Toward Solving the Health Care Crisis: The Paradoxical Case for Universal Access to High Technology

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INTRODUCTION

Nobody questions that the United States is in a health care crisis. Annual health care spending is over $1.9 trillion, 16% of the nation's GDP.\(^1\) Public spending is about 60% of that total, only 10% below that of public funding in countries with universal health care, yet there is no basic universal health care coverage\(^2\) and over 46 million people are uninsured.\(^3\) The daily news and print media are rife with distressing stories of underinsured individuals who are forced to declare personal bankruptcy, as insurers reimburse for fewer services and elevate co-insurance.\(^4\) In fact, 76% of individuals filing for personal bankruptcy due to medical expenses have insurance but are underinsured.\(^5\)

Not surprisingly, proposed health care reforms focus on the supply of health care goods to patients.\(^6\) The problem, as reformers see it, is a simple and obvious one: More people need access to basic health care services.\(^7\) As straightforward

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6. The health care plans of the 2008 Democratic presidential hopefuls would create a level of universal, basic health care. See, e.g., NYTobmes.com, The Presidential Candidates on Health Care, http://politics.nytimes.com/election-guide/2008/issues/healthcare/index.html (last visited Nov. 30, 2007). Republican proposals suggest market incentives to lower health care costs or tax credits or deductions to enable greater access to private health care plans. Id. President Bush recently proposed discontinuing tax exclusions for insurance premiums for some individuals insured through their employers in order to allow equivalent deductions for workers purchasing insurance as individuals. See Sheryl Gay Stolberg & Robert Pear, Bush Urges Tax To Help Cover the Uninsured, N.Y. TIMES, Jan. 21, 2007, § 1, at 1. By shifting the costs of health care in this way, some consumers may have access to fewer services since they will need to internalize costs. This effectively limits the supply of health care services to these individuals, though it may appear that it alters demand.
7. See supra note 6 and accompanying text.
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as this reasoning may seem, it is based on a misperception of critical points within the problem.

Altering the supply of basic health care services will not address the current health care crisis. Part of the problem is failure to understand the health care services that support the goals of basic health care. Programs that seek to provide basic health care services to target populations have historically focused on traditional health care services. Yet the crisis stems from rising costs created by consumer choices substantially unrelated to traditional health care services, namely, demand for high technology health care and convenient access to it. While the ontology of this demand is disputed, and demand for ineffective or unnecessary services must be eliminated, it is clear that understanding and appreciating demand for high technology health care must be at the heart of health care reform.

8. See, e.g., INST. OF MED., MEDICAL INNOVATION IN THE CHANGING HEALTHCARE MARKETPLACE 16 (Philip Aspden ed., 2002) ("Technological change has been the largest single driver of growth in health care spending over the past 50 years."); see also Timothy Stoltzfus Jost, The American Difference in Health Care Costs: Is There a Problem? Is Medical Necessity a Solution? 43 ST. LOUIS U. L.J. 1, 9 (1999) ("Both comparative research and also research performed within the United States has [sic] identified increased availability and use of health care technology as a major cause in the growth of health care costs. In particular, increased costs attributable to the use of imaging services and tests and other diagnostic technologies have dramatically outstripped general health care cost inflation in recent years."). The demand for high technology health care is so strong, that, as one study indicates, requiring large consumer contributions for high technology health care does not enervate demand. See Mark McClellan & Daniel Kessler, A Global Analysis of Technological Change in Health Care: The Case of Heart Attacks, 18 HEALTH AFF. 250, 253 (1999).

9. Cultural intolerance for inconvenience mandates the availability of high technology health care within small geographic regions; this causes high health care costs in many integrated health care delivery systems. See, e.g., Jost, supra note 8, at 10-12. While the rising cost of pharmaceuticals is also a contributor, consumer preferences for advanced medical technologies and more high technology health care facilities is fueling most of the crisis. See Poisal et al., supra note 1, at w243. Prescription drugs contributed only 10% to the 9.4% overall increase in health care costs from 2004 to 2005. Id.

10. John E. Wennberg and Elliott S. Fisher have long argued that health care providers and facilities drive use of high technology medical care. Over a period of thirty years, they conducted studies focused on Medicare, publishing findings of doctor-imposed preferences, ineffective treatments, and medical waste. See, e.g., John E. Wennberg, Variation in Use of Medicare Services Among Regions and Selected Academic Medical Centers, Duncan W. Clark Lecture, New York Academy of Medicine (Jan. 24, 2005), available at http://www.ihi.org/NR/rdonlyres/C871D688E344C3085296089D9A70B54/0/NYAM_Lecture_FINAL.pdf; John E. Wennberg & Floyd J. Fowler, A Test of Consumer Contribution to Small Area Variations in Health Care Delivery, 68 J. ME. MED. ASS’N 275 (1977). Perhaps most disturbing is the finding that decreased utilization of health care services among Medicare patients is associated with better
address directly demand for high technology health care, and the legal structures supporting basic minimum and rationing schemes historically neglect such services. The result is sadly ironic: Increasing the supply of traditional, basic health care services through government or private spending is like offering bottled water to members of a dehydrated population; while it may provide relief to some or even many, it does not address the causes of deprivation, that is, why the needs of a population are not being met, and supplies a resource in an ineffective manner.

At the root of the problem is the lag in legal response to changing medical technology. Our legal structures generally are unresponsive to consumer demand for high technology health care, due to its perceived cost and the misperception that it fails to support the goals of basic health care. State and federal programs

medical outcomes. See, e.g., DARTMOUTH ATLAS PROJECT, THE CARE OF PATIENTS WITH SEVERE CHRONIC ILLNESS: AN ONLINE REPORT ON THE MEDICARE PROGRAM (2006), available at http://www.dartmouthatlas.org/atlases.shtm (follow link on the word “here” in the second paragraph) (last visited Nov. 30, 2007); Elliott S. Fisher et al., The Implications of Regional Variations in Medicare Spending. Part I: The Content, Quality, and Accessibility of Care, 138 ANN. INTERNAL MED. 273 (2003); John E. Wennberg et al., Use of Hospitals, Physician Visits, and Hospice Care During Last Six Months of Life Among Cohorts Loyal to Highly Respected Hospitals in the United States, 328 BRIT. MED. J. 607 (2004). While special considerations undoubtedly apply to the use of high technology health care at the end of life and to chronic care generally, Wennberg and Fisher raise serious concerns about the misuse (including overuse) of high technology health care and possible patient coercion. This Article seeks to distinguish between the misuse of high technology health care and patient demand for clinically effective services. Further, this Article does not address patient coercion at any level, but assumes appropriate physician involvement in patient decision-making, comporting with a common law standard for informed consent. In this context, regardless of whether consumers who demand these services are influenced by physician recommendations, if the services are necessary and clinically effective, the demand for them must be considered directly. This Article argues that, paradoxically, focusing on this demand amid some important constraints (clinically efficacy and need, financial limitations including the need to self-ration, limited versus long-term treatment) is a step toward understanding and solving the health care crisis.

11. See supra note 6 and accompanying text. Both rationing and basic minimum frameworks seek to reduce costs by providing a limited range of health care services to more people. Oregon has operated its Medicaid program, part of the Oregon Plan, as a rationing scheme since the late 1980s. The approach is premised upon a cost-utility or Quality Adjusted Life Year (QALY) scheme and seeks to ration health care by providing basic services to those who will benefit most from them in terms of life-span and quality of life.

12. As health care technology increases, our conception of necessary health care services expands. Earlier, simplistic frameworks in the 1970s and 1980s sought to ration basic health care either directly, as with the Oregon Plan, or indirectly through the rise of health maintenance organizations (HMOs). HMOs offer a limited range of services provided by designated physicians for a lower cost than traditional fee-for-service medicine. The late 1990s saw a decline in HMO-
fund limited, largely traditional care for select groups of individuals. Public and private health plans may ration care or otherwise deny benefits under certain cost-saving managed care schemes; consequently, high technology health care services are often not covered. Further, most Americans receive their health

oriented managed care schemes, in response to litigation over denial of what were perceived to be necessary health care benefits, often high technology health care services. Many health law scholars view the current state of health care as a shift back towards something like fee-for-service medicine, where patients pay more for the care they receive and exercise greater control over the treatment options available to them and practitioner selection. See, e.g., Jon R. Gabel et al., Consumer-Driven Health Plans: Are They More than Talk Now?, Health Aff., W395, W395-96 (Nov. 20, 2002), http://content.healthaffairs.org/cgi/reprinthlthaff.w2.395v1.pdf.

13. Federal programs include Medicare, the military entitlement programs (TRICARE and the Civilian Health and Medical Program of the Department of Veteran Affairs (CHAMPVA)), and programs for government workers. Medicaid and the State Children’s Health Insurance Program (SCHIP) receive federal funds but are operated largely on the state level. Medicaid funds health care benefits for indigent families with dependent children and some indigent, disabled individuals. See 42 U.S.C. § 1396 (2000). Covered individuals typically are at or below 150% of the federal poverty line. Medicare funds hospital, home, and hospice care for individuals sixty-five and older, certain railroad employees and disabled individuals, and those with end-stage renal disease. See 42 U.S.C. § 1395c (2000). SCHIP operates as a subsidized insurance program for low-income pregnant woman and children who are usually at or below 200% of the poverty line. See 42 U.S.C. §§ 1397aa-1397jj (2000).


15. Relative to public insurance, private insurance often funds more high technology health care, though coverage is still limited. One striking difference in coverage arises in the area of genetic testing. For instance, under public programs, prenatal genetic testing is sparsely funded and only in situations of family history of genetic anomaly or high-risk pregnancies, and child and adult predictive testing is unfunded. For example, the TRICARE Handbook states:

Genetic tests to find out if your unborn child has genetic defects are covered. But TRICARE Standard helps pay only if: You are pregnant and age 35 years old or over, or You had rubella during your first 3 months of pregnancy, or You or your husband have had a child with a genetic (congenital) defect, or You or your husband comes from a family that has a history of genetic (congenital) defects.

TRICARE Handbook, http://www.tricare.osd.mil/TricareHandbook/results.cfm?tn=18&cn=8 (last visited Nov. 30, 2007). In the private sphere, large managed care operations, like Kaiser Permanente, offer a range of genetic testing services for adults and children. See, e.g., Kaiser Permanente, Genetics Northern California, http://genetics.kaiser.org/home/regionalprograms.htm (last visited Nov. 30, 2007). Nevertheless, when private insurers deny requests for prenatal genetic testing services, people are forced to refute these denials rather clumsily through actions like wrongful birth and life, which are recognized in only a few jurisdictions and have a low success rate. Legal claims based upon denial of access to testing after birth may be unsuccessful under judicial construction of the Employee Retirement Income Security Act (ERISA), see infra note 17, and the legality of cost-saving managed care measures. See Pegram, 530 U.S. at 211.
insurance through their employer, and coverage continues to decline under employee benefit plans, 16 without legal recourse for beneficiaries denied care. 17

In order to understand demand for high technology health care services, health care must be viewed as a different type of good. It is necessary to make a distinction between functional and service goods. A service good may generally be understood as something that is distributed by a government across a population according to a perceived need. A functional good is something chosen by an individual from a set or range of goods. Health care goods are functional goods. Patients choose particular goods because they are preferred over others to further a certain health state. 18 This choice is made in light of individual biological variation, preferences (including risk assessment and possible therapeutic benefit), and resource entitlement. Recognizing health care as a functional good is vital to understanding individual differences that affect demand for health care services.

To aid in making this distinction between service and functional goods—to analyze the importance of demand instead of supply in situations of scarcity—a theoretical framework is available, though long overlooked: Amaryta Sen's theory of basic capability equality. Sen, a philosophically-minded economist, offers a framework that may be used to represent value in choosing between

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16. Employee coverage may be limited due to the unavailability of health care benefit plans; high employee premiums, co-payments, and deductibles; or restrictions on the services offered under employer plans. From 2000 to 2005, there was a 9% decrease in employers offering health insurance. KAISER FAMILY FOUND., EMPLOYER HEALTH BENEFITS: 2005 SUMMARY OF FINDINGS 4, available at http://www.kff.org/insurance/7315/sections/upload/7316.pdf. Employees participating in health benefit plans are generally required to pay high premiums, deductibles, or co-payments in order to access services. Id. at 3-4. Premiums increased 42% from 1998 to 2003, resulting in a decline of 5% of eligible workers subscribing to employer-based plans. ROBERT WOOD JOHNSON FOUND., SHIFTING GROUND: CHANGES IN EMPLOYER-SPONSORED HEALTH INSURANCE 8-9, 22 (2006), available at http://www.rwjf.org/newsroom/CTUWFinalResearchReport2006.pdf. Individuals covered under employee benefit plans face additional restrictions. Hospital care often requires a separate deductible or co-payment. KAISER FAMILY FOUND., supra, at 3. Further, patients must typically receive prior certification for procedures performed in a hospital or out-patient facility, and these or other needed medical services may not be provided in light of cost-saving measures employed by health care entities. Id. at 5.


18. This concept is long established by the doctrine of informed consent, which requires that patients be provided with information about the availability and the risks and benefits of health care options in order to determine their course of treatment. See, e.g., Canterbury v. Spence, 464 F.2d 772 (D.C. Cir. 1972) (adopting the reasonable patient standard for informed consent).
different types of health care services and to understand the biological and resource constraints that affect decision-making.

Most importantly, basic capability equality addresses the basic health care benefits of high technology health care better than dominant utilitarian or contractarian frameworks. Under Sen’s theory, capabilities are maximized across a given population according to a specific calculus. Generally speaking, individuals choose a capability set, constrained by both personal characteristics and commodity entitlement. Applying basic capability equality to the distribution of basic health care services, patients choose health care services that best support their basic capabilities, where their choice is limited by their biological constitution and funding for such services. This approach allows patient choice among high technology and traditional health care services, while operating within budget constraints, such as caps on spending. While this Article does not develop discrete health care financing structures that support basic capability equality, the theoretical framework developed offers the possibility of more effective resource distribution, which may lower health care expenditures.

