

Psychological Consequences of Terrorist Threat

Karestan Koenen, Ph.D.
Harvard School of Public Health
&
Randall Marshal, M.D.
Columbia University





Outline

- ☞ What are the psychological consequences of terrorism?
 - » Posttraumatic stress disorder (PTSD)
- ☞ Why should we care?
 - » Public health consequences of PTSD
- ☞ Who is at risk?
- ☞ Who gets PTSD?
 - » Vulnerability Factors
 - » Contribution of ongoing threat
- ☞ What can be done?
 - » Early Identification
 - » Prevention
 - » Treatment
 - » Resilience

posttraumatic stress disorder

NOUN. abbr. PTSD. A psychological disorder affecting individuals who have experienced or witnessed profoundly traumatic events, such as torture, murder, rape, or wartime combat, characterized by recurrent flashbacks of the traumatic event, nightmares, irritability, anxiety, fatigue, forgetfulness, and social withdrawal.

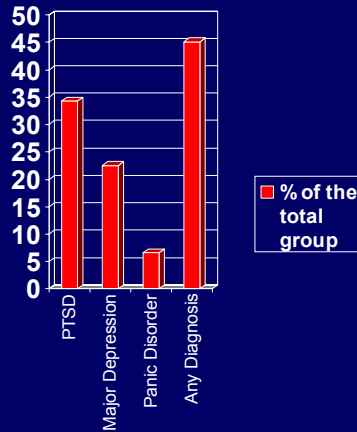
From Merriam-Webster Dictionary, 2004

Posttraumatic Stress Disorder

Core Symptoms:

- * Intrusive Re-experiencing
- * Avoidance
- * Numbing
- * Increased Arousal

Psychiatric Disorders Among Survivors of the Oklahoma City Bombing (North et al, JAMA, 282:755-762, 1999)



- ☞ Death toll: 167 (19 children)
- ☞ Injured: 684
- ☞ Property damage: \$625 million
- ☞ Exposed: 1092 (within 200 meters)
- ☞ Study: random sample of N=182 exposed 6 months later

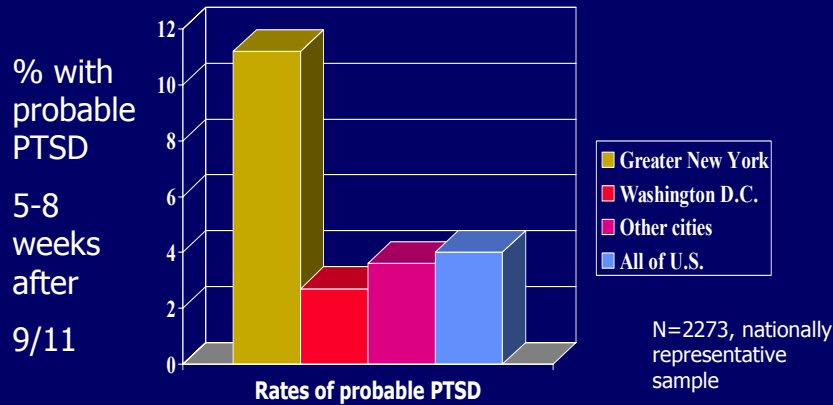
Psychological reactions to terrorist attacks: findings from the National Study of Americans' Reactions to September 11. (Schlenger WE et al., JAMA. 2002 Aug 7;288(5):581-8.)

