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The Politics of Human-Embryo Research: Avoiding Ethical Gridlock

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HOW SAFE IS OUR FOOD?

Lessons from an Outbreak of Salmonellosis

THE microbiologic hazards of food present an issue of increasing concern.^{1,2} In the not-so-distant past, most food was produced and consumed locally. In the 20th century, however, the production and distribution of food in the developed countries of the world have become increasingly industrialized. Small farms are being replaced by feedlots, local dairies supplanted by industrial plants, farmers' markets displaced by supermarkets, and local restaurants edged out by huge national chains. The relations among agricultural workers, food processors, and distributors have become increasingly complex and distant. The food chain and steps in food production are being varied in ways that stretch the imagination. From an economic standpoint, modern agribusiness offers many benefits, including the wide choices and apparently low costs of food available to the consumer. The development of national standards has improved food safety, yet certain microbial pathogens persist, the scale of foodborne transmission is increasing, and new hazards are being recognized. Many of these phenomena are exemplified in this issue of the *Journal*, in the clear and comprehensive report by Hennessy and colleagues of a massive outbreak of salmonellosis.³

Salmonellosis — with the notable exception of typhoid fever — is a disease of civilization. The animals we use for food production frequently carry salmonella, thus contaminating meat, dairy products, and eggs.⁴ Salmonellosis is rare in developing countries, where sanitation is poor and diarrheal diseases are endemic, but where food production and consumption are local.⁵ In contrast, in the United States the reported incidence of salmonellosis has been increasing over the past 50 years,⁶ and approximately 1 percent of the population becomes infected each year.⁷ Outbreaks are becoming larger and, as shown by Hennessy and coworkers, may affect hundreds of thousands of people.

Most cases of salmonellosis (and foodborne illness) are considered to be endemic (or sporadic) because they are not clustered. The usual explanation for endemic cases is the inappropriate handling in kitchens and restaurants of contaminated food (including improper storage, undercooking, or cross-contamination). This is a plausible hypothesis because so many of the farm animals in the United States are colonized with salmonella and products derived from these animals subsequently become contaminated. Alternatively, sporadic cases of disease may occur when a widely distributed food has low levels of contamination, a situation that leads to a low attack rate diffusely distributed over a large geographic area, so that no one realizes that an epidemic is occurring. The investigation by Hennessy and colleagues³ illustrates this second pattern. Despite substantial publicity, fewer than 600 of the more than 200,000 estimated cases of salmonellosis in this outbreak (only 0.3 percent) were actually reported to public health departments. The epidemic both highlights the deficiencies in our nationwide system of passive sur-

veillance for salmonellosis⁷ and illustrates the value of field epidemiology that uses current surveillance data to detect outbreaks and prevent further transmission and disease. The cooperation of state and federal agencies and the speed with which they worked to solve the puzzle and protect the public safety make this a model for future investigations.

However, this epidemic probably reflects only the tip of the iceberg. The low surveillance rate suggests that smaller outbreaks are regularly missed. That the incidence of salmonellosis among persons with AIDS is many times that among the general public⁸ is also consistent with the view that widely distributed foods are contaminated by low doses of a pathogenic agent, leading to low attack rates in normal hosts but higher rates in compromised hosts.⁹ Such sentinel populations teach us much about the distribution of particular agents. This model also may be applicable to other foodborne illnesses, in which detection of the agent and surveillance are even less efficient than for salmonella. The high incidence of *Campylobacter jejuni* infections in persons infected with the human immunodeficiency virus¹⁰ points to the widespread transmission of low levels of this foodborne agent as well.

Modern food production is often so complex that many points at which contamination could occur are simply not recognized. Thus, in the outbreak of salmonellosis the use of tanker trailers to ship both pasteurized and nonpasteurized products represents a classic cross-connection that was not identified until the investigation was undertaken. The bulk transport of nonpasteurized liquid eggs provides an efficient means of amplifying the impact of even a single salmonella-contaminated egg¹¹ so that it affects large numbers of consumers. This outbreak underscores the fact that to minimize risk from unrecognized hazards, pasteurization — one of the most powerful tools against bacterial pathogens in the public health armamentarium — should be undertaken at the latest possible step in food production.

