The Psychosocial Dimensions of Biodefense Preparedness and Response

A Call for Strategic Systems

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Executive Summary

This report is a call for a federally supported, public/private research and development effort to design, build, test, and evaluate state-of-the-art, computer-based systems that integrate planning assumptions about the psychosocial dimensions of large-scale public health emergencies to enhance public health preparedness and response. Public health officials have become increasingly aware of the urgency to take psychosocial and behavioral factors into account in preparedness planning. There have been at least four times the numbers of people with psychiatric as compared to medical sequelae from mysterious or frightening public health emergency events. Moreover, under conditions in which people perceive themselves to be at high risk even when they are outside of the zone of risk, the number of people who fear that they have been exposed may be orders of magnitude greater than those actually at risk. This occurred during the mail-related anthrax attacks of 2001 in which there were only 22 cases of anthrax (including four deaths) yet 35,000 people received medication to protect themselves and it is thought that well over hundred thousand may have perceived themselves to be at high risk.

Our current health care delivery system would be severely challenged if faced with large numbers of people having multiple stress-induced somatic and psychiatric complaints that mimic or confound the medical sequelae arising from direct toxic or infectious agent exposure. Our nation's health care system will remain inadequately prepared to effectively and efficiently manage and treat large numbers of patients if we fail to address psychosocial dimensions in our systematic planning efforts. Without proper attention to the psychosocial aspects of large-scale terrorist attacks or infectious disease outbreaks, our lack of preparedness could quickly result in demands that overwhelm local health care infrastructure, and trigger rampant mistrust in authorities and significant disruptions of social order – potentially having long-term damage to our economy, culture, and the long-term health of American citizens.

INTRODUCTION

Questions arose about our capacity to respond to the psychosocial dimensions of terrorist events and large-scale public health emergencies in the aftermath of September 11, 2001, the subsequent mail-related anthrax bioterrorist attacks, the serial sniper incidents in the metropolitan area around Washington DC, and the emergence of the global threat of severe acute respiratory syndrome (SARS). Specifically, questions arose about the adequacy of our health care infrastructure to respond to surges in demand for health and risk information and medical evaluation in response to the use of weapons of mass destruction or emerging infectious epidemics in the U.S. Little attention has been focused on the potential for large numbers of citizens to respond to these events by perceiving themselves to be exposed and thus placed at high risk of bad health outcomes in the future. These scenarios may also generate an overwhelming number of psychiatric casualties, people who present with unexplained symptoms and impaired function that mimics conditions associated with the attacks or the epidemic spread of disease. The "surge" created under such scenarios threatens to inundate emergency triage and primary

care systems. Failure to manage a surge effectively will render healthcare systems ineffective to care for those individuals who require medical treatment, including specialized infection control strategies, which, in turn, may create unnecessary exposure to pathogens, chemical hazards, or exacerbate secondary mass psychosocial reactions, and further delay necessary diagnosis and treatment.

This commissioned report is an initial attempt to explore the state of scientific knowledge about unexplained medical symptoms, amplified health concerns, and mental disorders that may occur following chemical, biological, and radiological terrorist attacks. In addition, the report will summarize (1) the scientific knowledge necessary to make critical triage assumptions; (2) identify important gaps in the scientific knowledge base; (3) recommendations on how to proceed to resolve such gaps; and (4) propose a psychiatric triage model. The ultimate aim is to develop and pilot test evidence-based, algorithmic protocols for accurate and efficient identification, triage, and management of health risks and psychiatric casualties.

The report is unavoidably limited by the current level of scientific uncertainty about the effectiveness of any single triage approach to manage a diverse variety of potential threats from terrorist threats and disease outbreaks. Therefore, the construction of optimal approaches will be based upon thoughtful consideration and integration of the best scientific evidence, the best attainable critical incident modeling, and reflection of crucial lessons derived from analysis of past exercises and relevant experiences. Once systems are being field-tested, they can begin a process of rapid refinement, including iterative improvement during and after simulated events and natural disease outbreaks (e.g., influenza, SARS).

METHODS

This initiative was inspired in part by 1) the U.S. International Electrical and Electronics Engineers (IEEE) Society's bioterrorism working group; 2) Research in risk communication that contributed to the formation of the National Disaster Risk Communication Initiative; 3) the Institute of Medicine's Committee (chaired by Lewis Goldfrank) report, *Responding to the Psychological Consequences of Terrorism,* including a workshop panel moderated by Robert Ursano in October 2002 (during which one of the authors, DBR, presented); and, 4) the American Psychosomatic Society (APS) task force on the biopsychosocial impact of terrorism and disasters. The multidisciplinary APS task force was asked to review the intersection of psychosomatic medicine, behavioral sciences, and public health preparedness. Building on the work of others (refs), the APS task force set out to review current and proposed strategies and to develop recommendations to improve public health preparedness in response to terrorism and outbreaks, including the exploration of innovative, technology-based solutions.

Steven E. Locke, President of the American Psychosomatic Society, and Michael D. McDonald, President of Global Health Initiatives, Inc., created the *Psychosocial Dimensions of Biodefense Preparedness and Response Initiative* (the "Initiative") and chaired two expert meetings during the spring and fall of 2003. Dori B. Reissman, Senior

Advisor for Disaster, Terrorism, and Mental Health at the Centers for Disease Control and Prevention, provided federal steering, meeting facilitation, project guidance and oversight. The meetings were hosted by Georgetown Medical Center, and organized by Veritas Health Solutions (Wayland, MA) and Global Health Initiatives, Inc. (Potomac, MD), with support from the American Psychosomatic Society (APS), Centers for Disease Control and Prevention (CDC), the Substance Abuse and Mental Health Services Administration (SAMHSA), and the National Institute of Mental Health (NIMH). (See Appendix A.)

During the meeting at Georgetown in June, 2003, four working groups or panels were created: 1) Scientific basis for assessment of multiple unexplained physical symptoms (Charles Engel and Arthur Barsky, co-chairs); 2) Risk communication (Glen Nowak, chair); 3) Management of contact distance (Stephen Prior, chair); and 4) Technology solutions (Victor Weedn, chair). Each of these panels has produced a written report, one of which is due to be published in March, and others are being readied for submission. Once the scientific underpinnings were elucidated, a fifth panel, "First-line medical triage" (Kurt Kroenke, chair) was created in November, with a report due to be completed in February, 2004.

BACKGROUND AND SIGNIFICANCE

The Initiative is concerned primarily with individual perceptions of high personal risk that may impact individual health-seeking behaviors, mass psychosocial behavior, and psychiatric sequelae in the immediate aftermath of an attack or other disaster. For example, many individuals directly exposed to a traumatic event may develop acute, but transient forms of psychosocial distress (refs). The graphic representation of a disaster or dangerous health event (e.g., bioterrorist attack or infectious disease outbreak) in the media can often amplify psychosocial distress over a very large population. A significant minority of those directly (i.e., to the hazard) or indirectly (i.e., psychologically, through the broadcast and print media) exposed may experience persistent psychiatric or psychosomatic problems as a result of real or perceived trauma and loss (refs). Of particular importance is a phenomenon called "multiple unexplained physical symptoms" (MUPS) that has been noted after disasters, criminal assault, and warfare. In addition to MUPS, there may also be emergent and maladaptive reactions involving groups of people (i.e., collective psychosocial reactions) in the aftermath of terrorism and large-scale public health emergency events, such as mass sociogenic illness (sometimes also called mass psychogenic illness or mass hysteria). Such illness is characterized by the acute and rapid spread of medically unexplained physical symptoms including dizziness, shortness of breath, nausea, and/or palpitations. These symptoms occur throughout a group of individuals, often through direct line of sight, in the absence of any substantiated toxic or microbiological exposure.

Even in the absence of disaster, terrorist attack, or other large-scale public health event, a wide range of medically unexplained physical and psychiatric symptoms are prevalent in both healthy and medically ill populations. The symptoms are associated with psychosocial stress, health-related anxiety and depression, all of which increase

healthcare utilization (refs). Currently, the healthcare triage process places a premium upon identifying life-threatening physical injuries and illnesses. Emotional disturbances, mental disorders, or psychosocial impairments are often not adequately incorporated into triage procedures.

Terrorists seek to create widespread fear, uncertainty, and loss of faith in institutional response capacity. Generally, the terrorist's primary goal is the social disruption that occurs due to psychological terror, not the damage done to the relatively few persons who are directly injured or killed by terrorist activities. Previous terrorist attacks in Tokyo, Israel, and New York City produced psychiatric casualties that vastly outnumbered medical casualties, as evidenced by the large numbers of individuals with medically unexplained symptoms who sought acute care treatment (refs). The societal magnitude of concerns is quite extensive when compared to the relatively small numbers of actual medical or surgical casualties resulting from attacks.

In addition, insidious and indirect psychiatric or behavioral health effects may occur long after the acute phase of a terrorist attack is over. Terrorism can alter our way of life and lead to economic disruption. For example, bioterrorist induced infectious disease outbreaks (e.g., smallpox), or even naturally occurring outbreaks (e.g., SARS), can lead to changes in social behavior with disruptive economic consequences: worried people may avoid restaurants or shopping malls or reduce their travel. This, in fact, has led to job loss and increased unemployment. This is of particular concern because job loss and unemployment are known to be associated with higher rates of substance abuse, domestic violence, major depression, suicide and measurable declines in physical functioning (refs). Clearly, there is a need to consider the unrecognized magnitude of psychosocial sequelae that coexist with medical mortality and morbidity.

Most psychosocial morbidity or co-morbidity goes unrecognized in primary care settings, making it likely that psychiatric co-morbidity will be under-diagnosed and under-treated after traumatic events like terrorist attacks, leading to poor life adjustment. Unless triage personnel are trained to utilize psychiatric screening instruments to identify existing mental disorders or at-risk individuals (overwhelming stressors), misdiagnosis and mismanagement may ensue. Biological attacks with infectious agents (e.g., smallpox) and community spread of a new infectious agents (e.g., SARS) are particularly dangerous because of the inherent uncertainties about self-protective measures and behaviors that could increase the spread of disease. Flocking to hospitals and health care settings for reassurance can be a grave mistake if unexposed persons come in contact with infectious patients, thereby enlarging the magnitude of the disease epidemic and confounding the epidemiologic investigation.

Unfortunately, important gaps in relevant scientific knowledge limit the ability to create a single triage strategy. These factors include uncertainty about the base rates of conditions associated with terrorist attacks, questionable applicability of existing screening instruments, and limited knowledge about which psychiatric triage approaches are most effective. However, implementing new, even if imperfect, systems is better than hoping that the current system doesn't become taxed beyond its capability to deliver

quality health care. We need to deliver information and learning tools to enable the average person to assess their own risk of exposure, illness, and risks and benefits of interventional options. These tools could be validated by exploiting naturally occurring disease epidemics (e.g., influenza, SARS) and scheduled biodefense exercise simulations by using historical data from prior events to test and iteratively improve the system, before we have to rely on it during a large-scale terrorist event or disease outbreak.

In recognizing that in the USA, at least to date, the major threat of terrorism involves psychological, social, and economic disruption, we need to develop systems to do the following: 1) help clarify risks and choices among those fearing exposure; 2) to appropriately refer those already manifesting psychosocial problems for mental health care; and 3) to appropriately refer those with hazardous exposures for medical care. Currently, no established validated tools exist to manage this challenge. By harnessing the power of information technology, self-assessment tools, scientifically-informed risk communication and health education, and computer-assisted triage, we should be able to address the needs of the key target groups within a relatively short period of time. Proposed systems will need to screen, prioritize, and manage the surge in health care needs, and provide appropriate risk communication and resource allocation in the event of terrorist attacks or infectious disease outbreaks. By virtue of the expert panel process outlined within this report, we propose a preliminary five-stage triage model using automated, interactive crisis health risk self-assessment tools for consideration. The model includes pre-clinical telescreening to determine the likelihood of toxic exposure, rapid physical assessment, and brief psychiatric screening to promote appropriate referrals to integrated systems of care for medical problems and psychiatric co-morbidity.

Inherent in any triage model is the recognition of the central role that effective risk communication (ref Baruch Fishhoff, Vince Covello or Peter Sandman) and health education must play to guide and manage health care resource demands. There must be detailed consideration of appropriate and timely systems of response, strategies to mitigate the stigma associated with seeking appropriate medical attention (i.e., to prevent reluctant infected patients from uncontrolled disease transmission), and an open acknowledgement that any triage system will be vulnerable to unanticipated events. The CDC has emphasized the importance of effective risk communication that is captured by their credo, “Be first, be right, be credible.”

Managing contact distance is another essential element of effective and comprehensive triage. This term is one of an emerging lexicon that considers the full range of interventions associated with management of disease outbreaks, including quarantine and isolation necessary to prevent person-to-person disease transmission. The Initiative considered specific implementation strategies that also account for the anticipated obstacles to promote appropriate public adherence, without resorting to onerous enforcement methods.

CONCLUSION

There is an immediate need to develop and test systems of response that can maximize the likelihood that following a WMD event or outbreak, those in greatest need of urgent medical care will have access to it. The Initiative proposes that by harnessing the power of information technology, evidence-based self-assessment tools, scientifically-informed risk communication, and computer-assisted triage, the needs of at-risk or exposed populations could be addressed effectively and efficiently. Proposed systems will screen, prioritize and manage the patient surge, and provide appropriate risk communication and resource allocation in the event of terrorist attacks or infectious disease outbreaks.

This report is an urgent call for a federally supported public/private research and development effort to design, build, and test state-of-the-art systems for public health preparedness and response. Failure to adequately plan for the psychosocial dimensions of biodefense leaves hospitals and medical systems extremely vulnerable to the threat of being catastrophically overwhelmed in the face of a large-scale emergency, as well as ill prepared to quickly and effectively meet the acute care needs of patients as well as a public under threat that perceives itself at high risk even when the actual risk may be quite low.

Strategic Recommendations

- Augment existing emergency response plans and strategies to reduce the risk that large numbers of psychiatric casualties, including acute stress reactions, with somatic presentations could exceed ambulatory surge capacity.

- Fund research to study the effectiveness and acceptability of technology-assisted tools for personal risk assessment and decision support when used to determine the urgency of need for medical evaluation and emergency care, including diverse and special needs populations.

- Develop, deploy and evaluate a computer-assisted, tailored personal risk communication system under central control, coordinated by the appropriate public health, emergency management, and security agencies working in collaboration.

- Develop a multi-level model for community response
    - Primary: home-based, computer-assisted self-assessment and tailored risk communication.
    - Secondary: community screening center staffed by trained, non-medical volunteers and professional first responders supported by portable decision support systems.
    - Tertiary: clinical setting such as a doctor's office, clinic, or ED.

- Recruit and train volunteers to serve in local community screening centers to assist in the emergency assessment, triage, and acute management of those with acute stress reactions, acute stress disorder, or mass psychogenic illness.

- Include planning for large numbers of non-exposed individuals perceiving themselves to be at high risk, mass psychogenic illness and/or somatic presentations of anxiety in simulation models and training to prepare for future attacks.

- Use interactive and mass media channels to educate the public about risks and somatic manifestations of acute and chronic stress to better prepare the public for the use of self-assessment tools and geocoded, tailored risk communication messages in a crisis.

- A national public health information infrastructure integrated within an interoperable homeland security infrastructure should interface at the state and local levels with home-based personal assessment systems as well as with inexpensive portable systems in community screening centers in the event of terrorism or outbreaks.

- Establish community resilience and coherence assessments, collaboration tools, organizational processes, and benchmarks to improve local preparedness and response with the help of an engaged public.

First Line Triage

Kurt Kroenke

Expert Panel:

Kurt Kroenke (chair), Donna Barbisch, Charles Engel, Stephen Epstein, Robert Friedman, Jeffrey Jackson, Ilan Kutz, Steven Locke, Michael McDonald, Kenneth Mandl, Elspeth Ritchie, Michael Roy, Robert Smith, and Ivan Walks

Primary Aims of First-Line Triage

First-line triage is the process which enables persons in the community with symptoms or perceived exposure to assess their risk prior to presenting to the health care system and to take the appropriate next steps. Two overarching aims of an effective first-line triage strategy would be to:

1. Develop effective population-based strategies and mechanisms that enable individuals experiencing physical symptoms in the aftermath of some real or purported exposure to perform self-assessment of risk, self-triage, and self-management. Hopefully, this would maximize the number of persons presenting to the health care system truly needing acute care and minimize the number presenting with symptoms due to anxiety, fear, or other psychological factors. The end result would be to improve the "signal to noise" ratio of those seeking care, thereby reducing the risk of hospital and clinic surge capacity being overwhelmed.
2. Develop surveillance methods for tracking symptoms in a geographic region following an event in order to: (a) map potential exposure; (b) distinguish agent-specific vs. psychosomatic symptom clustering; (c) refine communication strategies in "real time" to alert and inform the population; (d) reduce misinformation.

