ORIGINAL RESEARCH

Utility of Fear Severity and Individual Resilience Scoring as a Surge Capacity, Triage Management Tool during Large-Scale, Bio-Event Disasters

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FR = fear and resilience
PTSD = post-traumatic stress disorder
SARS = severe acute respiratory syndrome

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Abstract

Threats of bioterrorism and emerging infectious disease pandemics may result in fear-related consequences. If left undetected and untreated, fear-based signs and symptoms may be extremely debilitating and lead to chronic problems with a risk of permanent damage to the brain's locus coeruleus and stress response circuits. The triage management of susceptible, exposed, and infectious victims seeking care must be sensitive and specific enough to identify individuals with excessive levels of fear in order to address the nuances of fear-based symptoms at the initial point of contact. These acute conditions, which include hyper-vigilant fear, are managed best by timely and effective information, rapid evaluation, and possibly medications that uniquely address the locus-coeruleus-driven noradrenalin over-activation. It is recommended that a Fear and Resilience (FR) Checklist be included as an essential triage tool to identify those most at risk. The use of this checklist facilitates an enhanced capacity to respond to limitations brought about by surge capacity requirements. Whereas the utility of such a checklist is evident, predictive validity studies will be required. In addition to identifying individuals who are emotionally, medically, and socially hypo-resilient, the FR Checklist simultaneously identifies individuals who are hyper-resilient and can be asked to volunteer, and thus, rapidly expand the surge capacity.

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Introduction

During the 2003 severe acute respiratory syndrome (SARS) pandemic, fear frequently was cited as a psychological consequence.[1–9] Fear itself was referred to as a "central pathogen" in the early epidemic process and was believed to be "spreading faster than the disease itself."[10] In Hong Kong, fear about the SARS outbreak was considered "stronger and more widespread" than the fear of any comparable, life-threatening illness.[11] The SARS pandemic is but one example of modern bio-events, which are defined as large-scale disasters secondary to biological agents that are either naturally occurring (e.g., Influenza A, potential H5N1 outbreak) or deliberate in nature (e.g., smallpox, inhalational plague, anthrax).[12] Bio-events, like other "silent disasters" (chemical, radiation), provoke uncertainty through fear of exposure to an unseen bio-agent for an indeterminate time with the propensity to cause states of extreme fear/panic, helplessness, and horror within the population. Until recently, fear and its consequences (i.e., potential post-traumatic stress disorder [PTSD]), and their prevention and management options have received little attention or research. Advances in the neurochemistry of fear have provided mental health workers and disaster planners with new opportunities to identify and mitigate the suffering of individuals debilitated by consequences of fear. Whereas such opportunities often are overlooked in the greater scheme of disaster management protocols, the science of fear must be better understood and integrated into victim triage management at the initial point of contact in any disaster, especially those of a "silent" nature, such as pandemics.

The Fear Response in Disasters: A 2006 Update

Fear, in contrast to anxiety, is the emotion that occurs when there is a clear and obvious source of danger that would be regarded as real by most people.[11,13] Individual fear and population panic involve the activation of the central and peripheral sympathetic nervous system, allowing one to respond quickly when faced with an imminent threat to survival. Previously, this was termed the "fight-or-flight" response. In a series of recent articles reviewing the biological literature on the hardwired human response to extreme fear, one of the authors has pointed out that the above 1929 catchphrase is incorrect and that the correct sequence of the initial responses to extreme fear is actually freeze-flight-fight-fright. This especially is evident in silent disasters during which the "fight" segment of the fear response sequence is not applicable.[14–16]

Excessive fear, recognized as a hyper-vigilant fear response, may be seen in the susceptible, exposed, and infectious population seeking care.[17] It is caused by the over-activation of noradrenergic neurons and manifests as signs and symptoms of hyper-arousal; its persistent symptoms being recognized as the biological basis for acute and chronic PTSD.[18,19]

Disasters due to natural hazards commonly are accepted the world over as the "will of God or nature". Although some level of emotional distress is common, the distress rarely reaches diagnosable levels and the duration of distress is self-limiting. The main exception is seen in persons who are less resilient because they have experienced prior psychological symptoms. They are at increased risk for developing elevated levels of anxiety, depression, and somatic symptoms. The same probably is true for persons who are less resilient because of financial or multiple medical problems.

