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GENETIC TOWN HALLS: GENERATING INFORMED OPINIONS ABOUT REPRODUCTIVE GENETIC TESTING

by Joan Scott, M.S., C.G.C and Kathy Hudson, Ph.D.

Dr. Hudson is Director and Ms. Scott, Deputy Director, of the Genetics and Public Policy Center at The Phoebe R. Berman Bioethics Institute at The Johns Hopkins University and funded by The Pew Charitable Trusts. The goal of the Center is to create the environment and tools needed by key decision makers in both the private and public sectors to carefully consider and respond to the challenges arising from scientific advances in genetics. The Center does not advocate for or against any policy position.

The Genetic Town Hall: Making Every Voice Count

Public opinion plays an important role in political debate and policy decision-making. Indeed, it is impossible to read about any policy debate in the popular press today without the results of a recently administered poll informing us of how the public currently weighs in on the subject. But public opinion research about science policy often is criticized. Individuals are asked to comment on complex technologies and ethical issues about which they may have little knowledge or few opportunities to consider in depth. How reliable are such opinions and how much weight should they be given when setting science policy?

This “information deficit model” of the public’s understanding of science assumes a direct correlation between scientific knowledge and attitudes. A more scientifically educated public, it is assumed, would be more accepting of new technologies, less distrustful of the scientific community and better equipped to engage in informed policy discussions. Others, however, contend that the public has a legitimate opinion to offer based on other areas of knowledge and experiences which frame the context in which any technology would be considered and used, and play important roles in shaping attitudes. This contextualized view of the public’s understanding of science suggests that consulting the public can lend much to the quality of the policy debate. Public consultation gives policymakers insight into public opinion and the values that shape those opinions.

A number of methods for obtaining more robust public opinion have been described. The process known as “deliberative democracy” provides participants with access to information about the technology in question, opportunity to hear contrasting viewpoints from “experts” about the issues raised and

opportunity to deliberate with fellow citizens. Elements important to a successful deliberative engagement include broad and representative participation so that participants have the opportunity to hear all viewpoints, accurate and fairly balanced information, and ample opportunity to deliberate about the issues with the experts and fellow citizens. Policymaker involvement, either by being present during the deliberations or by receiving reports of the deliberations, helps ensure that policymakers can avail themselves of public opinion during the policy making process.

The Genetics and Public Policy Center at The Johns Hopkins University, with funding from the Pew Charitable Trusts, undertook a deliberative public engagement activity in six American cities during the summer of 2004.¹ These sessions are detailed in our report, *The Genetic Town Hall: Making Every Voice Count*. Participants considered issues about reproductive genetic testing, including carrier testing, prenatal testing, and preimplantation genetic diagnosis (PGD). Reproductive genetic testing provides parents more options in having healthy babies; it also raises troubling questions about future uses of testing technologies. Today, for example, it is possible to test for certain genetic disorders; tomorrow, it may be possible to test for genetic contributions to characteristics such as intelligence.

Participants were asked to consider three issues about reproductive genetic testing:

- Are there acceptable and unacceptable uses of reproductive genetic testing and if so, what are those limits and who should set them?
- Are we doing everything we should to be sure the tests are safe and accurate?
- What is the impact of our ability to select the characteristics of our children on individuals, families and society?

The total 536 participants for the six town halls came from diverse backgrounds² and were recruited by local coordinators³ through a variety of outreach strategies including notices in high traffic locations such as public libraries, churches, hospitals, clinics and supermarkets; electronic e-vites to chambers of commerce, trade associations, neighborhood associations and community discussion or roundtable groups; targeted outreach to constituencies with varied educational, socio-economic and racial backgrounds; and media ads and news articles. Participants arrived at the Genetic Town Halls with varying levels of prior awareness of, and personal experience with, genetics. Sixty-one percent of participants had heard about carrier testing before

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participating in the Town Hall, 93 percent had heard of prenatal testing and 47 percent had heard of PGD. Twenty-three percent either had undergone genetic testing themselves or were related to somebody who had.

