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United Nations Secretary-General's Mechanism

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Summary
The credibility and legitimacy of the United Nations Secretary-General's Mechanism (UNSGM) for investigating the alleged use of biological weapons relies in part on qualified experts trained to undertake fact-finding missions using an empirical scientific approach. As observed in the 2013 investigation into the alleged use of chemical weapons in the Syrian Arab Republic, this mechanism can be an effective tool in the verification of and as a deterrent against the use of chemical and biological weapons. The World Organisation for Animal Health (OIE) has a memorandum of understanding with the United Nations Office for Disarmament Affairs, supporting the UNSGM and providing experts for its roster for missions. As the majority of biological agents are of animal origin, the expertise of the OIE in this area, and its involvement in the UNSGM, are of paramount importance. Since 2014, experts from the OIE have participated in relevant training and are available for deployment to investigate any alleged use of a biological weapon anywhere in the world if the UNSGM were triggered.

Keywords
Alleged use – Animal pathogen – Biological weapon – Bioterrorism – Roster of experts – Toxin weapon – Veterinary – Zoonosis.

History

Overview

The United Nations Secretary-General's Mechanism (UNSGM) was developed in the late 1980s to undertake timely and evidence-based investigations (missions) in response to allegations involving the use of chemical, bacteriological (biological) or toxin-based weapons (1). The UNSGM mandate has been fully established and endorsed by United Nations Security Council (UNSC) Resolution 620 (1988) and United Nations General Assembly (UNGA) Resolution 42/37 C (2, 3). In addition, the UNSC, with support from the United Nations Office for Disarmament Affairs (UNODA), adopted a resolution, UNSC Resolution 1540 (2004), which decreed that all United Nations (UN) Member States shall refrain from providing any support to non-State organisations that attempt to develop, acquire, manufacture, possess, transport, transfer or use biological weapons, especially for terrorist purposes (4). An allegation can be brought to the attention of the Secretary-General of the United Nations (SG) by any UN Member State, and an investigation can be subsequently undertaken following a request from the SG. Importantly, the effective use of the UNSGM serves as a deterrent against the use of these weapons. For this principal reason, the UN guidelines and procedures (UNGA Document A/44/561), established pursuant to UNGA Resolution 42/37 C, allow for the timely and efficient investigation of reports of alleged use of such weapons (5). UN Member States nominate experts to be part of the roster from which the SG selects a mission team. These UN missions focus on collecting relevant data/information and on performing the necessary analyses in order to ascertain the facts related to the allegation of use of such weapons at the invitation of the country concerned, the results of which are contained within a report to the SG.

The international community looks to the UN, and to the use of this mechanism, for an objective, impartial determination of whether and to what extent such allegations can be substantiated. The roles and responsibilities of UNODA specified the need for all investigations to follow the UN mandate (UNGA Document A/44/561); with the critical point being that any investigation was of 'alleged' use only. The principal part of any such investigation is the deployment of experts representing the UN who will gather empirical data to support or refute an allegation. A team of experts is dispatched to the site(s) of the alleged incident(s) with the mandate to report the facts, within an agreed time frame, first verbally to the SG and then in a written report circulated to all UN Member States. In this

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methodical way, the facts pertaining to any alleged misuse of chemical, bacteriological (biological) and toxin weapons, or transgression of other relevant rules of customary international law in violation of the Geneva Protocol (1925) (6),which bans the use of chemical and biological weapons, can be obtained. The protocol was prepared under the auspices of the League of Nations in 1925, and following endorsement by its signatories, it became a legitimate document under international law in 1928. An important facet of this fact-finding mission is the gathering of factual information using an objective and transparent approach that employs the rigor of scientific methodologies. Proof of any misuse of weapons in violation of the Geneva Protocol (1925) is reported directly to the SG.

Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction

In 1975, the Biological Weapons Convention (BWC), a multilateral disarmament treaty banning the development, production and stockpiling of bacteriological (biological) and toxin weapons, officially entered into force. Information on members of the BWC treaty – be they State Party, signatory or non-State Party – is available on UNODA website. The website also includes details of each signatory's status, accession and/or ratification date, its regional group affiliation, and the number of BWC meetings and conferences it has attended since its entry into the treaty (7). In the last two years, additional UN Member States have become signatories and acceded to the regulations of the BWC. In 2015, Mauritania and Andorra both acceded to the BWC and officially became the 172nd and 173rd State Parties to the convention, respectively. In 2016, Côte d'Ivoire officially ratified the treaty in Moscow and Angola acceded to the BWC in Washington, DC, officially becoming the 174th and 175th State Parties to the convention, respectively. The BWC was the first multilateral disarmament agreement, where signatories decided 'never in any circumstances to develop, produce, stockpile or otherwise acquire or retain':

– 'microbial or other biological agents, or toxins…that have no justification for peaceful purposes'

– 'weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict' (8).

This was followed by an amendment, in 1986, that each signatory was to implement confidence-building measures that would improve international cooperation in biological activities. In 1991, the confidence-building measures were further developed ensuring that signatories provided annual reports relating to the BWC. This included information on the following: research centres and laboratories; vaccine production facilities; biological defence research programmes; past activities in either offensive and/or defensive biological research; the epidemiology of infectious diseases causing disease outbreaks; and information on legislation, contacts and regulations.

Biological and toxin weapons

Several countries have developed offensive biological weapons (bioweapons) programmes. These include: Canada (1939–1969), France (1922–1928, 1934–1940 and 1947–1972), Germany (1923–1945), Hungary (1936–1944 and 1945–1989), Iraq (1974–1991), Japan (1930–1945), South Africa (1981–1995), the Soviet Union (1928–1992), the United Kingdom (UK) (1940–1964), and the United States of America (USA) (1942–1969) (9).

Bioweapons are principally disease-causing pathogens or toxins from microorganisms that are capable of disseminating in a host (plant, crop, animal or human) resulting in harm, injury or death. Although the principal misuse of biological agents is the threat posed to public health, the risks to the agricultural sector and food security are also highly significant. These pathogenic microorganisms include viruses, bacteria, parasites, fungi, prions and rickettsia. Additionally, toxins, the lethal component of either microorganisms or plants, can be used as bioweapons. The pathogen or toxin becomes weaponised when it consists of a biological agent and a delivery mechanism. The development of such bioweapons has widespread application in strategic or military operations. Bioweapons have previously been used for political assassinations. One example is that of a Bulgarian spy, Georgi Markov, who whilst working as a broadcaster and journalist was attacked on 7 September 1978 on a London street. He was killed via a micro-engineered pellet containing the toxin ricin, which was fired into his leg through the point of an umbrella. That evening, Markov was admitted to hospital and died four days later. His killers were never apprehended but were considered to be in collusion with an opposing national intelligence agency working on behalf of, and with instructions from, Bulgaria. The use of bioweapons as destructive tools to kill or harm humans is sinister and can result in widespread illness with a large number of human fatalities. In addition, the use of bioweapons with a low case-fatality rate will still cause anxiety, fear and mistrust within a population. Another example of the alleged use of bioweapons after the Second World War includes an allegation against the USA that the origin of a cholera epidemic in Hong Kong in 1961 was the deliberate release of *Vibrio cholerae* (10).

Bioweapons have also been developed for use as 'stealth weapons' in the infection of livestock, aquaculture systems

