ISSN 1543-4672

Medical Ethics

Spring 2009
Vol. 16, Issue 2

Quote to note

"Ethics is the art of recommending to others the sacrifices required for cooperation with oneself."

—Bertrand Russell

Inside

Ask the ethicist
Dead, or as good as dead? 3
By James L. Bernat, MD

The legal column
Fathers, foreskins and family law 4
By Dena Davis, JD, PhD

Ethics and the humanities
Cost 5
By Roxana Robinson
Review by Anna B. Reisman, MD

Dialogue
The ethics of food 6
By Paul B. Thompson
Maya Joseph, PhD candidate
Marion Nestle, PhD, MPH

The opinions expressed in *Lahey Clinic Journal of Medical Ethics* belong to the individual contributors and do not represent the institutional position of Lahey Clinic on any subject matters discussed.

Lahey CLINIC
in collaboration with
Dartmouth-Hitchcock
Medical Center

Synthetic biology: engineering life

Christina D. Smolke, PhD
Assistant Professor of Bioengineering
Stanford University Department of Bioengineering
Stanford, California

Synthetic biology is a rapidly growing, interdisciplinary field that involves the development and application of engineering principles to make the design and construction of complex synthetic biological systems easier and more reliable. The engineering of biological systems holds great promise for developing solutions to many global challenges, including renewable energy production, material synthesis and medical advancement.

Modern synthetic biology builds upon the more mature field of genetic engineering. Genetic engineering began as a field more than 30 years ago and was largely developed around a set of foundational technologies that allowed researchers to amplify pieces of DNA, build relatively simple synthetic DNA elements by piecing together DNA fragments and place those synthetic DNA elements into living systems to encode relatively simple, novel biological functions. Early successes included the recombinant production of insulin (for diabetes) and erythropoietin (for anemia) in bacteria and mammalian cells, respectively. This resulted in broader public and policy support for research in this field. Because the foundational technology associated with genetic engineering does not scale readily to more complex engineered biological systems, biotechnology and medical technologies have not seen an increase in the complexity of reliably operating biological systems similar to the growth observed in other technology sectors.

The decoupling of design and fabrication, which is an important transition that has occurred in other technology sectors, including very large-scale integrated (VLSI) electronics, will allow for major improvements in the scale and complexity of systems that can be reliably built. Thus, a critical technology enabling synthetic biology is the de novo synthesis of very large pieces of DNA.[1] The traditional processes for the assembly of DNA fragments do not scale to large numbers of different DNA sequences and to longer fragment lengths (10,000–100,000 nucleotides). Recent technological advances have been made in the speed and reliability of DNA synthesis and assembly processes, which will potentially provide robust fabrication platforms for fast, economical and accurate DNA synthesis.[2]

Other efforts have focused on enabling the design process. Libraries of biologic components, similar to libraries used by electronic chip designers, have been established. One example is the Registry of Standard Biological Parts[3] that was founded in 2003 at MIT and currently has available about 3,200 genetic parts "that can be mixed and matched to build synthetic biologic devices and systems." These components, called BioBricks, should facilitate a wide range of biological building projects because a biological engineer can focus on design and will not need to fabricate each part from scratch. Typically, biological parts are obtained from natural biological systems, where the part may be refined to enhance its function and ease of use in the intended system. Although BioBricks have a parts

***Synthetic biology**—continued on page 2*

***Synthetic biology**—continued from page 1*

list, there is not a general rule set for reliably assembling them into devices and systems. Therefore, there currently still exist significant inefficiencies in the design process.

The goal of other efforts are to develop the tools that will move biological system design from current strategies that consider each new project as a new design problem (taking a more artisanal design approach) to new strategies based on common design principles. Technologies that permit the reliable assembly of biological components into more complex devices and systems can be used to facilitate a wide range of biological building projects.[4] The actual and potential benefits of synthetic biology are enormous. Commercial companies are starting to bring engineering principles to commercial biological manufacturing. Synthetic biology can be employed to engineer microbial chemical factories, develop vaccines against diseases such as HIV, degrade environmental waste, produce biofuels, detect explosives and toxins such as arsenic, engineer entirely synthetic organisms and build novel organisms from scratch.

One application that has attracted significant interest is in the area of engineering microbial chemical factories. Researchers are successfully engineering complex metabolic pathways (comprising up to 10–20 synthetic enzymatic steps) in microorganisms to achieve bioremediation and green synthesis strategies, the latter directed to the synthesis of various specialty drugs and chemical commodities, including biofuels. One particularly compelling example is based on the engineering of microorganisms, such as yeast and bacteria, to produce a cure for drug-resistant malaria based on the natural product artemisinin.[5] Artemisinin is a molecule that is naturally produced in the sweet wormwood plant, *Artemisia annua*, found mostly in northern China, and is obtained through extraction from the plant material. Harvesting chemicals and materials from natural sources can present disadvantages in land usage, crop yield variability, the use of toxic chemicals in the extraction processes and production over slower time scales and in less controlled environments. More importantly, the current cost of the drug does not allow for effective treatment of malaria in third world countries most afflicted with this disease.

