although the political reality later tilted the concept in favour of the first component rather than the second, the 1994 report suggests that it is time to give both components equal attention. The report identifies health security as one of the seven components of human security. The other categories encompassing most of the threats to human security are economic, food, environmental, personal, community and political security.

Since the events of 11 September 2001, emphasis on national security concerns in international politics has increased perceptibly. In parallel, however, the wider concept of human security is continuously promoted with health at its centre. One of the three goals set

by the independent Commission on Human Security – established in January 2001 in response to the United Nations Secretary-General's call at the 2000 Millennium Summit to advance the double goals of "freedom from want" and "freedom from fear" – was "to develop the concept of human security as an operational tool for policy formulation and implementation" (19,20).

The health chapter of the Commission's report *Human security now* (21) from 2003 examines the links between health and human security, identifying four criteria that influence the strength of these links. These criteria are: a) the scale of the disease burden; b) the urgency for action; c) the scale of the impact on society; and d) the interdependencies or externalities with potential to cause ripple effects. By applying these criteria, the report concludes that the following three health challenges stand out as closely linked to human security: global communicable diseases; poverty-related threats; and violence and crisis (21).

Globalization forces and increased interdependence have contributed to the changing role of health on the international agenda. Many recent developments and events have influenced the current debate on health security. Box 2 lists some of the most significant ones with implications for the European Region.

Intergovernmental and nongovernmental organizations, independent foundations, think-tanks and others have launched many new health- and security-related international initiatives worldwide over the past 15 years. Annex 1 includes a selection of these considered important to Europe. Especially important are the numerous health security-related initiatives of the European Union (EU), above all the establishment of the European Centre for Disease Prevention and Control (ECDC) in 2004 (22). Several recent joint United Nations initiatives and processes are closely linked to health and security, and WHO is an integral partner in these as the United Nations specialized agency for health. The many new initiatives show that global health security is increasingly recognized as a political priority.

## Box 2. Selected developments and events influencing debate on health security in Europe

- The spread of HIV, with the world's most rapidly growing epidemic recorded in the European Region (Estonia, Russian Federation and Ukraine) during the early years of the 21st century
- Chernobyl nuclear accident on 26 April 1986
- Bovine spongiform encephalopathy ("mad cow" disease) and the related variant Creutzfeldt-Jakob disease, from the late 1980s onwards
- The end of the Cold War, the subsequent shift from the old east–west polarization towards a polarization between high-income and low-income countries, and the rise of fundamentalism
- The break-up of the USSR and the resulting political and socioeconomic transition in central and eastern Europe and in central Asia, with related problems such as an increase in socioeconomic inequality and impoverishment, decreasing birth rates and life expectancy and continuous conflicts in parts of the Region
- The break-up of the Socialist Federal Republic of Yugoslavia, with a subsequent period of conflict inside the European Region in 1991–2002, and the status of the United Nations Administered Province of Kosovo still to be resolved
- The deliberate use of nerve gas (sarin) in Japan: the Matsumoto incident on 27–28 June 1994 and the deliberate use in the Tokyo subway on 20 March 1995
- The terrorist attacks on 11 September 2001 and the anthrax attacks of autumn 2001 in the United States of America
- SARS outbreak in 2002–2003
- The numerous terrorist attacks using explosives around the world, including Europe: the Madrid train bombings on 11 March 2004 and the underground London bombings on 7 July 2005
- The tsunami on 26 December 2004 in South-East Asia and Hurricane Katrina in August 2005 in the United States of America
- Avian influenza A/H5N1 outbreaks with human cases and the threatening influenza pandemic, from 2003 onwards
- Climate change, particularly the heat-wave of 2003 in Europe

It has even been said that health and human security are central to human survival in the 21st century (21). This new awareness and responsiveness needs to be appropriately harnessed to improve health security globally, nationally and in communities in the future (21).

An apparently widely accepted assumption is that the deteriorating health of a population can lead to socioeconomic instability and therefore to more generalized insecurity, whereas healthier people tend to form more stable and secure societies. It remains unclear, however, to

what extent poor health actually contributes to internal instability and whether improving health and health care can stabilize states, particularly in a post-conflict environment (23).

Although the existing links and common ground between health, security and foreign policy are broadly recognized, McInnes & Lee (23) assert that "there is a lack of clarity over two questions crucial to the framing of the future agenda: whose health and whose security is at risk; and what issues should be part of the global health security agenda (and which are not)". They also

assert that “without a broader understanding of the shared challenges facing the health, foreign policy and security communities, responses could ultimately be counterproductive to all concerned”.

### Scope of this discussion paper

This publication, marking the European celebration of World Health Day 2007, provides an overview of selected regional threats and challenges to health. In the WHO European Region, several policy dialogues and technical consultations in the year-long campaign will contribute to the WHO European Ministerial Conference on Health Systems that will take place in Tallinn, Estonia on 18–20 June 2008. Health security and evaluating effective strategies to improve health systems performance will be among the main topics at this Conference of health ministers from the 53 Member States in the WHO European Region. The recommendations of the Conference will serve to provide guidance to Member States and contribute to more responsive health systems and a safer European Region.

The regional threats and challenges to health discussed here were selected according to what is most commonly included under the concept of health security in the current debate, with special importance given to threats resulting from or augmented by the ways in which countries and their populations interact internationally. Chapter 2 covers four main public health areas with several concrete examples from recent health crises in the WHO European Region: communicable diseases, natural and human-made disasters, conflicts and complex emergencies and potential future challenges from global changes, particularly climate change. Several concrete examples document experiences from recent health crises in the WHO European Region.

- Within communicable diseases, avian influenza A/H5N1 virus, related human cases and pandemic preparedness comprise an example of an epidemic-prone disease and the importance of

strengthening health system preparedness. HIV demonstrates the dilemmas arising from “securitizing” a health problem. TB shows how microbial drug resistance is increasing and spreading internationally, becoming a health security issue. The strong links between poverty and health are also highlighted and briefly discussed under HIV and TB. Poliomyelitis and measles provide examples of problems related to eliminating and eradicating disease and preventing it by vaccination.

- Human activity causes or exacerbates natural and human-made disasters, many of which are unexpected events such as floods, extreme temperature, droughts and wildfires, earthquakes and accidents. Specific examples from recent disasters in the European Region highlight the health and security effects.
- Examples of conflicts and complex emergencies illustrate scenarios of health action in crises and during the post-conflict recovery period.
- The potential future challenges from global changes include the increasing global climate change and its effects on human health.

Socioeconomic determinants of health and related factors – such as poverty, unemployment, migration, unsafe workplaces, urban slums, lack of access to health systems, gender inequity, age, social exclusion and marginalization – are cross-cutting by nature, and influence and aggravate, possibly even cause, health security threats. Although they are important across the Region, especially in the countries with transitional economies (6,7), this publication does not address them. Thorough discussion is expected in 2008, when personal dimensions of health security, including access to services, will be the topic of World Health Day and of *The world health report 2008* and when the Commission on Social Determinants of Health, launched in March 2005, publishes its final report (24).



Although the European Region currently has no large-scale conflict, the potential for new conflicts or reactivation of old ones is constantly present, as well as terrorist attacks, such as the bombings in Madrid in 2004 and in London in 2005. The risk of deliberate use of biological and chemical agents or radionuclear material with the intention to harm human health remains real (as exemplified by the polonium-

210 incident in London, United Kingdom in November 2006). Analysing the likelihood, magnitude and consequences of the accidental release or deliberate use of biological and chemical agents or radionuclear material is also outside the scope of this publication, but the WHO guidance on public health response to biological and chemical weapons of 2004 covers this (25).

## 2. Threats and challenges to health security in the European Region

### Communicable diseases

For the past 60 years, WHO has played a prominent role in launching, coordinating and implementing public health programmes and initiatives related to communicable diseases. Examples include the eradication of smallpox, the ongoing efforts to eradicate poliomyelitis and eliminate measles, the Expanded Programme on Immunization, the Stop TB Partnership, the coordination of the global epidemic response to control SARS and the ongoing efforts to contain the spread of influenza A/H5N1 virus (avian influenza) and to prepare for pandemic influenza (26).

Widening development gaps, the collapse of public health infrastructure, poverty, urbanization, civil strife, environmental change and degradation and the globalization of travel and trade are contributing to the new challenges posed by epidemic-prone and emerging communicable diseases worldwide.

Communicable diseases in the European Region account for 9% of the disease burden measured in disability-adjusted life-years. This is largely attributable to high rates of TB and growing rates of HIV infection, particularly in central and eastern European countries and in central Asia, and to emerging and re-emerging epidemic-prone diseases (27) (Box 3).

At the beginning of the 21st century, the world still confronts:

- the emergence of new or newly recognized pathogens, such as Nipah virus, Ebola virus, Marburg virus, SARS coronavirus and influenza A/H5N1 virus;

- the recurrence of well-characterized epidemic-prone diseases, such as cholera, dengue, influenza, measles, meningitis, shigellosis and yellow fever; and
- the accidental release or deliberate use of biological agents, such as anthrax.

The challenges the epidemic-prone diseases pose to WHO are how to minimize the risk of international spread, how to assist countries in preparing for and controlling epidemics and how to coordinate and focus global resources when no single institution has the necessary capacity (28).

Outbreaks can cause significant economic losses, such as in the cholera outbreak in Peru in 1991 (US\$ 770 million), plague in India in 1994 (US\$ 1.7 billion), bovine spongiform encephalopathy in the United Kingdom (an estimated US\$ 38 billion by 2000 (28)) and the global SARS epidemic in 2002–2003 (US\$ 100 billion (29)).

The revised International Health Regulations (IHR (2005)), which enter into force in June 2007, provide a legal framework to assist countries in protecting the health of their populations against any potential public health emergency of international concern, implementing the necessary measures and contributing to making the world more secure.

WHO is in a unique position with its international mandate given by 193 Member States in World Health Assembly resolution WHA58.3 in May 2005. WHO provides the IHR (2005) secretariat, has an IHR coordination programme that provides technical support to States Parties (the countries bound by the International Health Regulations) for

capacity development and runs an alert and response operation underpinned by standard operating procedures (Box 3). Partnerships

with national institutions and national and international partners will maximize the benefit of strengthening surveillance and response.

**Box 3. Epidemic alert, verification, risk assessment and response in the WHO European Region (1 January 1998 to 31 December 2006)**

To ensure the timely detection of events that are potential public health emergencies of international concern, the WHO Regional Office for Europe, besides relying on official reports from national health authorities, systematically screens a wide range of formal and informal sources of information in several languages.

Globally, from 1 January 1998 to 31 December 2006, WHO identified 2031 events that were potential public health emergencies of international concern for which epidemiological verification was sought. Of these events, 290 were identified in the WHO European Region through formal and informal sources (such as media news), the latter accounting for most of the cases. Official sources (such as a health ministry or national public health institute) initially reported to WHO one third of the 195 events subsequently verified in the Region (30). At least one verified event that was a potential public health emergency of international concern was identified in 39 Member States of the WHO European Region.

Table 1 shows the syndromes and diseases associated with the 195 events verified in the European Region from 1998 to 2006. In addition to the events described in Table 1, 10 Member States in the European Region reported 34 cases of SARS, including one death, from 10 February 2003 to 31 July 2003. This figure corresponds to 4% of the cases reported worldwide over the same period.

**Table 1. Syndromes and diseases associated with verified events that were potential public health emergencies of international concern in the WHO European Region, 1998–2006**

| Syndrome/disease                  | Number of events | % of total |
|-----------------------------------|------------------|------------|
| Foodborne or waterborne diseases  | 42               | 22         |
| Acute respiratory syndrome        | 34               | 17         |
| Acute haemorrhagic fever syndrome | 32               | 16         |
| Other zoonotic diseases           | 20               | 10         |
| Acute neurological syndrome       | 16               | 8          |
| Vector-borne disease              | 11               | 6          |
| Vaccine-preventable disease       | 10               | 5          |
| Influenza (A/H5 virus)            | 2                | 1          |
| Influenza (novel virus, not H5)   | 2                | 1          |
| Cholera                           | 4                | 2          |
| Yellow fever                      | 3                | 2          |
| Plague                            | 2                | 1          |
| Others                            | 8                | 4          |
| Unknown                           | 9                | 5          |
| Total                             | 195              | 100        |

## Influenza and pandemic preparedness

### *Avian influenza and pandemic preparedness*

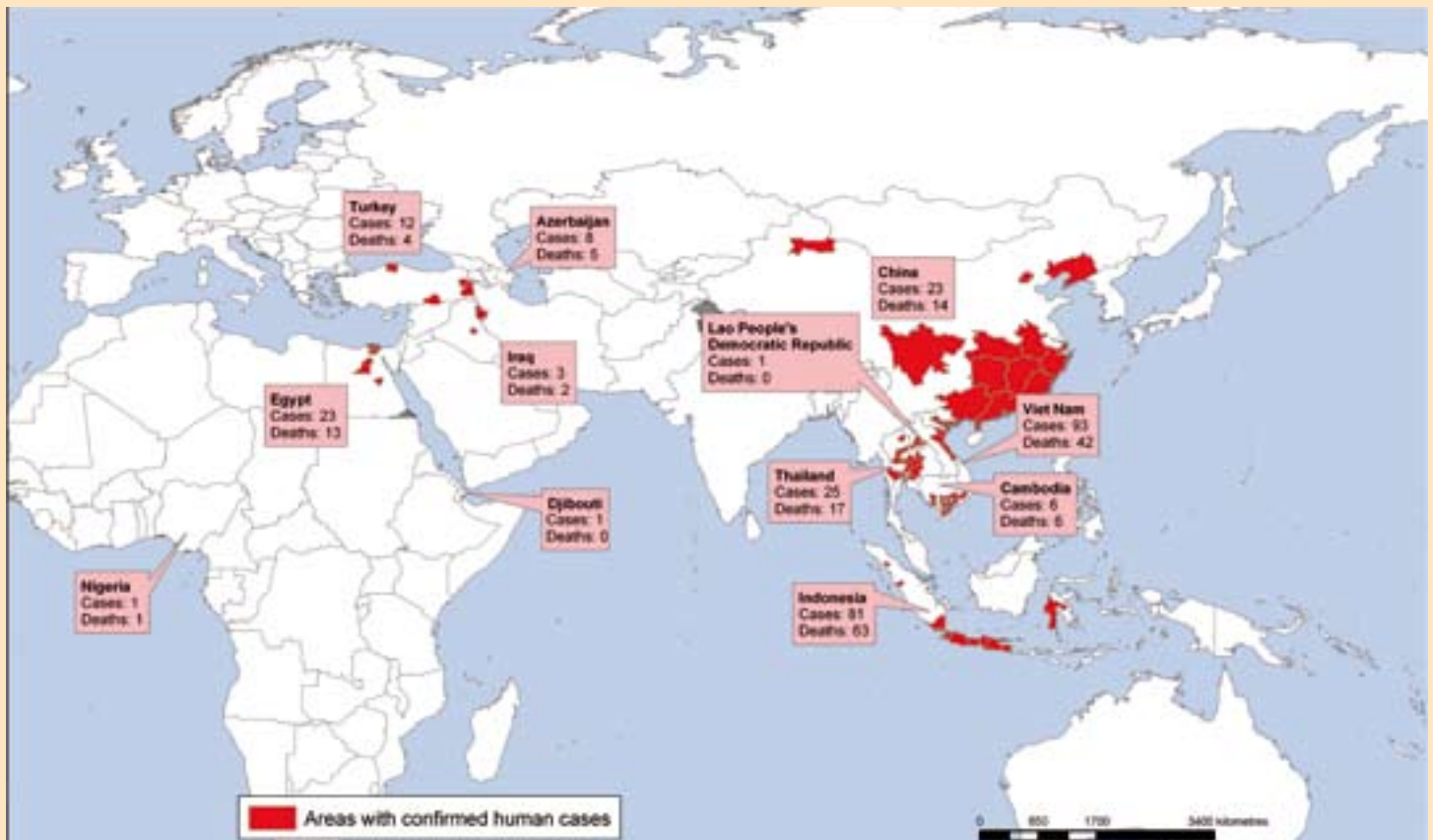
Although avian influenza virus has primarily affected animals since it appeared in 2003, its ability to infect humans and to cause high mortality makes the pandemic influenza threat associated with this virus non-negligible. Globally, as of 20 March 2007, 281 laboratory-confirmed human cases of influenza A/H5N1 virus infection, including 169 fatal cases (case fatality rate 60%), had been registered in 12 Member States (Fig. 1). In 2006, in the European Region, 20 human cases including 9 deaths were reported in Turkey (12 cases and 4 deaths) and Azerbaijan (8 cases and 5 deaths). The vast majority of cases of avian influenza among humans registered so far have been associated with exposure to infected animal-related sources.

Because of the risk posed to public health by the unprecedented influenza A/H5N1 outbreaks in the animal population, in May 2006 the Fifty-ninth World Health Assembly approved unanimously resolution WHA59.2 (32,33) calling for early voluntary compliance with the IHR (2005) for influenza-related issues. The WHO publication *Responding to the avian influenza pandemic threat: recommended strategic actions* (34) sets out actions and key steps including: controlling avian influenza in animals and reducing opportunities for human infection; strengthening the early warning system; containing or delaying spread at the source; reducing morbidity, mortality and social disruption; and conducting research to guide response measures.

### *Role of WHO in avian influenza control*

In close collaboration with the Food and Agriculture Organization of the United Nations and the World Organisation for Animal Health,

**Fig. 1. Confirmed human cases of and deaths from A/H5N1 avian influenza worldwide since 2003**



Source: Public Health Mapping and GIS Map Library (31).

WHO plays a central role in monitoring the spread of and in responding to avian influenza virus in humans. Besides systematic epidemic alert, verification and risk assessment, the WHO Regional Office for Europe provides support to Member States by deploying experts as required. A global action plan has been developed for monitoring the spread of the avian influenza A/H5N1 virus. This plan helps Member States and those responsible for emergency preparedness, public health, medical and veterinary services to respond to threats and occurrences of pandemic influenza.

In early 2006, following up on reports of outbreaks of avian influenza in poultry and wild birds and suspicious human cases of acute respiratory illness in Turkey and Azerbaijan, the Regional Office provided support to the Member States by deploying WHO and ECDC experts as required, coordinating and supporting the response and performing risk assessment missions in several countries in the eastern part of the Region, also involving partner institutions of the Global Outbreak Alert and Response Network (Box 4).

Laboratories in the WHO Global Influenza Surveillance Network (GISN) (36) collect and analyse virus strains of both seasonal and avian influenza worldwide. This allows recommendations on the choice of virus strains for vaccine production to be made. It also enables changes of influenza A/H5N1 virus to be monitored that may indicate the increased ability to transmit between humans and the susceptibility of the virus to antiviral agents. The GISN was established in 1952, after a WHO expert committee recommended that, through an international network of laboratories, WHO would be able to advise its Member States as to “what influenza control measures are useful, useless or harmful”. The WHO European Region currently has two WHO collaborating centres for research on influenza and WHO reference laboratories for the diagnosis of influenza A/H5 virus infection: the National Institute for Medical Research in London, United Kingdom and the Institut Pasteur in Paris, France (37). The GISN provides a global alert mechanism for the emergence of influenza viruses with pandemic potential. Its activities

#### **Box 4. WHO Regional Office for Europe response to outbreaks of avian influenza in humans**

Between 31 December 2005 and March 2006, 20 laboratory-confirmed human cases of influenza A/H5N1 virus infection, including 9 deaths, occurred in Turkey (12 cases and 4 deaths) and Azerbaijan (8 cases and 5 deaths). In both countries, the Regional Office led international missions to assist the governments’ efforts to investigate and respond to the outbreaks in humans and worked in close collaboration with the national multisectoral crisis committees as well as with other United Nations agencies on the ground. WHO assisted the health ministries in the epidemiological investigations of the source of infection and of the occurrence of human-to-human transmission; in advising on infection control practices and case management; in implementing pharmaceutical and non-pharmaceutical public health measures; and in implementing social mobilization activities aiming at reducing risk behaviour. WHO assisted the countries in transporting specimens of suspected human cases to the national laboratory and to the National Institute for Medical Research in London, United Kingdom – a WHO collaborating centre and a WHO reference laboratory – for final laboratory confirmation of influenza A/H5N1 virus infection (35).

In Azerbaijan, the source of infection was difficult to identify, as poultry outbreaks were limited and poultry were healthy in the affected village during the investigation. Large die-offs of wild swans, however, had been reported in the vicinity of the village in which seven of the eight cases occurred and, eventually, interviews with family members of these cases revealed the probable source of infection to be the defeathering of dead wild swans.

have contributed to the understanding of influenza epidemiology. The willingness and commitment of Member States to submit

specimens and viruses to the GISN is a crucial factor in this process. WHO also provides to Member States guidelines on infection control practice and case management, guidelines for health care facilities and other technical advice such as WHO guidelines on the use of vaccines and antiviral agents, checklists and other publications.

The Regional Office works closely with Member States to strengthen the early warning function of existing surveillance systems, to ensure the timely detection of suspected cases of avian influenza and to enhance laboratory capacity to diagnose both seasonal and avian influenza. Member States that do not have a national influenza centre with their WHO-certified laboratories are encouraged to send specimens and data to GISN for further investigation and virus confirmation and to attain national influenza centre status. The goal is to have a national laboratory in every country in the Region that can accurately and rapidly diagnose avian influenza virus infection in humans and provide laboratory support in outbreak situations. The Regional Office supports subregional networks of influenza laboratories, particularly in the south-eastern part of the Region, to enhance capacity in training laboratory staff on avian influenza diagnosis and to foster collaboration with the GISN with the designation of subregional WHO H5 reference laboratories for the diagnosis of influenza A/H5 virus infection.

#### *Influenza pandemic*

Human influenza pandemics are rare but recurring events. They have typically occurred every 10–50 years throughout recorded history. The last three influenza pandemics were recorded in the 20th century: in 1918 with about 40 million deaths, in 1957 with over 2 million deaths and in 1968 with about 1 million deaths. Pandemics often overwhelm the entire health system and in particular the health services, because they cause a sudden surge of illness and deaths and can cause severe social disruption and economic losses, in addition to human suffering and loss of life.