Manifestations of foodborne disease are not restricted to the gastrointestinal tract, as illustrated by the etiologic role of *Escherichia coli* O157:H7 in the hemolytic-uremic syndrome,¹ *C. jejuni* in Guillain-Barré syndrome,¹² and *Listeria monocytogenes* in fetal morbidity,¹³ nor are the ramifications always obvious. The most pernicious threat may be the spread of antibiotic resistance by foodborne organisms,¹⁴ because of the promiscuous use of subtherapeutic doses of antibiotics as food supplements for farm animals, or the potential foodborne spread of the scrapie agent. New opportunities for foodborne diseases result from the increasing internationalization of our food supply, with the importation of foodstuffs from all parts of the globe, the introduction of new and sometimes uncooked items into our diets, and the preparation of food in restaurants and households by people who may be carrying unusual pathogens.^{6,15}

Food is not sterile, and eating cannot be made risk-free. Because of the standardization and quality-control measures that are part of industrialized food produc-

tion, the safety of our food from many microbial hazards has probably never been greater. Yet because of the potential for amplification of a pathogen that is implicit in large-scale food production, the opportunities for the foodborne transmission of disease seem to be increasing. The grim implications of bovine spongiform encephalopathy (mad-cow disease) for cattle and possibly humans point to the unanticipated problems that can arise from a breach in basic ecologic relations (cows, which are herbivores, were fed animal offal). Since new hazards are emerging from both familiar pathogens such as salmonella and previously unrecognized microbial threats, improved surveillance for foodborne infections is essential. Careful medical detective work similar to that reported by Hennessy et al.³ should highlight the basic ecologic imbalances underlying endemic and epidemic foodborne hazards and lead to their correction.

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EXERCISE FOR WOMEN — HOW MUCH PAIN FOR OPTIMAL GAIN?

REGULAR physical activity is important for health and has been linked to a reduced risk of numerous chronic diseases.¹ Nonetheless, fewer than half of American adults engage in regular exercise.² A recent federal recommendation regarding regular exercise³ was based on three major considerations: the potential health benefits, safety, and feasibility of different amounts and intensities of physical activity. This recommendation applies to both men and women, but safety is particularly relevant to women, since exercise of high intensity and long duration may lead to menstrual and reproductive dysfunction. Given the potential differences between men and women in the balance of the benefits and the risks of exercise, what should the optimal guidelines be regarding physical activity for women?

The recent recommendations regarding exercise from the Centers for Disease Control and Prevention and the American College of Sports Medicine encourage 30 minutes of moderately intense physical activity on most, and preferably all, days of the week.³ This contrasts with previous recommendations that generally endorsed vigorous endurance exercise (i.e., at a level that results in a heart rate 60 to 90 percent of the maximal rate) for at least 20 minutes three times a week.⁴ The earlier recommendations were based on physiologic data showing that such a regimen induced cardiorespiratory fitness in untrained or previously sedentary people. The recent

and less formidable recommendation was designed, in part, to present less of an obstacle to exercise in the predominantly sedentary U.S. population. Unfortunately, many have interpreted the new recommendation as superseding previous guidelines and as meaning that high-intensity exercise offers no additional benefit over physical activity of moderate intensity. This is a misinterpretation. In fact, the recent guidelines state that "the recommendation presented . . . is intended to complement, not supersede, previous exercise recommendations," and "people who already meet the recommendation are also likely to derive some additional health and fitness benefits from becoming more physically active."

In this issue of the *Journal*, Williams⁵ provides evidence supporting the latter statement by documenting a dose-response relation for plasma high-density lipoprotein (HDL) cholesterol concentrations among women runners. HDL cholesterol levels increased with increasing numbers of kilometers run, even beyond 64 km per week. Should we then recommend a maximal intensity and amount of physical activity for women? Before we reach this conclusion, the issues of efficacy, safety, and feasibility must be carefully weighed.