Researchers developed a solution to this problem by copying the collection of genes (the genetic pathway) for artemisinin production to engineer a microorganism that can be grown cheaply, quickly and in very large volumes to produce an easily converted precursor to this drug at nearly one-tenth of its current price. However, the success of this single engineering effort required tremendous dedicated resources. Therefore, the investment required to apply this strategy anew to every chemical and material we might want to produce is unrealistic with current technologies.

The technology that makes the synthesis of gene networks possible can also generate novel proteins that might degrade environmental waste, destroy pathogens and mimic critical features on the surface of HIV or a novel virus such as SARS and be used to make vaccines. Synthetic biologic clocks can oscillate between producing a protein and not producing a protein or they can produce a protein that can function as a biologic switch that turns another module on or off.[6] Synthetic biologists represent a rapidly growing community of engineers and scientists from all parts of the world. The rapid growth of the field has been fueled by the iGEM (international Genetically Engineered Machines) competition.[7] Past iGEM projects have included bacterial photography using *E. coli* engineered to respond to light, banana and wintergreen smelling bacteria, an arsenic biosensor, and an engineered gut bacteria that treats vitamin deficiency, pathogen infections and lactose intolerance.

An alternative approach is the engineering of entirely synthetic organisms from scratch. This ambitious approach aims not to be limited by what exists in nature, but to be able to build novel biological functions and even entire organisms from the bottom up. Impressive progress has been made toward this goal with researchers demonstrating the synthesis of entire microbial genomes from scratch and the ability to boot up novel genomes in organisms.[8] Philosophical objections that this tinkering with nature represents misguided human hubris can be met by noting the various other ways in which man has altered nature and emphasizing that the goals of synthetic biology are constructive.

Synthetic biology is also garnering interest because of the risks associated with success if it accomplishes its stated goals. In particular, the technologies enabling the synthesis of very large pieces of DNA recently led to the reconstruction of the 1918 flu virus—dramatically highlighting the risks associated with being able to synthesize very large pieces of DNA from scratch. Synthetic biologists have been very active in engaging other scientific communities, policymakers, industry and the public in discussions of risks and appropriate safety measures. For example, one interdisciplinary group composed of research, industry and policy leaders recently proposed an oversight framework around DNA synthesis technologies to prevent biological threats.[9] Its proposals included requirements that people who place orders for DNA synthesis identify themselves, that there be customer screening, that potentially dangerous sequences be identified, that there be international cooperation and involvement of governmental agencies such as the FBI.

Engineering as a discipline is traditionally linked to safety, reliability and responsible practices (consider bridge or airplane design and construction). An engineering discipline developed around the science of biology will result in the design and construction of biological systems that operate within specified performance and reliability standards, ultimately leading to greater safety and risk management in the field. It will also result in a constructive, responsible, professional community of practicing biological engineers who uphold a code of practice and follow standards in design, construction and performance. □

[1]Endy D. 2005. Foundations for engineering biology. *Nature* 438:449–53.

[2]Baker D, et al. 2006. Engineering life: building a FAB for biology. *Sci Am* 294:44–51.

[3]http://partsregistry.org/Main_Page. Accessed May 26, 2009.

[4]Win MN, Smolke CD. 2008. Higher-order cellular information processing with synthetic RNA devices. *Science* 322:456–60.

[5]Ro DK, et al. 2006. Production of the antimalarial drug precursor artemisinic acid in engineered yeast. *Nature* 440:940–3.

[6]Spinzak D, Elowitz MB. 2005. Reconstruction of genetic circuits. *Nature* 438:443–8.

[7]http:// 2009.igem.org. Accessed May 26, 2009.

[8]Gibson DG, et al. 2008. Complete chemical synthesis, assembly, and cloning of a Mycoplasma genitalium genome. *Science* 318:1215–20.

[9]Bugl H, et al. 2007. DNA synthesis and biological security. *Nature Biotech* 29:627–9.

Ask the Ethicist:

Dead, or as Good as Dead?

Question: A 66-year-old man was admitted to the intensive care unit with a massive subarachnoid hemorrhage. Examination disclosed deep coma, no brain stem reflexes and irregular breathing. Brain MRI showed evidence of widespread hemorrhage and brain herniation, supporting the neurosurgeon's claim that the patient's condition was irreversible although he was not brain dead. Family members produced an advance directive in which the man had indicated his wishes that life-sustaining treatment be discontinued in this situation and that he be an organ donor. After organ procurement nurses had secured consent from family members, the patient underwent a terminal ventilator wean. His spontaneous breathing was inadequate and his heart stopped beating within eight minutes. After waiting an additional five minutes during which there was neither heartbeat nor breathing, he was declared dead and taken to the operating room, where his kidneys and liver were recovered. An ICU nurse later asked if he was truly dead at the moment he was declared dead.

