

# Making Nuclear Weapons 90 Percent Less Lethal to Your Community

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In today's increasingly tense world, the eventual use of widely proliferated nuclear weapons is likely if not inevitable. The U.S. Strategic Command released on Twitter the following<sup>1</sup> as a preview to testimony before the Senate Armed Services Committee:<sup>2</sup> "The spectrum of conflict today is neither linear nor predictable. We must account for the possibility of conflict leading to conditions which could very rapidly drive an adversary to consider nuclear use as their least bad option."

While there is little that individuals can do to thwart international nuclear weapons use, we can do a surprising amount locally to minimize nuclear explosions' horrendous effects in our communities. One will not survive being in or near a nuclear detonation, unless in an effective blast shelter. But few realize that 90 percent or more of total projected fatalities and casualties are well outside the ground zero area. For those 90 percent, risks from blast and fallout are readily avoidable when we first learn a few basic civil defense protective measures.

## Blast Effects

A nuclear detonation has a delay from its initial flash to the time when the blast wave arrives outside the ground zero area. The delay from seconds up to a minute or more is similar to that of lightning and thunder. If you were taught to "duck and cover" upon seeing a sudden, extremely bright flash, you increased your survival odds from arrival of the tornado-strength, three-second blast wave.

Even if you are caught outside in the open, you reduce your odds of blast injury by quickly lying flat on the ground. Miyoko Matsubara, a Hiroshima survivor, was outdoors and less than a mile from the explosion of the atomic bomb we labeled "Little Boy." She wrote that after seeing an airplane and a bright flash "I quickly lay flat on the ground. Just at that moment, I heard an indescribable deafening roar. My first thought was that the plane had aimed at me.... I had no idea how long I had lain unconscious, but when I regained consciousness the bright sunny morning had turned into a dark horrible night. Takiko, who had stood next to me, had simply disappeared."<sup>3</sup>

"Duck and cover" is under-appreciated by most Americans today but has long been known as a simple and effective blast shock wave lifesaver. Unfortunately, until this is universally taught, we still risk our school children's impulsively rushing to their nearest classroom window to see what/where that bright flash came from, just in time to be shredded by that delayed blast wave imploding those glass windows into their wide-eyed, exposed faces. Those at home and work also risk similar fates if they do not know to immediately "duck & cover" for a minute at least with the appearance of any sudden bright flash.

Remember the Chelyabinsk Russia meteor air burst in February 2013? Approximately 1,500 people were injured, most from the delayed shock wave exploding the window glass inward as they were anxiously scanning the winter sky, trying to see what/where the bright flash was earlier. But "duck and

cover" saved many.

A fourth-grade teacher in Chelyabinsk, Yulia Karbysheva, was hailed as a hero after saving 44 children from imploding window glass cuts. Despite not knowing the origin of the intense flash of light, Karbysheva thought it prudent to take precautionary measures by ordering her students to stay away from the room's windows and to perform a duck and cover maneuver. Karbysheva, who remained standing, was seriously lacerated when the blast arrived and window glass severed a tendon in one of her arms; however, none of her students, whom she ordered to hide under their desks, suffered cuts.<sup>4</sup>

In Japan in the days between the Hiroshima and Nagasaki atomic bombings, one Hiroshima policeman went to Nagasaki to teach police about ducking after the atomic flash. As a result of this timely warning, not a single Nagasaki policeman died in the initial blast.<sup>5</sup> Unfortunately, the general population was not warned of the heat/blast danger following an atomic flash because of the bomb's unknown nature. Many people in Hiroshima and Nagasaki died while searching the skies for the source of the brilliant flash.

Robert Trumbull, the *New York Times* Pacific and Asia war correspondent from 1941 to 1979, documented more double-bombing survivors in his 1957 book, *Nine Who Survived Hiroshima and Nagasaki: Personal Experiences of Nine Men who Lived Through Both Atomic Bombings*.<sup>6</sup>

Tsutomu Yamaguchi, age 29 in 1945, was a Mitsubishi ship designer who died in 2010 at age 93. Trumbull writes:

"Suddenly there was a flash like the lighting of a huge magnesium flare," Yamaguchi recalls. The young ship designer was so well drilled in air-raid precaution techniques that he reacted automatically. He flung his hands to his head, covering his eyes with his fingers and stopping his ears with his two thumbs. Simultaneously he dropped to the ground, face down.... "As I prostrated myself, there came a terrific explosion."

The left side of his face and arm facing the fireball were burned, and he returned to Nagasaki, experiencing the second nuclear explosion on the sixth floor of the headquarters office of Mitsubishi.