The world is ill prepared for a possible pandemic. Influenza pandemics are dramatic events that can rapidly affect virtually all countries. Once international spread begins, a global pandemic is considered largely unavoidable, as it is caused by a virus that spreads very rapidly through droplets (coughing or sneezing) and to which the population has no pre-existing immunity. As infected people can shed virus before showing clinical symptoms, international spread via asymptomatic travellers is of serious concern.

The severity of the disease and the number of deaths varied greatly in past pandemics and remain unpredictable for a possible future pandemic. During past pandemics, attack rates reached 25–35% of the total population. Should a pandemic be due to a virus that causes mild disease, the world could still experience an estimated 2.0–7.4 million deaths (projected from data obtained during the 1957 pandemic). Projections related to a more virulent virus are much higher. During the 1918 pandemic, which is considered exceptional, at least 40 million people died worldwide.

A further concern related to the response to an influenza pandemic, in contrast to natural disasters or more localized disease outbreaks, is that, as all countries would be likely to experience emergency conditions simultaneously, opportunities would be limited to rely on international assistance and governments would especially focus on protecting their domestic populations, the pandemic would also affect the availability of health professionals and further deteriorate any resilience mechanism.

Pandemics can cause a sudden increase in the number of people requiring or seeking medical or hospital treatment, temporarily overwhelming health services and the overall health system. High rates of worker absenteeism can also disrupt other essential services, such as law enforcement, transport and communications. As populations will be fully susceptible to an A/H5N1-like pandemic virus, mortality could go up rapidly, with temporary local social and economic disruptions. These may, however, be amplified in today's closely interrelated





© ISTOCK

and interdependent systems of trade and commerce. Based on past experience, a second wave of global spread should be anticipated within a year of the first wave.

#### *Role of WHO in pandemic preparedness planning*

The Regional Office, working closely with other United Nations agencies, the European Commission and the ECDC and other partners in the European Region, has provided technical support to its Member States to improve their own preparedness capacity for an influenza pandemic by conducting country assessments of pandemic preparedness, providing experts to work with pandemic influenza planning task forces and/or committees and by organizing regional and subregional workshops, with the latter including desk-top simulation exercises.

The WHO pandemic plan (38) and checklist (39) provide Member States with a template on which to base their own country-specific preparedness plans. As the WHO global influenza preparedness plan outlines, the five pillars of pandemic preparedness are planning and coordination, surveillance and monitoring, health system response, pharmaceutical and non-pharmaceutical interventions and communication (40). The resources, coordination and actions in a country required to prepare and respond to pandemic influenza must be captured in the national preparedness plan, encompassing the legal framework, intersectoral involvement and implementation at the national and subnational levels.

The purpose of pandemic preparedness plans is to minimize the impact of a pandemic by reducing morbidity and mortality as

well as mitigating economic and social disruption. An important component of pandemic planning is the assumptions on which planning considerations are based and scenarios developed. Planning assumptions are based on the expected clinical attack rate (as above, this could be 25–35% of the population), the number of people who would require hospitalization, the number of people hospitalized requiring mechanical ventilation and the number of deaths. Knowledge of the demographic characteristics of the high-risk groups for influenza will facilitate the planning process and the identification of priority groups to receive vaccines and antiviral drugs (if available) and the development of contingency plans for health care. Countries need to determine where people with influenza will be treated, whether to rely on existing health care facilities or consider establishing fever clinics and how the supplies of basic drugs can be ensured. Strategies for stockpiling antiviral drugs and vaccines must be developed and should include setting priorities for use. It is generally recognized that front-line workers such as health care workers should be given high priority.

Emergency plans and measures should be combined with longer-term measures to strengthen institutional capacity, as this improves their ability to manage other emerging and epidemic-prone communicable diseases effectively. Success in tackling a pandemic will also require learning from experience, evaluating the safety and effectiveness of measures taken both within countries and between countries.

Most countries in the Region have pandemic preparedness plans. These vary in the comprehensiveness of their multisectoral coordination mechanisms and the extent to which the plans are operational at the national, regional and subregional levels. Pandemic preparedness plans and emergency plans and measures, including policies on border control, need to be harmonized.

Country plans are therefore based on both the immediate and longer-term need to strengthen collective defences against future pandemic

influenza threats. Such plans should also be tested in simulation exercises that involve all relevant sectors included in the plan.

An actual example of a preparedness plan for avian influenza (Box 5) illustrates several practical matters that need to be considered when designing and implementing plans in an outbreak situation.

#### *Influenza vaccine strategy and other interventions*

An important element of health security is a government strategy for determining the safety and effectiveness of new antiviral agents and vaccines introduced during a pandemic. The European Region is currently the major producer of seasonal influenza vaccines. Demand for such vaccines is growing, and countries should map their risk groups according to WHO guidelines and provide for sufficient vaccine supplies. To improve the accessibility, safety and availability of vaccines, WHO assists production companies in low-income countries to obtain licences for vaccine production. WHO is also involved in research on prepandemic vaccine. The evaluation of prepandemic vaccine based on the current A/H5N1 virus is important: if this vaccine is safe, then countries will be more confident in updating it with a pandemic A/H5N1 strain and using it among their populations (42).

#### *Communicating about influenza*

Health crises can have an impact far beyond the actual threat to health. They generate fear and uncertainty and can influence political, economic and cultural forces that are likely to do the most damage. Too often in the past, such damage has been made much worse by poor communication. The primary goal of crisis communication is to reduce the damage from these forces. A crisis communication strategy should be part of the pandemic preparedness plan and of the emergency preparedness plan of any national health system.

Chapter 4 further discusses risk communication, which fills the gap between risk assessment and its perception.

### Box 5. A preparedness plan for avian influenza

Outbreaks of avian influenza must be detected, investigated and responded to quickly. This involves not only the veterinary services and health professionals but also the population in general. Experience has shown that practical aspects need to be thought through in detail: reporting of cases will be delayed if, for example, there is no compensation for poultry culled and destroyed or if the poultry farmers are insufficiently aware of compensation schemes. The population needs to be informed about the importance of immediate reporting of suspicious infections in birds and about effective protection measures through strict hygiene, avoiding direct contact with birds, increasing hand-hygiene measures and cooking meat thoroughly. Veterinarians, health professionals, ambulance drivers and anyone dealing directly with birds or people with suspected avian influenza should be equipped with personal protection equipment and disinfectant materials.

The Regional Office supports and trains mobile response teams to operate in the field in several countries. These field teams are expert teams that can respond at short notice to a reported outbreak, investigate possible cases, trace contacts and initiate control measures. The avian influenza preparedness plan should establish which experts should be included in these teams and how and where they are to be provided with full personal protection equipment, oseltamivir (Tamiflu®) supplies, sampling kits, disinfectant spray and so on. Their mission is to coordinate the outbreak response and ensure that suspected cases are referred to the nearest designated hospital.

The preparedness plan also needs to take into account the fact that human cases of avian influenza may present at different entry points to the health system. They may consult private doctors, local polyclinics or an emergency department, and they may be misdiagnosed. Plans have to be in place to deal with cases from any of these routes. The referral hospital should be identified according to its capacity to manage cases and the related catchment area specified. Minimum requirements for referral institutions include the availability of ventilators and medicine (antiviral agents and other drugs), trained staff with sufficient personal protection equipment, an X-ray facility, a laboratory for biochemical and haematological testing and the ability to store specimens for laboratory confirmation. Specimens for laboratory confirmation of the disease should preferably be taken at the referral hospital and transported to a laboratory with the capacity to test for H5N1 for confirmation as well as to a WHO collaborating centre. The transport of specimens should comply with current international and national regulations (41).

Getting patients to a hospital will involve ambulances or other means of transport: referral hospitals should have an ambulance service that is properly equipped and has trained staff and sufficient and proper personal protection equipment. Small stockpiles of oseltamivir need to be held at every referral hospital and at the district level. These are just a few concrete examples of the range of topics that require attention and planning.

### HIV and TB – global threats that medicine alone cannot cure

HIV, coupled with TB, is rapidly becoming a major threat to health, economic stability and human development in many parts of the European Region (43). In July 2000, United Nations Security Council resolution 1308 labelled HIV/AIDS a security threat (13). The resolution stresses the potential of HIV/AIDS

for devastating societies and states that it “may pose a risk to stability and security”, two areas that merit a closer look.

In the eastern part of the Region, the causal links between HIV, TB and poverty are evident: the poorest people are the most vulnerable to the diseases, and infected people are the most vulnerable to poverty. In turn, continuing poverty contributes to the persistence of

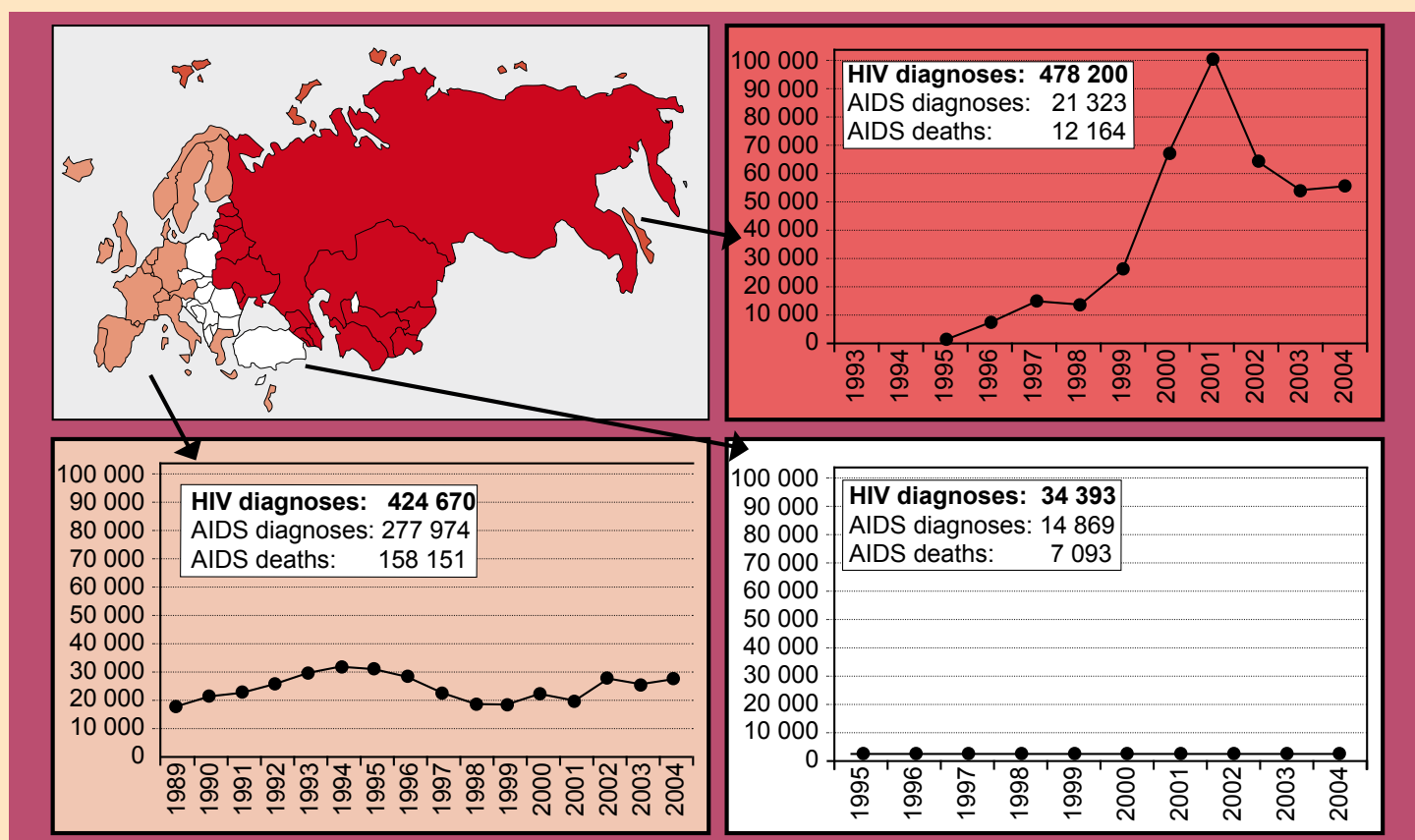
other societal problems, many of which have global consequences, such as illegal migration, violence and lack of environmental sustainability.

Political actors should not view HIV as a national or international security issue but as a health and development crisis. By virtue of its long-term and destabilizing nature, HIV differs from classic geopolitical security threats, although the struggle against HIV is often called “a war”. No empirical analysis suggests that HIV has actually led to an increased risk of armed conflict anywhere. But “securitizing” HIV raises serious ethical concerns.

WHO and UNAIDS (the Joint United Nations Programme on HIV/AIDS) estimate that, at the end of 2006, 2.44 million (confidence interval 1.78–3.57 million) people were living with HIV in the 53 countries of the European

Region, most of them (1.7 million (1.2–2.6 million)) in the countries of eastern Europe and central Asia (44). However, the number of reported people living with HIV is much lower (Fig. 2). The estimated HIV prevalence in adults now exceeds 1% in three European countries: Estonia, the Russian Federation and Ukraine. Yet the promise of increased access to antiretroviral therapy for people in need allows the development of a comprehensive public health response to the epidemic that fully integrates prevention, treatment, care and support. Evidence indicates that introducing treatment in affected communities can reduce the fear, stigma and discrimination that often surround HIV and AIDS, increase demand for the uptake of HIV testing and counselling and reinforce prevention efforts (45). Antiretroviral therapy also reduces the level of HIV to untraceable levels in many people (46). Although the virus is never eliminated –

**Fig. 2. New HIV diagnoses by year and cumulative totals of HIV diagnoses, AIDS diagnoses and deaths reported in three groups of countries in the European Region, 1989–2004**



Source: Sexually transmitted infections/HIV/AIDS programme (47).



and no one is cured – the risk of a person on effective antiretroviral therapy transmitting HIV is greatly reduced. This, coupled with strategies to emphasize safer behaviour surrounding HIV transmission, should have a considerable effect on the spread of HIV infection.

WHO estimates that, in 2005, 66 000 people died from TB and there were 445 000 new TB cases in the European Region. About 80% of these cases are from the eastern part of the Region; in western Europe, spots of social marginalization and migration from countries with a high burden of TB have resulted in an increasing incidence of TB, especially in major cities. In the eastern part of the Region, nearly 70 000 multidrug-resistant TB cases every year result from poor TB control practices, with an estimated proportion of 15% of the total TB cases, the highest in the world. Some of these cases are resistant to the most effective first-line anti-TB drugs and second-line drugs. Reported cases of an extensive multidrug-resistant type of TB are reported to be increasing in the eastern part of the Region, raising concerns about a future epidemic of virtually untreatable TB. Although anybody can become sick from TB, groups at higher risk include homeless people, alcoholics, drug users and prison inmates.

HIV is the greatest risk factor for the progression of latent or recent TB infection to active TB disease; conversely, TB is among the most important causes of mortality among people living with HIV. In 2005, the estimated prevalence of HIV among adults with TB in eastern Europe was 4.6%, or 13 568 cases. As the risk of people living with HIV acquiring TB is higher where the TB prevalence is high, the Russian Federation (170 422 estimated TB cases) and Ukraine (46 183 estimated TB

cases) are the hotspots for TB/HIV co-infection. Collaborative TB/HIV activities, tailored to different epidemiological situations and the specifics of countries, have just started to be implemented in the European Region. About half the countries report that they have national policies for HIV counselling and testing for people with TB. Only 20% of the countries, however, have a national surveillance system to measure the prevalence of HIV, which explains the limited knowledge of the real extent of TB/HIV co-infection. This weakness of surveillance systems is one of the great hindrances to improving the health security of Europe.

### **Poliomyelitis and measles – old threats that can be eliminated**

The world learned that eliminating a vaccine-preventable disease was feasible in the 1970s after global certification of the last case of smallpox. Only a few human diseases are candidates for eradication; their pathogens must, like the smallpox virus, circulate exclusively among humans and have no other environmental reservoir, and a highly effective means to prevent human infection must be available.

Vaccination is a highly effective and cost-efficient means to control communicable diseases and can be used to stop the indigenous spread of some diseases in large geographical areas or to prevent others from being global threats. Given the availability of highly effective vaccines and the crippling burden of disease caused by the poliovirus, the World Health Assembly targeted poliomyelitis for eradication in 1988. Measles has also now been targeted for elimination in four of the six WHO regions (Box 6).

#### **Box 6. Case study on measles in high-risk, mobile populations and the international health implications**

The measles outbreak that began in western Romania towards the end of 2004 eventually resulted in over 8000 cases in that country alone, including 13 deaths, by the time it ended in mid-2006. It was directly linked to outbreaks in at least five other countries in the European Region. Seventy-five per cent of the cases were seven years of age or younger. Interviewers characterized most of the cases investigated in Romania as marginalized groups such as Roma.

The investigation revealed that 32% of the mothers had not attended school and 28% had not received antenatal care with their last pregnancy; 75% of the fathers were unemployed; and only 44% of children had received their measles vaccine on time. Alarming, 20% of children had not received any polio vaccine. The case children and their families were more often than control children from communities not registered with a family doctor and more often used emergency departments. The caregivers of case children also less often agreed that vaccinations are safe or agreed that vaccine-preventable diseases can do harm and can be prevented by vaccination compared with the caregivers of control children.

The measles outbreaks in Germany, Italy, Portugal, Spain and Switzerland that were epidemiologically and/or virologically linked with that in Romania also involved children from Roma communities and resulted in at least one additional death. Another separate measles outbreak among Roma in Greece in 2005 was directly linked epidemiologically and virologically to a measles outbreak in Albania.

These measles outbreaks demonstrate the ability and risk of preventable communicable diseases to spread internationally through individuals and/or groups who do not use preventive health services because of real or perceived barriers, cultural practices or a lack of effective information on the benefits of these services. The effectiveness of national health systems in providing such services to marginalized and mobile high-risk groups can affect the overall health security of all countries in the Region. The receptiveness of these children to vaccine-preventable diseases increases the risk to all children in the European Region and limits the Region's ability to achieve the targets for measles and rubella elimination by 2010 and to maintain the poliomyelitis-free status reached in 2002.

In terms of global security, the process of eliminating or eradicating a disease has several benefits, but it also exposes Member States to certain risks, such as the accidental release and/or deliberate use of the pathogen. To achieve and maintain a state of elimination or eradication of the disease, strong public health capacity is required at the national and international levels to use existing vaccines effectively; to ensure that health systems do not create real or perceived barriers to immunization; to implement solid surveillance systems able to detect disease rapidly should it occur; and to implement a rapid response if the identified disease is detected.

### **Natural and human-made disasters**

Floods, extreme temperature, droughts and wildfires, earthquakes and accidents cause thousands of deaths and billions of euros of economic loss each year in the European Region. Between 1990 and 2006,

the Emergency Events Data Base (EM-DAT), a global disaster database managed by the Centre for Research on the Epidemiology of Disasters (12) – a WHO collaborating centre – recorded 1483 events, causing 98 119 deaths, affecting over 42 million people, with an estimated economic loss of more than US\$ 168 billion (€126 billion). The frequency of disasters also appears to be increasing.

Table 2 gives an overview of events recorded in the European Region. Extreme temperature events, specifically the heat-waves affecting western Europe, and earthquakes accounted for the most deaths, whereas floods, although much more frequent, caused relatively fewer deaths.

### **Floods**

Flooding is by far the most frequent natural disaster in the European Region, with vast effects on human health (Fig. 3). Most studies divide the health aspects of floods into direct



**Table 2. Natural disasters and accidents in the WHO European Region, 1990–2006**

| Type of event           | Number of events | Deaths        | Affected population | Economic damage (thousands of US\$) |
|-------------------------|------------------|---------------|---------------------|-------------------------------------|
| Flood                   | 344              | 3 593         | 11 566 509          | 66 093 052                          |
| Extreme temperature     | 112              | 52 119        | 1 389 529           | 9 024 788                           |
| Drought                 | 31               | 2             | 14 865 575          | 14 297 309                          |
| Wildfire                | 58               | 228           | 286 969             | 3 540 357                           |
| Earthquake              | 102              | 21 840        | 5 875 138           | 30 225 449                          |
| Accidents <sup>a</sup>  | 609              | 16 856        | 137 638             | 11 697 048                          |
| Landslide and avalanche | 57               | 2 084         | 90 196              | 156 589                             |
| Windstorm               | 170              | 1 397         | 8 063 234           | 33 114 822                          |
| <b>Total</b>            | <b>1483</b>      | <b>98 119</b> | <b>42 274 788</b>   | <b>168 149 414</b>                  |

<sup>a</sup>Only accidents with 10 or more killed and/or 100 or more affected are included in the figure. Accidents include the categories:

- 1) industrial accidents: technological accidents of an industrial nature or involving industrial buildings (such as factories), including chemical spills or leaks, explosions, radiation and gas leaks, poisoning, fires and other technological accidents involving industrial sites;
- 2) transport accidents: technological transport accidents involving mechanized modes of transport, including accidents involving aeroplanes, helicopters, airships and balloons, accidents involving sailing boats, ferries, cruise ships, other boats, accidents involving trains and accidents involving motor vehicles on roads and tracks; and
- 3) miscellaneous accidents: technological accidents of a non-industrial or transport nature, including explosions, collapses, fires and other miscellaneous accidents involving domestic/non-industrial sites.

Note: Because the time period for this overview starts in 1990, it does not encompass several severe events discussed in the text such as the Chernobyl nuclear plant accident and the Spitak earthquake affecting Armenia.

Source: EM-DAT: Emergency Disasters Data Base (12).