or agricultural crops and plants as a form of agroterrorism. Various agroterrorism agents have been weaponised with the aim of causing agricultural sabotage. This involves the deliberate spread of an animal or plant pathogen that may result in economic damage and social instability (11). This form of use creates economic losses, food shortages and political instability, and can directly or indirectly harm the human population. For example, from 1940 onwards, the UK experimented with *Bacillus anthracis* as a bioweapon. During the Second World War, 5 million cattle cakes with *B. anthracis* spores had been produced with the intention of malicious use against livestock in Germany. During these early years of bioweapon research, the UK bioweapon programme focused on the development of agents against animals and crops (10). Other nations also continued with biological warfare programmes during the Second World War, including the development of bioweapons made from human, animal and crop (food-producing) pathogens (10). After the Second World War, agroterrorism cases were also linked to political and religious terrorist groups (11). In 1984, the alleged deliberate use of a biological weapon as 'food terrorism' was investigated by the Oregon Health Department and the United States Centers for Disease Control (12). Forty-five victims were hospitalised from a total of 751 cases of severe enteritis during the outbreak, which was linked to the consumption of salads in restaurants in Oregon. The causative agent was confirmed as *Salmonella* Typhimurium. A member of a political terrorist group, the Rajneeshee cult, later admitted the attack was a deliberate act of terrorism (12). During the 1990s in the USA, a deliberate attack on a food production plant was also reported (13). In 1996, a cow carcass deliberately contaminated with the pesticide chlordane was rendered before being added to animal feed. Farms in four states received potentially contaminated animal feed, which resulted in huge economic losses to the feed company (13). Bioweapons can be produced on a large scale and stored for long periods of time before use. Disturbingly, the technology to produce bioweapons is freely available and is open to misuse by rogue individuals and terrorist organisations. A call for the implementation of controls on the supply of bioengineering information was highlighted in a recent review by the Nuffield Council on Bioethics (14). Concerns were raised in the report relating to dual-use research and the ethical issues in biology and medicine, especially the impact of genetic engineering. These technologies exploit the substantial advances in biology that can be used for terrorist purposes and have the ability to create bioweapons that can be enriched from what is naturally available to a more pathogenic state. In the 21st century, the development of a new group of bioweapons, by individuals or members of a terrorist group intent on causing widespread destruction, is not implausible. Such bioweapons are capable of displaying a broader host range and of disseminating by new routes of transmission, often by the airborne route through sprays and missiles (15).

United Nations Secretary-General's Mechanism mission structure

The key elements of the UNSGM are the roster of experts and laboratories provided by UN Member States, and the guidelines and procedures for the conduct of investigations of alleged use. The structure of these elements for UNSGM missions is further discussed below.