Basic capability equality is frequently referenced in legal scholarship, but no legal scholar has grappled with the formal expression of Sen’s theory. Only Sen’s formal model fully captures what is at stake in the analysis of capabilities, that is, its ability to account for a richer conception of well-being in light of biological and other constraints affecting medical decision-making. Basic capability equality is typically applied as a device rather than a framework to conceptualize well-being, resulting in generalizations that seem to misinterpret it. Further, undoubtedly due to its complexity, few scholars in other disciplines


20. See, e.g., Carlos Ball, Autonomy, Justice, and Disability, 47 UCLA L. REV. 599, 637 (2000); Steven P. Croley & Jon D. Hanson, The Nonpecuniary Costs of Accidents: Pain-and-Suffering Damages in Tort Law, 108 HARV. L. REV. 1785, 1828-34 (1995); Robert Post, The Rule of Law: What Is It: Democracy and Equality, 603 ANNALS AM. ACAD. POL. & SOC. SCI. 24 (2006). Martha Nussbaum offers a different account of basic capability equality, often confused with that of Amartya Sen, premised upon Aristotelian notions of human flourishing rather than a consequentialist framework. See, e.g., MARTHA C. NUSSBAUM, FRONTIERS OF JUSTICE: DISABILITY, NATIONALITY, AND SPECIES MEMBERSHIP (2006). Nussbaum identifies ten capabilities, including “bodily health”; a threshold or basic minimum of each is required for human dignity. Id. at 76-78. The capability list and the threshold is the same for all individuals. Id. at 179. As a result, Nussbaum’s approach does not provide the same flexibility as Sen’s in accounting for individual biological and other variation.

21. See, e.g., Ball, supra note 20, at 638 (failing to recognize that it is not the range of choice itself that is valuable but the value of the elements contained within that range; “The individual with few vectors from which to choose may have her needs satisfied but will have a reduced freedom.”); Croley & Hanson, supra note 20, at 1833-34 (overlooking the fact that biological
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apply the formal model of basic capability equality to practical problems.\textsuperscript{22} Sen himself provides limited bridges between his moral theory and his applied work in poverty and famine.\textsuperscript{23} Nevertheless, it is through the lens of basic capability equality that it is possible to see an especially strong case for universal access to high technology health care.

This Article argues that if basic health care is to be provided to a target or the national population, high technology health care that supports the goals of basic health care should be universally available. Under basic capability equality of health care, individuals will have access to a range of basic health care services—traditional and high technology—and choose from among these goods.\textsuperscript{24} This gives rise to an alternative type of distributive structure, which might be described as “self-rationing.” It is important to emphasize that self-rationing is not an argument for greater health care expenditures; rather, it demands spending money in a different, and possibly more efficient, manner.\textsuperscript{25} Self-rationing requires that legal structures support the availability of a range of clinically effective goods from which a patient will choose but not that every service be provided to an individual.\textsuperscript{26} A patient will choose services with constraints, including disabilities, limit capability sets); Post, supra note 20, at 32 (failing to recognize basic capability equality as a non-welfarist, maximizing approach; “Sen . . . [is] ambiguous as to whether the set of capabilities . . . are to be measured by the criteria of ‘justice as fairness’ or . . . ‘autonomy.’”).


23. See, e.g., \textsc{Amartya Sen, Commodities and Capabilities} 46-69 (1999) [hereinafter \textsc{Sen, Commodities and Capabilities}]; see also \textsc{Amartya Sen, Resources, Values and Development} (1984) [hereinafter \textsc{Sen, Resources, Values and Development}].

24. Technology should be provided in a cost-effective manner, likely requiring less equipment and fewer medical specialists in particular geographic regions.

25. Self-rationing has the potential to lower health care costs provided a few assumptions hold: tolerance for high technology health care services provided at fewer locations, see \textsuperscript{supra} notes 9 and 24 and accompanying text; greater clinical efficacy, see \textit{infra} notes 26, 42-44 and accompanying text; and a reduction in costs as high technology health care becomes more routine.

26. “Clinical efficacy” is demonstrated by services that generally bring about a desired medical result. How clinical efficacy will be determined is an important topic to be taken up elsewhere. A number of 2008 presidential candidates, including Hillary Clinton, Dennis Kucinich, and Barack Obama, have called for governmental boards to assess the effectiveness of treatments, presumably including medical innovations, as a cost-saving measure. \textit{See Candidate Commentaries, Modern Healthcare}, Nov. 26, 2007, at 12, 12, 19, 21; see also \textsc{H.R. 676, 110th Cong.} § 305 (2007). Equally important are comparative efficacy studies to aid consumer choice.

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professional guidance, and within a given level of health care funding such as a yearly or lifetime cap, in order to support the goals of basic health care. Choice of a particular service may foreclose other options based upon the resources available. This differs dramatically from traditional rationing schemes, where a narrow range of basic health care services are provided to certain individuals based upon criteria determined largely by governments or medical institutions. Under traditional rationing, not every patient is eligible for health care services, and patient choice is not directly valued.

This Article interprets Sen's formal model of basic capability equality to support an argument for universal access to high technology health care. It is argued that the dominant legal paradigms of basic minimums and rationing, and the moral theories from which they are derived, lack the ability to address patient choice for high technology health care goods and, as a result, cannot support self-rationing. Utilitarianism and Rawlsian-derived models fail to account adequately for the value of choice as well as the biological and external constraints an individual faces when making medical decisions. In addition, they do not accommodate all of the basic health care benefits enabled by high technology health care.

The Article is divided into three Parts and an Appendix. Part I briefly addresses limitations of current theoretical frameworks applied to the distribution of health care resources and proposes a new legal paradigm derived from basic capability equality for accommodating patient demand for medical services. It interprets Sen's formal model of basic capability equality, outlining the basic theory and discussing the role and nature of choice under the theory. These concepts are applied to the distribution of basic health care services and to patient decision-making. Part II applies basic capability equality to high technology health care specifically and develops a new approach to the distribution of basic health care: basic capability equality of health care. Predictive testing is presented as a case study. Such health care is discussed in terms of enabling a range of basic capabilities: broad capabilities, including a decent health status and endowment, and narrower capabilities, encompassing prophylactic measures, psychological preparedness, and family planning. The ability of high technology health care to expand one's capability set, or the range of capabilities available to an individual, is also discussed. Part III addresses potential problems with basic capability equality of health care, such as difficulty in valuing other-regarding choices, the loss of freedom when one medical choice forecloses another, and the implications of moving toward a new legal paradigm for health care distribution.

27. A patient's choice must be informed by a physician's advice about the relative strengths and weaknesses of effective options.

28. Given financial constraints, there are incentives for patients to choose lower-priced, clinically effective services.
given the social role of basic minimum and rationing schemes. Because this is the first time Sen's formal model has been interpreted in the legal literature, a detailed Appendix is provided, offering insights into how capability sets might be valued in order to make intrapersonal or interpersonal comparisons.

I. CAPABILITY EQUALITY MATTERS: DEMAND FOR HIGH TECHNOLOGY HEALTH CARE

Deprivation cannot always be understood in the simple terms of lack of supply. Studies have shown, for example, that in Bombay, one of the most technologically sophisticated cities in India, female children and adults have a lower treatment ratio in hospitals than male children and adults. Similarly, in Calcutta, more females than males perish from medical conditions. Strikingly, this differential applies across every income group. What is occurring in these situations? Health care services are available for consumption. The women are not sicker than the men. Rather, the choices of parents, husbands, and physicians support inferior treatment of women. These choices embrace gender bias and cause the deprivation of care; the deprivation is not the result of lack of available medical services in a more pure sense. In these instances, women lack equality in treatment and the basic capabilities it enables, such as the ability to enjoy a decent health state.

Similarly, there is more to the story of the causes of deprivation in the U.S. health care system than lack of supply of basic health care services. One cause is the inability of current social and legal structures to account for patient demand for high technology health care services. As a result, high technology is provided inefficiently, and this elevates costs. In order to address rising health care costs, insurers require that consumers contribute more to their care. High costs ultimately limit access to basic health care services, leading to more underinsured or uninsured individuals. Once the deprivation is understood in this way, it is clear that increasing the availability of traditional, basic health care services will not address it. Nor does it address the deprivation experienced by individuals who seek high technology health care services but are unable to afford them. Lack of access to high technology health care is significant because it may

29. Sen, Commodities and Capabilities, supra note 23, at 61-65. Female children fare the worst. Id. at 65.
30. Id. at 65-69.
31. Id. at 69.
32. Id.
33. Id.
34. See supra notes 8-9 and accompanying text.
35. See supra note 16 and accompanying text.

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support the goals of basic health care.

A. High Technology Health Care as Basic Health Care

Both traditional and high technology health care services may support the goals of basic health care. Thus, in order to further health care states enabled by basic health care, both types of health care services should be available. In situations of scarcity, an individual may need to engage in self-rationing, or to make trade-offs between traditional and high technology health care services, but this does not undermine the claim that the spectrum of technology that supports basic health care should be universally available.

While the line between traditional and high technology health care services need not be rigidly defined, working definitions are in order. Traditional health care services may be roughly understood as preventative, diagnostic, and therapeutic services that do not involve sophisticated medical equipment for imaging, analysis, or treatment. Bacterial cultures and urine samples followed by microscopic analysis, antibiotic treatments, and bone-casting are examples. High technology health care may be defined as health care services that involve sophisticated medical equipment for imaging, analysis, or treatment; these services typically are more costly. Examples include advanced diagnostic imaging through use of computed or positron emission tomography (CT or PET) scans or magnetic resonance imaging (MRI), genetic testing, artificial tissue and organ repair and replacement, individually-tailored medicines, and, perhaps in the near future, nanotechnology-based drug delivery systems. Obviously, as technology advances, some high technology health care services will become more traditional. What is important for present purposes is that some services considered high technology health care services are overlooked in contemplating health care reform, even though they support the goals of basic health care.

Basic health care may be defined loosely as health care services that support the goals of prevention, diagnosis, and limited treatment or amelioration of diseases or conditions. Traditional health care services are commonly associated with these goals. Basic health care may be understood in the context of the

36. Some authors use cost itself to distinguish between high and low technology health care. See, e.g., McClellan & Kessler, supra note 8, at 253-54 (defining high technology treatments as “those with high fixed costs to adopt or high variable costs per use” and low technology treatments as “those with low fixed and incremental costs of use”).

conventional physician-patient relationship; it reflects common intuitions about the reasons individuals seek medical attention within a primary health care setting and the expectations they possess about those experiences.38 A patient who is ill or dysfunctional, or who has reason to believe she could be in the future, seeks medical attention in a primary care setting. The medical practitioner handles the matter in the requisite number of appointments or refers the patient to a specialist, such as urologist, cardiologist, or geneticist. Primary care encompasses the time the patient presents with symptoms, dysfunction, or anticipates illness as well as diagnosis or limited treatment of the condition. Limitations in treatment are crucial to defining basic health care; it does not extend to long-term critical care, that is, extensive treatments and palliative care. Basic health care could include ongoing but not critical care of disabled individuals who remain functional in the community, however, as this is essentially ongoing primary care.

Basic health care is necessarily interpreted relative to both the state of current technology and the affluence of a given society. For example, in some developing nations, access to clean water and anti-parasitic drugs may constitute basic health care. In developed nations, high technology health care may support the goals of basic health care. Treatment may involve high technology health care when advanced pharmaceuticals, medical devices, or surgical procedures are used. High technology diagnostics may include CT, PET, and MRI scans as well as genetic tests. Prevention may also be enabled by these tests, if they are employed presymptomatically and are followed by prophylaxis; in this case, the tests constitute predictive technology.

Prediction may seem like a new addition to the traditional goals of basic health care delivery, but only in the sense that it is separated from the broader category of prevention. Predictive tests often enable prevention of disease. For example, cholesterol tests, a traditional form of cardiac health care, indicate risk of heart disease and allow patients the opportunity to improve their future health through diet and exercise. In cases where prophylactic options are unavailable, prediction enables patients to prepare psychologically for the onset of diseases or other conditions or, in the alternative, to confirm that they are not at risk for such conditions. In these cases, prediction provides indirect, basic health care benefits such as comfort, reassurance, and psychological preparedness related to diagnosis. In addition, prediction allows individuals to follow, and possibly invest in, research for their conditions and allows prompt use of prophylactics or

38. While this Article presents basic health care in terms of a descriptive, relational model, that is, it is premised upon the patient-primary practitioner relationship, others understand the goals of prevention, diagnosis, and limited treatment as supporting a baseline of human functioning that is of normative import. See, e.g., NORMAN DANIELS, JUST HEALTH CARE (1985); see also ALLEN BUCHANAN ET AL., FROM CHANCE TO CHOICE: GENETICS AND JUSTICE (2000).
treatments as they become available. In the prenatal context, prediction allows family planning, either through preventing or preparing for particular births. Given the possible influence of predictive testing on reproductive decision-making and life plans, limited access to these technologies has the potential to exacerbate social stratification.

Aside from the benefits of high technology health care already discussed, consumers may demand such health care because it is lower in cost or more effective than traditional health care services. This is true for some genetic tests, for example. Genetic testing is inexpensive compared to traditional diagnostic methods for multiple endocrine neoplasia type II (MEN-II) thyroid disease, familial adenomatous polyposis (FAP) screening in families for colorectal cancer predisposition syndrome, and, in some cases, homochromatosis screening on a population level for iron build-up. Further, holding clinical efficacy and initial cost constant for both genetic and nongenetic tests, genetic testing usually affords long-term cost benefits because most genetic tests are only performed once. Higher clinical efficacy is achieved with genetic tests used to detect “sensitive” leukemia and Duchenne muscular dystrophy. Genetic testing for sensitive leukemia is necessary to calculate the correct dose of chemotherapy and to avoid the unnecessary toxicity of a high dose or an ineffective, low dose. Advanced genetic testing for Duchenne muscular dystrophy detects most possible mutations, whereas measurement of serum creatine kinase levels, and even older genetic tests, fail to catch the disease approximately 29% of the time and usually involve painful muscle biopsies.