In order to ensure that the presentation was the same in each city, background information about the technologies — as well as commentaries from a diverse group of medical experts, policymakers, bioethics scholars and the clergy — were provided through a video series developed by the Center entitled *Chosen Children: Issues in Reproductive Genetic Technologies*. Participants were queried before, during and after the sessions to document their opinions and how they changed following discussion. The responses were recorded by an electronic keypad system provided by Public Forum Institute, Inc.⁴ that generated instant response results viewable by the group as a whole. Each 3-½ hour Town Hall concluded with a panel discussion of community leaders from a variety of backgrounds: theologians, clergy, medical professionals, parents with firsthand experience with reproductive genetic testing, elected officials, community activists and industry representatives.

Editor: Mark S. Frankel

Deputy Editor: Kristina Schaefer

Contributing Authors: Jocelyn Bosco, Kai Hsiao, Tova Jacobovits, Adrienne Kroepsch, Steven P. Nichols

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Setting Limits

For carrier testing, prenatal testing and PGD, Town Hall participants were asked to consider whether and how any limits should be set. About 89 percent of participants felt that limits should be set for acceptable and unacceptable uses of reproductive genetic technologies.⁵ To identify acceptable uses of reproductive genetic testing, participants were asked to indicate whether they strongly approved, approved, disapproved or strongly disapproved of carrier testing, prenatal testing and PGD in five situations:

- testing for a gene mutation associated with a fatal childhood disease;
- testing for a mutation associated with a tendency to develop a disease later in life such as cancer;
- testing for a hypothetical gene associated with intelligence or strength;
- testing for the sex of the baby; and
- testing to determine if the person will be a good tissue match for a sick sibling who needs a transplant.

More than 80 percent thought that testing for a gene associated with a fatal childhood disease is an appropriate use. Only 21 percent thought that testing for a hypothetical gene associated with intelligence or strength is an appropriate use. Carrier testing was the most acceptable use, being the least invasive.

People generally were divided over issues of who should decide which uses are appropriate and who should enforce guidelines and limits. Twenty-eight percent preferred that medical societies develop guidelines, 39 percent said the decision should be left up to individuals and their doctors, and 25 percent wanted federal or state legislation to establish acceptable uses for reproductive genetic testing. Ultimately, most participants supported setting limits through a combination of approaches: medical societies establish guidelines, the government ensures safety and accuracy and protects against abuses, and informed patients and their doctors make decisions about how to deal with test results.

Letters to the Editor: The editors welcome comments from our readers. We reserve the right to edit and abridge letter as space permits. Please address all correspondence to the deputy editor.

Safety and Accuracy

Ensuring safety and accuracy of reproductive genetic testing received the most clear-cut support and the strongest indication of an appropriate role for the government. Overall, 90 percent supported government review and approval of tests before they go on the market. Government regulation, however, raised some concerns. Fifty-one percent were somewhat or very concerned that increased regulation would increase the cost of tests; 41 percent were somewhat or very concerned that increased regulation would delay access to tests. Fewer were concerned that increased regulation would negatively affect the biotechnology industry, or that regulation itself is inherently ineffective.

Impact on Family and Society

In general, participants held positive views about reproductive genetic testing; 81 percent felt these technologies help families “make informed reproductive choices and have healthy babies.” While many spoke positively about reproductive genetic tests giving families the option to avoid or the opportunity to prepare for having an affected child, concerns arose over access to tests; the danger of “designer babies;” and diversity, disability and discrimination.

Before and After

One measure of the impact of this approach to public consultation is the shift in opinions that occurred over the course of the event. The most striking was a change in attitude about regulation; support for regulation, especially to ensure safety and accuracy, increased significantly over the course of the Town Hall. The opinion that reproductive genetic testing helps parents make informed reproductive choices did not change significantly, but concern about unregulated technology getting “out of control” increased from 72 percent to 85 percent.

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Public Engagement

Overall, our experience with this form of public engagement was extremely positive and we believe it helped participants become more informed about these issues: more than 70 percent of participants felt that the forum helped them clarify their own views and more than 90 percent found the forums personally valuable. A report describing the deliberations from all the Town Halls is being shared with policymakers at the state and federal levels (available at www.dnapolicy.org).

A difficulty in any public engagement approach, however, is ensuring that participation is truly representative – those with a vested interest in the topic are more likely to respond to even the most aggressive outreach efforts. To address this issue, the Center conducted a similar activity online. Instead of meeting for one 3-½ hour session, participants were recruited from a web-enabled panel¹ and met online for three, 1-hour sessions. We found that the deliberation of this more randomly selected participant group mirrored what we heard in the in-person Town Halls.

