FEATURE ARTICLE

Building a Framework for Green Bioethics: Integrating Ecology into Health Care

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Editor's Note: We welcome responses to the article that follows. They may be sent to ethics@chausa.org.

Introduction

Global CO_2 emissions—an indicator of resource consumption—increased 4.4 percent between 2008 and 2010.[1] Humans are currently using the equivalent of 1.5 earths to sustain consumptive lifestyles and it is predicted that by 2030, we will be using the equivalent of two earths to sustain the world's inhabitants and their lifestyles.[2] Food, water, energy, lumber, minerals and plant life are all fundamental to sustain basic human life, but the drive to consume more than what is essential is ravaging the planet. This unsustainable consumption is reaching critical levels for people and creatures, many of whom are becoming marginalized by such extensive human consumption. At this critical moment in human history, where our future depends on our ability to adapt and rise to the current challenges of environmental degradation, population growth, and diminishing biodiversity, all areas of life must be scrutinized for their ability to adapt to green priorities. Health care and the medical industry are no exception.

The health care system is ubiquitous in our lives. From birth to death, as well as every check-up, prescription, procedure, scientific advancement and therapeutic technique we utilize in between, all impact the environment. The health care system is too pervasive and significant an establishment to disregard its environmental effects or exempt it from environmental ethics. The integrity of the health care system and the consumption of medical goods should be assessed in light of environmental sustainability. Medicine and its attendant branches can become "green" through conservation[3] and aiming at integrating green bioethics into its developments, techniques, and procedures.[4]

In this essay, I will define green bioethics and provide a theological grounding for care of creation. Two established practices of green bioethics—green burial and green hospital administration—are offered as examples of conservation in the medical

realm. I will then propose four principles for determining if specific medical developments, techniques, or procedures are green and I will conclude by urging theologians, bioethicists and ecologists to consider the link between bioethics and ecology and move towards a green bioethics for the health care system and the medical industry.

Defining Green Bioethics

Green bioethics seeks to "do" bioethics from a green framework. Rather than working under the aegis of a particular moral theory—deontology or utilitarianism, for instance—green bioethics determines the morality of medical developments, techniques and procedures based primarily, but not solely, on their environmental impact. Practices that are beneficial for humans and the environment because they reduce consumption are said to be green. Practices that deplete resources unnecessarily and without concern for current human needs, simple solutions, global justice, or compassion are not green. Green bioethics' *telos* is to promote green medical developments, techniques, and procedures and reduce or eliminate ecologically harmful medical developments, techniques and procedures.

Though the term "green bioethics" is not yet a colloquialism, the concept of green bioethics has been flitting around the medical community for at least 15 years with Dr. Jessica Pierce appearing as a major advocate for green advances in medical and hospital practices. After her 1997 articles on the greening of health care products,[5] various other medical journalists picked up on the "reduce, reuse, recycle" refrain and integrated the concept into their writings.[6] Pierce in particular laid the foundation for green bioethics with her 2009 "Environmental Bioethics—A Manifesto"[7] appearing just months after her "Ethics of Sustainable Healthcare Reform" with Dan Bednarz.[8] Her philosophy of environmental bioethics touches on a wide variety of ecological issues within the medical industry, including climate change, peak oil, doctor-patient relationships, personal responsibility for health, carbon emissions, toxic pollution and the healthcare system.[9] Although she is not a theologian, her work echoes the Christian concern for humanity and the earth.

Reflections of Pierce and Bednarz's sensibilities recently appeared in an article in *Ethics, Policy and the Environment* by Matthew Liao, Anders Sandberg and Rebecca Roache entitled "Human Engineering and Climate Change."[10] This 2012 article proposed genetic engineering for meat intolerance, smaller people and altruistic tendencies—among other measures—to reduce the carbon footprint of future humans. While the suggestions in "Human Engineering" are quite extreme, and somewhat hyperbolic, they nevertheless reinforce both the possibility for integration of environmental ethics in the health care system and the necessity of conservation that is lauded in Catholic ethics.