Background

First-line means focusing on persons in the home and community rather than those presenting for medical care. The aim is to prevent massive number of individuals from flooding the health care system because of psychosomatic symptoms in the aftermath of some event related to terrorism or other disaster. The "surge capacity" of both our inpatient and outpatient health system is limited. Besides concerns about overwhelming the health care system, another risk with some exposures is that the health care system may serve as a vector for exposure. A recent, naturalistic example is the SARS outbreak; some types of bioterrorism could pose a similar manmade threat.

With any real or perceived threat or exposure, the number of individuals with symptoms far exceeds the number actually exposed, and the number of casualties is even smaller. The noise to signal ratio ("multiplier effect") can be exceptionally high, leading to high rates of psychogenic symptoms. For example, the anthrax incident that used the U.S. postal system as a vehicle for transmission resulted in 5 deaths, 22 cases, 35,000 prescriptions for ciprofloxacin and an estimated 100,000 persons who perceived themselves at risk.

Psychosomatic symptoms and psychiatric sequelae are commonly amplified in the general population after a real or perceived event. There may be a "transmissibility" of such symptoms, analogous to infectious agents. Robert Ursano describes this as "ripples of distress". Like a rock dropped into a pond, waves move out farther and farther in concentric circles. However, instead of the amplitude of waves dampening with distance, they can be amplified – a crescendo rather than a decrescendo. Factors that may amplify fears and concerns in the population include: (a) the event itself (and proximity to the event); (b) individual susceptibility factors (e.g., somatizing tendencies, social isolation);

(c) media attention, which can heighten the attention and concerns of the public; (d) hoaxes (or publicized threats) that emerge following the event.

The lexicon (terminology) is also important. Some labels used for the symptomatic patient (somatizing, psychosomatic, medically unexplained) may be alienating. Changing to a new, "neutral" name may only be a temporary solution if stigma is still attached to the patient with event-triggered symptoms and concerns (e.g., "worried well"). Also, some terms used for management strategies (quarantine, isolation) may carry a negative connotation. Even the word *triage* may concern some to whom it suggests relegating large groups of individuals to a "no care" group. A term like *risk assessment* may be preferable, in which first-line assessment targets individuals to the most appropriate level of care. In short, the social acceptability of any new label for symptoms is finite as long as the entity being labeled is negatively perceived.

While the initial focus may be on bioterrorism (e.g., anthrax, botulism, plague, smallpox, tularemia), other exposures (e.g., dirty nuclear bombs, sarin or other chemical agents, etc.) might eventually be considered as well. It is likely there are a number of issues that are similar regardless of the incident or threat. Indeed, some of the strategies developed may be generalizable to natural infectious outbreaks (SARS, influenza) or disasters (e.g., earthquakes, California fires, floods). In short, an "all hazards" approach may ultimately be developed.

In addition to a generic strategy for the general population, it is important to consider whether modifications need to be made for special populations, such as health care workers, minority groups, the mentally or cognitively impaired, the elderly, those without access to computers, telephones, radios or television, and other groups.

Where evidence is available in crafting recommendations, it should be used. However, good evidence may be lacking in many instances which should not prevent the group from proposing recommendations based upon what is known about MUPS in medical settings and following exposures (e.g., mass hysteria; post-disaster related symptoms, etc.). Subsequently, this may need to be tested in simulated models or pilot tested in real populations (e.g., in the influenza season when concerns about SARS may re-emerge). Inadequate evidence should not paralyze public health agencies and medical systems from developing strategies which we can subsequently refine based upon real or simulated experiences. An analogy might be that the standard for medical evidence in a court is set at a lower threshold ("more likely than not") than in scientific circles (i.e., confirmed in rigorous experiments).

There are several axes to consider: the exposure itself and the time course during which health concerns unfold in the public. For example:

a) In *chemical* exposures, there is a large, immediate response from the public who may present with fear/anxiety type reactions as well as nonspecific psychosomatic symptoms. Thus, the risk of overwhelming health care resources (surge capacity) is initially great but then declines rapidly within the first several days.

b) With certain *biological* threats (e.g., anthrax exposure via mail), the health concerns of the public may unfold over a longer period of time (e.g., weeks) and mimic more exposure-specific, somatic symptoms. This may be described a sort of a "rolling" rather than "all at once" public response. The latter can vary by individual factors (e.g.,

educational, somatizing or psychological characteristics, distance from the event, employment, etc.) as well as external influences (e.g., media communication about the event, amplification by hoaxes). Developing a "*matrix*" that includes a richer set of scenarios may be useful

A second type of *matrix* should consider the various agencies and personnel involved in incident/exposure response. This includes the general public, government agencies, police and fire officials, public health workers, the medical care system, trained lay personnel, the media, etc.

Public trust is also a recurring theme. Any models developed are dependent upon buy-in from the public as well as the government agencies, hospitals, etc. One mechanism is to engage "cultural guides or informants" – lay opinion leaders such as clergy, community officials, or others who are trusted by the local citizens as trusted individuals independent of government control or influence.

The pluralism of the U.S. at many levels is also a critical factor. We don't have one public health department but thousands. We don't have one hospital system but hundreds, often competing rather than cooperating with one another. We don't have one government agency with clear "command and control" in this area but rather many agencies with overlapping responsibilities. We have tens of thousands of reporters and other media personnel competing for the news. We have 50 states, countless communities, urban and rural areas, numerous racial and ethnic groups, and multiple other demographic, socioeconomic, and cultural factors. Developing a uniform, consolidated model must account for this heterogeneity.

There is no single approach ("one size fits all") for first line triage but rather a multi-pronged strategy including pre-event education, multiple technologies (mass media, telephone call-in lines, web-based, written materials, premedical satellite facilities, etc.), and post-event monitoring and surveillance to refine communication and to coordinate the responses of the public health and medical systems, government agencies and workers, media, and general population is optimal.

Although the focus is on "pre-medical" triage, there may be generic strategies that are also useful in the front-line medical system (emergency departments and primary care clinics). It will be helpful to identify these areas of overlapping strategies as well as being explicit how one system blends into the other.

In first line triage, it is important to determine the threshold for prompting individuals to seek care (i.e., second-line triage in an emergency rooms or primary care). One could elect to set the threshold higher than usual clinical practice, more like a wartime triage model where one needs to take some risk of missing a few cases in order to avoid overwhelming the medical system. It should be recognized that even in clinical settings, clinicians are never 100% certain but instead make decisions in a probabilistic fashion (e.g., whether to hospitalize an ER patient with chest pain vs. discharging to home). Alternatively, one could elect to set the threshold for prompting care-seeking at the same (or even lower) level than usual clinical practice. One rationale for this more conservative approach would be that first line triage will not be done by medical personnel but rather through self-assessment or interactions with various types of nonmedical media or personnel. A second reason might be that if first-line triage fails in

a few cases, public trust may be eroded. In reality, the threshold will have to be set high enough to avoid overwhelming surge capacity while at the same time being cognizant of

What is being done in premedical triage is really more case-finding (assessing patients who either have symptoms or concerns) than screening (evaluating a general population, many of whom are asymptomatic). However, there have also been some concerns regarding the *APE* group – asymptomatic potentially exposed individuals who may need to be warned and evaluated. At the same time, the purpose of premedical triage is typically not diagnostic – which requires medical evaluation.

Recommendations

1. Balancing individual vs. societal concerns. A first-line (pre-medical) triage system must balance and reconcile two competing concerns. The first is the *surge capacity* of the health care system, where a principal aim is to minimize the number of unnecessary health care visits in the aftermath of an event, when the health care system may the chokepoint (bottleneck). The second concern is the *urgency level* for a given subset of individuals, where a principal aim is to maximize the proportion of those who truly are at risk to seek care. Ideally, one optimizes the signal to noise ratio, i.e., maximizes the sensitivity and specificity of first-line triage algorithms. Regarding the first concern, the focus is on a system-level, utilitarian approach – the "greatest good for the greatest number". With respect to the second concern, the focus is at the individual level – an "avoid any casualty" approach.

2. Assessment and management. The first component of any first-line triage model is focus is *risk assessment* in persons with symptoms, concerns, or potential exposure. The second component is *management*, which may be either: (a) purely informational (education of the individual and risk communication), and/or (b) directive, which in turn may be optional (suggestions on the level of care to seek or next steps) or mandatory (e.g.; do come in for care because of high-risk status or don't come in because of the threat of being exposed or contaminating others).

3. Risk stratification. Persons who are screened/triaged will fall into 1 of 3 categories:
    a. *Medium to high risk* – will be encouraged to seek emergency care (unless a biological agent in which case the health care setting may be a vector for exposure or for contaminating others – alternative plan would then be needed)
    b. *Low risk* – watchful waiting or "mid-level" follow-up options might include
        i) Monitoring symptoms and reassessment
            (1) After a certain interval (e.g., 8-24 hours) by calling back by phone, re-evaluation on a web-based algorithm, etc.
            (2) Only if certain "red flag" symptoms emerge (analogous to patient with a head injury being sent home from the ER with an instructional sheet of what symptoms might warrant return to the ER).
        ii) Encouraging the patient to follow-up with their primary care physician in a certain time interval (e.g., next day) or for certain "red flag" symptoms

iii) Present to a community-based satellite facility (but not the ER or hospital) if the individual feels he/she needs in-person evaluation. These facilities could be staffed by trained (but nonmedical) lay personnel.

c. *Negligible risk*. Reassure individual that he/she is not at risk and requires no further evaluation.

4. Algorithms for assessment fall into two major categories:

   a. *Generic* algorithm that is relevant regardless of the exposure that would apply to any type of symptoms following an event. See Table on next page.

   b. *Exposure-specific* algorithms to identify symptoms more specific to a particular agent, especially when a particular agent or agents are suspected. For examples, Appendix 1 has a draft algorithm for differentiating symptoms due to biological agents vs. psychological disorders, and Appendix 2 has a rather comprehensive algorithm dealing with biological events.

5. Determine if and when empiric treatment for a large number of potentially exposed (or simply concerned) individuals is warranted. This is a balance between exposure risk and treatment-related risk. Exposure (treatment) examples include: anthrax (antibiotics), nerve agents such as sarin (atropine), and smallpox (vaccination).

6. Transferability. The algorithms developed should be adaptable enough to be used in multiple media and settings, such as:

   a. Web-based [this may be the template from which other media draw upon]
   b. Written materials
   c. Telephone-administered
   d. Public media, such as television, radio, and newspapers
   e. Satellite clinics or front-line medical setting (ER or primary care)

7. Tailoring. The algorithms developed should be culturally tailored (flexible) to adapt to differences in language, race/ethnicity, social history, locale (e.g., rural), special populations (elderly, children, etc.), and other special populations. In essence, there needs to be a balance between a model that is nationally generalizable and at the same time flexible enough for local needs and special groups or circumstances.

8. Person-independence. Such algorithms and systems should have an infrastructure that is not reliant on specific individuals. This is important because there is frequent turnover in government agencies, the media, the health care system, etc. Moreover, the U.S. is a large, diverse society with 50 states, thousands of communities, private organizations separate from the government (e.g., Red Cross), an independent press (the "fourth estate") with thousands of autonomous reporters, and a mobile society with rapid turnover in leadership.

Table. Example generic screening questions for individuals with symptoms or exposure concerns following an event [examples only; not validated or complete]

- Is the individual in a **geographic area** at high risk? (Example question: "Were you within X miles of ground zero, or of _____?")
- What are the individual's **specific concerns**? (Example question: "What in particular are you most worried about?")
- Are **symptoms** present? If yes:
  - Are the symptoms nonspecific (e.g., fatigue, headache, dizziness, nausea)?
  - Are the symptoms more discriminating, i.e., ones that are less common in psychosomatic-related distress (e.g., vomiting, diarrhea, skin changes, blurred vision, neurological symptoms).
  - Consider a brief psychosomatic symptom checklist (e.g., PHQ-15, Somatic Amplification Scale) to identify a potential somatizing patient
- Are objective physical **signs** (e.g., fever, lymphadenopathy) present?
- What is the **functional status** (ambulatory, weakened, prostrate)? For example: "Do you feel so weak that you can not carry out your daily activities?"
- Is the individual from a **special population** that may require tailored assessment or directions (e.g., elderly, socially isolated, minority group, cognitive or mental impairment, children, rural area)?

9. Command and control. Resolving important questions regarding authority and responsibility is essential given our government structure that has multiple overlapping agencies. Who decides when an exposure or event may have occurred? Who is responsible for triggering action? Should this be the public health system? Or another government agency? While the multi-agency nature of the U.S. government, the relative roles of federal and state authorities, the numerous independent and competing media personnel, all conspire to make delivery of a unified message and action plan complex, working towards better integration in times of disaster is essential. Getting various information sources better-aligned and "on the same page" is a critical aim.

10. Targeting. High, on-going levels of preparedness might best be focused on selected individuals in charge of monitoring circumstances pre-event, exercising command and control at the time of an event, or providing services immediately post-event. An analogy is the trusted, "just in time" hurricane warning. Experts track the weather and provide explicit recommendations to the public at risk in a timely fashion. The rest of the time the general public need not think about hurricanes. This is in contrast to being constantly vigilant (and eventually desensitized) or receiving

warnings that are typically false alarms or without specific advice about what to do (e.g., government alerts since 9/11). Ideally, the public would be acutely mobilized when needed rather than recurrently (and unnecessarily) disquieted.

11. Consider nontraditional personnel and sites for premedical management. Examples might include (but are not limited to):
    a. Community-based satellite facilities (schools, churches) that can serve as sites to assess patients face-to-face.
    b. Retired nurses, chronic care nurses and care managers, school nurses, other allied health professionals and students, to serve in community-based, local emergency screening centers to assist in the assessment, triage, and acute management of potentially exposed persons with symptoms or concerns.
    c. Public Health Service Health Care Reserve Force that could serve as "weekend warriors" and be available in emergencies.

12. Testing/validation. The algorithms and systems developed should in one or more ways which might include:
    a. Simulations, such as "table top" exercises, field testing in a mass casualty exercise, etc.
    b. Pilot test in clinical settings (e.g., primary care doctor evaluating a patient with unexplained somatic symptoms) or pre-clinical settings (e.g., school nurse evaluating children, e.g., during the respiratory illness season).
    c. Pilot test it in real community-based incidents (e.g., a local event or hazard – mercury spill, water contamination, …)
    d. Conduct a randomized clinical trial during a natural event (e.g., influenza outbreak) that may not be identical to a terrorist incident but may still have some issues in common, such as first line triage, self assessment through various media, risk assessment and communication, managing contact distance, dealing with concerns about uncommon but "masking" disorders (e.g., SARS), and influencing the appropriate seeking of health care.
    e. Use in an actual terrorist event, and refine it through after-action reports. The downside of this approach is that any errors that may erode public trust.
    f. Other issues related to testing:
        - Regardless of the validation method used, do initial (alpha) testing in one location, such as National Capital Area, and then move out to a few other cities or regions across the U.S.
        - Initially, preface the informational materials provided to subjects with *disclaimers*, indicating that this is risk assessment rather than diagnosis, and that the materials are in an ongoing developmental phase. Even when validated, there will always need to be some type of initial disclaimer informing subjects of what the self-assessment can and cannot guarantee.

13. Contingency plans. Despite algorithms and models, there needs to be built-in mechanisms to deal with exceptions due to various factors which include (but are not limited to): (a) a pluralistic U.S. society (described under Background); (b) individuals not behaving rationally or "normatively" after a disaster; although many may behave in accordance with public recommendations, the range of human responses will assure that at least an important minority of the affected population may overreact or respond inappropriately; (c) elected officials pressured by constituents to act outside the evidence-based or expert consensus model (e.g., insisting that antibiotics are widely rather than selectively available); (d) inevitable event-related "surprises" for which one could not be prepared.

14. Liability. It is important to resolve in advance issues related to legal, financial, or other types of risk for those individuals and institutions providing aid post-event. Following are example questions to consider:

    a. If physician and health care workers cross state lines, can they provide care in the absence of a state *license*? Although not a licensure issue, an analogy would be the firefighters going to California to battle the brush fires.

    b. Will they be protected from *malpractice* concerns (e.g., Good Samaritan acts)

    c. Will there be *indemnification* against present and future business losses for private institutions (hotels, etc.) that may serve as satellite facilities in a crisis?

    d. If certain data reported by individuals in self-assessment is used by public officials for surveillance, what are the *confidentiality/privacy* protections? For example, information collected by internet or telephone may be collated for monitoring an outbreak, refining communication, and directing action.

15. Post-event surveillance through first-line triage and systematic data collection may also be useful, in "real time", for:

    a. Identifying geographic regions with symptom clustering and outbreaks.

    b. Clarifying which regions are high-risk exposure areas (and, conversely, low-exposure areas where symptom outbreaks are likely psychosomatic)

    c. Redirecting persons from overloaded health care facilities to facilities that have not yet reached capacity (or to premedical satellite facilities).

    d. Recruiting/activating ancillary (satellite) premedical facilities and resources

    e. Refining public communication messages.

