

The Blossoming of Bioethics at NIH

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The establishment of the Department of Clinical Bioethics at the Warren G. Magnuson Clinical Center of the National Institutes of Health (NIH) has coincided with a burgeoning of interest and activity related to bioethical issues at NIH. The department has precipitated a reexamination and revitalization of existing bioethics activities in the Clinical Center and has launched new programs especially in the areas of education and research. In addition, the department contributes to the work of others throughout NIH who address bioethical issues.

The Organizational Location of the Department of Clinical Bioethics

Before describing the history and current activities of the Department of Clinical Bioethics, I will say something about its administrative location. Comprehension of the department's organizational location is essential to understanding its history, role, and function. Prior to interviewing for the position of chair of the department, I did not--and, if truth be told, still do not fully--understand the details of the organizational structure of NIH. I therefore assume that many other bioethicists outside of the Institutes, especially those who do not regularly receive NIH funding, may not fully grasp its organizational intricacies.

The Department of Clinical Bioethics is a department within the Warren G. Magnuson Clinical Center, which is NIH's "hospital." Hospital is in quotes because all of the patients at the Clinical Center must be enrolled in a research protocol and, therefore, are research subjects. The Clinical Center is where NIH's clinical researchers admit their research subjects or see them in the out-patient setting. The Department of Clinical Bioethics reports directly to the Director of the Clinical Center, John I. Gallin, M.D., and receives its finances, space, and other resources from the Clinical Center.

In this way, the department is part of NIH's intramural ("inside") program. People employed by NIH conduct intramural research, training, and other initiatives. The extramural program, which receives approximately 87 percent of NIH's budget, funds research at institutions outside NIH. The extramural program awards grants and contracts for research, training, and conferences conducted by investigators who are not affiliated with NIH. The National Human Genome Research Institute's ELSI (Ethical, Legal, and Social Implications) program, for example, is part of NIH's extramural program. As part of the NIH intramural program, the Department of Clinical Bioethics is not empowered to fund independent initiatives of people outside of NIH through grants and contracts. However, the department can collaborate with bioethicists and others on research, educational, and other programs outside of NIH and has some funds to support these collaborations.

In addition, it is important for bioethicists to understand that NIH is a collection of 24 institutes and centers. Although there is coordination and collaboration between the institutes and centers, each is funded separately, and each has its own scope, programs, administrative structures, research agendas, training priorities, boards of advisors, and so forth. In this sense, NIH is more like a university that has many distinct schools, each with its own dean, faculty, budget, and fund raising office, than one that is tightly integrated and centrally-administered. Within NIH's diffuse administrative structure, the Department of Clinical Bioethics is located within one of the centers (the Clinical Center) and has defined authority and responsibility only for bioethics within that center; in addition, because the Clinical Center's mission is to support clinical research at other institutes, the department's mission includes supporting the work of those institutes as well. Intellectual exchanges and relationships with other institutes and centers are neither pre-ordained nor administratively established; such relationships must be developed case-by-case, topic-by-topic, and initiative-by-initiative.

The History and the Development of the Department of Clinical Bioethics

The Department of Clinical Bioethics was launched in late 1996. Although the department's creation marked a major commitment to bioethics by the Clinical Center, and especially by its director, Dr. Gallin, it was formed on a pre-existing foundation of bioethics activities at NIH.

In 1977, John Fletcher, Ph.D., was appointed by then Director Mortimer Lipsett as the bioethicist at the Clinical Center; his official title was Assistant for Bioethics to Director, Clinical Center. Among the responsibilities of this role, Dr. Fletcher was expected to read every research protocol and evaluate it for ethical content. At that time, there was a great deal of suspicion about bioethics and bioethicists at NIH. As Fletcher (1995) reports, many equated bioethicists with policemen. In 1985, the one-person position expanded into a Bioethics Program. Dr. Fletcher left NIH in 1987, and Dr. Alison Wichman, a neurologist, became first the acting chief and then the chief of the Bioethics Program. Among her initiatives were the inclusion of a bioethicist on each of the NIH institutional review boards (IRBs), the creation of a bioethics fellowship program, and, in 1990, the formation of an ethics committee for the Clinical Center. Dr. Wichman resigned in 1991 in order to devote more time to clinical neurology, and Dr. Frederick Bonkovsky assumed the leadership of an expanded Bioethics Program that included two staff fellows and a secretary.