Conducted 1-2 Months after 9/11 Across the United States

- ☞ Web-based survey of nationally representative cross-sectional sample (N=2273)
- ☞ Assessed posttraumatic stress disorder (PTSD)
- ☞ NY area: 1,072,500 adults with probable PTSD
- ☞ U.S. total: 8,640,000 adults with probable PTSD

Rates of Probable PTSD Related to 9/11 by Geographic Location (PCL>50)

(Schlenger WE et al., JAMA. 2002 Aug 7;288(5):581-8)



Public Health Consequences of PTSD

- ☛ **Secondary mental disorders & suicide**
- ☛ **Impaired role functioning**
 - » 3.6 days work impairment per month
 - » Productivity loss of \$3 billion per year to the US
- ☛ **Reduced Life course opportunities**
- ☛ **Greater health care utilization**
- ☛ **Increased lifetime risk of cardiovascular disease, diabetes**
 - » **Similar to Major Depression which is projected to be the major cause of disease burden for females and individuals in developing countries by 2020**

Populations at Risk

- ☞ Directly exposed:
 - » Civilians in blast area
 - » First-responders: firefighters, police, emergency medical and hazardous materials teams
 - » Frontline medical teams
 - » Journalists

- ☞ Indirectly exposed:
 - » Family members of directly exposed, especially children
 - » Civilians in geographic proximity, disrupted by blast
 - » Helpers: Red Cross/FEMA workers

- ☞ Distally exposed:
 - » Anyone: television coverage broadens exposure and spread the potential for negative psychological affects across the population

Most Who Experience a Traumatic Event Do Not Develop PTSD

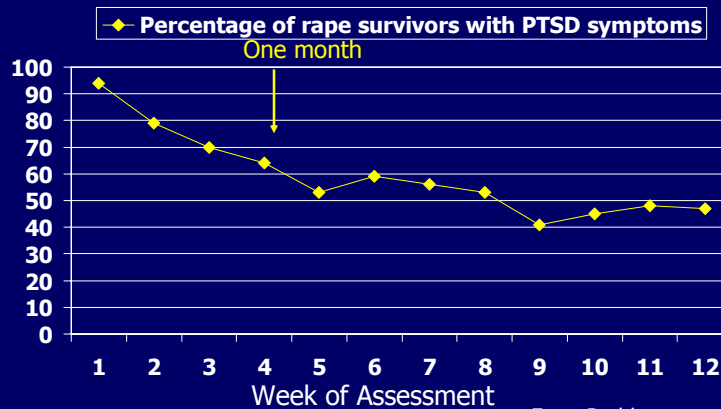
Event	Males (%)	Females (%)	Sex difference
Physical Abuse	22.3	48.5	F>M
Neglect	23.9	19.7	None
Molestation	12.2	61.4	F>M
Rape	65.0	45.9	None
Combat	38.8	---	---
Accident	6.3	8.8	None
Disaster	3.7	5.4	None
Any	8.1	20.4	F>M

From Kessler et al., 1995

Distress is Normal After Trauma

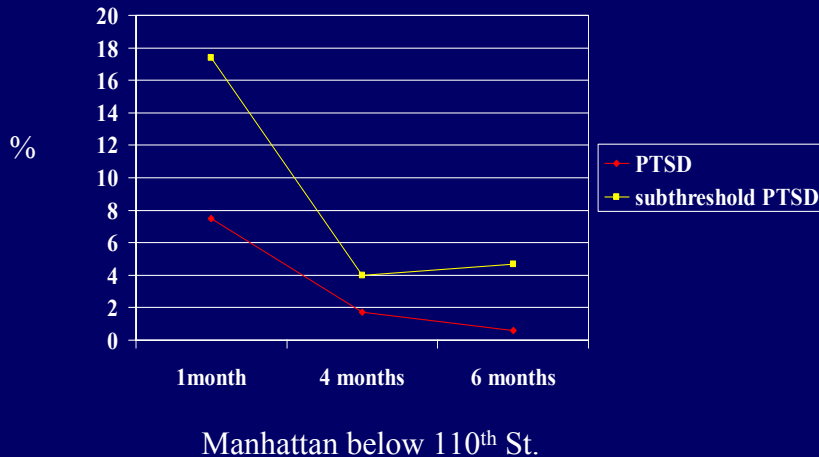
- ☞ Intensity varies with severity of trauma
- ☞ Re-experiencing symptoms (thoughts, dreams, images)
- ☞ Persistent memory often with vivid imagery
- ☞ Intense emotional reactions: fear, bewilderment, anger, helplessness, and despair
- ☞ Increased vigilance and autonomic arousal
- ☞ Gradual adjustment over weeks to months

