



**World Health Organization**

**Mental Health: Evidence and Research  
Department of Mental Health and Substance Abuse**

in collaboration with

**WHO Inter-Cluster Working Group on Preparedness for and response to  
natural occurrence, accidental release or deliberate use of biological and  
chemical agents or radionuclear materials that affect health**

## **MENTAL HEALTH OF POPULATIONS EXPOSED TO BIOLOGICAL AND CHEMICAL WEAPONS <sup>1</sup>**

**Prepublication version  
January 2004**

**Please send any comments on this prepublication version to  
vanommerenm@who.int before 31 March 2004.**

---

<sup>1</sup> This document has been prepared to be read as a stand-alone guide. This document is a supplement to the second edition of the WHO publication *Public Health Response to Biological and Chemical Weapons: WHO Guidance* (in press a), which is accessible at the following Web address:  
<http://www.who.int/csr/deliberatedemics/biochemguide/en/index.html>.

This document has been written by Drs Mark van Ommeren and Shekhar Saxena and includes the main points of (a) Norwood A. *Biological Terrorism: Psychological Consequences and Their Management*, 2002 (unpublished document) and (b) WHO. *Mental Health in Emergencies: Mental and social Aspects of Populations Exposed to Extreme Stressors*. WHO: Geneva, 2003 and is consistent with (c) the 'mental and social aspects of health standard' of the *Humanitarian Charter and Minimum Standards in Disaster Response* (Sphere Project, 2004).

The following colleagues are gratefully acknowledged for advice: Drs Thom Bornemann, Ottorino Cosivi, Cleto DiGiovanni, Baruch Fischhoff, Julian Ford, Srinivasa Murthy, Ann Norwood, James Pennebaker, Michael Phillips, Ben Sheppard, Carlos Sluzki, Robert Ursano, Xiangdong Wang, and Simon Wessely.

For feedback and further information, please contact Dr Mark van Ommeren (vanommerenm@who.int; fax: +41-22-7914160) or Dr Shekhar Saxena, Mental Health: Evidence and Research, Department of Mental Health and Substance Abuse, World Health Organization.



# MENTAL HEALTH OF POPULATIONS EXPOSED TO BIOLOGICAL AND CHEMICAL WEAPONS

## Background

In May 2002, the 55<sup>th</sup> World Health Assembly - through resolution 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* – specifically requested the Director-General of the World Health Organization (WHO):

to provide tools and support for Member States, particularly developing countries, in strengthening their national health systems, notably with regard to emergency preparedness and response plans, including disease surveillance and toxicology, risk communication, and *psychosocial* consequences of emergencies. (italics added)

While attention has been focused on the biomedical role of public health in the rapid identification of a biological or chemical attack and its medical management, much less attention has been directed to address mental health needs. This document provides information for Member States, particularly low-income and middle-income countries, to strengthen preparedness and response plans with regard to the social and mental health consequences of biological and chemical attacks.

Attacks involving biological or chemical weapons may induce significant mental and social effects in a number of ways - even when the agents induce low levels of mortality and physical morbidity. First, as the term 'bioterrorism' suggests, biological (and chemical) attacks are associated with the experience of intense social and psychological distress, especially fear (Box 1). Second, physical exposure to biological and chemical agents may induce organic mental disorders (e.g., organic psychosis, delirium, dementia) (Benedek et al, 2002; DiGiovanni, 1999). Third, exposure to any severe stressor – whether natural or human-made - is a risk factor for a range of long-term social and mental problems (including anxiety and mood disorders as well as non-pathological trauma and grief reactions) (Bromet & Havenaar, 2002). Fourth, fear of biological and chemical attacks may be associated with epidemics of medically unexplained illness (Box 2).

On a more positive note, historical research on group behaviour after exposure to biological or chemical agents has shown that - contrary to common expectations - public panic is uncommon (Glass & Schoch-Spana, 2002; Pastel, 2001; Box 1). Moreover, disasters may leave some communities with increased social coherence. Furthermore, even though exposure to war or disaster is likely extremely distressing to most persons, the vast majority of people can be expected to cope quite well, and some people may even have positive

experiences, such as pride about coping and resilience. Community members often show great altruism and cooperation, and people may experience great satisfaction from helping others.