This Article argues that a legal paradigm for the distribution of basic health care resources must consider consumer demand for both traditional and high technology health care services. High technology health care may be more effective for particular individuals or confer benefits that are not provided by most traditional health care services, such as those associated with prediction.

43. McLeod & Evans, supra note 42, at 107.
44. Flanigan et al., supra note 42, at 931, 933, 935-36, 938.
some cases, innovative medical technologies may also be more cost effective. Finite resources mandate that individuals cannot choose every service within a given range of services, however, it is necessary to find a way to value and understand choices within each range. This entails shifting focus away from the supply of traditional health care services available to an individual towards the demand for services—traditional or high technology—that support prevention, diagnosis, and limited treatment. Dominant theoretical frameworks employed to contemplate health care distribution are limited in their ability to consider demand in this way.

B. Limits of Cost-Utility and Contractarian Approaches

While academic conceptions about health care goods have grown in sophistication, dominant theoretical approaches to the distribution of health care services experience difficulty accounting for consumer demand for high technology health care that supports the goals of basic health care. Basic minimum and rationing paradigms are derived from contractarian and cost-utility theories, respectively. These frameworks fail to value adequately consumer demand or choice in medical decision-making and to account for certain health benefits, biological differences, and economic and social influences that inform choice.

Briefly stated, cost-utility conceptions, like those embraced by the Oregon Plan of medical rationing, embed utility within a framework of health-related welfare measured by access to health care services over a lifetime.\(^\text{45}\) Services are provided based upon Quality Adjusted Life Year (QALY) measurements, which determine health care entitlement by making assessments of the quality (utility) of length of life associated with certain identified health states.\(^\text{46}\) Under this type of framework, a costly high technology health care service is provided to a


\(^\text{46}\) QALYs are one measure of utility. A QALY is one life year weighted by the perceived quality of life after a particular health service. Patients, doctors, other medical practitioners, third party payors, or a certain geographic population are surveyed to make quality of life rankings, on a scale of zero to one, where zero is death and one reflects a state of full health. The results for each individual are scaled according to the number of QALYs gained, and the scales are combined or aggregated to produce a utility index that is used to make interpersonal comparisons between health states. John McKie et al., The Allocation of Health Care Resources: An Ethical Evaluation of the 'QALY' Approach 21-22 (1998). The estimated utility is multiplied by the predicted number of remaining years. For example, an individual who is 45 years old and suffering from hypertension might be expected to live 25 more years with an estimated utility of .95. Discounting for the change in health status, \(25 \times .95 = 23.75\) QALYs. Id. at 22 (presenting a similar example). Resources are distributed so as to maximize the number of QALYs.
population only if its lifetime benefits are perceived as significant, relative to health states achieved by means of different medical technologies.\textsuperscript{47} Some argue that this form of rationing places in double-jeopardy those who are most in need; the sickest are worse-off by nature of their conditions and then, as a result of their shorter life-spans, may receive limited health care services.\textsuperscript{48}

Partially in response to these shortcomings, scholars began to argue that there is something fundamental about health care as a good and its role relative to well-being. Scholars extending the contractarian theory of John Rawls embrace the idea of health care as a primary social good, that is, a good needed to fulfill all rational life plans,\textsuperscript{49} or as a good necessary to achieve fair equality of opportunity.\textsuperscript{50} Treating health care as a primary good poses a number of difficulties, including resource drain and the inability to make trade-offs between health care and other primary goods.\textsuperscript{51} Motivated by cost-saving considerations, the prominent work of Norman Daniels conditionally extends Rawls’s fair equality of opportunity principle in order to proffer a theory that health care should be provided to preserve a baseline of normal functioning.\textsuperscript{52} Under this theory, basic health care services are provided to prevent deviation from, restore, and maintain normal functioning.\textsuperscript{53} As the theory looks to direct and immediate benefits in relation to disease, problems arise in accounting for indirect, uncertain, and future health care benefits.

As explained below, both utilitarian and contractarian frameworks undervalue basic health care services with these benefits. Most importantly, however, neither contractarian nor cost-utility approaches account directly for

\begin{itemize}
  \item \textsuperscript{47} Id. at 21-22.
  \item \textsuperscript{48} Id. at 99-101.
  \item \textsuperscript{49} See Ronald M. Green, \textit{Health Care and Justice in Contract Theory Perspective, in ETHICS AND HEALTH POLICY} 112, 117-18, 120 (Robert M. Veatch & Roy Branson eds., 1976) (“[H]ealth care ought to be considered a primary social good in [Rawls’s] terms.”); see also Ani B. Satz, \textit{Testing Access: Toward a Theory of Entitlement to Genetic Testing and Screening as a Form of Health Care} 147-52 (June 30, 2001) (unpublished Ph.D. dissertation, Monash University, Melbourne, Australia) (on file with author) (arguing that some forms of health care may be understood to support the social primary good of the social bases of self-respect).
  \item \textsuperscript{50} See DANIELS, \textit{supra} note 38, at 33-34 (conditionally extending the fair equality of opportunity principle in order to ground entitlement to health care services that support the normal opportunity range, that is, the ability to pursue reasonable life plans and goals relative to an individual’s skills and talents); THOMAS W. POGGE, \textit{REALIZING RAWLS} 181-96 (1989) (presenting a “semiconsequentialist” view that individuals behind the veil of ignorance would choose a variation of Rawls’s fair equality of opportunity for “health protection” that would be of lexical priority to (not compromised in favor of) the difference principle).
  \item \textsuperscript{51} See Satz, \textit{supra} note 49, at 147-52.
  \item \textsuperscript{52} DANIELS, \textit{supra} note 38, at 33-34.
  \item \textsuperscript{53} Id.
\end{itemize}
patient choice in selecting health care services. In addition, they do not address the biological, economic, and social constraints under which patients make medical decisions.

1. Valuing and Understanding Choice in Medical Decision-Making

Both utilitarian and contractarian approaches experience difficulty in accounting for the nature of patient choice. The difficulty lies in the ability to distinguish between choice and non-choice factors. Choice factors are those where an individual chooses something because it is preferred; non-choice factors include variations in biology and social constraints that inhibit or prevent an individual from choosing something desired, causing them to choose something else. Generally speaking, neither dominant theoretical approach appreciates this distinction.

Consider the withdrawal of a feeding tube and hydration from a terminally ill, conscious patient who is competent to make medical decisions. By removing the feeding tube and hydration, the individual is making the decision to starve, dehydrate, and die. This choice seems clearly different from the starvation and dehydration of an individual who lacks food and water. In the later case, it is absence of material resources, or a non-choice factor, that results in starvation.

Under a cost-utility scheme, when there is great expense at the end of life with limited life extension, withdrawal of food and hydration may support the greatest utility. But the patient may be seeking death to end pain, incapacitation, depression, or family strife; these biological and social non-choice factors exist independently of the cost-utility of continuing care. While it is possible that these non-choice factors might be considered under a different understanding of well-being if they relate to utility, such a cost-utility framework still may not capture what is at stake. For example, mandating patient food and hydration does not

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54. Here, “utilitarian” is used to mean cost-utility and “contractarian” refers to extensions of Rawls’s theory of distributive justice. “Utilitarian” is also used in this Article to refer to classical utilitarianism, and this is so indicated where relevant. This Article speaks in general terms about utilitarian and contractarian approaches and does not seek to draw fine distinctions between them.

55. SEN, COMMODITIES AND CAPABILITIES, supra note 23, at 18.

56. AMARTYA SEN, INEQUALITY REEXAMINED 52, 111-12 (1992) [hereinafter SEN, INEQUALITY REEXAMINED] (speaking about the difference between fasting and starving due to lack of nourishment).

57. Sen provides another example regarding the inability of utilitarian (and contractarian) approaches to account for non-choice factors. The ability to metabolize food at a normal rather than a high rate is advantageous for preventing starvation. In order to prevent starvation within certain populations or to ensure sufficient humanitarian aid, metabolic rate must be considered directly along with the amount of food distributed. Utilitarian and contractarian theories premised on the distribution of primary goods consider metabolic rate only insofar as it affects desired mental states
eliminate the deprivation a depressed or incapacitated patient experiences. Similarly, contractarian approaches consider the circumstances behind the decision to withdraw treatment only indirectly; for example, whether the feeding promotes a social primary good or serves fair equality of opportunity.

Biological variation is another constraint on choice with significant implications for the distribution of high technology health care services. Individuals may function effectively in different ways. Some may walk with prostheses while others wheel for mobility, for example. Some high technology health care services, like pharmacogenetics and certain forms of genetic testing, rely upon individual variations of biological function for clinical efficacy; in other words, their medical appropriateness depends upon distinctions between individuals. For these reasons, it is necessary to use a framework for distributing health care services that accounts for biological variation and how individuals transform commodities, such as health care services, into certain health states.

A classical utilitarian approach and derivative cost-utility approaches, however, do not account directly for the different biological abilities of individuals. Rather, access to certain resources is presumed to have certain effects; “a bicycle is treated as having the characteristic of ‘transportation,’” and this is the case whether or not the particular person happening to possess the bike is able-bodied or crippled. Similarly, under a cost-utility scheme, rankings of health care services are determined by aggregative scales, which assign a set value to a given service.

Further, one must be able to account for external barriers to well-being or lack of commodity entitlement in order to understand consumer demand. These barriers might include social pressures, employment regulations, taxes, or national economic development. In the health care context, limitations pertaining to funding of health care and technological advancement, as well as cultural views about health care, are also relevant. A cost-utility approach considers these constraints only indirectly, to the extent that they impact the utility of a particular health care service.

or preferences, the availability of primary goods, or fair equality of opportunity. Thus, metabolic rate is considered indirectly, in terms of maximizing utility or determining who is disadvantaged by the distribution of primary goods or is not afforded fair equality of opportunity. SEN, COMMODITIES AND CAPABILITIES, supra note 23, at 18.

58. I have argued elsewhere the importance of considering alternative modes of functioning in disability accommodations. See Ani B. Satz, A Jurisprudence of Dysfunction: On the Role of “Normal Species Functioning” in Disability Analysis, 6 YALE J. HEALTH POL’Y L. & ETHICS 221 (2006).

59. Id. at 238.

60. SEN, COMMODITIES AND CAPABILITIES, supra note 23, at 6.

61. See supra note 46 and accompanying text.

62. Some of the barriers to commodity entitlement may be voluntary, like career choice.
Contractarian frameworks also experience difficulty in directly accounting for biological and commodity restrictions. In part, this is because the relationship between the distributional goods—primary social goods in the case of Rawlsian devices—and health is not direct. Primary goods are social goods, or goods governed by social institutions; health is a natural primary good, or one based on natural endowment. Health may be influenced by social institutions, but such institutions alone cannot control the value of health care because biological variation among individuals informs health status. Restrictions on commodity entitlement are addressed only indirectly as well, by redistributing resources to benefit the least advantaged. Daniels’ conditional extension of Rawls’s fair equality of opportunity principle encounters similar problems.\(^6\) Biological and resource barriers are relevant only insofar as they impede a baseline of normal functioning; they are not considered directly. Further, the relationship between health and fair equality of opportunity is not direct. Individuals may possess health-related abilities regardless of opportunities.\(^6\)

In order to understand the relevance of consumer demand for some basic health care services over others, it is important to operate within a theoretical framework that accounts for an individual’s biological, economic, and social restrictions. High technology health care may better advance the goals of basic health care for some individuals, based upon their biology or other constraints. In order to take patient choice seriously, our legal structures must support high technology health care services as part of the range of basic health care available to an individual.

2. Accommodating Indirect, Uncertain, and Future Health Care Benefits

Utilitarian and contractarian approaches consider direct benefits to well-being. Direct health care benefits afforded by diagnosis, prevention, and limited treatment are typically accommodated by these frameworks. Traditional and high technology may also provide indirect benefits, however, such as psychological preparedness, comfort, security, reassurance, and family planning, which support the goals of basic health care. These benefits are most often associated with high technology health care, and, in particular, innovative predictive health care services. Accommodating indirect benefits under a utilitarian or contractarian approach becomes especially difficult when the benefits are uncertain, even if their potential efficacy is great. Additional complications arise when uncertain benefits would not be immediate but in the future.

The importance of indirect, uncertain, and future health care benefits is

63. DANIELS, supra note 38, at 39-40.
64. One cannot have certain opportunities, however, without the requisite capabilities for health.
illustrated by the shortcomings of the Tengs study, which measured the QALYs associated with testing for the breast and ovarian cancer genes BRCA1 and BRCA2. The Tengs study serves as an example of how a utilitarian or cost-utility scheme for distributing high technology health care might function in practice. While the study indicates people desire predictive testing, and it has the potential to confer basic, indirect health care benefits like reassurance, these benefits are undervalued by the measures the study employs. Using data from published studies, a public database, and eighteen cancer experts (a response rate of 33%), the study found about a 0.5-2.0 QALY gain for women with a family history of early breast and/or ovarian cancer who were able to use the information to guide decision-making about prophylactic surgery. For women at average risk—that is, without such a family history—the estimated QALY gain was only .002-.008 QALYs, or one to three days. The QALY ranges reflect the spectrum between a perfect test of 100% sensitivity and specificity to ones with 80% sensitivity and 99% specificity, the lower boundaries being an estimate of the actual sensitivity and specificity. At the extremes of family history risk (that is, very high and very low risk), a test with less than 100% sensitivity and specificity has no QALY value because the test fails to supplement sufficiently the knowledge of the tested individual. This assumes that a slight chance of having or not having a life-threatening condition would fail to cause a large amount of distress.

The study ignores the indirect health care benefits associated with predictive testing, including comfort, security, and psychological preparedness pertaining to health status, and, as the study itself indicates, reassurance. Arguably, this translates into undervaluing the quality of life associated with testing. Testing may also invoke anxiety or fear for those who test positive and survivor guilt in those who test negative, but these negative, indirect influences on quality of life need to be weighed against the positive ones. Although it is possible that indirect benefits associated with BRCA1 and BRCA2 testing could be added to future QALY assessments, the Tengs study makes clear that these benefits present problems for standard interpretations of QALYs.

