HEALTH CENTERS AND THE MEDICALLY UNDERSERVED: BUILDING A RESEARCH AGENDA

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Health Center Cost Effectiveness and Value

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Health Center Cost-Effectiveness and Value
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Introduction

Federally qualified community health centers (CHCs) have been an integral part of the safety net of the health care system in the United States for four decades. In spite of this, a rigorous technical assessment of the value of these health centers following state of the art methodological recommendations has been lacking. This does not imply that nothing is known about either the costs of care at CHCs or the effectiveness of care at CHCs. Rather, it implies only that economic evaluations of CHCs that have been done to date do not measure up to Panel on Cost-Effectiveness in Health and Medicine's gold standard recommendations. The recommendations made by the Panel on Cost-Effectiveness in Health and Medicine were state of the art at the time they were made in 1996. Nine years later these represent only a subset of state of the art methods.

The studies on the costs or effects of CHCs may have been conducted using high quality methods to address the questions they were intended to address, but little has been done to inform the discussion of the exact short-term and long-term tradeoffs between cost and effects over time in CHCs. This is in contrast to an extensive high level cost-effectiveness literature for many pharmaceuticals and other treatments. There also are some types of medical care for which most economic evaluations are very close to the gold standard (e.g. cholesterol control and heart disease more generally). Even some health system interventions have been modeled using state of the art techniques; this work includes the *Disease Control Priorities (http://www.fic.nih.gov/dcpp/)* project and national evaluations of health care systems in transition economies. However, the evaluation of CHCs is not unique in the lack of studies that meet the gold standard recommendations. Despite the nine years since the release of the gold standard recommendations, the evolution of economic evaluation in much of medicine and public health has proceeded slowly.

Why Aren't CHC Cost-Effectiveness Studies up to the Gold Standard?

There are two primary reasons for lacking a gold standard assessment of the value of care in CHCs. First, in spite of years of maturation in the field of health services research, the basic meaning of the term "value in health care" is still uncertain. The difficulty of clearly defining and the importance of explicitly stating the "value to whom" and "under what assumptions" is not always recognized. Second, while there is some evidence of the costs of CHCs and the effects of CHCs on the health of their enrollees and the health of the population generally (i.e. a public health perspective on community health centers), there is very little work that juxtaposes the two or that technically correctly compares the costs of providing care in CHCs to the costs of providing care to CHC users in other settings and the resulting perception of the value of CHCs. The lack of research and difficulty of conducting such research on the cost-effectiveness or value of CHC care is notable.

Objectives

The first objective of this overview paper is to provide a context for discussing value in health care, which is more than simply cost-effectiveness, particularly as it applies to CHCs. The second objective will be to assess what we know about the cost-effectiveness and value of CHCs. The third objective is to suggest how research might evolve to bring economic evaluations of CHCs to the gold standard level. This will not be a short process. The discussion of the future steps will primarily focus on short-term "steps" that can improve what we know and help to lay the groundwork for later gold standard work. However, long-term "leaps"

will also be discussed briefly as the short-term steps make the most sense in the context of an awareness of the long-run expectations for the continued evolution of economic evaluations of CHC care. We will give an indication of how we might go about obtaining the data necessary to bring about short-term steps and long-term leaps. Finally, we discuss what the future holds for measuring and discussing the cost-effectiveness and value of community health centers.

How do we define and measure value?

The Simplest Interpretation of Value

The assessment of "value" in health care, and the term "value" in general, tends to focus on the perceived outcome of the health care obtained for the amount of money spent. Thus, in many ways, this term and cost-effectiveness are similar, at least conceptually. However, the similarity does not necessarily translate into the simple statement that applying the methods outlined by the Panel on Cost-Effectiveness in Health and Medicine in 1996 (or any other set of recommendations since that time) to a particular CHC or the CHC program in general would give us the capacity to ascertain the value of CHCs from all interested perspectives.

Whose Values Drive (Policy) Decisions?