Response: This case is a typical example of organ donation after circulatory death, also called organ donation after cardiac death, non-heart-beating organ donation or simply DCD. Organ recovery protocols permitting DCD have increased in number over the past decade and now are widely accepted. DCD protocols have proliferated because they satisfy two complementary goals: the wishes of family members for the organs of recently deceased patients to be recovered and the societal demand for more transplantable organs in addition to those recovered from the usual brain-dead donors. The medical acceptance of these protocols has been furthered by three supportive reports from the Institute of Medicine and endorsement from both the U.S. Department of Health and Human Services and the Joint Commission. Over the past decade, organs from DCD donors comprise a growing percentage of total organs recovered.[1]

DCD protocols allow coordination of the ICU team withdrawing life-sustaining therapy from irretrievably brain-damaged patients with the organ recovery team. Intensive care unit physicians declare death prior to organ recovery and provide the usual palliative care prescribed in other cases of withdrawal of life-sustaining therapy. Institutional DCD protocols vary on whether death determination is conducted in the ICU or the operating room.

DCD protocols respect the intent of the Dead Donor Rule that requires multi-organ donors first to be declared dead.[2] Standards for death determination vary among DCD protocols. Each protocol involves a "death watch" in which physicians observe the patient for evidence of circulation and breathing.[3] Cases of "auto-resuscitation," in which a heart that had stopped beating then restarts spontaneously, have been reported up to 65 seconds after absent heartbeat.[4] The duration of absent circulation, to eliminate the possibility of auto-resuscitation, varies among protocols from two to 10 minutes. The Institute of Medicine recommended a purposely conservative five-minute interval to protect against future cases in which auto-resuscitation might be observed after 65 seconds.[5] The Society of Critical Care Medicine Ethics Committee recommended an interval no less than two minutes and no more than five,[6] a guideline that was endorsed at the 2005 National Conference on DCD.[7]

Attention has focused on whether the timing of typical DCD death determination violates the Dead Donor Rule given the fact that statutes of death in the United States require the irreversible cessation of circulation, a condition that is not necessarily satisfied after only two to five minutes of absent circulation. I argue that the reason that current practices satisfy the intent of the Dead Donor Rule centers on the distinction between the permanent and irreversible cessation of circulation and respiration.[8]

Although death statutes require irreversible cessation of circulation and respiration, the medical practice standard always has required only their permanent absence. "Irreversible" means that the function *cannot* recover whereas "permanent" means it *will not* recover.[8] Consider the case of a hospitalized patient with a do not resuscitate order who is expected to die who then stops breathing and has no heartbeat. She is declared dead at that moment even though resuscitation might be able to restore her circulation and breathing. She is declared dead when physicians determine that her cessation of circulation and respiration is permanent, meaning that it will not restart itself nor will it be restarted therapeutically. The permanent cessation of circulation and respiration quickly and inevitably becomes irreversible, but physicians declare the patient dead at the earlier point when it has ceased only permanently.

Similarly, when the DCD donor patient is declared dead, her circulation and respiration have ceased permanently but not irreversibly. Cessation is permanent because we know that she will not auto-resuscitate after several minutes of stopped circulation and breathing, and because cardiopulmonary resuscitation will not be performed. Declaring her dead at the two- to five-minute time in the protocol is completely consistent with physicians' prevailing practice of death declaration using this standard in non-organ-donor hospitalized patients. Therefore, she is dead at the point of permanent cessation. The intent of the Dead Donor Rule is not violated because no patient who might survive extubation can become a DCD donor.[9]

An important social and medical practice issue surrounds how early in this process physicians should be permitted to determine death. In the 18th and 19th centuries, because of examination limitations, some physicians advocated awaiting unequivocal signs of death, such as rigor mortis or putrefaction, before declaring death.[10] Contemporary physicians make the declaration earlier when they know for certain that permanent cessation of vital functions will lead to their irreversible loss.

The U.S. Health Resources and Services Administration (HRSA) Division of Transplantation, the federal agency that funds investigational DCD protocols, recently impaneled a group of experts and charged them to examine the question of death determination in DCD, draft guidelines and apply their findings to innovative DCD protocols currently being tested. Their report is expected later this year.

James L. Bernat, MD
Neurology Department
Dartmouth-Hitchcock Medical Center
Lebanon, New Hampshire

Ask the ethicist—*continued on page 8*

The legal column:

*Fathers, foreskins and family law**

Dena Davis, JD, PhD
Cleveland-Marshall College of Law
Cleveland State University
Cleveland, Ohio

In the United States, a custodial parent has the right and responsibility to make medical decisions for one's child. But does that right encompass consenting for a surgical procedure for which there is little or no medical justification? What if the noncustodial parent opposes the procedure? And when is a child old enough to make the decision for him- or herself? How should a physician respond when asked to perform a surgical procedure when the decision is enmeshed in family controversy? These and other questions are considered in *Boldt*, a recent family law case decided by the Supreme Court of Oregon.[1]

The Boldts belonged to the Russian Orthodox Church when they married and had a child. They divorced in 1999 and embarked on an acrimonious battle for child custody. Custody of their son, whom the Court calls "M," was first awarded to Ms. Boldt, and four years later to Mr. Boldt. The Boldts appeared in court again in 2005. In the years since his divorce, Mr. Boldt had become increasingly interested in Judaism, and in 2004 he converted. Mr. Boldt had been taking M to a synagogue where M was learning Hebrew. Mr. Boldt mentioned his conversion to his ex-wife, adding that M might convert as well, and that in order to do so, the boy would need to be circumcised.