Mental health considerations must be integrated adequately into public health assessment, preparation and response plans. In certain countries, resistance may exist to having mental health professionals involved in a public health response during an acute crisis. Part of preparing for a public health response is affirming beforehand the essential role of mental health experts throughout the emergency. Principles and strategies described here are primarily for application in resource-poor countries, where the vast majority of the world's population lives. The mental health and well being of health and relief workers also warrant attention, but their needs are not addressed in this document.

In this document we use the term *social intervention* for interventions that primarily aim to have social effects and the term *mental health intervention* for interventions that primarily aim to have mental health effects. It is acknowledged that social interventions have secondary mental health effects and that mental health interventions have secondary social effects as the term psychosocial suggests (WHO, 2003).

Furthermore, we use the terms *acute emergency phase* and *post-emergency phase*. We define the acute emergency phase as the period during which the risk of contamination or infection is substantially elevated. This period is followed by a post-emergency phase when the risk of contamination or infection is once again very low.

### **General principles**

WHO (2003) has proposed eight principles for public mental health activities in emergencies. These principles are also valid for situations involving biological or chemical weapons and are as follows:

1. *Preparation before the emergency.*

In co-operation with citizens, national and local preparation plans should be made and should involve: (a) vulnerability analysis (to identify: potential scenarios, weaknesses in the public mental health system during crisis, needs and capability, and resources needed to respond (WHO, in press a), (b) a co-ordination plan with specification of focal persons responsible within each relevant agency in each relevant administrative region, (c) detailed contingency plans to prepare for an adequate social and mental health response, (d) realistic training of relevant personnel in indicated social and mental health interventions, (e) prepared and pretested risk communication plans (WHO, in press b) and (f) a contact list of relevant national and international public mental health experts who may give appropriate advice

when needed. Overall, preparation plans should indicate priorities for the allocation of limited resources.

2. *Assessment.*

Interventions in both the acute and post-emergency phase should be preceded by careful planning and rapid assessment of the local context (e.g., setting, culture, history and nature of problems, local perceptions of distress and illness, ways of coping, community resources, etc). Of note, population-based assessments of the prevalence of mental disorders is difficult, resource-intensive and typically unhelpful in developing disaster response plans. To plan for interventions in the post-emergency phase, it is recommended to mainly assess (a) available mental health and social services and resources (including assessment of the number, functions and location of those human resources who can deliver relevant interventions) (input indicators) and (b) daily functioning of individuals and communities (outcome indicator). When assessment uncovers a broad range of needs that will unlikely be met, assessment reports should specify urgency of needs, local resources and potential external resources.

3. *Collaboration and co-ordination.*

Government authorities need to be supported by an appropriate, knowledgeable public mental health adviser (or team of advisers), who will ensure that mental health aspects of the incident are given appropriate consideration and that mental health organizations collaborate with each other and with the general health and social services sector. Interventions should involve consultation and collaboration with governmental and nongovernmental organizations (NGOs) in the area. A multitude of agencies operating independently without co-ordination leads to waste of valuable resources. The performance of political leadership is critical to maintaining effective relationships between organizations.

4. *Integration into primary health care.*

Led by the health sector, mental health interventions should be carried out within general primary health care (PHC) and could in addition be organized in other pre-existing structures in the community, such as schools, community centers, youth and senior centers, and places of worship. Care by families and active use of resources within the community should be maximised. Clinical on-the-job training and thorough supervision and support of PHC-workers by mental health specialists are essential components for successful integration of mental health care into PHC.

5. *Access to services for all.*

Setting up separate, vertical mental health services for special populations is discouraged. As far as possible, access to mental health services should be for the whole community and not be restricted to subpopulations identified on the basis of exposure to biological or chemical agents. . Services delivered

within a single integrated system can – when necessary - be tailored to address the needs of different subpopulations (such as support groups specifically for bereaved families in the event of deaths, or providing outreach services and awareness programmes to vulnerable communities or minority groups that are reluctant or not able to attend clinic services).

6. *Training and supervision.*

Training and supervision activities should be by mental health specialists—or under their guidance—for a substantial amount of time to ensure lasting effects of training and responsible care. However, during the acute emergency phase, non-professional caregivers may be rapidly trained to provide psychological first aid, a relatively, uncomplicated intervention. However, during the post-emergency phase, short one-week or two-week skills training without thorough follow-up supervision is likely too short to adequately train basic mental health treatment skills.