The available data indicate that physical activity is associated with numerous benefits in terms of health, including a lower incidence of cardiovascular disease, non-insulin-dependent diabetes mellitus, osteoporotic fractures, colon cancer, and perhaps breast cancer.¹ Regular physical activity also helps to maintain a healthy

body weight, thus reducing the incidence of diseases related to obesity.¹

On the other hand, if extreme loss of weight and body fat results from regular exercise, amenorrhea may occur.^{1,6} Sustained alterations in the levels of female reproductive hormones have been observed with intense exercise training.^{1,6} In female athletes who increase their running mileage, levels of progesterone in the midluteal phase are lower during the cycles in which mileage is increased; in addition, the luteal phase may be shortened, with or without prolongation of the follicular phase. If the hormonal dysfunction progresses, anovulation may follow, initially in the presence of normal estrogen levels; later, hypoestrogenic amenorrhea may occur. Infertility is also more likely to occur among female athletes in whom such reproductive-system dysfunction develops.^{1,6} Because of the integral role of estrogen in maintaining bone mass, osteoporosis is another concern in women with menstrual dysfunction.¹ Female athletes with amenorrhea have lower bone mineral density than their counterparts with normal menstrual patterns who follow the same exercise regimens. When female athletes resume normal menses, they regain some bone mass, but bone density may still be lower than in athletes who have continued to have normal menses. In addition to amenorrhea and osteoporosis, eating disorders (including anorexia nervosa and bulimia nervosa) may occur, especially among adolescent and young adult female athletes involved in activities in which thinness is perceived to have aesthetic value, such as ballet and gymnastics.⁷ This combination of medical disorders, termed the "female-athlete triad," has been an increasing source of concern to experts in sports medicine.

With high intensities and large amounts of physical activity, musculoskeletal injuries are another potential mechanism of adverse effects on health. The available data regarding injuries associated with different types of physical activity are limited. Running has been studied the most; the risk appears to be fairly substantial, with 35 to 65 percent of runners injured per year.¹ There also appears to be a direct relation between the risk of musculoskeletal injury and the distance run per week. Moreover, in those who have habitually been sedentary, the initiation of vigorous exercise may substantially increase the risk of acute myocardial infarction; this is especially true for older persons.⁸

The study by Williams does not allow us to evaluate the balance of benefits and risks of higher amounts and intensities of physical activity. Specifically, it does not provide information on the prevalence of menstrual irregularities (we know only the percentage of the women who reported still having periods), bone mineral density, or the frequency of musculoskeletal injuries. It would have been helpful to examine whether these adverse health effects increase in frequency with increasing distance run per week.

Evidence from other sources indicates, however, that the risks of reproductive and musculoskeletal problems associated with high-intensity physical activity exceed those associated with moderate physical activity; thus,

it is of particular importance to compare the relative benefits of high-intensity and moderate-intensity exercise. The data that are available demonstrate that a moderate amount of physical activity at a moderate intensity confers important health benefits. In a study of more than 3000 women 20 years of age or older who were followed for eight years, Blair et al. reported an inverse association between physical fitness and death from any cause.⁹ The greatest reduction in mortality occurred between the lowest and the second-lowest quintiles of the group in terms of physical fitness. As compared with women in the least-fit quintile, those in the second-least-fit quintile were 48 percent less likely to die during follow-up. With increasing levels of physical fitness, mortality continued to decline, although the incremental gains were smaller; women in the most-fit quintile were 78 percent less likely than the least fit to die during follow-up. Among 73,029 women in the Nurses' Health Study who were 40 to 65 years of age at baseline and were followed for four years, the level of physical activity was inversely related to the incidence of both coronary heart disease and stroke.¹⁰ Again, the largest reduction in risk occurred between the lowest and the second-lowest quintiles with respect to physical activity; even brisk walking was associated with a substantial reduction in risk.

With regard to feasibility, given the high prevalence of sedentary lifestyles among adult Americans — some 60 percent perform no regular physical activity, or only irregular physical activity² — it is unrealistic to expect that this nation will cheerfully embrace an exercise regimen that involves long periods of intense physical activity, whatever the benefits in terms of health. The recent recommendation that adults engage in 30 minutes of moderately intense physical activity, such as brisk walking, on most days of the week represents a more feasible goal. Moreover, physical activity at moderate intensity has fewer health risks than vigorous activity, especially for those who have previously been sedentary.⁸ We do not mean to discount the additional health benefits that may accrue with more frequent, longer, and more intense physical activity, and we would not dissuade those who wish to exercise more. We do believe, however, that at some point the risks outweigh the health benefits of increased physical activity. If amenorrhea, reproductive disorders, or repeated musculoskeletal injuries occur, we believe that the level of exercise that produces these complications is excessive, regardless of its health benefits.