Green Bioethics and Christian Theology

Green bioethics is firmly rooted in Christian theology. Conservation and creation-care are tenets of theological anthropology, and human beings have been uniquely endowed with a role of biblical stewardship. Scenes of biblical responsibility to all of creation are especially noticeable after the establishment of the world [Gen. 1:28-29] and after the flood [Gen. 9:8-16] where there is a re-creation that encompasses God's plans for humans, animals, and indeed the earth itself. In these places of renewal, "the purpose of God included the well-being of the entire creation, not just of humanity alone."[11] A comprehensive ecology, first seen in the Bible, is also becoming a foundation of today's Christian theology and should be lived into by contemporary Christians. It must extend, of course, to the health care industry through green bioethics.

This attitude of conservation and concern for creation was highlighted in the 1990 World Day of Peace message delivered by Pope John Paul II. The Pope indicated that "two fundamental principles should guide our moral considerations: the integrity of all creation, and respect for life."[12] He felt that these twin principles would result in preservation and harmony, and he was quite right. Unfortunately, the violation of these principles in recent decades has led to the destruction of the earth, a loss of biodiversity, and increased pressure to find resources to survive. The negative consequences of earth destruction for millions of animals and plants are untold, but antidotes have been proposed.

The scriptures, moral reasoning, and current scientific data on the environment all provide a framework for a theological cosmology that focuses on protecting the biosphere. Indeed, as early as 1987 Pope John Paul II "expanded the concept of authentic development to include ecological considerations"[13] through the encyclical *Sollicitudo rei socialis* which reminded us that "natural resources are limited."[14] As such, each person must attenuate his or her consumption in accordance with the finite supply of resources available on the earth. Furthermore, business like the health care delivery system as well as the medical industry must also take responsibility to reduce the use of fossil fuels, minerals excavated and other limited resources.

Both theologians and ecologists have provided an outline for ethical consumption, yet these works lack a uniform dedication to specific ethical principles in the application of current and future medical developments. Previous suggestions on ecological conservation either tackle too broad of an application [as is the case with Pope John Paul II and Pierce and Bednarz] or else work under the current production-oriented health care model [as is the case with Liao, et al.]. What is needed, rather, is a systematized and coherent approach to green bioethics firmly grounded in the Catholic moral tradition and scientific data. In so doing, we can move the health care system forward into the future in an environmentally responsible manner. Through the four principles of green bioethics, a Christian theology of conservation can transform the health care

delivery system. But before I explain the four principles of green bioethics, it would serve us well to examine green practices already in place.

Green Bioethics in Action

The greening of the health care system so far has been more intuitive and less formal. Catholics, no stranger to utilizing the best of green advances, will serve as a model for green bioethics in assessing current and future needs. Through the use of green burial and hospital administration, the health care system is already utilizing a conservationist mentality and moving towards sustainability.

Green Burial

The environmental impact of our final resting place is often overlooked. Yet decisions regarding how we will "rest in peace" are a key piece of green bioethics, if for no other reason than the permanent mortality rate of 100 percent. That is to say, not everyone will need cancer care or corrective lenses, but everyone will die.

There are varying degrees of environmentally friendly burials currently offered. It can be argued that the typical American burial using embalming fluids, a mortician and a heavy coffin made from wood that is placed in the ground is the least green. Cremation saves space and land and does not take as many resources as wood, veneer and metal, nor does it rely on the chemicals needed for embalming fluid. However, cremation does emit carbon monoxide and relies on fossil fuels for most cremation processes. Currently new technologies are making cremation better for the planet.[15] Beyond these typical options, however, there exists an alternative for interment that employs even fewer resources and is already being established in some Catholic communities, namely, green burial.[16]

Green burial involves a biodegradable casket, no embalming fluids and no cremation. The body is placed in the ground in a traditional manner, but without the extra resources needed for a conventional coffin. Because the casket is biodegradable and the corpse will decompose into the earth, bodies must be in a region relegated only for this purpose.[17] One such location of a green burial ground is motherhouse of the Immaculate Heart of Mary sisters in Monroe, Michigan. Dubbed "the green nuns," these women have taken their commitment to conservation to a novel plane. Advances in the area of after-life care are looking for ways to reduce carbon impact, conserve resources, and maintain human dignity. This is one way the Catholic community is already operationalizing green bioethics.

Hospital Administration

In addition to developments in after-death care, some hospitals are entering green bioethics through responsible practices and initiatives. The Catholic Health Association [CHA] has led improvements in the greening of hospital facilities and the raising of employee ecological consciousness. This is undeniably tied to Catholic identity and is "as old as Genesis

and is woven into the very fabric of Catholic mission."[18] Green bioethics and Catholic ethics are natural partners. Currently, there are two primary ways in which some Catholic health care organizations are getting on board with green theology. The first is administrative, and the second is often overlooked, but essential to life, nutrition.