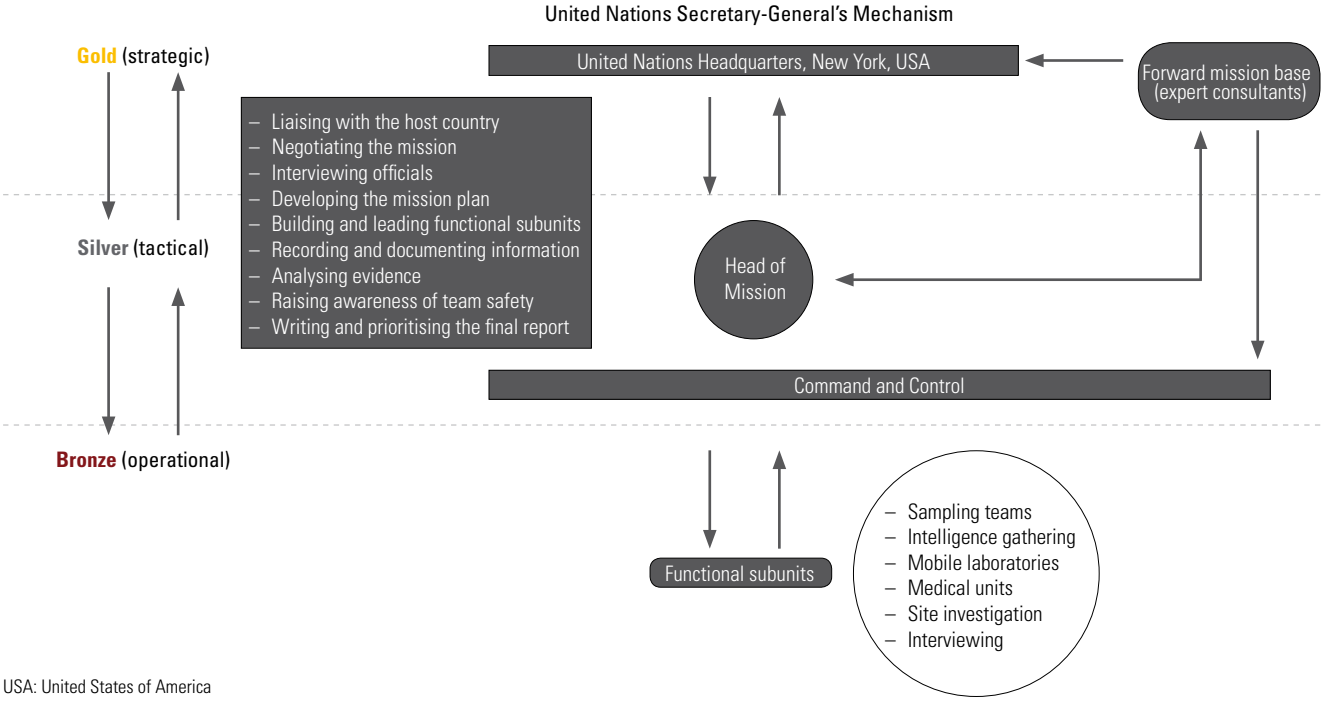
Roster of experts

When the UNSGM is triggered, the SG can quickly assemble a mission team from a roster of experts and laboratories provided to him/her by UN Member States. Since 2006, the roster of experts and laboratories has been updated by UNODA following a request received by the SG from UN Member States. In accordance with the guidelines and procedures for the conduct of investigations (see below), specialised training courses have been instigated to improve the knowledge, operational capability and expertise for existing and new experts in support of their possible role on the SG's behalf in carrying out investigations into alleged use of biological agents. The initial training course for experts was offered by the Government of Sweden and was undertaken in cooperation with UNODA in Umeå, Sweden, in May and June 2009. This was followed by courses in France, the UK and Germany between 2012 and 2014.

Guidelines and procedures for United Nations Secretary-General's Mechanism missions

In 2007, UNODA organised two meetings with representatives of different international organisations in order to update the technical guidelines and procedures for the conduct of investigations. These guidelines reflect the rapid and substantial developments that have occurred in biological research since the 1980s, taking into account the recommendations of the Chemical Weapons Convention (CWC) and the establishment in 1997 of the Organisation for the Prohibition of Chemical Weapons (OPCW). The guidelines focus on the relevant technical aspects for the investigation of any alleged use. They are now available for the timely and efficient investigation of alleged use of a bioweapon anywhere in the world.

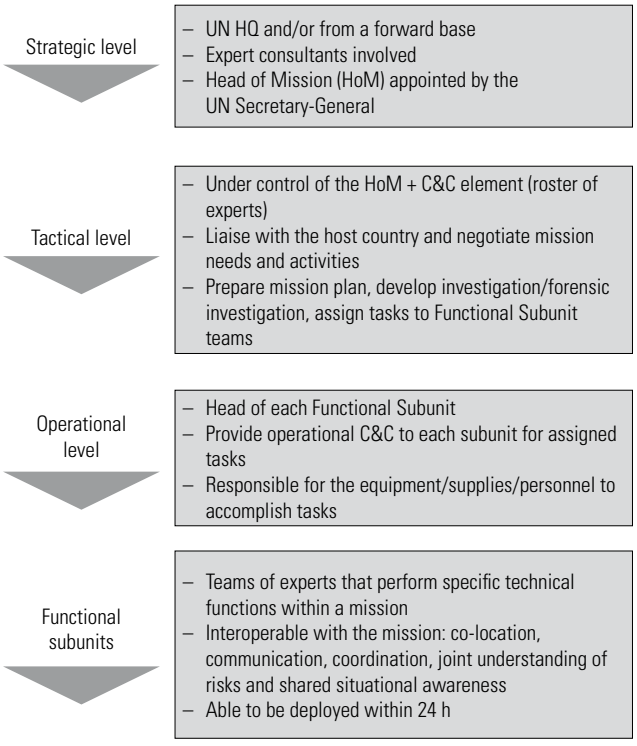
A UNSGM mission team has a distinct structure, and specific responsibilities and capabilities. It is composed of a selected team of experts (referred to as the Command and Control [C&C] element) that operates at three levels: strategic (gold), tactical (silver) and operational (bronze) (see Fig. 1). Based on the guidelines and procedures, strategic planning