16. Terminology. The lexicon is important. The stigma associated with certain words (psychosomatic, medically unexplained, quarantine and isolation) must be recognized. Also, substitution of certain words and phrases may be desirable (e.g., "managing contact distance" for "quarantine and isolation"; using the simple word "symptoms" instead of affixing potentially-loaded prefixes like "psychosomatic"; "risk assessment" and "fortifying individual decision-making" instead of "triage"; "community evaluation" instead of "crisis" centers). However, reasons for the

negative attitudes underlying the original terms must also be explicitly addressed in order to prevent the new labels from quickly being perceived as pejorative in term.

17. Legitimizing psychosomatic symptoms. The dualistic approach of respecting physical causes for symptoms and invalidating psychological causes must be dispensed with. In fact, symptoms frequently result from an interaction between body and mind – a reverberation of physiological, cognitive, behavioral, and sociological factors. To "somatize" after a frightening event or exposure can be a normal rather than pathological process. Concepts like "psychological first aid" should be endorsed in the same spirit as we embrace other self-health behaviors, like breast self-examination and measuring blood pressure in the supermarket.

18. The role of the media deserves special attention. On the one hand, they are both independent of government control in the U.S. and also have a tendency to focus on news that may arouse or excite (rather than reassure) their audience. At the same time, if educated about the public health implications and involved as a key stakeholder, they can be a particularly valuable ally in times of public events or disasters. After all, many more individuals will receive their information from the television, radio or newspapers following an event than through the internet, telephone or prepared educational materials. Three key questions include::

    a. Who delivers the message? For example, a national newscaster or authority may heighten the sense of anxiety, whereas local media may be better known and more reassuring. Also, the latter are also potentially at risk (they and their families) so they have a vested interest in public health as much as news. Ironically, the fear distal to the affected region is sometimes greater than among local citizens (e.g., SARS fears in U.S – where there were 0 deaths – compared to Toronto residents dealing with it on a daily basis).

    b. How often should messages be provided? For example, regular briefings (such as those that CDC's Julie Gerberding gave during the SARS outbreak, or Mayor Guiliani provided after 9/11) may be preferable to ad hoc messages.

    c. Should there be "fire drills"? Is there a role for public service announcements as a means of community education and preparedness (like Konel-rad in the 1950's)? Or would this be counterproductive, either heightening public anxiety, or conversely, desensitizing the public to the point where messages after a real event might be ignored (i.e., the "cry wolf" phenomenon)?

19. Cost. The resources required for developing and sustaining a premedical triage system needs to be estimated. Also, who bears the cost must be ascertained.

20. Motivating use. Strategies to encourage individuals (and institutions) to use the premedical triage system must be developed. This aspect is more "marketing" than simple risk communication. Getting buy-in is essential to any proposed system's success. Some of the informational delivery in time of crisis may rely on "pull" technology (individuals seeking out information on the internet, by phone, or via the radio, TV or newspaper), while other critical messages may be promulgated using "push" technology (i.e., messages directed to the public though various media)

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MUPS Assessment and Triage Science Base:

Medically Unexplained Physical Symptoms and Related Psychosocial Distress Following Suspected Chemical or Biological Attack

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Since September 11, 2001 and the anthrax mail attacks that followed, there has been an increasing concern over the national capability to prevent and respond to a terrorist attack involving mass violence, infectious, nuclear, radioactive, or toxic chemical agents. Relatively little attention has focused on the potential for large numbers of psychiatric casualties in the short and long term aftermath of such an attack, many of whom will present with medically unexplained physical symptoms to their usual portals of primary health care. The most vulnerable groups are likely to include children, the elderly, and those with physical or medical illnesses.

In the immediate aftermath of a terrorist attack, these stress-related casualties have the potential to overwhelm emergency triage and primary care systems and render them ineffective. This could compromise the care of casualties with life-threatening injuries and impede the care of individuals with contagious diseases. Because the prodromal physical symptoms associated with chemical and biological weapons and infectious disease outbreaks overlap with common psychiatric symptoms and the symptoms of an acute psychosocial stressor, the likelihood of misattribution of cause among individuals affected and misdiagnosis by health care providers is great. These disabling impacts on health care systems could prove catastrophic.

This report attempts to offer general observations on the state of scientific knowledge about medically unexplained physical symptoms, amplified health concerns, and mental disorders following a chemical, biological, or radiological terrorist attack. The report consists of a summary of 1) scientific knowledge necessary in order to make critical triage assumptions; 2) important gaps in this relevant scientific knowledge base; 3) a proposed psychiatric triage model; and 4) summary recommendations on how best to proceed to resolve important gaps in the scientific knowledge base. This report is only an initial effort to summarize, explore, and build scientific evidence. The ultimate aim is to develop an evidence-based, stepwise, algorithmic protocol for efficient identification, triage, and management of psychiatric casualties including medically unexplained physical symptoms following a terrorist attack or a similar ecological disaster or catastrophic disease outbreak.

One limitation of this report must be emphasized from the outset. A large number of potential bioterrorism scenarios are possible, and basic assumptions will vary depending on the exact nature of the attack or outbreak. For example, these scenarios may differ markedly depending on the degree of violence associated with the outbreak, the level and type of suspected exposures, illnesses, or diseases, the degree that suspected health threats were anticipated, and the time elapsed since the onset of the threat. Because of the multitude of potential exposures and other variables involved, the level of scientific uncertainty associated with any single triage approach will be great. Therefore, construction of optimal approaches must involve a thoughtful balance of best scientific evidence, best attainable critical incident modeling, and crucial lessons compiled from descriptions of past exercises and experiences.

Scientific Knowledge Relevant To Some Critical Triage Assumptions.

This section of the report attempts to briefly identify broad areas in which available research provides a basis on which to make future assumptions about the triage endeavor and to the identification of psychiatric casualties, particularly those involving medically unexplained physical symptoms.

A wide range of psychosocial sequelae occurs following catastrophic events such as a terrorist attack. The psychiatric sequelae of traumatic events are well known, and can be divided into two broad categories: those that immediately follow the attack, and those that occur weeks to years later. In this report we are concerned primarily with the former. For many years, post-traumatic stress disorder (PTSD) has dominated popular thinking about the psychiatric impact of these events. While PTSD is an important outcome of trauma (e.g., The National Center for Post Traumatic Stress Disorder (2003) reports rates of PTSD following natural disaster of 4-5%, bombing 34%, plane crash into a hotel 29%, and mass shooting 28%), research has shown that most individuals exposed to a traumatic event in fact do reasonably well, developing only acute but transient forms of psychosocial distress. The significant minority with persistent mental health issues related to the traumatic event includes not only those who develop PTSD but those who develop depression, anxiety, substance abuse, medically unexplained symptoms, and other problems (see Table 1).

Of particular importance is the occurrence of mass sociogenic illness (also called mass psychogenic illness or mass hysteria) that may occur after hoax attacks, terrorist threats that never materialize, or actual terrorist attacks.[1] Regardless of cause, such illness is aggravated as a result of uncontrolled rumors or excessive population vigilance. In this situation, physical symptoms (such as dizziness, faintness, shortness of breath, nausea, and palpitations) spread rapidly through a large group of individuals who believe they have been exposed to a toxic substance, although no toxic exposure can be substantiated. Mass sociogenic illness is frequently triggered by an environmental event or false rumor of an environmental event, such as nuclear release, smog, contaminated water supply, or an odor that is believed to be a poison gas. For example, there have been newspaper reports of mass sociogenic illness following the spraying of a harmless window cleaner in a subway station[1] and of chemical burns after opening letters containing nontoxic white powder during the 2001 anthrax scare[1]. This report adopts a phenomenological perspective, and therefore the term “mass idiopathic illness” is used to describe the acute and rapid spread of illness without any plausible toxic exposure or other physical explanation.

Studies of populations exposed to toxic wastes and hazardous chemicals reveal a high rate of idiopathic symptoms. A wide range of somatic symptoms is reported among populations who believe they have been exposed although it is later found that no medical danger existed. Those with a prior psychiatric history, those who believe that the danger posed by the exposure is greater, and those who are more certain that they have been exposed are at higher risk of symptom reporting. In one community study, 14% of

160 individuals exposed to hazardous waste displayed elevated somatization scores in the 8 to 40 days following the exposure[2]. A history of prior psychiatric treatment was a significant risk factor. When the residents of two communities situated near hazardous waste disposal sites were exposed to malodorous air and water, they reported more somatic symptoms than residents of a comparable, non-exposed community even though no harmful contaminant was ever identified in either community[3]. Likewise, the inadvertent dumping of a foul tasting but not harmful chemical into the drinking water of a community resulted in an increase in the reporting of 18 somatic symptoms[1]. In another study people living near a hazardous chemical site displayed elevated rates of somatic symptoms. Symptoms prevalence was not related to proximity to the site but was related to how stressful the respondent felt the experience of exposure was and to the degree to which the individual was convinced that he or she had been exposed[4]. Communities concerned about possible toxic environmental exposures become more distressed and vocal about these concerns when certain situational factors or exposure characteristics are operative. Sandman has described these as "outrage factors."[5] (Table 2)

Mental disorders commonly mimic physical illnesses.

Medically unexplained physical symptoms such as headache, abdominal discomfort and fatigue are an almost daily occurrence. Somatic complaints that have no demonstrable medical basis are prevalent in healthy community residents and in populations of medical patients alike. These medically unexplained physical symptoms vary widely in severity from single symptoms that are mild and transient to multiple symptoms that are chronic, and disabling.

The psychiatric conditions enumerated above are all characterized by prominent physical symptoms. An extensive epidemiological literature derived from both medical patients and community residents has identified a strong association between a wide-range of mental disorders, unexplained physical symptoms, functional impairment, and health related anxiety.[6] Unexplained physical symptoms often lead to and result from psychosocial stress, beliefs in an undiagnosed illness, health-related anxiety, and depression, and together these factors increase health care use.

Mental and physical disorders are not mutually exclusive and frequently co-occur.

Many individuals exposed to a chemical, biological, or radiological attack will present for care with both physical and mental illness. Physical symptom presentations are common in primary care settings for both physical and mental illness[7]. This makes it difficult to discriminate between the two problems. The triage process places a premium on identification of life-threatening physical injury and illness. An exclusive focus on medical diseases and physical wounds may occur in victims while psychiatric wounds go unmanaged. This runs counter to evidence that physical injury and illness increase the likelihood of that mental disorders are present[8].

The aim of the terrorist acts is not merely to wound and kill a few, but more importantly to terrorize many and disrupt an entire society. Thus the major societal impact of a terrorist attack is psychosocial. While geographically confined, such attacks result in extensive psychological, social, and economic disruption. A large zone of fear, disruption, and confusion surrounds a smaller zone of physical injury or disease[9].

Previous terrorist attacks have produced many more psychiatric than medical casualties. For every medical or surgical casualty of a terrorist attack, many psychological or stress-related casualties can be anticipated. Furthermore, such individuals will often present to emergency medical facilities with physical symptoms that are easily confused with symptoms of direct exposure to biological or chemical agents. For example, when a terrorist cult released nerve agent sarin in a Tokyo subway in 1995, 12 individuals were killed and an estimated 1000 individuals became acutely symptomatic. Though exact numbers are not available, it was estimated that over 5000 individuals were evaluated and released from area hospitals for related symptoms and concerns, suggesting that psychosocial distress played a significant role in individuals' decision to seek acute care[10]. Scud missile attacks on Israel during the 1991 Gulf War resulted in three stress-related casualties or self-inflicted accidental injuries for every traumatic physical injury, most of them mild. During the first attack, the ratio of psychiatric to medical casualties was 15 to one[11].

In a radiation accident in Brazil in 1987, nearly 126,000 individuals sought medical screening for health concerns, while only 20 were hospitalized, four died, and 50 required ongoing medical monitoring. In this event, the ratio of psychosocial distress to medical casualties was therefore at least 1,700 to one[12]. In another example, an outbreak of food poisoning in Spain resulted in 350 deaths and more than 6000 cases of "reactive disaster syndrome."[13] In the month following the terrorist attack on the World Trade Center on September 11, 2001, prescription rates for psychoactive medications significantly increased among Manhattan residents[14]. Between late November and early December 2001, about one to two months after the anthrax attacks of October 2001, the Harvard School of Public Health and Robert Wood Johnson Survey Project on Americans' Response To Biological Terrorism polled a nationally representative sample on their reactions to the recent anthrax attacks. Eleven percent of the sample indicated they had avoided public events, while 9% of the sample indicated that they or an immediate family member was very likely or somewhat likely to contract anthrax in the next twelve months[15]. The societal magnitude of concerns was disproportionate to the 22 diagnosed anthrax cases[16].

These findings are not presented to minimize the serious and far-reaching medical impact of terrorist attacks, but rather to underscore the sometimes forgotten or unrecognized magnitude of their psychosocial and unexplained somatic sequelae.

In addition to complicating the identification and treatment of biological casualties, the presence of medically unexplained physical symptoms will increase the likelihood that the mental disorders themselves will remain unrecognized and untreated[17]. Considering that in the usual, non-emergency primary care setting, major depressive

disorder, panic disorder, and PTSD is correctly diagnosed only in a minority of affected patients, it is likely that under-diagnosis and under-treatment of mental disorders will also occur in the post-attack crisis setting[18]. Mood and anxiety disorders including PTSD may often present with physical symptoms, remain undiagnosed, and receive inadequate treatment in general medical settings[19]. Unless triage personnel are trained to make these distinctions and equipped with brief surveys that help them screen and monitor these problems, there may be considerable confusion, misdiagnosis, and mismanagement at triage sites.

After a catastrophic event such as a suspected or confirmed bioterrorist attack, some individuals are more vulnerable to persistent attack-related health concerns, medically unexplained physical symptoms, and trauma-related distress than others. Those that are supported by empirical studies are listed in Table 3. Evidence for these relationships ranges from well established in some cases to tenuous in others.

A number of psychiatric screening instruments exist, both self-report questionnaires and structured interviews, to aid in identifying and diagnosing psychiatric distress and psychiatric disorders. However, no single psychosocial measure or series of measures is likely to distinguish psychiatric and psychosocial morbidity from acute physical illness with a high degree of specificity and sensitivity. Consequently, brief physical health assessments must be built into the assessment sequence (e.g., ambulatory or not, global assessment of appearance, fever, stability of other vital signs). Some tested triage strategies are available for linkage to brief psychosocial or psychiatric measures.

Important Gaps in the Relevant Scientific Knowledge.

A wide variety of potential bioterrorist scenarios exist, and the development of a 'one-size fits all' triage strategy presents important challenges. Some of these factors are reviewed below.

Base rates of medically unexplained physical symptoms, health or trauma-related distress, and psychiatric disorders will drive the predictive value measurements and assessments used in the triage process. The lower the incidence and prevalence of these problems in the population being screened, the poorer the positive predictive value of a given instrument will be. Uncertainty about the base rate of other illnesses and injuries is difficult to forecast but essential to achieving an understanding of how well measures designed to identify psychiatric complications will perform. For example, a screening tool will perform best when there are few competing differential diagnostic possibilities. The more differential diagnostic possibilities exist, the more poorly the instrument will perform.

Future deliberation and empirical studies are needed to dissect potential attack or outbreak scenarios in an effort to better understand under what circumstances particular measures will perform best. In the absence of these studies, reports from tabletop exercises can provide preliminary direction.

Most studies of the validity and reliability of psychiatric screening instruments have been carried out in epidemiological surveys of the general population or in medical care settings. The results of studies performed in these settings may offer only limited generalizability to situations involving mass medically unexplained illness after a terrorist attack, suspected chemical exposure, or a rapidly spreading infectious disease outbreak. Studies done in emergency settings may offer a validation setting that more closely resembles the acute setting that is the focus of this report. Unfortunately, the circumstances that typically result in emergency care also differ from a terrorist attack or suspected toxic community exposure in many potentially important ways.

Different geographic regions in North America differ significantly in demographic mix. Regions may emphasize different languages and manifest unique ethnic and racial combinations. Screening measures available in more than one of these languages or tested in more than one or two different cultural groups are rare. Many instruments have been translated into Spanish but efforts to identify promising measures and test them in different languages and cultural groups are needed.

Of the candidate measures within each symptom or illness domain, which one should be used and under what circumstances should another measure be selected instead?

Direct comparison of existing measures under model scenarios or actual scenarios involving disasters, terrorist attacks, acute toxic exposures, or illness outbreaks are needed. Such research is difficult to conduct, but efforts to address these problems are needed. Once again functional "tabletop" exercises can provide an important head start.

When and under what circumstances following a terrorist attack is psychiatric triage most effective?