After a Rape, Everyone Has Symptoms But About Half Recover



From Rothbaum et al., 1993

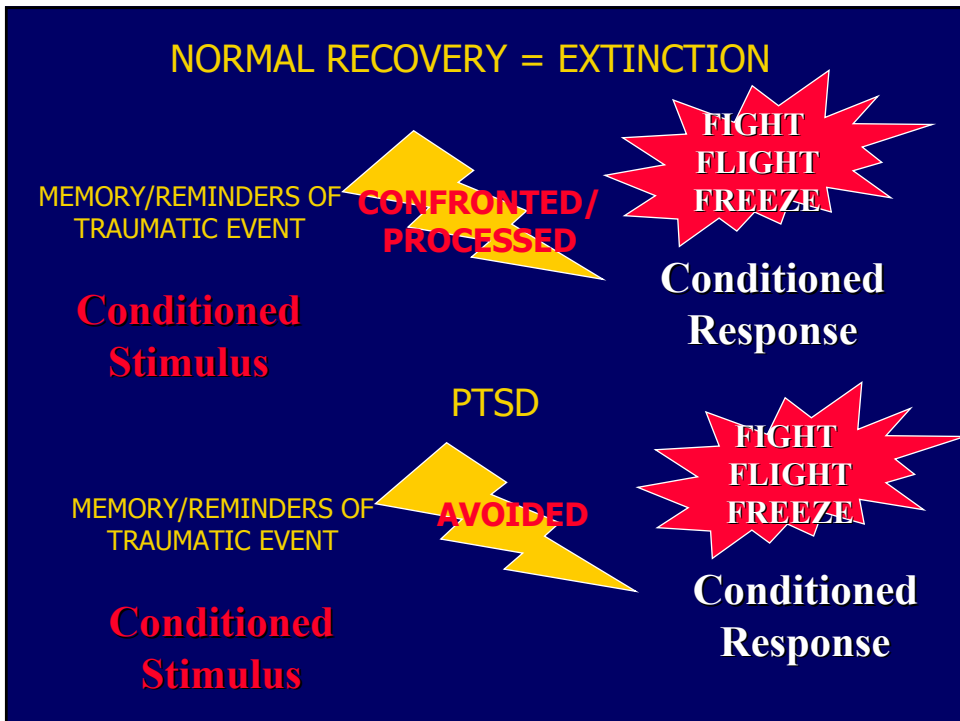
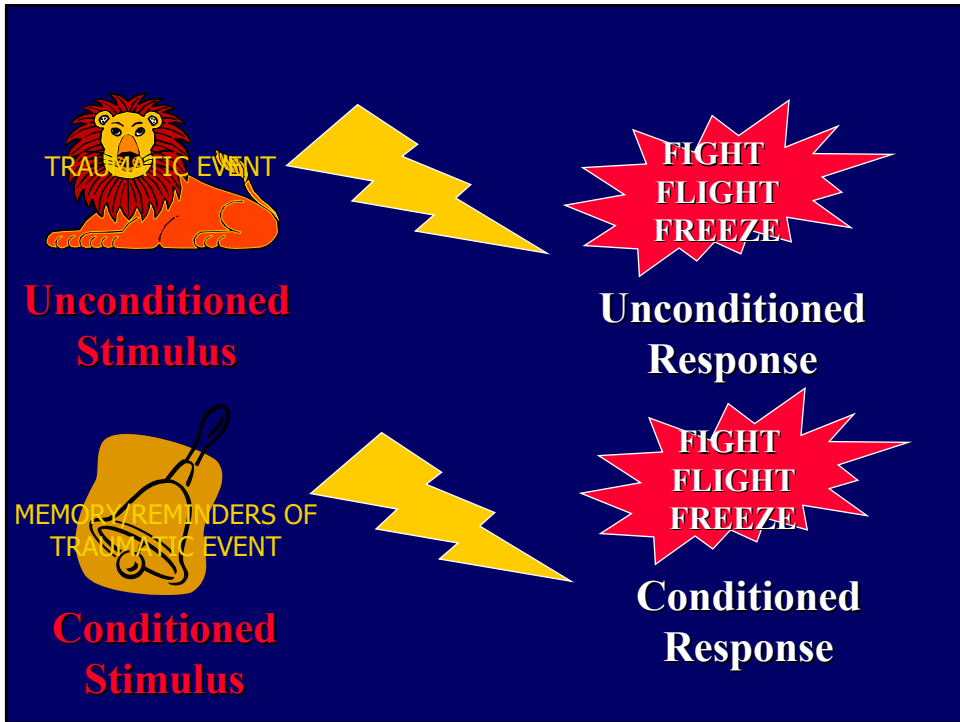
PTSD in Manhattan After September 11 (Galea et al., Am J Epi 158:514-524, 2003)