66. Id. at 366, 374.
67. Id. at 368, 373-74.
68. Id. at 371.
69. Id. at 367.
70. Id. at 371.
71. Id. at 374.
More importantly, the case of risk extremes suggests that the QALY method is likely not flexible enough to accommodate indirect benefits. Individuals who are at very high or low risk might benefit tremendously from genetic testing because of indirect, psychological benefits, but they will almost always receive a QALY score of zero because they are perceived not to benefit medically from the information. Thus, the indirect or uncertain benefits of low or high risk individuals will be inappropriately discounted.

The Tengs study also does not address the possible future benefit of testing, which raises the question of how QALYs would accommodate a time lag in possible benefit; that is, testing now in hopes of benefits such as prophylactic treatment later. QALYs measure benefit over a lifetime, but in terms of all possible services, rather than one particular service with protracted benefits. In this sense, QALY schemes only create entitlement to services with expected benefit. Under such frameworks, predictive, presymptomatic testing probably would not be provided when there are no prophylactics or other treatments for the tested conditions available other than experimental treatments.73

Contractarian approaches that appeal to baselines of functioning or basic minimums face similar challenges. These theories largely contemplate direct, current benefit. Health care services are valued to the extent they promote a current level of biological functioning or ameliorate a condition or risk of one in the present. Future benefit is considered only in the sense that services are provided for immediate advantage at certain points in time in order to benefit an individual over a lifetime, as, for example, in the case of vaccinations. These theories do not speak to the largely future benefits of health care services provided in the present. Yet some forms of innovative predictive technologies may allow individuals with certain predispositions to follow or invest in research for their predicted conditions and to use prophylactic or other treatments as soon as they become available in the future. These options have value, even if the benefits they confer are not realized at a given point in time.74

Capability equality more adequately addresses the benefits of high technology health care and consumer demand for such care. It accommodates technologies with indirect, uncertain, and future benefits. In addition, basic


74. Bernard Williams, The Standard of Living, Interests and Capabilities, in THE STANDARD OF LIVING 94, 99 (Geoffrey Hawthorn ed., 1987) (discussing the value of considering the actual abilities one has, given certain conditions, such as breathing clean air if one lives in the right part of the U.S. or is able to travel there, versus the actual abilities one has at the moment, like breathing clean air while one is living in Los Angeles).
capability equality has the ability to account for biological variance and commodity restrictions affecting medical decision-making. Further, the connection between capabilities and health is more direct than that between health and social primary goods, baselines of functioning, or utility. Basic capabilities, in fact, may be understood to support directly basic health care.

C. Interpreting Basic Capability Equality

Sen describes his theory of basic capability equality in a collection of works. The theory is expressed formally. For these reasons, interpretation of Sen’s theory is itself a rigorous enterprise. Due to the complexity and value of the theory, it is necessary to discuss its interpretation in greater detail than is normally warranted in an Article of this length. What follows is an interpretation of the key components of basic capability equality and their application to high technology health care. As Sen’s theory relies upon choice among particular sets of capabilities, valuation is an important aspect of the theory. Given the confines of this Article, however, the discussion of valuation is reserved for the Appendix.

1. Basic Theory

In very general terms, basic capability equality maximizes capabilities across a given population. Capabilities are defined generally in terms of functionings, which are in turn conceptualized as “doings and being.” Functionings are “parts of the state of a person, particularly the various things he or she manages to do or be in leading a life.” For example, the capability to overcome ailments may include functionings like the ability to sleep, to consume nourishing and fresh


76. Any relatively concise interpretation of basic capability equality is surely inadequate. Nevertheless, that is the most one can hope to present in an article—enabling some connections between Sen’s complex and robust theory and determining access to health care.

77. Sen, Capability and Well-Being, supra note 75, at 31.
food, and to develop white blood cells to fight infection.\textsuperscript{78}

Basic capability equality incorporates a consequentialist but non-welfarist (and non-utilitarian) conception of the good. It is consequentialist because it measures the moral value of actions in terms of the outcomes they bring about; basic capabilities are to be maximized across populations. Theoretically, such populations may be as small as families or as large as cultural communities. It is non-utilitarian because the "units" of distribution are capabilities, not utils or measurements of utility.\textsuperscript{79} Further, unlike utilitarianism, basic capability equality involves maximization without aggregation or summation.\textsuperscript{80} By maximizing capability sets rather than utility, basic capability equality avoids the classic arguments against utilitarianism about individuals adapting to, or accepting, objectively undesirable states.\textsuperscript{81} In addition, basic capability equality may be distinguished more broadly from welfarist approaches because it is concerned with what a person can do or be, rather than with a person's well-being independently of what she is capable of doing or being.\textsuperscript{82} This factor is important

\textsuperscript{78} Capabilities may also be more narrowly construed, like the capability to sleep, which also could be composed of functionings relating to the ability to fall and stay asleep and to experience the relevant restorative sleep cycles.

\textsuperscript{79} A mental state, such as pleasure, could be maximized as a functioning, although this would raise the classic problems of utilitarianism, such as offensive and expensive tastes. See J.J.C. SMART & BERNARD WILLIAMS, UTILITARIANISM FOR AND AGAINST (1973).

\textsuperscript{80} In other words, the mechanics of maximization for utilitarianism involves translating conditions into utils and then adding those units. Sen, \textit{Equality of What?}, supra note 75, at 359, 369; see also infra Appendix.

\textsuperscript{81} See SMART & WILLIAMS, \textit{supra} note 79. Basic capability equality shares some similarities with utilitarianism, however. Like utilitarianism, basic capability equality focuses on what goods do for individuals. Capabilities are agent-oriented; they are chosen from a capability set by an individual, and they pertain to what that individual is able to do or be. Sen, \textit{Capability and Well-Being}, \textit{supra} note 75, at 31. Capability indexes also may be used in ways similar to utility indexes to account for incremental contributions to well-being, although the units differ from utility. Sen, \textit{Equality of What?}, \textit{supra} note 75, at 369. Utilitarian considerations are only concerned with what goods contribute in terms of their utility, as measured by a valued mental reaction such as happiness, pleasure, or desire fulfillment. See SEN, \textit{COMMODITIES AND CAPABILITIES}, \textit{supra} note 23, at 19-20. Basic capabilities are multi-dimensional and allow for more direct evaluation of human conditions. SEN, \textit{INEQUALITY REEXAMINED}, \textit{supra} note 56, at 44.

\textsuperscript{82} In general, well-being is the way in which Sen speaks of assessing an individual's achievement in the sense of "how 'well' is his or her [state of] 'being'?” SEN, \textit{COMMODITIES AND CAPABILITIES}, \textit{supra} note 23, at 3. Sen's definition of well-being also may be distinguished from economic conceptions of well-being, which rely upon opulence or control of commodities. Sen divides valuation of well-being into two interrelated parts: (1) specification of valued functionings (value-objects) and (2) valuation of functioning achievements. SEN, \textit{COMMODITIES AND CAPABILITIES}, \textit{supra} note 23, at 20. Formally, valuation entails specification, though specification substantively makes valuation possible. See Sen, \textit{Capability and Well-Being}, \textit{supra} note 75, at 32.
for understanding Sen’s theory. He argues that basic capability equality supports well-being, but his conception of well-being should not be confused with welfarist conceptions of well-being.

Basic capability equality differs from contractarian frameworks like Rawls’s primary goods approach and Ronald Dworkin’s resource allocation theory, both in the units it seeks to distribute and in its approach to distribution. Such contractarian approaches focus upon the primary social goods or resources an individual possesses, while basic capability equality is concerned with a person’s capabilities, or opportunities or freedoms, given the characteristics and commodities she possesses. In addition, Rawls’s and Dworkin’s theories may generally be understood to distribute resources according to just procedure, while Sen’s theory looks to outcomes.

Another distinctive feature of basic capability equality is how it addresses inequality. The theory recognizes inequality as involving more than disparity in income, goods possessed, and utility. In so doing, it rejects classic economic models appealing to utility (commodities and income), Rawlsian primary good and other resource models, and utilitarianism. Instead, capabilities, which are believed to capture better the essence of well-being, are to be equalized at the highest possible level.

The ability of the basic capabilities model to consider more directly the essential functionings of life, or the “fuller recognition of the variety of ways in which lives may be enriched or impoverished,” is a driving factor behind Sen’s approach. As a result, basic capability equality requires that the values of basic capabilities are assessed directly, contributing to a multi-dimensional approach to well-being that more completely considers individual contributions to well-being.

85. Basic capability equality does, however, share some important features with the contractarian models Sen rejects. Sen’s work in capabilities is, in fact, inspired by Rawls’s conception of primary goods. Sen, Equality of What?, supra note 75, at 368. Both primary goods and basic capabilities are objectively valued entities that are distributed equally in some sense. Basic capabilities are to be maximized, and parties at the original position desire primary goods to the greatest extent possible. Unlike primary goods, capabilities are not static because individual choice affects which capabilities are valued. Capabilities also differ from primary goods because they do not comprise a finite list of goods. See id. These two differences may avoid the “fetishist handicap” often associated with Rawls’s list of invariable goods.
86. Sen argues that this type of maximization, basic capability equality, “corresponds to total utility equality” in that it looks to a total measure of equality based upon observed facts. Sen, Equality of What?, supra note 75, at 359, 369. This is different from maximization through aggregation or summation. Id. at 359; see also supra notes 80-82 and accompanying text.
87. Sen, Inequality Reexamined, supra note 56, at 44.
and better understands the causes of deprivation. In this way, Sen’s approach differs from Rawls’s primary goods approach, which only looks to the value of specific social goods, and may be contrasted with utility measurements, which are viewed as means to achieve given welfare ends rather than as contributors to well-being.

Sen uses formal language to represent the functioning vectors, and thus capabilities, which it is possible for an individual, $i$, to choose. The formal representation is useful because it is a concise expression of Sen’s theory and illuminates its flexibilities and constraints. For person $i$, capability sets are formally represented as follows:

$$Q_i(X_i) = \{b_i \mid b_i = f_i(c(x_i)) \text{ for some } f_i(\cdot) \in F_i \text{ and for some } x_i \in X_i\}.$$

That is, a capability $b_i$ is a vector of functionings. There is a personal utilization function $f_i$, such that $b_i$ is obtained through the application of a utilization function $f_i$ to $c(x_i)$ for some $x_i$, where $x_i$ is a commodity bundle and $c(x_i)$ are characteristics of the commodity bundle for person $i$. $Q_i(X_i)$ is the set of relevant capabilities.

Sen views $b_i$ as an individual’s “being” or functionings indicative of one’s well-being. Of relevance to applying capabilities in a health care context is the fact that $b_i$ may depend upon the commodities possessed by others, such as access to public health care programs to prevent the spread of contagious disease, as well as the functionings of others, like contagious illness itself. For parents, $b_i$ may be influenced by the medical care or other needs of their children. These are other-regarding choices to which we will return in Part III.

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88. *Id.* at 43-44.
89. *Id.*
90. SEN, COMMODITIES AND CAPABILITIES, supra note 23, at 7.
91. *Id.* at 9. The following preliminary definitions are provided by Sen. *Id.* at 7. This model resolves the ambiguity about Sen’s expression of functionings and capabilities in favor of the idea that capabilities are vectors of functionings, that is, capabilities are more generally vectors of doings or beings. See infra Subsection I.C.2.

- $x_i$ = the vector of commodities possessed by person $i$.
- $c(\cdot)$ = the function (linear or nonlinear) converting a commodity vector into a vector representing characteristics of those commodities.
- $f_i(\cdot)$ = a personal ‘utilization function’ of $i$ reflecting one pattern of use of commodities that $i$ can actually make (in generating a functioning vector out of a characteristic vector of commodities possessed).
- $F_i$ = the set of ‘utilization functions’ $f_i$, any one of which person $i$ can in fact choose.
- $b_i$ = achieved functionings (that is, a vector) resulting from choice of utilization function $f_i(\cdot)$, with commodity vector $x_i$, $b_i = f_i(c(x_i))$.

92. *Id.* at 8. Arguably this would also apply to standard of living. See infra note 155.
93. SEN, COMMODITIES AND CAPABILITIES, supra note 23, at 7.
Sen asserts that, in general, capabilities are limited or enabled by both the possible functionings an individual may achieve based upon personal characteristics and her entitlement to, or command over, commodities.\(^9\) \(Q_i(X_i)\) represents a capability set: the ability to choose functionings based upon the conversion of personal characteristics into functionings, \(F_i\), and commodity entitlements, \(X_i\). Both personal characteristics and command of commodities may restrict capabilities. Restrictions on capabilities may be the product of voluntary or involuntary choice.\(^9\) Considering personal characteristics, for example, nutrition may be voluntarily controlled, but certain biological conditions such as genetic disease may not be so restrained. Income and other commodity entitlements may be affected by voluntary choices about education or careers,\(^9\) while government employment regulations, taxes, or national economic development may involuntarily limit commodity entitlement.\(^9\)

There are various possible permutations of Sen’s theory, demonstrating flexibility in how the base theory functions and how it might be applied to new contexts. In order to understand how Sen’s theory could be applied to basic health care, it is helpful to conceptualize it in terms of two relationships: functionings and capabilities, and freedom and capabilities. Ambiguity within each of these relationships contributes to the complexity of basic capability equality, even before one arrives at the point of valuing capabilities.

### 2. Functionings, Capabilities, and Health Care

Capabilities pertain to the possible social and natural states of a person.\(^9\) They are abilities that may be realized. Health is closely related to the abilities or states of a person and may be viewed as a collection of capabilities.\(^9\) While Sen does not define “basic” in basic capability equality, he identifies basic capabilities as those roughly needed to live.\(^100\) On these terms, basic capabilities may be understood to support basic health care. As such, it is vital to explain the dimensions of capabilities within Sen’s theory.