Lia Boldt reacted to this news by getting a temporary restraining order to forbid Mr. Boldt from having M circumcised, and by filing a motion for a change of custody. Amicus briefs were filed by the American Jewish Congress and by Doctors Opposing Circumcision (DOC). Although the case had begun when M was 9, he was 12 by the time it reached the state Supreme Court.

This case evoked a number of arguments, especially regarding religious freedom. From a medical ethics perspective, it is relevant that the procedure would be performed by a licensed physician, that the same physician (a urologist) claimed that "there were medical concerns that were sufficient cause…for the procedure" and that the urologist claimed that the boy understood the procedure and "wanted the circumcision so that he could convert to Judaism." The father's argument was, first, that his son wished to have the procedure, and second, that his son's wishes were nonetheless "legally irrelevant," because a custodial parent has complete authority to make medical decisions. The mother argued that the boy had told her that he didn't want to be circumcised but was "afraid" to contradict his father. She also asserted that, because of the "significant" medical risks associated with the procedure, M should not be circumcised even if he stated he wanted the procedure. Lawyers for DOC claimed that the urologist's medical claims were bogus, or resulted from ignorance of the natural physical maturation of an uncircumcised boy.

The court concluded that, "although circumcision is an invasive medical procedure that results in permanent physical alteration of a body part and has attendant medical risks, the decision to have a male child circumcised for medical or religious reasons is one that is commonly and historically made by parents in the United States. We also conclude that the decision to circumcise a male child is one that generally falls within a custodial parent's authority, unfettered by a noncustodial parent's concerns or beliefs—medical, religious or otherwise." However, because M is now 12, the court took into account the boy's own opinions in this matter. Remembering that this is primarily a custody case, the court ruled that if M did oppose circumcision, then forcing it upon him against his will would seriously impair his relationship with his father, thus giving weight to the mother's claim to have custody reconsidered. The court remanded the case to the trial court to determine M's opinion about a possible circumcision. Meanwhile, the boy has finally been furnished with his own legal counsel, separate from the parents' lawyers.[2]

I will not review the medical pros and cons of male circumcision. Suffice it to say that both risks and benefits are modest, causing the American Academy of Pediatrics, in 2005, to conclude that "Existing scientific evidence demonstrates potential medical benefits of newborn male circumcision; however, these data are not sufficient to recommend routine neonatal circumcision."[3] Some of those benefits apply only to infants, so the benefit to M at age 12 is low. There is evidence from Africa that male circumcision has a protective effect against a number of sexually transmitted diseases. The extent to which this is true in the North American context is not known. Certainly the circumcision of a preteen boy is neither routine nor usually a medical necessity. (If the testimony of the urologist were dispositive, this case would have been over a long time ago.) So this case raises questions for a physician:

(1) Are there any circumstances in which a physician should perform cosmetic† surgery on a minor?
(2) Should a physician take into account a conflict between divorced parents about the child's best interests?

It is certainly possible to take a purist stand and refuse to perform any medically unnecessary procedure on a minor, from ear piercing to rhinoplasty. One could argue that these are nonreversible procedures that only a competent adult (or mature adolescent) should be permitted to make, and that there is often little harm in waiting until the child is 18 to perform the procedure. That position would rule out even routine newborn circumcision.

However, most pediatricians would attempt to balance the pros and cons of the procedure, the best interests of the child, and deference to parental decision-making authority. The law invests

***Legal**—continued on page 7*

**I have benefited greatly from the ideas of Ron Brauner, Doug Diekema and Janet Dolgin, all of whom participated with me in a panel on this case at American Society of Bioethics and Humanities, and from the work of my research assistant, Alexandra Jeanblanc.*

†*I use the term "cosmetic" with some misgivings, as this might appear to trivialize a religious motivation. The term "elective," however, still suggests an underlying medical reason, and "nonmedically indicated" is clumsy.*

Ethics and the humanities:
Cost

By Roxana Robinson
New York: Farrar, Straus and Giroux, 2008, 432 pages

Review by Anna B. Reisman, MD
Associate Professor, General Internal Medicine
Yale School of Medicine Internist
Home-Based Primary Care, VA Connecticut
New Haven, Connecticut

A **former patient,** a recovering addict, shared a grim prediction of the end of the road for most substance abusers: death, institutions or jail. This road cuts across all class lines. Even those with supportive families and no shortage of means—like the upper-middle-class family in Roxana Robinson's novel *Cost*—are not immune.

