

Questions and answers on governing dual-use research: how stakeholders can leverage WHO's Global guidance framework for responsible use of the life sciences¹

How can different stakeholders use the WHO Global guidance framework for the responsible use of the life sciences: mitigating biorisks and governing dual-use research (hereinafter the Framework)?

One of the key challenges in governing dual-use research is the rapid pace of scientific advancement, which often surpasses the ability of regulatory frameworks to keep up. This is further compounded by limited awareness of the dual-use potential of life sciences, including that many researchers may not fully recognize when their work has such potential.

The [Global guidance framework for the responsible use of the life sciences: mitigating biorisks and governing dual-use research](#) addresses these concerns by promoting proactive and regular risk assessments, strengthening education and training, and fostering stronger collaboration among researchers, governments, and industry and other stakeholders. Building a culture of responsibility and awareness across the life sciences is essential.

Preventing and mitigating biorisks, and governing dual-use research, requires inclusive collective effort. It is a shared responsibility involving a wide range of stakeholders with different roles and capacities. The Framework outlines the roles and responsibilities of key stakeholders, including national governments, scientists, research institutions, funding bodies, publishers and editors, standard-setting institutions, educators, international organizations, civil society networks and the public and private sector actors. This Q&A further details how specific actors that are less-developed in the Framework can engage in the responsible use of life sciences and contribute to the governance of dual-use research. It is intended to be used as a supplement to the Framework, highlighting the practical support and guidance the Framework offers to Member States and other key stakeholders in navigating these complex challenges.

¹ WHO thanks the [WHO Technical Advisory Group on the responsible use of the life sciences and dual-use research](#) (TAG-RULS DUR), as well as the leadership and contributions of the working group on capacity building, education and training, for their valuable input and advice in the development of this Q&As.

Q1. How can national governments use the Framework to strengthen policymaking, capacity building, and biorisk governance?

A1. National governments can leverage the Framework and its associated tools, such as the [WHO Academy online training course on dual-use research and the responsible use of the life sciences](#), the case studies and scenarios and the WHO Biorisk Implementation and Evaluation Tool (BRIET) (forthcoming) to inform and strengthen national legislation, regulations and guidelines. By using these resources, governments can empower stakeholders across sectors to engage in activities aligned with their roles and capacities, collectively working to minimize biorisks and promote the responsible use of the life sciences under all circumstances. National governments can leverage the Framework by building on its nine values and principles, associated commitments, and supporting tools.

To ensure effective implementation, it is essential to allocate adequate resources for the dissemination of the Framework and the delivery of education and training, particularly to frontline researchers and policymakers involved in the oversight of dual-use research.

Governments should also actively engage a broad spectrum of stakeholders, including scientists, educators, funders, publishers, and the public, to build a resilient network against accidents, unintended and deliberate misuse of biological knowledge, materials, technologies, and tools. In addition, anticipating and addressing emerging challenges and governance gaps is critical. As advances in the life sciences continue to accelerate, regular assessments and updates to national and institutional biorisk management strategies are necessary to remain responsive and effective.

Finally, promoting and strengthening international collaboration is key to sharing best practices in education and training, and to developing innovative approaches that enhance biorisk governance globally.

Q2. How does the Framework promote biorisk training and competency for laboratory leadership?

A2. The Framework acts as a guiding compass for laboratory leadership, helping them to mitigate biorisks while encouraging innovation. It provides tools and mechanisms for the governance of biorisks. Below is a summary of the Framework's principles and comprehensive strategies for promoting biorisk training and competency among laboratory leadership.

Principles from the Framework

- Risk awareness and assessment

Laboratory leadership ensures that research endeavours are conducted safely and securely. One key aspect of this responsibility is developing awareness and a nuanced understanding of the biorisks inherent in their research. To achieve this, laboratory leadership must conduct thorough risk assessments considering various factors, including the pathogenicity of the organisms under study, their transmissibility, and the potential for misuse. By taking a comprehensive approach to risk management, laboratory leadership can identify potential hazards and develop effective strategies for mitigating them. This may include implementing strict safety protocols, providing ongoing training to staff members, and implementing policies that promote responsible conduct in the laboratory. Ultimately, the goal is to create a culture of safety, security and responsibility that protects researchers, the public, and the environment.

