Integrity in science with dual-use potential

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What is research with dual-use potential

Public health / pharmaceuticals / agriculture

- Materials: seed cultures of pathogens, toxins, etc
- Equipment: fermenters, centrifuges, freeze dryers, etc
- Technology and knowledge: ‘know-how’, expertise

Biological weapons / Bioterrorism

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2nd World Conference on Research Integrity, Singapore 2010
Experiments of concern

A. The Fink Report (NRC 2004)
- Render a vaccine ineffective
- Confer resistance to antibiotics and antivirals
- Enhance virulence of pathogens or vice-versa
- Increase pathogen transmisibility
- Alter the host range of a pathogen
- Protect pathogens from detection
- Enable weaponization of biological agents or toxins

- Research w/information and communication technologies: surveillance, data mining, and profiling
- Research that leads to stigmatization or discrimination
The dual-use dilemma

- Dual-use nature of materials and equipment
- Difficulty in recognizing hostile intent in innocent transactions
- Research for beneficial purposes can have hostile applications

How to prevent the misuse of biological and biotechnology research for hostile purposes without hindering their peaceful application
Is the scientific practice changing?

- Should we not engage in research for fear of its outcome? Is there forbidden knowledge? Are there things we should not know? (Kemper et al. *Science* 2005)

- Should we control and restrict research results from publication, dissemination, sharing and open collaboration?

- *PNAS 2010* (Dias et al.)
  - steep decline in the number of papers published and 2-5x increase in the cost of select agents research
  - collaboration much more difficult

- *AAAS/NAS survey 2009*

  *Scientists support oversight through self-governance and responsible conduct of research*

*2nd World Conference on Research Integrity, Singapore 2010*
Panelists

- Gerald Epstein, American Association for the Advancement of Science, USA
- David Franz, Office of the Secretary of Defense, USA
- Daniel Davis, National Institutes of Health, USA
- Robert Mathews, University of Melbourne, Australia
- Elizabeth Heitman, Vanderbilt University, USA

Chairs

- Paula Strickland, National Institutes of Health, USA
- Lida Anestidou, National Academy of Sciences, USA