Jack first comes under suspicion when his brother Steven pays him a visit. Steven, who is considering law school, is alarmed to find his younger brother thin and pale, his clothes grimy. He's upset by his brother's neighborhood of: "…littered streets, run-down houses, weirdos swinging their fists." When Steven tells his mother, Julia, about his suspicions, her worst fears are confirmed:

> Her chest had grown larger, it had grown huge, and her heart was laboring to work inside its chasm. She could hear the blood pounding in her ears.
>
> "I could be wrong," Steven agreed. "But you asked me what I thought. He had blood on his shirt cuffs, from shooting up. I think he's on heroin."

Unlike many powerful memoirs by substance abusers and alcoholics—like *Go Ask Alice* and Caroline Knapp's *Drinking: A Love Story*—*Cost*, because it's a novel, goes a step beyond. Robinson fluidly shifts the point of view from Jack to his mother, Julia, an artist and teacher; his grandfather, a retired neurosurgeon; his grandmother, who's disappearing into Alzheimer's disease; to several other family members. The result is a panoramic view of addiction's wide reach. Like all families, this one exists around and in spite of its various problems, but addiction completely and aggressively devastates them.

Robinson explores in exquisite detail the life of an addict:

> His eyes suddenly needed rubbing. He bore down on the sockets, pressing hard. Then his face, too. The bones were obdurate in their resistance. He could feel his skin, tender and ready to itch. All the skin, over his entire body, was in a state of exquisite readiness. He felt the shadow of itch hovering over his body like a cloud. His skin was alive with the possibility of itching. It was like madness.

One foggy night, when Jack is hounded by his parents to pull up his sleeves to prove the presence or absence of track marks, he escapes into his mother's boat with Steven close behind. Jack is miserable: "His elbows were on his knees, his head in his hands. His body seemed loose and unstable, swaying and shifting with the Whaler's movement." Utterly desperate, Jack finally admits to his brother that he is addicted to heroin and shares the misery of withdrawal: "…My skin is on fire, I want to scratch my whole skin off. My head feels like someone set off a bomb in it, and I want to throw up..."

Jack resorts to stealing. He starts by swiping a pair of boots, escalates to a car and ends up breaking into a drugstore:

> Through the dimness he saw a glowing pink sign advertising sunscreen, and his heart lifted. In gratitude he scratched hard at the back of his hand. Growing and blooming inside his mind was the thought of smack, and the long black drop into pleasure. It was nearly unbearable. *Christ.*
>
> There might be methadone. There'd be painkillers, something. Maybe morphine….Whatever he got now he'd trade later for H. … All he needed was to get straight. His head was swollen, it felt bursting. His calves were on fire. *The itch, the itch, the itch.…*
>
> The door was made of heavy glass, with a horizontal bar across the center. He tried it: locked tight. The back door would be solid metal, probably. Better to get a rock and go for this one. Where would a rock be?

By this point, Jack's parents have been helplessly dragged into the world of his addiction. They live in perpetual fear, losing sight of what's important in their lives, trying unsuccessfully to control what they cannot. After an intervention, a rehab program and short stay at a halfway house, Jack becomes unreachable:

> … Days went by and she had no idea where he was, or what he was doing, or if he was still alive. Her stomach was permanently clenched.
>
> … Julia had changed the lock on her apartment and told the super not to let Jack in if he asked. She tried to harden herself against him, she tried to ready herself for the worst. Whatever that was. It was exhausting, being ready. She wanted to hear from Jack; she dreaded hearing from him. The burden of fear was exhausting.

This is the end of the road for the substance abuser's family, a black hole, a vortex: "She could not escape it. Jack and heroin made that relentless bass line, that terrible thudding constant in her consciousness. There was nothing else so strong, nothing she could do to stop it. Her cell phone was always on, and each time it rang, her heart lurched with dread."

Our long-term patients whose lives are affected by substance abuse may not be active addicts themselves—we're more likely to meet them during brief hospitalizations—more often, it will be people with addicts in the family, or recovering addicts. What's clear by the end is that the experience of an addict in a family is horrendous and terrifying; although there are strategies (interventions, rehab), at some point a family may need to accept that it cannot fix what is broken; that addiction is beyond its control.

I have one patient whose two adult children are addicts; he shares heartbreaking, sad tales about the further deterioration of his family each time I see him. He's a central character in his family's ghastly drama but is powerless to stop it. Reading *Cost* reminded me of what I can offer him: my ear and my heart. □

Dialogue:

The ethics of food

Authors Maya Joseph and Marion Nestle have articulated one often neglected and underappreciated ethical theme concerning food, but their emphasis on personal nutrition first and environmental impact second must be understood within a broader context of issues that define the ethics of food (*Lahey Clinic Journal of Medical Ethics*, Winter 2009). Two seminal articles published by the philosopher Peter Singer in the early 1970s round out nutrition and environmental concerns. "Famine, Affluence and Morality" highlighted the moral significance of both chronic and short-term food insecurity affecting perhaps two-thirds of the world's population living primarily in Africa, Latin America and Asia. Singer argued that geographical distance should not be equated with moral distance; comparatively wealthy people in the developed world have much more strenuous obligations to feed the hungry than typically thought.[1] "Animal Liberation" raised questions about the moral status of animals. Should animals be recognized as moral subjects, and if so, shouldn't the suffering they endure be weighed against the benefits humans derive from their use?[2] These questions led naturally to debates about the ethics of using animals for food that have become so extended and complex that they cannot be even summarized in the present context.