How does a normal response to threat become PTSD?

- ☞ A traumatic event (unconditioned stimulus) overstimulates endogenous stress hormones (unconditioned response); these mediate an overconsolidation of the event's memory trace; recall of the event in response to reminders (conditioned stimulus); releases further stress hormones (conditioned response); these cause further overconsolidation; and the overconsolidated memory generates PTSD symptoms.
- ☞ The individual avoids reminders of the trauma to reduce distress
- ☞ Avoidance prevents extinction of the fear memory

From Pitman & Delahanty, 2005



Case Example: Susan

- ☞ Traumatic experience:
 - » Escaped from WTC Tower 2 b/c she had stopped to buy her niece a present on the way to work
 - » Witnessed victims jumping to their death
- ☞ Traumatic reminders:
 - » Nightmares, images coming into her mind when she didn't want them to
 - » Plagued by thoughts of the randomness of death
 - » Anxious, easily startled, feels danger everywhere
- ☞ Complicating factors:
 - » Survivor guilt
- ☞ Avoidance to reduce distress:
 - » Drinks to fall asleep
 - » Doesn't talk about her experience with family or friends because she is "lucky to be alive" and it "wasn't that bad compared to others"
 - » Tries not to think about it
 - » Finds herself feeling anxious in tall buildings, on elevators, starts avoiding those as well
- ☞ Symptoms continue . . .

Continuum of Reactions to Terrorist Attacks and Threat

Mental Disorders

Normative reactions



PTSD

Depression

Substance abuse

subthreshold disorders

Change in behavior and appraisal

Distress

Severe impairment

Moderate impairment

Little or No impairment

Who Gets PTSD? Vulnerability factors

☞ Pre-trauma factors

- » History of previous trauma
- » Genetic factors
- » Preexisting psychiatric disorder
- » Preexisting substance abuse, including smoking
- » Family history of psychiatric disorder
- » Social isolation
- » Social adversity – poverty, residential instability

Who Gets PTSD? Vulnerability factors

☞ Trauma-related factors

- » Proximity/severity of trauma
- » Physical injury
- » Peri-traumatic dissociation