In nearly every imaginable chemical or biological scenario, careful attention to methods of psychiatric triage is critical. However, there may be circumstances under which psychiatric triage should be practiced differently (e.g., an ill-defined bioterrorist or chemical attack involving medically unexplained physical symptoms and a rapidly spreading fear of toxins or infectious disease versus another that involves attacks of physical violence such as bombings). Current knowledge is mainly anecdotal. These experiences are helpful in the absence of systematic modeling or scientific studies, but empirical evidence is needed that directly addresses which triage approaches are best suited to which situations.

When and under what circumstances is psychiatric triage most feasible?

There may be settings that lend themselves to psychiatric triage (e.g., emergency rooms). Other settings may present special problems (e.g., the workplace, the disaster or attack site, community shelters, other community settings). In many instances, if an experienced triage team can be dispatched to non-medical sites, it may be reasonable to assume that triage work can proceed with the same efficacy as the one performed in the ER. This having been stated, however, little systematic data is available regarding the

relative efficacy and burden of psychiatric triage systems in different settings and scenarios.

What computerized triage systems or other technological solutions increase efficiency and effectiveness of psychiatric triage?

Computerized triage systems promise to standardize or otherwise improve the efficiency of the triage process. While these technologies exist, it is not well known how acceptable these will be to highly distressed patients following a terrorist attack or disease outbreak. For example, immediately following an event, acutely distressed people are likely to have serious difficulties interfacing with the computer due to increased distractibility and concentration difficulties. The capacity for distressed patients to interface effectively with computers is likely to improve the greater the time and distance from the attack or outbreak. The effect of computerized psychiatric triage on patient queuing under various casualty assumptions is virtually unknown. The rate that information can be gathered, compiled, and processed using computerized psychiatric triage systems is important to test, as is the capacity for effective dissemination of casualty statistics for various purposes including effective population-level risk communication. Given the promise of computer technologies, further study is urgently needed.

A Preliminary Psychiatric Triage Model.

In addition to determining the state of current scientific evidence pertaining to psychiatric triage after a terrorist attack, the committee is proposing a preliminary triage model for further discussion, investigation, and improvement. The proposed model has five stages and takes into account the common comorbid occurrence of significant psychosocial distress and mental disorders with physical injury and medical morbidity. The proposed stages are: 1) preclinical telescreening; 2) vital signs and rapid physical examination; 3) brief psychiatric screening; 4) more detailed psychiatric assessment directed by screening results; 5) full psychiatric assessment and medical care as indicated. These stages are presented as a schematic in Figure 1.

The first stage of triage may occur before an individual physically seeks health care. One approach, for example, might involve the preclinical use of distance technology. Telephone and web-based help lines might be established for individuals with health concerns. Individuals using these help lines would work with either a live interviewer or a computer automated assessment. In addition to guiding each caller to appropriate assessment and treatment options, the information obtained in this manner might be used to help map the geographical distribution of psychosocial and medical status in the surrounding population, plan emergency responses, assess need for clinical services, and develop risk communication messages for individual and population dissemination.

A medical screener performs the second triage stage. Any patient who is obtunded, is non-ambulatory, appears toxic, manifests traumatic physical injuries, or shows unstable

vital signs is referred immediately for emergency medical care. Other patients are referred for brief psychiatric screening.

Triage stage 3 or brief screening involves the use of a symptom screening tools. In the immediate post-event period rating scales for high symptom levels with associated symptom-related reductions in functional status may be most relevant. For patients with complaints pertaining to fears of contamination or infection, instruments such as the one used in the first iteration of the PRIME MD may be most effective. The ideal triage tool must be simple, concise, reliable, and valid, most likely using 30 items or less to screen for common physical symptoms and mental disorders that occur after traumatic events. Patients who do not trigger areas of this screen may then be referred for urgent medical assistance depending on the nature of their complaints. Other patients are referred for a more detailed psychiatric assessment of potential problem areas.

Triage stage 4 involves a more detailed psychiatric assessment directed by the results of psychiatric screening. This may involve a brief structured interview such as the one used in the first iteration of the PRIME-MD or stage 3 and 4 may be combined using a self-report tool such as the patient health questionnaire found in subsequent versions of the PRIME-MD. Neither of these tools specifically cover acute stress disorder or post-traumatic stress disorder and supplementation may be required if these tools are used. Patients who have no significant psychiatric problems identified in stage 4 are referred for urgent medical care.

Individuals with significant psychiatric problems will receive triage stage 5, consisting of a psychiatric evaluation prior to medical referral as indicated.

Summary & Committee Recommendations

There is national concern over our capability to prevent and respond to a terrorist attack involving mass violence, toxic exposure, or infectious agent. Wide-scale psychosocial distress, mass idiopathic illness, and other psychiatric casualties have the potential to overwhelm the available emergency medical triage systems, placing lives at risk. There are many limitations to our existing knowledge base, yet in the post-September 11 era, there is an urgent need to develop psychiatric triage systems capable of efficiently discriminating physical from psychiatric casualties.

This report has attempted to identify areas of relative certainty and uncertainty and to provide an immediate “way forward”. The report is intended only as an initial step toward the goal of achieving an evidence-based, stepwise, and algorithmic protocol for efficient identification, triage, and management of psychiatric casualties after a terrorist or other attack involving mass violence, toxic exposure, or infectious agent.

Available research indicates that a wide range of mental disorders will occur following a catastrophic event, particularly those involving loss of life. Perhaps more importantly from a triage perspective, mass idiopathic illness (e.g., mass hysteria, mass sociogenic illness) is likely to spread rapidly in the hours, days or weeks following a

terrorist attack, especially one involving actual or threatened toxic chemical exposure or biological agent. Clinical presentations under any of these conditions often mimic medical illness and confound and complicate the triage process.

While standardized measurement tools exist for rapid recognition of mental disorders in medical settings, the utility of these instruments in the face of an acute toxic or biological threat to an entire community remains largely unknown. Uncertainties about the generalizability of different instrument characteristics to multilingual and multicultural populations and to different base rates of psychiatric versus physical illness represent substantial problems for future investigation. Given the possibility for widely divergent illness scenarios depending on the nature and delivery of the threat, there is an urgent need to use existing science to model psychiatric outcomes in each scenario.

The committee has proposed a preliminary psychiatric triage model that involves five potential stages: preclinical telescreening, physical examination, psychiatric screening, focused psychiatric assessment, and psychiatric provider care. The model is general and is intended to enhance future discussion and investigation. Particular instruments, the sequence in which they are used, and the potential role for computer automation or other technological solutions are additional areas for study.

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Figure 1. Model for Psychiatric Triage Following Terrorist Attack, Suspected Mass Exposure, or Infectious Disease Outbreak.

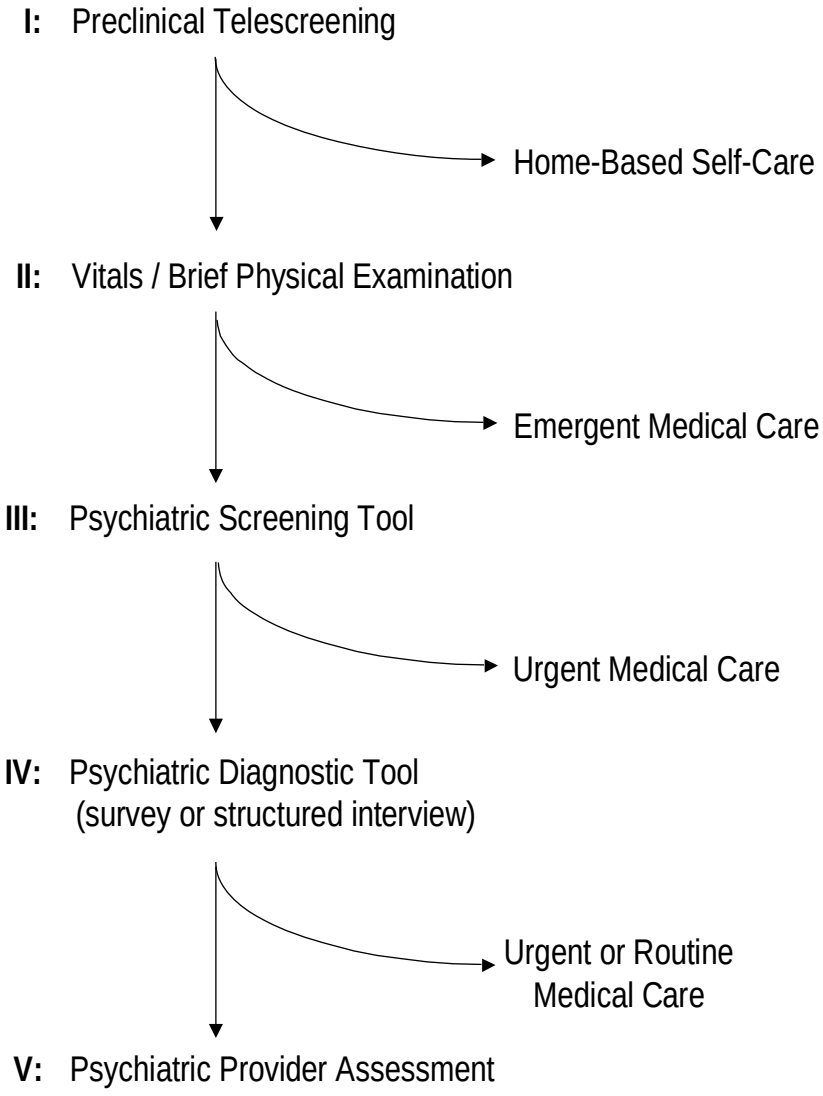


Table 1. Mental Disorders Following Catastrophic Events (A=acute aftermath, SA=subacute aftermath, and C=chronic aftermath). The strength of the analytic epidemiological evidence linking different disorders to trauma varies, ranging from population-based longitudinal cohort studies to case-control and cross-sectional studies completed in convenience samples.

Subclinical psychosocial distress (A, SA, C)
Grief reactions (A, SA, C)
Adjustment disorders(SA, C)
Mood disorders (A, SA, C)

- Major depressive disorder (SA, C)

Anxiety disorders (A, SA, C)

- Acute stress disorder (A)
- Post-traumatic stress disorder (C)
- Panic disorder (A, SA, C)
- Agoraphobia with or without panic disorder (SA, C)
- Specific phobias (SA, C)
- Generalized anxiety disorder (C)

Substance use disorders (SA, C)
Somatoform disorders (A, SA, C) and disorders of multiple unexplained symptoms

Table 2. Cognitive Factors Increasing Illness Fear & Conviction

Coerced exposures (versus voluntary)
Industrial exposures (versus "natural")
Mysterious or unfamiliar exposures
Memorable exposures
Dreaded exposures
Catastrophic or acute (versus chronic) exposures
Exposures with moral relevance (e.g., exposures viewed as "unfair" such as those specifically affecting the poor or women and children)
Exposures potentially perpetrated by some mistrusted party
Exposures followed by inaction on the part of the responsible party

Table 3. Psychiatrically Vulnerable Groups

Physical proximity
Visual proximity
Relationship proximity
Prior psychiatric history
Children
Frail elderly
Socially isolated
Prior pattern of medically unexplained physical symptoms
Those with excessive television & media exposure
First responders
Health care providers
Litigation or disability determination in progress

Table 4. Examples of Measurement Tools of Potential Use in Triage Processes.

Severity of Symptom-Related Distress

PRIME-MD Patient Health Questionnaire-15 (PHQ-15) [Kroenke et al, 2002] (Assesses bothersome physical symptoms)

Symptom Checklist-90-Revised (SCL-90-R) (Derogotis) (Assesses general and specific domains of psychosocial distress)

Brief Symptom Inventory (BSI) (Derogotis) (Assesses general and specific domains of psychosocial distress)

Mental Disorder Screening & Diagnosis

PRIME-MD screen & interview (Spitzer) (Assesses caseness and severity of common mental disorders in primary care using a two-stage procedure – survey screening followed by a brief structured interview)

PRIME-MD patient health questionnaire (Spitzer) (Assesses caseness and severity of common mental disorders in primary care using a survey format)

PTSD Check List (PCL) (Weathers) (Assesses PTSD symptom severity using a survey format)

PTSD Symptom Severity Interview (PSSI) (Foa) (Assesses PTSD symptom severity using a brief interview or survey format)

Illness Worry & Conviction

Whiteley Index (Pilowsky) (Assesses disease fear, bodily preoccupation, and disease conviction)

Illness Attitudes Scale (Kellner) (Assesses iIlness worry, fear of death, disease phobia, bodily preoccupation)

Somatosensory Amplification Scale (Barsky) (Assesses tendency to amplify and be distressed by benign bodily sensation) addressing the psychological and behavioral sequellae of bioterrorism has emerged as a central, but relatively neglected component of the National Bioterrorism Response effort.

Social Distance/ Contact Distance:
Quarantine and Isolation

Stephen Prior

Expert panel:

Stephen Prior (Chair), Donna Barbisch, Robert E. DeMartino, Clete DiGiovanni, Jr., David Goldbloom, Alan Goldberg, Marcia Kovach, E Cameron Ritchie, Michael Stoto, Jane Winchester

This report provides a summary of the major points that were developed by an interdisciplinary group of researchers in two 'breakout sessions' that were held during the subject Workshop. The comments and opinions in the report are not attributed to any specific member of the sessions and represent the consensus that was reached during wide-ranging discussions.

As stated in the goals of the workshop the breakout sessions sought to examine whether epidemiologic tools can be identified and/or developed to efficiently screen large numbers of patients remotely for the purposes of reducing the anticipated surge in demand on primary care and emergency care resources.

The specific goals of the participants in these breakout sessions was the consideration of how the practice of separating persons who are, or who are presumed to be infected or contaminated from uninfected or uncontaminated persons might contribute to the negative consequences of a terrorist incident. This issue is of significant importance in any post-event scenario involving weapons of mass destruction (WMD's). It is also important given that many of the current plans for WMD agents call for the use of such separation measures, including quarantine and isolation of persons who pose a danger to others in terms of cross-contamination. In the context of the workshop topic the consideration of such measures is of particular relevance because the health care response required by acutely ill patients requiring emergency medical management and hospitalization could be seriously compromised by large numbers of patients with confusing presentations seeking care despite having had no contact with the agent. Accordingly, systems of response must be developed that plan for this phenomenon.

The breakout session had two specific areas of consideration. The goal was to assess the basis for how to:

- Prepare a science base for practical implementation of 'contact distance' practices
- Consider and propose modeling processes to inform decision-makers on the utility and complications of 'contact distance' practices

The term 'contact distance' was used in this workshop to try and ensure that the focus of the breakout session did not focus solely on the issues that surround quarantine and isolation. Using the broader term of 'contact distance' meant that the full range of intervention measures that could effect an increase in person-to-person separation would be discussed. These measures range from travel restrictions into or from affected areas, through movement restrictions on individuals or groups, through voluntary quarantine measures, and even the use of mandatory quarantine of affected persons. To the credit of the organizers the term provided the basis for very broad discussions but it was felt by some of the session participants that the addition of new 'term' for the required measures may create further confusion rather than help to focus the debate. The use of the terms quarantine and isolation are now widespread (even though they are for the most part misused in the context of their strict epidemiological definitions). The addition of terms such as 'shelter in place', 'shielding', 'home quarantine', and even (in TOPOFF 2) 'snow day' has broadened the vocabulary of the topic but has not made explaining the measures

to the general population any easier. One of the first suggestions from the session was thus the development of a lexicon of the terms that would be used to describe measures to increase 'contact distance'. This could be used to describe the individual actions, allow their merit to be described, and outline the roles and responsibilities of all concerned. It would also help to explain to the general public what the measures would require of them in terms of action and response.

Breakout Session One.

The first session was focused on the recent experiences with Severe Acute Respiratory Syndrome (SARS). This disease state was chosen because of its similarity to some of the key elements of a future attack on the general population. Included in these features was the fact that it was 'unexpected', it could progress from a difficult initial diagnosis to a potentially lethal event in a wide range of affected populations, it is apparently transmitted by personal contact (and contact with inert objects), and it was spread rapidly to diverse countries.

The presence of Dr. David Goldbloom from Toronto allowed the session to gain valuable insight into the experience gained in Canada with SARS. The experience with SARS was particularly relevant for consideration of practices that support 'contact distance' in that this public health intervention provided the major means by which the disease was controlled (no diagnostic tests, vaccines, or medications were readily identified during the initial period of the disease in any country around the world). It is worth noting that the use of such measures, once they were properly implemented, has proven very effective in 'quenching' the SARS outbreak and demonstrates the utility of the practices of 'contact distance' (principally travel and movement restrictions, together with various quarantine measures, and physical barriers – masks, etc.). In the context of the goals of the workshop it was determined that:

- The experiences of Canadian authorities provides relevant data that can be quickly translated into 'lessons learned' that will benefit any program of 'voluntary' quarantine in the United States.
- Voluntary measures that focused on 'home quarantine' were extraordinarily effective and compliance by the affected populations was very high (In over 10,000 persons under some form of restriction only a few dozen required compulsory (legal) enforcement).
- There were significant issues for the Health Care community (HCC). One of the most significant of which surrounded the issue of the HCC being the main foci for transmission of the infection.
- Other HCC issues included the need to utilize skill-sets that were not normally part of normal practice, the need to develop back-up capability and capacity for over-utilized facilities and staff, the issues of staff 'stress,' and the problems of 'stigmatization' of both staff and their families.

