



Wyss Institute Risk Management Plan for Emerging Biotechnology

Introduction

Cutting-edge innovative technologies have the capacity to provide translational public health solutions that have far-reaching, worldwide opportunities for use. These technologies could also be misused. To address the potential safety, security, and environmental implications involved in the research of emerging biotechnologies, of which many have not yet been characterized with established safety standards to reference, the Wyss Institute has implemented an integrated, multi-tier research review process to ensure that such research is managed through an extensive oversight process. Specifically, we have worked to create a Risk Management Plan that ensures biosafety and biosecurity measures on several levels including: the modification of the design or conduct of the research, the application of specific or enhanced biosecurity or biosafety measures, regular review at the institutional level of emerging research findings to screen for high-risk or even dual-use¹ research implications, and determining the venue and mode of communication to report the research responsibly.

Objective

To ensure that novel and emerging research has the ability to be performed safely and securely, and that the research is translatable to other scientists through application of appropriate risk mitigation processes to the respective research areas pursued at the Wyss Institute.

Process and Procedures

The Wyss Institute will review research before it begins and periodically as needed after it has begun to evaluate and assess any potential dual-use classification.

- As a new project emerges, Wyss Institute faculty, dedicated research staff and investigators, external experts in the field and safety professionals will discuss proposed research.
- The review process will be an iterative internal process involving a variety of different review mechanisms determined on a case by case basis. It will commence proactively prior to the university review committees (Committee on Microbiological Safety-COMS, Harvard

¹ Not all research is defined as high risk or “dual use.” Only a narrow subset of research occurring at the Wyss would be classified as such.

University Institutional Biosafety Committee, Embryonic Stem Cell Research Oversight-ESCRO, Institutional Animal Care and Use committee-IACUC and Institutional Review Board-IRB). In all instances, strong partnerships between these review committees and the Wyss Institute will be maintained.

- The internal review process will facilitate risk management for specific project plans when warranted, and will cover the scope of the project.
- The Wyss Institute will facilitate the installation of a Risk Management Plan and this plan will be shared with the designated university committee involved in the review of the project. Depending on the nature of the project, multiple review committees may be involved.
- Each review committee may add on additional stipulations and requirements, above the measures outlined preemptively in the Risk Management Plan set forth by the Wyss Institute.
- After the institutional-level review and the review committees meet and approve the research, the Wyss will provide training to all involved personnel to incorporate all requirements of the risk management plan and to ensure all personnel safely and securely perform the work.
- After the initial plan is developed, periodic “check ins” on scope and procedures will occur as determined by the plan. This will allow a completely proactive approach to ensuring risk management is appropriately adjusted as research changes. As research and safety requirements evolve, the responsible review boards will be notified as well.

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i) Modification of research design or conduct

With regards to research that has potentially adverse biosafety/ biosecurity/ environmental impact, it is possible to consider the overall design of the research proposal to substitute agents or materials that are associated with lower risk, but produce the same experimental results. This modification is the easiest way to negate potential safety or security concerns, but is not always possible.

ii) Application of specific or enhanced environmental, biosecurity or biosafety measures

In instances where substitution is not possible, it is possible to enhance the safety and security measures by expanding inherent molecular containment mechanisms in a given organism and by expanding ecological containment mechanisms for a given organism, in addition to additional plus practices and procedures. Please review the table on page 3 for areas of risk assessment enhancement.

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All Wyss Institute laboratories are created under the strictest federal, state and local requirements surrounding lab design. Whenever possible, the Wyss Institute will support design of laboratories that allows a seamless flow of containment processes for a given research type permitting a structured setting of practices and procedures needed to address additional biosafety or biosecurity concerns for emerging technology. In essence, lab design will follow the requisite safety and security design requirements but also allow for a “think outside the box” process that supports flexibility and conversion of a containment level to that of a higher containment level when warranted by either changing process flow within the lab or enhancing procedures and practices.

TABLE: Application of specific or enhanced environmental biosafety or biosecurity measures

Section 1: Molecular Containment/Ecological Containment		
The internal controls that inhibit transmission of an organism’s traits or release of an organism. This aspect of control is the most crucial in preventing uninhibited spread. This can be natural or can be implemented through recombinant means.		
Section 2: Facility Containment and Associated Practices and Procedures		
Agent	Containment	Description
Safety-BSL1 agent/technology where negative Biosafety outcomes could be present	Enhance containment to either BSL1+ or BSL2	Incur additional practices and procedures following BSL2 procedures in a BSL1 laboratory or work within a BSL2 laboratory with BSL2 practices and procedures
Safety-BSL2 agent/technology where negative Biosafety outcomes could be present	Enhance containment to BSL2+ or BSL3	Incur additional practices and procedures following BSL3 practices and procedures in a BSL2 lab (BSL2+) or work within a BSL3 laboratory following BSL3 practices and procedures
Security- BSL1 agent/technology where negative Biosecurity outcomes could be present	Enhance containment to BSL1+ or BSL2	Incur additional practices and procedures following BSL2 procedures in a BSL1 laboratory or work within a BSL2 laboratory with BSL2 practices and procedures
Security- BSL2 agent/technology where negative Biosecurity outcomes could be present	Enhance containment to BSL2+ or BSL3	Incur additional practices and procedures following BSL3 practices and

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		procedures in a BSL2 lab (BSL2+) or work within a BSL3 laboratory following BSL3 practices and procedures
Section 3: Additional Controls above base-containment level and in addition to the molecular/environmental controls		
These additional practices and procedures would be enhancements above and beyond the standard requirements seen in biocontainment. Examples of these controls would include enhanced engineering and administrative controls including alternative waste treatment practices, specialized containment controls, and specialized decontamination processes.		

iii) Regular review of emerging research findings

The internal review process will consistently analyze research directions, especially in the arena of synthetic biology, to stay a step ahead of the safety concerns. All research will be evaluated internally by an extensive hazard analysis process, wherein, a basic Risk Management Plan will be drafted. The risk management process is an evolving process that must be reviewed and adapted as the research changes. The same body of internal reviewers and parties responsible for the initial Risk Management Plan will be tasked with the continued review of the ongoing research for further needs in risk assessment and management. As needed, additional experts will be brought in to address expansion of the research into areas not initially covered.

Once this process occurs, through one of the institutional review boards like COMS, IRB, ESCRO or IACUC, further biosafety or biosecurity measures may be added on the Risk Management Plan. This process is iterative and may involve both internal and university-based review at multiple times during a given project.

iv) Determine venue and mode of communication (addressing content, timing, and possibly the extent of distribution of the information) to communicate the research responsibly

On a case by case basis involving high-risk research or research that has potential dual-use implications, a communication plan will be developed in partnership with members of Harvard University, including but not limited to the Office of Public Affairs, Office of General Counsel, and others as deemed necessary, in order to outline the routes of publication, public information sharing, and distribution of information.