The incidence of post-disaster PTSD often is used as the standard by which psychological severity of a disaster's impact on a population is measured.[20] Current diagnostic criteria for PTSD require that a person experience, witness, or be confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of self or others, and that a person's response involves intense fear, helplessness, or horror.[21] Using measures specifically developed to assess PTSD, researchers have found low rates of PTSD following floods, volcanoes, mudslides, and tornadoes where property damage was substantial, but other dimensions of trauma thought to contribute to PTSD, such as direct threat to one's survival or the presence of dead bodies, were not present.[20] However, the relationship of PTSD with fear-based events, such as exposure to lethal, inter-group violence (combat, war zone exposure, or intentionally caused disasters that result from terrorism) produce PTSD rates that usually are several times higher, and, as such, require reinvestigation of the potential that they can be prevented and/or mitigated.[19] Shalev *et al* conducted a landmark, prospective study of the onset, overlap, and course of PTSD and major depression in 211 subjects presenting to a general hospital's emergency department following traumatic events. These authors found that major depression and PTSD occurred early after the event. The authors found that "63 survivors (29.9%) met criteria for PTSD at one month, and 37 (17.5%) had PTSD at four months. Forty subjects (19.0%) met criteria for major depression at one month, and 30 (14.2%) had major depression at four months. Comorbid depression occurred in 44.5% of PTSD patients at one month and in 43.2% at four months." Shalev *et al* concluded that "major depression and PTSD are independent sequelae of traumatic events, have similar prognoses, and interact to increase distress and dysfunction. Both should be targeted by early treatment interventions and by neurobiological research."[22]

Humans Are Not Hardwired to React Adaptively to Pandemics

Evolution's role in altering species-specific risk for virulence of the disease during pandemics is well known; however, only recently has psychiatry and psychology begun to explore the evolutionary underpinnings of common psychiatric symptoms related to the limbic fear-circuits in humans. These background concepts have been reviewed by Bracha.[19,23–26] Building on concepts pioneered by Nesse, Bracha has argued that neuro-evolutionary time-depth principles also are useful in predicting human behaviors during the early stages of pandemics.[19,27] Intensive animal husbandry practices that facilitate re-assortment-triggered genomic shifts and pandemics only appeared following the emergence of high-population-density societies (circa 2000 BC). During the evolution of the human fear-circuits (early Pleistocene), population densities were too low for pandemics to occur.

Fear-circuitry evolution primarily was driven by disasters caused by natural hazards, predatory animals, and eventually, war. Therefore, humans evolved and became "hardwired" to flee and seek safety in numbers.[18,19,27] Whereas self-preservation often is assumed to be the natural response to physical danger, the greater stressor appears to be separation from attachment figures such as familiar persons and places.[28] Therefore, it is not surprising that disaster organizations, such as the Red Cross, historically have developed post-disaster, shelter care expertise. However, mass shelters in bio-events increase density-related risks, and become not only irrelevant and impractical, but actually contraindicated.[19] Moreover, the post-disaster psychiatric expertise developed by disaster organizations also now has been shown to actually be detrimental (Cochrane Database of Systematic Reviews).[30]

Bio-Events and Fear-Based Concerns

The modern world has seen increasing population densities, more crowded bio-event-disaster-prone urban centers, and emerging diseases often resulting from the encroachment of humans into formerly animal dominated environments (e.g., Hanta virus, Ebola, and HIV). The goal of triage-management in any pandemic is to prevent secondary infections by reducing the transmission rate of disease. Epidemic control is based on the fact that if the reproductive rate (Ro) of the disease (measured as average number of individuals directly infected by a primary case) can be held to <1, the disease eventually will disappear.[12,17] The SARS epidemic data indicate that during the first weeks of a pandemic, many

individuals may have mistaken (amygdala-driven) acute pseudo-somatic fear (i.e., panic) symptoms for infection-caused (cytokine-driven) symptoms.[19] Therefore, susceptible, but unexposed individuals may have ignored public announcements to shelter themselves in-place and instead flocked to hospitals, emergency departments, and clinics. Such actions actually increased the density and disease transmission by mixing uninfected persons with those already infectious.[12] In the initial days of the SARS outbreak in Toronto, the health system was "inundated" with susceptible individuals seeking care for the disease they did not yet have.[7] In those countries and cities in which SARS outbreaks occurred, reports indicate that non-compliance of the population was considered the main factor for the delay in controlling the disease.[31]