In July 1995, in collaboration with the Office of Human Subjects Research, the National Institute of Nursing Research, and the National Center for Genome Research, Dr. Gallin convened a "Conference on the Future of Clinical Bioethics at the National Institutes of Health Intramural Program." The conference was attended by leading bioethicists from around the nation, including Edmund Pellegrino, Ruth Faden, Ruth Macklin, John Fletcher, Robert Levine, Ronald Green, Lynn Peterson, LeRoy Walters. The purpose of the conference was for Dr. Gallin to delineate his vision for a new Department of Clinical Bioethics and for the attendees to offer their suggestions regarding the structure and function of the proposed department. A national search for the chief of the proposed Department of Clinical Bioethics began in the fall of 1995, resulting in my assuming the position in February 1998.

The Mission and Program of the Department of Clinical Bioethics

In establishing the Department of Clinical Bioethics, Dr. Gallin provided substantial amounts of space and financial support while eschewing micro-management. He presented the department with one overall goal and one specific priority. Dr. Gallin stated that he was creating the department with the goal of it becoming one of the nation's premier centers for bioethics. An important specific priority of his was the development of a fellowship-training program in bioethics because fellowship training is one of the most important and successful missions of NIH and the Clinical Center. Regarding the department's specific direction and its programs and their implementation, Dr. Gallin generously left the department free to chart its own course.

Mission Statement

Having long viewed mission statements as soporific verbiage, the creation of which consumes too much time for their ultimate utility, I tried to avoid having a mission statement for the Department of Clinical Bioethics. The other departmental faculty did not share my perspective. They won, since the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) requires, as part of its accreditation process, that hospital departments have mission statements. Thus, the Department of Clinical Bioethics is committed to the following:

The Department of Clinical Bioethics (DCB) is a center for research, training, and service related to bioethical issues. The DCB conducts conceptual, empirical, and policy-related research into bioethical issues; offers comprehensive training to future bioethicists and educational programs for biomedical researchers and clinical providers; and provides high quality ethics consultation services to clinicians, patients, and families of the NIH's Clinical Center and advice to the NIH IRBs on ethical conduct of research protocols.

The Faculty

The Department has four full-time faculty members that include physician-, nurse-, and philosopher-bioethicists. In addition to myself, there are Marion Danis, M.D.; Christine Grady, R.N., Ph.D.; and David Wendler, Ph.D. The department currently is recruiting two additional tenured or tenure-track faculty members, preferably--but not necessarily--one physician-bioethicist and one philosopher-bioethicist. In addition to its full-time faculty, the department has two "special experts," individuals who the department can hire to provide specialized skills for a maximum of four years. Lauren Randell, M.D., who is working on issues related to managed care, is a psychiatrist who completed the Johns Hopkins-Georgetown Greenwall fellowship program and is the embodiment of a collaborative relationship between the department and the Agency for Health Care Policy and Research (AHCPR). Louisa Smith, J.D., who is working on issues related

to confidentiality and the privatization of state services, is a lawyer who is splitting her time between the department and the Justice Department. Finally, the department also has established a permanent position for a visiting bioethics scholar. The objective of this apparently incongruously described position is several-fold. It helps to ensure intellectual stimulation for the department by introducing a new faculty member each year; it provides an opportunity to broaden the research topics pursued inside the department; and it provides an opportunity for external bioethicists to experience and learn about the many facets of research and bioethics at NIH. Margaret Little, Ph.D., of Georgetown University and the Kennedy Institute, just completed her tenure as the department's first visiting scholar. Dena Davis, J.D., of Cleveland State University, is the current visiting scholar, and James Childress, Ph.D., of the University of Virginia will be the department's next visiting scholar.

Research Program

Unlike previous bioethics endeavors at NIH, the Department of Clinical Bioethics has a major research commitment. The ultimate goal is to permit each faculty member approximately two-thirds protected research time. The department's current research interests fall into two major sections: (1) the section on human subjects research and (2) the section on ethics and health policy.

