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The global impacts of a terrorist nuclear attack: What would happen? What should we do?

Irma Arguello and Emiliano J. Buis

ABSTRACT

As seen by recent events such as the bombing in Manchester, UK, terrorism can occur anywhere, at any time. So far, the terrorist incidents have been relatively low-tech – such as improvised explosive devices detonating inside pressure cookers, trucks driving down crowded sidewalks, or bombs exploding in backpacks containing metal bolts and screws. But what if terrorists were to build a dirty bomb that contained radioactive materials instead of bits of metal shrapnel, and set it off in a major city? Or, worse, what if they managed to build a fully functioning nuclear weapon, cart it to the downtown of a city, and then detonate it – even a small, rudimentary one that was much smaller than the atomic bomb dropped on Hiroshima? What would the social, economic, and political impacts of the successful terrorist use of a nuclear weapon look like? What planning has the international community done for such an event?

KEYWORDS

Nuclear terrorism; dirty bomb; nuclear device; nuclear security; improvised explosive device

Though hard to accept, the detonation of a nuclear device – by states or non-state actors – is today a plausible scenario. And while much of the world's focus has been on the current nuclear weapons arsenals possessed by states – about 14,550 warheads, all of which carry the risk of intentional or unintentional use – the threat of nuclear terrorism is here and increasing. For more than a decade, Al Qaeda, Aum Shinrikyo, and other terrorist groups have expressed their desire to acquire fissile material to build and detonate an improvised nuclear bomb. None of them could fulfill that goal – so far. But that does not mean that they will not succeed in the future.

Making matters worse, there is evidence of an illicit market for nuclear weapons-usable materials. There are sellers in search of potential buyers, as shown by the dismantlement of a nuclear smuggling network in Moldova in 2015. There certainly are plenty of sites from which to obtain nuclear material. According to the 2016 Nuclear Security Index by the Nuclear Threat Initiative, 24 countries still host inventories of nuclear weapons-usable materials, stored in facilities with different degrees of security.

And in terms of risk, it is not necessary for a given country to possess nuclear weapons, weapons-usable materials, or nuclear facilities for it to be useful to nuclear terrorists: Structural and institutional weaknesses in a country may make it favorable for the illicit trade of materials. Permeable boundaries, high levels of corruption, weaknesses in judicial systems, and consequent impunity

may give rise to a series of transactions and other events, which could end in a nuclear attack. The truth is that, at this stage, no country in possession of nuclear weapons or weapons-usable materials can guarantee their full protection against nuclear terrorism or nuclear smuggling.

Because we live in a world of growing insecurity, where explicit and tacit agreements between the relevant powers – which upheld global stability during the post-Cold War – are giving way to increasing mistrust and hostility, a question arises: How would our lives be affected if a current terrorist group such as the Islamic State (ISIS), or new terrorist groups in the future, succeed in evolving from today's Manchester style “low-tech” attacks to a “high-tech” one, involving a nuclear bomb, detonated in a capital city, anywhere in the world?

We attempted to answer this question in a report developed by a high-level multidisciplinary expert group convened by the NPSGlobal Foundation for the Latin American and Caribbean Leadership Network. We found that there would be multiple harmful effects that would spread promptly around the globe (Arguello and Buis 2016); a more detailed analysis is below, which highlights the need for the creation of a comprehensive nuclear security system.

The consequences of a terrorist nuclear attack

A small and primitive 1-kiloton fission bomb (with a yield of about one-fifteenth of the one dropped on Hiroshima,

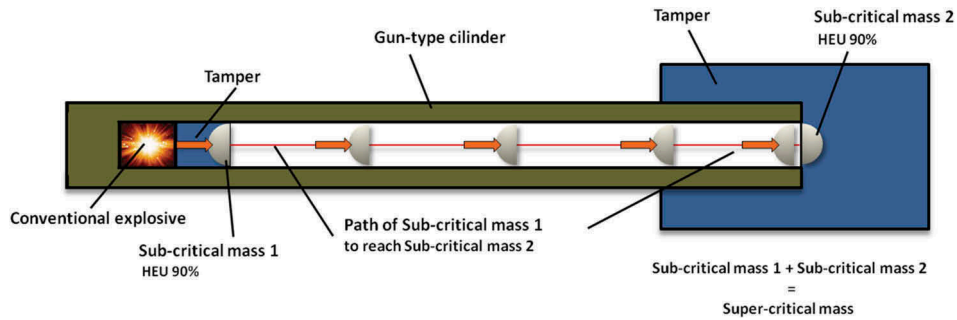


Figure 1. Small, primitive, 1-kiloton fission bomb likely to be used by terrorists.