Value is much more than simply cost-effectiveness because even the most sophisticated and most rigorous cost-effectiveness analysis can only follow a particular set of rules on how to conduct the analysis under a particular set of assumptions from a particular perspective. Even the most general analysis will end up being limited. Specifically, when the recommended societal perspective is used, this only guarantees that the welfare of all who are affected by an intervention is incorporated into the analysis. From a theoretical perspective, it does not guarantee that the interests of all who are affected will be represented in the way that each group considers most appropriate or in a way that captures the priorities of each group. The societal perspective requires that societal valuation be used when measuring the effect rather than the perspective of those affected by the intervention. Thus, a group's own value is not necessarily considered even though most economic theory and legal and political theory suggests that individuals are the best judge of how health and health care treatments affect their own welfare. Thus, while there are perfectly legitimate theoretical reasons for the suggestion to use the societal perspective in cost-effectiveness analyses, one shortcoming in the assessment of value is often an aggregation of the effect presented as a single outcome with a single valuation without a presentation of the valuation expressed by each interested party.

The societal or payer valuation appears to be used most frequently for policy interpretation. In contrast, the valuation expressed by each party (or at least by each group of individuals such as the target population and the health center management) is likely to determine individual behavior in light of the health policy. This contrast between the different perspectives helps to make a clear argument for a holistic approach to assessing all value from all perspectives when conducting a cost-effectiveness type of analysis.

Whose Values were Considered in Gathering the Data?

Expressing the value of CHCs is also made difficult by the failure to clearly delineate the perspective from which each assumption or each piece of data in a cost-effectiveness analysis was originally made or analyzed. The process of measuring value and using such measurement in health policy discussion and policy making is a process that includes identifying the public health problem for which value is being assessed, gathering evidence, performing the analysis, and making a recommendation. At each phase, information that may come from different perspectives is incorporated into the analysis. Realistically, at some point in the process of performing a cost-effectiveness analysis, the information must be aggregated and summarized into a single perspective rather than the diversity of perspectives originally

reflected. While state-of-the-art procedure in cost-effectiveness analysis recommends the presentation of a list of assumptions and data sources so that all concerned can assess the quality of the data being used, the perspective from which the data originally were assessed does not need to be presented explicitly. The original perspective can often be inferred from the source, but a formal summary would make the analysis much more transparent. While transparency has always been important, in the future transparency will grow increasingly important as accountability for health care decisions continues to grow.

Subjectivity of Value

Obtaining a single, objective definition of the value of health, health care, or health policy, particularly as it applies to CHCs, may be impossible. While the concept of an objective definition that can be agreed upon by all interested parties is appealing, the term value itself implies that some amount of subjectivity is likely to remain. Even basic clinically measured health outcomes and the clinical effects of health care or health policy are likely to be objectively agreed upon only in randomized controlled trials. Further, even in randomized controlled trials while the internal validity is expected to be high, external validity is often questioned. Cost-effectiveness, value analyses, and health services research in general are often conducted with significant departures from randomized controlled trials and involve observational data or modeling in ways that can be questioned much more easily than randomized controlled trials.

Is there a Single Outcome of Interest?

While the clinical effects might be agreed upon, the meaning of those clinical effects to the affected individuals and the meaning of the distribution of outcomes is something for which different parties can have much different perceptions. In some cases, all parties agree that a particular outcome is the "best" or most important in some sense; however, this does not imply that the perceived magnitude of improvement will necessarily be agreed upon by all interested parties. Private insurers are expected to focus on profit. The target patient population is expected to focus on their own health. The government is expected to focus on its own bottom line or budget. Even a simple statement like the government having budget neutrality as a focus has complications because different levels of government have limited formal cost sharing arrangements and even more limited formal cost savings sharing arrangements. This problem not only characterizes different levels of government but different agencies or departments within a given level of government in many cases. This reflects the tension between a "silo-based" view of value and a holistic view of value. Thus, the "governmental" perspective will often need to be specified more specifically in terms of both a level and a department. While government is supposed to reflect the will of the population that has put it in power, and that power may include spending more money to achieve improved health outcomes, government decision making at this point in time focuses quite often on only cost savings.

Aggregating Effects

The typical approach to the aggregation of health care valuation is simply to aggregate individual effects. This does not capture anything about the distribution of effects or the relative effects on different populations. Of all aspects of value analysis this is likely to be the most contentious, beginning with the philosophical question of whether the role of government and community is to assure equal opportunity or equal outcomes. Different communities in general and different community advisory councils for CHCs specifically may have much different ideas about the relative importance of different outcomes.