Christine Grady heads the section on human subjects research, which has a unit devoted to vulnerable populations headed by David Wendler. (Sections and units are the formal subdepartmental administrative structures at NIH.) One of the section's current projects encompasses a critical examination of the ethical arguments for and against the payment of research subjects, an examination of the policies and practices of academic centers, corporations, and others regarding the payment of subjects, and an empirical assessment of the impact of payment on research subjects themselves. Another research project, conducted in collaboration with Charles Weijer, M.D., of Dalhousie University, relates to the protection of communities in research. The project's goal is to evaluate the numerous existing guidelines for protecting aboriginal populations in research and to articulate the kinds of protections that would be required for both community consent and community consultation as well as to justify the circumstances under which such protections should be implemented.

The unit on vulnerable populations, in conjunction with Duke, UCLA, and Stanford, has begun a project that focuses on the attitudes and interests of decisionally incapacitated persons toward participation in clinical research and their inclination to complete advance directives for research. Because it is impossible to interview patients who already are decisionally incapacitated, the subjects for this study are people who are at risk for Alzheimer's disease because they have a first degree relative (a parent or sibling) who has Alzheimer's and randomly selected individuals who are Medicare beneficiaries over 65 years of age. In another, related, project, one of the bioethics fellows is critically evaluating the differing positions of Ronald Dworkin and Rebecca Dresser on how the expressed preferences of Alzheimer's patients should be considered when making medical care decisions for them. At the same time, she is articulating a new perspective that is more consistent than the others with the observed losses of different mental functions in people with Alzheimer's disease. Finally, the unit is trying to elucidate the process of pediatric assent. Three factors motivate this project: the new NIH mandate to expand pediatric clinical research; the concern over informed consent, especially of the decisionally incapacitated; and the paucity of data on informed consent in the pediatric context. In conjunction with several sites outside NIH, the project will examine how well pediatric subjects understand the protocols in which they are enrolled and what factors predict better understanding.

The section on ethics and health policy is headed by Marion Danis. This section's goal is to develop a theoretical framework for connecting medical ethics and health policy and to develop a research agenda based on this framework. Efforts of the section focus on conceiving strategies for equitably attending to the health of individuals in a market-based economy; setting priorities for health care delivery under resource constraints; and exploring theoretical and practical mechanisms for balancing respect for individual patient autonomy and equitable distribution of resources. A major research project, being done in collaboration with Susan Goold of the University of Michigan, seeks to determine the choices that managed care enrollees would make for health care services when they are provided information on the services and the related costs for insurance.

Another set of projects in the section relates to ethical issues in managed care organizations. One of these projects continues a collaboration with the Harvard Center for Ethics in Managed Care to elucidate the best

practices regarding ethical issues in a consortium of 11 leading managed care organizations. The project's objective is to identify and describe best practices in areas such as confidentiality, benefit adjudication, end-of-life care, and physician financial incentives, so that other managed care organizations that are committed to ethical behavior and policies but may not have the time and resources to develop new programs can adapt and implement these best practices. Another project seeks to delineate more carefully the areas of overlap and tension between medical and business ethics. Although many people have pointed to an inherent conflict, the specific tensions have not been well articulated. The results of the project could be very helpful in the creation of institutional structures to mediate some of the disagreements about managed care.

Educational Program

The Department of Clinical Bioethics has two main educational programs: (1) the training of bioethics fellows and (2) the training of non-bioethicists in bioethical issues. The fellowship is a two-year program that admits both pre- and post-doctoral fellows who receive identical training and have identical responsibilities. In the first year, fellows take a required year-long seminar in bioethics that provides a broad introduction to the methods and specific issues of bioethics. The topics range from principlism and casuistry to the termination of life-sustaining care and euthanasia, from reproduction and abortion to justice and the allocation of health care resources, from conflict of interest to genetics. This seminar also ensures that the fellows have read most of the "classic" books, articles, and judicial decisions in bioethics. (In addition to the department's first-year fellows, selected physicians and others from the NIH community who want to gain bioethics training--and who can offer a practical perspective--participate in this seminar.) First-year fellows must attend an intensive course in clinical research offered by the Clinical Center. The course covers clinical trial design, quality of life assessments, statistical analysis, presentation of research results to the press, and the like. Fellows also are required to attend the department's on-going research seminar, in which members of the department discuss their research projects, and a journal club, which reviews articles related to bioethics. In addition to this "classroom" learning, each first-year fellow attends one of NIH's 13 IRBs as a junior observer-member apprenticed to a senior bioethicist who is a full-fledged member of the IRB. The fellows read all protocols being considered by the IRB and discuss with their mentors the ethical issues that are raised. Finally, first-year fellows participate in the Clinical Center's ethics consultation service to become proficient in the consultation process and attend ethics committee meetings, in which cases and other ethics-related policy matters are discussed.