Capabilities are defined generally in terms of functionings, or the “doings

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94. Id. at 9.
95. Id. at 18.
96. This assumes a range of career options.
97. This assumes an affected individual has a limited capacity to change the government.
98. Capabilities refer directly to the states of a person, rather than to the relation of her external circumstances to her ability to function.
100. Sen, Capability and Well-Being, supra note 75, at 41 (“[B]asic capabilities’ . . . was intended to separate out the ability to satisfy certain crucially important functionings up to certain minimally adequate levels.”).
and beings” in leading a life.\textsuperscript{101} There are two ways to understand capabilities under Sen’s model:\textsuperscript{102}

(a) Alternative combinations of functionings that a person can achieve, and from which she can choose one collection; that is, a capability is a vector of functionings,\textsuperscript{103} or

(b) A set of vectors of functionings, reflecting a person’s freedom to lead one type of life over another.\textsuperscript{104}

In the first case, capabilities themselves are vectors consisting of functionings, or capability-vectors. On this reading, the components of a capability-vector are functionings, which may be either doings or beings. Thus, the term “functioning” does not describe a vector of doings and beings, but is instead a more general term for doings and beings. In the alternative, functionings are vectors of doings and beings, and capabilities are sets of functionings, that is, sets of functionings-vectors.\textsuperscript{105}

To understand this distinction, consider the following examples of functionings: the ability to consume a balanced diet, to exercise, to breathe without obstruction, and to be immune from, or to have the ability to overcome, ailments. Using understanding (a) of capabilities above, these functionings could be components of a vector and constitute the capability of “having basic health” or “having a decent health status.” Using understanding (b), the functionings would be components of a vector, and would be combined with other vectors of functionings to constitute a capability. For example, having basic health could be one vector within the capability set for being able to learn. Other vectors might include being able to read, to comprehend, to freely express ideas, and to interact socially.

Although capabilities and functionings should be distinguished from the common language usage of the terms, they may be applied whenever the formal

\textsuperscript{101} Id. at 31.

\textsuperscript{102} This ambiguity may be explained by Sen’s motivation to capture the essence of well-being by using capabilities. Sen emphasizes that what should matter for distributive justice is that people are placed in a position to function at roughly the same level, though not necessarily in the same way. That is, the range of things an individual can do or be should be equalized, rather than welfare or resources. The amorphous nature of this idea makes finding models that capture all, or at least most, of its aspects difficult.

\textsuperscript{103} Sen, \textit{Capability and Well-Being}, supra note 75, at 31. This view of capabilities is also endorsed in Sen, \textit{Commodities and Capabilities}, supra note 23.

\textsuperscript{104} SEN, \textit{INEQUALITY REEXAMINED}, supra note 56, at 40.

\textsuperscript{105} Sen, \textit{Capability and Well-Being}, supra note 75, at 31.
notions that support them can be interpreted to match concrete factual assumptions. In this way, the ambiguity that is a problem for systemic discussion makes it possible to conceptualize capabilities in ways appropriate for different contexts. It seems that the more specific the capabilities being considered, the smaller the number of relevant functionings. The opposite is true for general capabilities, which likely involve more functionings. For instance, broad capabilities like health, nourishment, and average lifespan may include more functionings than the less general capabilities of seeing, walking, and hearing. For the purpose of thinking about high technology health care, it is useful to invoke a broad capability category, like decent health endowment or health status, as well as narrow capabilities, such as the ability to take advantage of prophylaxis or family planning, as enabled by predictive testing.

Capabilities and their corresponding functionings vary not only in generality but also in importance, ranging from significant to trivial. The capabilities to eat, to drink, and to be clothed and sheltered may be the most basic and important. The capability to possess health is perhaps at a level above these most basic capabilities but is still very basic. Level of specificity does not inform significance. For example, the ability to have a decent health status is a vital but very general capability, while the ability to have straight teeth is a specific but nonessential health status. Applying Sen’s theory only requires a choice of capabilities relevant to understanding the deprivations of a given population. The focus of this Article is the range of basic capabilities that are supported by high technology health care.

3. Capability, Freedom, and Medical Decision-Making

Capability sets reflect a person’s freedom because, by construction, capabilities are chosen by the relevant agent. Sen believes that, in general, capability sets account for positive freedom: “[t]he freedom to lead different lives.”

106. Id.

107. Most of Sen’s writings focus upon basic capabilities, though the flexible formal language of his theory could be applied to non-basic (and possibly even trivial) capabilities.

108. Sen, Capability and Well-Being, supra note 75, at 32.

109. Id. at 33. Sen claims that basic capability equality supports the ability of an individual to have and evaluate options (capability sets). See, generally, works cited supra note 75. Commentators argue that this is one possible interpretation of basic capability equality; the other is that chosen functionings are what matter. See Anthony Atkinson, The Contributions of Amartya Sen to Welfare Economics, 101 SCANDINAVIAN J. ECON. 173 (1999). The former interpretation of basic capability equality values freedom of choice and supports, for present purposes, something akin to freedom in medical decision-making. On the latter reading, it is not freedom to choose that is significant, but rather the outcome, or whether capabilities are maximized by actual choice. This interpretation supports something like maximal health status.
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types of life is reflected in a person’s capability set." In fact, he finds fault with Rawls’s and Dworkin’s contractarian theories on the ground that both fail to consider adequately positive freedom. Sen believes that this freedom may be of intrinsic significance itself, in addition to its instrumental importance to well-being. He goes further to tie freedom to the moral importance of capability; “if freedom is valued then capability itself can serve as an object of value and moral importance.” The choice of one capability vector over another is characterized by commentators as a positive freedom in the spirit of Isaiah Berlin’s classic account. Capabilities are viewed as fully capturing positive freedom.

On this positive freedom account of basic capability equality, it is the choice involved in generating outcomes that is of value to the theory. It is this interpretation that distinguishes basic capability equality, in part, from welfarist approaches, including cost-utility approaches, because freedom is valued independently of outcome. Thus, there is value in an individual being able to choose high technology health care that is unproven or risky, but potentially greatly rewarding, even if it ultimately does not lead to the desired health state. This freedom in decision-making is also not captured by contractarian-derived models, which allocate services to supply a baseline of care to support a certain level of functioning, without attention to patient choice among services. Contractarian models do not value freedom independently of process.

Considering freedom of choice with regard to capability sets has important implications for the valuation of such sets and medical decision-making. First, it implies that there is value in a range of choice. The example of choosing to

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110. Sen, Capability and Well-Being, supra note 75, at 33.
111. SEN, RESOURCES, VALUES, AND DEVELOPMENT, supra note 23, at 323.
113. SEN, RESOURCES, VALUES, AND DEVELOPMENT, supra note 23, at 316.
114. Berlin discusses two types of freedom: negative and positive. Negative freedom is freedom from interference by others. Positive freedom is freedom to act in accordance with one’s own will. See Isaiah Berlin, Two Concepts of Liberty, in FOUR ESSAYS ON LIBERTY 118, 121-34 (1969).
116. Sen uses this idea of freedom in his development work to argue for “capability expansion” as emancipation from deprivation, instead of preference satisfaction or greater utility. SEN, RESOURCES, VALUES, AND DEVELOPMENT, supra note 23, at 509-10; Qizilbash, supra note 115, at 143-48, 159.
117. Atkinson, supra note 109, at 179. The range of choice cannot be assessed independently of an individual’s valuation of the elements in that range, however. See infra Section II.C. Bernard Williams questions whether capabilities may so easily be equated with freedom in terms of agency as freedom of choice. Williams, supra note 74, at 97-98. He suggests that factors considered by Sen
starve given biological or social restrictions on choice (for example, one’s own pain or the burden on one’s family) versus the same choice without these restrictions (for example, to make a political statement through a hunger strike) is informative here. Only the latter involves freedom of choice. Second, it demands the availability of more information than a situation where the maximal outcome is sufficient. Namely, it requires sufficient information to consider possible alternatives. As will be discussed in Part II, high technology health care, like predictive testing, may help provide this information.

In sum, basic capability equality values patient choice for high technology and other health care independently of outcome or predicted health status. As a result, basic capability equality accounts for patient freedom in medical decision-making more fully than cost-utility or contractarian-derived frameworks. It captures the value to patients of both the direct and indirect benefits of high technology health care, including uncertain therapies with the potential to increase basic capabilities, now or in the future.

II. BASIC CAPABILITY EQUALITY OF HIGH TECHNOLOGY HEALTH CARE: PREDICTIVE TESTING AS A CASE STUDY

In passing, Sen recognizes basic health care as enabling basic capabilities to be capabilities and enabled by high technology health care, such as life expectancy, do not involve a meaningful sense of freedom in terms of choice. The choice, he says, relating to life expectancy, is whether to live or die, and it is odd to think that living longer preserves a choice about whether one wishes to commit suicide (physician assisted or otherwise). Id. (Williams holds, though, that capabilities need not be directly related to choice; it is enough for the capability to generate a valued good or for choice to be relevant in an indirect way. Id. at 98.) If valid, Williams’ criticism would affect the claim that Sen’s basic capabilities approach more directly accommodates high technology health care than the Rawlsian one, insofar as it relates to freedom to make certain choices that affect health, family planning, or individual life plans. Williams’ quibble with Sen’s use of life expectancy seems misplaced, however. It is more an interpretation of the reason that life expectancy is a capability, rather than evidence that capabilities are not related directly to freedom as choice. An increase in life expectancy, for example, need not be associated with whether to live but, rather, with the freedom to make choices about how to live. Surely this is at least part of what Sen means when he speaks about the lower life expectancy of women in India and China in his development work. See, e.g., SEN, COMMODITIES AND CAPABILITIES, supra note 23, App. B at 52-69 (India); SEN, RESOURCES, VALUES AND DEVELOPMENT, supra note 23, at 526-27 (China). The same types of considerations motivate predictive testing employed to determine life expectancy. Individuals may undergo testing in order to determine whether they (or their fetuses) are at risk for disorders that affect life expectancy. The concern is that one has a life of sufficient length to make subsequent choices about life plans, experience certain qualities or aspects of life, et cetera, and not whether one has a longer time to choose whether to continue to live.

118. SEN, INEQUALITY REEXAMINED, supra note 56, at 33, 111-12.
vital to well-being and economic development, and others have assessed the impact of basic health care upon developing countries. I am unaware, however, of any work that considers the role of health care in enabling basic or other capabilities in more developed societies. This discussion makes plausible the idea that Sen’s theory is applicable to health care, especially high technology health care, as it has been applied previously to poverty, famine, and other serious deprivations.

Applying basic capability equality to high technology health care requires that the “currency” or “units” of basic capabilities are applicable to innovative medical technologies. This Part will address basic capability equality as it applies to predictive testing, both genetic and otherwise. Section A will discuss broad health capabilities, or predictive testing as enabling a decent health status or endowment. Section B will address more specific capabilities allowed by predictive testing, such as psychological preparedness and the ability to take advantage of prophylactic treatments. It is also possible to make a case for high technology health care like predictive testing on a more foundational level, since it generates medical information that has the potential to broaden an individual’s range of capability sets and thereby enhance her positive freedom to choose between sets. This is the topic of Section C.

Predictive testing is chosen as a test case for the application of Sen’s theory to high technology health care for two reasons. First, it faces perhaps the greatest challenge in being recognized as a form of basic health care because of the indirect health care benefits it confers. Second, it likely has the most potential of high technology health care to impact social stratification, given its potential effect on the formation of life plans and future generations. This Part will demonstrate that predictive testing supports basic capabilities that inform basic health. The arguments in this Part apply broadly to demand for other forms of high technology health care that meet the goals of prevention, diagnosis, and limited treatment.

A. Broad Capabilities: A Decent Health Status or Endowment

Predictive testing that confers basic health care benefits may be viewed as enabling the broad capability of basic health. In other words, the capability set of basic health may include capability-vectors of functionings pertaining to capabilities for diagnosis, limited treatment, and prevention (including prediction). Functionings may vary depending upon whether basic health is

understood as a decent health status or a decent health endowment.\footnote{Either may be a capability, or, in the alternative, a functioning in a broader set of capabilities including other functioning needed to live a good life, such as basic education and rational life plan formation.} A decent health status may generally be conceptualized as a current state of affairs; a decent health endowment implies a more foundational health status, for example, that which results from favorable genes or other long-term biological advantages.\footnote{These advantages need not be ones that can be passed to future generations.} While the line between the two is not solid, the distinction is useful for identifying the contours of the capability of basic health as enabled by predictive technology.

Basic health care may relate to health status or endowment in different ways. Health status may be the result of prevention (including prediction), diagnosis, and limited treatment. Predictive testing may affect health status by generating information that contributes to comfort, security, or psychological preparedness. In other words, each of these benefits may be functionings supporting the capability of a decent health status. A decent health endowment is currently largely the product of predictive testing, such as prenatal or carrier genetic testing, followed by family planning (assisted reproduction or selective abortion) to avoid certain genetic diseases or other conditions.\footnote{A decent health endowment could also result from genetic alteration, though this is not currently technologically possible.} In this instance, the capability of a decent health endowment may support any of a number of functionings related to having a healthy child. The line between health status and health endowment is not rigid, however, as predictive information may contribute to capabilities, such as the ability to take advantage of prophylactic options with long-term effects, which contribute to both status and endowment.

It is important to note that the capability to have a decent health status or endowment is relative to both social and biological constraints. Social constraints include wealth, material entitlements, and cultural norms. In more affluent societies, where assisted reproduction is available, obtaining a decent health endowment may entail genetic testing and embryo selection to prevent all known diseases or deleterious conditions. In these societies, the demand for high technology health care may mirror commodity entitlement.\footnote{On the other hand, a decent minimum could be defined regardless of wealth, as in societies where top genetic endowments are not required in order to be fully functional. See, e.g., Ani B. Satz & Anita Silvers, Disability and Biotechnology, in ENCYCLOPEDIA OF ETHICAL, LEGAL, AND POLICY ISSUES IN BIOTECHNOLOGY 173, 183 (Thomas H. Murray & Maxwell J. Mehlman eds., 2000).} In less economically advantaged societies, a decent health endowment may be one that results from traditional procreation and does not produce life-threatening disease. Predictive testing and other high technology health care may not play a role in

\footnote{121. Either may be a capability, or, in the alternative, a functioning in a broader set of capabilities including other functionings needed to live a good life, such as basic education and rational life plan formation.

