National Citizens Technology Forum

Converging Technologies for Human Enhancement

Report of the California Delegation

This report was produced by a group of citizens from Northern California, as part of a nationwide public deliberation project. Participants were selected from a pool of volunteers, with the aim of constituting a panel that reflects the diversity of California's population in terms of ethnicity, income, and gender. The group received and reviewed an extensive set of background materials concerning the convergence of nanotechnologies, biotechnologies, information technologies, and cognitive science (collectively NBIC), and their possible applications in the area of human enhancement. They gathered in person for an initial weekend of consultations, and participated in multiple online sessions together with the individuals from the other five sites nationwide. These online sessions included Q&A sessions with a number of experts in related disciplines, as well as an exchange of views among locations. The process culminated in a final weekend of meetings, resulting in the following consensus report. The opinions and words expressed here are those of the participants.

March 31, 2008

Introduction

The goal of this report is to present a protocol for the testing and development of human enhancement products that will ensure the physical, cultural, social and political safety of human beings and protect our global environment, while simultaneously encouraging the innovative, aggressive and steadfast development of these new technologies. The convergence of NBIC technologies presents a tremendous set of potential benefits and risks. We want to ensure equitable access to the benefits, and minimize the public's exposure to the risks.

Thus, the federal government should assume a broad proactive approach towards approving the development and use of these technologies including thorough, unbiased testing and the strict disclosure of all information. This requires coordination and cooperation among multiple government agencies, with adequate funding and authority to carry out their missions, without detracting from their existing responsibilities. Additionally, collaboration between the public and private sectors is an important element of an overall governance strategy. This includes identifying funding mechanisms that allow private organizations to contribute to the public good.

Currently, NBIC technologies cut across multiple industries and areas of application, and are characterized by a great deal of uncertainty. We are concerned by the apparent lack of a comprehensive, cohesive set of policies concerning the following areas:

- Allocation of funding
- Enforcement of regulations
- Disclosure of potential risks and benefits
- Testing and approval of new products using converging technologies
- Public education

We recognize that overregulation could stifle productive innovation, especially at such an early stage of deployment. We encourage the development of beneficial applications, but believe that public safety, individual rights and privacy should be a higher priority than profitability. We also encourage the United States government to continue its efforts at international collaboration and exchange in these areas.

Finally, we endorse participatory processes such as this National Citizens Technology Forum, and urge that similar opportunities for public input be ongoing.

Specific Recommendations

Within each priority area, recommendations are numbered in accordance with the following categorization:

1. The policy-making and priority-setting processes for NBIC

2. Environmental Concerns
3. Privacy
4. Public Welfare and Safety
5. Alternatives (to NBIC-based human enhancement) and Prevention

A. Allocation of funding

1. Policy Process

- With public funds in short supply and competition between agencies for these monies, we need to establish a system to prioritize the allocation of funds.
- Agencies and projects requesting public funding for nanotech should clearly demonstrate that the monies would be used first for treating, preventing or curing disease or other human suffering; and, second for human enhancement beyond "normal" capabilities. Military applications should be the third level of priority, unless shown to be absolutely necessary for national security.
- We recommend that government introduce methods for increasing stakeholders' ability to have a say in how funds for non-military research are allocated. By stakeholders we refer to the public, NGOs, and others that represent the public interest. Some methods for achieving this may include congressional commissions that bring together scientists, consumer groups, and others without a vested interest in the outcome of funding decisions, citizen institutional review boards, and others. Academics in this field are discussing alternative methods that the government should consider.
- Regarding access to information, while recognizing some information needs to be classified and that much information is already available, we recommend that greater efforts be made to make the details of products being produced with government funding as available as possible.
- There should be funding dedicated specifically to monitoring, testing and ensuring the public and workplace safety and the environment. This includes funding for inspectors and adequate agency staffing to carry out these tasks effectively.
- The government should not allow religious values to affect public or private funding for emerging human enhancement technologies.

2. Environmental Concerns

- Incentives should be used to encourage companies to develop NBIC-based solutions to clean up pollution resulting from human enhancement activities.

5. Alternatives and Prevention

- For every dollar of public money invested in NBIC technologies for disease remediation, a proportionate amount must be allocated towards research in, the promotion of, or increasing the accessibility of preventative medicine.
- Public research funds should target disease prevention, particularly AIDS, hypertension, diabetes, heart disease, cancer, etc., along with repair and replacement of body parts.
- We recommend that, for each family of enhancement applications, we assess the availability of lower-risk and/or more cost-effective alternatives to NBIC technologies prior to allocating significant funding.

B. Enforcement of Regulations

1. Policy Process

- We recommend the formation of a new oversight body explicitly focused on NBIC technologies, comprised of representatives from existing government agencies, including EPA, FDA, Homeland Security, HHS, OSHA, etc., in order to implement the policy recommendations made in this report effectively. It is important that the individual members have the necessary expertise and time to dedicate to these issues.
- The federal government should continue to seek international cooperation with regard to developing and implementing policies to manage the risks and benefits of NBIC technologies.