The administrative aspects of Catholic hospitals are very much like any other business that is aware of the need to conserve resources. Employees at many Catholic hospitals are encouraged to recycle paper, carpool, reduce waste in the workplace and support renewable forms of energy to power doctor's offices.[19] These are all laudable procedures, but the Catholic Health Association, in particular, has gone one step beyond these organizational models by encouraging the use of green cleaning products, by engaging communities in gardening, and lobbying for better government support for the environment.[20] All of these reflect Catholic values of social transformation and are altering and improving the health care environment.

Furthermore, many Catholic hospitals are addressing what goes into our bodies at the most fundamental level of diet. Attention to the types of food served in hospitals, curtailing the waste of food, and focusing on the way food is grown have been offshoots of green bioethics in health care. The "Green Guide for Health Care: Food"[21] examines purchasing local fruits and vegetables as a way to reduce carbon emission from trucks which transport the food. Eliminating nutrient deficient deep fried foods from patient menus conserves resources. Providing organic alternates reduces the amount of pesticides used on food. Finally, encouraging humane farm and trade practices also contributes to making hospital food greener. These are all paving the way for greener hospitals and are entry points for a discussion of green bioethics on various hospital committees both within and outside of the Catholic medical community. For all the work that is being done, there could be so much more. Green bioethics is certainly becoming a priority for Catholic health care, but integrating green bioethics into care will do even more for conserving resources for the sake of the planet and in accordance with our divine purpose.

Green Bioethics Priorities

It is undeniable that human life is the highest value for Catholics as exemplified by the statement of the United States Conference of Catholic Bishops that "in our view, the best measure of any proposed health care initiative is… preserving human life and dignity."[22] In proposing the four conservationist priorities for green bioethics, therefore, I have attempted to take a comprehensive approach that accounts for the Catholic concern for the dignity of the person, the present environmental crisis, the need for global justice and the realities of economics.[23] The priorities are: 1) current human needs should take priority over current human wants for enhancement; 2) simple treatments should normally be chosen before complex ones; 3) a general allocation of resources should occur before special interest access; and, 4) financial

profit should not drive technology, but rather compassion and justice. I will now consider these priorities individually.

Current humans needs over current human wants: environmental conservation.

The first priority of green bioethics is, appropriately, grounded in a theological ecological ethic that advances human *needs* first, while *wants* are checked in order to conserve resources. However, focusing health care as well as research in and allocation of medicine on human needs rather than wants is controversial. Wants are subjective [though needs are not], and wants drive the economy beyond basic purchases related to food, clothing and shelter. Many people become anxious when opportunities for consumerism might be attenuated, especially when that consumerism is related to rare but life-saving treatments.[24] Additionally, focusing medicine in certain areas rather than others may seem to some to be a violation of freedom, a highly cherished value in American society. Nevertheless, some serious changes must be made in our thinking about the health care system in order to do our part in ecological conservation.

The demarcation between human wants and needs is not precise, but some generalizations can be attempted. Human needs consist of those entities immediately relevant to somatic health: food, clothing, shelter. Human wants include such things as upscale automobiles, electronics and recreational drugs. In the realm of medicine, human needs primarily include vaccinations for common diseases as well as a painless death, and, secondarily, the management, treatment, and care of diseases that threaten life. In contrast, many treatments for non-life threatening conditions or procedures that necessitate disproportionate,[25] extraordinary or unusual care, as commonly defined,[26] are wants.

Undoubtedly, drawing this line between needs and wants in the use of medical treatments will not always be easy. There will not always be a clear demarcation. For example, some "treatments" such as prosthetics and wheelchairs are not medically "necessary," but vastly improve the quality of human life. Or what may be some extraordinary piece of technology in developing countries, e.g., respirators for critically ill newborns,[27] are generally not so in developed countries. There is simply not a hard and fast line that can be drawn between human needs and human wants-either in life or in medicine, but intelligent people should be able to make competent decisions regarding these issues.