☞ Post-trauma factors

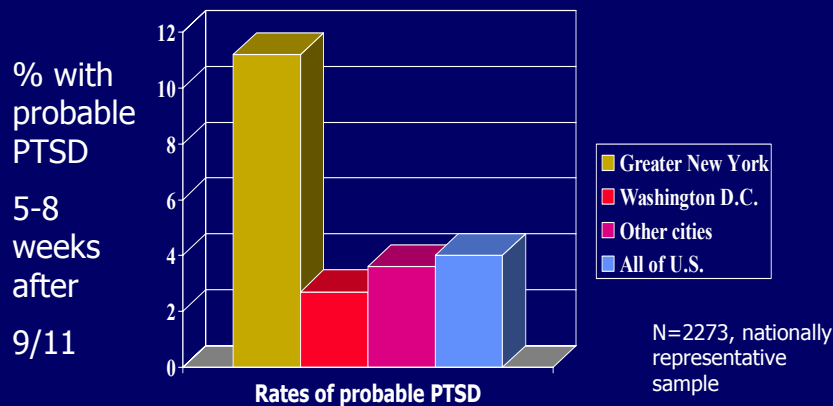
- » Lack of social support
- » Substance abuse
- » Disruption and disability
- » Exposure to reactivating environmental events
- » Perceived ongoing threat

Who Gets PTSD? Contribution of Ongoing Threat

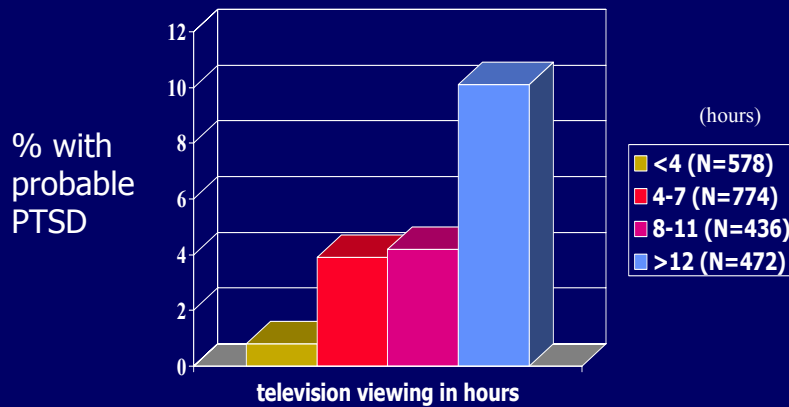
- ☞ 8 weeks after September 11 (Silver et al., 2002):
 - » 65% adults feared future attacks
 - » 59.5% feared harm to a family member
- ☞ 6 months after September 11 (Silver et al., 2002):
 - » 40% still feared for family's safety
- ☞ 1 year after September 11 (Seo et al., 2004):
 - » 50% of U.S. adults had increased safety concerns related to future terrorist attacks

Rates of Probable PTSD Related to 9/11 by Geographic Location (PCL>50)

(Schlenger WE et al., JAMA. 2002 Aug 7;288(5):581-8)



Television Viewing Per Day in Hours on 9/11 and the First Few Days Afterward (Schlenger et al., 2002)



Role of the Media in PTSD after 9/11

- ☞ This is the first well-documented instance of PTSD symptoms strongly associated with media viewing as the mode of "being confronted with" the criterion A trauma
- ☞ Explanations:
 - ☞ -risk factors in high TV viewers
 - ☞ -viewers already have symptoms (high TV viewing represents attempts at mastery)
 - ☞ -**perception of exaggerated threat to self (risk appraisal)**

☞ (Marshall RD, Galea S. Science for the Community: Mental Health After 9/11. J Clin Psychiatry 65(suppl): 37-43, 2004)

- ☞ The extent and severity of the reaction both in the greater New York area and across the U.S. cannot be explained by existing models of risk and exposure (the “Bull’s eye” model)
- ☞ Indirect exposure accounts for a large proportion of PTSD cases
- ☞ That fact that large numbers of persons developed psychopathology and functional impairment due to indirect exposure suggests a vulnerability in the population or society / special characteristics of terrorist threat

What can be done?