Is Cost-Effectiveness All There Is to Value?

The simple answer to this question is "no". The discussion of value thus far has focused exclusively on whether the methods used in cost-effectiveness analysis can be thought of as

representing what is perceived as value by health policy makers—no matter how well the methods match the underlying theory. There are other considerations that cost-effectiveness analysis does not tend to capture. First, most cost-effectiveness analyses are incremental—asking what will happen if we add alternatives. For some communities in which CHCs are located, the CHC is the only provider. The entire CHC represents added care in this case; an addition at the level of the system of care that becomes available rather than a single new treatment option or service. Second, cost-effectiveness analyses usually ends at the provision of care. CHCs also provide employment; the salary puts money into the hands of community members that can be spent in the community. Community empowerment is critical but very difficult to value, particularly in the short-term. Complete value analyses of CHC existence and care will involve not only state of the art cost-effectiveness analyses of care (which has its own limitations), but also analyses of CHCs as employers (which is an aspect rarely combined with CHCs as health care providers) and the difficult to value community-empowerment.

If this level of scope and detail were required in all future economic evaluations, this would make an already difficult task of producing state of the art analyses even more difficult. However, aspiring to reach this level of scope and detail will help analysts to raise the bar, give analysts choices of what to measure and how to present results, and present policy makers with an exhaustive measure of value to use in making resource allocation decisions.

What do we know about the cost-effectiveness and value of CHC services?

Limited Number of Studies

Very few technically rigorous cost-benefit or cost-effectiveness analyses of CHCs themselves or the care provided at CHCs have been conducted. As a first indication, when accessing the following search in Pubmed

> *(cost effectiveness OR cost benefit) AND (community health center OR federally qualified health center OR CHC OR FQHC)*

only 175 articles come up as ever being published. Some of these are not about health centers in the United States; others are not about CHCs at all. In the list of references back to 2000, some articles mention cost-effectiveness but none actually conduct a technically correct, rigorous cost-effectiveness analysis. While this lack of state of the art evaluations involving both the cost and effectiveness side of the equation is notable for a program that represents an important publicly funded component of the safety net system in the United States, CHCs are not unique in the lack of related rigorous cost-effectiveness analyses.

Is the Work Peer Reviewed?

Work that has been summarized recently falls into a variety of categories. Some of the work has not been published in the peer reviewed literature but has been in reports. While the reports are likely to be high quality and reflect the high level of expertise available within the CHC community, these have not necessarily been vetted and evaluated to the same degree as manuscripts in the peer reviewed literature. Thus, a first step to strengthening the literature on the cost-effectiveness and value of CHCs and the care they provide would be to get more of the evaluations that have been done into the peer reviewed literature.

Topics of Focus in the Extant Literature

The literature that has been grouped with the cost-effectiveness literature in recent reviews and annotated bibliographies tends to focus on cost savings for Medicaid specifically or on expensive services that are avoided without performing a complete cost-benefit or cost-effectiveness analysis. Several examples follow; these demonstrate the findings and

demonstrate why the findings alone are suggestive of favorable economic outcomes but do not represent all the data that are needed to advocate for resource allocation to CHCs.

Examples from the Extant Literature

Hadley and Cunningham (2004) recently reported that uninsured patients' proximity to federally qualified health centers was associated with lower levels of unmet need and decreased utilization of emergency care. This finding demonstrates that CHCs are effective in important ways. The key additional questions for a full economic evaluation (not the intent of the article but a necessary part of resource allocation decision making) would be "how should this be valued?" and "how much does this cost?"

First, consider how the findings of decreased levels of unmet need should be valued. Policy makers are certainly interested in the savings that come from lower levels of utilization of emergency care, but a more holistic version of the value of what CHCs provide may be of interest. Avoiding emergency visits may be related to changes in the long-term health of the uninsured population. Further, there may long term effects that apply to the families of uninsured individuals local to federally qualified health center. For example, if the uninsured are adults, keeping them healthy may relate to their children's health. Keeping an adult population healthy may also affect the health of older adults for whom they provide informal care. As a standard input from a cost of illness evaluation, the value of increased potential home and workplace productivity of the adult uninsured population is also important.