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DIVERSITY IN MEDICINE

WITH a record number of applicants to medical schools in the United States in 1995 and concern about a surplus of physicians, it is sometimes forgotten that many people are underserved by the medical profession, particularly the poor, members of minority groups, and residents of rural areas. Although the underserved are less likely to have health insurance or other financial resources, they are more likely to have medical needs. These needs may be aggravated by social or financial problems, language barriers, or inability to find high-quality care.

In this issue of the *Journal*, Komaromy et al. document the essential role of minority physicians in California in caring for the poor and members of minority groups.¹ The findings are striking and are consistent with the results of other studies.^{2,3} At a time when college and university admissions policies that give preference to members of minority groups are under attack throughout the country, such data are particularly relevant. In July 1995, the regents of the University of California banned preference based on race or sex in admissions, hiring, and contracting.⁴ In March 1996, the U.S. Court of Appeals for the Fifth Circuit sharply limited the use of affirmative-action programs at the University of Texas.⁵ And in November 1996, Californians will vote on the California Civil Rights Initiative, a measure that would ban race- and sex-based preferences in public employment, public education, and public contracting. Thus, although there is strong support within the medical profession for increasing racial, ethnic, and sexual diversity among physicians,^{6,7} in the near future fewer members of minority groups may enter medical practice.

Using various sources of information and a survey of physicians, Komaromy et al. examined the relation between the characteristics of physicians in California and the communities where they practice. Communities with high proportions of black and Hispanic residents were substantially more likely than other areas to have shortages of physicians, regardless of community income. On average, black and Hispanic physicians practiced in areas with fewer primary care physicians per capita than did white physicians. These areas tended to have higher proportions of residents with the same racial and ethnic background as the physicians. Even after taking the proportions of such residents into ac-

count, Komaromy et al. found that black and Hispanic physicians cared for substantially more black and Hispanic patients, respectively, than did other physicians. Black physicians cared for more patients with Medicaid insurance, and Hispanic physicians cared for more patients without health insurance.

These findings are supported by national data from the Association of American Medical Colleges.⁸ In 1993, 39.8 percent of students graduating from medical school who were members of underrepresented minorities (blacks, Mexican Americans, mainland Puerto Ricans, and American Indians) said they planned to practice in underserved areas, as compared with 8.9 percent of other graduates. Nearly 60 percent of members of underrepresented minorities preparing for careers as generalists planned to locate in such areas, as compared with less than 24 percent of other graduates preparing for generalist careers.

Komaromy et al. cite studies showing that black and Hispanic patients have less access to care, poorer-quality care, and worse outcomes than non-Hispanic whites. Their findings are limited, however, by the absence of data on case mix or the quality of care. People who identify a nonwhite physician as their usual source of care are likely to be sicker than people who identify a white physician.³ All other factors being equal, we do not know whether racial and ethnic congruence between physician and patient is associated with better care. We do know that patients sometimes prefer physicians with backgrounds similar to their own.

In recent years, more members of underrepresented minority groups have applied to medical school, entered, and graduated. In 1994, a record 2487 blacks, Hispanics, and Native Americans (12.9 percent of all entrants) entered allopathic and osteopathic schools, and 1495 (8.6 percent of all graduates) graduated.⁹ In addition, about 15 percent of graduates were Asians or Pacific Islanders.⁸ Between 1990 and 1994, 5 of the 10 medical schools with the highest percentage of underrepresented-minority graduates were in California — at the University of California campuses at San Francisco, Davis, San Diego, and Irvine and at Stanford.¹⁰ (The other five were at Meharry, Morehouse, Howard, the University of Illinois, and the University of Michigan.) Nonetheless, as Rivo and Kindig wrote in a recent issue of the *Journal*,⁹ increased minority enrollment in medical schools “is far from enough even to approach a goal of parity with the minority population in the next 50

years, given the expected growth of that population.” Indeed, non-Hispanic whites will represent a decreasing percentage of the U.S. population according to census projections, falling from 76 percent in 1990 to 72 percent in 2000 and 60 percent in 2030.¹¹

In education, fostering diversity can be a win-win situation, improving both the institution and the educational experience. We learn from people with different backgrounds and beliefs. A recent federal review of affirmative-action programs at the University of California at Berkeley found that as the campus became more diverse, the academic quality of the students also increased.¹² Physicians are teachers of their colleagues and role models for future physicians. A diverse physician work force should help us attract people of all races and backgrounds who have outstanding personal characteristics, genuine motivation to be primary care physicians, and the skills needed to work in underserved areas, such as fluency in a language other than English and an understanding of the cultural and health beliefs of diverse groups. Strong academic performance and excellent training are essential, but they are not ends in themselves. Nonetheless, when there are many applicants for a limited number of spaces, any classification system will be perceived as unfair to some.