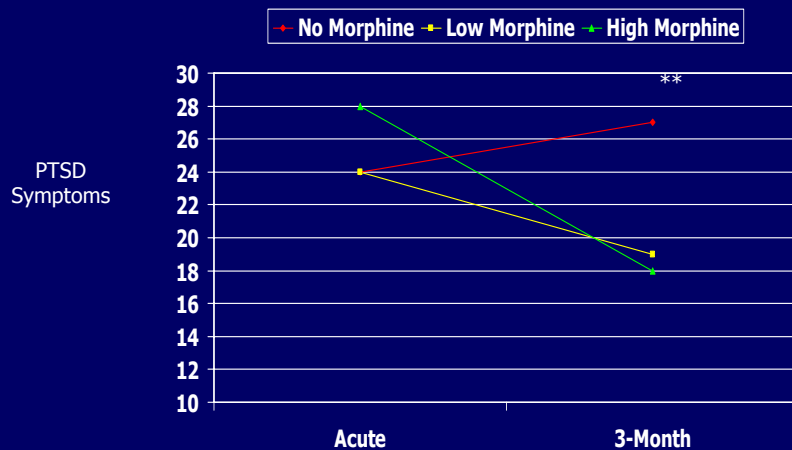
- ☞ Early Identification
 - » Screening
 - » Gene expression profiling
- ☞ Prevention
 - » Pharmacological
 - » Psychological first-aid
 - » Targeting risk appraisal
- ☞ Treatment

Prevention of PTSD: Pharmacological Approaches

- ☞ Etiologic Model: Overconsolidated memory generates PTSD symptoms.
- ☞ Solution: Interrupt memory consolidation
- ☞ Noradrenergic hyperactivity in the amygdala mediates over-consolidation of memory in PTSD
- ☞ Interrupt over-consolidation with:
 - » Alpha2-adrenergic agonists – opioids
 - » Beta-adrenergic antagonists – beta-blockers (propranolol)

From Pitman & Delahanty, 2005

Acute Morphine Administration & Course of PTSD Symptoms in Injured Children



** $p < .01$ No vs. High or Low; Saxe, Koenen et al., 2005

Pilot Study of Secondary Prevention of Posttraumatic Stress Disorder with Propranolol

Roger K. Pitman, Kathy M. Sanders, Randall M. Zusman, Anna R. Healy, Farah Cheema, Natasha B. Lasko, Larry Cahill, and Scott P. Orr

Biological Psychiatry, 2002; 51:189-93

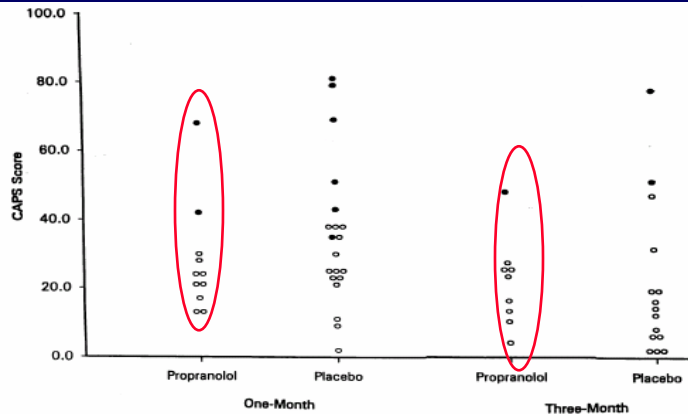


Figure 1. Clinician-administered posttraumatic stress disorder scale scores. Black circles indicate patients who met categorical DSM-IV criteria for posttraumatic stress disorder.

Prevention of PTSD: Psychological First Aid

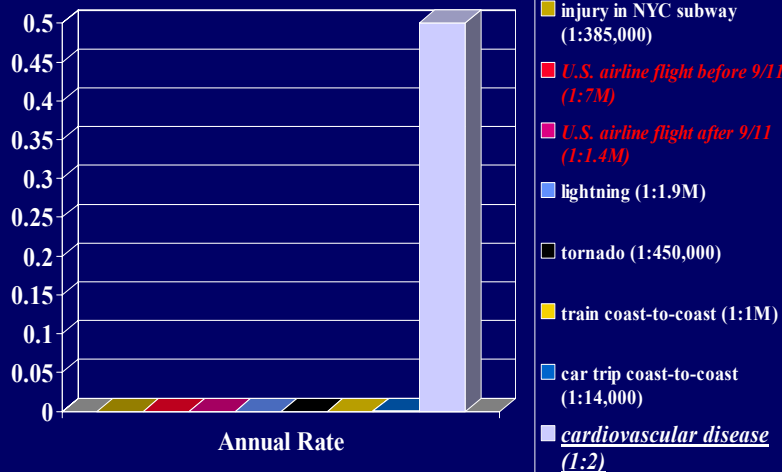
Basic Objectives of Psychological First Aid