USA: United States of America

Fig. 1
Levels of operation of a United Nations Secretary-General's Mechanism mission team

is undertaken at UN Headquarters in New York, USA, which provides a forward mission base. The responsibility of the SG is to appoint a Head of Mission (HoM), selected from the C&C element, who is also involved at the strategic level. The tactical command structure is under the control of the HoM and it leads the tactical command element. The HoM together with the C&C element is responsible for the preparation of the mission plan, before developing both the investigative plan and the forensic investigation. The C&C element is responsible for assigning tasks to functional subunits (selected from national teams with specific technical functions). Each functional subunit is thoroughly briefed before any mission to manage expectations regarding equipment and operational logistical requirements. This includes arranging its equipment for personal protection; sampling, packing and transporting of material; and ensuring overall safety in the field. The C&C element is required to liaise with the host country to negotiate the mission and the choice of officials to interview. Following this, the mission plan is developed with responsibilities that include building and leading teams; recording and documenting information; collecting and sampling forensic evidence; evidence analysis; awareness of personnel and team safety; and writing and presenting the final report in line with the UN mandate. A summary of the structure of a UNSGM mission team is provided in Figure 2.



C&C: Command and Control
HQ: headquarters
UN: United Nations

Fig. 2
Structure of a United Nations Secretary-General's Mechanism mission team

OIE involvement in the United Nations roster of experts

In order to further cooperation and enhance the technical capabilities of investigations of alleged use, the UN and the World Organisation for Animal Health (OIE) signed a memorandum of understanding in 2012 concerning OIE support to the UNSGM for the investigation of alleged use of chemical, biological or toxin weapons (16). The memorandum of understanding supports the mandate of the OIE to improve animal health, veterinary public health and animal welfare worldwide. It is recognised that the OIE acts as the leading organisation on international animal health work. Expertise with scientific and technical support is provided from the global network of OIE Reference Laboratories and Collaborating Centres. In addition to the provision of nominated OIE experts, the OIE has agreed to allow access to the network of OIE Reference Laboratories and Collaborating Centres for laboratory investigations. Also, the advice, animal health information, field operations and disease outbreak control methodologies of the OIE and its experts will be disclosed to the UN. Named OIE experts form part of the collaborative agreement between the UN and the OIE for the purpose of investigating an alleged use of a bioweapon, particularly the use of an animal pathogen or zoonotic agent. Under the OIE, and on request from UNODA, the OIE proactively aims to have a trained body of experts who can provide technical support, as required.

The involvement of the OIE with the UN and other agencies related to the UNSGM includes enhanced training of veterinary scientists in the fields of animal health and zoonosis. Veterinary scientists have specialised expertise in veterinary public health, which provides them with the knowledge and experience to participate in international missions in support of any investigation of alleged use of a bioweapon. This is especially pertinent if the alleged bioweapon is an animal or zoonotic pathogen. The specialist experts who are readily available through the OIE network of Reference Laboratories and Collaborating Centres have the ability to work together with solidarity and cooperation in planning and executing biothreat reduction strategies. These strategies include the dissemination of scientific and technical information that advocates the non-proliferation of biological weapons. The OIE also provides support to UNODA in updating the technical guidelines for the UNSGM and in providing experts for the SG roster of experts. The proposed OIE involvement is integral to the existing mechanism to support UNODA's mandate under the guidelines and procedures, including references to the investigation being undertaken with a functional subunit-based approach. Since 2014, experts from the OIE have participated in training courses and are available for deployment to investigate any alleged use of a biological weapon anywhere in the world if the UNSGM were triggered.