All four of the above noted themes—personal health, environmental impact, global food security and animal ethics—had already been integrated in one of the most widely read counterculture tracts. Frances Moore Lappé's *Diet for a Small Planet* was published as a mass-market paperback in 1971.[3] Her viewpoint lacked the scientific backing that Joseph and Nestle emphasize, yet the similarity of her basic advice is striking. Lappé urged a semivegetarian diet as a means to better health, better environmental quality, more humane farming and justice to the poor. Some would hesitate to classify Lappé's book as a work in food ethics. Its thoughtful dietary message was couched in terms of moral obligations and concerns, but it did not explore, much less attempt to reconcile, implicit tensions between the exercise of personal dietary preferences understood as moral rights and the aggregate impact of that exercise in terms of unintended social costs. One social cost that was overlooked both by Lappé and by Joseph and Nestle concerns the effect of consumption patterns on farmers and farm families.

Farming has been and remains an extremely complex and subtle practice requiring attentiveness to a number of biological, economic and social variables. Primary producers, as distinct from the food industry overall, are vulnerable to threats that range from local or regional drought or disease outbreak to sudden shifts in the market price for their commodities, which may be caused by bumper crops or policy decisions made on the other side of the world. This vulnerability extends to both large and small-scale producers,[4] but the ethics issue here is primarily focused on the structural inequalities that can be seen in the decline of relatively small, household farming worldwide. There has been a steady decline in farm numbers in the United States for over a century. In 1900 approximately 40% of the U.S. population were farmers compared to less than 2% now. Even today, what might once have been considered relatively large family farm operations exist in a zone of extreme vulnerability to bankruptcy and liquidation.[5] Small farmers in the developing world are also highly vulnerable to price fluctuations, either in subsistence food commodities or in specialty export crops.[6]

Is the fate of farmers and farm communities an ethical issue? One view holds that agriculture is like any other sector in an industrial economy. Greater technological efficiencies will displace workers and change the nature of work, but so long as "externalities"—costs to the environment, to public health and possibly to animals—are reflected in these efficiencies, the lower cost of food offsets this displacement. However, history is replete with people who saw transitions in farming as different from displacement and change in other trades or walks of life. Xenophon and Aristotle viewed the farm household as the linchpin to Greek democracy. Thinkers from St. Benedict to Emerson viewed farm work as possessing a special dignity in virtue of its deep interpenetration with the ways of nature. National cuisines rooted in traditional methods of production are implicated in ideals of cultural identity, and political leaders have cited the farming communities' tie to the land as the surest source of patriotism and citizenship responsibilities. If these claims seem antiquated, the tension between this historical deposit and contemporary sensibility nonetheless testifies to the fact that *whether* the fate of farmers really matters is indeed a contested philosophical issue.[7]

The viability of small farms was, in fact, the ethical issue that led to the Homestead Act, the formation of the United States Department of Agriculture (USDA) and the creation of land-grant universities, all in 1862. These programs coordinated mechanisms of federal support for farming through the redistribution of federal lands, encouragement of agricultural science and the education of rural Americans in the latest agricultural production methods. President Abraham Lincoln had articulated the rationale for this program of support for agriculture in a speech delivered in 1859. Lincoln argued for an effort to "push the soil up to something near its full capacity," and concluded with the following words:

> It is said an Eastern monarch once charged his wise men to invent him a sentence, to be ever in view, and which should be true and appropriate in all times and situations. They presented him the words: "And this, too, shall pass away." How much it expresses! How chastening in the hour of pride!—how consoling in the depths of affliction! "And this, too, shall pass away." And yet let us hope it is not quite true. Let us hope, rather, that by the best cultivation of the physical world, beneath and around us; and the intellectual and moral world within us, we shall secure an individual, social, and political prosperity and happiness, whose course shall be onward and upward, and which, while the earth endures, shall not pass away.[8]

Ironically, USDA's laserlike focus on pushing the soil to its limits was the source of decisions that the analysis of Joseph and Nestle shows to have been shortsighted. Policymakers and agricultural scientists became committed to an ethic of "productionism" that assumed "too much ain't enough," and abjured serious ethical reflection on the goals and purposes of agriculture. Not only were health and environmental externalities neglected in this turn of thought, but the diverse array of roles and functions attributed to farming by agrarian thinkers of the past were also sublimated.[9]

I believe that this philosophical error is more responsible for our current situation than the policy capture by economic interests that Joseph and Nestle stress. Yet I would also argue that the ethical concerns Lincoln noted in 1859 have *not* passed away. While the economic survival and quality of life in farming areas cannot be said to override

the health of food consumers, it is ethically necessary to consider such effects (along with animal and environmental impacts) when evaluating proposals of the sort that Joseph and Nestle endorse in their concluding paragraph. The idea that farming and food production can be treated like any other sector of our economy invites an overly simplified picture of food ethics. Farming performs many functions for us. Becoming landscapes and cultural meanings are important. Neither would I be too quick to dismiss the accumulated wisdom of past thinkers cited above. And one thing that they perhaps overlooked is that a society embedded firmly in the quotidian tasks of farming is less likely to underestimate its dependence on the continued functioning of natural ecosystems. What is more, the recent growth of "slow food," farmers' markets and organic diets suggests that reconnection with farmers may be part and parcel of effective reform. This presupposes, however, that there are farmers at those markets for people to reconnect with.