122. These advantages need not be ones that can be passed to future generations.

123. A decent health endowment could also result from genetic alteration, though this is not currently technologically possible.

124. On the other hand, a decent minimum could be defined regardless of wealth, as in societies where top genetic endowments are not required in order to be fully functional. See, e.g., Ani B. Satz & Anita Silvers, Disability and Biotechnology, in ENCYCLOPEDIA OF ETHICAL, LEGAL, AND POLICY ISSUES IN BIOTECHNOLOGY 173, 183 (Thomas H. Murray & Maxwell J. Mehlman eds., 2000).}
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these societies.125

Social norms may also impact capabilities. Even if predictive testing is available, the information derived from it may not be of value in certain societies. This may be the case in countries with prenatal testing capabilities where abortion is viewed as immoral, for example. In other societies, patient belief that predictive genetic information is unique, and its disclosure is therefore likely to pose a greater threat of discrimination than other medical information, may limit use of testing.126 Privacy laws that specifically target genetic or other predictive information may lessen the incentives for private insurers to reimburse for testing, due to fear of increased litigation over privacy breach.127

There are also biological restrictions. Some individuals may not benefit psychologically from predictive information, or they may prefer to live free from such knowledge.128 Physical benefit may be limited if there are no treatments or prophylactics for one’s particular disease or condition, though there may be other benefits to knowing such information, like comfort, reassurance, and security that are relevant to basic capabilities. Further, for individuals with uncorrectable defects, promoting one’s health endowment may entail actions that do not further hinder functionality. It may not matter to someone born blind, for example, that she has a genetic mutation that causes night blindness. In contrast, night blindness might be of more concern to someone without congenital blindness.

The basic health care benefits derived from predictive information could be understood as enabling the broad capability of having basic health. This, in turn, may be viewed as either possessing a decent health status or a decent health endowment. A decent health status is supported by predictive testing that allows psychological benefits and prophylactic treatments. A decent health endowment may result from predictive testing that contributes to family planning or long-term prophylaxis. Under either conceptualization, the functionings that support basic health are defined relative to biological and social restrictions.

B. Specific Capabilities: Prophylactics and Mental Health

The ability to engage in predictive testing or know predictive information may itself be considered a basic capability resulting in basic health benefits. The capability to know predictive information is a more specific capability than a

125. The wealth of a society not only affects the availability of predictive testing but that of subsequent health care services needed to further certain capabilities, such as treatments, surgeries, and prenatal care.
126. Nongenetic information, such as information about contagious disease and exposure to environmental toxins, may also be predictive. Like genetic information, this medical information may reveal information about others. See Satz, supra note 49, at 104-06.
127. Id.
128. See supra note 72 and accompanying text.
"decent health status" or a "decent health endowment." The advantage to beginning with a smaller capability set under Sen’s formal model is that it simplifies subsequent evaluations. This Section seeks to provide a general illustration of the application of the theory to the specific capability of knowing predictive health information.

A hypothetical is useful to apply Sen’s model to the functionings, or basic health care benefits, associated with predictive testing. Assume for present purposes that prediction includes only presymptomatic testing, leaving aside carrier and prenatal testing. The capability to predict one’s health status includes the following functionings: psychological preparedness, assurance, comfort, security, and prophylactic options. Also assume that genetic diagnostics are the best method of prediction.

Now imagine an indigent male, Harry, living in a society where access to predictive genetic testing is limited by the ability to pay for testing and by physical proximity to genetic testing centers, which are located in the wealthy suburbs of the city in which he lives. Harry is ineligible for Medicaid because of his gender and age, and he does not live in a locality with a genetic testing center, nor is one easily accessible to him by public or private transportation. Harry wishes to know his predictive (genetic) health information, and it would be useful to him, since a genetic form of colon cancer runs in his family for which there is effective monitoring and treatment.

Recall the capability set equation for person, $i$:

$$Q_i(X_i) = \{b_i \mid b_i = f_i(c(x_i)),$$ for some $f_i(\cdot) \in F_i$ and for some $x_i \in X_i\}.$$  

In the present example, for the capability to know predictive information, $b_i$, there is a vector of functionings containing psychological preparedness for the onset of disease, assurance, comfort, security, and the ability to take advantage of monitoring and prophylactic treatments. There is a personal utilization function $f_i$, such that $b_i$ is obtained through the application of a utilization function $f_i$ to $c(x_i)$ for some $x_i$, where $x_i$ is a commodity bundle and $c(x_i)$ are characteristics of Henry’s commodity bundle. In this case, Harry has several restrictions on his commodity entitlement, given his lack of health insurance and his geographic location. Harry has few restrictions in terms of relevant personal characteristics because he wants to know, and would benefit from, the information. $Q_i(X_i)$ is the set of the relevant capabilities, which contains diagnosis, prevention, and limited treatment.

The function $v_i$ is defined by the achievable functionings, $b_s$, of the

129. See supra note 13 and accompanying text.
130. See supra notes 91-97 and accompanying text.
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capability set $Q_i(X_i)$. The values of well-being that it is possible for one to achieve are represented by Sen as:

$$V_i = \{ v_i | v_i = v_i(b_i), \text{ for some } b_i \text{ in } Q_i \}.$$

The set $V_i$ shows the range of well-being that an agent may achieve with the capabilities available to her. In terms of the ability to know predictive information, the value expressed by $V_i$ is low for Harry because he is burdened by restrictions on entitlement to commodities. He may favor a capability set with a greater chance of knowing predictive genetic information, but it is unavailable to him; his intrapersonal comparisons are limited to those capabilities actually achievable. As a result, he must choose a capability set of basic health care without the capability to know predictive genetic information. (Other sources of predictive information still might be available to him, however, such as non-genetic diagnostics that are performed by the clinics in his locality.)

Remember, though, that Harry lives in an affluent society. Other individuals within his metropolitan area may choose the capability to know predictive information, and in particular genetic information, as part of their capability sets. This alone may be enough to establish a partial dominance ranking favoring access to predictive genetic information as part of a measure of an overall living standard. Interpersonal comparisons may reveal a partial ordering with weighted values that reflect increases in well-being for individuals who are capable of obtaining predictive genetic information regarding their health. This data might be obtained through statistics reflecting the length of life of individuals with and without such information, professional assessments of their psychological health, and their overall quality of life, assuming certain objective measures. In this case, there would be strong support for equalizing access to predictive genetic technologies through government funding, and, as an indigent male, Harry may eventually receive access to predictive genetic testing.

So far this discussion has focused on using the basic capability equality framework to contemplate the health care benefits of predictive genetic testing.

131. Sen formally represents the valuation $v_i$ of individual $i$ as: $v_i = v_i(f_i(x_i))$. SEN, COMMODITIES AND CAPABILITIES, supra note 23, at 8-9. This reading of capabilities follows the view that they are alternative combinations of functionings a person can achieve, and from which she can choose one collection, where capabilities are vectors of functionings. See supra Subsection I.C.2. The valuation, $v_i$, then, is a valuation of capability-vectors. As with all valuation functions, this function pertains to a particular agent. Concisely stated, the valuation function associates a measure of well-being with each capability available to a specific agent.


133. A partial ordering may result when it is possible to rank some capabilities over others without being able to rank every vector of functionings contained therein. See infra Appendix.
for purposes of furthering the goals of basic health care. Special attention was paid to the capability of knowing predictive genetic information. Predictive medical information may also serve a more foundational role in basic capability equality. That is, the information generated from such testing may expand capability sets, and concomitantly, patient choice.

C. Capability Set Expansion

Recall that freedom of choice is an integral part of evaluating capability sets. The implications of this are that there is value in a range of choices, and information is needed to define the relevant range. Sen is careful to point out, though, that it is not the range of choice itself that is valuable, but rather, the value of the elements contained within that range. This is a fine distinction, but the value of the range of choice is tied to an individual’s assessment of the freedom to choose a capability set from within that range, rather than the size of the range per se. Choice from an expanded range may be valuable because the ability to evaluate and choose a capability set is a positive freedom.

Predictive information directly informs the range of choice available to an individual. In this sense, predictive testing, like genetic testing, facilitates the functionality of basic capability equality. If the range of choice is enlarged and valued by an individual, her positive freedom is enhanced. This might occur if predictive information allows treatment or prophylaxis, the ability to form reasonable life plans, or family planning, for example.

The range of choice would not necessarily be enlarged with access to predictive information, however. Medical information may narrow capabilities. This may be the case when an individual does not benefit psychologically from knowing the information, such as when there is no course of action to ameliorate the effects of a disease or other condition. Of course, even in these instances, psychological preparedness may be of value, but this depends upon the person’s capability to use the information to her benefit, or the subjective aspect of the relevant disabling conditions. Some people prefer not to know predictive information about their health, and knowing it may cause them psychological harm. The salient example is the person who has only a very slight risk of a deadly disease but for whom this information dramatically limits her capabilities, by dominating and grossly restricting her life activities.

Regardless, predictive information provides a more accurate picture of an

134. See supra Subsection I.B.1.
135. Sen, Capability and Well-Being, supra note 75, at 34-35.
136. Id. This point is missed in the legal literature. See, e.g., Ball, supra note 20 and accompanying text.
137. Sen, Capability and Well-Being, supra note 75, at 34-35.
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individual’s capability sets with respect to her current and future health states. It allows a more complete understanding of an individual’s personal characteristics and the limitations and advantages they pose for capabilities she may achieve. Thus, the potential of prediction to expand capabilities bolsters the argument for universal access to high technology health care. Access to health care, like predictive testing, not only supports the goals of basic health care, it has the potential to expand the range of medical choices available to an individual.

III. OBSTACLES

While basic capability equality offers strong advantages over dominant theoretical frameworks for distributing basic health care, a number of obstacles arise. The first is inherent to the formal model itself. Namely, the ability to consider constraints on choice is a limitation as well as an asset. The second problem occurs at a practical level: Using basic capability equality to develop a legal paradigm for the distribution of health care will require the abandonment of socially and legally entrenched basic minimum and traditional rationing schemes.

A. Limits of Theory: Constraints on Choice

At a theoretical level, the most significant limitations to applying basic capability equality to health care demand are constraints on choice. Thus far, the ability of Sen’s formal model to accommodate these restraints is understood as a benefit of his theory: It allows one to better understand the circumstances surrounding an individual’s medical decision-making. Nevertheless, these advantages create challenges for the formal model in accounting for negative freedom in choice as well as loss of freedom as a result of choice. The first challenge arises from requiring individuals to choose from among capability sets that may be significantly restricted by personal or social limitations. The second difficulty is created by the loss of freedom caused by making choices that foreclose or significantly restrict future choices, such as irreversible medical decisions. This loss of freedom may occur regardless of whether an individual maximizes her capabilities. The third difficulty is in accounting for other-regarding choices. Each is addressed in turn.

To begin, one must choose from a capability set restricted by personal characteristics, including personal knowledge. One important implication of this model for medical services is that choice operates relative to an individual’s biology. For example, an individual who is ill must choose a capability set from among possibilities restricted by illness. A permutation of this criticism is

138. See supra notes 54-61 and accompanying text.
139. See supra notes 58-61 and accompanying text.
140. Des Gasper, Policy Arena: Sen’s Capability Approach and Nussbaum’s Capabilities Ethic,
that Sen fails to account adequately for negative freedom. While basic capability equality considers commodity entitlements and personal characteristics with respect to positive freedom and capability, it fails to consider freedom from deviation from a certain kind of functioning when capability levels are maintained. For example, someone who is paralyzed but is capable of motion with the assistance of a wheelchair might be considered deprived of motion in the same manner as walking individuals, affecting her negative freedom or her freedom from being impaired in this way.

It is true that there is something lost when an individual suffers an accident and is paralyzed or must choose from capability sets affected by illness. What is lost, however, is largely individual. It is not necessarily the capability for mobility or better health, nor is it necessarily a loss of freedom. There may be alternative modes of functioning that support well-being. In fact, alternative methods of functioning may be enabled by high technology health care such as advanced medical equipment, pharmacogenetics, and biological enhancements that serve as treatments for illness or other conditions.

If functionings may be restricted by choice, an individual may also limit her own freedom, even if she maximizes her capabilities. If individual $i$ chooses the maximal element $b_i$ for $Q_i$, and all other choices are rendered unavailable by this choice (or, in the alternative, the choices become unavailable due to a change in entitlement), capabilities will be maximized, but freedom in terms of choice will decline. This problem is evident in irreversible medical choices. If an


141. See supra note 58 and accompanying text.

142. See, e.g., Venkat Krovi et al., Design of a Walking Wheelchair for the Motor Disabled, 4 PROC. INT'L CONF. REHABILITATION ROBOTICS 125 (1994), available at http://citeseer.ist.psu.edu/krovi94design.html (follow “PDF” hyperlink under “View or download”) (discussing the “walking wheelchair”).

143. Researchers in pharmacogenomics seek to develop drugs to account for genetic variation among individuals. See William E. Evans & Mary V. Relling, Moving Towards Individualized Medicine with Pharmacogenomics, 429 NATURE 464 (2004); Robert F. Service, Pharmacogenomics: Going from Genome to Pill, 308 SCIENCE 1858 (2005); see also John F. Deeken et al., Toward Individualized Treatment: Prediction of Anticancer Drug Disposition and Toxicity with Pharmacogenetics, 18 ANTI-CANCER DRUGS 111 (2007).

144. Certain biological enhancements may help compensate for impairments and serve as treatments that support alternative modes of functioning. For example, gene therapy may be used to increase lipoprotein receptors above the normal range to compensate for the effects of hypercholesterolemia or to cause capillary formation above normal levels in individuals with arterial blockage. See Satz & Silvers, supra note 124, at 184.


146. Id. ("$Q_i(X)$" represents the freedom that a person has in terms of the choice of functionings, given his personal features . . . and his command over commodities . . . . $Q_i$ can be called the
individual chooses to know certain information, and this information diminishes her previous range of choice of functionings associated with not knowing the information, she may experience a loss of (well-being) freedom. Such a loss of freedom pertains most strongly to diagnostic and predictive tests with high specificity. It may be exacerbated in instances where an individual is unable to obtain treatment for a certain condition. The majority of diagnostic and predictive tests provide partial risk information, however. Further, as discussed with regard to biological limits, loss is largely individual; such restrictions on capability sets may not affect health status based upon individual psychology or the ability to function.