United Nations Secretary-General's Mechanism mission example: allegations of the use of chemical weapons in the Syrian Arab Republic, 2013

In March 2013, allegations of the use of chemical weapons in the Khan Al-Asal area of the Aleppo Governorate were officially reported by the Government of the Syrian Arab Republic. The government immediately requested the SG to investigate this alleged use under the mandate of the UNSGM. The SG agreed to the appeal and requested the assistance of the OPCW and the World Health Organization in undertaking an investigation. The mission lead was Professor Åke Sellström from Sweden. A team was assembled under the leadership of Professor Sellström and dispatched to the Syrian Arab Republic in August 2013, after reassuring itself of the safe and efficient undertaking of this mission. The team investigated three sites of alleged use of chemical weapons, including Khan Al-Asal. A second alleged use of chemical weapons was also made in August 2013 in the Ghouta area of Damascus. The team was also deployed to investigate this allegation as a priority. Beforehand, the UN High Representative for Disarmament Affairs met with the Government of the Syrian Arab Republic and obtained permission for the mission team to enter the Ghouta area unhindered and with full cooperation. Towards the end of August 2013, the mission team returned to OPCW Headquarters in the Hague, the Netherlands, with their collected data/information and laboratory samples, which were then sent to OPCW-designated laboratories in Europe for further analysis.

In September 2013, Professor Sellström presented his report to the SG, which was then disseminated to the UNSC and the UN General Assembly. The SG confirmed that the allegation was upheld and that chemical weapons had been used 'aggressively' against a civilian population (17). The use of chemical weapons (sarin) in this large-scale attack resulted in numerous casualties, the majority of whom were children. The UN condemned this use of chemical weapons and designated the attack a 'war crime' and a violation of international law under the Geneva Protocol (1925) (18). In addition, the UN noted that the individuals responsible for any confirmed use of chemical or biological weapons must be held to account for their actions under international law.

In the same month, the Syrian Arab Republic signed up to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (19). Following this, the USA and the Russian Federation developed a framework for destroying all chemical weapons held in the Syrian Arab Republic. As a result of this internationally unlawful use of chemical weapons and the clear demonstrable capability of a UNSGM mission team to investigate such alleged use, the UNSGM has strengthened its mandate. In particular, the SG has fully supported the viewpoint that the use of a mission team to investigate allegations of the use of either chemical or biological weapons will serve as an effective deterrent, with the hope of impeding their future use.

Other examples of the triggering of the UNSGM for investigating the alleged use of a chemical weapon include a mission to Mozambique in June 1992 (see UNSC Document S/24065) and a mission to Azerbaijan in July 1992 (see UNSC Documents S/24053 and S/24344) (20, 21, 22).

Discussion

The advent of technological advances in biology, such as the attenuation of a microorganism or genetic engineering, has led to a revolution in vaccine design and in understanding some of the complexities of pathogen–host interactions. These technological advances have progressed at a rapid pace, including high throughput sequencing, gene editing and modification, and genome synthesis, which provides the ability to create molecular clones with the gain of function attributes. With the widespread use of molecular biology techniques, it is now possible to construct pathogenic organisms from synthetic DNA. This pivotal research has led to an explosion in reverse genetics allowing genome rearrangements, and the selection and isolation of rescued viruses that do not occur naturally. However, possible drawbacks of these technologies are their use in developing pathogens with altered phenotypes that demonstrate a broader cell tropism with enhanced targeting moieties. In addition, these same advances in technology and knowledge can be used for harmful purposes in the generation of biological agents with new properties. This could include microorganisms with a stronger resistance to immunity, increased virulence, a broader host range and the adaptability of the pathogen for inter-human airborne transmission via aerosols.

In order to counteract the proliferation of bioweapons, the Biological Weapons Convention was initiated and adopted by UN Member States. The treaty remains a major milestone in the international community's efforts to prevent the development, production, stockpiling and use of bioweapons. Although adherence to the treaty that entered into international law in the 20th century is mandatory to those states that are signatories, bioweapons have still reportedly been used by individuals and terrorist organisations resulting in criminal acts, assassinations and biological warfare. In addition, agents used in the manufacture of bioweapons and for non-military use, including vaccine production, have previously been accidentally released by manufacturing processes and in laboratories. These issues still remain unresolved, especially when considering the complexities surrounding pathogen research into defensive weapons and for vaccine research and development (10). More concerning is the fact that several false allegations regarding the use of bioweapons have been made. This issue demonstrates the difficulties in differentiating between accidental and deliberate use, and in confirming the release of biological agents used in the manufacture of bioweapons. This point supports the need to develop expert teams capable of investigating any alleged use of a bioweapon, with the knowledge and technical expertise to prove whether any such release was accidental or deliberate.