¹ The public Town Halls were held in: Sacramento, CA on June 29, 2004; Seattle, WA on July 1, 2004; Kalamazoo, MI on July 19, 2004; Fort Worth, TX on July 31, 2004; New York City on August 2, 2004; Nashville, TN on August 4, 2004.

² Participant demographics: About 40 percent were 50 years old or older, 34 percent were between the ages of 30 and 49, and 26 percent were younger than 30. Overall, 59 percent of the Town Hall participants were women and about 80 percent of participants were white. Nineteen percent had some college or vocational education, 27 percent had a bachelor's degree and 44 percent had some postgraduate education. In Sacramento, Seattle and Nashville, about half were Democrats; in New York, 63 percent. The highest percentage of Republicans at any Town Hall was 34 percent in Fort Worth. About a quarter of participants at Seattle and Kalamazoo considered themselves Independents. Overall, more than a quarter of all participants gave their religious affiliation as Protestant, about 18 percent said they were Catholic, about 16 percent said they were affiliated with another Christian religion and about 7 percent said they were Jewish; about a quarter said they had no religion or preferred not to say.

³ The events were advertised as free and open to the public and as an opportunity to learn more about reproductive genetic testing and voice opinion. Individuals interested in participating were asked to pre-register online so that recruitment efforts could be monitored.

⁴ PFI, Inc. www.pfide.com

⁵ “Do you think there should be limits set for acceptable and unacceptable uses of reproductive genetic testing?”

⁶ Knowledge Networks, Inc. www.knowledgenetworks.com

IN THE NEWS

AFRICA AND EUROPE ESTABLISH MEDICAL ETHICS NETWORK

Information on the existing research ethics capacity of African countries is limited and lacking. To remedy that gap, European and African researchers have partnered to start an initiative called Networking for Ethics in Biomedical Research in Africa (NEBRA). Launched in January 2005, it is intended to profile and promote medical research ethics in Africa, and is supported by a European Union grant.

The main goal of the initiative is to boost African countries' own scientific capacity and presence as international scientific contenders, said a spokesperson of the UK Medical Research Council (MRC). If the NEBRA program is successful in the 15 countries in west and central Africa participating in the pilot test, the program could be extended to the rest of Africa.

As part of the initiative, experienced postdocs from the 15 participating African countries will survey and interview a range of individuals – from health ministers to university representatives – in order to assess the existing ethics structure in each country. The initial data-gathering phase of the program will last for 18 months. The second phase, which is dependent on additional funding, would strengthen existing structures and foster links between the countries where appropriate.

According to the MRC spokesperson, the initiative stemmed from the European and Developing Countries Clinical Trials Partnership, whose mission is to speed up the development of clinical trials for drugs to treat HIV/AIDS, malaria, and tuberculosis in developing countries.

The African countries participating in the NEBRA project are Benin, Burkina Faso, Cameroon, Central African Republic, Congo, Cote d'Ivoire, Democratic Republic of Congo, Gabon, Gambia, Ghana, Guinea, Mali, Nigeria, Senegal, and Togo. European partners include the French National Institute of Health and Medical Research, the World Health Organization, the UK Medical Research Council, and the University Eberhard Karls, Germany.

*AK

NEW BILLS COULD DRAMATICALLY AFFECT STEM CELL RESEARCH

Three bipartisan bills were reintroduced in the first session of the 109th Congress that could dramatically impact human cloning and stem cell research. Currently, there is no federal law forbidding human reproductive cloning or stem cell research.

The *Stem Cell Research Enhancement Act of 2005* (H.R.810), reintroduced by Representatives Michael N. Castle (R-DE) and Diana DeGette (D-CO), would allow federal funding of research on additional embryonic stem (ES) cell lines revising President Bush's policy that bans federal funding for ES cell lines made after August 9, 2001. Since then, a significant number of the existing cell lines have been shown to be unfit for research. Furthermore, use of the remaining cell lines presented problems related to whether such cells represented significant genetic diversity, whether they were safe to be used in humans, and whether they were created according to high ethical standards.¹

The *Human Cloning Act of 2005* has been reintroduced in the Senate (S.658) by Senators Sam Brownback (R-KS) and Mary Landrieu (D-LA) and in the House (H.R.1357) by Representatives Dave Weldon (R-FL) and Bart Stupak (D-MI). The bills would set a comprehensive ban on somatic cell nuclear transfer (SCNT) for both human reproductive cloning and stem cell research. In the latter, the nucleus of an egg is replaced with the DNA of another person and then stimulated to grow to the blastocyst stage, when cells would then be extracted for research purposes.

