

“Synthetic biology is likely to create new risks for society, including possible unintended harmful consequences for human health and environment, or deliberate misuse for hostile purposes.”<sup>a</sup>



## THE RISKS



## ENVIRONMENT

“Unknown risks include various levels of harm to humans, animals, plants, other microorganisms and the environment in the event of an unplanned release.”<sup>b</sup>

“The lack of attention to the ecological harms posed by synthetic biology is irresponsible and dangerous”<sup>c</sup>

## How Safe Are Biolabs?

- “No one knows precisely how many accidents occur at the lower containment levels”<sup>h</sup>
- 1,495: the number of registered biolabs in 2010, triple the number from 2004<sup>e</sup>
- 105: The number of deaths traced to anthrax at a biological warfare facility<sup>e</sup>
- The new and emerging field of synthetic biology is steeped in scientific uncertainty.<sup>d</sup>
- Currently there is no comprehensive regulatory apparatus for the oversight and governance of synthetic biology
- “There is no reason that someone couldn’t modify a virus; you could release it on an airplane or subway, and it could have profound terror effects.” – *NY Times*<sup>i</sup>
- “New biological materials, nanomaterials, there are many things where we don’t have adequate information, and we think workers need to have protection.” - *David Michaels, Assistant Secretary of Labor for Occupational Safety and Health*

## HEALTH

- “There have been many reported cases of laboratory-acquired infections involving dangerous pathogens.. including 2 medical researchers with SARS virus.”<sup>d</sup>
- “Government officials are not able to get access to select agent research being done....this information would be useful so agencies could prepare for the possibility of a laboratory accident that spreads to the general community.”<sup>d</sup> -*NYC Dept. of Health.*
- Three lab employees at Boston Univ were exposed to Pahvant Valley Plague, a potential bioweapons agent, when it was mistakenly tested in a low level lab. The FBI and CDC were not properly notified.<sup>h</sup>
- 1979-2004: 1,448 symptom causing infections in biolabs resulting in 36 deaths- “substantial underestimation”<sup>c</sup>



## KEEP THE BIOLABS UNDER CONTROL

“All organisms...should be studied under a high level of biocontainment until their safety can be demonstrated”<sup>a</sup>

“Over the past decade, new labs have experienced repeated problems caused by withholding of information about safety and risks.”<sup>f</sup>

a. Tucker, J. B., & Zilinskas, R. a. (2006). The promise and perils of synthetic biology. *New Atlantis* (Washington, D.C.), 12, 25-45. Retrieved from <http://www.thenewatlantis.com/publications/the-promise-and-perils-of-synthetic-biology> b. Fleming, D. O. (2007). Risk Assessment of Synthetic Genomics : A Biosafety and Biosecurity Perspective. *Science*, 105-164. c. Pollack, A. (2010). Presidential Bioethics Panel Gives a Green Light to Research in Synthetic Biology - *The New York Times*. *New York Times*. Retrieved October 13, 2011, from [http://www.nytimes.com/2010/12/17/health/17synthetic.html?\\_r=1&src=twrbp&pagewanted=print](http://www.nytimes.com/2010/12/17/health/17synthetic.html?_r=1&src=twrbp&pagewanted=print) d. Kahn, L. H. (2004). BioDefense Research: Can Secrecy and Safety Coexist? *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 2(2). Retrieved from <http://www.scienceboard.net/community/perspectives.110.html> e. Kaiser, Jocelyn. Taking Stock of the Biodefense Boom. *Science* 2 September 2011: 1214. [DOI:10.1126/science.333.6047.1214] f. National Science Advisory Board for Biosecurity (NSABB). (2010). Addressing Biosecurity Concerns Related to Synthetic Biology. g. Gronvall, G. K., Fitzgerald, J., Chamberlain, A., Inglesby, T. V., & O’Toole, T. (2007). High-containment biodefense research laboratories: meeting report and center recommendations. *Biosecurity and bioterrorism : biodefense strategy, practice, and science*, 5(1), 75-85. doi:10.1089/bsp.2007.0902 h. Barry, A. (2005). Report of Pneumonic Tularemia in Three Boston University Researchers. *Public Health*. Boston. i. Rabinow, Paul. (2011) Lab Fight Raises U.S. Security Issues. *NY Times*, October 22, 2011