Triage-Management of Fear

Fear is said to have three components: (1) cognitive; (2) physiological; and (3) behavioral. Psychological stress will be ubiquitous among the outbreak-affected population, but for the most part, will not represent psychiatric illness.[8,32] Fear is essential. It is the recognition of what is a threat to personal survival, and therefore, must address fundamental issues of safety.[8,19] The susceptible population represents the largest population subgroup requiring immediate intervention, often provoked out of fear. If not attended to in a timely and accurate manner, this population may disrupt resource-limited services at healthcare facilities.[12,17] Effective information should mitigate the sense of danger and fear and lead the population to accept their home as a safe "shelter-in-place" environment. A secondary goal is to narrow the susceptible population to those who will require additional professional assessment, evaluation, and monitoring.[17]

If effective, risk management information is the basis for population-based public announcements that are the first line of triage management, along with social distancing measures (e.g., sheltering-in-place, closing schools, canceling mass-gatherings, and isolating cases), to ensure safety and control disease transmission. Community-based programs primarily would consist of phone-based hotlines and face-to-face encounters in infection-free ("cold zone") triage and information centers, outside hospitals, ambulatory care facilities, clinics, or vaccination and prophylactic medication distribution centers within a community. The first level of communication would include repeating and disseminating the exact message via television, radio, and/or the Internet by the Department of Health Public Affairs personnel.[33,34] This reinforcement and clarification of critical information should lead to recognition of potentially dangerous behaviors, confidence to manage issues of safety and creation of a safe home environment, and embracement of schedules of media-based, health information updates. In addition, the public health infrastructure must respond to essential needs such as the provision of food, medication, and the care of co-morbid disease, and to communicate these arrangements to the population effectively.

The Canadian SARS experience suggests that a phone bank approach is appropriate for first-line triage contact during an epidemic. The Canadian Government-operated 1-800-Telehealth phone bank, which normally received 2,000 calls/day, received up to 20,000 calls/day during the outbreak, requiring additional staffing by nurses and public health personnel. By utilizing protocol-driven recorded and live assessments and advice, the system was able to separate callers into probable "infected versus uninfected" categories and served to minimize duplication of efforts and mixing of triage category populations at the hospital level. Real-time, central data interpretation of information and population needs collated by the phone bank system contributed to the development of new protocols and improved advice and referral schemes.[35,36]

Fear Scoring Using the Bio-Event Fear and Resilience (FR) Checklist

The triage-management system must be alerted to identify persons with excessive fear, low resilience, and a lack of coping skills that may require further evaluation without increasing their risk of exposure. Victims suffering hyper-vigilant fear represent a key subgroup that may benefit from short- and long-term interventions. Normally, the diagnosis can be mitigated cognitively by effective information that is frequent, honest, and transparent. Even then, hyper-vigilant fear states may compel many to seek additional assistance, and if left undetected and untreated, may be extremely debilitating and lead to chronic problems with an increased risk for permanent damage to the locus coeruleus stress response system.[18,38–40]

A rapid assessment tool, the Bio-Event Fear and Resilience (FR) Checklist, can be administered either by phone or face-to-face by trained volunteers (Figure 1).[41] Parts 1–3 checklist objectives are used to assist in the determination of whether the caller to a phone hotline or a citizen showing up at a Triage-Information Center is *probably exposed/infected* vs. *probably not exposed/infected*. For the purpose of illustration, each question would be weighed similarly at the onset during all epidemics and pandemics, especially of a respiratory nature, and are arbitrarily given generic scores of 1. However, the score weight of each question would change and become more disease-specific as the case definition of the outbreak would change. Part 4 (Fear and Resilience: FR) emphasizes physiological symptoms with special emphasis on physiological signs that are the most common and best-researched predictors of adverse, post-disaster consequences among healthy individuals. The symptoms are: (1) racing heart; (2) sweaty palms; (3) tremulousness; and (4) shortness of breath (hyperventilation).[18,37,38] Indeed, Shalev *et al* reported that trauma survivors with PTSD had higher heart rate levels at the emergency department and reported more intrusive symptoms, exaggerated startle, and peri-traumatic dissociation than did those with major depression.[22]

Fear and resilience scoring can be performed in two minutes using a yes/no/maybe format, providing a *fear severity score*. Part 4 scores range from zero to a maximum of 50 (the higher the score the greater the risk). Emotional resilience questions (3 of 17) estimate a person's resilience to emotional stress (protective factors); physical resilience utilizes the number of different prescription medications as

BIOEVENT FEAR & RESILIENCE (FR) CHECKLIST

Bracha & Burkle ,2006

Face-to-face __ | Phone __

Screener #:

Start with part 1 below
Circle Yes's checkmark No's

PART 1:
Do you believe you have been exposed or infected? Yes (1) No
If so, how did this occur?