Spelling out the danger of flying glass, he urged them to keep windows open during an air-raid alert, and at the instant of the flash to seize at once upon any shelter available.... The second A-bomb confirmed young Yamaguchi's words, exploding in a huge ball of fire about a mile away. Yamaguchi's lecture (just an hour earlier!)... was not lost upon his colleagues. With the young designer's words still fresh in their minds, they leaped for the cover of desks and tables. "As a result," said Yamaguchi, "my section staff suffered the least in that building. In other sections there was a heavy toll of serious injuries from flying glass."<sup>6, pp 28,109</sup>

Masao Komatsu, age 40, was hit by a falling beam in a Hiroshima warehouse and was on board a train in Nagasaki when the second bomb fell:

The interior of the coach was bathed in a stark, white light. Komatsu immediately dived for the floor. "Get down!" he screamed at the other passengers. Some recovered sufficiently from the daze of the blinding light to react promptly to his warning. Seconds later came the deafening crack of the blast, and a shock wave that splintered all the windows on both sides of the train. The passengers who had not dived under the seats were slashed mercilessly from waist to head by glass flying at bullet speed.<sup>6, p 101</sup>

While terrorist bombs would likely be smaller than the 15-kiloton Hiroshima bomb, in a modern superpower conflict today, the nukes would be larger, most in the 100 kt to 500 kt range. The unsurvivable "ground zero" lethal zone of a 500-kt nuclear airburst, would extend out to about 2.2 miles. The blast wave would arrive at that 2.2-mile marker about eight seconds after the flash, and then continue on causing death or injury from there out to about 9 miles. This puts at grave risk more than 15 times more lives than were already lost within that unsurvivable 2.2-mile ground-zero radius. That's IF people don't know to "duck and cover" in those eight-to-20 seconds after the flash and before the blast wave arrived. In other words, with "duck and cover" taught to and employed by all, casualties from the blast wave could be reduced 15-fold.

## Radioactive Fallout

Radioactive fallout from a ground-burst nuclear explosion can extend dozens, even hundreds of miles downwind from ground zero, and can cause injury or death for any who are needlessly outside and exposed to it. Fortunately, it can be readily minimized by a public trained beforehand in what to do and not do.

What you don't want to do is to get stuck in a traffic jam, exposed on the road while trying to get away. What you do want to do is simple and easy: shelter in place, go to the center of whatever intact building you are already in or near, and prepare to sit it out while you sort out which way the wind is blowing the fallout. Odds are that the wind is not even blowing it directly at you from ground zero, and even if it is, radioactive fallout loses 90 percent of its lethality in its first seven hours, and 99 percent of it in two days.<sup>7</sup>

Of those requiring shelter from fallout, the majority would only need two or three days of full-time hunkering down, not weeks on end, before safely joining an evacuation, if still necessary then. There are many last-minute things you can do to make your expedient shelter more effective and comfortable for those couple of days.<sup>8</sup>

## Preparedness

People know the threat intellectually but won't respond educationally until something nuclear has been unleashed upon the world, bringing the necessary concern undeniably front and center. Preparedness organizations have striven to be "ready with the goods" when the public clamors for lifesaving civil defense guidance. We hope that there might be a brief intermission between an awareness-raising event and a crisis affecting your community, but there might not be.

Concerned citizens, especially physicians, need to bring

life-saving information to emergency managers, emergency medical service (EMS) personnel, fire and police chiefs, city councils, school boards, chambers of commerce, civic leaders, and media. They need to be able to tell the public in one confident unified voice what to do. Whoever does so will likely be responsible for 90 percent fewer casualties and fatalities, and emergency services will be many times more effective in response.

Failure to take action will needlessly condemn many of our American families to a tragic but easily avoidable fate.

As Toshiharu Kano, third-generation Japanese-American and author of *Passport to Hiroshima*,<sup>9</sup> reminded us recently:

I am the last, closest to ground zero (800 meters from hypocenter), living survivor of Hiroshima atomic bomb of August 1945. Many of the tens of thousands of victims there tragically perished from an unfamiliarity of how to protect themselves from the unique effects of a nuclear bomb's flash, blast, and radiation. As a U.S. citizen living in middle America today I see a hauntingly similar vulnerability growing among the general public here ever since Civil Defense was discontinued after the Reagan Cold War era. The "Good News About Nuclear Destruction"<sup>10</sup> is that if all Americans were trained again in the Civil Defense basics of what to do and not do if nuclear weapons were ever unleashed again, we could instantly make all nukes 90% less lethal. Ideally, while I'd like to see a world free of nuclear weapons someday, in the meantime we should all embrace rejuvenating public Civil Defense to minimize their lethality (Kano T, personal communication, 2017).

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