7. *Long-term perspective.*

In the aftermath of a population's exposure to severe stressors, it is preferable to focus on medium- and long-term development of community-based and primary mental health care services and social interventions. Unfortunately, impetus and funding for mental health programmes are highest during or immediate after acute emergencies, but mental health effects (including medically unexplained somatic symptoms (Clauw et al, 2002)) tend to last much longer than the duration of the acute crisis.

8. *Monitoring indicators.*

Activities should be monitored and evaluated through indicators that need to be determined—if possible—*before* starting the activity. Indicators should focus on inputs (available resources, including pre-existing services), processes (aspects of programme implementation and utilisation), and outcomes (e.g., functioning of beneficiaries).

### **Acute emergency phase**

During the acute emergency phase after an attack involving biological or chemical agents, the public health system will focus much of its resources on risk management (WHO, in press a): (a) rapid identification of nature, hazards and characteristics of the specific biological or chemical agent, (b) hazard prevention and control procedures (e.g. quarantine, travel restrictions, hot-zone scene control, evacuation), (c) protecting responders and health-care workers from physical exposure, (d) case triage (i.e., initial reception, assessment, and prioritization of casualties), and (e) early physical health care to reduce excess mortality and injury. These general public health interventions are essential and should be complemented with a range of social and mental health interventions. Social interventions are typically not in the domain of expertise of (mental) health professionals. Nevertheless, social interventions address important factors

influencing mental health. Therefore, (mental) health professionals should advocate and work in partnership with colleagues from other disciplines (e.g., communication, education, community development, disaster coordination) to ensure that relevant social interventions are fully implemented.

### **Early social interventions**

- Establish and disseminate an ongoing reliable flow of credible information about (a) the nature of the risk and the exact recommended prevention methods of reducing risk, (b) the availability of medical evaluation and treatment and how and where to obtain them (c) information on any other relief efforts, including what each aid organization is doing and where they are located. Information should be disseminated according to principles of risk communication: e.g., information should be timely (to avoid damaging rumours and magical thinking about microbes and viruses), uncomplicated (understandable to local 12-year olds) and empathic (showing understanding of the situation of survivors). Vague reassuring messages or messages asking the public to not panic are likely unhelpful (Durodié & Wessely, 2002). For specific help with risk communication and working with the media, see *Handbook on Risk and Crisis Communication: Seven Steps for Public Health Officials Communicating About Disease Outbreaks Caused by Chemical, Biological, or Radiological Agents* (WHO, in press b).
- Brief field officers in the areas of health and social welfare regarding issues of fear, grief, disorientation and need for active participation.
- Set up a system of rapid identification of the location of relatives and friends who may be scattered in various locations (due to flight, quarantine, or evacuation).
- In case of quarantine or evacuation, enhance access to communication with absent relatives and friends.
- If appropriate and feasible, set-up phone support systems to reduce isolation of people who are isolating themselves to reduce the chance of infection.
- In case of evacuation after chemical contamination of an area, organize shelter with the aim to keep members of families and communities together. Consult the community regarding decisions on where to locate religious places, schools and water supply if camps are to be building. Provide religious, recreational and cultural space in the design of camps.
- If at all realistic, discourage unceremonious disposal of corpses to control infectious diseases. Contrary to myth, dead bodies carry no or extremely limited risk for most infectious diseases. The bereaved need to have the possibility to conduct ceremonious funerals and—assuming it is not mutilated or decomposed—to see the body to say goodbye if this is culturally appropriate. In any case, death certificates need to be organized to avoid unnecessary financial and legal consequences for relatives.
- Assuming the activity is safe (i.e., does not violate contamination/infection prevention and containment procedures), encourage the re-establishment of

normal cultural and religious events (including grieving rituals in collaboration with spiritual and religious practitioners).