In the 1970s, Allan Bakke, who is white, claimed that he had been denied admission to the medical school at the University of California at Davis because of a quota system that reserved places in the entering class for members of minority groups. In 1978, the Supreme Court, in a five-to-four vote, found programs that set aside a fixed number of places for minorities unconstitutional, but said that colleges and universities could consider race or ethnicity as a factor in admissions decisions.¹³ In 1995, however, the University of California regents ended the consideration of race or ethnicity, even as one factor among many. In the 1995 *Adarand* case, the Supreme Court sided with a white contractor in Colorado who had been passed over for a federal highway contract, despite having submitted the low bid, because of financial incentives to hire minority-owned firms.¹⁴ Justice Sandra Day O'Connor, writing for the five-to-four majority, concluded that racial classifications imposed by federal, state, or local governments “are constitutional only if they are narrowly tailored measures that further compelling government interests.” In the 1996 *Hopwood* case, the Court of Appeals for the Fifth Circuit, citing recent Supreme Court rulings, rejected any consideration of race or ethnicity as a factor in admission to the University of Texas law school, “even for the wholesome purpose of correcting perceived racial imbalance in the student body.”¹⁵ Although the immediate effects of this controversial decision are limited — the ruling was stayed in April pending an appeal by Texas — this or another case may lead

the Supreme Court to reconsider the role of affirmative action in higher education.

As the debate over affirmative action continues, we should pursue a variety of efforts to diversify the medical work force and increase the number of physicians who care for the underserved. There are ongoing initiatives to draw academically qualified minority applicants to medical schools, such as magnet health-sciences high schools, science-education partnerships between academic health centers and school systems, and other educational improvements.⁶ Admissions decisions should take into account career plans, interest in primary care, prior community service, language skills, and other relevant factors. We should be concerned that highly qualified minority applicants may perceive themselves to be unwelcome at institutions that scale back their commitment to diversity, particularly institutions that have historically admitted few members of minority groups. Medical schools should work hard to counter such perceptions. Adequate financial-aid programs are important. Targeted financial incentives for practicing physicians would encourage more to care for the underserved.⁹ Large managed-care firms are likely to provide care for an increasing number of minority patients, including Medicaid patients. Such firms should use some of their ample financial resources to support efforts to increase the number of minority physicians. In the long run, universal health insurance, although it is not currently on the horizon, might make the most sense for the underserved.⁹ Regardless of the fate of affirmative-action programs in medicine, the social problems they are trying to address are not going to go away.

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THE POLITICS OF HUMAN-EMBRYO RESEARCH — AVOIDING ETHICAL GRIDLOCK

In late January 1996, President Bill Clinton signed a continuing resolution to keep the government open. Among other things, the resolution prohibits the use of federal funds for research on human embryos.¹ This prohibition, which continues until September 30, the end of the current fiscal year, would become permanent if Congress reaffirms it and the President concurs.¹ Compromise language to limit the prohibition to embryos created expressly for research purposes, but permitting federally funded research on “spare” embryos (those created for procreation but no longer needed) was defeated.² A much stronger case can be made for using spare embryos in research than for creating embryos specifically for that purpose. We think that if this case is made, the compromise language has a reasonable chance of success, should Congress reconsider the issue.

Compromise, however, requires disentangling the subject of research on embryos from the continuing debate on abortion. This is so because abortion is a defining political issue, and neither the Supreme Court’s 1992 reconfiguration of *Roe v. Wade*³ nor the election of President Clinton has dethroned it. But abortion is about more than politics; it is fundamentally about ethics, morals, equality, and religion, and how we think about abortion reveals much about how we are likely to think about other life-and-death issues in contemporary American medical practice. Because politics as currently practiced seems so unprincipled, there have been sporadic attempts to redefine abortion-related issues as ethical questions and to set up national panels and advisory groups to examine various practices and make recommendations about their ethics. When the subjects studied by such panels have been unrelated to abortion, the panels have often helped to forge a consensus. But when abortion has dominated the agenda, virtually no progress has been made.