2. Environmental Concerns

- Severe civil and criminal penalties should be levied against companies that develop or use NBIC technologies that damage the environment. It is important that these penalties are not simply seen as a routine cost of doing business, but are substantial enough to prevent such actions.

3. Privacy

- Medical information must be kept private and confidential. If a medical procedure can or will jeopardize a patient's privacy, the patient must be able to make an informed decision about whether or not to proceed. Existing regulations guaranteeing privacy should be extended as appropriate to cover new privacy risks arising from NBIC-based applications.
- Health insurers should be prohibited from discriminating against individuals based on genetic testing or new methods for early disease detection, whether in group or individual policies. This includes both the denial of policies and coverage for specific therapies.
- Employers should be prohibited from discriminating against individuals for employment and workplace opportunities based on NBIC-derived medical information or treatments.

- Legislation is needed to guarantee that the military and other security-related organizations, including the CIA, NSA, FBI, Homeland Security, and federal, state and local law enforcement, cannot use these technologies to conduct surveillance on people residing in the U.S. without due process. Because NBIC-based technologies pose a serious risk of abuse of privacy, these rights must be protected by the Constitution. To this end, it is necessary to review whether they are adequately covered in the current Constitution.

4. Public welfare and safety

- All military personnel must be given full disclosure of any risks to personal health and safety derived from the use of NBIC-based applications for military purposes and must be allowed to consent or not, without retribution or coercion. Furthermore, the military must be responsible for the effects of any implants or personal deployment of NBIC-based technologies and actively assist with re-integration into civilian life.

C. Disclosure

4. Public welfare and safety

- All test results affecting public safety and welfare must be fully disclosed in a timely manner upon discovery. It is in the public's interest to have all information concerning health and safety readily available so that an informed decision can be made by each individual as well as by society as a whole. Knowledge is power.
- All consumer products containing nanomaterials or produced using nanotech must be clearly labeled as such.
- All worksites where workers are handling or exposed to nanomaterials must clearly post notices of the potential human risks of these materials, as well as verbally inform workers of these risks.

D. Testing and Approval

2. Environmental Concerns

- All NBIC-based technologies should go through vigorous testing regarding the effect of the specific nanomaterials on the environment.
- When testing human enhancement products, we must keep in mind the absolutely integral relationship between the earth and humans. We are completely dependent on the earth and it is our responsibility to take every action to protect it. Recycling and waste strategies should be tested ahead of times. Private and public developers should pay for their own waste management and clean up. Those that do not comply with regulation

should be penalized. We should ensure that no irreparable harm will come to the physical environment of our earth or surrounding atmosphere.

- Testing should be completed by non-biased, neutral experts. Studies by industry or private business interests alone will not be considered sufficient evidence for the approval of new technologies. Follow-up testing must be conducted on a regular basis.
- Producers of nanomaterials or nano-based consumer products need to be held responsible for the environmental impact of their products for their entire lifespan: from the extraction or production of raw materials to the conditions under which it is produced – including worker safety – to the proper disposal and/or recycling of the product itself and wastes/byproducts of production.

4. Public welfare and safety

- Where feasible, testing should be done on artificial/virtual subjects before testing on humans and animals.
- Before any human enhancement technology is approved for use on the market, thorough cost-benefit analyses should be conducted to compare these with any existing alternative therapies.
- In regards to human testing, testing should only occur with willing participants. Testing should not target certain ethnic and prisoner communities. Testing should only occur after testers have actively provided testees with as much information as possible about the materials, procedures, side effects, potential harms, physiological/emotional changes and long-term effects.
- The communities surrounding test facilities should be made aware of the testing procedures, possibility of dangerous outcomes, waste management procedures, and all changes in the environment prior to testing. Neighborhoods and towns should have the authority to say whether or not they approve the testing. If the environment is damaged, the company should pay for clean up and compensate the community appropriately.
- Under no circumstances is it ok to release dangerous, toxic or untested particles/substances into the environments of communities and countries that don't have the privilege of financial or regulatory protection.
- All neighborhoods and cities should be equally protected from adverse consequences of testing despite the economic advantages or disadvantages of the community.

E. Public Education

4. Public welfare and safety

- The public must be educated particularly regarding the potential benefits and harms involved in employing NBIC-based technologies for human enhancement, such as misuse, contamination, etc. This can be accomplished via public service announcements, public school education, neighborhood workshops, press releases, talk shows, mass emails (e-blasts), white papers, FAQs and others.

- Patients seeking or eligible for NBIC-based treatments and human enhancement options should be informed by their physicians of alternatives. Complete information should be available and accessible to the public in both printed and electronic form.
- The results of clinical trials of these technologies should be disseminated to workers/unions, consumers, educators, NGOs, and academics via the methods listed above.