In short, no short development of these themes can hope to be convincing. Yet food ethics must continue to bear Lincoln's concern for farmers and rural communities in mind, even while searching for a balance of the concerns that authors such as Lappé, Singer and now Joseph and Nestle introduce to counter Lincoln's advocacy of pushing the soil to its limit. Food ethics is every bit as complex as medical ethics.

Paul B. Thompson
W.K. Kellogg Professor of Agricultural, Food and Community Ethics
Department of Philosophy
Michigan State University
East Lansing, Michigan

[1]Singer P. Famine, affluence and morality." *Philosophy and Public Affairs* 1972; 1: 229–243.

[2]Singer P. Animal liberation. *New York Review of Books,* April 5, 1973.

[3]Lappé FM. *Diet for a Small Planet.* New York: Ballantine Books; 1971.

[4]Jereski L. Oprah knocks beef, and a big rancher in Texas has a cow. *Wall Street Journal*, June 3, 1997, p. Al.

[5]Lyson TA, Stevenson GW and Welsh R, eds. *Food and the Mid-level Farm: Renewing an Agriculture of the Middle.* Cambridge, MA: MIT Press; 2008.

[6]Mazoyer M and Roudart L. *A History of World Agriculture: From the Neolithic to the Current Crisis.* Membrez JH, trans. London: Earthscan Books; 2006.

[7]Thompson PB. *Sustainability and Agrarian Ideals.* Lexington, KY: University Press of Kentucky; forthcoming.

[8]Lincoln A. An address by Abraham Lincoln before the Wisconsin State Agricultural Society Milwaukee, Wisconsin, September 30, 1859 National Agricultural Library, USDA. http://riley.nal.usda.gov/nal_display/index.php?info_center=8&tax_level=4&tax_subject=3&topic_id=1030&level3_id=6723&level4_id=11085 Accessed February 28, 2009.

[9]Thompson PB. *The Spirit of the Soil: Agriculture and Environmental Ethics.* London and New York: Routledge Publishing; 1995.

Response: We greatly admire Paul Thompson's work and concur with his insistence that food ethics encompass the broad social consequences of dietary habits and policies, among them the costs to farmers and agrarian values.

Thompson reminds us why farming has long been venerated by philosophers, poets and politicians. Farming demands responsibility, independence, ingenuity and thrift—as well as a (now) rare intimacy with the natural world. If our current food landscape is indeed characterized by caloric excess, ecological pollution and bewildering marketing claims, it is in part because we have forgotten small farms and the virtues of care, economy and prudence that they promote and sustain.

We ignore agrarian values at great peril to human health. Although it is understandable why farmers have exchanged rural life for urban amenities, this shift affects the way we feed and care for ourselves. Current agricultural practices may be productive, but they harm soil, animals and farm workers, and their inexpensive and excessive calories damage human health.

While a "philosophical error" may have led to this situation, its solution

***Dialogue**—continued on page 8*

***Legal**—continued from page 4*

parents with this authority because parents are believed to act in the best interests of their children, and because parents have the right to raise children in their own religion and culture. The latter right has obvious limits; we do not permit parents to deny their children an education, nor to perform female genital cutting.‡ Taking all this into account, performing circumcision on a newborn at the parents' behest seems ethically acceptable, despite the fact that it deprives children of the freedom to make this important decision for themselves at a later time. When parents choose circumcision out of religious conviction, the procedure provides the added benefit of allowing the child to feel like a full member of the group, and in the Jewish context to become bar mitzvah at age 13.

A 12-year-old boy, however, is hardly a newborn. One could imagine that M has embraced Judaism, as his father claims, and has Jewish friends, perhaps all of whom will soon become bar mitzvah. It would be rational for M, despite the discomfort and risks of circumcision, to choose to undergo the procedure in order to be a full member of the Jewish community now, and if this is truly his wish, it would be wrong to force him to wait until he is 18, because his mother opposes circumcision. But one could equally imagine that M would just as soon not go through a painful and medically unnecessary procedure, that he is not enthusiastic about Judaism and that he feels somewhat intimidated by his father. In that case, requiring that he wait until he is of legal age harms no one, and gives M the space and protection he needs to make a more autonomous decision when he is older. Furnishing the boy with his own lawyer is long overdue. Hopefully, the hearing in family court held on April 22, 2009, will resolve some of these questions.