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Proponents are concerned that SCNT in the destruction of the embryo, and that there is also a risk that the embryo, if not used in research, could be the implanted into a uterus to grow into a cloned human baby. Thus, advocates of the *Human Cloning Act of 2005* argue that it would be impossible to regulate a ban on reproductive cloning.² Others, however, believe that it would be possible for federal agencies, such as the NIH and the FDA, to enforce a ban on reproductive cloning while permitting SCNT stem cell research to go forward.³

In addition, the act would domestically and internationally prohibit the shipping and receiving of embryos resulting from the SCNT procedure and products derived from research cloning.⁴ If the *Human Cloning Act of 2005* is enacted, violators could be imprisoned for ten years and fined one million dollars.

*KH

¹ <http://www.aaas.org/spp/cstc/briefs/cloning/index.shtml>

² Press Release, "Weldon and Stupak Re-Introduce the 'Human Cloning Prohibition Act of 2005'," March 17, 2005.

³ See *Regulating Human Cloning*; 2003 at www.aaas.org/spp/cstc/pnc/pubs/cloningreport.pdf

⁴ United States Senate, 1st Session. *Human Cloning Act of 2005*, March 17, 2005.

RESEARCHER PLEADS GUILTY TO FRAUD

Dr. Eric T. Poehlman, under a plea agreement, will plead guilty to criminal charges of fraud conducted at the University of Vermont College of Medicine (UVM) for fabricating results in research from 1992 to 2002. These studies included "The Longitudinal Menopause Study", "The Longitudinal Study of Aging", "The Prospective HRT Study" and various others related to metabolism in Alzheimer's patients and endurance training.

Poehlman has been under investigation by UVM since 2000, when lab technician Walter F. DeNino noticed a discrepancy in results after Poehlman had taken them home to work on during the weekend. During the investigation, Poehlman destroyed electronic documents, presented false documents and

had other colleagues produce other false documents in an effort to cover up his misdeeds. When the UVM discovered evidence of fraud, they handed the case to the Office of the United States Attorney.

In addition to pleading guilty, Poehlman has agreed to pay \$180,000 in response to a civil suit for filing false grant applications at UVM, pay attorney fees for DeNino, be barred for life from applying for funding from any federal agency, and to request the retraction of the fabricated work published in scientific journals. Poehlman still faces the possibility of five years imprisonment.

For more information, visit <http://ori.dhhs.gov/misconduct/cases/poehlman.shtml>

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THE DEVELOPMENT OF UNIVERSAL NORMS IN BIOETHICS

As a world leader in establishing global bioethical standards, the United Nations Educational, Scientific and Cultural Organization (UNESCO) will oversee the creation of a Declaration on Universal Norms on Bioethics.¹ This decision was made after the Director-General of UNESCO commissioned the International Bioethics Committee (IBC) to assess whether international guidelines that deal with emerging ethical questions in science and technology are necessary. Published on June 13, 2003, the IBC Report found that a globally supported Declaration would be a valuable tool in terms of addressing key ethical concerns, fueling public discourse, and establishing a shared set of values in areas of the world which would otherwise have no other way to do so. Since issuing the report, the IBC has been working closely with the Intergovernmental Bioethics Committee (IGBC), Member States, and other interested international organizations, to develop such a Declaration.²

A meeting in Paris was held in January 2005 with representatives from IBC and IGBC to confer on the fourth draft of the text.³ The document stressed that, although scientific advancement could be of enormous benefit to humankind, the rapid pace of the field should not disallow the international community from ensuring

that these innovations do not violate human rights. The remainder of the document dealt with the scope of the declaration, the principles it endorsed, the implementation of these principles, and considerations for the future. A final draft form of the Declaration will be reviewed in March and June of 2005.⁴

Although the international community has hailed the preparation of these guidelines as both indispensable and valuable, concern exists from a handful of interest groups. For example, according to Kathryn Hinsch, founder of the Women's Bioethics Project located in Seattle, "Although the current IBC draft Declaration on Universal Norms on Bioethics does not overtly discriminate against women, it does not reflect the disproportionate ways in which bioethical issues affect women, and thus discriminates by omission." Despite the good intention of the Declaration to protect all people equally, many women's organizations are troubled by the fact that nearly 80% of the IBC task force is comprised of men. These organizations are hoping that a shift towards broader female representation will be granted before the final guidelines are drafted.⁵

*JB

¹ U.S. National Commission for UNESCO: Monthly Update, February 2005, Vol. 1, Issue 1: 3.