In general, human wants tend to be cosmetic, elective, even superfluous and not directly related to physical well-being. Some well-intended, but unnecessary treatments include some types of fertility treatments, ophthalmological techniques and cosmetic manipulations of the body. Additionally, some techniques like breast reconstruction surgery can be used for either cosmetic or medical purposes. This complicates issues of needs and wants. The point is not that human wants should never be provided for, but rather that an ethic of conservation demands that we

reserve some resources for the future and thus certain medical techniques that siphon natural and intellectual resources away from human needs should be decreased. Once basic human needs are provided for in the most foundational sense and conservation is embedded in bioethics, then weak needs/ strong wants would be allocated, and so on in ever-widening circles.

Beyond the philosophical nature of the need versus want debate, personal freedom is perhaps the largest obstacle to suggesting that medicine become more sustainable by providing for human needs before human wants. This is the case in every aspect of life that can be altered from unsustainable to sustainable and is a continuing conflict in ecology and policy. Convincing people that they should, for instance, decrease the amount of meat in their diet to reduce the amount of methane cows produce, or drive smaller cars, use more public transportation, buy fewer technological gadgets and spend less on "retail therapy" is challenging, especially when so many people view their quality of life in terms of what they can buy and consume. But this is really a standard of living issue and not quality of life.[28] To some, it seems a breach of personal freedom that breast lifts, Viagra, assisted reproductive technologies and every available exotic treatment would not be available to a person if science can conceive and produce it.[29] Lisa Sowle Cahill warns that many of "these technologies are sold and used in a rarified atmosphere of medical sophistication, consumer power, free-form family building, and for-profit healthcare."[30]

When material and intellectual resources, and research upon and distribution of luxury medical wants are placed over basic human needs and the sustainable future of the planet, this would seem to violate fundamental values and tenets of Catholic ethics. But if providing for human needs (such as nutritious food, clean water and preventive medicine) prior to moving into the realm of human wants is ethical, then temporarily modifying "freedom" would seem to be justifiable. Indeed, these soft measures may prevent draconian policies in the future, should the environmental crisis continue on the trajectory on which it is currently heading.

To sum up this section, the first principle of green bioethics should place human needs above human wants. It is undeniable that we have a limited amount of resources. It is therefore necessary to curtail some of the environmental "spending" which we are doing in the health care system. Removing basic human needs would be monstrous, but temporarily ceasing to offer unnecessary, desired and even superfluous treatments to satisfy the wants of certain humans is not unethical. In fact, it will be easier to remove certain options from the roulette of elective treatments than it will be to feel the effects of the gradual depletion of the earth's resources and the subsequent catastrophe brewing on the horizon. "If we take the biblical tradition seriously, we will conclude that the moral goal of retrenchment is not just a matter of the quest for more abundant life on the part of the individual...it is also inseparable from some degree of equity in the

distribution of wealth and resources."[31] This includes the scarce medical resources in a time of ecological crisis.

Simplicity before complexity: reducing dependence on medical technology.

The second ethical priority for green bioethics is simplicity before complexity. Simplicity in living and a reduction of consumption are basic premises of the environmental philosophy of conservation,[32] but go against much of present day medicine and medical technology. Medical developments, techniques and procedures are a cause of growth for the industry and the economy. Cutting edge, advanced, and improved techniques allow for varied approaches to treatments, but the medicalization of human life, decline, and death have produced a treatment for almost any human ill, however slight. In order to move toward green health care, I suggest that approaches to treating and healing disease rely on simple measures before complex, expensive, or multi-step procedures are undertaken.

A most obvious example of simplicity in action comes from the issue of the bourgeoning waistline of Americans. With approximately 70 percent of the population obese or overweight,[33] there are a multitude of health complications that result. Type II diabetes, hypertension, stroke, cardiac disease, infertility and high cholesterol are all associated with carrying extra body weight.[34] Current medical models of treatment of obesity-related conditions include medications, gastric bypass surgery, heart surgery, stents, pacemakers and even liposuction and fat sculpting. A green bioethics would look to the simple, conservation-oriented solutions such as individual reduction in food consumed and more exercise before approaching medical intervention. Those seeking to prevent or reverse the effects of obesity can benefit from a reduction in food. This is not only better for the individual physically, it also saves resources as people restrict portions, perhaps avoid diets rich in fat, and eat lower on the food chain.[35] The simplicity of a modification of diet instead of medical reliance on pills, procedures and interventions will aid in environmental conservation as we look for ways to reduce our carbon footprint without utilizing natural resources.[36] Additionally, exercise is free, available to all and does not require extra resources. One does not even need to join a gym to enjoy the benefits of walking, running and swimming. Again, instead of relying on products of medicine to treat obesity, the alternative exercise is free, carbon neutral, and available to all but the very infirm.