Second, consider what cost information Hadley and Cunningham provide. They do not comment on the overall cost of such care. To be fair, this was not the intent of the analysis. The authors did, in fact, make a comment on recent expanded funding, although the evaluation does not apply to only this funding. Thus, to use findings like Hadley and Cunningham's to help make an economic case for resource allocation additional work would need to be done to combine the findings from this study with some type of model of how much it would cost to increase the availability of CHCs or how the recent increased expenditures have changed the proximity of CHCs to the uninsured population in order to make a comparison of the costs and projected effects.

As an additional methodological point, a study like this one is advantageous for making projections to the population around CHCs rather than only to CHC users. The focus of analyses was the uninsured population rather than only federally qualified health center users. This would be very important when considering the effects of new health centers that might be built. Such projections are more uncertain when the unit of analysis in a published study is the health center user as the number of users will then need to be projected before projecting the effects on the population.

In summary, the work by Hadley and Cunningham unquestionably demonstrates that there is value produced by federally qualified health centers. The key issue that is unresolved in the article is whether the value is sufficient, in comparison with the cost of producing such value, to make additional societal resource allocation worthwhile.

The piece by Hadley and Cunningham is not the only one that demonstrates that federally qualified health centers produce value but does not demonstrate how this value compares with the cost. In all cases, these could lead to strong arguments for resource allocation based on reasoning that is not entirely economic. However, additional information would be required in order to make a complete, coherent, economic argument. Several other papers are discussed below with a brief comment on the finding in each and an extensive discussion of how the

results might be extended to provide additional information to make resource allocation arguments.

Porterfield and Kinsinger (2002) also demonstrated the effectiveness of CHCs at producing value for a specific group of patients. These authors abstracted medical records of diabetes patients in a sample of eight physicians' office and three community health centers. The results indicated that diabetes patients at community health centers were more likely to have appropriate values for four of six process measures associated with quality of care. From some perspectives, this may be sufficient data with which to advocate for more resources but does not provide all the information we need to make an economically driven decision.

While better process measures for diabetes patients should result in better outcomes, there are many other factors in the lives of diabetes patients in general and patients who obtain care at CHCs specifically. The other issues may moderate the effect of high quality process measures on the outcomes for diabetes patients at CHCs. There is little evidence to confirm or refute this supposition. However, a measure of value based only on process measures and not on outcome measures is a limited measure of value.

Cost-effectiveness studies are sometimes reported with effectiveness measured by process measures, but these are weak for making policy recommendations. Cost-effectiveness studies that only provide information on changes in process measures (particularly when there are multiple process measures that are not perfectly correlated either with each other or with outcomes) leave decision makers with little to do but to make implicit judgments about the value of care. This can lead to conflict if policy makers do not make judgments that are shared by their constituents. Ultimately, finding ways to link changes in process measures to changes in outcomes (and ultimately changes in costs) is critical to a more detailed assessment of value. Consideration of patients with a specific condition, such as putting greater weight on the effects for these patients, is an important aspect of value for some decision makers.

Finally, it is important to understand whether having higher quality process measures results in higher costs or can be achieved without significantly increased costs. If care at the CHCs not only is higher quality based on process measures but is also not more expensive, then the CHC care is clearly superior from an economic perspective. This is not the only way in which a new treatment/intervention can be judged to be relatively cost-effective. For example, a policy alternative may cost more and yield better outcomes, but policy makers may consider the extra expense to be worthwhile.

A study by Carlson et al. (2001) described the demographics of uninsured users of community health centers and then compared their contact with physicians and likelihood of having a usual source of care with the uninsured in general. The findings were favorable to CHCs, i.e. the uninsured users of CHCs were more likely to have regular contact with physicians and more likely to have a usual source of care. The key question then is how regular contact with a physician and the likelihood of having a usual source of care is translated into value. As with the findings reported above, some may find this sufficiently important with no additional evidence to structure resource allocation arguments around this fact. However, more information is needed for a complete economic evaluation. The two findings regarding contact with physicians and a usual source of care could be translated into value in many ways. The most direct would be their effects on costs. More regular contact with a physician would clearly result in higher costs of that use of care. However, that use of care could result in later savings. As mentioned with respect to the Hadley and Cunningham findings, effects on adults may have further effects on children or older adults for whom the adult patients of CHCs are responsible.