- Assuming the activity is safe, encourage activities that facilitate the inclusion of the bereaved, orphans, widows, widowers, or those without their families into social networks.
- Assuming the activity is safe, encourage the organization of normal recreational activities for children and encourage starting schooling for children, even partially.
- Assuming the activity is safe, involve adults and adolescents in concrete, purposeful, common interest activities (e.g., assist in caring for the ill especially if people are cared for at home, constructing/organizing shelter).
- Widely disseminate uncomplicated, empathic information on normal stress reactions and culturally appropriate relaxation techniques to the community at large. Brief non-sensationalistic press releases, radio programmes, posters and leaflets may be valuable to educate the public. Focus of public education should primarily be on normal reactions, because widespread suggestion of physical and mental disease during this phase (and approximately the first four weeks after) may potentially lead to unintentional harm. The information should emphasise an expectation of hope, resilience and natural recovery.

### **Early mental health interventions**

- As soon as sufficient knowledge is available on the characteristics of the specific agent used in the attack, organise rapid information to health care personnel allowing for differentiation between psychogenic symptoms and relevant organic brain syndromes and other somatic disease states caused by the specific agent. Information for health care personnel should also include knowledge of mental effects of relevant antidotes.
- Train health workers who conduct triage (process of allocating treatment to patients according to priorities designed to maximise the number of disaster survivors) in the basics of assessing mental and neurological disorder to minimise misdiagnosis and inappropriate treatment.
- Manage urgent psychiatric and neurological complaints (e.g., delirium, psychoses, severe depression) within emergency or PHC care facilities. Ensure availability of essential psychotropic medications at all levels of health care. Some persons with urgent psychiatric complaints will have pre-existing psychiatric disorder and sudden discontinuation of medication needs to be avoided. Develop contingency plans on how to manage psychotic, difficult-to-control, contagious patients (e.g., reserve a separate hospital rooms for such patients). Protect institutionalised patients in psychiatric institutions from physical exposure to biological and chemical agents by screening staff and new admissions.
- As far as possible, manage acute distress without medication following the principles of 'psychological first aid' (i.e., listen, convey compassion, assess needs, ensure basic physical needs are met, do not force talking, provide or mobilise company from preferably family or significant others, encourage but

do not force social support, protect from further harm) (NIMH, 2002). 'Psychological first aid' is basic, natural social support, and can be taught quickly to non-expert, volunteer carers as well as to professionals. This psychological first aid should be made available in the community at general health care facilities where exposed people seek help. Psychological first aid should also be made available to grieving relatives at emergency care facilities. An essential component of psychological first aid is protection, which is important because feelings of terror may lead people to behave irrationally in ways that put themselves and others in jeopardy. Important to ongoing delivery of psychological first aid is supervision.

- Manage medically unexplained symptoms immediately to prevent potential chronicity of such symptoms. PHC-workers should collaborate with medical examiners to give negative test results. The following steps would be involved: to inform client of good news that there is no serious disease or injury; to not say "nothing is wrong" but to acknowledge presence of symptom and suffering; to avoid medically unnecessary further tests; to examine the patient's reaction to the good news; to elicit the patient's explanation for the experience of symptoms; to educate the patient if he or she has relevant incorrect understanding of the body; to explain in simple words how bodily sensations (stomach ache, muscle tension) can be related to experiencing anxiety; to avoid arguing with the concerned individual; to avoid using psychiatric terminology to explain the symptoms; and to avoid reinforcing the view that something is wrong with the body through unnecessary pharmacological or placebo treatment.
- Health workers should avoid mass prescription of benzodiazepines to treat acute anxiety. Over-prescription is common in emergencies and is associated with potential dependence. Because of possible negative effects, it is not advised to organize forms of single-session psychological debriefing if these are organized in such way that they push persons to share their personal experiences beyond what they would naturally share (van Emerink et al, 2002). Creating *natural* opportunities for individuals to share their concerns and support each other may be helpful.
- Assuming the availability of volunteer/non-volunteer community workers, organize outreach and non-intrusive emotional support in the community by providing, when necessary, aforementioned 'psychological first aid' and referral.
- If the acute phase is protracted, start training and supervising PHC workers and community workers in mental health care (for a description of these activities, see further on).