Conclusion

The credibility and legitimacy of the UNSGM in the investigation of alleged use of bioweapons relies in part on qualified experts trained to conduct fact-finding missions using a scientific, defendable approach. The lessons learned from previous UN missions have been used to improve preparedness planning against a 21st century bioterrorism incident. The principal components of an investigation into the alleged use of a bioweapon include accurate and timely reporting systems involving trained professionals, capable of providing expert advice by working in functional subunits and led by a C&C team. With this in mind, the OIE and its Biological Threat Reduction Strategy are fully supportive of, and aligned with, the missions of the UNSGM in order to provide experts who can be used in the investigation of any alleged use of a bioweapon. In addition, enhanced knowledge of the motives promoting bioweapon use has led to improved biological countermeasures. It is therefore necessary for governments and international organisations, including the OIE and UNODA, to develop plans that combat any aggressive use of bioweapons by implementing a global, integrated programme and early detection system that can be used to investigate an alleged use of a bioweapon.

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Le Mécanisme du Secrétaire général des Nations Unies

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Résumé

La crédibilité et la légitimité du Mécanisme du Secrétaire général des Nations Unies visant à enquêter rapidement sur les allégations relatives à l'emploi possible d'armes biologiques reposent en partie sur le travail d'experts qualifiés et formés aux enquêtes d'établissement des faits, qui font appel à une méthode scientifique empirique. Comme cela a été constaté lors de l'enquête de 2013 concernant l'emploi allégué d'armes chimiques en République arabe syrienne, ce mécanisme peut constituer un outil efficace de vérification et de dissuasion en matière d'utilisation d'armes chimiques et biologiques. L'Organisation mondiale de la santé animale (OIE) a conclu un Mémorandum d'accord avec le Bureau des affaires de désarmement des Nations Unies, par lequel l'OIE s'engage à soutenir le Mécanisme du Secrétaire général et à mettre à disposition des experts pour participer aux missions. Les agents biologiques étant majoritairement d'origine animale, les compétences de l'OIE dans ce domaine et sa contribution au Mécanisme du Secrétaire général des Nations Unies sont d'une importance capitale. Depuis 2014, les experts de l'OIE ont participé aux formations requises ; en cas d'activation du mécanisme, ils sont donc opérationnels pour prendre part aux missions d'enquête sur l'emploi allégué d'armes biologiques partout dans le monde.

Mots-clés

Agent pathogène d'origine animale – Arme à toxines – Arme biologique – Bioterrorisme – Emploi allégué – Liste d'experts – Médecine vétérinaire – Zoonose.

El Mecanismo del Secretario General de las Naciones Unidas

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Resumen

La credibilidad y legitimidad del Mecanismo del Secretario General de las Naciones Unidas para la Investigación del Presunto Empleo de Armas Químicas, Biológicas o Toxínicas reposa en parte en la participación de expertos cualificados y formados para llevar a cabo misiones de esclarecimiento de los hechos empleando métodos científicos experimentales. Como dejó patente la investigación sobre el presunto uso de armas químicas en la República Árabe Siria realizada en 2013, este mecanismo puede constituir una eficaz herramienta de verificación y un factor disuasorio del uso de armas químicas o biológicas. La Organización Mundial de Sanidad Animal (OIE) tiene suscrito con la Oficina de Asuntos de Desarme de las Naciones Unidas un memorando de entendimiento en virtud del cual presta apoyo al Mecanismo del Secretario General y proporciona expertos que figuran en la lista de especialistas llamados a participar en sus misiones. Toda vez que la mayoría de los agentes biológicos son de origen animal, la competencia técnica de la OIE en este ámbito, así como su participación en el Mecanismo, revisten una importancia capital. Desde 2014, expertos de la OIE han participado en actividades de formación sobre el tema y están disponibles para

desplegarse en cualquier lugar del mundo e investigar todo caso de presunta utilización de un arma biológica en cuanto se active el Mecanismo del Secretario General.

Palabras clave
Arma biológica – Arma toxínica – Bioterrorismo – Empleo presunto – Lista de expertos – Patógeno animal – Veterinario – Zoonosis.

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