Social preferences may restrict capability sets when, regardless of whether functionings may be valued differently by individuals, widespread acceptance of certain functionings as having high (or low) worth limits the opportunity for individual valuation. Consider social movements for the right to life, which have limited the availability of abortion, assisted suicide, and therapies from fetal stem cells. Like biological constraints, social choice restrictions, as well as commodity restraints, impact the process of evaluating capability sets. These are, however, issues to be addressed by political and policy leaders. Social and economic limits plague any distributive approach.

What if an individual makes choices that do not maximize her capabilities? These choices may be self-regarding or other-regarding. If they are self-regarding, this is a loss of freedom that basic capability accepts and that may be justified, based upon the arguments above (the social implications of bad choices are discussed below in Section B). If they are other-regarding, Sen’s formal model cannot directly account for them as contributing to one’s own well-being achievement. Further, the model does not account for the value of the rejected

147. Sen makes distinctions between agency achievement, agency freedom, well-being achievement, and well-being freedom. Sen, The Standard of Living: Lecture II, supra note 75, at 26-29. Agency achievement is the attainment of goals one wants to achieve, possibly outside of one’s own well-being, such as fighting for a cause. Id. Agency freedom is the ability to accomplish those goals. Id. Well-being achievement and well-being freedom are parallel concepts understood relative to one’s own well-being, that is, the attainment of, and freedom to support, one’s well-being, respectively. Id. The categories overlap insofar as an individual’s well-being is affected by other-regarding preferences. See infra notes 150-55 and accompanying text. Thus, they cut across Sen’s notions of well-being, quality of life, and standard of living. See infra note 155.

148. SEN, COMMODITIES AND CAPABILITIES, supra note 23, at 33.
149. Id. at 20.
150. Recall that the function \( v_i \) is defined on the achievable functionings, \( b_i \), of the capability set \( Q_i(X) \). The values of well-being that it is possible for one to achieve are represented by Sen as:

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V_i = \{ v_i \mid v_i = v_i(b_i), \text{ for some } b_i \text{ in } Q_i \}.
\]
Genetic testing for linkage analysis, or testing for the presence of genetic markers indicative of diseases or conditions within certain families, provides an example of how these problems might arise. Consider an individual, Rebecca, who does not wish to know her own genetic status but chooses to be tested in order to aid her pregnant sister, Sarah, who wants to know whether her fetus possesses the breast cancer mutation that runs in their family. Even if the test results are not disclosed to Rebecca, her own results may be indicated by her sister’s decision to carry to term or terminate the pregnancy. To simplify matters, assume Rebecca’s status is indeed indicated by her sister’s actions, and this unwanted information negatively impacts Rebecca, preventing her from maximizing her capabilities.

Under Sen’s formal model, only choices that affect Rebecca’s well-being are integrated directly. Rebecca’s decision to aid her pregnant sister will support Rebecca’s agency and well-being freedom but decrease her well-being achievement. The problem is in accounting for the value that seems lost with regard to Rebecca’s other-regarding choice. This problem may be mitigated partially by the fact that capabilities are maximized across populations. In this sense, contributions to the well-being of others may be integrated indirectly because the overall contribution to the well-being of the women’s family is the same. In the example, Rebecca’s well-being is increased while Sarah’s is not.

As Sen recognizes, the valuation function only evaluates choices with respect to the agent’s own well-being, and an individual’s well-being is fostered only when her agency is concerned with her own doings and beings. Id. Although he does not elaborate upon this point, one can infer that Sen’s theory may experience difficulty in interpersonal comparisons, given the possibility for non-optimal choice with respect to one’s own well-being achievement for the sake of others and the inability to account for this in an individual’s own valuation function. Arguably, agency and well-being freedom are preserved, however. See supra note 147 and accompanying text.

In linkage analysis, several individuals with the disease or condition are tested for polymorphisms, which are certain normal variations in genetic sequences that are often present with an unknown disease gene. Presymptomatic individuals, people without clinical manifestation of the disease but who share these polymorphisms, may be at risk for the disease. For symptomatic individuals, those who are experiencing clinical symptoms, linkage analysis may confirm or disaffirm a genetic diagnosis.

See supra note 147 and accompanying text.

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150. See supra note 23, at 8-9. The set $V_i$ shows the range of well-being that an agent may achieve with the capabilities available to her. This formal representation has several implications for other-regarding choices. Consistent with Sen’s model, one may choose not to maximize one’s own well-being. For example, one may act to benefit another, out of obligation or for other purposes, and decrease one’s own well-being achievement. This means that one acts to maximize, or to improve by some increment, another’s well-being.

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151. In linkage analysis, several individuals with the disease or condition are tested for polymorphisms, which are certain normal variations in genetic sequences that are often present with an unknown disease gene. Presymptomatic individuals, people without clinical manifestation of the disease but who share these polymorphisms, may be at risk for the disease. For symptomatic individuals, those who are experiencing clinical symptoms, linkage analysis may confirm or disaffirm a genetic diagnosis.

152. Sen, Commodities and Capabilities, supra note 23, at 9-10.
153. See supra note 147 and accompanying text.
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(though Sarah exercises agency and well-being freedom in making her choice).\textsuperscript{154} Regardless of whether Rebecca undergoes testing, the outcome, in terms of increasing familial well-being, is identical. One sister’s well-being is increased while the other’s is not, but the opposite choice will produce the same result. Perhaps the maximization of capabilities comes as close as possible to the maximization of the preferred capability range (the value-objects) for all individuals in a given population. This may be the best measure of individuals’ choices, even if it cannot directly integrate other-regarding choices (or account for rejected self-regarding choices) in the valuation process.\textsuperscript{155}

\textbf{B. Social Role of Basic Minimums and Traditional Rationing}

On a practical level, it may be argued that basic minimums and traditional rationing play an important social role in the distribution of health care services. There may be a sense that, even in a developed, western nation, universal access to traditional health care must come before access to high technology health care services, or that there is a need to build the health care service menu from the ground up. This claim might rest on the assumption that high technology health care is not important (or at least not as important as traditional health care services) for meeting the goals of basic health care. In the alternative, it is possible to believe that individuals should not be afforded an opportunity to choose from a set of health care services that contain high technology health care, even with self-rationing, because they may make bad choices, and these choices may be costly to society.

\textsuperscript{154} See \textit{supra} note 147 and accompanying text. Sen assumes other-regarding choices are made because they are of value to the agent. \textit{See, e.g.,} SEN, INEQUALITY REEXAMINED, \textit{supra} note 56, at 61-62. The premise being discussed is that they are of value to another individual and that the rejected (self-regarding) choice is of value to the agent. In addition, it is possible that both sisters in the example may benefit from the other-regarding choice, if the tested sister derives benefit from her sister’s increase in well-being as a result of the testing.

\textsuperscript{155} Respecting these competing interests, Sen makes further distinctions about the scope of basic capabilities in different contexts. Sen defines quality of life as a broader category than well-being because it considers other-regarding commitments. Gasper, \textit{supra} note 140, at 288. Well-being may entail other-regarding preferences of value to the agent, however. Standard of living, which does not consider such preferences, is understood as a component of well-being. \textit{Id.} As some high technology health care, like predictive testing, generates shared genetic information that has implications for individuals other than the tested individual, well-being and quality of life, rather than standard of living, are relevant. This does not assume, however, that well-being should be measured in families or communities but not with respect to individuals, only that other-regarding choices may be made by individuals in furtherance of well-being. In fact, in his work on poverty and sex bias, Sen argues that equality requires a more just distribution of resources within families, that is, for each individual. \textit{SEN, RESOURCES, VALUES, AND DEVELOPMENT, supra} note 23, at 364-65.
Part I of this Article argues that high technology health care may support the goals of basic health care and provides examples; the claim is further defended in Part II. In the latter Part, the flexibility of Sen’s model to accommodate capabilities of varying degrees of importance and specificity is discussed. Nevertheless, it is worth saying more about how basic capability equality might contemplate the relative importance of different capabilities in light of the question: How important is high technology health care relative to traditional health care?

To start, Sen argues that the importance of capabilities may parallel degrees of command over commodities.\(^\text{156}\) If social and economic barriers are low or removed, the importance of relatively higher-order basic capabilities may increase.\(^\text{157}\) Sen cites Adam Smith’s famous example of appearing in public without shame (of close relation to Rawls’s primary good the social bases of self-respect).\(^\text{158}\) This example is understood to support basic capabilities, such as the ability to be clothed, as well as less basic capabilities, like the ability to wear a linen shirt.\(^\text{159}\) Bernard Williams is troubled by the idea that what Sen terms an invariant, or base-line, capability might entail different responses, for example, a luxury over a more standard response, to enable a particular capability.\(^\text{160}\) This concern about providing sophisticated goods over more standard ones is frequently raised with regard to access to high technology health care. Williams tests the boundaries of the concept of a basic capability by asking whether the capability to wear a linen shirt washed with Bloppo, a favored laundry detergent, constitutes a basic capability.\(^\text{161}\)

Is high technology health care, such as predictive testing, closer to washing with Bloppo, wearing a linen shirt, or wearing any shirt at all? In the instances where such testing enables basic health-related capabilities that are not supported by other diagnostics, it seems closest in analogy to the basic capability of wearing any shirt at all. When predictive testing confers the same benefits as traditional diagnostics but is less invasive or involves less frequent testing or monitoring, it may be closer to the capability of wearing a linen shirt, though it might still be considered basic given its advantages. Most conservatively stated,

\[\text{156. Sen, The Standard of Living: Lecture II, supra note 75, at 17-18.}\]
\[\text{157. Id.}\]
\[\text{158. Id. at 16-17; see also Rawls, supra note 83, at 440.}\]
\[\text{159. Sen, The Standard of Living: Lecture II, supra note 75, at 17-18.}\]
\[\text{160. Williams, supra note 74, at 98-102.}\]
\[\text{161. Id. at 98, 101-02. Sen argues instead that one does not need to assess the importance of capabilities before establishing capability sets because the valuation of capabilities will serve to eliminate the trivial ones. See Sen, Inequality Reexamined, supra note 56, at 44-45. Regardless, Sen and Williams agree that convention or nature, or some combination of both, restrict capabilities within populations during capability set formation and valuation. See id. at 101-02; supra notes 91-97 and accompanying text.}\]
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there is a thin line in the basic health care context between the regular and linen shirt. For example, predictive testing for some forms of colon cancer may eliminate the need for repeated, invasive colonoscopies, which may also detect cancer risk. This does not seem like a luxury good. One approaches the analogy to the linen shirt only when using predictive testing to facilitate very marginal basic health benefits, like testing to predict a mild, temporary ailment. Presumably, the use of predictive testing to exceed the capabilities considered to be part of basic health would be akin to wearing the linen shirt or even washing the linen shirt with Bloppo.

The view that our legal and political structures should support access to only traditional forms of health care to further basic health is misguided. High technology health care may be more clinically efficient and derive better results than traditional care. Further, biological variation or different modes of functioning may be best supported by high technology health care. Examples include technologically advanced prostheses for persons who have lost limbs and super-oxygenation of the blood of individuals whose bodies experience difficulty with normal oxygen intake due to deformed erythrocytes. Nevertheless, a patient may have to make a decision in a state of uncertainty about whether traditional or high technology services are best for their situation, and it is possible that the wrong choice will be made.

Concern about the social cost of bad patient choices is another reason people may argue that it is best to provide a basic minimum of traditional health care services or to ration them—making available a set of identified services known to be most effective in terms of typical effect on health status, functioning, or quality and length of life. In other words, basic minimum and traditional rationing schemes limit patient choice, possibly guarding against bad patient decision-making. The assumption is that if individuals make poor medical choices, they will likely require emergency or other additional costly medical interventions. If such health needs arise in the emergency context, under the Emergency Medical Treatment and Labor Act, most hospitals are legally required to address them.

It is true that, by self-rationing, individuals may make choices that do not maximize their capabilities, either because the choices are bad ones or they are other-regarding (they increase the capabilities of someone else). It is the first category with which we are concerned, since the latter arguably still contributes

162. Satz & Silvers, supra note 124, at 185.
163. The Emergency Medical Treatment and Labor Act requires that hospitals accepting payment from Medicare and operating an emergency room engage in “appropriate medical screening” to determine whether a patient has an emergency medical condition and, if so, that they stabilize the patient. 42 U.S.C. § 1395dd et seq (2000).
164. See supra notes 150-55 and accompanying text.
to the maximization of capabilities across a given population.\textsuperscript{165} Individuals may make poor health choices from among high technology and traditional health care services alike, however. Avoiding vaccinations, or failing to partake in preventative care for one’s heart or for diabetes, are strong examples in the traditional health care context. Further, even if one is limited to traditional health therapies, one might still engage in risky social behaviors that dramatically affect one’s health, like smoking, failing to wear a seatbelt or motorcycle or bicycle helmet, eating or drinking to excess, eschewing exercise, etc. If policy-makers are concerned with the cost of poor health care choices, these behaviors should be prevented as well. Further, the high technology health care discussed in this Article has the potential to support the goals of basic health care; thus, a poor choice in this context is more like a suboptimal, rather than an irrational or irresponsible, one.