The session continued with consideration what would be the impact of a recurrence of SARS in the fall of 2003. (It appears that SARS has abated following the initial outbreak – whether this reflects a seasonal relief during the summer months is not yet clear). The

session concluded that regardless of whether the relief from SARS is short-term or long-term the authorities must begin to plan for the possibility that the disease becomes a problem in the United States either later this year or in subsequent years. Moreover, the authorities need to assess how the incidence of SARS might be impacted if it occurs concurrently with a disease that exhibits similar symptomatology such as Influenza. It is worth noting that this feature of SARS, the mimicry of a flu-like disease, is another element that it shares with several of the most significant of the biological WMDs. The success in addressing SARS with measures that focused on 'contact distance' indicates that such measures will probably be a major focus in any future efforts, at least until other measures, such as vaccination, can be made available. It was agreed that for many of the potential WMD agents a similar focus on such measures will be a feature of most planning documents. The participants in this session agreed with Dr. DeMartino that the approach to implementing any measures to address a future SARS outbreak (or other incident) should focus on three elements relating to increasing the 'contact distance' between those at risk from exposure to the disease. These are:

- Preplanning.
- Obstacles to implementation.
- Incentives and enforcement of proposed measures.

The need for preplanning was apparent to all of the participants. As stated earlier many lessons could be learned from the experiences gained by Canada in trying to deal with their SARS outbreak. Equally, it was felt that the latter two issues needed to be addressed and that they pose unique challenges to local, state, and federal planners.

The participants identified four key issues that a future SARS outbreak would pose:

- The absence of a SARS diagnostic test would require an 'all persons' approach to any plans.
- There are significant risks in communicating any message about the need to plan for a future SARS outbreak – the most significant risk involves creating a sense of fear in the general public.
- There is a need to identify at federal, state, local, and community levels both the 'message' and the 'messenger'.
- The problems in disseminating the 'message' and supporting any Federal initiative at the local level needs to be addressed. (The local 'teams' are saturated through having to deal with post-9/11 and Anthrax actions, the smallpox vaccination programs, the implementation of bioterrorism preparative measures, and the burden of their 'regular' work).

Breakout Session Two.

The participants in this session addressed the role of 'contact distance' measures in the treatment of MIPS patients following a terrorist incident. It was clear that from the standpoint of the 'treatment' of MIPS patients the use of 'contact distance' provides one of the least invasive measures/interventions but is one that requires significant

preplanning. It was agreed that the three elements outlined earlier; preplanning, obstacles to implementation, and incentives/enforcement, provided a good basis for consideration of the issue. Accordingly, the session participants again used this approach.

The session participants discussed several general issues before considering in more detail the three elements. These issues included:

- The need to develop a lexicon for the actions that support 'contact distance' measures such as quarantine, shelter-in-place, etc. It was suggested that in defining the measures the inclusion of individual and collective roles and responsibilities would be of great value. (We all agreed that defining 'who does what, to whom, where, when, and how?' were at least some of the key issues).
- That the range of potential incidents represents a major challenge to planners, responders, and the general public given that each incident (based on agent, location, scale, etc.) may differ significantly from every other incident. Moreover, what is an ideal solution for one incident may be totally inappropriate for another, apparently similar, incident.
- The more restrictive the measures the more likely it will be that a voluntary approach will be preferred to a mandatory or compulsory approach. The success of the Canadian experience with SARS and 'home quarantine', a voluntary approach, is readily contrasted with the failures experienced by other countries (e.g. Hong Kong) where attempts to impose mandatory 'home quarantine' were significant failures.
- Any approach must be seen as 'equitable' and equally applied to all sections of the population. The experience of the Anthrax Attacks in fall 2001 indicates that any sense of unfair allocation of resources or favored treatment will exacerbate any tensions that underpin the implementing of restrictive measures.
- There is a clear conflict between the public health aspects of attempts to increase 'contact distance' and the needs of a population that has witnessed an attack or incident to engage in social support. At the time, post-incident, when people most need to gather to develop mutual support and strengthen community ties any attempts to engage in restricted gatherings, restricted travel, or a need to engage in social separation are considerable stress points for any community or population.
- The issues of centralized (facility-based) mechanisms versus decentralized (family-based) mechanisms were discussed. The ability to remain in 'familiar surroundings' with familial or community support systems would appear to offer better opportunities for successful implementation and compliance than those that require movement to less familiar surroundings.

<u>Preplanning.</u>

Several points were discussed by the participants, the main points are noted below.

- The use of any measures involving 'contact distance' for MIPS patients versus other elements of the population will require the development of techniques and

technologies that are the subject of other breakout sessions at the workshop. These include, but are not limited to:
    - Science Base for Assessment and Triage.
    - Effective Risk Communication Strategies and Public Policy.
    - Technology solutions supporting biodefense response to terrorism and outbreaks
- In the absence of a methodology to separate those persons affected by MIPS rather than by direct exposure the least disruptive approaches are of key interest. In this respect the use of voluntary approaches rather than compulsory or mandatory mechanisms should be a major focus.
- The preplanning efforts must address with equal urgency the twin issues of risk and response. Addressing one without the other only heightens concerns and develops confusion in the mind of the general population.
- The solutions need to be addressed at the local/community level and must appeal to all of the population using whatever approach is most appropriate to the individual community needs. It will be vital to craft an effective message and have it delivered by a trusted messenger.

<u>Obstacles to Implementation.</u>

- In any response to an incident that involves the use of increasing 'contact distance' (whether quarantine or some other measure) the conflict between the need to engender 'social distance', to disrupt the disease or prevent cross-contamination, and the needs of individuals to increase 'social contact' during periods of extreme stress must be balanced.
- There is a general concern about the ability of any community to provide the logistics support for any widespread measures that may require persons to restrict their contact with other people or refrain from using communal services like shops. A more compelling need will be any requirement to provide health care services to people in a distributed community. The United States has a health care system that is largely centralized, those persons needing to access health care normally travel to the point of service/delivery. In most scenarios involving the use of 'contact distance' the assembly of, and contact between potentially ill persons and healthy persons is prohibited. In Canada a distributed health system was able to provide health support to those engaged in 'home quarantine' – it is not clear how the U.S. might achieve similar success.
- The issue of 'stigmatization' is considered an obstacle to effective implementation. This was an issue in Canada during SARS and remains, together with equitable response, a historical problem that must be addressed in any future plan.
- One of the key elements that was identified by the participants was the fact that in any incident there will be multiple, ill-defined, triggers for implementing any approach to the incident. The thorny questions of decisions about who, where, when, how and why remain to be addressed.

Incentives and Enforcement.

Incentives:

- The participants agreed that the best incentive for compliance with any action that may need to be imposed was a sense on the part of those impacted by the action that a plan existed that would meet their basic needs in several key areas. These included some form of logistical support for their needs in terms of:
    - Physiology (Food, water, power, heat, etc)
    - Security
    - Medical
- Any plan would need to address the problems of potential 'gaps' in insurance, wages, and other financial support mechanisms for those impacted by the imposed or requested measures.

Enforcement:

- The comment was passed and widely supported that "the law is a poor enforcer" – it was agreed that the imposition of legal restraints and measures to insure compliance will be uniformly unwelcome and pose more problems than it will solve.
- Any planned use of measures for 'contact distance' must recognize that while voluntary imposition may not bring total compliance it is much more palatable and likely to succeed than mandatory measures. Moreover, as a political imperative at every level from federal down to local, asking people to comply with restrictive measures for their own safety and that of others is much easier than instructing people that they must sacrifice their freedoms etc. for the sake of their neighbors.

Observations & Recommendations.

Observations.

We are confronted with a situation where, in the face of the reality of the threat such as the return of SARS or the release of a bioterrorist agent, the public is sensitized to the threat but lacking in firm data on which to make decisions that may have significant personal impact.

As a public health measure, quarantine, has a long history of successful use against a range of human and animal (and plant) diseases. There is little doubt about its utility but there are scientific, social, and cultural issues that surround its implementation in any society – let alone a nation like the United States, where the rights of citizens are enshrined in the Constitution and every facet of everyday life.

There is little doubt that a form of 'quarantine' or movement restrictions will be used in the event of a major public health emergency and that such use will have psychosocial impact on the affected community and the nation at large. Any implementation must be seen by those affected (and those observing through the media) to be 'fair' and evenly

engaged across the entire social spectrum. Any sense of 'favoritism' of one community over any other will likely result in a breakdown of the imposed measures.

There are a spectrum of potential movement restrictions that effectively accomplish the goal of increasing social distance and effecting contact management that might be used as public health measures in an emergency disease state. The spectrum includes; restrictions on travel, social gatherings, attendance or gathering at schools/centers of worship/workplace, mass transit systems, border controls, home curfew, voluntary and mandatory measures, and quarantine in the sense of a 'cordon sanitaire'. It is important to note that none of the proposed restrictive measures has to be 100% effective to be of value in controlling the spread of disease. Even a partial decrease in contact between persons will help to manage the spread of a contagious disease.

It will be important to provide for the needs of special populations impacted by any imposed movement restriction. This includes supporting the medical needs of persons affected by the measures, including day-to-day medical requirements as well as those that result from the imposition of movement restrictions, and providing support for persons with physical or mental disabilities.

Recommendations.

Develop a series of studies that focus on strategies that could be immediately implemented to improve the current plans, guidelines, or best practices that may be used to minimize the psychosocial impact of implementing movement restrictions. One area of immediate concern would be to develop and apply a lexicon that permits the issues to be discussed where all parties recognize the measures that are being defined. The current misuse of terms like 'isolation' and 'quarantine' does not facilitate decision making by the various agencies that are required to provide expertise and guidance.

Several areas of specific focus were identified these include; risk communication, specific guidance to the public, health care workers and public health practitioners, and identifying 'trigger events' that would invoke release of information to the public. A related component would seek to identify how non-governmental sources including the media, schools, workplaces, faith-based centers, etc may be used to reinforce and supplement the advice that will result from 'official' sources. It was felt that these sources of the 'message' – delivered by trusted 'messengers' were particularly valuable for delivery of information that may be perceived as 'alarming' or anxiety provoking.

Many of the restrictions on movement do not require specific legislation but the overall status of laws across the states is a 'patchwork' of good, not so good, and poor. If the use of movement restrictions, especially the more restrictive measures such as quarantine, are to be uniformly applied then the status of the laws needs to be addressed and some consensus reached on a baseline that would be appropriate to ensure that measures can be introduced that will not exacerbate the problem by encouraging transit across state lines to 'escape' from one or more state laws that are considered prohibitive.

Effective Risk Communication Strategies and Public Policy

Glen Nowak

Expert Panel:

Glen Nowak (Chair), Briant Coleman, Daniel Dodgen, David Goldbloom, Dan Hanfling, Marcia Kovach, Ilan Kutz, Steven Locke, Glen Nowak, Col. Ann Norwood, Elspeth Ritchie, Dan Rutz, Gary Strong, Terri Tanielian, Ivan Walks, and Raymond Weinstein

This report provides a summary of the major points that were developed by an interdisciplinary group of researchers[1] in two 'breakout sessions' that were held during the subject Workshop as part of the Psychosocial Dimensions of Biodefense Preparedness and Response Initiative. The comments and opinions in the report are not attributed to any specific member of the sessions and represent the consensus that was reached during wide-ranging discussions[2].

As stated in the goals of the workshop, the breakout sessions sought to 1) identify the key risk communication and public policy challenges and issues associated with *Managing the Biopsychosocial Impact of Terrorism and Outbreaks*, 2) examine the relative merits and utility of different risk communication approaches and strategies to effectively inform and educate different target audiences in the event of a large-scale terrorism event or bio-terrorism attack, 3) discuss whether, and how, risk communication could be used in conjunction with triage and risk assessment tools (e.g., web-based patient screening tools); and 4) identify some of the major barriers and facilitators of effective communication and public policy strategies in response to a large-scale terrorism event or bio-terrorism attack. Overall, one of the primary goals of the risk communication and public policy strategies would be to help effectively guide and manage the demands placed on primary and emergency care resources.

One of the specific goals of the participants in these breakout sessions was the consideration of how risk communication principles and strategies could be used to facilitate overall emergency response efforts (e.g., helping to identify and separate people who are, or who are presumed to be infected or contaminated from those people who are uninfected or uncontaminated persons, achieving effective implementation of separation measures, such as isolation and quarantines, etc.). Participants also identified some of the characteristics of a post-event scenario that would hinder overall emergency response efforts as well as (risk) communication and public policy activities.

Key (Risk) Communication and Public Policy Challenges

Given the overall focus of the workshop, much of the initial interest and concern involved issues related to mass psychogenic illness and its effect on the population [e.g., anxiety-related syndromes, including mass psychogenic illness (MIPS), multiple 'unexplained' physical symptoms (MUPS) and loss-related syndromes]. Participants noted that risk communication principles and strategies could—and should—play a central role in providing the public, healthcare providers, and emergency responders information and updates regarding the attack or outbreak; and that this central role included educating all audiences about risk factors, symptoms, treatments, and recommended resources and courses of action. Early on in a post-event scenario people will be looking for guidance on: 1) whether they or their family have been exposed to a potentially dangerous substance or element; 2) whether they or their family are at risk of

[1] The participants are listed at the conclusion of the report.
[2] The report was prepared by the session chair (Dr. Nowak) – any mistakes, omissions, or misrepresentations remain the sole responsibility of the author and should not reflect on the expert opinions expressed by the session participants.

harm or exposure; 3) steps that they can take to reduce or remove the risk to themselves and their family; and 4) steps and actions they should take if they or their family have, or may have been, harmed or exposed to a potentially dangerous substance or element. As a result, one of the most effective pre-event communication strategies that can be adopted is the creation of messages and materials that provide information and guidance on these four areas for known, potential threats (e.g., smallpox, anthrax, botulism, etc.).

The breakout session participants recognized that systems of response need to be developed that plan for the possibility that the health care response needed to take care of acutely ill patients requiring emergency medical management and hospitalization could be seriously compromised by large numbers of patients with confusing presentations seeking care despite having had no contact with the agent. Telephone information lines (both in-person and automated), web-based screening programs, and paper-based (e.g., short flyers or brochures) all represent risk communication tools that could assist in managing the questions, concerns, and needs of both patients and health care providers. Many of the participants noted that while technology will be of value in triaging and screening patients, that many people will still seek personal contact with health care professionals (e.g., for re-affirmation or additional information).

Recent experiences involving severe acute respiratory illness (SARS) also served to highlight another challenge that may arise in the aftermath of a bio-terrorism event or infectious disease outbreak— people who have an illness, particularly one that is contagious, are prone to stigmatization. This phenomenon, in turn, can make people hesitant to seek medical attention or care (e.g., including creating a group of people who are could be characterized as "un-worried, un-well"). In the case of SARS, for instance, because of the stigmatization experienced by Asians, many people who had symptoms or illnesses that should have been evaluated were hesitant to seek medical care. Some in the public also avoided contact with people who, by race, were associated with SARS (e.g., Asians) because they were perceived to be potential SARS importers. In addition, stigmatization also impacted health care professionals, with many reluctant to see people who might have symptoms worth evaluating. Thus, in contrast to the MIPS phenomena, stigmatization can create the opposite effect— people unwilling to engage with the formal medical care system. As a result, communication and public policy efforts need to be cognizant of the adverse impact of stigmatization, and take steps to reduce the likelihood that policy and communication efforts foster stigmatization.

A third policy and communication challenge that may arise in the aftermath of a large-scale terrorism or bio-terrorism event is maintaining the capacity of the hospital and emergency response systems. In the case of SARS, for example, as the epidemic unfolded, many health care professionals, particularly nurses, grew reluctant to care for SARS patients. Pre-event strategies and policies thus need to include steps and activities designed to address the concerns, questions, and needs of healthcare and emergency response professionals and their families (e.g., a likely concern for many healthcare and emergency response professionals involved in an infectious disease outbreak is their potential for infecting their loved ones). These steps can include training and education, early involvement of healthcare and emergency response professionals in the

development of emergency response plans and protocols, and use/development of psychosocial support initiatives designed to ensure the continuation of effective care in the event of a large-scale attack or disease outbreak. Further, much like the first responders have organized support systems for their family and loved ones, in a bioterrorism event or during an emerging infectious disease outbreak, families of health care providers will have special needs that may need to be addressed with targeted strategies and messages.