² "Towards a Declaration on Universal Norms on Bioethics," UNESCO Social and Human Sciences. http://portal.unesco.org/http://portal.unesco.org/shs/en/ev.php-URL_ID=1883&URL/shs/en/ev.php-URL_ID=1883&URL_DO=DO_TOPIC&URL_SECTION=201.html.

³ See note 1.

⁴ International Bioethics Committee, "Elaboration of the Declaration on Universal Norms on Bioethics: Fourth Outline of a Text," December 15, 2004. http://portal.unesco.org/shs/en/file_download.php/377486e581fab8658319802f8269db00PublicOutline4_en.pdf

⁵ "UNESCO Develops Universal Norms in Bioethics, Women Under-Represented," *Medical New Today*, January 30, 2005.

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THE NATION'S FIRST CENTER FOR PEDIATRIC BIOETHICS TO BE ESTABLISHED IN SEATTLE

The nation's first Center for Pediatric Bioethics, exclusively dedicated to children's research and health care, will be established by Children's Hospital and Regional Medical Center in Seattle. F. Bruder Stapleton, M.D., pediatrician-in-chief at Children's and Chairman of the Department of Pediatrics at the University of Washington (UW) School of Medicine, hopes the center will serve as "a national resource for physicians, researchers, policy-makers, parents, and patients,"¹ while providing a global model for studies and practices involving children.

The center will address the complex ethical issues facing families with children in healthcare institutions and research facilities, and the need for ethical guidelines, distinct from those applied to adult bioethics and healthcare practices. The center will focus on four primary areas: research in pediatric bioethics; education of medical students, health care professionals and the public; providing a resource for health-care professionals facing ethical dilemmas in clinical care; and serving as advocates for children receiving care and participating in research.² Where appropriate, experts at the center will help children participate in their own medical decisions, which might include determining if innovative therapies or participating in research studies are appropriate.³

Caring for ill children raises unique questions which federal regulations address only vaguely. Parents and physicians must interpret what is in the best interest of children they care for and in which circumstances the children's or physicians' decisions take priority over those of the parents' wishes.

The first annual kickoff Conference on Pediatric Bioethics at the Center takes place in July 2005, and will host a forum on the relationship between the pediatric research, healthcare, and the pharmaceutical industry.

*TJ

¹ Children's Hospital & Regional Medical Center Press Release, "Center for Pediatric

Bioethics to be Established in Seattle,"

December 6, 2004. http://www.seattlechildrens.org/home/about_childrens/press_releases/001933.asp

² Ibid.

³ Ibid.

THE UK'S HFEA ADOPTS A "LIGHTER TOUCH" APPROACH TO PGD SCREENING

The UK's Human Fertilisation and Embryology Authority (HFEA) announced in January that it had streamlined its approval process for preimplantation genetic diagnosis (PGD) embryo screening in order to speed up the system for patients and clinicians. Under the new guidelines, if a clinic with proven PGD expertise applies for a license to screen for a condition that is already being screened for successfully in other clinics, "the HFEA will approve the application without having to go through the full HFEA license committee process, providing the same technique and methods are used."

In order to be eligible for the streamlined licensing process, a clinic must have a qualified biopsy practitioner for PGD, namely, an embryologist who has completed a number of biopsies under supervision and an exam administered by the HFEA scientific inspector. Further, the PGD license must be for a common and proven application of PGD.

At present, eight clinics in the United Kingdom are licensed to carry out PGD for conditions like sickle cell anemia, cystic fibrosis, and Duchenne's muscular dystrophy. "We have decided that whilst PGD is a specialized procedure, which can only be carried out by a qualified embryo biopsy practitioner, it should be straightforward for those clinics with a proven track record in the appropriate techniques to be able to carry out screening for any of the conditions currently approved," said Suzi Leather, Chair of the HFEA.

Less common applications of PGD – like screening for new conditions, human leukocyte antigen tissue typing, and screening for late onset conditions or susceptibility genes – will still require thorough consideration by an HFEA license committee on a case-by-case basis, however.