Perhaps the biggest hurdle for making high technology health care available as basic health care is its cost for intense periods of care, such as that for premature infants and individuals at the end of life. It is here that utilitarian schemes, like the rejected cost-utility approach, provide a satisfying answer: Benefits are to be measured over a lifetime.\textsuperscript{166} As one ages, one’s entitlement to benefits under a QALY scheme decrease, guarding against excessive expenditures at the end of life.\textsuperscript{167} But this may leave large expenditures at the beginning of life, if quality and length of life are expected to outweigh costs, and such services are prioritized by a population.\textsuperscript{168}

Much remains to be resolved with regard to the application of basic capability equality to prolonged periods of substantial health care expenditures. Since capabilities are maximized over a population, the broader the population, the more difficult it is to sustain large costs that may affect only a minority of individuals. This may include care for some premature infants. As I discuss in Part I, I do not believe these forms of long-term treatment support the goals of basic health care. Nevertheless, the issue of resource drain at the beginning and end of life or during other periods of intense medical need is one that must be addressed in the future. I believe basic capability equality holds much promise for informing this area of decision-making as well. One possible solution, which I explore elsewhere, is to combine self-rationing under basic capability equality,

\begin{itemize}
\item \textsuperscript{165} See supra notes 153-55 and accompanying text.
\item \textsuperscript{166} See supra notes 45-48 and accompanying text.
\item \textsuperscript{167} See supra notes 45-47 and accompanying text.
\item \textsuperscript{168} Contractarian frameworks fare worse than utilitarian ones in addressing this problem. Substantial resources may be diverted from some patients in order to assist others. See, e.g., Norman Daniels, Am I My Parent’s Keeper? An Essay on Justice Between the Young and the Old 66-82 (1990) (suggesting it is necessary to determine entitlement to health care resources at each life stage).
\end{itemize}

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for purposes of basic health care distribution, with a form of rationing or a basic minimum as applied to non-basic medical care.\textsuperscript{169}

\section*{Conclusion}

High technology health care that supports the goals of basic health care should be universally available. Basic capability equality provides strong normative support for this assertion, that is, for the ability of patients to self-ration, or choose amongst basic health care services. It is only by moving away from dominant economic, utilitarian, and contractarian approaches focused on supply, and toward an approach that directly considers patient demand, that it is possible to begin to understand the deprivation underlying the current health care crisis. This deprivation, based in part on demand for high technology health care, is not addressed by reforms that seek to expand the supply of traditional health care services. These reforms fail to understand the biological, social, and economic factors affecting patient choice as well as the range of basic health care benefits enabled by high technology health care.

\textsuperscript{169} Satz, \textit{supra} note 49, at 216-21.
For basic capability equality to function, it must be possible to evaluate and compare capability sets. Evaluation may involve intrapersonal or interpersonal comparisons. An intrapersonal comparison in this context is one in which an individual evaluates capability sets (capability-vectors or functionings-vectors) in order to choose one. Relevant interpersonal comparisons are those made between individuals in a given population. The possible mechanisms for both types of comparisons are essentially the same, with the exception that there are a host of classic, additional problems associated with making interpersonal comparisons. Although these issues cannot be addressed here, they are discussed thoroughly elsewhere.\footnote{See \textit{Interpersonal Comparisons of Well-Being} (Jon Elster \& John E. Roemer eds., 1991).}

The following text serves as a general discussion of possible methods for intrapersonal and interpersonal comparisons of well-being as part of basic capability equality. With the exception of Sen's formal expression of the valuation function for intrapersonal comparisons, the discussion applies to both intrapersonal and interpersonal comparisons.

I. \textbf{WHAT IS ONE MEASURING?}

The first step in making set comparisons is to determine what "units" are being evaluated. Sen speaks of these "units" in terms of "evaluative space" or objects of value for evaluation.\footnote{Sen, \textit{Inequality Reexamined}, supra note 56, at 42-44; Sen, \textit{Capability and Well-Being}, supra note 75, at 32-33.} For utilitarians, individual utilities comprise the evaluative space; for Rawls, it is primary goods. With respect to basic capability equality, both functionings and capabilities constitute the relevant evaluative space. Functionings are a "larger" evaluative space than capabilities because they may represent conditions that are not possible for a given individual, that is, certain functionings cannot be capabilities. Functionings may be conditions that are unattainable, due to differences in personal characteristics or individual command over commodities. Capabilities are capability-vectors or functionings-vectors that may be achieved or are actually possible. By choosing certain capabilities, an individual selects the valued goods, value-objects, to be weighted. Implicit in this choice is that the chosen goods are of greater value to an individual than those that are not chosen.\footnote{Sen, \textit{Inequality Reexamined}, supra note 56, at 42-44; Sen, \textit{Capability and Well-Being}, supra note 75, at 32-33.}
II. MECHANICS

Valuation in basic capability equality entails a comparison of capability-vectors or functionings-vectors, in order to make intrapersonal or interpersonal comparisons. For intrapersonal maximization to be meaningful, one must be able to make intrapersonal comparisons of capability-vectors or functionings-vectors, and for interpersonal maximization to have force, one must be able to make interpersonal comparisons of those vectors. The mechanics of valuation is perhaps the most contentious aspect of Sen’s theory, as the flexible formal language does not provide much guidance in either the scope of the “units” of well-being to be valued or the process of valuation necessary to achieve practical outcomes.

Unlike utilitarianism, maximization under the capability approach does not amount to summation. As a result, the mechanics of maximization are much less straightforward for basic capability equality than for utilitarianism. For utilitarianism, all conditions are translated into utils, and the summation of these units provides a mechanism for maximization. Basic capability equality compares more than utilities, and due to this added complexity, capabilities cannot be summed. By starting with different “units,” Sen creates the vexing issue of how to carry out such comparisons.

Sen believes this ambiguity is necessary to best capture the essence of well-being, which he believes is lost by adhering to more simple units of utility. Over-precision is, in fact, perceived by Sen as a danger in valuation, since well-being, as captured by functionings, is too complex to allow for oversimplified comparisons. Sen stresses the need for flexibility in valuing elements of well-being and equality, which are “broad and partly opaque concepts.” He seeks to offer a pragmatic approach to interpersonal comparisons, preferring to rank what may be ranked through partial orderings, rather than forcing a complete ordering that may sacrifice the needed ambiguity of basic capability equality. Although Sen argues that basic capability equality does not embrace a specific means of valuation, he offers partial ordering as an incomplete but viable method of maximization without summation.

173. SEN, INEQUALITY REEXAMINED, supra note 56, at 48.
174. Id.
175. Id. at 48-49.
176. Sen, The Standard of Living: Lecture II, supra note 75, at 29-31. Sen’s discussion of partial ordering with respect to standard of living is cited here over other discussions of partial ordering that are not limited to the standard of living context because it is a more concise and clear explanation of the different types of partial ordering to which he appeals. This discussion has general application to broader well-being assessments. Recall that the difference is that standard of living does not take into account other-regarding preferences. See supra note 155 and accompanying text. This does not affect the mechanism for capability set comparison.
III. PARTIAL ORDERINGS

Sen speaks of evaluating capability sets on a spectrum, ranging from complete orderings to partial or incomplete orderings. He concentrates on partial orderings that provide the most practical methods to evaluate capability sets. Partial orderings themselves offer varying levels of completeness. What Sen terms dominance partial orderings amount to a minimum evaluation. Other partial orderings are closer to complete orderings, where exact values are known and possible to compare.

Sen defines a dominance partial ordering as one that does not require that each element $b_i$ in the set $Q_i(X_i)$ be given a numeric value or a relative weight. A dominance partial ordering is created when certain capability sets (capability-vectors or functioning-vectors) are identified as valuable. Dominance partial orderings may provide partial measures of overall living conditions or standards, for example.

Other possible partial orderings involve assigning specific values or weights to capabilities. These orderings also utilize dominance relationships, but since weights are involved, they are considered to be a higher level of evaluation than the dominance partial ordering. Value may be assigned in two different ways. It may be based either upon an individual’s own judgments about her capabilities relative to what others possess, or, in the alternative, upon an assessment of an individual’s own capabilities against the social standard. Sen refers to the first case as self-evaluation and the second as standard-evaluation. He argues that the two approaches need not result in the same weight assignments, as they pose different questions serving varying purposes.

More specifically, an ordering is a partial ordering if not all elements of the set on which the partial ordering is defined can be compared. Consider, for example, a set that contains as its elements other sets. Some of those sets will be subsets of others and in that sense “smaller,” and they can be compared to the “larger” sets. Other couples of sets may intersect without one being included in the other, or in the alternative, not intersect at all; these set elements cannot be compared by means of set theoretic inclusion.

An example of a partial ordering in the current context is the relation according to which one vector “dominates” another, if each component of the

178. Id.
180. Id.
181. Id.
182. The order of the components that are dominant is not significant for this type of ordering.
first is bigger than the corresponding component of the second. Consider the following two comparisons. The first is a comparison between \( V_1 = (3, 6, 9, 10) \) and \( V_2 = (1, 4, 7, 9) \). The components of \( V_1 \) are each larger than the components of \( V_2 \), and \( V_1 \) dominates \( V_2 \). But now consider \( V_3 = (4, 8, 29, 10) \) and \( V_4 = (2, 10, 27, 6) \). \( V_3 \) does not dominate \( V_4 \), and vice versa. This demonstrates that the dominance relation is a partial ordering, or incomplete ordering of the elements (vectors) of the set to which they all belong. There are also instances where functionings in two capability-vectors simply cannot be compared component by component. For these situations, the vector with at least one superior (in the relevant sense) component would be viewed as dominant over the other. The same reasoning applies to partial orderings of sets, although the comparison is between elements of the sets instead of vectors.

One significant criticism of dominance partial ordering is that it approximates the results of summation, a process Sen explicitly rejects. Parallel results hold for partial dominance sets where all values are known, as well as for those in which only some values are known or only some values are given within a range. In the first instance, if the elements of Set One each dominate the elements of Set Two, the sum of the elements of the first set obviously will be larger than the elements of the second, and Set One will be chosen in both cases. Where only certain elements have known values or ranges of values, summing the known values or comparing a summation of the extreme (low or high) possibilities of the range will obtain the same result as a dominance ranking that considers the same variables.

Although the distinction between utilitarian summation and maximization with regard to dominance ranking is difficult to see when both methods appear to yield the same result, summation over the elements of capability sets cannot be conceptualized in a meaningful way. Utils cannot simply be substituted for “capability units” because they represent different things. It is even unclear how practically one would convert capability units into utils. Of the possible functionings mentioned by Sen in various works, only one functioning, longevity, could easily approximate utility measure, that is, quantity of life. The rest—including having nourishment and basic health, avoiding epidemics, being literate, possessing the ability to interact socially and take part in community life, being able to live a life without being ashamed of one’s clothing, having the ability to engage in cultural and intellectual pursuits and to travel—cannot be so easily converted. Further, even if such conversion is possible, it seems to violate the spirit of Sen’s theory, which is to capture a robust form of well-being. In other words, a dominance ranking of Set One \{3, 23, 74\} over Set Two \{6, 20, 69\} may not necessarily yield the same result as a summation comparison of these two sets, if enough value is lost in the conversion of capabilities to utils.
IV. MAXIMIZATION WITHOUT SUMMATION

The ability to maximize without summation is a key difference between basic capability equality and utilitarianism, and it must be possible for basic capability to be a functional theory. Given this, it is worth exploring methods other than dominance ranking for maximizing without summation that are relevant to either exact or weighted ranges of values. Although not addressed by Sen, these examples help express the flexibility of Sen’s formalism, that is, the general and abstract language that is needed to assess functionings in a broad range of cases.

One example of maximizing without summation is comparing the majority of elements in a set or the majority of components in a vector for a dominance relation. Imagine a vector $V_1$, in which components $x_1, x_2, x_3, x_4,$ and $x_5$ are 1, 2, 8, 9, and 10, respectively. Now imagine a vector $V_2$ in which components $x_1, x_2, x_3, x_4,$ and $x_5$ all have a value of 6. Even though summation would allow the choice of either vector, a comparison of components between vectors would result in the choice of $V_1$, because it is the vector in which the most components dominate. This differs from the partial orders discussed above because a known lesser value for $V_i(x_j)$ is chosen, and represents instead something more like “partial vector dominance.” The same reasoning applies to set comparisons.

Another way to maximize without summation is lexicographic maximization. This approach compares the components of vectors or the elements of a set in order. Again consider comparisons of vectors, although the same method is applicable to set comparisons. If the first components are unequal, the vector with the component of largest value is chosen. If the first components are equal, the remaining components are assessed one at a time, until unequal companion values are reached, resulting in a dominance ranking. Consider the vector $V_1$ with components 2, 5, 6, 7, and $V_2$ with components 1, 7, 8, 9. Under the lexicographic approach, $V_1$ would be chosen. This result differs from the one obtained by summation, which would result in the choice of $V_2$. Similarly, if $V_1$ contains components with values in the order of 2, 3, 4, 1, and $V_2$ contains components with values in the order of 2, 3, 3, 4, a lexicographic approach would again result in the choice of $V_1$ and summation in the choice of $V_2$. In general, summation and lexicographical ordering will not deliver the same results.

The well-known Gini coefficient provides an alternative possibility for maximization without summation, although specifically within the domain of social welfare comparisons. Briefly stated, the Gini coefficient is a social welfare measure that assesses inequality by measuring the distance, in a specific

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sense, between the graph of a function expressing the actual distribution of income and a graph of a function expressing an equal distribution of the same.  

If the x-axis of the A quadrant represents the percentage of individuals, and the y-axis is the percentage of income, a forty-five degree diagonal dividing the quadrant from the origin represents equality. The Gini coefficient is defined as the ratio of the area between the two curves and the area below the identity function. This quotient must be between zero and one; it is zero if the two functions coincide, that is, if the income is equally distributed, and it approaches one as income is distributed more unequally. Equality is maximized when there is no space between these two functions, that is, the Gini coefficient is zero on a scale of zero to one. The Gini coefficient remains at zero for each doubling of incomes for all individuals represented.

This measure of equality, as well as the other methods of maximization without summation proposed, provide support in addition to partial orderings that basic capability equality is functional as a theory. Maximization without summation allows for valuation of basic capabilities that extend well-being outside of the confines of utility measures. Much theoretical work remains, however, to determine how capabilities and capability sets should be ordered and what valuing capabilities and capability sets offers, in practical terms, over assessing other goods or preferences.

184. The first function assigns to each percentage \( n \) of the population the percentage of income held by the bottom \( n \) percent, whereas the second is the identity function in the A quadrant, which is the function that assigns to every value on the x-axis the same value on the y-axis (the diagonal).