Even though the abortion debate in the United States is not likely to be resolved by ethical argument, it should not be permitted to hold every related issue of medical ethics hostage, as it now does. Crucial issues such as human-embryo research, prenatal genetic screening, and the manipulation of embryos before their implantation must be disengaged from the abortion issue to receive the public debate they require. This task is extremely complex, as the experience of the Human Embryo Research Panel of the National Institutes of Health (NIH) shows. It has been more than 18 months since the panel’s report was presented to the director of the NIH, and it is unlikely that the director will act on it until the political climate changes substantially. Understanding the content and reasoning of this

report is critically important to efforts to end the ethical gridlock on abortion-related issues of medical practice and research.

THE HUMAN EMBRYO RESEARCH PANEL

The Human Embryo Research Panel was created to recommend guidelines for the funding of research on embryos. It met six times from February to September 1994, when the final report was issued.⁴ The panel’s narrow charge was to classify potential research involving ex utero human embryos into one of three categories: research acceptable for federal funding, research warranting additional review, and research unacceptable for federal funding.

By majority vote, the 11 researchers and 8 nonresearchers on the panel (a total of 10 men and 9 women) concluded that research on methods of improving the chances of pregnancy; fertilization; egg activation, maturation, and freezing; genetic diagnosis before implantation; and the development of embryonic stem cells was acceptable for federal funding.⁴ Research on the cloning and use of oocytes without their transfer to the uterus for gestation was considered to warrant additional review. Unacceptable research included the cloning and use of oocytes followed by transfer, and cross-species fertilization.⁴

The panel offered specific guidelines for the review and conduct of federally funded research. The guidelines stipulated that there be a qualified researcher and a valid research design promising major scientific or clinical benefit; that the research goals not be accomplishable with animals or gametes; that the number of embryos required for the research be kept to the minimum necessary to ensure valid results; that informed consent be obtained from gamete donors; that no gametes or embryos be purchased or sold for use in research; that the research protocol be reviewed by an institutional review board; that gamete donors be selected equitably; and that no research be conducted on embryos more than 14 days after fertilization.⁴

The composition of panels such as this one has been widely criticized. For example, an earlier NIH panel on the use of fetal tissue for transplantation research was criticized by right-to-life groups for including too few members with explicitly right-to-life views. Others have said that the Human Embryo Research Panel and earlier panels had too many scientists as members. Feminists have also complained that past embryo-research panels, such as the Ethics Advisory Board, were made up almost exclusively of men and had a tendency to view “embryos and fetuses . . . as a man’s sperm personified [making them] appear to be real to these men in a way women are not.”⁵ The Human Embryo Research Panel was balanced according to sex, but nonetheless there may have been insufficient attention to the vast differences involved in supplying sperm as compared with ova.

The reason the panel’s recommendations have been

more or less ignored has little to do with its generally reasonable conclusions. Rather, in our view, it is because the panel did not make a persuasive moral case for the conclusions. Unless a strong moral framework is presented that recognizes and addresses the concern of those troubled by the use of human embryos for research, such research is unlikely to gain the political acceptance needed for it to receive federal funding.

THE MORAL FRAMEWORK PRESENTED BY THE PANEL

The panel members considered and rejected the view that a human embryo has rights that completely prohibit its use in research. To those who argue that an embryo is a human being from the moment of conception, the panel responded that no single trait or property is present at conception that suffices to confer personhood, and thus rights, on the embryo. This view is persuasive. All human life begins at conception, but many embryos do not implant, and even among those that do, many spontaneously abort. Whatever shifts occur in the moral equation at conception, it is not self-evident that that biologic event is of such moral importance that it should cause all human embryos to be placed outside the realm of research.

Having rejected the idea of innate rights as the framework for determining the moral status of the human embryo, the panel recommended what it termed a “pluralistic” approach.⁴ Embryos, it said, possess “a variety of distinct, intersecting and mutually supporting considerations,” such as “genetic uniqueness, potentiality for full development, sentience, brain activity, and degree of cognitive development.” Furthermore, “their developing presence in an entity increases its moral status until, at some point, full and equal protectability is required.”⁴ For those uncertain about the moral status of human embryos, this was an unsuccessful effort to please everyone.