*AK

U.N. APPROVES RESOLUTION ON HUMAN CLONING

After nearly two years and three proposals, the United Nations has abandoned its plans to create a treaty that would prohibit all forms of cloning.¹ Instead, the Sixth Committee of the U.N. agreed to endorse a non-binding resolution that would encourage Member States to "adopt all measures necessary to protect adequately human life in the application of life sciences, as well as measures necessary to prohibit the application of genetic-engineering techniques that may be contrary to human dignity."² This resolution was adopted by the U.N. General Assembly on March 8, 2005.

The Assembly's voting results reflect the contentious nature of this issue. Only 84 Member States favored the declaration, 34 voted against it, and another 37 abstained from voting.³ The resolution encourages countries to implement legislation that will disallow any practice that may be viewed as an affront to "human dignity" and "human life," but does not attempt to define these concepts. In a letter sent to the U.N. General Assembly the day before the vote, Alan I. Leshner, the Chief Executive Officer of the American Association for the Advancement of Science (AAAS), urged the U.N. to proceed with caution before voting on the resolution. Like many science societies committed to pursuing progress in research science, AAAS wishes to promote cloning for research purposes, but continues to oppose reproductive cloning on human embryos. Leshner implored the U.N. Assembly to redefine the language of the resolution in a way that would permit cloning practices in countries where it is done solely for research purposes, while still stressing the importance of outlawing human reproductive cloning.⁴

Although a spokesman for the U.S., Richard A. Grenell, declared that the vote in support of the resolution "means that the United Nations is stating very clearly that member states should adopt legislation outlining cloning practices," the resolution was controversial and is non-binding.⁵ Britain is one country that has already decided not to follow the directives of the newly passed resolution on

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the grounds that the resolution unfairly rejects Britain's dedication to and expertise in the field of stem-cell research. Britain's Westminster health secretary, John Reid, comments, "It is a shame that the UN couldn't agree to a legally binding worldwide ban on reproductive cloning, simply because a small group of countries intransigently refused to allow countries to make up their own minds on therapeutic cloning."⁶ Most countries do not support reproductive cloning, but many see research (therapeutic) cloning as a valuable tool for the future of science and medicine. Therefore, many countries like Britain will be hesitant to support a call for legislation that could put their aspirations for research progress in jeopardy.⁷

*JB

¹ Philipkoski, Kristen. "U.N. Calls for Clone Ban." *Wired News*. February 20, 2005.

² Farrell, Elizabeth F. "United Nations Committee Approves Resolution against Cloning but Does Not Call for a Ban." *The Chronicle: Daily News*. February 21, 2005.

³ Wadhams, Nick. "U.N. Resolution Seeks Ban on Cloning." *Yahoo! News: Associated Press*. March 15, 2005.

⁴ Leshner, Alan I. *Letter to the U.N. General Assembly President, Jean Ping*. March 7, 2005. <http://www.aaas.org/news/releases/2005/0308cloningLetter.shtml>.

⁵ Farrell, Elizabeth F.

⁶ Nelson, Fraser. "Britain to defy UN over Therapeutic Cloning Ban." *Scotland on Sunday*. February 27, 2005.

⁷ Pisik, Betsy. "Asian Nations to Ignore UN Cloning Ban." *The Straits Times*. March 12, 2005.

RESOURCES

Engineering Ethics as a "Core Competency"

A Review of *Emerging Technologies and Ethical Issues in Engineering* (155 pages), The National Academies Press, Washington, D.C., 2004, available at <http://www.nap.edu/catalog/11083.html>

By Steven P. Nichols

Associate Vice President for Research and Director, Murchison Chair of Free Enterprise

The University of Texas at Austin

Engineers have a strong impact on society and on the environment. That impact is inherent in the very nature of engineering activities, and it imposes numerous restrictions and responsibilities both on the engineering profession and on the individual engineering professional. The National Academy of Engineering (NAE) organized a workshop the Fall 2003 to examine the role of selected emerging technologies, to consider potential impact of those technologies, and to bring together professionals in engineering and other disciplines to explore ethical dimensions of engineering practice. The subject of this review, *Emerging Technologies and Ethical Issues in Engineering*, provides a compilation of papers prepared for and presentations delivered to the workshop.