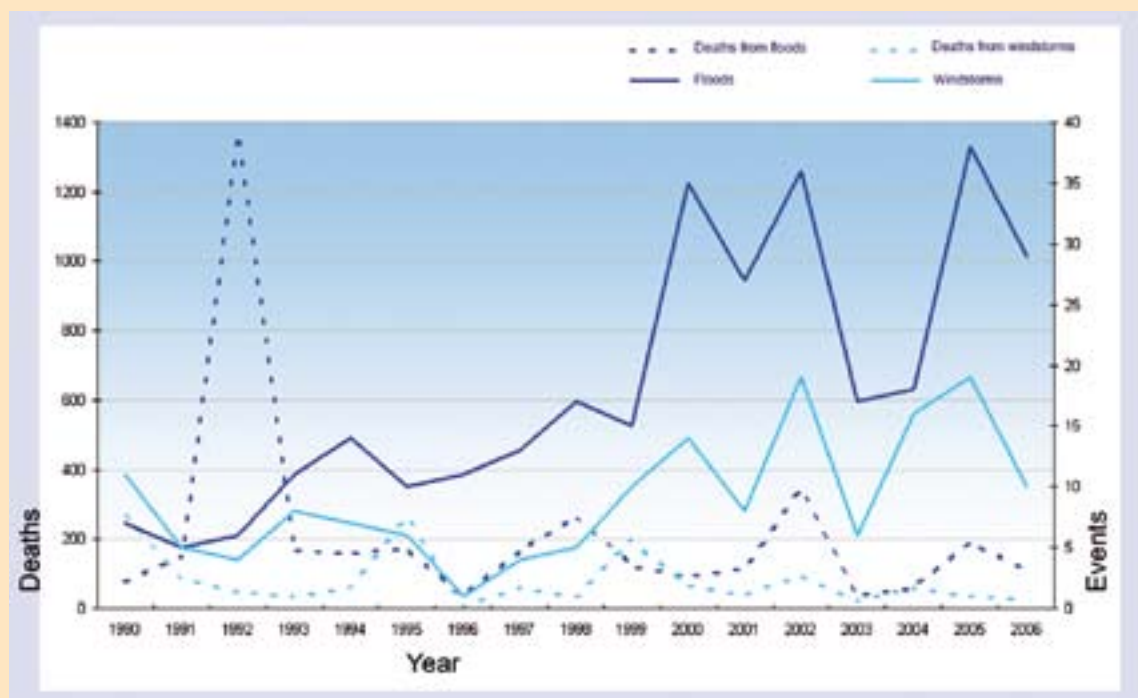
effects caused by the floodwaters (such as drowning or injuries) and indirect effects caused by other flood effects (such as waterborne, vector-borne and rodent-borne diseases), acute or chronic effects of exposure to chemical pollutants released into floodwaters or food shortage.

Since 1990, 3593 people have died from the direct or indirect effects of floods in the European Region (Table 2). The number of deaths associated with flooding is closely related to the life-threatening and related risky behaviour characteristics of flood situations. Major health effects of floods include drowning, traumatic injuries, waterborne and vector-borne diseases, rodent-borne diseases such as leptospirosis, snake bites (as snakes tend to seek shelter in houses to escape from flooding), sewage and waste contamination of the drinking-water supply, post-traumatic stress disorders and



poisoning caused by toxic substances. Negative health effects are further aggravated by the

**Fig. 3. Frequency of floods and windstorms with numbers of related deaths in the European Region, 1990–2006**



Source: EM-DAT: Emergency Disasters Data Base (12).

disruption of health-care services and population displacement (Boxes 7 and 8).

A few short- and long-term epidemiological studies have assessed and documented the health effects of flooding in Europe. Although there is little evidence about the role of extreme

rainfall on waterborne disease outbreaks or the effect of droughts on human health, extreme rainfall and runoff events may increase the total microbial loads in watercourses and in drinking-water reservoirs (48). Notable outbreaks of cryptosporidiosis have been associated with heavy rainfall (49).

#### **Box 7. Seasonal flooding in south-eastern Europe in 2006: a call for joint action**

From April to July 2006, central and south-eastern Europe (Bulgaria, Croatia, Czech Republic, Hungary, Poland, Serbia and Montenegro<sup>a</sup> and Slovakia) was hit by seasonal flooding, following a rapid rise in temperature, melting winter snows and heavy rainfall that pushed the Danube to its highest level for more than a century. As a result, Europe's second-longest river swept across hundreds of thousands of hectares in central and south-eastern Europe, forcing people on the Danube's flood plains out of their homes. The foreign ministries of Hungary, Romania and Serbia and Montenegro stressed the need to join forces in coping with floods, repairing damage and improving the organization of flood preparedness and response for the future. The three governments agreed to launch consultations on joint efforts on flood prevention and response. WHO, as part of the United Nations country team in different countries (see Box 8 for more on these teams), provided support to the health ministries in conducting rapid health assessment missions to the affected areas and coordinating and monitoring the public health situation in the flooded areas.

<sup>a</sup>Montenegro became a WHO Member State in August 2006.

### **Box 8. Flooding in Bulgaria in 2005**

In summer 2005, torrential rains and flooding in Bulgaria affected 2 million people, claiming 20 lives and leaving an estimated 10 000 people homeless. Damage to the economy was estimated to be about US\$ 624 million, with massive destruction of farmland and vital infrastructure. The regions of Targovishte, Rousse, Velico Tarnovo, Stara Zagora, Haskovo, Pazardzik, Shoumen and Bourgas were most severely affected.

A state of emergency was declared in the flood-affected areas. The state agency for civil protection conducted immediate assessments and urgent search and rescue activities together with the Ministry of Health and other government stakeholders. An international response was also launched to deliver emergency supplies such as clean water, blankets and food and to provide technical support to the government. The United Nations country team coordinated this.

WHO conducted rapid health assessment in the flooded areas to identify environmental health threats and to address the public health needs of the population. In particular, the assessment investigated the following areas: water, sanitation and hygiene, vector control, epidemiological surveillance and basic health care, chemical hazards in the flooded areas, food and public awareness.

A communicable disease surveillance system was in place and vaccinations continued without interruption. Health facilities were largely unaffected by the floods and no shortage of drugs or vaccines was reported. The provision of basic health care was uninterrupted. Although no major outbreaks had been reported, contamination of water supplies and food sources posed a potential threat to health, livelihoods and security.

Cultivated land that normally provided basic food for families was flooded and contaminated by septic pits. The resulting economic losses affected a wider population than those directly affected by the floods, leaving people in a difficult situation, especially vulnerable groups. Although water supply was not disrupted, the wells in private homes were largely contaminated by sewage water. The local authorities warned people about the risk of possible water contamination and advised them to use only mineral water, adding an additional burden on the already limited income of rural families. The mass media reported on deaths by drowning as a result of the flooding, and lightning killed one man as he tried to rescue his livestock.

The WHO assessment also reported a high level of distress among the community, particularly elderly people. Research from previous floods indicates that, aside from the experience of being flooded, many mental health problems, such as increased incidence of anxiety and depression, stem from the troubles brought about by geographical displacement, damage to the home or loss of familiar possessions. Lack of insurance is also likely to make recovery difficult. Some previous studies suggest an increase in suicide after a flood, although there was no evidence of this in Bulgaria.

Although the immediate health effects of the floods in Bulgaria were addressed through public health measures such as disease surveillance, water analysis and treatment, health education and information to the public, the more enduring health effects in terms of mental health and of reduced access to health care by vulnerable groups may not have been sufficiently addressed.

The case of Bulgaria shows that floods threaten the security of populations simultaneously through their direct and indirect impact on health and on economic stability, increasing vulnerability in terms of the ability of communities and individuals to cope and recover.

Hence disaster preparedness and strategies for reducing risk need to be emphasized more strongly before a flood occurs. This requires an intersectoral approach and can include: legislating to relocate structures away from flood-prone areas, proper land use, planning and maintenance of riverways, improved early warning and flood forecasting and insurance policies. Lack of maintenance of the riverbeds is a further problem in these regions and may have led to increased flooding, while a single sewerage and drainage system may have received less attention. It also implies international cooperation in terms of land and river use and flood forecasting.

The impact of the floods on regional economic, health and political security is more difficult to measure and quantify. If the predictions of increased flooding under potential future climate change are correct, however, the European Region must address this issue through coordinated planning, action and cooperation in response.

*Source: Rapid health assessment of flooding in Bulgaria (57).*

The vulnerability of communities to flood-related effects is closely related to the level of public awareness of health-related flood hazards, economic conditions, structural and non-structural mitigation measures in place including the maintenance of river banks and canalization systems and the institutional response capacity and recovery planning.

Studies in both high- and low-income countries indicate that the mental-health aspects of flood-related effects have been inadequately investigated (50–52). A systematic review of post-traumatic stress disorders in high-income countries demonstrated a small but significant effect of this disorder in relation to disasters (53). Elderly and disabled people, children, women, ethnic minorities and people with low incomes are more vulnerable and need special attention during the response and recovery periods (54).

Flooding may lead to the contamination of water systems with dangerous chemicals from storage, plants or pesticides. Published data and evidence are lacking on a clear cause–effect relationship between chemical contamination and the pattern of morbidity and mortality following flooding events (55,56).

### **Extreme temperature**

Extreme temperature includes heat-waves and cold-waves. We only report here the dramatic event in 2003 caused by a heat-wave in Europe.

Extreme temperatures in the form of heat-waves are increasingly frequent weather events that are likely to become even more common in the future. A main reference point is the unexpected heat-wave that hit parts of Europe in August 2003, resulting in an unprecedented death toll of 35 000 deaths in August alone. France suffered most, with more than 14 800 excess deaths during the first 20 days of August, a 60% increase in mortality compared with the same periods in 2000 to 2002. Excess mortality figures were statistically significant in all regions and for all age groups older than 45 years. Serious excess mortality was also reported for Belgium, the Czech Republic, Germany, Italy, the Netherlands, Portugal, Spain, Switzerland and the United Kingdom.

Below are some crucial lessons learned from this dramatic experience about who was affected and what were the risk factors. They should help Member States in the European Region in adopting measures to prevent





having similar health effects in the future and in mitigating the effects of high-temperature events.

#### *Who was primarily affected?*

People older than 70 years of age were affected most severely. Given the ageing populations in many European countries, this is of particular concern. In France, deaths among people 75 years and older increased by 70%, in United Kingdom by 22% (with a 59% excess in the London area), in Portugal by 47% and in Italy by 21%, amounting to 92% of all deaths.

Females were particularly affected. In France, female mortality was 15–20% higher in all age groups, in Italy 32–33% and in Portugal more than twice (58–60).

Younger age groups were also affected. Excess mortality among people 45–74 years old in France increased by 20%.

The burden of heat-wave mortality falls across a wide range of causes. Heat stroke, although widely underreported, was fatal in 10–50% of all cases and may lead to nervous system disorders in 20–30% of people. Deaths have been further attributed to cardiovascular and respiratory diseases.

Contrary to expectations, hospital admissions for morbidity vary greatly, and no increase was detectable during the heat-wave.

#### *Who is most at risk?*

People with chronic debilitating diseases are more at risk. These include cardiovascular diseases, respiratory insufficiency, mental and nervous system disorders, blood and metabolic or endocrine gland disorders, diabetes and malnutrition. Particularly people confined to bed need to be carefully followed up.

Many types of medication can directly affect the central and peripheral mechanisms of thermoregulation and/or increase cardiac output and thereby heat elimination. Heat exposure can increase medication toxicity and/or decrease its efficacy. Health professionals need to give careful advice to people taking medication.

Age-associated factors such as social isolation are very important, as are the often lower socioeconomic status of elderly people and the social and health care aspects of their lives. The highest excess mortality was registered among vulnerable, low-income people (+18% in Rome) and in groups with lower educational levels (+43% in Turin) (59). Nursing homes in northern Italy (61) and retirement homes in France reported a larger than expected excess death rate.

Vulnerability differs for urban and rural areas; heat island effects in urban environments, such as Athens, can account for a temperature increase of up to 4.6°C during summer (62). Excess mortality in France ranged from +4% in Lille to +142% in Paris, suggesting that heat gain by city buildings or traffic patterns may influence mortality (63). Exceptionally, mortality cases were reported more in rural villages than in provincial capitals in Spain (64). The position and location of buildings, indoor temperature, exposure to a high concentration of ozone and particulate matter and heat-waves with higher intensity and duration increased the risk of dying during heat.

#### *Key elements of a heat-wave plan*

Many countries initiated action and preventive measures in the wake of the 2003 heat-wave. France, Germany, Hungary, Italy, Portugal, Spain and the United Kingdom have developed heat-wave plans, and many European countries have established heat health warning systems (65). France, Italy, Portugal and the United Kingdom have developed real-time data systems.

The EuroHEAT assessment (66) identifies the key elements of a heat plan by analysing lessons learned in the countries that implement them. The following are the six key elements of health system preparedness planning for heat-waves: planning for future heat-waves, early warning systems, health systems preparedness, real-time data, medical and public advice, housing and urban planning.

- Heat-wave plans strongly rely on common elements such as coordination with the weather service to obtain accurate and timely forecasts, a sound understanding of the effects of heat-waves on health, the designation of a responsible lead agency, the scaling up of public information and awareness-raising during the summer season, the identification of high-risk population groups with targeted priority interventions, the availability of cooling facilities, the engagement of social services, the integration of “clients” and target groups in the planning process and design of communication and close monitoring and evaluation of the plan.
- Heat health warning systems link public health actions to forecasts of dangerous weather patterns and aim at preventing heat-related health effects. Some countries have developed heat health warning systems that identify dangerous weather patterns one to three days in advance, provide information through public channels and alert and update relevant institutions and authorities (67). In addition, EuroHEAT identifies and predicts potentially dangerous situations up to 10 days ahead.



- Health systems, especially the main health care and referral services, need to prepare contingency plans for sufficient staffing levels and mobilization mechanisms for extra staff during the hot season: establish cooling facilities and develop and disseminate standard operating procedures, guidelines and treatment protocols to share knowledge and best practices broadly to treat and prevent heat-related health effects.
- Informing about the health outcomes in real time is important, especially in the countries with no heat health warning system. France, Italy, Portugal and the United Kingdom have developed real-time data and fed them back to a central registry based on 72-hour mortality registration and the number of registered emergency visits and calls, to target or modify interventions as the need arises.
- Medical and public advice: essential first-aid knowledge to treat people suffering from heat stress should be broadly disseminated. The most effective measure during a heat-wave is reducing people's exposure to heat. This can be done through a number of domestic and behavioural measures. The population should be aware of effective protection measures to reduce heat exposure, essential advice on rehydration and cooling measures and the need to reduce physical activity.
- Housing and urban planning: as a long-term strategy, reduction to heat exposure should be integrated into urban planning and be reflected in building codes for high-risk environments.

### **Droughts and wildfires**

Heat-waves, droughts and wildfires are correlated. The effects of droughts on human health comprise malnutrition (protein–energy malnutrition and/or micronutrient deficiencies), respiratory diseases and waterborne diseases. Drought diminishes dietary diversity and reduces overall food consumption and may therefore lead to micronutrient deficiencies. Malnutrition increases the risk of acquiring and



dying from a communicable disease. Droughts in central Asian countries have been reported to be associated with effects on child growth and malnutrition.

The Aral Sea is a special case of a slow human-made ecological disaster that has led to a drop of about 60% in the volume of the sea and to a doubling of its salt concentration since the 1960s. People in the Aral Sea region suffer from a wide spectrum of health effects from this chronic disaster (68).

Droughts can also affect the drinking-water supply and compromise water quality. Associated low water levels in rivers can increase the loads of contaminants in water

supplies. The incidence of viral hepatitis A and shigellosis dysentery increased during droughts in Bulgaria in 2004. The loss of livelihoods resulting from droughts is also a major trigger for population movements and mass displacement.

Warmer, drier conditions will eventually lead to more frequent and prolonged droughts with increased risks of forest and bush fires, particularly in the Mediterranean region. Since 1990, 228 people have died from wildfires in the European Region, and the devastation caused affected almost 300 000 people.

### Earthquakes

Severe earthquakes that affect human settlements are a terrifying experience potentially resulting in widespread destruction

and devastation. Besides the huge economic effects, earthquakes massively affect the health status of the affected population.

The direct impact can be high immediate mortality from trauma and asphyxia. Search and rescue and emergency medical treatment of related injuries are needed immediately, including managing “crush syndrome”. A consensus is growing that the psychosocial effects of such traumatic as well as other post-emergency events should be addressed comprehensively through social interventions and the integration of mental health care into general health care services.

The European Region has experienced several severe earthquakes in the past two decades, including the Spitak earthquake affecting Armenia in 1988 and the Marmara earthquake affecting Turkey in 1999 (Box 9).



© SCANPIX



### **Box 9. The Marmara earthquake in Turkey in 1999**

An earthquake measuring 7.8 on the Richter scale struck the Marmara region of Turkey on 17 August 1999. It hit a densely populated area at 03:02. About 2 million people in five towns were affected. Essentially it was an urban earthquake. According to official statistics, 18 256 people died, 48 905 were injured and 357 322 buildings were damaged, of which one third collapsed. An estimated 200 000 people were left homeless.

Of the survivors pulled from the rubble of the earthquake, 639 cases of crush syndrome were reported. Hospitals were ill equipped with dialysis facilities to treat associated renal failure and neither rescue personnel nor medical emergency teams were prepared to give immediate on-the-spot medical treatment to people with crush syndrome. As a result, crush syndrome was the major cause of death among survivors of the earthquake.

Numerous myths and misconceptions about the health threats that followed the earthquake surfaced in Turkey's mass media. Media reports fearing cholera and typhoid epidemics were largely unfounded, according to experience from previous earthquakes. The threat that dead bodies posed to public health was also overstated.

The disruption of water and sanitation infrastructure and the resulting unsafe water did pose a risk of diarrhoeal disease. This was adequately addressed, however, by distributing thousands of bottles of clean drinking-water. WHO assisted the Government of Turkey in setting up an early-warning surveillance system to monitor five major diseases, including diarrhoea and measles, with particular focus on those left homeless by the earthquake.

The overemphasis on the perceived threat posed by dead bodies resulted in a misallocation of resources and time into public health interventions, such as spreading lime around buildings, spraying disinfectant into the air and mass and rapid cremation of dead bodies. This diverted essential efforts and resources from more urgent health threats, such as treating crush syndrome, and did little to promote stability, with families not being given the time to identify and adequately mourn their relatives.

The earthquake's enduring health impact was evident in the prevalence of mental health problems, especially post-traumatic stress. Only a few affected people received proper treatment. Vulnerable groups such as elderly and unemployed people, children and women faced increasingly difficult access to health care after the earthquake. Unable to afford the additional burden of a natural disaster, the economic and health security of these groups became more precarious.

One key lesson learned from this earthquake is that both the government and the mass media need to coordinate and release accurate information about health threats after an earthquake and appropriate health interventions. Strong coordination implies sharing information to best identify needs and address gaps in assistance.

Lack of coordination among both ministries and humanitarian actors was a major impediment to the earthquake response. The lack of coordinated appeal for donations resulted in some inappropriate donations and too many international medical volunteers. The Ministry of Health has now set up a central office to address disasters, and a major effort has been made to collect data on the major types of injury that can occur and the medicines, equipment and human resources necessary in the aftermath of an earthquake.

After the earthquake, certain buildings such as hospitals, schools and administrative structures had to be rebuilt to resist hazards and be able to continue functioning in any kind of disaster. Postgraduate training programmes on disaster preparedness have now been started in engineering, and the curricula of medical faculties and legislation have been changed to prepare the state better for future disasters.

Disaster preparedness measures must take place concurrently with sustained government development efforts. Communities with educated, well-informed, organized individuals living and working in healthy environments are likely to be more resilient and better equipped to cope with the health aspects of disasters.

*Source: Strengthening health systems' response to crises. Towards a new focus on disaster preparedness (69).*

### Accidents

A major technological accident, such as an explosion or a fire or the uncontrolled release of a chemical substance, has the potential to develop into a public health emergency. Since 1990, more than 600 such accidents have been reported in the European Region

(Table 2) (12). In total, these accidents caused almost 17 000 deaths. The accident at the Chernobyl nuclear power plant in 1986 (Box 10) and the sinking of the oil tanker Prestige off Spain in 2002 (Box 11) are two examples of major accidents in the WHO European Region.

#### Box 10. Accident at the Chernobyl nuclear power plant in 1986

On 26 April 1986, the most serious nuclear accident in history released substantial radioactive material, causing serious contamination of local regions and trace contamination throughout eastern and western Europe. The accident caused severe social and economic disruption and had significant environmental and health effects. The Chernobyl accident was a human tragedy, resulting in large-scale displacement of populations: 116 000 people were evacuated from the areas surrounding the reactor in 1986, and after 1986 about 220 000 were relocated. It also contaminated vast land areas with a population of about 5 million people (70) and resulted in the loss of livelihoods. The people affected by the accident were confronted with a sudden situation they could not understand and against which they had no means of defence. The mental trauma suffered by those who had to be evacuated compounded an already intolerable situation, as many experienced the severing of links with their home and social networks.

The health effects of the Chernobyl accident include the effects of exposure to ionizing radiation and disturbance of livelihoods from relocation. The most seriously affected population groups were clean-up workers, especially those active in the initial decontamination, and resident populations living in areas with high deposition of radionuclides. Two people died during the explosion and 134 people had acute radiation sickness, 28 of whom died within a few days or weeks.

Many research activities have been carried out since 1986 to measure whether cancer rates increased and to estimate other potential health effects (70). Substantial increases in the incidence of thyroid cancer were reported in children in all age categories living in contaminated

areas in Belarus and Ukraine (71,72). The increase, after an unexpectedly short latency period, was due to the unique susceptibility of children, probably exacerbated by pre-existing iodine deficiency. Initially, no excess of leukaemia or other types of cancer could be confidently attributed to radiation exposure from the Chernobyl accident (73). Recently, dose-dependent increases in cancer risk associated with exposure to Chernobyl fallout have been reported in Belarus (74) and in Sweden (75). In European countries affected by lower levels of radioactive contamination from Chernobyl, there are conflicting reports of health effects that may be related to radiation exposure in utero, including stillbirths, congenital malformations, infant mortality and childhood leukaemia (76,77). Research is being conducted on these issues.