From the physician's perspective, it is difficult to imagine a doctor who would perform elective surgery on a protesting or even an unenthusiastic preteen. The principle of respect for autonomy requires that persons with the mental capacity to make certain medical decisions have those decisions respected. Circumcision, with modest benefits and risks, is well within the capacity of a boy of M's age. Although legally M's assent may be irrelevant, it is highly relevant to any physician and in my opinion, no doctor should perform this surgery unless he or she is confident of M's enthusiastic (not merely passive) participation. If M appears unsure or intimidated, nothing is lost by waiting until he is more certain of what he wants. □

‡*For a comparison between legal attitudes toward male circumcision and female genital cutting in the United States, see Davis DS, Male and female genital alteration: a collision course with the law?"* Health Matrix *Summer 2001 11/2.*

[1]344 Ore. 1; 176 P.3d 388; 2008 Ore. LEXIS 3.

[2]Personal conversation with John V. Geisheker, General Counsel, Doctors Opposing Circumcision.

[3]American Academy of Pediatrics, Task Force on Circumcision, "Circumcision Policy Statement," *Pediatrics* 103, no. 3 (1999): 686–93.

Ask the ethicist—continued from page 3

Outcome: The ethics consultant explained this analysis to the nurse, who was reassured it constituted acceptable medical practice. □

[1]Steinbrook R. Organ donation after cardiac death. *N Engl J Med* 2007;357:209–213.

[2]Robertson JA. The dead donor rule. *Hastings Cent Rep* 1999;29(6):6–14.

[3]DeVita MA. The death watch: certifying death using cardiac criteria. *Prog Transplantation* 2001;11:58–66.

[4]DeVita MA, Snyder JV, Arnold RM, Siminoff LA. Observations of withdrawal of life-sustaining treatment from patients who became non-heart-beating organ donors. *Crit Care Med* 2000;28:1709–1712.

[5]Institute of Medicine. *Non-Heart-Beating Organ Transplantation: Practice and Protocols*. Washington, DC: National Academy Press, 2000.

[6]Ethics Committee, American College of Critical Care Medicine and Society of Critical Care Medicine. Recommendations for non-heartbeating organ donation. A position paper by the Ethics Committee. *Crit Care Med* 2001;29:1826–1831.

[7]Bernat JL, D'Alessandro AM, Port FK, et al. Report of a national conference on donation after cardiac death. *Am J Transplant* 2006:6:281–291.

[8]Bernat JL. Are organ donors after cardiac death really dead? *J Clin Ethics* 2006;17:122–132.

[9]Bernat JL. The boundaries of organ donation after circulatory death. *N Engl J Med* 2008;359:669–671.

[10]Powner DJ, Ackerman BM, Grenvik A. Medical diagnosis of death: Historical contributions to current controversies. *Lancet* 1996;348:1219–1223.

Dialogue—continued from page 7

requires more than a shift in thinking. Food problems are rooted in economic and political considerations as well as philosophical choices, as witnessed by the buying of vast tracts of agricultural land in impoverished countries by wealthy countries in the Mideast and Asia eager to protect their own food security. While derived from a production philosophy, this is also a political act that requires a political response.

We do not dispute Thompson's call for integration of agrarian values into our understanding of food, nutrition and health. But if we are to improve the sustainability of our global food system, address its ethical quandaries and provide nutritious food for all, we require not only agrarian values but also their translation into political action. □

Maya Joseph, PhD candidate
Department of Political Science
The New School of Social Research
New York, New York

Marion Nestle, PhD, MPH
Paulette Goddard Professor
Department of Nutrition, Food Studies and Public Health
New York University
New York, New York

Medical Ethics

Lahey Clinic Journal of Medical Ethics **encourages reader participation. We welcome comments for our "Dialogue" column and invite submission of ethical dilemmas for "Ask the ethicist." Send correspondence and requests for complimentary subscriptions to David Steinberg, MD.**

David Steinberg, MD, Editor
Lahey Clinic Medical Center
41 Mall Road, Burlington, MA 01805
david.steinberg@lahey.org

James L. Bernat, MD, Assoc. Editor
Dartmouth-Hitchcock Medical Center
One Medical Center Drive, Lebanon, NH 03756
bernat@dartmouth.edu

Editorial Board

Jeanne M. Zimmermann
Managing Editor

David M. Gould, Esq.
Legal Editor

Susan M. Donovan
Circulation Manager

Daniel Callahan, PhD
Allan M. Brandt, PhD
Dan W. Brock, PhD
Diane M. Palac, MD
Thomas J. Prendergast, MD
Paul Reitemeier, PhD
James A. Russell, DO
Andrew G. Villanueva, MD

Generous funding for *Lahey Clinic Journal of Medical Ethics* is made in memory of Harold Karp, by the Karp Family Foundation.

Lahey Clinic Journal of Medical Ethics **can be found on the Lahey Clinic Journal of Medical Ethics website at www.lahey.org/ethics/.**

Medical Ethics
www.lahey.org/ethics/

41 Mall Road
Burlington, MA 01805

Nonprofit Organization
U.S. Postage
PAID
Lowell, MA
Permit No. 57