Unfortunately, the pluralistic framework — in which embryos possess a set of properties that somehow, when mixed in an unexplained and mysterious way, confer moral standing — is not convincing. This is primarily so because that framework requires a detailed analysis that explains why the particular properties cited confer moral worth, or to what degree each property cited is necessary or sufficient. Without such an underlying rationale, the framework looks like an attempt to rationalize a desired conclusion — namely, that some research on embryos ought to be permitted — rather than to derive a conclusion from an ethical analysis.

Such an analysis is needed in order to show that having a unique genetic identity, a nervous system, a human appearance, the potential to become an adult, brain activity, or the ability to feel pain moves an embryonic entity over the line from being “deserving of respect” to having moral standing such that experimentation would violate its intrinsic rights. Many inanimate objects, such as cadavers, works of art, national parks,

and archeological treasures, have moral standing, and duties of respect are accorded to them in both law and ethics, but they lack the biologic properties mentioned by the panel. Likewise, many forms of animate life — among them, dogs, rodents, pigs, goats, and primates — are routinely used for research, but they would not be considered acceptable subjects for experimentation if the panel’s standards of moral worth were applied to them. Without knowing why certain properties count, we cannot draw clear boundaries between acceptable and unacceptable types of research. From a pluralistic perspective, we cannot tell whether it is right to prohibit research after the primitive streak appears at 14 days’ development. Why should research on older embryos not be allowed, if it would benefit other embryos, fetuses, children, or adults?

Inability to define the moral status of the embryo convincingly is the crucial failure of both the panel’s report and the overall debate on the subject. Until it is demonstrated that embryos are owed moral consideration, concern about the ethics of research on embryos can be dismissed as “nothing more than fights over symbols.”⁶ However, such curt dismissals completely fail to respond to the deep moral reservations about such research held by many Americans, including the President. By adopting a bald political compromise on a moral issue, the panel guaranteed that its report would have no effect.⁷

CREATING EMBRYOS FOR RESEARCH

The need for a moral argument is most vividly demonstrated by the question of whether to allow embryos to be created solely for research. A recommendation in favor of this idea was publicly rejected by President Clinton in December 1994 and probably eroded whatever public support the report might otherwise have received.⁸ As subsequent congressional action has clearly indicated, anyone who recommends federal funding for research on embryos has the burden of persuasion.^{1,2}

We believe a persuasive moral argument for conducting some research on human embryos can be made. Such an argument must explicitly and straightforwardly account for the relationships involved in human procreation and its social context. An embryo has moral standing not so much for what it is (at conception or later), but because it is the result of procreative activity. The strong public reaction to the ongoing embryo scandal at the University of California at Irvine, for example, occurred not because embryos were made the objects of medical research, but because they were used to create babies without either the consent of the ova providers or disclosure of information about the origins of the children to the parents now raising them.⁹ People have a direct interest in the status and fate of every embryo formed from their gametes, because such embryos carry their genes and can potentially become their children. In this respect, the embryo is not only a symbol; it is real. Similarly, society has a direct interest in that

embryo, since society has an interest in how its members procreate and how families are created.

Recognizing that the embryo's moral status derives not only from a property or cluster of properties it possesses, but also from the interests that potential parents and society bring to procreation and reproduction, makes it clearer why creating embryos solely for research purposes is morally problematic. If two people seek to have a child and create a number of embryos to help them do so, there can be no doubt that they hope that at least one of those embryos will become a child. For most people it is the intention to create a child that makes the creation of an embryo a moral act. To create embryos solely for research — or to sell them, or to use them in toxicity testing — seems morally wrong because it seems to cheapen the act of procreation and turn embryos into commodities. Creating embryos specifically for research also puts women at risk as sources of ova for projects that provide them no benefit.¹⁰

Careless use of language can also undercut moral arguments. The panel, for example, described a human embryo as “significantly smaller than the period at the end of this sentence.”⁴ These words suggest that we should judge an embryo's value by its size; that it is, after all, just a speck or dot.¹¹ But describing the period as located “at the end of this sentence” suggests that periods have value only in relation to words. Periods are related to sentences and conclude them. In the same way, embryos are valued because of their relationship to the gamete providers, the potential parents, not because of their size. Deliberately creating embryos that are disconnected from human relationships takes them out of context. Removing them from the context of human procreation calls for a much better justification than the acquisition of potentially important information. Embryos created for procreation, but ultimately not needed because the procreative aims of the couple have been reached, do not have this “manufactured-orphan” status. This argument parallels one used by those who approve of using tissue from aborted fetuses for research, but many of these same people would be horrified at the idea that a woman could become pregnant for the sole purpose of having an abortion to produce fetal tissue for research purposes.