Within the framework of the WHO International Programme on the Health Effects of the Chernobyl Accident, WHO has carried out several health projects aimed at providing assistance to Belarus, the Russian Federation and Ukraine to minimize the medical consequences of the accident. Building on the results of the WHO International Programme, the International Thyroid Project and a series of International Agency for Research on Cancer pilot projects have aimed to evaluate the feasibility of different approaches to the epidemiological monitoring of the exposed population.

WHO is continuing and developing its activities in following up the Chernobyl accident, integrating the activities and expertise of its various offices and specialized programmes. It has identified priority areas in collaboration with the three affected countries:

- maintaining the thyroid tissue and DNA data banks for early diagnosis and verification of thyroid diseases and for studying radiation-induced cancer;
- conducting risk assessment of exposure to low-dose and low-dose-rate radiation; and
- providing medical relief for children affected by the Chernobyl accident by developing and implementing health telematics.

Many lessons have been learned from the Chernobyl accident, and some country preparedness activities have been initiated to respond and mitigate similar accidents in the future, including the Radiation Emergency Medical Preparedness and Assistance Network of WHO (70).

### **Box 11. The Prestige oil tanker spill in 2002**

The holing and subsequent sinking of the Prestige oil tanker off Spain's north-western coast on 14 November 2002 created the longest (in terms of time) and lengthiest (in distance) oil slick in the history of the north-eastern Atlantic. Some 4000 tonnes of heavy fuel oil were released before the ship sank, with a further 60 000–70 000 tonnes on board in its compartments. The major impact of the spill was on wildlife along a 100-km stretch of coast; fisheries in this area were closed.

The major risks to human health were from polycyclic aromatic hydrocarbons that can be absorbed by the skin or by inhalation. Polycyclic aromatic hydrocarbons are probable human carcinogens, classified as Group 2 by the International Agency for Research on Cancer, showing a relationship between skin tumours and lung tumours among exposed workers. These substances also cause digestive problems (such as nausea, vomiting, pain and diarrhoea), headache, confusion and irritation. The precautions necessary to safeguard against damage to



human health from ingestion of contaminated fish were expected to lead to economic losses of up to €100 million. The chemical stability and the toxicity of the leaked material mean that the threat from oil residues may last for 20 years.

## Conflicts and complex emergencies

Violent conflicts are the most obvious and direct threat to the health security of a population, causing death, population displacement and massive destruction of health systems and severe socioeconomic effects. Since the 1990s, the WHO European Region has experienced a number of wars and violent conflicts with vast political, social and human effects.

During 1991–2002, armed conflict of variable intensity in Slovenia, Croatia, Bosnia and Herzegovina, Serbia (especially in southern Serbia and in the United Nations Administered Province of Kosovo) and The former Yugoslav Republic of Macedonia resulted in large human losses and caused severe damage to basic social support systems. It is estimated that more than 125 000 people were killed and up to 3 million people were displaced.

The break-up of the USSR brought about a number of violent episodes in the formation of new state entities and the transition to self-government. Although statistics are diverging, conflicts in Abkhazia (Georgia), Chechnya, Ossetia and Dagestan (Russian Federation) Nagorno-Karabakh (Azerbaijan), Transnistria (Republic of Moldova) and Tajikistan may have claimed more than 200 000 lives.

WHO's involvement in coordinating health-related humanitarian assistance during acute conflict situations always aims to ensure the functioning of the national and local health systems and access to basic health care services to the most severely affected people, even in the most difficult circumstances. At the same time, WHO provides advocacy to bring together health authorities and professionals

from different sides of the conflict and to discuss common health issues. The peace through health programme of WHO and the United Kingdom Department for International Development implemented systematically in south-eastern Europe documented several experiences in Bosnia and Herzegovina and in Croatia (eastern Slavonia) (8,9).

Effective health coordination, such as in south-eastern Europe and the north Caucasus (Boxes 12, 13 and 14), could effectively enable local authorities to direct international support to where it is most needed. Chapter 4 details other lessons learned from the recent conflicts in the European Region.

In a post-conflict environment, a coordinated strategy to rebuild public health capacity and strengthen health systems is essential to re-establish a critical basis for health security. The health component of the Stability Pact for South Eastern Europe (10,11) is a new form of institutional arrangement for addressing important health issues with international dimensions (Box 12). By building trust and improving health, the initiative contributes to the wider strategies for preventing conflicts in the region.

In the context of the reform of United Nations humanitarian efforts, WHO, as the lead agency for the United Nations Inter-Agency Standing Committee (IASC) Global Health Cluster, will continue to work to strengthen its partnerships with other United Nations organizations, national institutions, government and nongovernmental organizations and other health partners (26). (See Box 16 in Chapter 5, for more on the concept of cluster lead agencies.)

### **Box 12. Stability Pact for South Eastern Europe as a process of conflict prevention and reconstruction**

In 1999, the international community established the Stability Pact for South Eastern Europe as a conflict-prevention and reconstruction process. More than 40 partners joined forces to replace the previous reactive crisis intervention policy in south-eastern Europe with a comprehensive, long-term strategy for preventing conflicts.

The international community soon realized that health was a vital element in this process: there could be no reconstruction process without a healthy population. In 2001, a public health component was added to the Stability Pact agenda and the Dubrovnik Pledge on meeting the health needs of vulnerable populations in south-eastern Europe, a unique political commitment to health in the region, was signed (78). The health component took the form of a joint action plan within the South-eastern Europe Health Network, for which the Council of Europe and the WHO Regional Office for Europe currently provide a joint secretariat. The action plan launched a political process of regional collaboration through public health projects in nine countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Republic of Moldova, Romania, Serbia and The former Yugoslav Republic of Macedonia).

One area of cooperation is mental health. Since the mid-1990s, WHO has worked with the Governments of Albania, Bosnia and Herzegovina, Montenegro, Serbia (including the United Nations Administered Province of Kosovo) and The former Yugoslav Republic of Macedonia to ensure immediate provision of appropriate mental health services to people, many of whom suffered from the various traumas of armed conflict and displacement. In the post-conflict situation, WHO initiated the mental health reform process that included the deinstitutionalization of psychiatric patients, often from unspeakable conditions, the establishment of over 60 new community mental health centres and developing the capacity of social and health professionals through training and exchange with mental health institutions and partners in Europe.

Armed conflicts, political crises, economic collapse and a host of inherited problems led to a severe deterioration in the help provided to mentally ill people in south-eastern European countries while the demand for such services was simultaneously increasing. The Stability Pact process has given a much-needed boost to these efforts and has established mental health goals for the entire region.

Besides mental health, the public health priorities in the Dubrovnik Pledge have also developed into projects in communicable diseases, blood safety, food safety and nutrition, health information systems and tobacco control. Today, south-eastern European countries are working closely together on cross-border health projects to ensure policy dialogue, improve health systems, ensure the approximation of national legislation with that of the EU, reconstruct societies and restore neighbourly relations within and among the countries.

### **Box 13. Improving essential health care services in Chechnya, Russian Federation**

After more than a decade of hostilities, Chechnya is now considered to be in a rehabilitation phase. However, internal hostilities continue, and although the United Nations security phase was reduced from Phase V to IV in 2006, Chechnya remains difficult to access for United Nations staff. In the neighbouring Republic of Ingushetia, the situation remains volatile, with a number of reported incidents and assaults against new law enforcement and government authorities.

The general health status of the people in the north Caucasus republics compares unfavourably with the Russian Federation average. Owing to the near collapse of the health system, access to health care is limited and the quality of health services is poor throughout the region. Basic health needs, particularly the needs of vulnerable groups, remain acute. Health structures lack skilled technical, administrative and managerial staff, specialized and basic medical equipment, furniture and consumables. Health facilities are dilapidated and have frequent problems with crucial supply lines and with sewage disposal.

The presence of many internally displaced people from Chechnya in Ingushetia (about 30 000 people) and in Dagestan (10 000 people) puts additional pressure on the already overstretched and weakened health systems.

The strengthening of primary health care services in the north Caucasus republics is a national health sector priority. In 2006, the region received an increase in the federal budget to strengthen the health care system, in particular for the rehabilitation of the health infrastructure, the provision of equipment and the provision of training to implement the priorities outlined in the national health plan. However, crucial needs are far from met and the health sector continues to present a complex challenge for national authorities in terms of governance, financing and inequity between and within the republics.

The common objective of the humanitarian health community, underlined in the *Inter-Agency Transitional Workplan for the North Caucasus* (79), remains to coordinate efforts to minimize the health effects of this chronic systemic crisis and to mitigate its social and economic impact. Specific objectives are to improve and promote access to preventive and curative services at the primary and secondary levels for vulnerable populations needing continued humanitarian support and to strengthen the health system and increase the capacity of local health authorities to address the urgent challenges of the early recovery phase in partnership with health stakeholders.

WHO has been contributing to these objectives by:

- providing technical support to local health authorities to strengthen health systems and public health programmes;
- coordinating the IASC Global Health Cluster, comprising more than 30 international and national organizations dealing with public health projects; and
- implementing projects to strengthen the local health systems through capacity-building activities and public health interventions.

Humanitarian and international recovery assistance is still required for reconstructing and rehabilitating state health facilities, for strengthening the main public health programmes (maternal and child health, sexually transmitted infections, HIV and AIDS, communicable disease surveillance, TB control, mental health and psychosocial rehabilitation and mine victim support) and for improving access to primary and specialized health care.

On 15 February 2007, the EU, the United Nations Children's Fund (UNICEF) and WHO officially launched a health and education programme for the north Caucasus. The WHO component of this partnership will be focusing on strengthening health systems in the Republics of Chechnya and Ingushetia by building the capacity of 3000 health personnel, establishing learning and information centres and providing essential medical equipment and supplies.

Source: *Inter-Agency Transitional Workplan for the North Caucasus* (79).

#### **Box 14. Health hazards among vulnerable groups**

In the aftermath of the conflict in the United Nations Administered Province of Kosovo, the northern part of the Mitrovica/ë region faced a complex health security situation caused by political and socioeconomic difficulty, further aggravated by the traumatic experiences of large groups of the population combined with chronic exposure to environmental pollution. The communities living in the town of Mitrovica/ë largely comprise Serbs (north) and Albanians (south).

The closure of TREPÇA in 2000, one of the largest metallurgic and mining complexes in the former Yugoslavia, further limited employment opportunities in an already difficult economic situation. Sixty years of mining operations had resulted in extensive pollution of the surrounded environment and placed the resident population at risk, with abandoned areas still spreading lead-contaminated dust.

The socioeconomic situation of the Roma, Ashkali and Egyptian minority population groups has been especially disadvantaged. They are the most marginalized ethnic groups living in this area in terms of economic activity, education, health care, social and public services and participation in civil society. Since they were relocated to three camps for internally displaced people in 1999, they have lived under very poor conditions and experienced extremely high levels of lead exposure. The three camps in which they have lived since 1999 were never intended to become semi-permanent settlements, but the continuing tensions prevented their return to southern Mitrovica/ë at that time.

The multisystem effect of chronic exposure to lead on the human body is mainly asymptomatic and often misdiagnosed. Absorbing lead during childhood leads to brain and nerve damage, impaired speech, hearing problems, mental retardation, decreased learning abilities, behavioural problems and reduced growth.

Evidence from risk assessment activities and missions by WHO experts demonstrated that children's lead poisoning in this region is now considered to constitute one of the most serious children's environment and health crises in contemporary Europe. Since July 2002, WHO has been implementing a programme to decrease the exposure of populations to environmental pollution from heavy metals in the United Nations Administered Province of Kosovo. As reduction of exposure remains the most important step in treating lead contamination, WHO recommended in 2004 an immediate but voluntary relocation of the most severely affected inhabitants of the three Roma, Ashkali and Egyptian camps to a safer environment. Owing to their extremely elevated blood lead concentrations, most of the children under the age of six qualified as medical emergencies, requiring immediate special treatment (chelation therapy). Although this was urgent, the complexities of the local environment caused uncertainties and delays, and the WHO recommendations were not implemented until the end of 2005. In 2005, a dedicated expert task force was established to address the lead crisis.

The relocation of the Roma, Ashkali and Egyptian camps is, however, only an interim solution. Given the overall heavy-metal pollution in northern Mitrovica/ë, no lead-free relocation sites actually exist, and the Roma, Ashkali and Egyptian population have not been able to return to their original settlement. Although this is the only long-term solution, this settlement has not yet been able to be reconstructed owing to a lack of funds. France's former military camp Osterode was therefore refurbished to accommodate the 560 Roma, Ashkali and Egyptian people, but some of them were reluctant to move again except to return to their homes. In March 2006, most of the community moved to the new location after one of the camps was partially flooded.

The relocation was a necessary precondition for starting the chelation therapy, owing to potential side effects in a contaminated environment. Further, local authorities needed to approve the use of the required chelating drugs, and a protocol was developed for on-site treatment at the Osterode camp because the number of affected children exceeded local hospital capacity. Thus, a clinical lead unit has been established in the camp, providing treatment and screening and monitoring the blood lead concentrations of the inhabitants.

By October 2006, most of the children had completed the chelation therapy. A second round of treatment is currently being prepared for the children not yet treated or needing further treatment.

Additional measures, such as a public awareness campaign to reduce the risk of additional lead exposure, a review of the nutritional supplements (food basket) on which most families rely, a psychosocial support programme and a health-promoting schools project are now being implemented as part of WHO's activities to support this public health programme.

## Potential future challenges from global changes

Evidence is increasing that climate change, environmental changes, the depletion of stratospheric ozone and increasing interconnectedness through changes in trade, travel and technology will potentially affect human health through complex and interdependent mechanisms. Population growth and increasingly intense economic activities are triggering a range of global environmental risks to well-being and health of an unprecedented scale and systemic nature (80). Some of the pathways through which these changes affect human health are well documented. They include the massive excess mortality and morbidity attributable to extreme weather events, changes in (communicable) disease patterns, changes in water and food supplies, the introduction of new plant and animal species and changes in their migratory patterns and the related economic losses. Other pathways are more complex, requiring further scientific investigation to fully understand the extent of their potential effects.

## Potential climate changes

Climate change is becoming a reality. The global mean surface temperature has increased by  $0.74 \pm 0.18^\circ\text{C}$  during the last 100 years, the global average sea level has risen by 1.8 mm per year since 1961 and Arctic Sea

ice is shrinking by  $2.7 \pm 0.6\%$  per decade. In addition, the sea surface temperature is rising, mountain glaciers are retreating, surface ocean waters are getting more acid and more frequent extreme weather events are occurring. The potential changes to the climate in Europe are as follows (81,82).

- The projected cumulative increase in the annual mean temperature from 1980–1999 to 2080–2099 varies from  $2.3^\circ\text{C}$  to  $5.3^\circ\text{C}$ , depending on the underlying assumptions and scenarios.
- In northern and central Europe, the mean winter precipitation is projected to increase, and the summer precipitation is projected to decline in central Europe and in the Mediterranean area.
- The sea levels around Europe increased by 0.8–3.0 mm per year in the 20th century. The projected rate of sea level rise between 1990 and 2100 is 2.2–4.4 times higher than the rate in the 20th century.
- Under several different scenarios (A1B, A2 and B1) the Intergovernmental Panel on Climate Change elaborated in its *Special report on emissions scenarios* (83), large parts of the Arctic Ocean are expected to no longer have year-round ice cover by the end of the 21st century.





© JÜRIG ALFAN, SWISSEDC (HTTP://WWW.SWISSEDC.CH)

- The *Special report on emissions scenarios* projects reductions in pH of between 0.14 units and 0.35 units in the 21st century (depending on the scenario), adding to the decrease so far of 0.1 units since pre-industrial times.
- The frequency of days and nights with low temperatures is likely to decrease.
- The frequency of days and nights with high temperatures is likely to increase.
- The frequency, intensity and duration of warm spells and heat-waves are likely to further increase.
- The frequency of heavy precipitation events is likely to increase over most areas.
- The European Region is likely to have more droughts.

The Intergovernmental Panel on Climate Change has released drafts of two summaries for policy-makers on the physical science basis of climate change (81) and on climate change impacts, adaptation and vulnerability (82) as part of its Fourth Assessment Report. The final report will include a detailed compilation of facts and scenarios, and the projected health and security effects are therefore not further elaborated at this stage. Some potential scenarios for the European Region are listed below.

## Potential scenarios

The number of deaths from heat-waves could potentially increase substantially. Based on the experience of the 2003 major heat-wave in Europe that killed more than 35 000 people, these lessons need to be reflected in future health system preparedness efforts.

Overall mortality could potentially rise during summer periods. Projections show that long-term changes in mean temperatures may contribute to increased future mortality.

The number of flood events could increase, affecting an increasing number of people. Predictions include increased precipitation for parts of Europe. Coastal flooding from storms and rising sea level could potentially affect up to 2.5 million more people annually in Europe, affecting human health and damaging infrastructure, with saltwater intrusion into coastal freshwater resources and damage to ecosystems such as fisheries. Storm events with strong winter cyclones could increasingly affect Europe (84).

The introduction of new plant and animal species could increase and the geographical range and seasonality of some species may change disease patterns. The geographical range of some vector-borne diseases will diminish in some areas (some areas in the south becoming too dry), whereas elsewhere the geographical range will expand with extended transmission seasons.

Ground-level ozone, with related health effects more severe in the summer period, has increased over time largely owing to increasing emissions of methane, carbon monoxide and nitrogen oxides, and this trend is expected to continue (85,86). Air pollution episodes and the related health effects have been well documented, such as the London smog episode of 1952–1953.

Micronutrient deficiencies and food- and waterborne diseases may increase, associated with periods of drought. More frequent droughts and prolonged dry periods could affect agricultural productivity with consequent nutrition-related health effects.

The frequency of cardiovascular diseases due to higher concentrations of ground-level ozone could increase, particularly during the summer season. Concern is mounting that climate change could negatively influence morbidity and mortality associated with gaseous pollutants and fine particles.

Loss of livelihoods due to climate trends could trigger migration and transitional population displacement. A recent World Bank paper (87) outlines the potential displacement of hundreds of millions of people due to a rise in the sea level during the 21st century.

The serious socioeconomic impact of climate change could potentially affect health and social investment. The Stern review, published by the United Kingdom HM Treasury in October 2006 (88), estimated that annual flood losses in the United Kingdom could increase from 0.1% of gross domestic product today to 0.2–0.4%, and climate change could reduce global per capita consumption by 11%.

## Collaborative plans

Health systems will need to include these evolving health threats in their comprehensive preparedness efforts to prevent and manage the health effects of environmental changes. Multidisciplinary collaboration is crucial to anticipate weather-related events, initiate early warning and early action and facilitate adequate preparedness planning.

The active collaboration of national and international agencies and the research community and the active involvement of civil society are of fundamental importance in understanding and projecting potential future scenarios for the European Region. Realistic scenarios allow planning for potential future events, thus ensuring active communication and outreach advice. Coordinating and integrating health, environment, development, trade and security agendas are fundamental to this process.

### 3. A renewed framework for managing health security threats: the International Health Regulations (2005)

Epidemics, pandemics and public health emergencies of any kind can place sudden and intense demands on governments, societies and health systems. They expose existing weaknesses in these systems and, in addition to the morbidity and mortality they cause, can disrupt economic activity and development. Travel and globalization have both increased at a phenomenal rate in recent decades, making disease spread much faster, and new diseases and new threats have emerged and re-emerged. The international public health community therefore needs to respond rigorously. The IHR (2005) forms a legal framework to support countries in achieving this response (89).

The IHR (2005) are the result of the concerted efforts of countries to protect their health security, efforts that go back to the 13th century when quarantine laws protected the population against plague. Global agreements protecting countries from importing communicable diseases date back to the 19th century. The cholera epidemics that overran Europe between 1830 and 1847 were catalysts for intensive diplomacy and multilateral cooperation in public health and led to the first International Sanitary Conference in Paris in 1851. In 1948, the WHO Constitution entered into force, and three years later the WHO Member States adopted the International Sanitary Regulations, which were replaced

by and renamed the International Health Regulations in 1969 and modified in 1979 and 1981. The IHR were originally intended to monitor and control serious communicable diseases. Under the IHR (1969), Member States were required to notify WHO of three diseases, cholera, plague and yellow fever, if and when these diseases occurred on their territory.

In the 1990s, Member States asked that the IHR be revised. The process to achieve this was participatory and consultative in each WHO region. It culminated in the Intergovernmental Working Group, convened by WHO in November 2004, to negotiate a revised version of the IHR. The task was to balance the need for national autonomy with the maximum level of health security, freedom of travel with protection of the public and accountability with early action. This was a difficult balance to strike, but experience from the SARS outbreak helped to shape the revision. As a result of the negotiations, the World Health Assembly adopted the revised IHR (2005) on 23 May 2005 (WHA58.3) (89). They enter into force on 15 June 2007, but countries have until 2012 to comply fully with all the requirements.

The IHR (2005) provide a legal framework to assist countries in protecting the health of their populations against any potential public health emergency of international concern and to implement the necessary measures. Article 2 of

the IHR (2005) states that the aim is to “prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks and which avoid unnecessary interference with international traffic and trade” (89).

### **National capacity**

The IHR (2005) require countries to develop core public health surveillance capacity, strengthened and maintained at the primary, intermediate and national levels in order to detect, report, share information and respond to public health risks and potential public health emergencies of international concern by implementing the necessary measures. The best way to prevent the international spread of disease is to act when the problem is still small: this therefore involves early detection by effective national surveillance systems based on both diseases and events and drawing from the largest possible number of formal and informal sources of information. The IHR (2005) also provide for reporting and information-sharing that require countries to engage in continuous dialogue with WHO. It also involves building systems that can ensure response at all levels by investigating and implementing control measures. Under the IHR (2005), countries have also broad obligations that include, for example, building national capacity for routine prevention such as public health measures for ports, airports, land borders and the transport used for national and international travel.

### **Broader scope**

The IHR (2005) are broader than the IHR (1969), which were designed to help monitor and control only the most serious communicable diseases. Although the IHR (2005) maintains a disease-specific approach in terms of notification for smallpox, novel influenza, SARS and wild poliovirus, the scope of the IHR (2005) reflects an approach driven by risk assessment for the timely detection of and response to any potential public health emergency of international concern.