Overall Risk Communication Goals

There are at least two important overall risk communication goals with respect to effectively managing the biophysical impact of terrorism and infectious disease outbreaks:

1. Help effectively guide and manage the demands placed on primary and emergency care resources (e.g., via effective use of mass media, websites and web-based communication applications, interactive communication tools, etc.).
2. Mitigating or reducing negative behavioral reactions or consequences (e.g., minimizing, to the extent appropriate, the surge on the health care system); and
3. Promoting or enhancing the implementation of effective or positive behavioral responses (e.g., implementation of public health recommendations or guidance, such as getting vaccines, taking medicines, managing contact distance, etc.).

Risk Communication Principles and Strategies

The fields of health and risk communication, including those aspects related to media relations and public affairs, provide a strong and helpful foundation for emergency communications. The workshop participants identified a number of communication principles and strategies that should be utilized in a post-event response scenario, including:

- There are likely to be differences in risk communication strategies and activities across three phases: pre-event communication; during-event communication; and post-event communication. For example, information needs will be different during each phase, and strategies might need to be tailored accordingly.
- Be prepared for lots of surprises and unanticipated events. Early on, communication strategies and public policies should frame things so that the public, media, healthcare providers, and others understand that "we're going to be learning as we go."
- Take steps very early on, including in the pre-event stage, to manage expectations. This is especially important with respect to when things will, or may be known (e.g., test results, causes, etc.).
- Breakdown (i.e., translate) scientific and medical jargon and terminology—use words, language, examples, analogies, and explanations that are readily accessible to laypeople. Be prepared to develop "portfolios" of materials

(e.g., fact sheets may have to be created or formatted at different literacy levels and in different languages).

- With respect to information provision and guidance, it is critical to achieve three things: "Be first. Be right. Be credible." Keep in mind it is not enough to "be first." You need to be first with correct and credible information.
- Prepare for the possibility that public health policies and actions may create or foster stigmatization. Develop ways to address the unintended stigmatization that may arise as a result of public health policies or communication efforts—including providing the public with a more effective coping mechanism (i.e., stigmatization of a group of people often arises when the broader population lacks a more effective strategy for dealing with the uncertainty surrounding an event or disease outbreak).
- Be mindful that an initial and primary concern of most members of the public is on protecting themselves and their families. People will be trying to keep themselves and their family safe—and their actions will be guided by this. Thus, public health policies and communication efforts should provide helpful guidance (e.g., tangible steps and actions) with respect to protective actions and use of medical care. Provide information on risk factors and, if possible, on ways people can reduce their personal risk.
- Relatedly, post-event public health policies and communication efforts should seek to provide people with a "safe" sense of control.
- People outside an affected area tend to worry or be more cautious/fearful than people inside an affected area. For example, in the case of SARS, many people who lived in Toronto worried less about contracting SARS than people who were considering traveling to Toronto (who in most case, cancelled or postponed their travel plans).
- Remember that words are not the only thing that communicate—pictures, policies, and behaviors also communicate—and often times, more powerfully than words. Protective gear, for example, brings with it much visual impact (e.g., a person dressed in protective gear telling others "not to worry" or that "protective gear isn't necessary" can send a mixed message).
- Often, especially in the case of terrorism attacks, people in relatively close proximity are among the first to provide aid and assistance—regardless of their formal training in emergency response or medical care. Thus, initial communication efforts (e.g., radio broadcasts) should guide people as to how they can best help others.
- Acknowledge uncertainties, fear, and unknown realities. This is a challenge, but it will be critical to explain to opinion leaders and individuals that fear and anxiety are normal reactions to stressful conditions; and that uncertainty should be expected. Effort will be needed to educate people so that they understand and can effectively cope with uncertainty. Often, acknowledging uncertainty helps opinion leaders and others who are responding to an emergency build credibility and trust.
- Recognize, and be prepared for, the possibility that protective measures (e.g., vaccines) can also give rise to MIPS/MUPS-like phenomenon. Some members of the public or healthcare community may experience, find, or

perceive real or imagined adverse events after vaccination or treatment (and some of these may be quite serious from a medical standpoint). Even if the adverse are rare, and regardless of whether they are "real" or "perceived," media attention to them can foster doubts and hesitation about vaccines or medicines.

Integrating Risk Communication Principles with Triage and Risk Assessment Tools

There was general consensus that risk communication principles were quite pertinent with respect to the development and utilization of post-event triage and risk assessment tools, particularly tools that utilized information technology hardware and software. There was also general consensus that the broader fields of marketing and communication were domains that needed to be tapped in the development, dissemination, and promotion of information technology-based triage and risk assessment tools. Such tools, for example, need to be responsive to the needs and requirements of the targeted users (e.g., healthcare professionals), take into account the operating environments of the targeted users, identify and address the potential barriers to use and acceptance, determine the benefits and features most desired by targeted users, and communicate those benefits and features in ways that the targeted users find interesting, engaging, and helpful.

The workshop participants also identified a number of other communication and risk communication strategies and considerations that should be taken into account with respect to the development of triage and risk assessment tools, including:

- Technology and technology-based tools that foster social interaction and contact in a post-event scenario will be critical—and likely among the most quickly adopted or utilized. As SARS and other public health emergencies have illustrated, many people often seek social interaction as a way to a) gain more information; b) reduce anxiety and stress; and c) find helpful coping strategies. This also highlights the need to be mindful that some technologies can foster/rely on isolation—and that those technologies may bring with them unintended negative consequences.
- Workplaces are often overlooked—both in the development of tools and technologies—and in the "roll out" process. Thus, a priority should be placed on learning more about the workplace environments that tools and technologies will be used in, including working with healthcare professionals and others (e.g., hospital administrators) to facilitate adoption.
- Early engagement of frontline emergency response and medical personnel is often critical for success. Often, tools, interventions, and technologies need to be done more "with people" than "to, or for people."
- Communication, including risk communication, is a necessary but not sufficient "condition" to getting or gaining adoption of tools/technologies or compliance with recommendations or guidelines. Thus, while messages and materials are critical to success (e.g., providing information and/or education about a tool or technology), other factors are also key determinants of

adoption and use, including the specific features/characteristics of the tool or technology, the perceived benefits (and risks), financial and resource requirements, and timing.

- Websites are an effective way to provide updates, information, and resources and should be utilized. However, other communication strategies and message delivery channels will need to augment websites because many people, including health care professionals, do not have internet access; many who do have limited capacity (e.g., telephone connections); and many healthcare professionals do not routinely use web-based resources in the course of their daily practice.
- Recognize that some technologies and assessment tools, depending on when and how they are used, can or will cause changes in normal operating routines or practices. For example, screening tests/assessments done when people first enter a hospital or medical care facility can change the normal flow of people in that facility.

Barriers and Facilitators to Effective (Risk) Communication and Public Policies

Barriers to the adoption and use of effective (risk) communication strategies to guide the development and implementation of public health responses, activities, and policies include:

- Lack of political, agency, and/or administrative will to adopt and use (risk) communication principles and strategies. For example, many people, including political leaders, do not have knowledge of, or formal training in, communication principles and strategies. In addition, agencies and administrators may not place a high priority on such training and skills development prior to an emergency.
- Lack of infrastructure and critical relationships with communities to implement effective communication plans and public policies. In some cases, for example, this could be a lack of involvement with experts and advisors, while in other cases, it could be a lack of connectedness to potential audiences. Both of these barriers are related to trust/credibility (or lack thereof) (e.g., if trust does not exist prior to an emergency or event, "lack of trust" may become a major barrier when it comes to quickly and effectively implementing a communication strategy or public policy).
- Communication expertise/leadership a) not being brought into the emergency response process early enough and/or b) not being part of policy and leadership discussions and decisions. Similarly, communication being defined too narrowly—for example, in terms of written products or materials—rather than in terms of global messages and actions.
- Limited resources, particularly with respect to undertaking pre-event communication planning and preparation.
- Uncertainties surrounding the event or incident; for example, incidents that involve multiple, ill-defined, events or triggers for implementing emergency

or public health responses bring with them considerable communication challenges (including the likelihood of changing messages and guidance).

The facilitators to the effective adoption and use of (risk) communication to guide the development and implementation of public health responses, activities, and policies include:

- A strong commitment, and understanding, of the value and importance of communication expertise in the development and implementation of a) pre-event response plans and strategies and b) post-event responses and actions by senior managers and leaders.
- A commitment to develop and undertake emergency communications training before an actual incident or event (e.g., spokesperson training, "rehearsals," and testing of communication protocols and systems).
- A high priority should be placed on policies, information, and education that address the needs and concerns of frontline medical and emergency response personnel (e.g., nursing staff and others who physically deal with patients and victims).
- Early on, in the public policy formulation stage, seek to identify the possible or potential "unintended" consequences of policy options/alternatives and messages (e.g., will the policy create or foster stigmatization? Do the messages provide actions and steps that will be perceived as viable and feasible? Do the primary spokespeople have the subject matter expertise and communication skills necessary to achieve credibility?)
- Adoption and use of the principles of risk and health communication outlined earlier (e.g., pages 3-4).

Recommended Next Steps

- Identify and summarize risk communication and public policy activities and research to date related to managing the biopsychosocial impact of terrorism and infectious disease outbreaks; and use that summarization to identify strengths, gaps, best practices, and ideal models.
- Develop specific proposals and plans for developing and implementing best practices and ideal models.
- Design exercises, tests, and simulations that using pandemic influenza and SARS to evaluate communication systems, tools, and messages.
- Develop standardized emergency response messages and materials in a digital format for use in the event of a terrorist attack or infectious disease outbreak.

Future Research

Although much is known about effective risk communication strategies, there are a number of unanswered questions that would benefit from future research. These questions include:

1. What resources are needed to effectively communicate about emerging diseases or terrorism acts?
2. What communication training and skills should be provided to healthcare professional peer leaders?
3. How can communication be used to help a) mobilize, b) motivate, and c) maintain the need emergency response and health care workforce, including volunteers?
4. What types and kinds of information and materials should be prepared in advance for an outbreak or event?
5. What roles can/should risk communication play in responding to a weapon of mass destruction or an emerging infectious disease? What should be the goals and objectives of risk communication strategies and activities?
6. What (risk) communication strategies can be used to effectively address or counter (a) stigmatization, (b) people's fears, concerns, etc., about symptoms and disease and social isolation, (c) denial, (d) public cooperation/adoption of recommendations, and (e) health care provider cooperation/adoption of recommendations?
7. What should expectations be regarding the effects or goals of risk communication since often it is a necessary but not sufficient factor for gaining compliance?
8. What are the different (risk) communication approaches, strategies, and needs by different audiences (e.g., physicians, nurses, etc)? Do healthcare professionals need different content and messages – or are their concerns often similar to those of the public?
9. What are the priority psychological related risk communication issues – MIPS/MUPS, denial, stigmatization, fear of stigmatization, etc? How, if at all, do those vary with respect to terrorism vs. infectious disease?
10. How should risk communication strategies and approaches, e.g., messages, evolve over the course of a threatening or terrorism event?
11. How can communication experts facilitate and/or reassure clinicians, scientists, and other subject matter experts to craft understandable policies, messages, and materials?
12. What processes, structures, and mechanisms need to be developed to (1) foster collaboration, (2) consistent communication/messages and, (3) appropriate responses across experts and organizations?

Managing the Community Response to Bioterrorist Threats

Crisis Health Risk Self-Assessment Tools to Triage the Patient Surge

Victor W. Weedn, Michael D. McDonald, Steven E. Locke, Merritt Schreiber, Robert H. Friedman, Richard G. Newell, and Lydia R. Temoshok

Expert panel:

Victor W. Weedn (Chair), Adil Alaoui, James Carter, Niel Constantine, Adam Darkins, Robert Friedman, Dan Hanfling, Steven Locke, Michael McDonald, Merritt Schreiber, Peter Szolovits, Lydia Temoshok, and Eugen Vasilescu

Addressing the psychological and behavioral aftereffects of bioterrorism has emerged as a central but relatively neglected component of the National Bioterrorism Resp0onse effort. The significant public health challenges surrounding the potential psychosocial effects of bioterrorism were highlighted in the aftermath of 9/11, the Anthrax attacks in Florida, New York and Washington during 2001, national reports from the Institute of Medicine, Secretary's Emergency Public Information and Communication Advisory Board and the National Advisory Board for Children and Terrorism, compounded by results of several national exercises such as TOPOFF 2 and Dark Winter.

The psychosocial impacts of bioterrorist events are diverse and pervasive—extending far beyond those victims who are exposed and ill, to include those individuals who perceive themselves or their family members as threatened or affected by the agent. Psychosocial effects are manifest across a spectrum of disorders, including posttraumatic stress disorder, panic, specific fears, and "psychogenic illness" with symptoms that may mimic those associated with various chemical, biological, radiological or nuclear explosive agents (CBRNE) agents.[1] These phenomena have been described as Multiple Unexplained Physical Symptoms (MUPS),[2] Idiopathic Psychosomatic Illness (IPI), Disaster Somatization Reaction (DSR),[3] and in the past as "worried well," a serious misnomer given that the overwhelming anxiety of such individuals hardly constitutes "wellness". When such reactions occur in large numbers of people, the phenomenon has been called "mass psychogenic illness."[4]

Experience with CBRNE incidents to date has shown that the great proportion of individuals seeking care (the so-called "surge") have in fact had no known direct exposure whatsoever, but have been stimulated by media reports. For example, in the aftermath of the Tokyo Sarin attack of 1995, approximately 88% of the medical emergency visits (4,500 of the 5,100) were of individuals who feared that they had been exposed but for whom no exposure was determined.[5] Similarly, following the death of 4 children who accidentally ingested discarded medical isotopes, over 100,000 individuals were screened, and approximately 5,000 with no known exposure to the agent in question, reported symptoms consistent with acute radiological poisoning.[6] Thus, in terrorist events with CBRNE agents, the numbers of individuals who seek care in the absence of exposure may be orders of magnitude larger than the number of individuals seeking care who are actually exposed or ill, thus presenting a secondary public health impact and demand on emergency care systems beyond that of the CBRNE agent itself.

The health care response required by acutely ill patients in need of emergency medical care and/or hospitalization could be seriously compromised by this patient surge.[7] In other words, MUPS patients, and an even greater number of concerned but non-exposed individuals, threaten to overwhelm the system and in turn create further secondary mass psychological reactions, potentially delaying diagnosis and care for those actually exposed. From both the emergency management and public health standpoint, responses must be developed to address this phenomenon. Although the impact of surge has been postulated and observed in national exercises, the management of the psychosocial and behavioral factors that contribute to surge has been largely overlooked in most terrorism preparedness and response planning. To date, no national emergency management and

public health strategy has been articulated to prevent, mitigate, and manage these psychological/behavioral reactions as they relate to medical surge in terrorism events.

PROPOSED MANAGEMENT OF PATIENT SURGE: AUTOMATED CRISIS HEALTH RISK SELF-ASSESSMENT TOOLS

We will describe an armamentarium of automated crisis health risk self-assessment tools designed to address the CBRNE patient surge and form the basis for a community crisis awareness system. Harnessing the power of information technology (IT) yields the opportunity to reach the broad public in a sufficiently timely and efficient manner to deal with the overwhelming numbers of individuals who are likely to seek healthcare and information in the wake of bioterrorism. IT architectures can screen large numbers of individuals rapidly, efficiently and uniformly, can apply sophisticated algorithms and heuristics to the problem of differential diagnosis, and can adapt to evolving information and situations on a real-time basis. We envision this IT screening system as only one component of a larger strategy to respond comprehensively to the various medical, psychological and behavioral aspects of bioterrorism. When appropriately validated, the crisis health risk self-assessment tools could be expanded into a cost effective "all hazards approach" to inform and educate the public about their risks during various phases of such emergencies.

Specifically, we propose developing, adapting and validating automated crisis health risk self-assessment tools, consisting of a screening tool to determine the likelihood of actual exposure and whether the symptoms appear to be more likely psychogenic or agent-based, and a personalized report to help the individual determine the likelihood of actual exposure and need for further information or human services. These tools will provide individuals with the capacity to assess their own symptoms and relative risk of illness from a particular event prior to, or upon entry into the healthcare system, thus diverting a portion of the non-exposed away from emergency and primary care settings, towards other support systems and mental healthcare. One section of their personal report will provide referral information so that an individual can rapidly act on his or her most appropriate response options. The toolset can be designed to be customized and localized so that local jurisdictions can refer the public in a highly specific manner to the most optimal local services to address their particular medical, psychosocial, mental health, and/or informational service needs. The system would serve to bolster strategies developed by officials to guide the public to the most optimal services to address their particular medical, psychosocial, mental health, or informational needs. The system could also assist in scheduling needed appointments. Thus, intelligent health risk self-assessment tools will facilitate the distribution of patients across and within healthcare systems geographically and temporally, permitting public health systems and communities to more appropriately and effectively handle the "surge," thus preventing regional healthcare provider systems from being overwhelmed.