- Education and training

To effectively manage the risks associated with biological materials and research, laboratory leaders, like other laboratory personnel, must engage in continuous education and training. This involves staying up to date with the latest biosafety protocols, biosecurity measures, and risk communication strategies. It also includes considering ethical considerations surrounding dual-use research, such as the potential to be used for both beneficial and harmful purposes. A comprehensive approach to biorisk management education should cover various topics, from the basics of laboratory safety to the latest advances in technology and research methods. By staying informed and engaged in ongoing training, laboratory leaders can help ensure the safety of their staff, the public, and the environment while advancing scientific research.

- Leadership and accountability

Laboratory leaders play a crucial role in ensuring the safety and security of their institutions. As custodians of biorisk management, they are responsible for implementing and upholding effective policies and practices that minimise the risk of biological hazards. This involves establishing a strong culture of safety within the organisation and promoting accountability among all staff members. In addition, laboratory leaders must ensure that all relevant regulations and guidelines are adhered to, and that appropriate training and resources are provided to staff. By demonstrating a strong commitment to safety and

security, laboratory leaders can help protect the health and well-being of their staff and the broader community from potential hazards.

- Communication and collaboration

Effective biorisk management hinges on transparent communication and collaboration among laboratory leadership, researchers, biosafety professionals, and other stakeholders. By fostering an environment conducive to knowledge sharing and collaboration, institutions can collectively strengthen their resilience against biorisks.

Strategies to promote biorisk training and competency

- Develop comprehensive training programs

A comprehensive training program is needed to prepare for the unpredictable nature of biorisk situations. This program should cover theoretical knowledge, hands-on skill-building, and realistic scenario-based training exercises. The simulations of real-world scenarios can provide the experience and confidence needed to effectively manage biorisk events.

- Promote continuing education

One way to support laboratory leaders in strengthening their skills in biorisk management is to encourage them to engage in continuous professional development. This can be achieved through participation in various learning opportunities, such as workshops, seminars, webinars, and online courses. Providing incentives, such as funding support and recognition, can also effectively motivate laboratory leaders to pursue ongoing learning and skill enhancement.

- Integrate biorisk training into leadership development

One way to promote greater safety in laboratories is to incorporate biorisk management modules into leadership development programs. This can help laboratory leaders acquire valuable skills in biorisk assessment, mitigation, and crisis response. In addition, opportunities for peer-to-peer learning and mentorship can facilitate the sharing of knowledge and transfer of skills among leaders in the field. By taking these steps, laboratories can become better equipped to handle various challenges and ensure the safety of their employees and the wider community.

- Foster a culture of safety and security

Encourage the development of a safety and security-first culture that prioritises risk management across all aspects of the organisation. Provide laboratory leaders with the tools and resources needed to champion safety and security initiatives, encourage open

communication, and promote the proactive identification of potential hazards. Ensure that adequate resources are allocated to enhance safety and security measures in the workplace.

- Provide resources and support

Allocating sufficient resources, such as funding, infrastructure, and personnel, is important to ensure effective biorisk management practices. One way to achieve this is by establishing dedicated biorisk management teams or designating biosafety officers who can offer technical expertise, guidance, and support to laboratory leadership and research teams. This will not only enhance the safety of the laboratory environment but also help promote a culture of responsibility and accountability.

Q3. How can research institutions use the Framework to manage biorisks more effectively?

A3. Research institutions can use the Framework as a strategic roadmap for strengthening their biorisk management practices. The Framework offers practical tools, including the six-step approach for implementation, risk assessment checklists, guidance for setting up review boards for dual-use research, and recommendations for fostering a strong culture of biosafety and biosecurity, that can be tailored to different contexts.

In addition, the [WHO Academy online training course on dual-use research and the responsible use of the life sciences](#) helps building awareness and strengthen institutional capacities on the responsible use of the life sciences and governance of dual-use research. By using these resources, institutions can align with international standards while adapting them to their specific needs. Through these efforts, research institutions not only improve internal risk management but also contribute to a broader culture of responsibility, biosafety and biosecurity in the life sciences and oversight of dual-use research.