Schematic of the interior of the most likely type of weapon to be detonated by nuclear terrorists in any large capital city. © NPSGlobal.

and certainly much less sophisticated; cf. Figure 1), detonated in any large capital city of the developed world, would cause an unprecedented catastrophic scenario.

An estimate of direct effects in the attack's location includes a death toll of 7,300-to-23,000 people and 12,600-to-57,000 people injured, depending on the target's geography and population density. Total physical destruction of the city's infrastructure, due to the blast (shock wave) and thermal radiation, would cover a radius of about 500 meters from the point of detonation (also known as ground zero), while ionizing radiation greater than 5 Sieverts – compatible with the deadly acute radiation syndrome – would expand within an 850-meter radius. From the environmental point of view, such an area would be

unusable for years. In addition, radioactive fallout would expand in an area of about 300 square kilometers, depending on meteorological conditions (cf. Figure 2).

But the consequences would go far beyond the effects in the target country, however, and promptly propagate worldwide. Global and national security, economy and finance, international governance and its framework, national political systems, and the behavior of governments and individuals would all be put under severe trial. The severity of the effects at a national level, however, would depend on the countries' level of development, geopolitical location, and resilience.

Global security and regional/national defense schemes would be strongly affected. An increase in global distrust

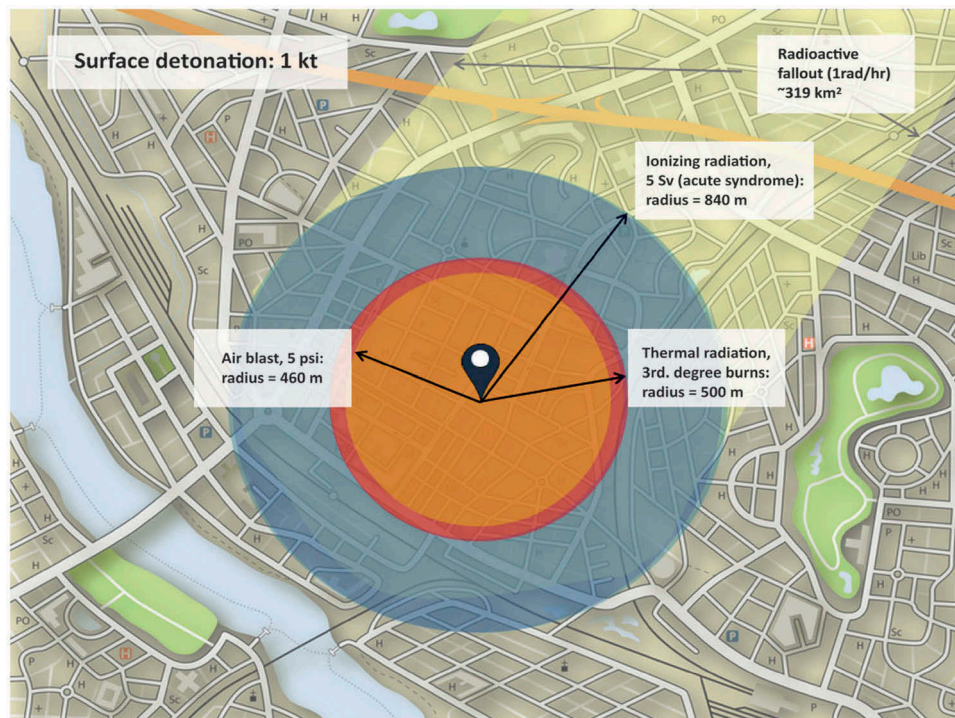


Figure 2. Direct effects of explosion.