Every simple solution to each medical problem, however, does not fit all people. For some, glandular conditions prompt corpulence and only medical interventions will be able to address them. Moreover, socioeconomic and demographical factors influence disease. Certainly obesity-related conditions are higher in low-income areas where people are more likely to work full time to survive and thus have less access to leisure, recreation,[37] and fresh, healthy foods. Nevertheless, for the vast majority of those who do not have glandular problems, simple weight-loss solutions are

available. And, for those whose time is restricted, whatever income level, consumption of calories can be controlled, though exercise may be more difficult to come by.

Simple medical solutions that treat conditions that afflict human beings should be utilized first. Mosquito nets instead of malaria drugs,[38] clean water instead of anti-diarrheal treatment, reducing cholesterol by lessening or removing cholesterol-laden food sources instead of pills, and what was said earlier about obesity-related conditions are just a very few examples. Conservation of resources will be achieved if simple solutions are ingeniously utilized before the medical solution is sought.

General allocation of resources should precede special interests: global justice.

A third priority for green bioethics is related to the first, but expands the realm of concern from the immediate medical context to the entire world. Global health care workers echo the concern of ecologists regarding our limited resources, while bioethicists recognize the need for better health opportunities in other countries. "The virtue of solidarity and our teaching on the option for the poor and vulnerable require us to measure our health system in terms of how it affects the weak and disadvantaged."[39] The system, as it is, affects our neighbors in other counties in very harmful ways.

While in developed countries, many resources are being directed toward physician specialists,[40] extravagant procedures, and even frivolous treatments, those in developing countries often face a doctor shortage. Although people in industrialized counties should not be punished medically because they happen to be born into a wealthy country, neither should we ignore our position of privilege and our level of consumption in comparison to other counties. Global justice can be sought within health care and bioethics and resources can be conserved for those who need them the most by paying more attention to the allocation of medical resources, especially to those procedures that have a low success rate, a high cost and an extensive experimental phase.

Health care should be directed toward making life livable for those who suffer without even the basic necessities for a healthy life. Noted theologian Charles Curran states that health care partially ensures "the rights of human beings to a minimally decent human existence and the obligation of society to meet these fundamental needs,"[41] yet the tension between resources and global needs persists on a world-wide scale. Providing running water,[42] sanitation,[43] shelter,[44] nutrition[45] and adequate clothing as both humanitarian and therapeutic treatments could become a medical priority instead of catering to the curiosities of medical sophistication for the elite. The basic human needs of those outside of our own homeland, much like the first priority, must be met before excessive medical developments, techniques and procedures are provided to and purchased by those fortunate to have more than enough of their needs satisfied.

It is truly unfortunate that global medical justice is not adequately secured because many health problems in other countries such as pollution that causes asthma and lung cancer[46] are a result of first-world demands for unnecessary goods which have been outsourced to other countries that then bear the brunt of our consumption. Moreover, many health issues in developing countries could be remedied fairly easily. It seems almost cruel that women in Africa and other countries die from childbirth and are ostracized due to maternity related fistulas,[47] while women in America are seeking breast augmentation for cosmetic enhancement of post-nursing breasts and scheduling cosmetic cesarean sections.[48]

Naturally, global justice is not as simple as some have suggested whether by shifting military budgets to humanitarian aid[49] or encouraging people to stop buying cosmetics in order to end world hunger.[50] Factors of global inequality include a lack of aid as well as political structures that limit distribution. But they also comprise a deep unwillingness to give up some financial gain and an inability to grasp the seriousness of world poverty.

With the environment, resources really are a zero-sum game. We cannot consume without someone else being without. And, while the principle of affiliation does demand that we take care of our own family, and perhaps even our own fellow citizens first, green bioethics seriously examines how much time, energy, resources and doctors are being absorbed by demands for unnecessary, marginally beneficial or even superfluous treatments while the majority of the world is without basic medical care. The United States Bishops' Resolution on Health Care Reform stated that "reform of the health care system which is truly fundamental and enduring must be rooted in values which reflect the… claims of the poor."[51] Though certainly they were not envisioning a green bioethics of distribution, the principle can be applied to that as well. When the weakest in our own and in global society are dying because of a lack of basic health care while others are receiving access to superfluous treatments, we must make every effort to find viable avenues to enlarge the supply of essential resources to those in the two-thirds world. Special access to medical developments, techniques and procedures cannot take precedence over the general allocation of natural resources if conservation is a priority.