Compilations provide an interesting challenge to reviewers, and the reader should recognize that the review is necessarily selective and uneven.

This review first describes the organization of the compilation and individual contributions and then discusses a selection of themes observed in the combined work.

The compilation consists of the keynote address by Dr. William Wulf¹ and three thematic sections.

The **first section** includes transcripts from oral presentations delivered at the workshop. The first oral presentation² from Dr. Braden R. Allenby discussed the pervasive (and unpredictable) impact that humans have had on the planet and the ethical responsibility resulting from the complexity of interactions. The second oral presentation³ from Dr. George

Khushf examines research and engineering in fields of nanotechnology and gives examples of ethical implications related to selective sub-fields and potential applications. The third oral presentation⁴ from Dr. Paul Wolpe discusses neurotechnology and neuroethics with respect to "chemical, organic, and electromechanical interventions in the brain." The last oral presentation⁵ by Dr. John Ahearne explored some of the ethical and policy issues associated with selection of energy resources and the use of those resources.

The **second section** includes articles by Dr. Ed Harris,⁶ Dr. Caroline Whitbeck,⁷ and Dr. Joseph Herkert⁸ addressing the "State of the Art in Engineering Ethics." More specifically, the articles present methodologies for and approaches to addressing engineering ethics (both in the context of the individual engineer acting as a moral agent and in the context of professional bodies addressing global issues of engineering ethics).

The **third section** included papers by Dr. Vivian Weil⁹ and Dr. Stephanie Bird¹⁰ describing specific programs and approaches for teaching engineering ethics in universities.

Each of the entries in the compilation offer readers an opportunity to expand their knowledge about engineering ethics, engineering education, and/or social and ethical aspects of engineering research and specific engineering applications. The articles address both microethical issues (those faced by engineers operating as individuals, or a small group of individuals) and macroethical issues (involving an assessment of a set of values involving broader social impact). The compilation, however, is greater than the sum of its parts. The entries combine to make a compelling argument that the practice of engineering and the topic of engineering ethics are inseparably interrelated, and the evaluation of many of the ethical components will necessarily involve talents from multiple disciplines.

In his presentation, Allenby argues that ethics must become "not just a desirable adjunct to engineering, but a *core competency*" (p. 24, emphasis added). Each contribution to the compilation appears to independently develop and support Allenby's position. [The

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reviewer has argued that engineering ethics should have always been a core competency of engineers.]¹¹

The compilation's most interesting theme involves macroethical issues in engineering, engineering practice, and engineering research. Each of the four oral presentations (included in the first section) independently argues that the full development of appropriate ethical positions (with respect to technology) requires a multidisciplinary examination of the application of a particular technology and its potentially complex social implications.

The practice of engineering has strong social and economic impact. Engineers must also understand that society has an undeniable strong and unavoidable impact on the practice of engineering. The articles address the fact that engineers can participate in the great debate of the social worth (positive and negative) of their products, or they can watch as others frame the issues, draw conclusions, and dictate answers with respect to the practice of engineering, and the application of technologies created by engineers.

Prominent engineers can have a profound effect on public perception. This potential power of their persuasion emanates from a combination of their specific technical training as well as the perception of their objectivity (the papers and presentations correctly point out, however, that this objectivity frequently comes under attack). Engineers, however, are not generally trained or educated to address the full range of social, environment, and economic impact of new technologies. The papers and presentations argue persuasively for an increased role by organizations such as the National Academy of Engineering and the various engineering professional societies to take a lead in initiating multidisciplinary analysis of macroethical concepts involved in engineering research and engineering practice. The authors effectively stress that these interdisciplinary teams should not start with the deployment of the technology, but earlier during the development of the technology.

The National Academy of Engineering has made a significant contribution in

organizing the workshop and providing the compilation in *Emerging Technologies and Ethical Issues in Engineering*. The reader will find the collection both educational and thought provoking.

¹ President, National Academy of Engineering.

² "Engineering and Ethics for an Anthropogenic Planet," Braden R. Allenby, Environment, Health, and Safety Vice President, AT&T, and adjunct professor at Columbia University.

³ "The Ethics of Nanotechnology: Vision and Values for a New Generation of Science and Engineering," George Khushf, Humanities Director, Center for Bioethics, and Associate Professor, Department of Philosophy, University of Southern California.