The immediate effects of the detonation of a 1-kiloton atomic bomb, including air blast, thermal radiation, ionizing radiation, and radioactive fallout. © Robert Adrian Hillman/Shutterstock; © NPSGlobal

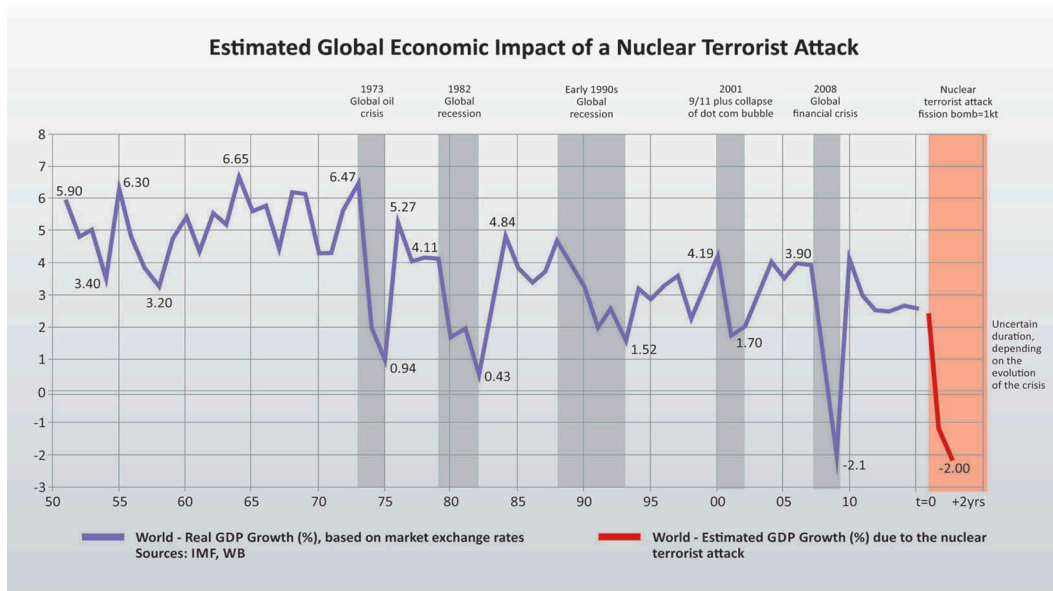


Figure 3. Estimated global economic impact of a nuclear terrorism attack.

The detonation of even one small nuclear bomb by a terrorist group would have multiple far-reaching, terrible effects, going far beyond a target city's boundaries. In addition to the tens of thousands of dead and injured, and the total destruction of the city's infrastructure, there would likely also be a years-long global economic depression, with 30 million more people reduced to extreme poverty. © NPSGlobal

would spark rising tensions among countries and blocs, that could even lead to the brink of nuclear weapons use by states (if, for instance, a sponsor country is identified). The consequences of such a shocking scenario would include a decrease in states' self-control, an escalation of present conflicts and the emergence of new ones, accompanied by an increase in military unilateralism and military expenditures.

Regarding the economic and financial impacts, a severe global economic depression would rise from the attack, likely lasting for years. Its duration would be strongly dependent on the course of the crisis. The main results of such a crisis would include a 2 percent fall of growth in global Gross Domestic Product, and a 4 percent decline of international trade in the two years following the attack (cf. Figure 3). In the case of developing and less-developed countries, the economic impacts would also include a shortage of high-technology products such as medicines, as well as a fall in foreign direct investment and a severe decline of international humanitarian aid toward low-income countries. We expect an increase of unemployment and poverty in all countries. Global poverty would raise about 4 percent after the attack, which implies that at least 30 million more people would be living in extreme poverty, in addition to the current estimated 767 million.

In the area of international relations, we would expect a breakdown of key doctrines involving politics, security, and relations among states. These

international tensions could lead to a collapse of the nuclear order as we know it today, with a consequent setback of nuclear disarmament and nonproliferation commitments. In other words, the whole system based on the Nuclear Non-Proliferation Treaty would be put under severe trial. After the attack, there would be a re-assessment of existing security doctrines, and a deep review of concepts such as nuclear deterrence, no-first-use, proportionality, and negative security assurances.