### **Post-Emergency Phase**

As described elsewhere (WHO, in press a), after the risk of infection or contamination has been contained the public health system should focus on implementing ongoing surveillance and risk assessment procedures as well as ongoing long-term care of inflicted injuries and disease. Surveillance should

include mental symptoms (Hyams et al, 2002) and social problems. Furthermore, a range of standard mental health and social interventions described below are recommended for consideration in the aftermath of emergencies (WHO, 2003). Many of these interventions are likely also relevant after community exposure to biological or chemical weapons. In addition to the interventions mentioned below, public education campaigns may need to be organized to reduce social stigma and related social isolation of ex-patients and health workers who may be shunned because of undue public fear of contagion or contamination.

### **General social interventions in the post-emergency phase**

- Continue relevant social interventions outlined above in the section on social interventions during the acute phase.
- Organize outreach and relevant psycho-education. Educate the public on availability or choices of mental health care. Commencing no earlier than four weeks after the acute phase, carefully educate the public on the difference between psychopathology and normal psychological distress, avoiding suggestions of wide-scale presence of psychopathology and avoiding jargon and idioms that carry stigma. Encourage application of pre-existing positive ways of coping. The information should emphasise positive expectations of natural recovery. At the same time, information should increase people's willingness to seek help when they are experiencing severe symptoms.
- Over time, if emergency-induced poverty is an ongoing issue, encourage economic development initiatives. Examples of such initiatives are (a) micro-credit schemes or (b) income-generating activities when markets will likely provide a sustainable source of income.

### **General mental health interventions in the post-emergency phase**

- Train and supervise PHC workers in basic mental health knowledge and skills (e.g., assessment, provision of appropriate psychotropic medication, 'psychological first aid', supportive counselling, working with families, suicide prevention, management of medically unexplained somatic complaints, management of organic mental disorders substance use issues and referral).
- Ensure continuation of medication of psychiatric patients who may not have had access to medication during the acute phase of the emergency.
- Train and supervise community workers (i.e., support workers, counsellors) to assist PHC workers with heavy caseloads. Community workers may be volunteers, paraprofessionals, or professionals, depending on the context. Community workers need to be thoroughly trained and supervised in a number of core skills: assessment of individuals', families' and groups' perceptions of problems, 'psychological first aid', providing emotional support, grief counselling, stress management, 'problem-solving counselling', mobilising family and community resources and referral.
- Educate other humanitarian aid workers as well as community leaders (e.g., village heads, teachers, etc) in core psychological care skills (e.g.,

'psychological first aid', emotional support, providing information, answering frequently asked questions, encouraging practical ways of coping, recognition of core mental health problems) to raise awareness and community support and to refer persons to PHC when necessary.

- Facilitate creation of community-based, self-help support groups. The focus of such self-help groups is typically problem sharing, brainstorming for solutions or more effective ways of coping (including traditional ways), generation of mutual emotional support and sometimes generation of community-level initiatives.
- Collaborate with traditional healers if feasible. A working alliance between traditional and allopathic practitioners may be possible in certain contexts.
- Work towards proper and relevant national mental health legislation, policy, and plans. The long-term goal is a functional public health system with mental health as a core element.

### Conclusion

An essential public health approach is advocated to address the mental and social health consequences of exposure to biological or chemical weapons. Many of the social and mental health sequelae are similar to those in other emergency situations. Nonetheless, acute fear, organic mental problems, psychological responses to somatic illnesses and injuries, and long-term development of medically unexplained symptoms are particularly likely in emergencies involving biological and chemical weapons. Furthermore, medically unexplained epidemic illness may be seen in environments where there is a fear of biological or chemical weapon attacks. Many of the proposed social and mental health interventions do not require a high level of specialized skill to be implemented. Contingency planning is essential to prepare communities and health professionals to respond adequately.

### References

- Alexander DA, Klein S. Biochemical terrorism: too awful to contemplate, too serious to ignore: subjective literature review. *Br J Psychiatry*. 2003;183:491-497.
- Bartholomew RE, Wessely S. Protean nature of mass sociogenic illness: from possessed nuns to chemical and biological terrorism fears. *Br J Psychiatry*. 2002;180:300-6.
- Benedek DM, Holloway HC, Becker SM. Emergency mental health management in bioterrorism events. *Emerg Med Clin North Am*. 2002;20:393-407.
- Bromet EJ, Havenaar JM. Mental health consequences of disasters. In N Sartorius, W Gaebel, JJ Lopez-Ibor, M Maj (eds.). *Psychiatry in Society*. Wiley, 2002:241-262.