In the second year, fellows attend the seminar offered by the joint Johns Hopkins and Georgetown University Greenwall fellowship program. Over the course of the year, this seminar explores several bioethics topics in depth. In addition, each second-year fellow serves as a "walk round" ethicist to one of the medical teams at the Clinical Center. That is, every week they go on rounds with a medical team, and are available to provide educational material on bioethical issues that arise, offer opinions on fairly straightforward matters, and so forth. Fellows also participate in a seminar that reviews the cases that arise on "walk rounds."

Finally, throughout the two years, fellows are expected to spend 50 to 70 percent of their time conducting conceptual or empirical research on a bioethical issue under the guidance of one of the faculty. The goal is to have each fellow be an author on two to four articles by the end of the fellowship.

One of the specific missions of the NIH bioethics fellowship program is to train more philosopher-bioethicists. During the 1970s, young philosophers attracted to bioethics generated new approaches to bioethical issues that have fostered an enormous blossoming of intellectual discourse. Unfortunately, after this era, the field has neither attracted nor trained many more young philosophers in bioethics. Consequently, there is a dearth of philosopher-bioethicists in their late thirties and early forties, leaving a number of senior positions for philosopher-bioethicists without suitable candidates. The Department of Clinical Bioethics has made special efforts to entice philosophy graduates into its fellowship program both by advertising in "Jobs for Philosophers" and by arranging for fellows to teach in the philosophy departments of Georgetown and Johns Hopkins universities. The department's goal is to train a new generation of philosopher-bioethicists, one that will bring rigorous philosophical insights to bioethical issues and, simultaneously, bring experiences of actual bioethical dilemmas from the wards, research protocols, and IRBs to philosophy. These new trainees should be sufficiently skilled in philosophy to secure jobs in major philosophy departments and sufficiently knowledgeable of the practical operations of the health care system to teach and interact effectively in medical centers. The department's intention is that these fellows should progress to inherit the intellectual leadership of the field. Because the job market for freshly trained

philosophy graduates, even those from the very finest graduate programs, is exceedingly competitive, the department has been very successful in recruiting philosophers with outstanding training. The first fellow to go into the philosophy job market has accepted a position in the philosophy department at Stanford University.

In addition to the fellowship program, the department participates in conferences on ethical issues sponsored by others and provides educational programs for nonbioethicists through several initiatives. One such initiative, which targets the NIH intramural community, is "Ethics Grand Rounds." These are modeled on the ethics rounds held at the Dana-Farber Cancer Institute, which are published in the *Journal of Clinical Oncology* (see Patterson and Emanuel 1994). Bimonthly, during a regularly scheduled grand rounds period, the department hosts the ethics grand rounds. The format is unique and interactive. An actual case that raises a specific bioethical issue is presented by one of the NIH medical staff who participated in the case. A guest bioethicist is then asked to comment on the case for only 10 minutes. The desire is not a formal presentation with slides, but reflections of an expert and a conceptual framework for thinking about the issues raised by the case. The next 30 to 40 minutes are devoted to the audience's questions for the guest bioethicist. To date, Robert Truog, M.D., of Boston's Children's Hospital, has addressed "do not resuscitate" in the operating room; Paul Appelbaum, M.D., of the University of Massachusetts Medical Center, has discussed the consent of mildly demented patients to participation in research; Robert Buchman, M.D., of the University of Toronto, has spoken on breaking bad news to patients; Dan Brock, Ph.D., of Brown University has addressed the question of when pain relief with morphine constitutes euthanasia; and Bernard Lo, M.D., of the University of California-San Francisco, has discussed how to manage cultural conflicts in the care of terminally ill patients. Upcoming grand rounds will include Saul Levmore, J.D., of the University of Chicago, addressing the issue of paying research subjects.