- Establish a human connection in a non-intrusive, compassionate manner.
- Enhance immediate and ongoing safety, and provide physical and emotional comfort.
- Calm and orient emotionally-overwhelmed or distraught survivors.
- Help survivors to articulate immediate needs and concerns, and gather additional information as appropriate.
- Offer practical assistance and information to help survivors address their immediate needs and concerns.
- Connect survivors as soon as possible to social support networks, including family members, friends, neighbors, and community helping resources.
- Support positive coping, acknowledge coping efforts and strengths, and empower survivors; encourage adults, children, and families to take an active role in their recovery.
- Provide information that may help survivors to cope effectively with the psychological impact of disasters.
- Facilitate continuity in disaster response efforts by clarifying how long the Psychological First Aid provider will be available, and (when appropriate) linking the survivor to another member of a disaster response team or to indigenous recovery systems, mental health services, public-sector services, and organizations.

Prevention of PTSD: Targeting Risk Appraisal

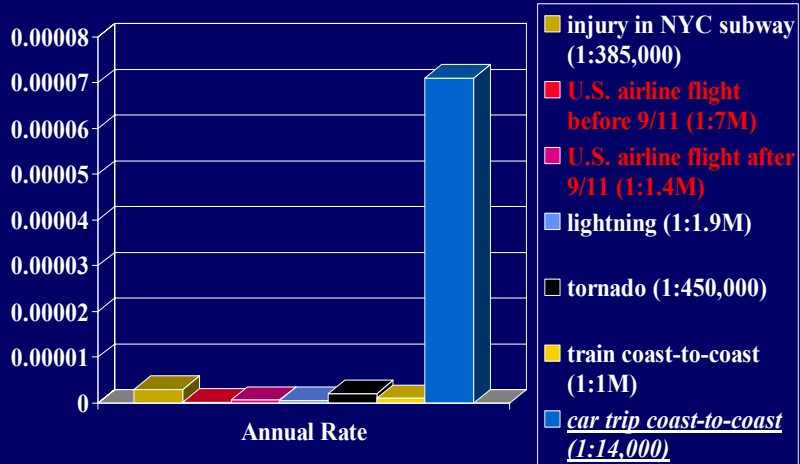
- ☞ After 9/11 many Americans perceived an ongoing threat and risk to self and family *irregardless of geographic location*
- ☞ Risk appraisal distortions:
 - » Small risks are overestimated (dying from botulism)
 - » Large risks are underestimated (dying from diabetes or heart disease)
 - » Accidents misjudged in relation to disease
- ☞ Signal Potential:
 - » High impact, dramatic, catastrophic events affecting large numbers of people have high signal potential (warning of new ongoing threat). New threats are preferentially attended to and feared.

Risk of Death Compared to Death from Cardiovascular Disease



Natural History Museum, LA; MIT; UC
Berkeley, courtesy of anxieties.com

Risk of Death (w/o CVD)



Natural History Museum, LA; MIT; UC Berkeley, courtesy of anxieties.com

Who gets PTSD? Contributing Factors Related to Terrorism

- ☞ Indirect Exposure
- ☞ Ongoing Threat
- ☞ Fear-related behavior

- ☞ Solution: Targeting Risk appraisal in the context of ongoing threat

Dirty Bomb

- ☞ Combines conventional explosives with radioactive material
- ☞ "In most instances, the conventional explosive itself would have more immediate lethality than the radioactive material. At the levels created by most probable sources, not enough radiation would be present in a dirty bomb to kill people or cause severe illness."
- ☞ "Weapon of Mass Disruption"
- ☞ **"Prompt, accurate, non-emotional public information might prevent the panic sought by terrorists."**