PART 2:

Do you have a fever?	Yes(1)	No
Did you check your temperature with a thermometer?	Yes(1)	No
Do you know how high the fever is? _____	Yes(1)	No
Are you experiencing persistent cough?	Yes(1)	No
Are you experiencing a sore throat?	Yes(1)	No
Are you experiencing difficulty breathing?	Yes(1)	No
Are you experiencing diarrhea?	Yes(1)	No

PART 3:

Is anyone in your immediate family or contacts experiencing these symptoms?	Yes(1)	No
Have they received Medical evaluation or care?	Yes	No(1)

If any questions in PART 2 are answered in the positive please provide the caller with the immediate-referral options listed separately on referral Forms __

If determined as probably not exposed/infected please continue to PART 4 (estimate of current risk for future PTSD in civilians) ⇨

PART 4: A one-minute checklist for screened persons unlikely to be infected

	Circle and add YES scores:	YES	?	NO	Total sub-scores:
Are you fearful that...	...you are infected with ...? (the bird flu, SARS, etc.?)	5			Max: 30 PTSD A1
	...you will die from the ...?	10			
	...a close family member will die from ...?	5			
	...your children will die from... ?	10			
Right now, do you feel...	...fearful?	1			Max: 3 PTSD A2
	...helpless?	1			
	...horrified?	1			
Right now, are you experiencing...	Sweaty palms or cold sweat?	3			Max: 12 PTSD A3
	Trembling, shaking, or buckling knees ?	2			
	Racing or pounding heart?	5			
	Shortness of breath?	2			
Are you fearful that you will run out of money if you cannot work for the next 2-3 months?		5			Low Resilience PTSD A4
How many (different) prescription medications are you on?					
Are you the kind of person that tends to bounce back after an illness?		-10			High Resilience PTSD A5
Do you have any nearby blood relatives who may be willing to help you?		-2			
Do you have any friends you can contact by telephone/e-mail so that you do not feel alone?		-3			

PARTS 1 +2+3
Total Score ->

M/F: ___ Age: ____

Date: ____/______/____

Name: ________________________________

Phone: ______-______ Phone 2: _____-______

PART 4 score range is from minus 15 to 50 (+ number of medications)

PART 4 only:
Total Score ->
Criterion A of PTSD

Table 1—Bracha-Burkle Bio-Event Fear and Resilience (FR) Checklist. Parts 1–3 assist in identifying those exposed and/or infectious. Part 4 aims to objectively quantify current acute-fear severity and to estimate pre-morbidity resilience levels

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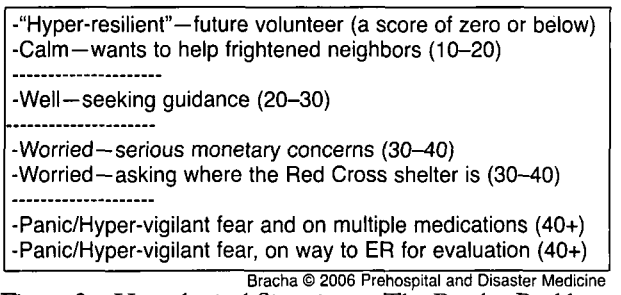

Figure 2—Hypothetical Situations—The Bracha-Burkle Fear and Resilience (FR) Checklist is utilized easily in identifying those with excessive acute fear (high scores), as well as those with high resilience (low or negative scores). By design, the FR Checklist has no obligatory cut-off, allowing disaster planners to adjust the intervention levels depending on surge capacity resources.

a proxy of physical frailty; and economic resilience is based on a fear of a lack of income in the coming 2–3 months. The authors posit that these two questions are more likely to be accurate predictors than immediate income loss, property loss, or employment status. During the SARS epidemic, the Canadian Government assured the affected population that it would provide for lost wages, thereby directly lessening the fear potential.

High scores (Figure 2) would alert volunteers to refer the individual to a healthcare provider backup system for further evaluation/referral, place emphasis on the cognitive process utilizing effective information and reassurance of safety, daily monitoring of fear and resilience-related negative behaviors and actions, and/or medications to mitigate noradrenalin over-reaction. According to the Cochrane Database of Systematic Reviews, treating hyper-vigilant fear with anxiolytic medications (benzodiazepines) and/or critical incident debriefing are contraindicated.[29,30] In contrast, a series of recent landmark studies have demonstrated that the short-term use of the beta-blocker, propranolol, in order to reduce noradrenergic over-activation in the immediate aftermath of emotional trauma is likely to be beneficial and efficacious in preventing the development of subsequent PTSD.[42–44] Interestingly, the alpha-blocker prazosin recently has been shown to have a major role in the treatment of PTSD-related nightmares and PTSD-related intrusive symptoms.[45,46] Only further studies will determine if such interventions for fear will serve to prevent the development of PTSD, and/or stress-triggered major depression.