Particularly in the case of radiological and biological events, perceptions of risk and individuals' reactions to a terrorist attack will change over time. Such projected trajectories will be factored into the proposed system's algorithms on a real-time, as

needed basis. We envision a mature system composed of multiple stages of assessment over time, designed to take into consideration special populations with special needs, such as children, the disabled, the disenfranchised, the elderly, or other populations with special healthcare needs.

Automated crisis health risk self-assessment tools could be deployed to homes, workplaces, schools, hospitals, or other community facilities through home computers, telephones, manned terminals, or some combination of these. The most obvious, easiest, and most powerful medium would be a website on the Internet accessible to individuals in their home. More individuals have telephones (98% of Americans) and the web-based version could be mirrored on the phone system. National and local trusted communicators would increase the value of and the receptivity to these communications. Individuals who do not have computers or telephones could be directed through the media and word-of-mouth to public access stations. Manned or unmanned health risk self assessment stations could be setup at emergency room entrances, schools, or other disaster health care settings for those not remaining at home.

Moreover, an intelligent crisis health risk self-assessment toolset could be incorporated into a highly interactive and personalized approach on the web and through telephone-based interactive voice response (IVR) to provide additional value beyond present static media sources. For example, if the self-assessment results suggest that a person with dizziness has a likelihood of a psychogenic disorder, the program could provide the following feedback:

> "Ms. Smith, given your answers to this self-assessment, it is most likely that you have not been exposed but are understandably nervous about the possibility of contracting <anthrax>. Sometimes nervousness can cause symptoms of dizziness, and we suggest you take the following anxiety relieving techniques…"

An example of such integrated assessment and interactive educational feedback system was developed in the early nineties by the Behavioral Prevention Program of the US Military's HIV Research Program. Interactive videodisk systems for at-risk and HIV-infected military personnel consisted of (1) self-paced assessment of, respectively, HIV/STD exposure and transmission risk, and (2) feedback modules, in which an individual's responses to a risk scenario triggered presentations of the consequences of various choices and/or corrective information.[8] Also, randomized clinical trials of automated telephone patient assistance systems have demonstrated clinical efficacy and reduction in emergency health services utilization by patients.[9-14] Evaluations by patients, consumers, and health professionals have indicated high levels of satisfaction with using interactive voice response patient assistance programs like the Telephone Linked Communications (TLC), discussed below.

BASIS FOR DISCRIMINANT FUNCTIONS

There is a long and distinguished history of the use of psychological testing dating back to World War II, with more recent developments in intelligent medical diagnostic

and triage algorithms. A number of assessment tools, both self-report questionnaires and structured interviews, have been validated specifically for identifying and diagnosing a variety of more or less relevant psychological reactions and conditions (Table 1).[15,16] For example, the "Impact of Event Scale-Revised" (EIS-R), is a 22-item self-report measure designed to assess current subjective distress for any specific life event.[17-19] Recently, an NIMH roundtable compared the sensitivity and specificity of dozens of such instruments with unpublished results at this time.[20] These currently available instruments are generally narrow in their scope of assessment and have not been designed to distinguish psychiatric morbidity and psychosocial distress from acute physical illness. Stress and anxiety indicators, in and of themselves, are not expected to well discriminate between exposed and non-exposed populations. In the immediate aftermath of mass casualty events and the resultant media exposure, many individuals—both those truly exposed and those not exposed—experience non-specific stress-related symptoms, most of which will subside in the short-term. It is also important to recognize that individual differences dominate event characteristics in the response to toxic events and treatment options.[21] Hence, new tools must be developed, which will largely be based on objective agent-specific symptoms,[22] Nonetheless, elements of various psychological assessments might prove useful in community crisis awareness tools to reflect the level of distress by the individual and assist in the differential diagnosis.

Thus, automated crisis health risk self-assessment tools will primarily aim to discriminate between agent-derived illness and psychogenic phenomena through: 1) knowledge of the range of symptomatology generated by given biothreat agents over time, 2) our knowledge base of psychological profiling of persons demonstrating MUPS and those thought to be at risk for the development of MUPS,[23-26] and 3) geospatial and temporal of actual threat exposure information. Further sensitivity and specificity will be achieved by including questions to assess individual response proclivities, including non-attentive or social desirability answering, minimizing, exaggerating, and frank malingering. The result will be a probabilistic differentiation between those who are suffering from actual exposure and those without clear exposure but who are nonetheless affected by an event. With time and validation testing, such systems could become further sophisticated and capable, but even an imperfect system would be an enormous improvement to the current system, or lack there of, in which no attempt is made to segregate the MUPS from exposed individuals.

An ideal assessment tool would be tiered, sensitive to time and event processes, and interactive. As an example of a tiered assessment, if someone self-reports symptoms of confusion, they move down the algorithm to a brief assessment of anxiety, which could exacerbate these symptoms. If such symptoms are not anxiety-related, the person could be given a brief automated neurocognitive screening battery.

Such tools could not only categorize symptoms but also assess the severity and phase of anxiety or illness. Interactive discernment of levels of possible exposure would lead to various agent-specific algorithms in tiered systems. This information would be useful for prioritization schema as well as useful for specific medical care or mental support. Thus, a severity scale or time plot wizard would assist emergency or mental

healthcare workers to optimally and efficiently address patient needs, as well as to furnish a picture of overall community health.

This novel technology might prove not only more efficient, but also improve the accuracy of discrimination and differential diagnosis. Emergency physicians are not generally adept at dealing with psychogenic symptomatology;[27] whereas, the computer can deploy sophisticated heuristics and statistics to analyze the responses of a presenting individual, and use dynamic real-time state-of-the-art information that has evolved during a particular biological event.

CURRENT EFFORTS

We now describe three complementary existing or developing tools that aid or could aid individuals in conducting self-assessments following a bioterrorist outbreak:

1. Proposed National Capital Region Self-Risk Assessment and Communication Demo System

   This proposed self-risk assessment and communication system is based upon an initial assessment tool developed at the Harvard School of Public Health and the School of Medicine, by Rick Newell, Steven Locke, Paul Testa, and Kathy Wong. The plan is to launch the system on Global Health Initiatives servers as a testbed within the National Capital Region during 2004.[28] The function of this tool is to intervene as a triage mechanism in the period following a likely biological weapon attack. Secondarily, it assists with the separation of those who are manifesting symptoms from actual exposure to the agent, from those who are experiencing the symptoms as a result of attack-related stressors. Risk communication skills are used throughout the system to appropriately convey the relative risk of exposure. An incorporated geographic information system (GIS) allows the tool to assist with public health outbreak investigations, case finding, and directions customizable to the individual taking the assessment. The tool can be deployed via paper, phone with speech-recognition software, home computer via the Internet, a screening center, or an acute care facility. The assessment begins with the questions most predictive of actual exposure first. If the respondent answers these questions in such a way that indicates he or she should seek medical care, the program will so direct the individual, and the assessment will end.

   There tool assesses four types of data. Type 1 data assesses the patient demographics and situational factors such as proximity to exposure, and availability of mass transportation. Type 2 data are customized to a given attack/agent, based upon knowledge of the presumptive agent from syndromic surveillance, intelligence, or detection systems. Type 3 data assess symptoms that are more likely the result of acute stress rather than exposure. Type 4 data assess the susceptibility of the individual to experience physical symptoms as a result of stress. A final score is given to each patient and reflects the probability that he or

she is experiencing symptoms related to exposure versus the acute stress of the attack. A threshold score will be set at which the respondent will be directed to seek medical care in order to be treated for exposure or further rule out exposure. Other thresholds can be set directing respondents to other sources of care or counseling. These thresholds will be adjusted during the time following an attack based on the capacity and flow through emergency and healthcare services. The threshold can be lowered continuously as healthcare services are able to deal with added patients, and thus all respondents can eventually be seen if they so desire. By delaying or smoothing out the somatization surge post event, medical access of those more likely at risk is protected and ensured.

2. Pediatric Disaster Systems of Care and PsySTART

PsySTART is a pediatric disaster system of care model linked to a technology-based rapid triage system.[29,30] Developed by Merritt Schreiber at David Geffen School of Medicine at UCLA, the system is designed for comprehensive incident management of pediatric mental health risk across phases of mass casualty events and across various "disaster systems of care". The system uses a web-based interface to systematically triage, assess, and track children at risk from psychological consequences of mass casualty events, disasters, and WMD terrorism events. PsySTART provides real-time, geographic information system (GIS) enabled linkage between emergency departments, primary care providers, schools, specialized medical disaster settings (i.e., NDMS /DMAT), disaster relief agencies, and public mental health to link services for children at high risk for post-event effects. It serves as a centralized communication tool to coordinate the acute phase and recovery mental health response, and establishes a common protocol for seamless triage, screening, clinical assessment, and definitive care.

3. Automated Telephone-Based Symptom Triage

Telephone-Linked Communications (TLC) is a telecommunications system for monitoring patient symptoms and other clinical findings, and for educating, advising and counseling patients and consumers about their health and medical conditions. TLC technology and clinical applications have been developed and evaluated by Robert Friedman and colleagues at Boston University with about $20M of NIH and AHRQ support over the past 20 years. TLC systems use validated instruments supplemented by expert clinician input to evaluate potential symptoms, and to report these automatically to responsible clinicians in a form that assists in clinical decision-making.[31-34] For a future biodefense preparedness system, TLC could be used, via a toll-free telephone number, for people who believe they may have been affected in an event to triage them for appropriate follow-up. Using behavior change intervention strategies that have been effective in a variety of health behaviors, TLC could also educate, advise and counsel individuals who are likely to have stress related symptoms.

SYSTEM ARCHITECTURE

Automated health risk self-assessment tools should be incorporated into IT system software that is sufficiently general that it can be applied to jurisdictions throughout the United States, and yet is sufficiently flexible to be customizable for local needs. Ultimately, any information technology solution to bioterrorist incidents should be a distributed system, based upon core standardized and interoperable tools that allow customization and localization at the state and local levels. Any IT software must be flexible to accommodate to new, dynamic and fluctuating situations, as well as to adapt to a variety of jurisdictional political requirements and information system architectures. Open system software should be used to permit the greatest flexibility for adaptation. The system must have a central architecture with the core elements of the system, as well as local controllables, supplemental databases, and customized applications that can be added over time. The system should be redundant so that it is not dependent upon only one communication mode; for instance, it would not be wise to assume the Internet will be available for the system to function during a crisis.

Acceptance and integration into the IT fabric of modern governments will require consideration of pertinent standards. The broader biodefense and homeland security information infrastructure to which these system components may be linked will also play key roles in assisting outbreak responses. The system may integrate multiple functional components (e.g., self-assessment, resource tracking, referral, risk communication, surveillance, alerts, geographic tracking) into a seamless decision support system. Thus, a broad variety of applications, such as computer-assisted screening interviews, meme[35] surveillance of portal databases to trigger alerts on psychological and behavioral issues, chemical and biological detection devices, monitoring contact distance through the use of locator bracelets, tracking of patients, allocation of resource stockpiles, management of patient flow, and tracking of behavioral response to risk communications can and should be developed and linked to the self-risk assessment and communication IT system. In this way, multifunctional homeland security system components can interconnect and work synergistically to provide a seamless fabric that best protects our citizens and societal infrastructure.

We propose that the system infrastructure conform to the Department of Homeland Security (DHS) Federal Enterprise Architecture (FEA) Technical Reference Model Version 1.0,[36] and informed by Department of Defense bio-surveillance data integration efforts.. In addition, the software should be compatible with the developing National Health Information Infrastructure,[37] following the specific guidance for IT systems[38] and risk communication.[39] established by the Centers for Disease Control and Prevention (CDC) .It is anticipated that the architecture may rely heavily on messaging infrastructures (i.e., message queuing) and content (XML, HL7 etc) while allowing for fully autonomous local functioning and capturing clinical data using the expected standards (e.g., LOINC, SNOMED, DICOM).

Security and privacy concerns will be of utmost importance to any such system that deals with sensitive individual information and public surveillance data. Universal secure

access to the system is necessary, however, for participation of government leaders, responders, and the public.

OTHER SYSTEM FUNCTIONS

In addition, to the primary purpose of health risk self-assessment screening and reduction of surge, there are other significant potential functions of this proposed system: 1) medical staging and prioritization, 2) contact distance management, 3) surveillance of community mental health, and psychosocial/behavioral concerns, and 4) risk communication.

Medical staging and prioritization: In addition to discriminating psychogenic manifestations from bioagent-derived symptoms, the system could also provide information on the level of emotional distress, and likely phase of the malady that would be useful for later emergency caregivers to have at their fingertips. Self-assessment tools could provide a tiered structure of screenings according to constructed algorithms that would order clinical diagnostic tests automatically on the basis of respondents' responses.

Contact distance management: The crisis self-assessment tools may provide the epidemiological data necessary for public health interventions to prevent contact with an infectious agent and to maintain social distance between exposed and non-exposed groups. In the case of communicable infectious disease, the benefit is clear and compelling. In addition, it is also good medical practice to separate those with actual disease from those with stress disorders and other psychopathologies to prevent further psychogenic ("hysterical") contagion. An automated crisis health risk self-assessment system could play a major role in increasing the efficiency of patient isolation and self-quarantine in the case of community spread of an infectious agent such as SARS.

Risk communication: The proposed automated crisis health risk self-assessment system can be used as a vehicle to facilitate communications to the general public. The quality of the communication about an outbreak and corresponding messages of civic leaders and government officials can foster fear or allay anxiety, and thus the resultant levels of stress, distress, and MUPS.[40,41] For example, Winston Churchill through his oratory effectively calmed the British peoples in the face of great danger. The ability to identify, categorize, prioritize and communicate risks is critical to optimize response in disasters.[42]

The proposed system could be a significant component of a wider community risk communication effort. The communicators used in automated crisis health risk self-assessment communication components should be known and trusted figures within a given community (e.g., video sequencing showing a respected person advising you to stay calm or helping you consider whether you have symptoms pertinent to the current emergency). The IT system could educate and inform specific targeted communities by providing linkages to other local sources of information. It would help augment understanding of basic biological concepts such as relative risk, exposure, contagion, and so forth, so that individuals may make better and more empowered health-decisions in

crises. The interactive nature of this technology could be extended into providing mini-interventions for various problems (e.g., lack of information, or understanding about a biological agent), and individually tailored on-the-spot corrections of misinformation, reducing uncertainty and decreasing anxiety.

Automated components of these systems will enable automatic translation of messages into other languages and use culturally competent and educationally appropriate vocabulary and phraseology. Information technology permits highly interactive and customizable communications that enable appropriate responses to an individual's and subpopulation's reactions in helping make health- and life-critical decisions and take actions in high risk, and potentially low trust, environments. A person could indicate in the beginning of the assessment whether they would like to have the "interviewer" or communicator voice in a certain language, or a certain gender, and the system could recognize the source location and customize accordingly. Groups that might receive specifically tailored messages include those immediately threatened by the incident, healthcare workers, rural-dwellers, families, and those with special needs. Such a system could deliver evidence-based messages that are soothing as well as action-oriented, precisely to those most concerned. To address the individual's need for self-preserving actions in a context of understanding issues affecting the common good, programs can be designed to deliver messages designed to maintain and improve community cohesion and resilience in times of emergency and crisis.

Surveillance of community mental health: Simultaneously, while the system assists preliminary screening functions, data can be generated on the evolving public reaction to a critical incident. Key professional, community, and government decision-makers will be able to monitor surge capacity, public response, and message structure in a secure backend component of the system that includes scientific visualization and decision-support employing a geographic information system. Information on the number of patients directed to mental health workers, emergency medical care, and other support systems will facilitate ideal healthcare resource allocation. Moreover, the data will be a real-time direct gauge of the true incidence and magnitude of public concern and psychosocial dimensions, along with geospatial and temporal aspects used to determine trending. Viewing this information dynamically on geographic information systems enables key decision makers to respond effectively to the most pressing considerations of the crisis at that specific moment. Specifically, the system could permit a more formalized community-wide risk assessment to public health and emergency services. The need for such a system was highlighted during the 2002 anthrax letter attacks, when the CDC received over 11,000 telephone calls from the public. The absence of standardized health communication protocols prevented efficient follow-up investigations and could not give an up-to-the-minute sophisticated picture of the public reaction.[43]

IMPLEMENTATION

Stakeholders: Automated health risk self-assessment software components are likely to be developed by a broad array of public and private interests. A range of licensing and ownership options are likely to emerge if automated health risk self-assessment toolkits

and systems are determined by pure market forces. System service stakeholders might include states, political jurisdictions, public health departments, mental health services, emergency services, non-governmental organizations (e.g., the American Red Cross), regional and local hospitals and healthcare systems, as well as the patients themselves. It is suggested that core system components be developed as according to national standards, evaluated by the Federal government, but maintained by private interests required to meet established performance and safety standards. Incentives, such as from an advanced component economy, should be created to ensure that automated health risk self-assessment tools, components and systems continue to evolve in depth, breadth, and quality. Attempts should be made to benchmark the most effective self-assessment tools, components, and systems.