### **Defining a public health emergency of international concern**

A public health emergency of international concern is an extraordinary public health event considered to be a public health risk to other countries through the international spread of disease and to potentially require a coordinated international response. The occurrence of a specific disease does not inherently provide enough information to assess the risk of international spread. The geographical setting, the time, the size of the outbreak, the proximity to an international border or airport and the speed of spread and mode of transmission are all relevant in analysing whether the event is a public health emergency of international concern.

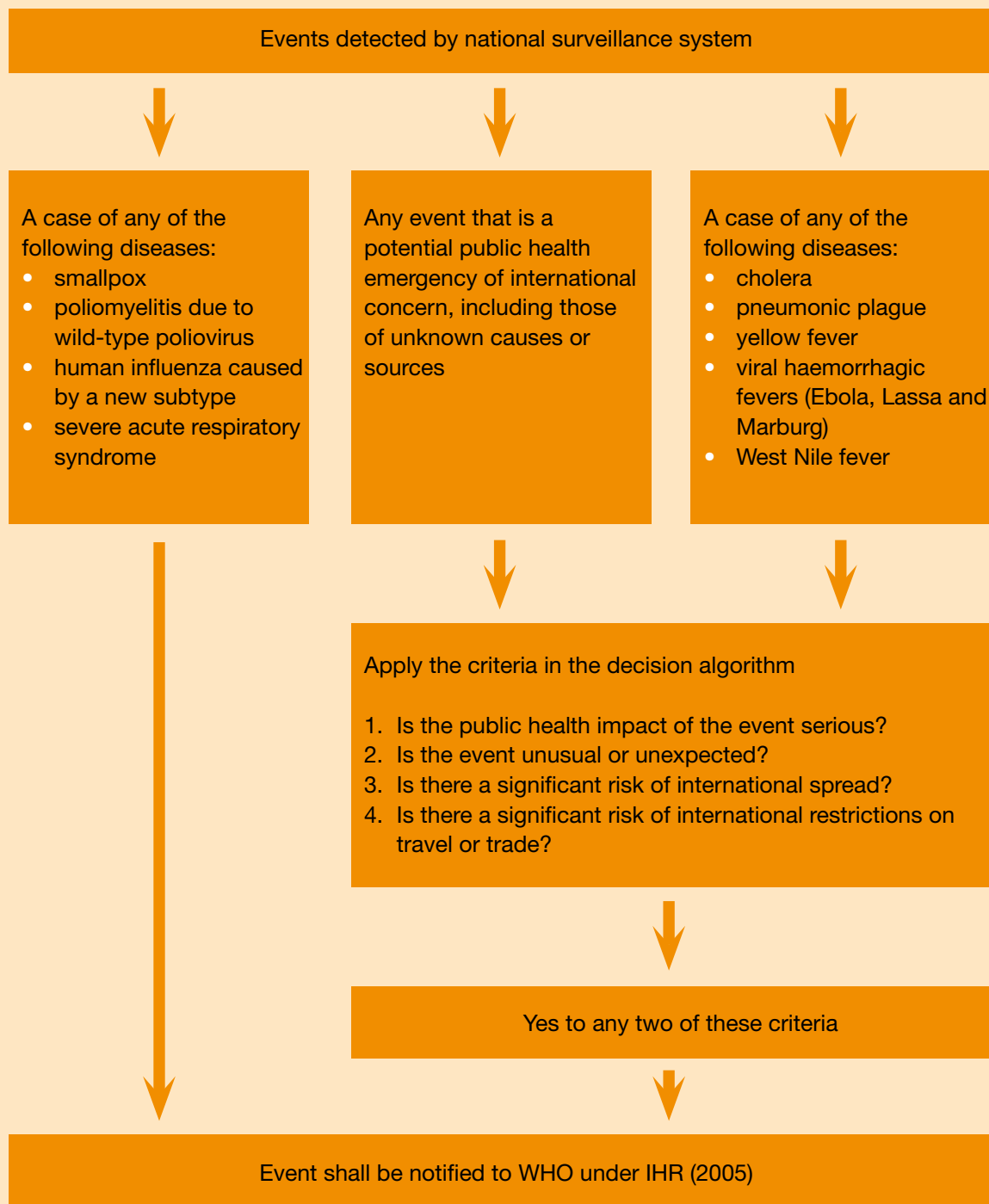
To help countries identify what may or may not constitute a public health emergency of international concern, Annex 2 of the IHR (2005) (89) provides a decision instrument (Fig. 4). It directs countries to assess the public health risk associated with events occurring within their territory and to consult and notify WHO of those that may constitute a public health emergency of international concern according to the following criteria:

- the seriousness of the public health impact of the event;
- the unusual or unexpected nature of the event;
- the potential for the event to spread internationally;
- the risk that restrictions to travel or trade may result because of the event.

### **Notification**

A disease-specific approach is maintained for notification of smallpox, novel influenza, SARS and wild poliovirus. States Parties are also, however, required to notify WHO of all events that may be a public health emergency of international concern within 24 hours of assessment and to respond to subsequent requests for details and verification of information regarding such events. This will enable WHO to ensure appropriate technical collaboration for effective protection in such

**Fig. 4. Decision instrument for the assessment and notification of events that may constitute a public health emergency of international concern**



Source: simplified from IHR (2005) (89).



emergencies and, under certain defined circumstances, inform other countries of the public health risks that merit action on their part.

### **Recommendations and focal points**

The Director-General of WHO determines whether an event is a public health emergency of international concern in consultation with the States Parties concerned and an emergency committee of experts nominated by States Parties as part of a roster of experts. Once a public health emergency of international concern is determined, WHO will make temporary recommendations on the health measures to be implemented. These are made on an ad hoc, time-limited, risk-specific basis as a result of a public health emergency of international concern. They may include recommended measures for application by the State Party affected, by other States Parties and by operators of international transport.

A further category is standing recommendations. These indicate the appropriate measures to apply routinely for specific ongoing public health risks at certain international airports, ports and land crossings and may be applied routinely or periodically. Measures could apply to people, baggage, cargo, containers, ships, aircraft, road vehicles, goods or postal parcels.

The IHR (2005) also provide that countries identify national IHR focal points and that corresponding contact people or officials be identified who will provide information to and receive it from WHO 24 hours a day, seven days a week.

### **Legally binding**

The IHR (2005) govern the roles of both States Parties and WHO in identifying and responding to public health emergencies and sharing information about them. They comprise an international legal instrument that is legally binding on all WHO Member States that have not rejected them (or, subject to the procedure

stipulated by the IHR (2005), that have made reservations) and on all non-Member States of WHO that have agreed to be bound by them.

### **WHO's role**

WHO provides the IHR (2005) secretariat, has an IHR coordination programme that provides technical support for capacity development and runs an alert and response operation underpinned by alert and response operating procedures. It has designated IHR contact points in each WHO regional office and keeps the database of national focal points. It maintains the roster of experts and the WHO Influenza Pandemic Task Force. It gives guidance on early warning systems, produces capacity definitions and strategy and makes protocols on points of entry. WHO country offices around the world, together with the Global Outbreak Alert and Response Network, provide operational support to countries in identifying and responding to disease outbreaks.

WHO has privileged access to information through the IHR (2005). Its obligations under the IHR (2005) are:

- to identify events that could threaten public health across international borders;
- to assess the risk that the event will have international repercussions;
- to help affected States Parties to contain threats;
- to inform other States Parties to facilitate their preparedness and response; and
- to initiate the process for a public health emergency of international concern for events that may require temporary recommendations for international control measures.

## 4. The way forward

### Lessons from past experience

Health is a major concern in all crises, disasters and complex emergency situations. Enhancing health security requires a sound understanding of the national context: the major hazards and risks and their impacts, institutional arrangements and health systems capacity. Priorities should be set for strengthening national capacity based on this understanding.

Health system preparedness planning requires thorough analysis to identify priority health threats and challenges so that appropriate preparedness measures can be identified. A continuous process of preparedness planning with a multisectoral and multihazard approach ensures the interoperability of national preparedness plans and identifies priority interventions to improve the capabilities of health systems and of national health authorities to respond to a public health emergency of international concern.

Effective coordination of the health response is strongly related to well-established and sustainable crisis management programmes in health ministries with a multisectoral, multihazard approach and comprehensive risk reduction strategies that also promote risk communication principles. These programmes should be in charge of health system preparedness planning and management of health crises so that the health sector can be ready to take the lead and coordination role and technically guide other sectors facing a health security crisis.

The crisis management programmes need to be anchored in the health ministry with strong links to other sectors, focusing on a multisectoral, multihazard approach to

strengthening health systems preparedness. Functioning and tested networks of private and public facilities, with civil defence and security forces, nongovernmental organizations and volunteer involvement, need to be in place to enable health services to save lives in times of crisis, when they are needed most.

In times of crisis, large quantities of medical relief supplies, including essential vaccines and pharmaceuticals, are often donated as part of humanitarian assistance. Undoubtedly, many of them save lives and alleviate suffering, but some donations may unintentionally aggravate the problems of the recipient countries. The interagency *Guidelines for drug donations* (90) and *Guidelines for safe disposal of unwanted pharmaceuticals in and after emergencies* (91), elaborated by WHO in collaboration with other partners, should be shared widely and actively promoted to donors, their implementing partners and potential recipient countries as an emergency preparedness action before a crisis occurs. The establishment of systems for monitoring logistics and tracking supplies and prearranged mechanisms to receive humanitarian aid, including fast-track registration procedures for pandemic vaccines, can help prevent local systems from being overwhelmed by external relief supplies.

Emergency situations tend to trigger unrealistic myths that can result in irrational behaviour and inappropriate reactions. Crisis communication is crucial to providing accurate and reliable health information and avoiding panic reactions compromising health security. Both governments and the mass media need accurate information about health threats and appropriate health interventions.

After a major conflict, rebuilding public health capacity and strengthening health systems are crucial components of the rehabilitation and recovery process. In this phase, comprehensive assessment of the overall capacity of health systems to manage health emergencies will identify crucial gaps that need to be addressed. The likelihood of positive health outcomes is much increased if rehabilitation interventions are well planned and coordinated with a focus on the public health system, human resources and health infrastructure.

### **Key lessons from recent regional health crises**

Unexpected, rapidly occurring and evolving events, even in advanced and well developed health systems, can create chaos with confusion and delayed action. Anticipating potential hazards and risks is essential for health system preparedness planning.

Accurate, reliable and timely communication and information-sharing are essential tools for health decision-making and to minimize and mitigate the health effects on the public.

Intersectoral coordination and predefined streamlined decision-making processes are crucial in crises and emergencies to minimize health and security effects.

Well-prepared health care services and established mitigation measures, such as flood- and earthquake-proof infrastructure, resilient water and sanitation systems, emergency care facilities and critical supply lines, effectively reduce the negative effects on human health and security.

Public awareness, risk communication and guidance for decision-makers are effective tools in promoting and implementing essential preventive measures.

Continuous dialogue with key policy stakeholders in the decision-making process and reliable information can prevent mistrust and uncertainty.

In post-conflict environments, a coordinated strategy to rebuild public health capacity and strengthen health systems is essential to re-establish a critical basis for health security.

### **The regional agenda: strengthening health systems to manage crises**

Well-prepared health systems can contribute effectively to preventing a public health emergency of international concern from triggering a security crisis. Many newly emerging security scenarios, such as the deliberate use of biological and chemical agents or radionuclear material and potential terrorist attacks, are intended to jeopardize the health and consequently the security of communities, with health services being the first entry point for possible victims.

Weak health systems can become the critical bottleneck impeding the effective management of health crises and the weak link in the health security preparedness and response chain. The promotion of further collaboration and continuous dialogue between health professionals, security officials and policy-makers is therefore crucial to increase mutual understanding of each other's systems and operational procedures and to ensure the interoperability of national preparedness plans.

### **Promoting a multihazard, multisectoral approach**

Modern preparedness concepts tend to favour a multihazard approach, addressing and including all types of natural and human-made disasters, epidemics or the accidental release or deliberate use of biological and chemical agents or radionuclear material. Essential public health measures need to be integrated into intersectoral coordination efforts. Strengthening stewardship, implementing health systems preparedness planning as a continuous process with a multihazard approach, establishing sustainable crisis management and health-risk reduction programmes in health ministries and establishing multisectoral



© WHO / JUUKA PUKKILA

coordination mechanisms are effective strategies to prevent and mitigate future health security crises.

### **Developing health system preparedness plans**

Health systems require complex preparedness strategies for handling health and security risks. Preparedness means activities and measures taken in advance to ensure an effective response to the effects of hazards, including timely and effective early warnings and the temporary evacuation of people and property from threatened locations.

Health systems face high expectations, multiple hazards and limited resources in many countries of the European Region. Good governance involves well-functioning health information systems designed to facilitate and support coordination within the health sector and between the health sector and other sectors, strategic and operational decision-making and risk communication strategies to reduce public fear and uncertainty.

Clear coordination mechanisms for the health sector, command and control structures, standard operating procedures to scale up the health response in a crisis situation, including mobilizing extra resources and personnel, and essential predefined treatment protocols

need to be established well in advance. Wide dissemination of best practices and evidence-based approaches is essential to prepare hospital and primary care emergency plans addressing mass casualty management, triage and emergency health interventions (92).

National health systems preparedness plans should include roles and responsibilities, define the tasks for all institutional levels of the health system and specify administrative and operational procedures and strategies for coordinated capacity-building activities. Health emergency management training should be institutionalized and included in the curricula of health professionals as an essential national priority for education.

The response to health challenges has traditionally been organized along vertical lines, addressing each challenge through a number of targeted interventions. This approach tends to suffer serious systemic shortcomings, however, being highly cost-intensive and having the intrinsic danger of creating parallel structures and duplication.

To translate vertical achievements into sustainable long-term improvements, health security strategies require the gradual integration of vertical programmatic approaches into a coherent, systematic, horizontally

coordinated framework. Strong strategic and operational capacity is needed at the national level to build an overarching common system to respond to future threats to health and security.

Each country's health system is organized and managed uniquely. The debate is therefore not limited to the mere conceptualization of a health systems framework but rather focuses on the critical action a country can initiate to achieve its health systems objectives, including the effective response to health crises.

### **Making health services capable of enhancing health security**

#### *Initiative to make hospitals safe from disasters*

The health system is particularly sensitive to security threats, and essential health services need to be engaged in planning and intersectoral coordination efforts.

Hospitals and primary care services play a critical role in emergency situations, as do health facilities providing essential services. Hospitals and health care facilities must be constructed and planned so that they function in crises. The health infrastructure is highly dependent on other sectors, including security, supply lines (such as waterworks and energy supply systems) as well as transport, education, governance and the economy in general.

The survival and recovery of a community after a major event depends largely on the ability of health facilities to function without interruption and to cope with the excess demand for health care during a crisis and in the aftermath of disasters. Mitigation should be considered an essential component of health security programmes and strategies to reduce the effects of disasters and needs to be promoted as a crucial element of the stewardship role of health ministries. Programmes for national health system preparedness should therefore ensure that hospital preparedness plans include business continuity to ensure that the minimum requirements are met to deliver immediate emergency care services

to the affected people and to ensure that the infrastructure of health facilities functions without interruption.

Reducing the functional and structural vulnerability of health facilities – including their crucial supply lines – is indispensable to ensure business continuity. “Health facilities [being constructed in a way that makes them] safe from disasters” is one of the key recommendations of the Hyogo Framework for Action, adopted at the World Conference on Disaster Reduction held in Kobe, Hyogo, Japan in January 2005 (93). The WHO Regional Office for Europe actively supports the initiative led by the International Strategy for Disaster Reduction to promote the concept of health facilities safe from disasters and has published a handbook to guide hospital managers through the process of evaluating the vulnerability of hospitals in earthquake-prone areas (94,95).

#### *Improving the crisis preparedness of hospitals and emergency medical services*

When a health emergency arises, hospitals and health facilities of all sizes and types are suddenly confronted with a huge demand for delivery of their services: immediate access to high-quality medical care is a crucial factor in minimizing the death toll. They need to start operating immediately in a mode that is very different from the way they function routinely. Such a switch is not easy, as it requires reorganizing how services are provided, how people work and how people are managed and treated. It also requires coordinating with a wide range of public health partners outside the hospital, as hospitals confront the need to communicate and to provide public information.

Not all facilities are prepared to deal with such situations. Few hospitals have an operational plan in place to respond to health emergencies. Nevertheless, strengthening emergency medical services can prevent many deaths and much long-term disability. All countries could do much to optimize the use of available resources through better organization and planning.



The WHO Regional Office for Europe is working with Member States to improve their process of hospital preparedness planning. Experts from several Member States in the European Region have jointly agreed on a planning tool (96) that underlines the structural elements of what should be planned for and initiated in hospital settings when a crisis emerges. This tool is meant as rough guidance for the managers of health facilities responsible for developing crisis preparedness plans. It offers a checklist of measures that should be planned, outlining the main areas to be addressed:

- how to organize and manage the crisis response: information flow and coordination, hierarchical lines, mobilization, planning for transport, pre-hospital links, etc.;
- how to empower professionals to assist victims effectively: permanent hospital staff should be fully prepared and trained in advance while reserve staff should be available on demand and external social and medical support planned;
- how to deliver effective care in an emergency; and
- what other factors should be considered in advance: planning for flexible spaces within the health facility, ensuring the safety of both patients and health personnel, being ready for an increased demand for supplies and logistics, etc.

Emergency medical services are positioned at the front line in the struggle for health security, as a crucial protective factor and a safety net for the population. First-responders, health professionals and security forces need to coordinate more closely to prevent and mitigate such incidents and to have interoperable plans developed and the necessary expertise and technological skills and equipment available to minimize harm in a worst-case scenario.

Mass-casualty incidents clearly show that a sound and tested health system response saves lives. At the international level, the effective implementation of the IHR (2005) can certainly facilitate early detection report and response to any public health emergency

of international concern, with WHO leading the implementation process. For this specific reason, strengthening activities in the following emergency services areas is imperative (96):

- improving the planning and organization of emergency medical services;
- catalysing the creation of intersectoral networks that are functional and effective and ensure adequate emergency care for the population;
- strengthening emergency medical services from a health systems perspective in all functional aspects, including strong stewardship, adequate financing, skilled human resources and rational provision of service; and
- ensuring future sustainability through continuous monitoring and evaluation activities.

The WHO Regional Office for Europe has long committed itself to providing technical support to promote crisis preparedness planning in hospital, primary health care and emergency services. The Regional Office also provides standardized tools and techniques to assess the need for pre-hospital and facility-based capacity in emergency medical care and supports Member States in reviewing and reforming the legislation, organization and management of all services concerned.

### **Improving risk communication**

Health security includes communicating with the public in ways that increase trust. In a globalized world, where rumours and news spread fast, hiding information is difficult. People are entitled to know what affects their lives. An organizational culture of transparency is vital to address and communicate health risks effectively. Involving the public early helps build credibility, which is strongly associated with acceptance of official guidance.

Transparent, timely information is crucial: it will foster the public's resilience and encourage them to participate in supporting an appropriate response, thus contributing to controlling the crisis.

As crises are difficult to predict, a communication strategy can and should be planned beforehand. In the heat of a crisis, effective mass-media communication is crucial, as it can directly affect events. Setting out principles of public communication, education and awareness as part of a communication strategy for future crises prepared and tested well in advance can prevent a health threat from becoming a political or a security crisis. A crisis communication strategy should be part of any national health system preparedness plan.

Risk communication strategies must be developed and implemented if health authorities are to earn trust and legitimacy when communicating about uncertainty and health risks. Box 15 outlines WHO's key principles for risk communication.

Communication plans need to identify all the main stakeholders; coordinate the release of information; address who will take responsibility for responding to the mass media; and identify the main tools and channels to inform and update the community, including special categories such as children, parents, teachers and religious, health and front-line workers (35,97,98). This includes providing the public with transparent information and updates. What is happening? What is being done to help me? What can I do myself?

Risk communication fills the gap between risk assessment and perception. People's risk judgements are influenced by many factors other than just statistical data, such as their values, emotions, group affiliations, socioeconomic status, trust in institutions and sense of control, and these largely shape individual behaviour.

Accurate, reliable and timely communication and information-sharing are essential tools for health decision-making and can minimize and mitigate the health effects on the public.

Easily understandable messages that are accurate, timely and transparent communicated by the mass media or delivered through social mobilization and

health education awareness activities can give the public simple measures to protect their health and trigger surveillance. Ensuring that essential operational procedures are activated and measures in place is easier if decision-makers have communicated properly, awareness is raised in advance and discussion is promoted to facilitate public acceptance.

In crises, public demand for information (and action) is such that, if official sources provide no information, then others will fill the gap. The authorities need to say something even when there is nothing to say (14). Health crises tend to be communication crises. Several lessons have been learned from experiences with crisis communication in the European Region.

- The general public tends to perceive risks and health threats differently than do health professionals. Communication strategies need to take into account the importance of dialogue with the public as a way to bring risk assessment and risk perception closer.
- Trust is the ultimate goal of effective risk communication.
- When public services fail to address health risks effectively, this often takes place in a climate of mistrust, suspicion, blame and retribution created by inappropriate and conflicting information.
- Myths and rumours and perceived attempts to hide crucial information can contribute to panic and jeopardize security.
- Transparency is vital to address and communicate health risks effectively.

### **Recovery and rehabilitation**

Crises are resolved when essential systems have been repaired and rebuilt. Humanitarian action should concentrate on bringing essential lifelines to those in need, but relief should be supplemented from the start with well-informed efforts to identify key elements of the former social, economic and security systems and get them working again.

## **Box 15. WHO's key principles of risk communication**

### **Trust**

The overriding goal is to communicate with the public in ways that build, maintain and restore trust. This is true across cultures, political systems and levels of development. Trust in communicating with the public is critical in both directions. Evidence shows that public panic is rare, and it is very rare when people have been candidly informed.

### **Announcing early**

The first official announcement establishes the parameters of trust. This message's timing, candour and comprehensiveness may make it the most important communication.