FR Checklist and PTSD

The FR checklist was not intended to (and should not be used for) diagnosing disaster victims suffering from PTSD. Instead, it was designed as a practical tool for assessing the severity of acute fear that may represent a level of suffering that deserves additional immediate and possibly long-term attention, evaluation, monitoring, and intervention. In addition, the FR Checklist has no overlap with any of the existing checklists for PTSD. A diagnosis of PTSD requires that the individual fully meet DSM-IV Criteria (A, B, C, D, and E). Unfortunately, the focus of all the existing checklists almost is exclusively on Criteria B, C, and D. This is true for both civilian and military PTSD checklists.[47] There is a growing awareness in the field of PTSD biology that Criterion-A assessment has been greatly under-emphasized.[18,44] The FR Checklist (Figure 1) supplements these by providing a structured assessment of PTSD Criterion-A.[18,37,38] This process incorporates into the Checklist, a new sub-criterion (A3) purposed for the DSM-V, which, for the first time, utilizes psychophysiological research that has demonstrated the importance of tachycardia in the emergency department setting as an immediate predictor of subsequent PTSD.[42–44] It also is argued that research is warranted to examine the predictive value of hyperventilation, sweaty palms, cold sweat, trembling/shaking, and buckling knees in the hours and days following a traumatic event (ideally in the emergency department setting) as additional predictors of subsequent PTSD.[37,38]

FR Checklist and Surge Capacity Adjustment

Bio-event, triage-management decision, based on a resource-constrained environment, will require surge capacity decisions. An unfortunate, but real consequence of silent disasters, is that healthcare providers and other essential workers may choose not to report for duty. Realistic disaster planning may incorporate the assumption that only 40–58% will report at the time of a bio-event from the beginning.[48] Timely risk communications, just-in-time training, and evidence-based assurances of personal protection may increase these numbers. However, hotline callers may be functioning without the benefit of a cadre of backup healthcare professionals, necessitating that the severity score be matched with available resources. Incorporating contemporary psychometric theory, the FR Checklist was designed specifically to have no obligatory cut off. The practical advantage of no obligatory cut off during large-scale bio-event disasters is that intervention levels would be raised or lowered depending on the availability of critical referral resources.

Resilience Scoring May Facilitate Rapid Expansion of "Cold Zone" Volunteers

Coordinating a rapid expansion in the number of volunteers is expected to be another challenge for disaster planners. Large numbers of 'cold zone' volunteers are required to assist in controlling, informing, and educating the susceptible population, and maintaining vaccination and prophylactic medication distribution centers and short- and long-term counseling of victim families and survivors. Currently, there is no brief interview for identifying potential volunteers. Pre-screened individuals who are trained and have accepted the risks may be more capable (and more emotionally stable) than individuals who offer to volunteer during the bio-event. The FR Checklist can assist in the triage of volunteers in that it can produce a "negative fear-score" (from -1 to -15), identifying most individuals who can be considered hyper-resilient and, therefore, could be asked to volunteer. As such, the FR Checklist includes a rapid assessment of pre-disaster resilience as two additional DSM-V sub-criterion of Criterion-A, tentatively termed

Sub-Criterion-A4 (low resilience), and Sub-Criterion-A5 (high resilience).

Further Research

The authors contend that the construct utility of a FR checklist has been established.[49] The FR checklist has formalized several elements of previous bio-event hotline questionnaires, and revealed the utility of identifying those victims who might exhibit additional physiologically-based, measurable levels of both fear and resilience. However, further outcome and relevance of diagnosis research (retrospective and prospective) must be completed to determine the concurrent and predictive validity of this methodology.