Financial profit should not drive technology, but rather compassion and justice: ethical economics.

The fourth and final priority for a green bioethics engages economics. Green bioethics must consider all the aspects of medicine. The choices we make about providing or creating new medical developments, techniques and procedures are based partially on finance. Any industry that generates revenue must address the economic considerations of environmental exploitation. To be sure, the whole health care industry is a business, and financial transactions are all but inevitable. Yet when profits drive the creation, distribution, and marketing of

medicine, those who are underprivileged suffer.

As generic medications spin off from name brands[52] and as the cost of developing new high-tech or specialized techniques emerge, the goals of medicine[53] fade into the background. As suggested by Margaret Farley,[54] when compassion and justice guide medicine instead of revenue generation, competition for clients declines and precedence is given to realizing human goods.[55] More importantly, if people make decisions based on the kinds of values found in Catholic social teaching and the facts about environmental decline instead of fiduciary gain, conservation will happen.

The daily choice to seek compassion and justice above marketing medical developments, techniques and procedures for monetary gain will allow the health care system to focus less on production and more on conservation. Yet suggesting a temporary abbreviation of available medical options will likely mean a decline in the revenue of doctors, businesses and the GDP. This is alarming for most economists.

To counter this fear of production loss, one might consider, in the vein of environmentalism, that more attention be given to GDH [gross domestic happiness; quality of life] rather than to financial generation.[56] And, if this still worries the policy makers, economists and the government, then we might buy and sell medicine for human needs with a green emphasis.[57] Energy companies, automotive plants, and architects have all come to see that green use, design and sensibilities do not necessarily mean a dip in revenue. Green medicine, which utilizes renewable resources, emphasizes sustainability, and examines alternative sources, can likewise remain a lucrative source of income for doctors, researchers, assistants, manufacturers and the country at large, while still having compassion and justice at its center.

Conclusion

Green bioethics should be given consideration in medical developments, techniques, and procedures as the future of humanity depends on how we react to pressing environmental issues. While I am not advocating a deep ecological or utilitarian approach to bioethics, I am advocating for a sober consideration of known scientific facts about the status of our planet, in conjunction with the Christian doctrines of resource conservation, in order to influence which medical advances are distributed.

The foundation of green bioethics has been laid through the gradual assimilation of environmental practices into the medical domain, a process in which Catholic health care has played an important role. We must now also seek to find ways to integrate the green principles of current human needs, simple solutions, global justice and compassion, and ethical economics into medical developments, techniques and practices. Ecological ethics and bioethics can no longer be separated. They must be integrated into health care and cemented in theology. The future of our world may very well depend on how

we halt ecological destruction and conserve our resources so that there may be a future. In this, Catholic health care has a critical role to play.

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[1] International Energy Agency, "CO_2 Emissions from Fuel Combustion - 2011 Highlights," at http://www.iea.org/co2highlights/co2highlights.pdf

[2] Global Footprint Network, "How Big is the Human Footprint on Earth?" at http://www.footprintnetwork.org/en/index.php/GFN/page/2010_living_planet_report/

[3] Conservation is the just stewardship and allocation of resources. In ecological terms, it is the middle ground between preservation (preventing resources from any use) and exploitation (using all resources without regard for others).

[4] There are too many offshoots of the health care industry to provide a comprehensive and coherent green bioethics, so I have limited my work here to medical developments, techniques and procedures. In the future, work can be done on the chemical waste of the pharmaceutical industry, the disposal of human hazardous waste and even the "cradle to grave" manufacturing practices of medical devices like hearing aids, crutches, stents, etc. The possibilities are only limited by the industry itself.

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[10] Matthew Liao, Anders Sandberg, and Rebecca Roache, "Human Engineering and Climate Change," Ethics, Policy and the Environment 15 no. 2 (2012): 206-221.

[11] Lisa Sowle Cahill, *Theological Bioethics: Participation, Justice, and Change* (Washington DC: Georgetown University Press, 2005), 11.