### **Transparency**

Maintaining the public's trust throughout an event requires transparency. Transparent communication is candid, easily understood, complete and factually accurate. Transparency should characterize the relationship between the event managers and the public. It allows the public to view the information-gathering, risk-assessing and decision-making processes associated with the event.

### **Public**

Risk communication messages should include information about what the public can do to make itself safer. Understanding the public is critical to effective communication. Changing pre-existing beliefs is usually difficult without explicitly addressing these beliefs. Designing successful messages that bridge the gap between the expert and the public is nearly impossible without knowing what the public thinks. Early risk communication is directed at informing the public about technical decisions (known as the "decide and tell" strategy).

The communicator's job is to understand the public's beliefs, opinions and knowledge about specific risks, sometimes called communication surveillance. Today, risk communicators teach that crisis communication is a dialogue.

### **Planning**

Risk communication should be incorporated into preparedness planning for major events and in all aspects of an outbreak response. The decisions and actions of public health officials have more effect on trust and public risk perception than communication. Everything outbreak control managers do affects risk communication and not just what they say. Risk communication is therefore most effective when it is integrated with risk analysis and risk management.

*Source: adapted from WHO outbreak communication guidelines (99).*

For the health system, the priority is to ensure a secure and safe working environment for national and international personnel. Once this is achieved, fundamental services must be repaired.

In post-conflict environments, a coordinated strategy to rebuild public health capacity and strengthen health systems is essential to re-establish a critical basis for health

security. Coordinating donors is crucial in the recovery and rehabilitation phase, and WHO's role is to facilitate such coordination by mobilizing expertise and by providing strategic guidance for local health authorities. WHO has well-tested mechanisms for mitigating the health effects of emergencies arising from conflicts and natural disasters. WHO's role in strengthening partnerships is discussed further in Chapter 5.

## 5. Working in partnership towards health security

As described in previous chapters, there are many different threats to health security. These threats do not recognize any borders and are therefore the business of various actors at the global, regional and national levels. WHO is just one of many stakeholders in this struggle. Margaret Chan, Director-General of WHO, stresses (100): “Given the growing complexity of these health and security challenges and the response required, these issues concern not only governments, but also international organizations, civil society and the business community. Recognizing this, the World Health Organization is making the world more secure by working in close collaboration with all concerned stakeholders to address these shared challenges.”

### Value added by WHO

WHO’s unchallenged comparative advantages include its impartiality, neutrality and strong convening power as well as its commitment to the values of its Constitution and the legitimacy that stems from its close relations with governments. WHO, in collaboration with the ECDC, also plays an unparalleled role in tackling diseases and putting its normative work into action. WHO promotes evidence-based debate and has numerous formal and informal networks around the world (2). One of WHO’s greatest strengths in international health work is its ability to consolidate and share the best knowledge, experience and capacity of individual experts, institutions and countries around the world and to bring their expertise to bear on health development issues (101).

WHO’s additional strength is its regional and country office structure that, in parallel with the global objectives shared by all levels of the Organization, recognizes each region’s and

country’s own characteristics, enabling WHO to emphasize certain functions on a regional basis and tailor its services to the specific needs of its Member States.

In the European Region, WHO’s specific strength lies in its ability to serve as a bridge between countries, especially between the eastern and western parts of the Region, and between diverse societal sectors (3). The regional country strategy “Matching services to new needs” (5) defines WHO’s overall partnership aim in Europe as to: “rapidly take initiatives to mobilize the international community, help countries themselves to coordinate the interventions by different organizations and ensure that these interventions result in progress for the health systems of the countries concerned and, ultimately, in better health for their people” (5).

### The importance of partnerships

WHO participates in more than 80 global health partnerships and in numerous global, regional and national health networks. These partnerships and networks contribute to achieving WHO’s objectives in various ways. They help to incorporate the health agenda in all sectors; provide focused support to Member States; spread the WHO message broadly; use resources efficiently; and increase the available finances, labour and expertise. WHO’s partner organizations benefit from the Organization’s convening power and technical expertise (26).

WHO will continue to take the lead in promoting effective partnerships for health, in shaping the global health environment and in putting the reform of the United Nations System into operation at the global, regional and country levels. In addition, WHO will continue to provide

forums for dialogue with increasing numbers and types of entities involved in health and development, such as systematic contact with civil society and industry, including the international health care and pharmaceutical industries (26).

Given the complex context of health security and the challenge of limited resources, national and international stakeholders have launched a process to improve the management and effectiveness of development assistance. This joint effort for better harmonization and alignment of development aid is reflected in the Rome Declaration on Harmonization (102) and the Paris Declaration on Aid Effectiveness (103), endorsed by major multilateral and bilateral international organizations, recipient countries and main donors.

The United Nations reform process, which started in 1997, emphasizes coordination and collaboration within the United Nations System to reinforce and streamline operational activities, especially in countries (Box 16). WHO, as the United Nations specialized agency for health, is committed to these initiatives and actively takes part in all related processes at the global, regional and national levels. Within the framework of the international harmonization

and alignment processes, WHO has also undertaken a process of reform in recent years. It has highlighted the crucial role that partnerships play in improving aid, particularly in conjunction with its country activities.

In the field of health security and humanitarian action, WHO is an active partner of various United Nations bodies and supports the effective coordination of emergency and humanitarian action. It is an active member of the Working Group of the United Nations IASC and other interagency initiatives and collaborates closely with the United Nations Office for the Coordination of Humanitarian Affairs. WHO also actively collaborates with the United Nations Economic Commission for Europe, the United Nations International Strategy for Disaster Reduction and the World Meteorological Organization in developing and implementing guidelines such as flood prevention guidelines and developing heat health warning systems. The recent United Nations humanitarian reform process and the associated introduction of cluster lead agencies – with WHO as the lead agency of the IASC Global Health Cluster – give WHO an even stronger mandate for future humanitarian operations.

#### **Box 16. WHO and United Nations humanitarian reform: direction and guidance**

The world has changed fundamentally since the United Nations was established at the end of the Second World War. Opportunities as well as threats and challenges have become increasingly interconnected. The number of Member States has more than tripled since the United Nations was created. The mandate of the United Nations System has continually expanded in both scope and complexity. The United Nations has emphasized relevance, effectiveness, efficiency and accountability.

Health is increasingly viewed as a key aspect of human security (104). More recent examples of SARS and avian influenza emphasize the increasing cross-cutting nature of health on the international agenda, stretching across the entire spectrum of priority areas of concern to the United Nations System, including humanitarian assistance, development, environment and security.

In 2005, the outcome of the World Summit on Sustainable Development provided new impetus to the United Nations reform debate by increasingly emphasizing the need for a more strategic, comprehensive and results-focused approach to reform. This new approach also permeates the



report of the Secretary-General's High-level Panel on United Nations System-wide Coherence in the Areas of Development, Humanitarian Assistance, and the Environment, entitled *Delivering as one*, submitted to the Secretary-General on 9 November 2006 (105).

Nevertheless, this agenda goes beyond what the multilateral system can do alone. WHO cooperates with UNICEF, the United Nations Population Fund and many other United Nations System partners but, with the number of stakeholders in health expanding well beyond the United Nations System, WHO's work at all levels requires strong leadership, coordination and partnerships. These partnerships, including close working relationships with partners with a more operational role and capacity on the ground, are formed on the basis of complementary roles and competencies.

WHO is currently working to adjust its contribution to the United Nations reform effort. The WHO Executive Board has formulated the main components and priorities of WHO's perspective (106). WHO's contribution to United Nations reform is expected to enhance its own ability and that of other organizations in the United Nations System to form effective partnerships with a broad range of stakeholders in pursuing better health outcomes.

WHO's work at the country level includes support in building national capacity and implementing norms and standards; keeping abreast of continuously emerging and re-emerging health risks capable of developing into threats to global health, development and security; and following up on global agreements, such as the IHR (2005).

WHO contributes to global cross-cutting issues, including environment, gender and human rights and provides the health input to the work of other organizations that have a leading role in related issues such as education, agriculture, trade and economic development. At the same time, WHO receives the support of partners from other sectors, where and when appropriate.

An example of the United Nations System successfully brokering effective working arrangements is the cluster leadership approach in humanitarian affairs. To ensure predictable and effective action, all agencies concerned have collectively agreed on a set of clusters to represent sectors or areas of activities and corresponding cluster lead agencies to ensure a coherent approach and response.

The United Nations IASC has adopted the cluster leadership approach as a mechanism to help to address identified gaps in response and enhance the quality of humanitarian action by strengthening partnerships between nongovernmental organizations, international organizations, the International Red Cross and Red Crescent Movement and United Nations agencies. It is part of a wider reform process aimed at improving the effectiveness of humanitarian response by ensuring greater accountability, predictability and partnership.

WHO is the designated lead agency for the IASC Global Health Cluster in the context of humanitarian response. Based on a joint action plan, the IASC Global Health Cluster serves as an effective platform for advocating the central importance of health in emergencies.

At the global level, in recognition of the United Nations IASC agreement on the allocation of responsibilities, cluster lead agencies are accountable to the emergency relief coordinator for ensuring adequate preparedness and effective responses in the sectors or areas of activity concerned.

At the country level, the humanitarian coordinator – with the support of the United Nations Office for the Coordination of Humanitarian Affairs – retains overall responsibility for ensuring an effective humanitarian response and is accountable to the emergency relief coordinator. Cluster leads at the country level are accountable to the humanitarian coordinator for ensuring adequate preparedness and effective responses in the sectors or areas of activity concerned. This must be done in ways that ensure the complementarity of the various stakeholders' actions, strengthen the involvement of national and local institutions and make the best use of available resources.

The cluster lead ensures the joint assessment of the needs of the population and the capacity of various actors within the cluster to develop a strategy and response plan. If the response plan has critical gaps, the cluster lead will do its utmost to ensure that these are addressed, calling on relevant humanitarian partners.

The cluster leadership approach is intended, therefore, to strengthen rather than to replace sectoral coordination. Some sectors have benefited in the past from having clearly designated lead agencies, but other sectors or areas of humanitarian activity have not. The cluster leadership approach aims to rectify this by ensuring a clear system of leadership and accountability for all areas of humanitarian activity.

The growing number of stakeholders working in health at both the national and international levels and the rapidly increased funding from public and private sources for international public health work during the past few years create additional demands for sharing information and joint planning and action. WHO recognizes the need to respond flexibly and rapidly to this evolution and intends to use its convening power to stimulate action across sectors while building the capacity of governments to take on this role nationally. Further, WHO intends to promote evidence-based debate, analysis and framing of the development of policy for health through the work of offices, expert and advisory groups, collaborating centres and the numerous formal and informal networks in which it participates and to continue to provide leadership in public health, optimizing its impartiality and near-universal membership (26).

### **A strong regional stakeholder: the European Union**

The EU to date covers 27 Member States of the WHO European Region and is a major partner in promoting international health security. It set up the Health Security Committee in 2001 (Box 17). Within the EU, various institutions are in the process of specifying their security roles,

with an emphasis on crisis management, and conducting a broad discussion to define the dimensions of threats to EU security and the authority of EU institutions to coordinate and react. This is interpreted as an attempt to meet future security challenges through the concept of moving from a European security community to a secure European community.

The European Commission identified priorities and principles for preparedness planning in the EU in a communication (107) and technical document (108) in 2005. They are being implemented at the political and technical levels, partly funded under the public health programme and supported with scientific advice, technical support and training by the ECDC. In accordance with the concepts outlined in the EU *Interim document: technical guidance on generic preparedness planning for public health emergencies* (108), WHO promotes a continuous, sustainable, comprehensive, multihazard approach to public health emergency preparedness planning, with a multisectoral focus. WHO's new roles, as IASC Global Health Cluster lead agency in international health crisis preparedness and response and in leading the implementation of IHR (2005), complement the strategic priorities of the EU and the ECDC.

### **Box 17. The terms of reference of the EU Health Security Committee**

Health ministers and the European Commissioner for Health and Consumer Protection established the EU Health Security Committee as an informal cooperation and coordination body in 2001. Its terms of reference are:

- to exchange information on health-related threats from acts of terrorism or any deliberate use of biological or other agents with the intent to harm health;
- to share information and experience on preparedness and response plans and crisis management strategies;
- to be able to communicate rapidly in case of health-related crises;
- to advise health ministers and the European Commission services on preparedness and response as well as on coordinating emergency planning at the EU level;
- to share and coordinate health-related crisis responses by EU Member States and the European Commission; and
- to facilitate and support coordination and cooperation efforts and initiatives undertaken at the EU and international levels and to help and contribute to implementing them at the national level.

*Source: adapted from 2786th Council Meeting, Employment, Social Policy, Health and Consumer Affairs (109).*

### **Institutional capacity**

To perform as a reliable partner in future health crises, WHO continuously strives to further enhance its professional and operational capacity to respond rapidly and effectively to expected and unexpected events. Promoting a coordinated, cross-cutting health system response has increasingly become a core orientation for the Regional Office. The continuous effort to strengthen collaboration between all levels of the Organization – headquarters, regional and country levels – will enable WHO to ensure that coordinated public health interventions are tailored to respond appropriately to rapidly evolving emergency scenarios and health security needs.

#### **Mobilizing international expertise – expert rosters**

WHO has established global mechanisms to mobilize expertise quickly from a well-established network of experienced international experts to respond to disasters, emergencies and disease outbreaks.

Working in conjunction with other members of the United Nations IASC, WHO has developed an interagency Public Health Pre-Deployment training programme for humanitarian public health personnel. This programme is designed to complement the United Nations Disaster Assessment and Coordination training conducted by the United Nations Office for the Coordination of Humanitarian Affairs for general humanitarian professionals. The first regional course is being held in the Russian Federation in April 2007 (110).

The Public Health Pre-Deployment course is designed to facilitate close collaboration with partners and teamwork in humanitarian health response at the country level as common principles. The training familiarizes professionals with relevant standard operating procedures and with potential operational support platforms and prepares them to become part of a roster of experts to be deployed on behalf of WHO in future crises. Those completing the course will be able to perform as effective members of public health response teams designed to ensure the delivery of improved humanitarian health outcomes, which will be

assessed according to agreed benchmarks and standards. WHO needs to further develop and update its skills and capacity to operate in crises and emergencies, to build and improve its own institutional readiness, including fine-tuning internal mobilization mechanisms at the regional level and expanding and maintaining rosters of external experts, involving collaborating centres and donor organizations.

The Global Outbreak Alert and Response Network, established by the Epidemic and Pandemic Alert and Response programme, is a technical collaboration of existing institutions and networks that pool human and technical resources for rapidly identifying, confirming and responding to outbreaks of international importance (111). The Network provides an operational framework to link this expertise and skill to keep the international community constantly alert to the threat of outbreaks and ready to respond.

WHO is also part of the United Nations Disaster Assessment and Coordination team, which is a stand-by team of disaster management professionals nominated and funded by member governments, the United Nations Office for the Coordination of Humanitarian Affairs, United Nations Development Programme and operational humanitarian United Nations agencies such as the World Food Programme, UNICEF and WHO. At the request of a disaster-stricken country, the United Nations Disaster Assessment and Coordination team can be deployed within hours to carry out rapid assessment of priority needs and to support national authorities and the United Nations resident coordinator in coordinating international relief on site. Members of the United Nations Disaster Assessment and Coordination team are permanently on stand-by to deploy to relief missions following disasters and humanitarian emergencies.

### **A strong country presence**

The country focus initiative (112) at the global level and the Regional Office country strategy “Matching services to new needs” (5) emphasize a tailored approach to providing

services in countries. In the past decade, WHO has carried out a major shift towards country-based operations in the European Region. WHO has channelled increased resources to the WHO country offices, which now form a reliable WHO network with permanent presence in 29 countries of the Region.

The goal of WHO’s country presence is to enable the entire Organization to support a country in reaching its national health goals and contributing to global and regional public health action and to draw on the experience of the country in building public health knowledge that can benefit the rest of the world. Under the leadership of the head of each WHO country office and supported by all levels of the Organization, the WHO country office is the centre of WHO’s mechanism for delivering its technical cooperation with health ministries.

The heads of WHO country offices are the interface between WHO’s technical expertise and its Member States. They are the front-line responders at the country level, coordinating initial assessments and the public health response to any health crisis. Their continuous close collaboration with the health ministry and coordination with health stakeholders are WHO’s essential comparative advantage, specifically in the early stages of an evolving health crisis. WHO can thus assist Member States promptly to assess the priority health needs of affected populations, to coordinate the health response effectively, to identify critical gaps, to facilitate the restoration of essential public health functions and to rebuild the health system.

In the context of reform of United Nations humanitarian efforts, the WHO country offices play an increasingly important role in supporting the IASC Global Health Cluster activities for coordinating the health humanitarian assistance of health stakeholders and partners at the country level in health crises.

### **A joint operational platform**

A regional joint operational platform for the timely mobilization of international expertise and resources would improve the logistical aspects

of future crisis response operations. The establishment of such a platform would require close coordination with relevant programmes at WHO headquarters and the regional offices to ensure necessary back-up and support as well as coordination with external partners. Work is underway in close collaboration with the World Food Programme and other partners to scale up logistic and transport capacity and to preposition essential medication and supplies to improve operational capacity in future health crises.

### **Sharing experiences and lessons learned**

Recent experiences from the involvement of Regional Office experts in crisis response to the tsunami in South-East Asia, the earthquake in Pakistan, the Beslan event in the north Caucasus, the Andijan refugee event in Kyrgyzstan, the environmental health crisis due to lead exposure in the United Nations Administered Province of Kosovo, the heat-wave in western Europe and the A/H5N1 outbreaks among humans in Turkey and Azerbaijan all clearly demonstrate the importance of extracting and documenting lessons learned to improve future preparedness and appropriate response operations.

Evidence clearly needs to be compiled and the lessons learned need to be promoted to ensure that they increasingly become lessons applied. Examples of effective response should be reflected and integrated in health systems preparedness plans to reduce the vulnerability of the health sector to potential hazards and threats.



© WHO / MELITA JAKOB



## 6. Concluding remarks: towards health security in Europe

The WHO Regional Office for Europe will further coordinate and collaborate with Member States, other United Nations agencies and health stakeholders and at the pan-European level with EU institutions, the European Commission and the ECDC to ensure that the evidence base and the lessons learned, are integrated and reflected in strategies to develop national health systems preparedness, emphasizing the importance of comprehensive intersectoral preparedness for health security.

According to some of the projections outlined here, European populations will be facing new challenges and risks in the near future deriving from changes in the environment, climate change, the emergence of new or newly recognized pathogens, rising trends in the trade and traffic of hazardous substances and increasing human mobility and migration.

In combination with existing risks, increasing socioeconomic disparity and pockets of poverty, rising health care costs and demographic changes will aggravate the burden and pressure on already stretched health systems, national authorities and governments.

Now is therefore the time for consolidated effort and action.

- National systems need to be strengthened to anticipate and predict hazards effectively at both the international and national levels and to allow for effective preparedness strategies.

- Health must increasingly be recognized and targeted in all policies and be seen as a cross-cutting issue and an integrated crucial element in social policies and systems.
- Public health authorities need to better understand the regional and national context and the complex aspects of health security through sound risk analysis and continuous health security preparedness processes.
- Health systems now need to get better prepared to establish and strengthen health-risk reduction and crisis management programmes so they can guide other sectors technically to jointly foster health security.
- Implementation of the new IHR (2005) is a crucial tool and the international legal framework for improving health and security in the 21st century.

With its unique advocacy role, WHO will provide the platform to mobilize international expertise to anticipate and coordinate activities related to health security.

The Regional Office will continue to provide technical assistance to Member States, develop guidelines and consolidate and share evidence on how to improve national public health security effectively by strengthening stewardship, implementing health systems preparedness planning as a continuous process with a multihazard approach, establishing sustainable crisis management and health-risk reduction programmes in health ministries

and establishing multisectoral coordination mechanisms and promoting risk communication principles for future health and security crises. Further consultations with Member States will be required to identify and jointly agree on priority areas for collaboration and intervention and eventually to agree on developing a regional strategy for health security.

Under the leadership of its Regional Director Marc Danzon, the Regional Office will continue this work with Member States and partners to strengthen national and regional capacity to prevent health threats from triggering a political or a security crisis.

# References

1. *Engaging for health. Eleventh General Programme of Work, 2006–2015. A global health agenda*. Geneva, World Health Organization, 2006 (<http://www.who.int/about/finance/en/index.html>, accessed 6 April 2007).
2. *World Health Assembly resolution WHA59.4. Eleventh General Programme of Work, 2006–2015*. Geneva, World Health Organization, 2006 ([http://www.who.int/gb/eb\\_e\\_wha59.html](http://www.who.int/gb/eb_e_wha59.html), accessed 6 April 2007).
3. *WHO Regional Committee for Europe resolution EUR/RC56/R3 on the future of the WHO Regional Office for Europe*. Copenhagen, WHO Regional Office for Europe, 2006 ([http://www.euro.who.int/Governance/resolutions/2006/20060919\\_5](http://www.euro.who.int/Governance/resolutions/2006/20060919_5), accessed 6 April 2007).
4. *The Health for All policy framework for the WHO European Region: 2005 update*. Copenhagen, WHO Regional Office for Europe, 2005 (European Health for All Series, No. 7; [http://www.euro.who.int/InformationSources/Publications/Catalogue/20051201\\_1](http://www.euro.who.int/InformationSources/Publications/Catalogue/20051201_1), accessed 6 April 2007).
5. *The WHO Regional Office for Europe's country strategy "Matching services to new needs"*. Copenhagen, WHO Regional Office for Europe, 2000 (EUR/RC50/10; <http://www.euro.who.int/document/RC50/edoc10.pdf>, accessed 6 April 2007).
6. Suhrcke M et al. *Health: a vital investment for economic development in eastern Europe and central Asia*. Copenhagen, WHO Regional Office for Europe (in press).
7. Walters S, Suhrcke M. *Socioeconomic inequalities in health and health care access in central and eastern Europe and the CIS: a review of the recent literature*. Copenhagen, WHO Regional Office for Europe, 2005 (Working Paper 2005/1; [http://www.euro.who.int/Document/SED/Socioecon\\_ineq.pdf](http://www.euro.who.int/Document/SED/Socioecon_ineq.pdf), accessed 6 April 2007).
8. Hess G. *WHO/DFID peace through health programme: a case study*. Copenhagen, WHO Regional Office for Europe, 1999 (<http://www.euro.who.int/document/e67081.pdf>, accessed 6 April 2007).
9. Hess G, Pfeiffer M. *Comparative analysis of WHO "Health as a Bridge for Peace" case studies*. Geneva, World Health Organization ([http://www.who.int/hac/techguidance/hbp/comparative\\_analysis/en/index.html](http://www.who.int/hac/techguidance/hbp/comparative_analysis/en/index.html), accessed 4 March 2007).
10. Stability Pact for South Eastern Europe [web site]. Brussels, Stability Pact for South Eastern Europe, 2007 (<http://www.stabilitypact.org>, accessed 6 April 2007).
11. South-eastern Europe Health Network [web site]. Copenhagen, WHO Regional Office for Europe, 2007 (<http://www.euro.who.int/stabilitypact>, accessed 6 April 2007).
12. EM-DAT: Emergency Disasters Data Base [online database]. Brussels, Centre for Research on the Epidemiology of Disasters, 2007 (<http://www.em-dat.net>, accessed 6 April 2007).
13. *United Nations Security Council resolution 1308 (2000)*. New York, United Nations, 2000 (<http://daccess-ods.un.org/TMP/4127821.html>, accessed 6 April 2007).