Conclusion

The scrutiny of the 2001 US anthrax incident, the SARS pandemic, and the realization of the global threat of emerging natural diseases have revealed that population-based fear is a critical consequence worthy of intervention. Simultaneous advances in the understanding of the neurochemistry of fear-based brain circuitry has increased opportunities for early intervention and management to identify the victims and mitigate, if not prevent, their suffering. Fear and resilience recognition and fear severity scoring are the first steps in surge capacity triage management that must begin at the point of contact by healthcare providers and disaster managers alike. The FR checklist serves as a useful tool in assessing a state of fear in victims deserving of further evaluation, monitoring, and intervention. In large-scale bio-event disasters, the FR checklist has the potential of assisting in the targeting of limited surge capacity resources, identifying victims who would benefit most by the targeted resources, assisting in mitigating mass chaos, assess the effectiveness and applicability of risk communication and public announcements in limiting fear-based symptoms, and assist in identifying a potential volunteer force that exhibits levels of functional resiliency. Further research is needed to validate this process.

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Fear, Panic, and Bio-events: A Population-Based Approach

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Reading the Bracha and Burkle article gave me a flashback to a military course I took early in my career: the Combat Casualty Care Course (C4), an exercise of mass-casualty triage and management. Triaging and treating the severely injured—all types of blunt and penetrating injuries—proved relatively manageable with practice. However, what I distinctly remember as the most challenging, were those cases of stress-induced psychosis that the course leaders periodically threw at us. Dazed "soldiers" with the "hundred mile stares" and predictably unpredictable thoughts and behaviors, drained our valuable resources as they required constant vigilance in addition to their "three hots and a cot" (three meals and a place to sleep).

The world has changed since then, especially with regard to bio-event preparedness and the mental health issues that invariably will arise within an affected population. The degree of disruption caused by mass population fear and panic, particularly among the worried well, that played out in Toronto during the April 2003 severe acute respiratory syndrome (SARS) outbreak, is the catalyst for seriously examining methods to implement control and treatment measures as a component of the bio-event triage mechanism itself. Solutions to population problems require a population-based approach, the essence of public health. The individual care I provided on the mock battlefield as a clinician no longer is valid when massive numbers are susceptible to, exposed to, or infected by a bio-agent. Triaging bio-events will require the population-based understanding of public health practitioners and disaster managers must make that fundamental paradigm shift. The following lessons of past pandemics, in which public health measures have served us well, will need to be meticulously implemented: (1) sheltering in place; (2) social distancing; (3) strict respiratory hygiene procedures; (5) quarantine and isolation measures; and (4) timely and credible mass communication.

Mass communication plays a critical role in the triage and management of public panic, or what clinically (and less pejoratively) has been termed mass-psychogenic illness. Bracha and Burkle expose the reality of population fear and panic and what it bears on bio-event response operations. Not surprisingly, the literature has been silent on the incidence and management of mass psychogenic illness for bio-events in comparison to the diagnosis and treatment of the various agents and their physical manifestations. The main focus has been on prevention strategies (vaccines), early recognition of bioagents by first-line health providers (modeling and surveillance), and treatment options (isolation, medications, hospital surge capacity). Akin to the combat-stressed soldier, those experiencing panic and fear can be insufferably distracting, yet at the same time, require treatment, thus consuming time and resources. Unlike the soldier, however, fear and panic must be approached and treated differently, often with medications that blunt the autonomic response. While the majority of those with hyperarousal and hypervigilance will improve with conservative measures of rest, reassurance, support, and education from engaged public health officials and the mass media, a small but significant proportion will go on to develop a debilitating illness, a fact well documented in the literature. The authors' point regarding the psychological resiliency

of health providers also is well-taken: at Sunnybrook Hospital in Toronto, which became the major SARS referral site, 29% of 2001 hospital employees experienced emotional distress defined by a general health questionnaire. The responders are no less apt to be at risk from fear and panic.

The Fear and Resiliency checklist elaborated by Bracha and Burkle could be a significant adjunct to the population-based, comprehensive triage strategies that will need to be implemented in a bioevent. Its utility only will become more apparent in bioevent disaster drills and modeling and, God-forbid, the real thing. In either case, this assessment tool, the first to address the issue of epidemic mass fear response, should be studied fully and validated for its effectiveness. We welcome the authors' efforts in providing this tangible device, and for pioneering this issue within the domain of bio-event response.

The attention to managing the mass psychological effects of a bio-event further serves to remind us that behavioral care experts with a public health understanding should be involved in the disaster planning process. Responsible, real-time information on suspected bio-agents, the likelihood of exposure, the understanding of clinical manifestations, methods of transmission, and appropriate personal response behaviors should be fast-tracked into journals, public health Websites, and the media. Most importantly, as noted by Ontario's former Chief Public Health Officer, public health leaders must focus on restoring public confidence.

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