⁴ "Neurotechnology and Brain-Computer Interfaces: Ethical and Social Implications," Paul Root Wolpe, Professor, Department of Psychiatry, and Senior Fellow, Center for Bioethics, University of Pennsylvania.

⁵ "E": Energy, Engineering, and Ethics," John F. Ahearne, Director of the Ethics Program at Sigma Xi.

⁶ "Methodologies for Case Studies in Engineering Ethics," Charles E. Harris, Professor, Department of Philosophy, Texas A&M University.

⁷ "Responsibility and Creativity in Engineering," Caroline Whitbeck, Professor, Department of Philosophy and Department of Mechanical and Aerospace Engineering, Case Western University.

⁸ "Microethics, Macroethics, and Professional Engineering Societies," Joseph R. Herkert, Associate Professor of Multidisciplinary Studies, North Carolina State University.

⁹ "Ethics Across the Curriculum: Preparing Engineering and Science Faculty to Introduce Ethics into Their Teaching," Vivian Weil, Director, Center for the Study of Ethics in the Professions, Illinois

Institute of Technology.

¹⁰ "Integrating Ethics Education at All Levels: Ethics as a Core Competency," Stephanie J. Bird, Coeditor, *Science and Engineering Ethics*.

¹¹ Nichols, S.P., Weldon, W.F., "Professional Responsibility: The Role of Engineering in Society," *The Journal of Science and Engineering Ethics*, Volume 3, No. 3, p. 327-337, 1997.

ANNOUNCEMENTS

Conference – The 11th Annual Trainer-of-Trainers Conference will be held June 12-17, 2005 in Snowmass, Colorado. The topic is "Teaching Survival Skills and

Ethics." Details on the conference and an application form are available at <http://www.survival.pitt.edu/events/trainer.asp>

Conference – On June 13-14, 2005, UC Davis and the Office of Research Integrity are co-sponsoring a conference in Sacramento, CA on "Promoting a Productive and Responsible Research Environment." For more information, visit www.research.ucdavis.edu/ori-conf.

Symposium – "Human Enhancement Technologies: Through the Looking Glass of Drama" is the subject of symposium at Cleveland State University, July 14-17, 2005. The symposium is co-sponsored by **Hiram College Center for Literature, Medicine and the Health Care Professions** and **Cleveland State University Division of Continuing Education**. Online registration and information is available at <http://www.csuohio.edu/ce/programs/hiram.html>.

Fellowship – The **Department of Health and Human Services** is accepting applications for the post-doctoral Cancer Prevention Fellowship Program. The program provides funding for an M.P.H. degree, NCI summer program in cancer prevention, mentored research and field opportunities, professional development and additional coursework, as needed. The deadline for applications is September 1, 2005. For more information, visit <http://cancer.gov/prevention/pob>.

Call for Abstracts – Abstracts are invited for a one-day forum on "The Ethics of Intellectual Property" to be held on September 8, 2005. The forum is part of a larger conference on "Innovation and Growth of the International Firm," sponsored by the **Carnegie Bosch Institute of Carnegie Mellon University**. Visit <http://cbi.tepper.cmu.edu> for more information.

Call for Papers and Conference – Abstracts are being accepted for the conference "International Perspectives in Applied Ethics: Recent Developments in China and the U.S." sponsored by the Department of Health Care Ethics at **Regis University** and the Department of Philosophy at **Wuhan University**. The

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Call for Papers and Conference –

Abstracts are being accepted for the conference “International Perspectives in Applied Ethics: Recent Developments in China and the U.S.” sponsored by the Department of Health Care Ethics at **Regis University** and the Department of Philosophy at **Wuhan University**. The deadline for abstracts is June 15, 2005 and the conference will be held on October 15-16, 2005 in Wuhan China. For more information, contact Dr. Mark Meaney, Regis University, 303.964.5110, mmeaney@regis.edu.

Conference – The Canadian Bioethics Society will hold its 17th Annual Meeting, October 20-23, 2005 in Halifax, Nova Scotia. The theme of this year’s meeting is “Money, Money, Money: Bioethics Confronts Dollars & Sense.” For more information, visit <http://www.bioethics.ca>.

Support From the Following Societies and Organizations is Gratefully Acknowledged:

American Anthropological Association
American Association of University Professors
American Political Science Association
American Psychological Association
American Psychological Society
American Society for Engineering Education
American Sociological Association
Botanical Society of America