Clauw DJ, Engel CC Jr, Aronowitz R, Jones E, Kipen HM, Kroenke K, Ratzan S, Sharpe M, Wessely S. Unexplained symptoms after terrorism and war: an expert consensus statement. *J Occup Environ Med.* 2003;45:1040-8.

DiGiovanni C Jr. Domestic terrorism with chemical or biological agents: psychiatric aspects. *Am J Psychiatry.* 1999 Oct;156(10):1500-5.

Durodie B, Wessely S. Resilience or panic? The public and terrorist attack. *Lancet.* 2002;360:1901-2.

Fischhoff B, Wessely S. Managing patients with inexplicable health problems. *BMJ.* 2003;26:595-7.

Glass TA, Schoch-Spana M. Bioterrorism and the people: how to vaccinate a city against panic. *Clin Infect Dis.* 2002;34:217-23.

Holloway HC, Norwood AE, Fullerton CS, Engel CC Jr, Ursano RJ. The threat of biological weapons. Prophylaxis and mitigation of psychological and social consequences. *JAMA.* 1997;278:425-7.

Hyams KC, Murphy FM, Wessely S. Responding to chemical, biological, or nuclear terrorism: the indirect and long-term health effects may present the greatest challenge. *J Health Polit Policy Law.* 2002 27:273-91.

National Institute of Mental Health (2002). *Mental Health and Mass Violence: Evidence-based Early Psychological Interventions for Victims/Survivors of Mass Violence. A Workshop to Reach Consensus on Best Practices.* (NIH Publication No. 02-5138). US Government Printing Office. Washington. DC.

<http://www.nimh.nih.gov/research/massviolence.pdf>

Pastel RH. Collective behaviors: mass panic and outbreaks of multiple unexplained symptoms. *Mil Med.* 2001;166(12 Suppl):44-6.

Sluzki CE. Psychosocial scenarios following a terrorist attack (unpublished manuscript), 2003.

Sphere Project. *Humanitarian Charter and Minimum Standards in Disaster Response* (2004 revised edition). Geneva: Sphere Project; 2004.

<http://www.sphereproject.org/handbook/index.htm>

Ursano RJ, Fullerton CS, Norwood AE. *Terrorism and Disaster: Individual and Community Mental Health Interventions.* Cambridge University Press, Cambridge UK, 2003.

van Emmerik AA, Kamphuis JH, Hulsbosch AM, Emmelkamp PM. Single session debriefing after psychological trauma: a meta-analysis. *Lancet.* 2002;360(9335):766-71.

Wessely S. Responding to mass psychogenic illness. *N Engl J Med.* 2000;342:129-30.

World Health Organization (WHO). *Public Health Response to Biological and Chemical Weapons: WHO Guidance* (2<sup>nd</sup> edition). WHO: Geneva, in press a.

<http://www.who.int/csr/delibepidemics/biochemguide/en/index.html>

World Health Organization (WHO). *Handbook on Risk and Crisis Communication: Seven Steps for Public Health Officials Communicating About Disease Outbreaks Caused by Chemical, Biological, or Radiological Agents.* Geneva, in press b.

World Health Organization (WHO). *Mental Health in Emergencies: Mental and social Aspects of Populations Exposed to Extreme Stressors*. WHO: Geneva, 2003. [http://www.who.int/mental\\_health/media/en/640.pdf](http://www.who.int/mental_health/media/en/640.pdf)

### **Box 1. The experience of fear in biological and chemical warfare**

Exposure to disasters or warfare is frightening to most persons. However, fear is even more likely when biological and chemical agents are involved. First, the most intimidating and terrifying component of biological and chemical warfare is that invisible agents are involved. In an explosion, people know immediately whether or not they have been injured. However, during biological warfare, people generally cannot rely on their own senses to determine physical exposure.

Second, fear and helplessness is increased when the agent can be spread by person-to-person contact creating a situation in which health providers, family, friends, and neighbours may be sources of illness. As a result, safe health care and social support may not be readily available at a time when they are needed most. The use of an agent that is contagious induces distressing problems, such as social stigma, isolation, and quarantine, including the separation of children from their parents, and fear of infecting beloved ones. A chemically contaminated area may lead to the distressing experience of evacuation.