Q4. Does the Framework address responsibilities of biodefense research scientists?

A4. While the Framework does not explicitly refer to biodefense research, its tools, mechanisms, and checklists are equally applicable to biodefense research institutions, scientists, and other relevant stakeholders. Life sciences researchers and other biodefense stakeholders can adopt the six-step approach to implement biorisk management as a comprehensive guide for governing dual-use research and mitigating associated biorisks.

The nine values and principles underpinning the Framework, while adaptable to specific circumstances and contexts, could serve as an ethical compass for guiding biodefense scientists and serve as “an anchor for policy and a community of practice that is aligned with recognized (international) standards, best practices and good governance”.

Among the Framework’s tools and mechanisms for biorisk management, the codes of ethics are highlighted as essential norm-setting instruments. For example, the [Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists](#) outlines ten elements: ethical standards, laws and norms, responsible conduct of research, respect for research participants, research process management, education and training, research findings dissemination, public engagement on science and technology, role of institutions, and international cooperation. These guidelines draw inspiration from the [Hague Ethical Guidelines](#) developed by the Organization for the Prohibition of Chemical Weapons.

Operationalizing the Framework within biodefense settings – through education in relevant academies, staff colleges, and international trainings and meetings – can support the [Biological and Toxin Weapons Convention \(BWC\)](#) and its confidence building measures as well as the compliance with [UN Security Council Resolution 1540 \(UNSCR 1540\)](#), which seeks to prevent the acquisition of weapons of mass destruction by non-state actors, including terrorists and illicit networks.

To safeguard against ethical lapses, the Framework provides foundational knowledge for further education, training, principles and value-based guidance.

Q5. Does the Framework address responsibilities of editors and publishers in managing biorisks?

A5. While there is currently no international standard for conducting risk-benefit analyses of dual-use research, many journal editors and publishers have voluntarily taken steps to assess the dual-use implications of submitted manuscripts. However, such practices are not yet consistently applied across the publishing landscape.

The Framework offers a checklist for different stakeholders, including publishers and editors, that can support them in strengthening their oversight of dual-use research. The Framework emphasizes the importance of integrating risk mitigation strategies throughout the research lifecycle, noting that these strategies should be regularly reviewed and adapted in response to new data or unexpected findings. By adopting these practices, publishers can play a critical role in promoting the responsible dissemination of life sciences research and reducing the risk of misuse.

Q6. What role does the private sector play in ensuring life sciences research is used responsibly?

A6. The private sector is a key stakeholder in the governance of dual-use research and biorisk mitigation. Companies operating in the life sciences domain can contribute to responsible science by implementing robust biosafety and biosecurity measures, funding ethically sound research, and adhering to ethical guidelines.

The Framework underlines the importance of private sector actors to align with industry best practices, work closely with regulators, and support policies that reduce biorisks while still enabling scientific innovation. By fostering a culture of responsibility and transparency, private companies can help safeguard public trust and ensure that advances in the life sciences are used for peaceful and beneficial purposes.

Q7. What role does the public and youth play in ensuring life sciences research is used responsibly?

A7. The public and youth are critical stakeholders in the governance of dual-use research because their involvement contributes to ensure that dual-use research is being developed and used responsibly. Civil society networks play a critical role in raising awareness of biological risks and promoting responsible research practices. They educate, engage and empower the public, act as a bridge between scientific communities and society, and support policy-making by facilitating dialogue between scientists and diverse public to balance innovation with precaution. Partnerships between experts and civil society can identify systemic gaps and mobilize political commitments. These efforts underscore the importance informing about the potential benefits, potential harms and mitigation measures on dual-use research, and of transparency and public access to information on research and laboratory undertakings that may impact societal well-being. It underlines the importance of participatory governance and promoting collaboration to promote trust and strengthen global solidarity in support of health, safety and security.

Youth are key stakeholders in the governance of dual-use research, as they represent the next generation of scientists, policymakers, entrepreneurs and citizens. Their active involvement strengthens governance by raising awareness, examining new social perspectives and relevant ethical considerations, and promoting responsible innovation. Moreover, youth can pioneer new forms of participation that complement existing governance structures, making them more inclusive, adaptative and responsive to emerging challenges.