14. McInnes C. *Health, security and the risk society*. London, The Nuffield Trust, 2005 (<http://www.nuffieldtrust.org.uk/ecommm/files/HSecrisky.pdf>, accessed 6 April 2007).
15. Governance [web site]. Copenhagen, WHO Regional Office for Europe, 2007 (<http://www.euro.who.int/Governance>, accessed 6 April 2007).
16. Constitution of the World Health Organization. In: *Basic documents*. 45th ed. Geneva, World Health Organization, 2005.
17. *A more secure world: our shared responsibility. Report of the Secretary-General's High-level Panel on Threats, Challenges and Change*. New York, United Nations, 2004 (<http://www.un.org/secureworld>, accessed 6 April 2007).
18. New dimensions of human security. In: United Nations Development Programme. *Human development report 1994*. New York, Oxford University Press, 1994:22–46 ([http://hdr.undp.org/reports/global/1994/en/pdf/hdr\\_1994\\_ch2.pdf](http://hdr.undp.org/reports/global/1994/en/pdf/hdr_1994_ch2.pdf), accessed 6 April 2007).
19. Commission on Human Security [web site]. New York, Commission on Human Security, 2003 (<http://www.humansecurity-chs.org>, accessed 6 April 2007).
20. *Human security now*. New York, Commission on Human Security, 2003 (<http://www.humansecurity-chs.org/finalreport/index.html>, accessed 6 April 2007).
21. Better health for human security. In: *Human security now*. New York, Commission on Human Security, 2003 (<http://www.humansecurity-chs.org/finalreport/English/chapter6.pdf>, accessed 6 April 2007).
22. European Centre for Disease Prevention and Control (ECDC) [web site]. Stockholm, European Centre for Disease Prevention and Control, 2007 (<http://www.ecdc.eu.int>, accessed 6 April 2007).
23. McInnes C, Lee K. Health, security and foreign policy. *Review of International Studies*, 2006, 32:5–23.
24. Commission on Social Determinants of Health [web site]. Geneva, World Health Organization, 2007 ([http://www.who.int/social\\_determinants/en](http://www.who.int/social_determinants/en), accessed 6 April 2007).
25. *Public health response to biological and chemical weapons. WHO guidance*. 2nd ed. Geneva, World Health Organization, 2004 (<http://www.who.int/csr/delibepidemics/biochemguide/en>, accessed 6 April 2007).
26. *Draft Medium-term Strategic Plan 2008–2013*. Geneva, World Health Organization, 2006 ([http://www.who.int/gb/e/e\\_mtsp.html](http://www.who.int/gb/e/e_mtsp.html), accessed 6 April 2007).
27. *The European health report 2005. Public health action for healthier children and populations*. Copenhagen, WHO Regional Office for Europe, 2005 (<http://www.euro.who.int/document/e87325.pdf>, accessed 6 April 2007).
28. *Global outbreak alert and response. Report of a WHO meeting. Geneva, Switzerland, 26–28 April 2000*. Geneva, World Health Organization, 2000 ([http://www.who.int/csr/resources/publications/surveillance/WHO\\_CDS\\_CSR\\_2000\\_3/en](http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_CSR_2000_3/en), accessed 6 April 2007).
29. *SARS: down but still a threat*. Washington, DC, National Intelligence Council, 2003 (Intelligence Community Assessment ICA 2003-09; [http://www.dni.gov/nic/NIC\\_specialproducts.html](http://www.dni.gov/nic/NIC_specialproducts.html), accessed 6 April 2007).
30. GeoForschungsZentrum Potsdam [web site]. Potsdam, GeoForschungsZentrum, 2007 (<http://www.gfz-potsdam.de/index.html>, accessed 6 April 2007).
31. Public Health Mapping and GIS Map Library [web site]. Geneva, World Health Organization, 2007 (<http://gamapserver.who.int/mapLibrary/default.aspx>, accessed 15 March 2007).

32. *Strengthening pandemic-influenza preparedness and response, including application of the International Health Regulations (2005)*. Report by the Secretariat. Geneva, World Health Organization, 2006 ([http://www.who.int/gb/ebwha/pdf\\_files/WHA59/A59\\_5-en.pdf](http://www.who.int/gb/ebwha/pdf_files/WHA59/A59_5-en.pdf), accessed 6 April 2007).
33. *World Health Assembly resolution WHA59.2. Application of the International Health Regulations (2005)*. Geneva, World Health Organization, 2006 ([http://www.who.int/gb/ebwha/pdf\\_files/WHA59/WHA59\\_2-en.pdf](http://www.who.int/gb/ebwha/pdf_files/WHA59/WHA59_2-en.pdf), accessed 6 April 2007).
34. *Responding to the avian influenza pandemic threat: recommended strategic actions*. Geneva, World Health Organization, 2005 ([http://www.who.int/csr/resources/publications/influenza/WHO\\_CDS\\_CSR\\_GIP\\_05\\_8-EN.pdf](http://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_05_8-EN.pdf), accessed 6 April 2007).
35. *Making preparation count: lessons from the avian influenza outbreak in Turkey*. Copenhagen, WHO Regional Office for Europe, 2006 (<http://www.euro.who.int/document/E89139.pdf>, accessed 6 April 2007).
36. The WHO Global Influenza Surveillance Network (GISN) [web site]. Geneva, World Health Organization, 2007 (<http://www.who.int/csr/disease/influenza/influenzanetwork/en/index.html>, accessed 6 April 2007).
37. WHO reference laboratories for diagnosis of influenza A/H5 infection [web site]. Geneva, World Health Organization, 2004 ([http://www.who.int/csr/disease/avian\\_influenza/guidelines/referencelabs/en/index.html](http://www.who.int/csr/disease/avian_influenza/guidelines/referencelabs/en/index.html), accessed 6 April 2007).
38. *WHO strategic action plan for pandemic influenza 2006–2007*. Geneva, World Health Organization, 2006 ([http://www.who.int/csr/resources/publications/influenza/WHO\\_CDS\\_EPR\\_GIP\\_2006\\_2c.pdf](http://www.who.int/csr/resources/publications/influenza/WHO_CDS_EPR_GIP_2006_2c.pdf), accessed 6 April 2007).
39. *WHO checklist for influenza pandemic preparedness planning*. Geneva, World Health Organization, 2005 ([http://www.who.int/csr/resources/publications/influenza/WHO\\_CDS\\_CSR\\_GIP\\_2005\\_4/en/index.html](http://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_2005_4/en/index.html), accessed 6 April 2007).
40. *WHO global influenza preparedness plan*. Geneva, World Health Organization, 2005 ([http://www.who.int/csr/resources/publications/influenza/WHO\\_CDS\\_CSR\\_GIP\\_2005\\_5/en/index.html](http://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_2005_5/en/index.html), accessed 6 April 2007).
41. *Guidance on regulations for the transport of infectious substances 2007–2008*. Geneva, World Health Organization, 2007 ([http://www.who.int/csr/resources/publications/biosafety/WHO\\_CDS\\_EPR\\_2007\\_2.pdf](http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_EPR_2007_2.pdf), accessed 6 April 2007).
42. *Global pandemic influenza action plan to increase vaccine supply*. Geneva, World Health Organization, 2006 ([http://www.who.int/csr/resources/publications/influenza/WHO\\_CDS\\_EPR\\_GIP\\_2006\\_1/en/index.html](http://www.who.int/csr/resources/publications/influenza/WHO_CDS_EPR_GIP_2006_1/en/index.html), accessed 6 April 2007).
43. Matic S et al., eds. *HIV/AIDS in Europe: moving from death sentence to chronic disease management*. Copenhagen, WHO Regional Office for Europe, 2005 ([http://www.euro.who.int/InformationSources/Publications/Catalogue/20051123\\_2](http://www.euro.who.int/InformationSources/Publications/Catalogue/20051123_2), accessed 6 April 2007).
44. Global summary of the AIDS epidemic, December 2006. In: *AIDS epidemic update. December 2006*. Geneva, UNAIDS, 2006 ([http://data.unaids.org/pub/EpiReport/2006/02-Global\\_Summary\\_2006\\_EpiUpdate\\_eng.pdf](http://data.unaids.org/pub/EpiReport/2006/02-Global_Summary_2006_EpiUpdate_eng.pdf), accessed 6 April 2007).
45. Global HIV Prevention Working Group. *HIV prevention in the era of expanded treatment access*. Seattle, Bill & Melinda Gates Foundation, 2004 (<http://www.gatesfoundation.org/nr/downloads/globalhealth/aids/PWG2004Report.pdf>, accessed 6 April 2007).
46. Porco TC et al. Decline in HIV infectivity following the introduction of highly active antiretroviral therapy. *AIDS*, 2004, 18:81–88.



47. Sexually transmitted infections/HIV/AIDS programme. *WHO/Europe survey on HIV/AIDS and antiretroviral therapy: 31 March 2006*. Copenhagen, WHO Regional Office for Europe, 2006.
48. Kistemann T et al. Microbial load of drinking water reservoir tributaries during extreme rainfall and runoff. *Applied and Environmental Microbiology*, 2002, 68:2188–2197.
49. Howe A et al. *Cryptosporidium* oocysts in a water supply associated with a cryptosporidiosis outbreak. *Emerging Infectious Diseases*, 2002, 8:619–624.
50. Ohi CA, Tapsell S. Flooding and human health. *British Medical Journal*, 2000, 321:1167–1168.
51. Tapsell S et al. Vulnerability to flooding: health and social dimensions. *Philosophical Transactions of the Royal Society of London*, 2002, A 360:1511–1525.
52. Maltais D et al. Soutien social et santé psychologique de victimes d'inondations [Social support, coping and mental health after a flood]. *Sciences Sociales et Santé*, 2005, 23:5–38.
53. Galea S et al. The epidemiology of post-traumatic stress disorders after disasters. *Epidemiologic Reviews*, 2005, 27:78–91.
54. Hajat S et al. The human health consequences of flooding in Europe and the implications for public health: a review of the evidence. *Applied Environmental Science and Public Health*, 2003, 1:13–21.
55. Euripidou E, Murray V. Public health impacts of floods and chemical contamination. *Journal of Public Health*, 2004, 26:376–383.
56. Ahern MJ et al. Global health impacts of floods: epidemiological evidence. *Epidemiological Reviews*, 2005, 27:36–45.
57. *Rapid health assessment of flooding in Bulgaria*. Copenhagen, WHO Regional Office for Europe, 2006 ([http://www.euro.who.int/document/EHA/RA\\_Bulrep.pdf](http://www.euro.who.int/document/EHA/RA_Bulrep.pdf), accessed 6 April 2007).
58. Empereur-Bissonnet P et al. Heatwave in France, July 2006: 112 excess deaths so far attributed to the heat. *Eurosurveillance*, 2006, 11(8):E060803.3.
59. Michelozzi P et al. The impact of the summer 2003 heat waves on mortality in four Italian cities. *Eurosurveillance*, 2005, 10(7):161–165.
60. Nogueira PJ et al. Mortality in Portugal associated with the heat wave of August 2003: early estimation of effect, using a rapid method. *Eurosurveillance*, 2005, 10(7):150–153.
61. Rozzini R et al. Elevated temperature and nursing home mortality during 2003 European heat wave. *Journal of the American Medical Directors' Association*, 2004, 5:138–139.
62. Livada I et al. Determination of places in the great Athens area where the heat island effect is observed. *Theoretical and Applied Climatology*, 2002, 71:219–230.
63. Vandentorren S, Empereur-Bissonnet P. Health impact of the 2003 heat-wave in France. In: Kirch W et al., eds. *Extreme weather events and public health responses*. Berlin, Springer, 2005.
64. Simón F et al. Mortality in Spain during the heat waves of summer 2003. *Eurosurveillance*, 2005, 10(7):156–161.
65. Koppe C et al. *Heat-waves: risks and responses*. Copenhagen, WHO Regional Office for Europe, 2004 (Health and Global Environmental Change Series, No. 2; <http://www.euro.who.int/document/E82629.pdf>, accessed 6 April 2007).
66. Improving public health responses to extreme events. Bonn, Germany, 22–23 March 2007 [web site]. Copenhagen, WHO Regional

- Office for Europe, 2007 ([http://www.euro.who.int/globalchange/topics/20070227\\_2](http://www.euro.who.int/globalchange/topics/20070227_2), accessed 6 April 2007).
67. Pascal M et al. France's heat health watch warning system. *International Journal of Biometeorology*, 2006, 50:144–153.
  68. Lindgren E. The human health situation in the Aral region: causes and concerns. *International Conference on the Aral Sea*, Royal Swedish Academy of Sciences, Stockholm, Sweden, 18 October 2006.
  69. *Strengthening health systems' response to crises. Towards a new focus on disaster preparedness*. Copenhagen, WHO Regional Office for Europe, 2004 (<http://www.euro.who.int/Document/E87920.pdf>, accessed 6 April 2007).
  70. *Health effects of the Chernobyl accident and special health care programmes*. Geneva, World Health Organization, 2006 ([http://whqlibdoc.who.int/publications/2006/9241594179\\_eng.pdf](http://whqlibdoc.who.int/publications/2006/9241594179_eng.pdf), accessed 6 April 2007).
  71. Baverstock K et al. Thyroid cancer after Chernobyl. *Nature*, 1992, 359:21–22.
  72. *Assessment of radiological consequences and evaluation of protective measures*. Vienna, International Atomic Energy Agency, 1991.
  73. Baverstock K, Williams D. The Chernobyl accident 20 years on: an assessment of the health consequences and the international response. *Environmental Health Perspectives*, 2006, 114:1312–1317.
  74. Pukkala E et al. Breast cancer in Belarus and Ukraine after the Chernobyl accident. *International Journal of Cancer*, 2006, 119:651–658.
  75. Tondel M et al. Increased incidence of malignancies in Sweden after the Chernobyl accident – a promoting effect? *American Journal of Industrial Medicine*, 2006, 49:158–168.
  76. Dolk H, Nichols R. Evaluation of the impacts of Chernobyl on the prevalence of congenital abnormalities in 16 regions of Europe. *International Journal of Epidemiology*, 1999, 28:941–948.
  77. Møller A, Mousseau T. Biological consequences of Chernobyl: 20 years on. *Trends in Ecology and Evolution*, 2006, 21:200–207.
  78. *Health and economic development in south-eastern Europe*. Copenhagen, WHO Regional Office for Europe, 2006 (<http://www.euro.who.int/Document/E89184.pdf>, accessed 6 April 2007).
  79. *Inter-Agency Transitional Workplan for the North Caucasus*. Moscow, United Nations Office for the Coordination of Humanitarian Affairs, 2007 ([http://www.reliefweb.int/rw/RWFiles2006.nsf/FilesByRWDocUnidFilename/B37C7A809DA8FD284925724200268B27-Full\\_Report.pdf/\\$File/Full\\_Report.pdf](http://www.reliefweb.int/rw/RWFiles2006.nsf/FilesByRWDocUnidFilename/B37C7A809DA8FD284925724200268B27-Full_Report.pdf/$File/Full_Report.pdf), accessed 6 April 2007).
  80. Confalonieri U, McMichael A, eds. *Global environmental change and human health. Science plan and implementation strategy*. Paris, Earth System Science Partnership, 2006 (ESSP Report No. 4; [http://www.essp.org/fileadmin/redakteure/pdf/GEC\\_HHSciPlan.pdf](http://www.essp.org/fileadmin/redakteure/pdf/GEC_HHSciPlan.pdf), accessed 6 April 2007).
  81. *Climate change 2007: the physical science basis. Summary for policymakers. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Intergovernmental Panel on Climate Change, 2007 (<http://www.ipcc.ch/SPM2feb07.pdf>, accessed 6 April 2007).
  82. *Working Group II contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report. Climate change 2007: climate change impacts, adaptation and vulnerability. Summary for policymakers*. Geneva, Intergovernmental Panel on Climate Change, 2007 (<http://www.ipcc.ch/SPM6avr07.pdf>, accessed 6 April 2007).

83. Nakicenovic N, Swart R, eds. *Special report on emissions scenarios. A special report of Working Group III of the Intergovernmental Panel on Climate Change*. Cambridge, Cambridge University Press, 2000 (<http://www.grida.no/climate/ipcc/emission/index.htm>, accessed 6 April 2007).
84. Leckebusch GC, Ulbrich U. On the relationship between cyclones and extreme windstorm events over Europe under climate change. *Global and Planetary Change*, 2004, 44:181–193.
85. Prather M et al. Fresh air in the 21st century? *Geophysical Research Letters*, 2003, 30:1100.
86. Anderson HR et al. *Air pollution and climate change. An expert review for comment*. London, Department of Health, 2001:219–237.
87. Dasgupta S et al. *The impact of sea level rise on developing countries*. Washington, DC, World Bank, 2007 (World Bank Policy Research Working Paper 4136; [http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2007/02/09/000016406\\_20070209161430/Rendered/PDF/wps4136.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2007/02/09/000016406_20070209161430/Rendered/PDF/wps4136.pdf), accessed 6 April 2007).
88. *Stern review on the economics of climate change*. London, HM Treasury, 2006 ([http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/stern\\_review\\_report.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm), accessed 6 April 2007).
89. *Revision of the International Health Regulations*. Resolution WHA58.3. Geneva, World Health Organization, 2005 (<http://www.who.int/csr/ihr/en>, accessed 6 April 2007).
90. *Guidelines for drug donations. Revised 1999*. Geneva, World Health Organization, 1999 ([http://whqlibdoc.who.int/hq/1999/WHO\\_EDM\\_PAR\\_99.4.pdf](http://whqlibdoc.who.int/hq/1999/WHO_EDM_PAR_99.4.pdf), accessed 6 April 2007).
91. *Guidelines for safe disposal of unwanted pharmaceuticals in and after emergencies*. Geneva, World Health Organization, 1999 ([http://www.who.int/water\\_sanitation\\_health/medicalwaste/unwantpharm.pdf](http://www.who.int/water_sanitation_health/medicalwaste/unwantpharm.pdf), accessed 6 April 2007).
92. Davoli A, ed. *A practical tool for the preparation of a hospital crisis preparedness plan, with special focus on pandemic influenza*. Copenhagen, WHO Regional Office for Europe, 2006 (<http://www.euro.who.int/Document/e89231.pdf>, accessed 6 April 2007).
93. *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters*. Geneva, International Strategy for Disaster Reduction, 2005 (<http://www.unisdr.org/wcdr/intergover/official-doc/L-docs/Hyogo-framework-for-action-english.pdf>, accessed 6 April 2007).
94. Disaster preparedness and response. Publications [web site]. Copenhagen, WHO Regional Office for Europe, 2006 ([http://www.euro.who.int/emergencies/publications/20020611\\_1](http://www.euro.who.int/emergencies/publications/20020611_1), accessed 6 April 2007).
95. *Health facility seismic evaluation. A handbook*. Copenhagen, WHO Regional Office for Europe, 2006 (<http://www.euro.who.int/Document/e88525.pdf>, accessed 6 April 2007).
96. *Health systems. Emergency-care systems. Report by the Secretariat*. Geneva, World Health Organization, 2007 (EB120/27; [http://www.who.int/gb/ebwha/pdf\\_files/EB120/b120\\_27-en.pdf](http://www.who.int/gb/ebwha/pdf_files/EB120/b120_27-en.pdf), accessed 6 April 2007).
97. *WHO outbreak communication. WHO handbook for journalists: influenza pandemic*. Geneva, World Health Organization, 2005 ([http://www.who.int/csr/don/Handbook\\_influenza\\_pandemic\\_dec05.pdf](http://www.who.int/csr/don/Handbook_influenza_pandemic_dec05.pdf), accessed 6 April 2007).
98. *Outbreak communication. Best practices for communicating with the public during an outbreak*. Geneva, World Health Organization, 2005 ([http://www.who.int/csr/resources/publications/WHO\\_CDS\\_2005\\_32web.pdf](http://www.who.int/csr/resources/publications/WHO_CDS_2005_32web.pdf), accessed 6 April 2007).