Thus, many people, like President Clinton, could approve of research using “spare” embryos created by in vitro fertilization without approving of the creating of embryos for that specific purpose.^{2,8} Provided with reasonable grounds for distinguishing research on spare embryos from research on embryos created solely for the purpose, even the Republican-dominated House of Representatives might have made the distinction. The House Appropriations Committee, for example, voted 30 to 23 in July 1995 to bar all federal funding for research on human embryos.¹² A proposed amendment to permit such funding for research on spare embryos

failed by a tie vote (26–26). It seems plausible that a more nuanced rationale for this distinction could have persuaded at least 1 of the 26 members who voted against the amendment to vote for it.

The moral problem with making embryos for research is that as a society we do not want to see embryos treated as products or as mere objects, for fear that we will cheapen the value of parenting, risk commercializing procreation, and trivialize the act of procreation. It is society's moral attitude toward procreation and the interests of those whose gametes are involved in making the embryos that provide the moral force behind the restriction or prohibition of the manufacture of embryos for nonprocreative uses. A moral framework that reduces the matter to an exclusive focus on the intrinsic properties of embryos, ignoring the interests of those whose gametes make the embryos and the circumstances under which procreation occurs, cannot persuade, or even engage, those to whom the creation of embryos solely for research is morally suspect. Obtaining consent is not enough. A new framework — one that takes relationships seriously — is essential.

THE POLITICS OF ABORTION

An ethical discussion of research on embryos *ex utero* need not involve abortion, because no pregnancy is involved. When legally protectable human life begins is an important issue, but it is one that must be confronted on its own terms. Moreover, embryo research itself can actually help both to increase the number of pregnancies and to reduce the number of abortions. One example is preimplantation genetic diagnosis, which involves the extracorporeal creation of an embryo through in vitro fertilization, followed by blastomere removal for genetic diagnosis. Only embryos determined not to be affected by the genetic disorder in question are then transferred to the uterus.¹³ Such genetic diagnosis, unlike conventional prenatal diagnosis (chorionic-villus sampling or amniocentesis), obviates the need for a woman to decide whether to undergo an abortion.

A strong case can also be made for the importance of embryo studies to understanding basic problems of fertilization and development and improving the effectiveness of in vitro fertilization itself. Research on fetal-tissue transplantation did not garner public support and federal financing until supporters persuaded Congress that it might benefit the treatment of major diseases, such as Parkinson's disease.¹⁴ Embryo research will not receive needed support unless it is linked more directly to research on fertility. It should be acknowledged, of course, that even those to whom choosing among “permanent storage,” destruction, and donation presents no particular ethical problem may nonetheless reject the idea of research using spare embryos on the prudential basis that once such research is accepted, research on embryos created specifically for research is

inevitable. It is easy to see the force of this version of the slippery-slope argument,¹⁰ but a line can nonetheless be drawn and maintained as long as the rationale for it is accepted and embryo research addresses questions directly related to infertility.

The country needs clear and consistent rules for research on human embryos, as well as uniform methods of review. This uniformity cannot be provided by local institutional review boards, but only by a central review panel. There is a compelling need for the nationwide regulation of embryo research, and federal funding of such research would provide an impetus for such uniform rules.³

Ethics in the public sector cannot transcend politics completely, because the public sector is the political arena. But for ethical guidelines to survive changes in political power in Washington, they must be grounded on more than political expediency. When politicians can associate issues of medical ethics with the politics of abortion, they will do so. In politics, the majority vote wins. In ethics, however, ethical reasoning should prevail: a vote without a supporting rationale will not be convincing to policy makers in a world where one's position on abortion can directly affect one's political future.

Ethics panels debating an abortion-related issue must persuasively distinguish their subject from abortion itself and provide a strong ethical reason for the research and its need for public funding. As the angry response to President Clinton's April 10 veto of a ban on "partial-birth" abortion demonstrates, we are nowhere near a political consensus about abortion.^{15,16} Unless we are content to let the politics of abortion bring discussions of publicly funded medical research to gridlock, we must

do much better at articulating an ethical basis for abortion-related research.

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