Dr. Harold Varmus, Director of NIH, has been particularly interested in improving the training of clinical researchers with regard to the ethical aspects of human subjects research. NIH currently requires intramural clinical investigators to complete a one-hour, Web-based training module developed by the Office of Human Subjects Research before they can participate in protocols. Dr. Varmus asked the Department of Clinical Bioethics to develop a more expansive course on human subjects research for NIH researchers. With the extensive assistance of John Arras, Ph.D., and Jonathan Moreno, Ph.D., both of the University of Virginia, the department has developed an educational program that includes participation in mock IRBs, interviews with individuals who have already been subjects of clinical research, examination of actual informed consent documents, and the like. The topics covered in the course range from the horrors and scandals of the past--e.g., the Tuskegee, Willowbrook, and Beecher studies--and the content of current codes for human subjects research to the ethical issues raised by subject selection, informed consent, Phase I research, randomized trials, placebo controls, international research, and the function of IRBs. The department hopes that the comprehensive syllabus on human subjects research developed for this course will be published and available for others to use in their teaching and for clinical researchers and IRBs to use as references. The course debuted at NIH during the week of 11 January 1999, with guest faculty including: John Arras, Ph.D.; Robert Chanock, M.D.; Alan Fleischman, M.D.; Dale Hammerschmidt, M.D.; Jonathan Moreno, Ph.D.; Alan Sandler, D.D.S.; Robert Temple, Ph.D.; Robert Truog, M.D.; and Alison Wichman, M.D.

A third educational program is a conference designed to elucidate and to stimulate reflection on the ethical and value issues that will confront the American health care system in the next decade. The goal is to anticipate the fundamental value conflicts and ethical dilemmas, clearly articulate the issues and possible approaches to them, and outline a research agenda that would help to address them before they become crises. To further this effort, the department, the Agency for Health Care Policy and Research, and the Robert Wood Johnson Foundation are collaborating to organize and fund a conference to solicit views. A preliminary open discussion, intended to air a number of potential issues, was convened in June 1998. A full conference to address this refined set of issues is planned for 1 October 1999.

Service Functions

In addition to its research and educational roles, the Clinical Bioethics Department is responsible for two main service functions. NIH has 13 IRBs that review intramural protocols. Internal NIH policies require each IRB to have an ethicist as a member, and it is the department's responsibility to provide the ethicists. The department also conducts a bimonthly meeting of all the IRB ethicists to discuss controversial and new topics in human subjects research, such as the FDA's waiver of informed consent for research on patients in emergency settings and new NIH guidelines regarding research with children.

The Clinical Center has conducted ethics consultations for more than a decade. The previous system was intricate in that individual members of the bioethics program conducted all ethics consultations and selected cases were reported to the Clinical Center's ethics committee. Within the last eighteen months, this system has been reformed. The department now has administrative responsibility for ethics consultations and a member of the department leads a three person consultation team that includes members of the ethics committee. Bioethics fellows are expected to participate in consultations to learn about the process. Brochures describing the ethics consultation service and how to request a consultation are now included in all patient admission packets. The department is in the process of developing an evaluation procedure to assess the quality of the consultation service.

Other Bioethics Activities at NIH

Importantly, the Department of Clinical Bioethics's work is neither isolated from nor ignored by the rest of NIH. Indeed, one of the most exciting aspects of doing bioethics in Bethesda is the tremendous blossoming of interest in and activity surrounding the subject that has occurred throughout the NIH campus in the last few years. In addition to the well-established and congressionally mandated ELSI program, there are numerous other bioethics initiatives at NIH, a few of which are described here.

Grants for Teaching Human Subjects Research and Career Development Awards for Human Subjects Research

As part of President Clinton's apology for the Tuskegee experiments, NIH will fund two programs in the field of research ethics. One program funds short-term courses in research ethics; the other, career development awards in research ethics. Many clinical researchers, like myself, have had no formal instruction in human subjects research prior to writing their first protocol and informed consent document and enrolling a patient in a clinical trial. Like the department's new course for intramural researchers, the proposed short courses are meant to remedy this deficiency by supporting opportunities for researchers to receive formal training in the ethical aspects of human subjects research. The career development awards offer support for individuals who wish to pursue careers related to the ethical issues involved in human subjects research. The first grants were awarded in September 1998 and supported eight short-term courses and two career development awards.