Third, the uncertainty of the extent of dangerousness of biological and chemical weapons enhances fear. Because many agents are rarely encountered, there may be a lack of clarity among professionals about who is at risk of infection, how to reliably detect cases (generating myriad of 'false positive' assessments), what the health consequences might be, and how to manage the crisis. The expression of conflicting expert opinions and changing public health recommendations are likely to enhance public anxiety.

Fourth, persons may misattribute signs of autonomic arousal as evidence of infection or contamination. Sign and symptoms of autonomic arousal are normal among frightened persons and involve various systems and organs and include muscle tension, palpitations, hyperventilation, vomiting, sweating, tremors, and a sense of foreboding. Thus frightened, physically healthy individuals experiencing symptoms of autonomic arousal may mistakenly attribute the physical sensations to infection or contamination and may overwhelm health services.

Fifth, persons wearing protective clothing, masks, and respirators may experience great distress due to: heat and breathing stress, claustrophobic effects, potential impairment in verbal communication, and reduction in physical functioning to perform tasks perceived to be necessary for survival.

Despite high public fear and uncertainty, historical accounts of chemical and biological attacks suggest that public panic is rare. Public panic occurs only when there are inadequate exits in confined places (e.g., in stadiums) or perceptions of limited access to essential health services, but such situations are uncommon.

*References:* Alexander & Klein, 2003; Benedek et al, 2002; Durodié & Wessely, 2002; Glass & Schoch-Spana, 2002; Holloway et al, 1997; Pastel, 2001; Sluzki, in press, Ursano et al, 2003; WHO, in press a.

## **Box 2. Management of medically unexplained epidemic illness**

Fear of exposure to biological or chemical agents may lead to episodes of medically unexplained epidemic illness (also known as mass sociogenic illness, mass psychogenic illness, or mass hysteria), involving the rapid spread of medically unexplained signs and symptoms, which are misinterpreted by affected persons as signs of serious physical illness. Eight common characteristics of this phenomenon are: symptoms with no evident organic basis; symptoms that are mostly transient and benign; rapid onset and recovery of symptoms; occurrence in a cohesive group, symptoms spread via rumour, media, or witnessing ill persons; the index case is a relatively higher-status person (e.g., an older student); over time younger students become affected (if the epidemic is school-based); and females are more likely to have symptoms. Medically unexplained epidemics have occurred throughout time and tend to reflect local belief. Modern epidemics mostly involve physical symptoms of acute anxiety and fear of either contaminated food or a toxic environment. Societies that experience a threat of biological or chemical weapons are thus at particular risk of medically unexplained epidemics.

It is challenging to manage these episodes to the satisfaction of the affected population. These episodes are best managed using a coordinated public health effort involving different sectors (e.g., local authorities, public health, clinical specialities, environmental health, mass communication). The following steps are suggested. First, if the episode occurs in a specific site (e.g., a school or job site), close the site until negative results of contamination or infection are established. Second, investigate the aforementioned eight common characteristics to further ascertain whether the episode represents a typical epidemic of medically unexplained illness.

Third, communicate the results of physical tests and examinations carefully. It may be preferable to avoid suggesting that 'there is nothing wrong' or that the episode is purely psychogenic or sociogenic, because this invalidates people's experience, and one way for people to prove that something is wrong is to remain ill. If the investigators are certain that the symptoms have no organic base, it is likely best to: (a) emphasise the good news that no toxic contamination, infection, or physical disease has been identified, (b) validate people's experience and suffering by affirming with empathy that people do experience genuine symptoms, and (c) emphasise that episodes of benign, medically unexplained symptoms are common throughout the world, that these symptoms are non-fatal, and that most people tend to improve rapidly and continue to live satisfying and productive lives.

Fourth, if a specific stress-related stimulus can be identified (e.g., irresponsible media reporting or an odour in a building), intervene to reduce the impact of the stress-related stimulus. Fifth, carefully consider the advantages and disadvantages of doing numerous, irrelevant tests and examinations. Such tests may be requested by the public but are likely to reinforce the idea that hazardous chemical or biological agents are present.

*References:* Bartholomew & Wessely, 2002; Wessely, 2000.