[12] James T. McHugh, "A Catholic Perspective on Population," in *The Challenges of Global Stewardship: Roman Catholic Responses* edited by Maura Ryan and Todd David Whitmore (Notre Dame: University of Notre Dame Press, 1997), 85-101 at 93.

[13] Drew Christiansen, "Learn a Lesson from the Flowers: Catholic Social Teaching and Global Stewardship," in *The Challenges of Global Stewardship: Roman Catholic Responses* edited by Maura Ryan and Todd David Whitmore (Notre Dame: University of Notre Dame Press, 1997), 19-37, at 23.

[14] John Paul II, *For the Twentieth Anniversary of "Populorum Progressio": Sollicitudo rei socialis* (Washington, DC: United States Catholic Conference, 1987), 34.

[15] See Neil Bowdler, "New 'Green Cremation' Machine Opens in Minnesota," *BBC News,* August 16, 2012 at http://www.bbc.co.uk/news/health-19259804

[16] Cheryl Corley, "Burials and Cemeteries Go Green," *NPR,* December 16, 2007 at http://www.npr.org/templates/story/story.php?storyId=17232879

[17] Heidi Glenn, "Q&A: What it Means to Have a Green Burial," *NPR,* December 16, 2007 at http://www.npr.org/templates/story/story.php?storyId=17232879

[18] Catholic Health Association and Practice Greenhealth, "Environmental Suitability: Getting Started Guide (St. Louis: The Catholic Health Association of the United States, 2010): 1-28, inside cover.

[19] Florida Medical Association, "Renewable Energy Introduction," *Workbook 2: Renewable Energy* at http://www.flmedical.org/Renewable_Energy_Introduction.aspx

[20] Catholic Health Association and Practice Greenhealth, "Environmental Suitability: Getting Started Guide" (St. Louis: The Catholic Health Association of the United States, 2010): 1-28.

[21] Green Guide for Health Care, "Green Guide for Health Care: Food": 1-40.

[22] United States Conference of Catholic Bishops, "Resolution on Health Care Reform," *Origins* 23 no. 7 (1993): 89-102, at 97.

[23] This, of course, is a large undertaking, which I plan on developing more fully in my Ph.D. dissertation in years to come. For now, however, the briefest of sketches will be drawn.

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[25] Congregation for the Doctrine of the Faith, *Declaration on Euthanasia* May 5, 1980, part IV.

[26] See Joanne Lynn and James F. Childress, "Must Patients Always Be Given Food and Water?," in *Life Choices: A Hastings Center Introduction to Bioethics,* 2nd ed., Joseph H. Howell and William Frederick Sale, eds. (Washington DC: Georgetown, 2000), 291-304 at 297.

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[30] Cahill, 193.

[31] Joseph Blenkinsopp, "Global Stewardship: Toward an Ethic of Limitation," in *The Challenges of Global Stewardship: Roman Catholic Responses* edited by Maura Ryan and Todd David Whitmore (Notre Dame: University of Notre Dame Press, 1997), 38-53, at 50.

[32] Karen Hansen, "Voluntary Simplicity Brings Greater Happiness, More Sustainable Environment," *The Examiner,* July 11, 2011 at http://www.examiner.com/article/voluntary-simplicity-brings-greater-happiness-more-sustainable-environment

[33] The Center for Disease Control and Prevention, "Adult Obesity Facts," at http://www.cdc.gov/obesity/data/adult.html

[34] Ibid.

[35] See the comparisons of resource consumption of people by body weight given in Ross Andersen, "How Engineering the Human Body Could Combat Climate Change," *The Atlantic*, March 12, 2012 at http://www.theatlantic.com/technology/archi

ve/2012/03/how-engineering-the-human-body-could-combat-climate-change/253981/

[36] Hastings Center founder and Catholic Daniel Callahan recently addressed the obesity crisis in America. He also suggested carbon neutral strategies, like change in individual habits, stigmatization and social pressure, but the Gospel teaching on love of neighbor would preclude implementing many of his policies. Daniel Callahan, "Obesity: Chasing an Elusive Epidemic," *Hastings Center Report* 43, no. 1 (2013): 34-40.