End-of-Life Care

Through the coordination of five institutes and offices, and administered by the National Institute of Nursing Research, dedicated funds now exist to support research related to end-of-life care. In September 1997, the group of institutes and offices sponsored a research workshop on "Symptoms in Terminal Illness." In December 1997, the initial program announcement--i.e., a public document that informs the research community of available funds and the research topics or areas toward which proposals should be directed--soliciting grant applications was published stating that the overall objective of the program was to "stimulate research that will lead to improved quality of life for those at the end of life and decrease distress for their caregivers." Although the initial announcement focused on the "management of symptoms and syndromes that are associated with life-limiting illnesses," the program's aims are broader than just physical symptoms. Indeed, one of the six specific areas of interest mentioned was "research on the ethical issues associated with research at the end of life, including the needs and expectations of dying persons and their families."

Informed Consent

As a result of the recommendations of the Advisory Commission on Human Radiation Experiments, nine institutes, 2 along with the Departments of Energy and Veterans Affairs, are collaborating to support grants to investigate the process of informed consent. (This is the first inter-departmental research funding program on informed consent.) In September 1997, the institutes issued a request for applications (RFA) asking for grant applications pertaining to "research on how to enhance the degree of understanding achieved by research participants on issues such as: developing innovative methods for clearly conveying consent information or for assessing comprehension and reasoning ability required to understand and consent to specific experimental procedures and risks; identifying cognitive processes underlying complex decisions." Of the 82 applications received, 15 were funded. It is anticipated that the program will be continued and expanded in the future.

TNBC-Trans-NIH Bioethics Committee

Because of the increased number of ethical issues confronting the institutes and because of the need for the institutes to discuss these issues and to formulate coherent positions on them, a Trans-NIH Bioethics Committee (TNBC) was formed in 1997. Chaired by Lana Skirboll, Ph.D., the NIH Associate Director for Science Policy, the TNBC has high level representatives from each of the institutes, centers, and relevant offices. In its short existence, the TNBC has addressed many issues including the Secretary of Health and Human Services's proposed confidentiality regulations, especially as they relate to research records, and draft reports of the National Bioethics Advisory Commission.

Genome Ethicist

The National Human Genome Research Institute (NHGRI) has always been committed to addressing ethics and policy issues in its activities. From its inception, there has been an Ethical, Legal and Social Implications (ELSI) program in the NHGRI Division of Extramural Research, which has been responsible for providing funding for investigators. This program is currently directed by Elizabeth Thomson, R.N., M.S. The NHGRI Office of Policy Coordination in the Office of the Director, directed by Kathy Hudson, Ph.D., was developed to address policy issues of interest to other NIH institutes, professional and consumer organizations, and federal agencies and organizations outside of NIH. Most recently, the NHGRI Division of Intramural Research established a position for a bioethicist who would conduct research, help to create and operate an IRB for NHGRI, and educate other intramural NHGRI researchers about bioethical issues. After a national search, Ben Wilfond, M.D., was selected for the position. He and a fellow will be physically located within the Department of Clinical Bioethics. There will be extensive integration of the NHGRI intramural bioethics program and the departmental programs, including the bioethics fellowship seminar, Ethics Grand Rounds, and some joint research projects.

Bioethics Interest Group

Miriam F. Kelty, who was a staff member of the original National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research and who now works in the Institute of Aging, coordinates an interest group focused on bioethics. Interest groups are intended to provide a forum for individuals from all institutes and centers within the NIH and interested people in the greater Washington area to discuss and pursue a common research and intellectual topic. The bioethics interest group was formed more than two years ago and holds monthly meetings. This year its main foci are the ethics of international biomedical research, ethical issues in assisted reproduction, and ethical issues in informed consent.

Conclusion

The Department of Clinical Bioethics is still in its infancy. It has wonderful opportunities to pursue research in areas related to human subjects research and health policy; it has attracted talented fellows and is able to provide extensive educational opportunities; it has many venues for educating nonbioethicists; and it provides essential bioethics services to NIH's Clinical Center. Fortunately, the department was born and is developing at a time when interest in bioethics within NIH is blossoming. This makes NIH a scintillating environment in which to pursue bioethical issues.

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Notes

1. A full history of bioethics at the NIH can be found in two previous "Bioethics Inside the Beltway" articles: Alison Wichman and Michele A. Carter (1991) and John C. Fletcher (1995).
2. The institutes are: the National Cancer Institute, the National Human Genome Research Institute, the National Institute on Aging, the National Institute on Alcohol Abuse and Alcoholism, the National Institute of Allergy and Infectious Diseases, the National Institute of Child Health and Human Development, the National Institute on Drug Abuse, the National Institute of Mental Health, and the National Institute of Nursing Research.

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