Emergency services have command and control authority over crisis incidents and thus they are a possible service owner, particularly if the system is aimed at pre-hospital distribution. The data generation and risk communications aspects of such a system would seem clearly to fit within governmental crisis response efforts. Medical triage, however, is an important entry function of healthcare systems and automated health risk self-assessment tools could play a part in directing individuals toward appropriate hospital admitting operations (See Figure 1). Healthcare systems will want control over patients once they are entered into their system. A psychosocial or mental health triage tool may be claimed as the province of human resource departments. Perhaps the most obvious owner/licensee would be public health departments, in that community health and the medical consequences of a bioterrorist outbreak are usually the province of public health authorities. It is conceivable, however, that public health systems may not see such an IT solution as among their traditional duties and responsibilities. We would argue that the need to prevent the overload of medical services of a region—which could lead to a failure of system response—is logically construed as a local or regional public health responsibility that transcends any single healthcare system.

Regardless of the agency that takes ownership of the system, the effort must have the buy-in of all stakeholders, including the medical community, public health, emergency responders, and of the community. Challenges for obtaining buy-in will include funding, "turf," and the difficulty in validating the early instantiations of the systems.

Liability: Liabilities are created both from errors of commission and errors of omission. Some may voice concerns over the liability involved in self-assessment tools. This same concern was voiced in earlier years with respect to medical websites and self-help books, which have now been in common usage for many years without significant problems regarding litigation. Nonetheless, national standards establishing the scientific basis and validation and verification process for such systems will be important to maximize public safety and minimize liability for the product developers and service owners/licensees who comply with the national standards.

The preliminary assessment, screening, referral and risk communication components should carry disclaimers that the system is for educational purposes and is not to be considered diagnostic systems (which would, under the present conditions, require the

direct intervention of a physician in real time). However, in lieu of full diagnosis, there is reason to believe from the extensive literature on premedical screening, that the assessment and referral components can handle large numbers of people in a pre-medical screening mode which directs those with high risks of exposure or medical symptoms to appropriate medical and mental health services for further diagnosis and treatment.

Upon completion of the screening, the symptomatic patient will end up in the care of a traditional human service-based medical and mental health professional. If the individual has been found to be misdirected, he or she can be then be redirected to the more appropriate medical element. The greatest concern is that individuals who are at high risk might use health risk self-assessment tools and not seek necessary care. This potential problem needs to be carefully studied in controlled environments, perhaps in non-emergency conditions, such as during the annual flu season to explore the extent of this potential problem. Every effort should be made to avoid false negative risk designations, while also understanding the critical need to reduce infrastructure overload by MUPS patients and lower risk, asymptomatic individuals.

Without such a pre-medical screening system, and with medical systems under the stress of infrastructure overload, many people in need of immediate medical care may be delayed in reaching medical care or may not reach a medical professional during the critical time necessary to optimize treatment and reduce harm to others. Before community crisis assessment systems come into common usage, the perceived liability will be in the adoption of such systems. Once systems are in common practice, by far the greater liability will be in not providing access to health risk self-assessment tools.

Pilot Projects: Pilot testing will be necessary for validation and verification efforts, to garner acceptance, and to make improvements in the self-assessment tools and IT system. With pilot tests, many problems, gaps, and potential solutions will be revealed. Although the system's objectives are compelling, early testbeds must be carefully evaluated and well documented in attaining their proposed goals before many jurisdictions will adopt the operational systems. Validation will, in the first instance, begin with clinical practice and perhaps also during emergency preparedness training exercises. Simulated attacks have been used to assess community reactions. For example, DiGiovanni and colleagues simulated an intentional Rift Valley fever outbreak in a community in the southern part of the United States using a series of simulated print and television "news reports" over a fictional 9-day crisis period.[44]

Demonstrations through early adopters will be necessary. Potential testbeds might include: 1) the National Capital Region; 2) Allegheny County, Pennsylvania; 3) Santa Clara County, California; 4) Los Angeles County, California; and 5) State of Massachusetts with a focus on the Boston Metropolitan area. In each area, there is a very active bioterrorism preparedness effort, perceived vulnerabilities to infrastructure overload, and a willingness to investigate new IT solutions.

Funding: DHS may also be a significant source of funding for pre-hospital systems to states and localities. CDC and the Health Resources and Services Administration

(HRSA) funds may also be useful in distributing toolsets as regional patient surge capacity/bioterrorism equipment. The need for such systems would seem to be a national mandate, in the wake of 911 and the anthrax outbreak of fall 2001. The cost of effective risk assessment tools and communication systems amortized over many jurisdictions would be a small fraction of the human service costs associated with addressing the service need directly through the health care system, let alone the human costs and economic damage associated with a health care system failure during a crisis. Thus, the need to proliferate and distribute effective automated health risk self-assessment systems broadly should follow quickly.

CONCLUSION

In modern history, biological weapons have proven to be more of a psychological threat than a physical danger. At least in the United States, they have proven to be weapons not of mass destruction, but of mass psychogenic illness. Hippocrates first noted this phenomenon around 400 BC when he introduced the term hysteria to describe a group of women he observed who had unexplained muscle spasms, abdominal cramps, nausea, and headaches.[45] This phenomenon has been recognized as the presentation of physical symptoms for which there is no underlying physical cause, but instead, appear to be manifestations of psychological distress. Healthy adults commonly experience isolated minor symptoms, minor illness, and transient dysfunctions in the course of daily life that could be construed as within the range of hysterical phenomena. Population-based surveys indicate that 86% to 95% of the general population experience at least one symptom in a given 2- to 4- week interval, and the typical adult has at least one somatic symptom every 4 to 6 days.[46-50] After a bioterrorist attack, individuals experiencing these psychogenic symptoms will outnumber those actually exposed by many times. These two patient groups must be separated and addressed differently; yet, there is currently no established, validated tool or mechanism to manage this realistic challenge. By using the power of information technology, self-assessment tools will be able to distinguish these two groups; provide initial customized feedback to individuals about their risk, what they can do to manage stress and psychogenic symptoms, and/or seek medical care for likely agent or event-based physical symptoms; provide a mechanism to screen, prioritize and distribute the patient surge; optimize resource allocation; facilitate individual and community risk communications; and surveillance and monitor public exposure, stress, and reactions to crisis events.

TABLE 1. Examples of Existing and Relevant Pyschometrics*

Generalized Psychosocial Distress:

Symptom-Checklist-90 [SCL-90] (Derogatis, 1973)
Brief Symptom Inventory [BSI] (Derogatis & Melisaratos, 1983)
Primary Care Evaluation of Mental Disorders [PRIME-MD] (Spitzer et al., 1994)
General Health Questionnaire [GHQ] (Goldberg, 1972)
Symptom-Driven Diagnostic System Primary Care [SDDS-PC] (Broadhead, 1995)
Mental Health Inventory [MHI] (Veit, CT and Ware, JE, 1983)
Behaviour and Symptom Identification Index [BASIS-32] (Eisen & Grob, 1989)
Impact of Events Scale [IES] (Horowitz, Wilner, & Alvarez, 1979)

Depression:

Beck Depression Inventory [BDI] (Beck et al, 1961)
Center for Epidemiological Studies [CES-D] (Radloff et al., 1977)
Hamilton Rating Scale for Depression [HAM-D] (Hamilton et al, 1967)

Post Traumatic Stress Disorder (PTSD):

PTSD Checklist [PCL] (Weathers et al, 1991)
PTSD Symptom Severity Interview [PSSI] (Foa et al, 1993)
Clinician-Administered PTSD Scale [CAPS] (Blake et al., 1990)

Illness Worry & Conviction:

Whiteley Index (Pilowsky, 1967)
Illness Attitudes Scale (Kellner, 1986)
Penn State Worry Questionnaire [PSWQ] (Meyer, Miller, Metzger, & Borkovec, 1990)

Stress:

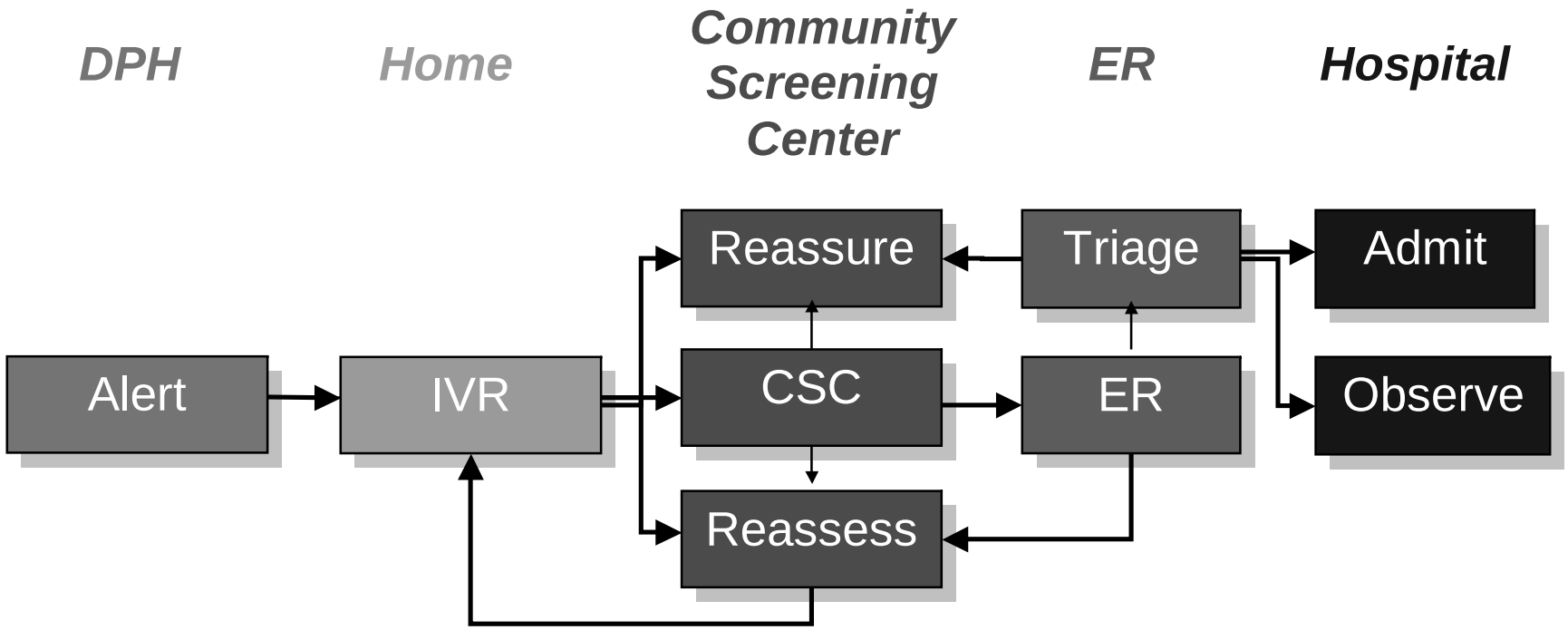
Perceived Stress Scale [PSS] (Cohen, 1983)

Anxiety:

Anxiety Screening Questionnaire [ASQ] (Wittchen & Boyer, 1998)
Hamilton Anxiety Scale [HAS] (Hamilton, 1959)

* These are provided as examples, there are numerous other validated and accepted instruments.

Figure 1. Screening and Triage Protocol



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Appendix A

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Appendix C: IOM Recommendations 2003

These are the recommendations from the 2003 report from the Institute of Medicine, *Preparing for the Psychological Consequences of Terrorism: A Public Health Strategy*, Washington DC, National Academies Press, 2003. We have included comments in italics that were informed by the discussion among the expert panels participating in the preparation of the present report.
In contrast with the IOM report, this present report focuses on the need for increased attention to a unique dimension of psychological first aid, the potential confusion of physical-somatic symptoms attributable to direct toxic effects of biological, chemical or radiological weapons as opposed to the somatic manifestation of acute stress and anxiety secondary to fear of exposure, whether real or imagined.

"Recommendation 2-1: The Department of Health and Human Services (HHS) including the National Institutes of Health (NIH), the Substance Abuse and Mental Health Services Administration (SAMHSA),and the Centers for Disease Control and Prevention (CDC), should develop evidence-based techniques, training, and education in psychological first aid to address all hazards and all members of society during the pre-event, event, and immediate post-event phases of a terrorism event in order to limit the psychological consequence of terrorism."

"Recommendation 2-2: HHS, including NIH, SAMHSA, and CDC, should develop public health surveillance for pre-event, event, and post-event factors relevant to addressing the psychological consequences of terrorism and should develop methods for applying the findings of this surveillance through appropriate interventions for groups of special interest."

Comment: One of the questions raised in the present report is whether patients with a past history of medical conditions involving frequent care for medically unexplained symptoms are more likely to seek care inappropriately following news of a WMD event. If this were to prove to be true, this special population might increase the demand on ambulatory surge capacity

"Recommendation 3-1: Academic healthcare centers, professional associations and societies for mental health professionals, and state boards of education, in collaboration with HHS, including SAMHSA, NIH, and CDC, should ensure the education and training of mental health care providers, including community- and school-based mental health care providers on responding to the psychological consequences of terrorism."

Comment: We would add to this recommendation that expertise in psychosomatic medicine should be included in the skill sets required for training teams.

"Recommendation 3-2: Academic centers and professional associations and organizations, in collaboration with HHS, including SAMHSA, NIH, and CDC, should ensure the education and training of relevant professionals in health fields, including

primary car providers, school-based health care providers, public health officials, and the public safety sector, in the psychological consequences of terrorism."

Comment: We would add to this recommendation that expertise in psychosomatic medicine should be included in the skill sets required for training teams.

"Recommendation 3-3: SAMHSA, in collaboration with academic centers and state and local health care agencies, should ensure the provision of education and training in the psychological consequences of terrorism for a range of relevant community leaders and ancillary providers."

Comment: Training of community leaders and ancillary providers should include training on the potential confound of stress-induced unexplained symptoms and their potential misattribution to a WMD when a history of exposure is unlikely.

"Recommendation 3-4: The National Institute of Occupational Safety and Health (NIOSH) and the Department of Labor should collaborate to ensure the existence of appropriate guidelines to protect workers by incorporating the psychological aspects of preparedness into all planning and interventions. Because schools are a workplace for staff and students, the Department of Education should collaborate with state and local education systems to ensure preparedness."

Comment: Training of staff responsible for worker and student health should include training on the potential confound of stress-induced unexplained symptom, mass psychogenic illness, and their potential misattribution to a WMD effect under conditions when a history of exposure is deemed unlikely.

"Recommendation 3-5: Federal agencies such as CDC, NIH, SAMHSA, and NIOSH should coordinate research agendas, cooperate in establishing funding mechanisms, and award timely and sufficient funding of research on best practices to inform and guide interventions that will address the psychological consequences of terrorism."

Comment: There is an acute and critical need for research to determine if self-administered risk assessment and risk communication tools can be deployed for home-based use using technologies such as interactive telephony or the Internet to permit citizens to self-assess their risk of exposure and make informed decisions regarding the need for secondary medical evaluation or treatment.

"Recommendation 4-1: HHS and the Department of Homeland Security should analyze federal, state, and local preparedness for terrorism to ensure that the nation's public health infrastructure is prepared to adequately respond to the psychological consequences across a continuum of possible terrorism events, including weapons of mass destruction. The committee's example public health strategy should serve as a base from which components of the infrastructure are evaluated."

Comment: The present report provides additional detail including specific recommendations for how to expand the existing public health infrastructure to permit a large proportion of the risk assessment and risk communication that informs individual decisions to seek secondary or tertiary care.

"Recommendation 4-2: Federal, state, and local disaster planners must address psychological consequences in their planning and preparedness and their response to pre-event, event, and post-event phases of terrorist attacks. Consideration should be given to needs associated with different types of events and to needs of various segments of the population. Adequate federal, state, and local prioritization and funding of resources and support should be provided to ensure psychological preparedness and response."

Comment: The present report provides additional detail including specific recommendations for how to expand the existing public health infrastructure to permit a large proportion of the risk assessment and risk communication that informs individual decisions to seek secondary or tertiary care. In addition, the psychosocial dimensions of table top exercises and simulations need to be expanded to create more realistic scenarios that can test our system's capacity to respond appropriately to the potential confound of stress-associated unexplained medical symptoms, as well as those associated with predictable and expected anxiety reactions.