[37] C.R. Tomson, R. N. Foley, Q. Li, D. T. Gilbertson, J. L. Xue, A. J. Collins, "Race and End-stage Renal Disease in the United States Medicare Population: the Disparity Persists," *Nephrology Carlton* 13 no. 7 (2008): 651-656. Christian ethicists must address these issues too. See Emilie M. Townes, *Breaking the Fine Rain of Death: African American Health Issues and a Womanist Ethic of Care* (New York: Continuum, 1998).

[38] Though mosquito nets are simpler in terms of resource use and ease of distribution, they are not cheaper. See Colleen C. Denny and Ezekiel J. Emanuel, "U.S. Health Aid Beyond PEPFAR: The Mother and Child Campaign," *Journal of the American Medical Association* 300 no. 17 (2008): 2048- 2051, chart at 2050.

[39] United States Conference of Catholic Bishops, 97.

[40] Nir Eyal and Till Bärnighausen, "Precommitting to Serve the Underserved," *The American Journal of Bioethics* 12 no. 5 (2012): 23-34.

[41] Charles E. Curran, "Virtue: The Catholic Moral Tradition Today," in *Virtue: Readings in Moral Theology No. 16,* eds. Charles E. Curran and Lisa A. Fullam (Mahwah, New Jersey: Paulist Press, 2011) 51-78, at 65.

[42] Almost one-fifth of the world's population (about 1.2 billion people) lives in areas where water is physically scarce. World Health Organization, "Fact File: Water Scarcity," at http://www.who.int/features/factfiles/water/water_facts/en/index2.html

[43] In 2006, 1.4 billion people lacked basic sanitation conditions. The United Nations, "The Millenniums Development Goals Report," (New York, 2009), 1-56, at 5.

[44] In 2005 over one-third of all people were still living without adequate shelter. In parts of sub-Sahara Africa, that number is over 60 percent. The United Nations, 47.

[45] In 2006 about 1 in 4 children worldwide were underweight; in parts of Africa the number is over 1 in 2. The United Nations, 12.

[46] World Health Organization, "Global Health Risks: Mortality and Burden of Diseases Attributable to Selected Major Risks," (Geneva: WHO Press, 2009), 6; 44.

[47] Sandra D. Lane and Robert A. Rubinstein, "Judging the Other: Responding to Traditional Female Genital Surgeries," *Hastings Center Report* 26 no. 3 (1996): 31-40, at 33.

[48] S. J. Burrow, "On the Cutting Edge: Ethical Responsiveness to Cesarean Rates," *American Journal of Bioethics* 12 no 7 (2012): 44-52.

[49] *Mallory Factor,* "What's the Real Defense Budget?" *Forbes Magazine,* March 28, 2011 at http://www.forbes.com/forbes/2011/0328/billionaires-11-capital-flows-mallory-factor-real-defense-budget.html

[50] *United Nations Educational, Scientific and Cultural Organization,* The World Game Institute, "Eliminating Starvation / Feeding Humanity; Costs/Benefits-How Much Is a Human Life Worth?" at http://www.unesco.org/education/tlsf/mods/theme_a/interact/www.worldgame.org/wwwproject/what01.shtml

[51] United States Conference of Catholic Bishops, 97.

[52] Marcia Angell, *The Truth About Drug Companies: How They Deceive Us and What to Do About It* (New York: Random House, 2005).

[53] Defined as "the prevention of diseases and injury and the promotion and maintenance of health; the relief of pain and suffering caused by maladies; the care and cure of those with a malady, and the care of those who cannot be cured; the avoidance of premature death and the pursuit of a peaceful death." Joseph H. Howell and William Frederick Sale, "Specifying the Goals of Medicine" in *Life Choices: A Hastings Center Introduction to Bioethics,* 2nd edition, Joseph H. Howell and William Frederick Sale, eds. (Washington D.C.: Georgetown, 2000), 62-73.
[54] Margaret A. Farley, *Compassionate Respect: A Feminist Approach to Medical Ethics and Other Questions* (Mahwah: Paulist, 2002).
[55] For a case study on the effects of green commerce, humanitarianism and food see Ken Koopman, *People Before Profit: The Inspiring Story of the Founder of Bob's Red Mill* (Portland OR: Inkwater Press, 2012).
[56] For a more robust economics assessment see Eric Davidson, *You Can't Eat GNP: Economics as if Ecology Mattered* (Cambridge, MA: Perseus Publishing, 2000).
[57] See Paul Hawken, *The Ecology of Commerce: A Declaration of Sustainability* (NY: HarperCollins, 1993).