Finally, the behavior of governments and individuals would also change radically. Internal chaos fueled by the media and social networks would threaten governance at all levels, with greater impact on those countries with weak institutional frameworks. Social turbulence would emerge in most countries, with consequent attempts by governments to impose restrictions on personal freedoms to preserve order – possibly by declaring a state of siege or state of emergency – and legislation would surely become tougher on human rights. There would also be a significant increase in social fragmentation – with a deepening of antagonistic views, mistrust, and intolerance, both within countries and towards others – and a resurgence of large-scale social movements fostered by ideological interests and easily mobilized through social media.

Prevention, preparedness, response

Given the severity of the impacts, no country in possession of nuclear weapons or weapons-usable materials

can guarantee its full protection against nuclear terrorism or nuclear smuggling for proliferation purposes. Nor is it realistic to conceive of full compensation to others in the international community, if a catastrophic event happens because of any country's acts or omissions. Therefore, we consider that prevention is the only acceptable way forward to preserve global stability.

Consequently, it is essential for countries to make every effort to prevent nuclear terrorists from fulfilling their goals. It is true that the "primitivism" of currently active terrorist organizations gives a certain space to do what is necessary to enhance the current nuclear security effort concerning prevention and response. However, the perception of the "low likeliness" of a nuclear terrorist attack neutralizes the required sense of urgency in decision-making. Being in fact a "high-risk" scenario, it is imperative that governments consider this reality when setting priorities and making decisions about nuclear security.

In practical terms, the essential measures that all countries should take include securing all their nuclear materials and facilities (both civilian and non-civilian) to an agreed minimum acceptable level, eliminating highly enriched uranium and separated plutonium, and becoming accountable for their nuclear security practices toward the international community. This means that there is a need to strengthen supervision over nuclear materials and weapons, which in turn calls for ratifying and complying with the provisions in the key treaties that regulate prevention of terrorism and nuclear materials, and to implement global measures within the scope of the United Nations Security Council. It is imperative that all countries establish strategies to comply with these nuclear security commitments and participate in international partnerships aimed at strengthening the global capacity to prevent, detect, and respond to nuclear terrorism. More supervision, in its turn, means implementing reliable border control systems and training personnel at all levels involved in handling and securing nuclear materials and facilities.

A sound prevention strategy is crucial, but it is also essential to have adequate mechanisms and capabilities in place to manage the crisis, if it occurs. These capabilities of preparedness and response should include, at an international level, the negotiation and approval of innovative crisis management protocols or guidelines, worked out jointly within the United Nations Security Council. They should also include improved international control over measures taken by states that could affect human rights and individual guarantees, and the creation of crisis management mechanisms in formal multilateral institutions (community banks, interstate cooperation blocks) to lessen the impact of a crisis and secure aid flows.

At a national level, all countries should adopt measures aimed at establishing mechanisms for prompt decision-making – which may include the creation of crisis management teams. These mechanisms should be accompanied by the creation of contingency funds to mitigate any economic effects; the definition of protocols to use in responding in the public and private sectors; the setting of economic priorities to secure sustained fast access to basic goods such as water, food, fuel, medicine; and the design of crisis management mechanisms to secure the continuity of payment systems. These measures require the enforcing of national policies and contingency plans to respond to possible attacks, based on best practices, but avoiding causing panic in society.

How to move forward after the Nuclear Security Summits

There is a general consensus that the present nuclear security regime would fall short in coping with a threat of the magnitude of nuclear terrorism, because of its fragmentation and its lack of comprehensiveness in terms of states' participation and in protecting nuclear assets. In this sense, the post-Nuclear-Security-Summits era poses a major challenge: to take the international prevention effort to the next level, by building an improved global nuclear security system. For that purpose, it is essential to define a strategic roadmap for the future to provide overall direction to the entire nuclear security effort.

The joint statement endorsed by 40 states and two international organizations (the United Nations and Interpol) proposed a monitoring team – to be known as the Nuclear Security Contact Group – to oversee advances after the end of the fourth Summit in April 2016. This is a very promising move. The contact group should become a space to not only review the fulfillment of summit-era commitments but discuss fresh ideas for the future – including the design of the required strategic roadmap.