From the: (United States Nuclear Regulatory Commission, Dirty Bomb Fact Sheet, March 2003, <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/dirty-bombs.pdf>)

Relative Risk Appraisal as a Focus for Primary Prevention

- I. Perception of threat drives the subjective response to trauma, and is thus a useful potential focus for public health intervention, along with secondary appraisal.
- II. Exaggerated Risk Appraisal in the U.S. population probably increased risk of PTSD, subthreshold symptoms, and maladaptive behaviors (phobic avoidance), and fueled distress and disability.
- III. Distortions in Risk Appraisal lead to ineffective coping strategies (e.g., action-oriented rather than perception-oriented)

Relative Risk Perception as a Focus for Primary Prevention

- IV. In the context of ongoing threat, accurate risk appraisal is a necessary prerequisite to mature effective coping for individuals and groups
- V. Relative Risk Appraisal is potentially amenable to public health interventions, both primary (before an attack) and secondary (immediate aftermath), and selective enhancement within communities.

Treatment Domains in PTSD

Affect

- anxiety
- fear
- irritability
- depression
- numbing

Behavior

- avoidance
- aggressive outbursts
- withdrawal

Cognition/schemas

- re-experiencing
- vigilance for traumatic recurrences
- self-as-fragile
- world-as-dangerous

PTSD Treatment: Pharmacological

- ☞ SSRI's Paroxetine and Sertraline are the only FDA approved medications for PTSD
- ☞ Clinicians use a wide variety of anti-depressant and anxiety medications to treat PTSD
- ☞ 30-50% of clients with chronic PTSD do not respond to Paroxetine or Sertraline
- ☞ New medications are needed

PTSD Treatment: Psychotherapies Effective in Controlled Trials

- ☞ Exposure-based Therapy
- ☞ Stress Inoculation Training
- ☞ Cognitive Therapy
- ☞ Trauma-focused psychodynamic therapy
- ☞ Hypnosis (to promote desensitization)
- ☞ EMDR (recent trials indicate less effective than exposure therapy)
- ☞ Response rate = 60-70%

Exposure-Based Therapy

- ☞ A set of techniques designed to promote confrontation with feared objects, situations, memories and images (e.g., systematic desensitization, flooding)

Cognitive Therapy

- ☞ Fearful, anxious, demoralized states are linked to specific interpretations of present and future circumstances ("distortions")
- ☞ Change in these interpretations can result in amelioration of symptomatic states

"Alice knew it was the Rabbit coming to look for her, and she trembled till she shook the house, quite forgetting that she was now about a thousand times as large as the Rabbit and had no reason to be afraid of it."

--Lewis Carroll, *Alice's Adventures in Wonderland*

Resilience

- ☞ A model that lends itself to intervention development: major adverse events are disruptions that present **opportunities** to increase (or decrease) resilience through cognitive and emotional processing of the traumatic event
- ☞ Outcomes: more resilient, baseline, or less resilient to future trauma (increased vulnerability to subsequent stressors)
- ☞ Core Principle: **Only Thing We Have to Fear is Fear Itself**

RESILIENCE

"There is a story about a Zen master whose monastery was overrun by marauding soldiers. When the Zen master did not appear frightened, the soldiers' captain said, "don't you know who I am? I could run my sword through you and not think twice about it.' The Zen master replied, "Don't you know who I am? You could run your sword through me and I wouldn't think twice about it."

--Thich Nhat Hanh, *no death, no fear* (Riverhead Books, Penguin, New York, 2002)

Courage is not the absence of fear but rather the judgment that something else is more important than fear.

Ambrose Redmoon