99. *WHO outbreak communication guidelines*. Geneva, World Health Organization, 2005 ([http://www.who.int/csr/resources/publications/WHO\\_CDS\\_2005\\_28en.pdf](http://www.who.int/csr/resources/publications/WHO_CDS_2005_28en.pdf), accessed 6 April 2007).
100. Message from the Director-General [web site]. Geneva, World Health Organization, 2007 ([http://www.who.int/world-health-day/2007/toolkit/dg\\_message/en/index.html](http://www.who.int/world-health-day/2007/toolkit/dg_message/en/index.html), accessed 6 April 2007).
101. *Reports of advisory bodies and related issues. WHO policy concerning expert committees. Report by the Director-General*. Geneva, World Health Organization, 1998 (EB102/10, [http://ftp.who.int/gb/pdf\\_files/EB102/ee10.pdf](http://ftp.who.int/gb/pdf_files/EB102/ee10.pdf), accessed 6 April 2007).
102. *Rome Declaration on Harmonization*. Rome, Italy, February 25, 2003. Suva, Pacific Islands Forum Secretariat, 2003 ([http://www.forumsec.org/\\_resources/main/files/Rome%20Declaration%20-%20Harmonisation.pdf](http://www.forumsec.org/_resources/main/files/Rome%20Declaration%20-%20Harmonisation.pdf), accessed 6 April 2007).
103. *Paris Declaration on Aid Effectiveness. Ownership, harmonisation, alignment, results and mutual accountability*. Paris, Organisation for Economic Co-operation and Development, 2005 (<http://www.oecd.org/dataoecd/11/41/34428351.pdf>, accessed 6 April 2007).
104. *In larger freedom: towards development, security and human rights for all. Report of the Secretary-General*. New York, United Nations, 2005 (A/59/2005; <http://www.un.org/largerfreedom/report-largerfreedom.pdf>, accessed 6 April 2007).
105. *Delivering as one. Report of the Secretary-General's High-level Panel*. New York, United Nations, 2006 (<http://www.un.org/events/panel/resources/pdfs/HLP-SWC-FinalReport.pdf>, accessed 6 April 2007).
106. *WHO and reform of the United Nations system. Report by the Secretariat*. Geneva, World Health Organization, 2007 (EB120/31; [http://www.who.int/gb/ebwha/pdf\\_files/EB120/B120\\_31-en.pdf](http://www.who.int/gb/ebwha/pdf_files/EB120/B120_31-en.pdf), accessed 6 April 2007).
107. *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on strengthening coordination on generic preparedness planning for public health emergencies at EU level*. Brussels, Commission of the European Communities, 2005 (COM(2005) 605 final; [http://ec.europa.eu/health/ph\\_threats/com/preparedness/preparedness\\_en.print.htm](http://ec.europa.eu/health/ph_threats/com/preparedness/preparedness_en.print.htm), accessed 6 April 2007).
108. *Interim document: technical guidance on generic preparedness planning for public health emergencies*. Brussels, Commission of the European Communities, 2005 ([http://ec.europa.eu/health/ph\\_threats/com/preparedness/preparedness\\_en.print.htm](http://ec.europa.eu/health/ph_threats/com/preparedness/preparedness_en.print.htm), accessed 6 April 2007).
109. *2786th Council Meeting, Employment, Social Policy, Health and Consumer Affairs*. Brussels, Council of the European Union, 22 February 2007 (Press release 6226/07 (Presse 23); [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/lsa/92911.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/lsa/92911.pdf), accessed 23 February 2007).
110. Public Health Pre-Deployment Training, 15–28 April 2007, Moscow, Russian Federation [web site]. Geneva, World Health Organization, 2007 (<http://www.who.int/hac/techguidance/training/predeployment/en/index.html>, accessed 6 April 2007).
111. Global Outbreak Alert and Response Network [web site]. Geneva, World Health Organization, 2007 (<http://www.who.int/csr/outbreaknetwork/en>, accessed 6 April 2007).
112. *Country focus initiative. Report by the Director-General*. Geneva, World Health Organization, 2002 (EB111/33; [http://www.who.int/gb/ebwha/pdf\\_files/EB111/eeb11133.pdf](http://www.who.int/gb/ebwha/pdf_files/EB111/eeb11133.pdf), accessed 6 April 2007).

# Annex 1. Selected international initiatives with health security dimensions

- Emergence of the concept of “human security” rather than “national security” in the United Nations Development Programme *Human development report 1994* (Chapter 2. New dimensions of human security) (1).
- Expansion of the nongovernmental health sector and a general increase in the number of actors and stakeholders in international public health from the 1990s.
- New academic initiatives devoted to health- and security-related issues, such as the Nuffield Trust’s work in the United Kingdom on globalization and health since 1997 and its Global Health programme 2002–2006 (2) and the establishment of the Center for Domestic and International Health Security by the RAND Corporation in the United States of America (3).
- Establishment of the Intergovernmental Panel on Climate Change in 1988 by the World Meteorological Organization and the United Nations Environment Programme in recognition of the problem of potential global climate change (4).
- Adoption of the United Nations Framework Convention on Climate Change in 1992, which entered into force in 1994 (5).
- Several multilateral environmental agreements related to health and security, including the Vienna Convention for the Protection of the Ozone Layer in 1985 (6) and the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987 (7); the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal in 1989 (8); the Convention on Biological Diversity in 1992 (9); the United Nations Convention to Combat Desertification in 1992 (10); the United Nations Framework Convention on Climate Change in 1992 (11) and the Kyoto Protocol to the United Nations Framework Convention on Climate Change in 1997 (12); the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade in 1998 (13); the Cartagena Protocol on Biosafety to the Convention on Biological Diversity in 2000 (14); and the Stockholm Convention on Persistent Organic Pollutants in 2001 (15).
- The process of reform at the United Nations (from 1997) in general (16) and the United Nations humanitarian reform in particular (the report *Delivering as one* from November 2006) (17).
- Establishment of the International Strategy for Disaster Reduction by the United Nations on 22 December 1999 as a successor arrangement for the International Decade for Natural Disaster Reduction in the 1990s (18).
- Creation of the Millennium Development Goals in 2000, with 3 of 8 goals, 8 of 18 targets and 18 of 48 indicators directly related to health (19).
- Establishment of the Global Outbreak Alert and Response Network at a meeting at WHO headquarters in April 2000 (20).



- Establishment of the Stability Pact for South Eastern Europe in 1999 as a conflict-prevention and reconstruction process in the region. In 2001, a health component was added to the Stability Pact's Initiative for Social Cohesion in collaboration between the WHO Regional Office for Europe and the Council of Europe, initiating the South-eastern Europe Health Network (21,22).
- Establishment of the independent Commission on Human Security – an initiative of the Government of Japan – in January 2001 (23), as a result of the United Nations Millennium Summit, which focused on securing freedom from fear and freedom from want. The Commission published *Human security now* in 2003 (24,25).
- The United Nations General Assembly Special Session on HIV/AIDS in June 2001, where HIV/AIDS was declared a security issue (26), which the United Nations Security Council had already done in 2000 in resolution 1308 (27).
- Decision to establish the Global Fund to Fight AIDS, Tuberculosis and Malaria by the G8 Summit in July 2001 (28).
- Adoption of a Ministerial Declaration at the World Trade Organization Ministerial Conference in Doha in November 2001, with special significance for access to key vaccines and drugs to combat national public health emergencies (29).
- EU expansion to include 27 Member States by 2007 (30), establishment of the EU Health Security Committee in October 2001 (31), founding of the ECDC in 2004 (32) and adoption of a European Union generic preparedness plan on 28 November 2005 (33,34).
- Establishment of the Global Health Security Initiative by the First Ministerial Meeting (of Canada, France, Germany, Italy, Japan, Mexico, the United Kingdom, the United States of America, the European Commission and WHO) in Ottawa, Canada on 7 November 2001, with WHO as a technical adviser. A Global Health Security Action Group of experts was tasked with developing proposals and concrete actions to improve global health security and to serve as a network of rapid communication and reaction in the event of a crisis (35).
- The first Global Change Open Science Conference in Amsterdam led the four international global environmental change research programmes (the International Programme of Biodiversity Science, the International Geosphere/Biosphere Programme, the International Human Dimensions Programme on Global Environmental Change and the World Climate Research Programme) jointly to form the Earth System Science Partnership in 2001. The Earth System Science Partnership Joint Project on global environmental change and human health was launched at the Earth System Science Partnership Open Science Conference in Beijing, China on 9–12 November 2006 (36).
- The World Economic Forum founded the Global Risk Network in 2004, to help the international community and the global business community to improve their response to a changing global risk landscape (37).
- Publication of the report of the United Nations Secretary-General's High-level Panel on Threats, Challenges and Change: *A more secure world: our shared responsibility* in 2004 (38).
- Endorsement by the United Nations General Assembly on 22 December 2005 (resolution A/RES/60/195) of the Hyogo Declaration and the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters, as adopted by the World Conference on Disaster Reduction, held at Kobe, Hyogo, Japan, 18–22 January 2005 (39,40).

- Unanimous adoption of the revised International Health Regulations (IHR (2005)) by the Fifty-eighth World Health Assembly on 23 May 2005. They are scheduled to enter into force on 15 June 2007 (41).
- Publication in the United Kingdom of the *Stern review on the economics of climate change* in October 2006, named for Sir Nicholas Stern, Head of the United Kingdom Government Economics Service and Adviser to the Government on the economics of climate change and development (42).
- Publication by the World Bank in February 2007 of a report *The impact of sea level rise on developing countries*, predicting displacements of hundreds of millions of people in this century owing to sea level rise (43).
- Publication in February and April 2007 of drafts of two summaries for policy-makers on the physical science basis of climate change (44) and on climate change impacts, adaptation and vulnerability (45) as part of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, to be published in total during 2007. The other parts of the Report will focus on the mitigation of climate change and a synthesis report.

## References

1. New dimensions of human security. In: United Nations Development Programme. *Human development report 1994*. New York, Oxford University Press, 1994:22–46 ([http://hdr.undp.org/reports/global/1994/en/pdf/hdr\\_1994\\_ch2.pdf](http://hdr.undp.org/reports/global/1994/en/pdf/hdr_1994_ch2.pdf), accessed 6 April 2007).
2. The Nuffield Trust for Research and Policy Studies in Health Services [web site]. London, The Nuffield Trust, 2006 (<http://www.nuffieldtrust.org.uk>, accessed 6 April 2007).
3. RAND Center for Domestic and International Health Security [web site]. Washington, DC, RAND Corporation, 2007 (<http://www.rand.org/health/centers/healthsecurity/index.html>, accessed 6 April 2007).
4. Intergovernmental Panel on Climate Change [web site]. Geneva, Intergovernmental Panel on Climate Change, 2007 (<http://www.ipcc.ch>, accessed 6 April 2007).
5. *United Nations Framework Convention on Climate Change*. New York, United Nations, 1992 (<http://unfccc.int/resource/docs/convkp/conveng.pdf>, accessed 6 April 2007).
6. *Vienna Convention for the Protection of the Ozone Layer*. New York, United Nations Environment Programme, 1985 ([http://ozone.unep.org/Treaties\\_and\\_Ratification/2A\\_vienna\\_convention.shtml](http://ozone.unep.org/Treaties_and_Ratification/2A_vienna_convention.shtml), accessed 6 April 2007).
7. *Montreal Protocol on Substances that Deplete the Ozone Layer*. New York, United Nations Environment Programme, 1987 ([http://ozone.unep.org/Treaties\\_and\\_Ratification/2B\\_montreal\\_protocol.shtml](http://ozone.unep.org/Treaties_and_Ratification/2B_montreal_protocol.shtml), accessed 6 April 2007).
8. *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*. Geneva, Secretariat of the Basel Convention, 1989 (<http://www.basel.int/text/documents.html>, accessed 6 April 2007).
9. *Convention on Biological Diversity*. Montreal, Secretariat of the Convention on Biological Diversity, United Nations Environment Programme, 1992 (<http://www.biodiv.org/convention/default.shtml>, accessed 6 April 2007).
10. *United Nations Convention to Combat Desertification*. Bonn, Secretariat of the United Nations Convention to Combat Desertification, 1992 (<http://www.unccd.int/convention/menu.php>, accessed 6 April 2007).

11. *United Nations Framework Convention on Climate Change*. Bonn, Secretariat of the United Nations Framework Convention on Climate Change, 1992 ([http://unfccc.int/essential\\_background/convention/background/items/2853.php](http://unfccc.int/essential_background/convention/background/items/2853.php), accessed 6 April 2007).
12. *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. Bonn, Secretariat of the United Nations Framework Convention on Climate Change, 1997 ([http://unfccc.int/essential\\_background/kyoto\\_protocol/background/items/1351.php](http://unfccc.int/essential_background/kyoto_protocol/background/items/1351.php), accessed 6 April 2007).
13. *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*. Geneva, Secretariat for the Rotterdam Convention, 1998 (<http://www.pic.int/home.php?type=t&id=49&sid=16>, accessed 6 April 2007).
14. *Cartagena Protocol on Biosafety to the Convention on Biological Diversity*. Montreal, Secretariat of the Convention on Biological Diversity, United Nations Environment Programme, 2000 (<http://www.biodiv.org/biosafety/protocol.shtml>, accessed 6 April 2007).
15. *Stockholm Convention on Persistent Organic Pollutants*. Geneva, Secretariat for the Stockholm Convention on Persistent Organic Pollutants, United Nations Environment Programme, 2001 (<http://www.pops.int>, accessed 6 April 2007).
16. Reform at the United Nations. Reference reports and materials [web site]. New York, United Nations 2007 (<http://www.un.org/reform>, accessed 6 April 2007).
17. *Delivering as one. Report of the Secretary-General's High-level Panel*. New York, United Nations, 2006 (<http://www.un.org/events/panel/resources/pdfs/HLP-SWC-FinalReport.pdf>, accessed 6 April 2007).
18. *Resolution adopted by the General Assembly 54/219. International Decade for Natural Disaster Reduction: successor arrangements*. New York, United Nations, 2000 (A/RES/54/219; [http://www.unisdr.org/eng/about\\_isdr/basic\\_docs/GA-resolution/a-res-54-219-eng.pdf](http://www.unisdr.org/eng/about_isdr/basic_docs/GA-resolution/a-res-54-219-eng.pdf), accessed 6 April 2007).
19. UN Millennium Development Goals [web site]. New York, United Nations, 2005 (<http://www.un.org/millenniumgoals>, accessed 6 April 2007).
20. *Global outbreak alert and response. Report of a WHO meeting. Geneva, Switzerland, 26–28 April 2000*. Geneva, World Health Organization, 2000 ([http://www.who.int/csr/resources/publications/surveillance/WHO\\_CDS\\_CSR\\_2000\\_3/en](http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_CSR_2000_3/en), accessed 6 April 2007).
21. Stability Pact for South Eastern Europe [web site]. Brussels, Stability Pact for South Eastern Europe, 2007 (<http://www.stabilitypact.org>, accessed 6 April 2007).
22. South-eastern Europe Health Network [web site]. Copenhagen, WHO Regional Office for Europe, 2007 (<http://www.euro.who.int/stabilitypact>, accessed 6 April 2007).
23. Commission on Human Security [web site]. New York, Commission on Human Security, 2003 (<http://www.humansecurity-chs.org>, accessed 6 April 2007).
24. *Human security now*. New York, Commission on Human Security, 2003 (<http://www.humansecurity-chs.org/finalreport/index.html>, accessed 6 April 2007).
25. Better health for human security. In: *Human security now*. New York, Commission on Human Security, 2003 (<http://www.humansecurity-chs.org/finalreport/English/chapter6.pdf>, accessed 6 April 2007).
26. United Nations General Assembly Special Session on HIV/AIDS, 25–27 June 2001 [web site]. New York, United Nations, 2001 (<http://www.un.org/ga/aids/coverage>, accessed 6 April 2007).

27. *United Nations Security Council resolution 1308 (2000)*. New York, United Nations, 2000 (<http://daccess-ods.un.org/TMP/4127821.html>, accessed 6 April 2007).
28. Global Fund to Fight AIDS, Tuberculosis and Malaria [web site]. Geneva, Global Fund to Fight AIDS, Tuberculosis and Malaria, 2007 (<http://www.theglobalfund.org/en>, accessed 6 April 2007).
29. *Ministerial declaration*. Geneva, World Trade Organization, 2001 ([http://www.wto.org/english/thewto\\_e/minist\\_e/min01\\_e/mindecl\\_e.htm](http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm), accessed 6 April 2007).
30. European Commission, DG Health and Consumer Protection, Public Health [web site]. Brussels, Commission of the European Communities ([http://ec.europa.eu/health/index\\_en.htm](http://ec.europa.eu/health/index_en.htm), accessed 6 April 2007).
31. *2786th Council Meeting, Employment, Social Policy, Health and Consumer Affairs*. Brussels, Council of the European Union, 22 February 2007 (Press release 6226/07 (Presse 23); [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/lsa/92911.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/lsa/92911.pdf), accessed 23 February 2007).
32. European Centre for Disease Prevention and Control (ECDC) [web site]. Stockholm, European Centre for Disease Prevention and Control, 2007 (<http://www.ecdc.eu.int>, accessed 6 April 2007).
33. *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on strengthening coordination on generic preparedness planning for public health emergencies at EU level*. Brussels, Commission of the European Communities, 2005 (COM(2005) 605 final; [http://ec.europa.eu/health/ph\\_threats/com/preparedness/preparedness\\_en.print.htm](http://ec.europa.eu/health/ph_threats/com/preparedness/preparedness_en.print.htm), accessed 6 April 2007).
34. *Interim document: technical guidance on generic preparedness planning for public health emergencies*. Brussels, Commission of the European Communities, 2005 ([http://ec.europa.eu/health/ph\\_threats/com/preparedness/preparedness\\_en.print.htm](http://ec.europa.eu/health/ph_threats/com/preparedness/preparedness_en.print.htm), accessed 6 April 2007).
35. Global Health Security Initiative (GHSI) [web site]. Global Health Security Initiative, 2007 (<http://www.ghsi.ca/english/index.asp>, accessed 6 April 2007).
36. Earth System Science Partnership (ESSP) [web site]. Paris, Earth System Science Partnership, 2007 (<http://www.essp.org/en/home.html>, accessed 6 April 2007).
37. Global Risk Network [web site]. Geneva, World Economic Forum, 2007 (<http://www.weforum.org/en/initiatives/globalrisk/index.htm>, accessed 6 April 2007).
38. *A more secure world: our shared responsibility. Report of the Secretary-General's High-level Panel on Threats, Challenges and Change*. New York, United Nations, 2004 (<http://www.un.org/secureworld>, accessed 6 April 2007).
39. *Resolution adopted by the General Assembly 60/195. International Strategy for Disaster Reduction*. New York, United Nations, 2006 ([http://www.unisdr.org/eng/about\\_isdr/basic\\_docs/GA-resolution/a-res-60-195-eng.pdf](http://www.unisdr.org/eng/about_isdr/basic_docs/GA-resolution/a-res-60-195-eng.pdf), accessed 6 April 2007).
40. *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters*. Geneva, International Strategy for Disaster Reduction, 2005 (<http://www.unisdr.org/wcdr/intergover/official-doc/L-docs/Hyogo-framework-for-action-english.pdf>, accessed 6 April 2007).
41. *Revision of the International Health Regulations*. Resolution WHA58.3. Geneva, World Health Organization, 2005 (<http://www.who.int/csr/ihr/en>, accessed 6 April 2007).
42. *Stern review on the economics of climate change*. London, HM Treasury, 2006 ([http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/stern\\_review\\_report.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm), accessed 6 April 2007).

43. Dasgupta S et al. *The impact of sea level rise on developing countries*. Washington, DC, World Bank, 2007 (World Bank Policy Research Working Paper 4136; [http://www-wds.worldbank.org/external/default/WDSCContentServer/IW3P/IB/2007/02/09/000016406\\_20070209161430/Rendered/PDF/wps4136.pdf](http://www-wds.worldbank.org/external/default/WDSCContentServer/IW3P/IB/2007/02/09/000016406_20070209161430/Rendered/PDF/wps4136.pdf), accessed 6 April 2007).

44. *Climate change 2007: the physical science basis. Summary for policymakers. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Intergovernmental Panel on Climate Change, 2007 (<http://www.ipcc.ch/SPM2feb07.pdf>, accessed 6 April 2007).

45. *Working Group II contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report. Climate change 2007: climate change impacts, adaptation and vulnerability. Summary for policymakers*. Geneva, Intergovernmental Panel on Climate Change, 2007 (<http://www.ipcc.ch/SPM6avr07.pdf>, accessed 6 April 2007).



The WHO Regional  
Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

Member States

Albania  
Andorra  
Armenia  
Austria  
Azerbaijan  
Belarus  
Belgium  
Bosnia and Herzegovina  
Bulgaria  
Croatia  
Cyprus  
Czech Republic  
Denmark  
Estonia  
Finland  
France  
Georgia  
Germany  
Greece  
Hungary  
Iceland  
Ireland  
Israel  
Italy  
Kazakhstan  
Kyrgyzstan  
Latvia  
Lithuania  
Luxembourg  
Malta  
Monaco  
Montenegro  
Netherlands  
Norway  
Poland  
Portugal  
Republic of Moldova  
Romania  
Russian Federation  
San Marino  
Serbia  
Slovakia  
Slovenia  
Spain  
Sweden  
Switzerland  
Tajikistan  
The former Yugoslav  
Republic of Macedonia  
Turkey  
Turkmenistan  
Ukraine  
United Kingdom  
Uzbekistan

The health security of Europe is increasingly threatened by communicable diseases, natural disasters and large-scale accidents, conflicts, complex emergencies and climate change. Recent health crises such as avian influenza and the threat of a human influenza pandemic, the heat-wave of 2003 and armed conflict in south-eastern Europe have brought these threats into focus.

This publication reviews the lessons learned in tackling these threats. Although the health sector takes the lead in health security, health threats are multisectoral so it must also collaborate with and guide the responses of other sectors. As the lead agency of the United Nations Inter-Agency Standing Committee Global Health Cluster, WHO's function is to promote effective partnerships with others, be they governments, international organizations, civil society or the private sector. Together they can help the Member States of the WHO European Region prepare to prevent and mitigate future health security crises.

Targeted at policy-makers, this publication offers guidance on how the international community can apply the lessons learned to future threats, emphasizing the importance of preparing health systems for future challenges.

World Health Organization  
Regional Office for Europe  
Scherfigsvej 8, DK-2100 Copenhagen Ø  
Denmark  
Tel.: +45 39 17 17 17. Fax: +45 39 17 18 18  
E-mail: [postmaster@euro.who.int](mailto:postmaster@euro.who.int)  
Web site: [www.euro.who.int](http://www.euro.who.int)