Countering global threats requires global action. The challenge here is to achieve a strong commitment from as many countries as possible, in addition to the 53 countries participating in the last summit. In this sense, countries should act in their respective regions, bilaterally or through the appropriate regional forums, to promote the debate about nuclear security as well as an increasing participation of all countries. One of the most critical issues is the need to restore a cooperation between Russia and the international community concerning nuclear security matters, despite Russia's withdrawal from previous summits. Opening opportunities for a dialogue with Russia about the future actions to prevent nuclear terrorism should be a priority.

Another key challenge is the creation of a joint strategy to protect not only civilian but also non-civilian nuclear assets. In the case of nuclear weapons-usable materials, civilian ones (those within the scope of the Nuclear Security Summits and the IAEA) only represent 17 percent of the total, and therefore the remaining 83 percent (non-civilian materials) ought to be included.

Concerning the nuclear “non-civilian” world, countries involved are extremely reluctant to set up any line of cooperation, which poses an extremely difficult situation.

With this in mind, it is essential to promote future joint work between governments and independent non-governmental organizations, in all environments in which key nuclear security issues are discussed and decisions are shaped.

Finally, it is of the utmost importance to adopt a comprehensive approach to reduce nuclear risks. The dangers related to current arsenals, further proliferation, and nuclear terrorism are inter-related, and should therefore be dealt with in an integrated manner.

In this sense, nuclear security must be a matter of agreement and not of rivalry among states, since it represents a genuine common interest of the international community. Based on that, it would be highly desirable to find ways to improve nuclear security besides disarmament and non-proliferation.

Following this approach, nuclear security should be regarded as a key relevant element of the Non-Proliferation Treaty Review cycle. Consequently, the traditional three-pillar approach historically related to the treaty could be updated to give place to an innovative comprehensive, integrated and universal strategy, focused on nuclear risks reduction.

Keys to an improved global nuclear security system

After the end of the Summits in April 2016, the priority has been to take advantage of all the international experience in nuclear security. It can be done by weaving together the required international agreements to achieve the global nuclear security system. It should be functional enough to define a set of minimally acceptable nuclear security standards, and look for their universal acceptance (thereby increasing the number of participating states).

The new system should promote countries’ accountability for their nuclear security practices in the international community, support universal implementation of the key binding international instruments – such as the recently re-named Convention on the Physical Protection of Nuclear Materials and Nuclear Facilities and the

International Convention for the Suppression of Acts of Nuclear Terrorism – and of the complementing global measures decided by the United Nations Security Council (Resolutions 1373/01 and 1540/04). At the same time, it should encourage countries’ adoption of the IAEA nuclear security guidelines and their participation in voluntary international initiatives aimed at strengthening the global aptitude to prevent, detect, and respond to nuclear terrorism. All weapons-usable materials (both civilian and non-civilian), nuclear facilities, radiological sources, and information should be fully protected from theft, illicit trafficking, and sabotage. This requires acknowledging that nuclear arsenals around the world are a source of risk from the nuclear security point of view. Such a conclusion implies that there is a need to promote minimization and further eliminate weapons-usable materials, highly enriched uranium, and separated plutonium with the aid of diverse nuclear technologies.

Lastly, the new regime should encourage transparency and shared best practices, while protecting countries’ critical information and their legitimate right to peaceful nuclear development and use. It should also be affordable, dynamic and flexible, so as to be practical and provide adequate responses to the future evolution of nuclear threats.

Combating nuclear terrorism as a universal enterprise

A nuclear terrorist attack would threaten the world order in all ways. Beyond any doubt, the new scenario will demand new paradigms in politics, law, economy, security, and international affairs. It is in every nation’s interest to implement policies aimed at prevention, preparedness, and response to a nuclear attack, irrespective of how close or far from their national borders it may occur. We are against the belief that certain countries would benefit more than others from prevention measures.

Today there is more need of leadership than ever to move towards a less insecure world. With the agreement of countries about appropriate international rules, the identification of clear priorities at national, regional and global levels, and quality policymaking worldwide, there is hope that such a catastrophe will turn out to be less likely in the future.

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