More regular utilization of care in general facilitates care for chronic conditions, screening, and utilization of preventive care. More regular utilization of care can have important implications for trust of the medical care system in general. All of these can affect costs. The research and policy focus on the uninsured population implies that this population is being given emphasis and quite possibly extra weight in decision making.

Epstein (2001) reported that patients in areas that were served by a CHC had 5.8 fewer preventable hospitalizations per 1000 individuals over a three year period in comparison with similar patients in areas not served by a CHC. This clear indication of the effect of care at CHCs is similar to the work by Hadley and Cunningham as it reports an effect at the population level. In spite of the clearly quantified result, translation into an economic argument rather than simply a human argument is limited because there are many different types of preventable hospitalizations. Without more information on the type of hospitalizations that are being prevented, it is impossible to express the cost savings, and cost savings are not the only value of avoidable hospitalizations. Avoiding preventable hospitalizations can be the result of better ongoing care of chronic conditions. Better care of chronic conditions for individuals may be related to better health behaviors in other aspects of their lives. If hospital care is being used more appropriately within a community, the hospital and other health care providers within the local health care system can make more rational decisions about expansion and changes as they move forward.

One difficulty with research like this (and others above) is that avoiding preventable hospitalizations is only one effect of CHCs. From this type of study, the costs of providing CHC care in an area could be compared with only the cost savings from preventable hospitalizations avoided. If this limited result were not favorable, this would not necessarily imply that CHC care is not cost-effective. Clearly, a complete economic evaluation would need to combine the multiple effects of CHC care. Additionally, the full extent of CHC effects will be understood only when the health results are combined with the overall economic results.

Another study by Falik et al. (2001) focuses specifically on ambulatory care sensitive hospital admissions and emergency use among Medicaid patients. This is more specific than vulnerable patients generally and is clearly a different group than uninsured patients. The implications of avoiding preventable care are similar to those that are discussed above. The lack of information on cost is still an issue. As CHCs have generally positive effects but the magnitude of the effects can differ for different populations, this would further complicate the comprehensive cataloging of effects and projection of the overall impact of CHCs on the population of their users and the surrounding community in general.

One study demonstrated a change in protocol and procedures at a CHC. Klein et al. (2001) demonstrated that the implementation of Guidelines for Adolescent Preventive Services improved the receipt of preventive services for adolescents and the discussions between adolescents and providers for a whole list of topics. A fist question is whether some subset of the guidelines would be sufficient to obtain similar outcomes or which are most critical for achieving such outcomes. In general, this study, again, is a process based outcome measure for which a link to eventual outcomes would be even more interesting. However, the more interesting issue with adolescent services is that the effects of adolescent health improvement last a lifetime. This is not to discount the long-term effects of improvements in the health of adults, but the improvements in adolescent health continue for many years in many ways. More healthy adolescents may improve their educational attainment. More healthy adolescents become more healthy adults. These more healthy adults can earn more and are likely to have more healthy children. Healthier adults are also more likely to be engaged in their communities.

The improvements over time will need to be valued in a way that reflects the relative value of improvements at different ages. Thus, valuing better care for adolescents is a complex task extending into the future. Expressing society's willingness to accept costs with the expectation of future health improvements is critical in economic evaluations. There are standard ways of accounting for long-term tradeoffs, although the methods are not without controversy and may or may not reflect the entire population's relative weight on present and future outcomes.

Another study by Ulmer et al. (2000) assessed care for four common conditions handled by primary care physicians. CHCs were found to provide care that was equal to or better than care provided in other settings based on process measures. The same considerations mentioned for other process studies are important. The key in this case is the difficulty of assessing the combination of results. Some type of larger cataloging of results and modeling of how different results interact is critical to the use of this type of result. Starfield and Shi (2004) also found that populations in communities with health centers have better primary care than communities without health centers. Again, the interpretation of the results, the need to tie this to outcomes, and the need for comparative cost data is similar to other studies.

A recent piece focuses on CHCs as economic engines, in addition to being health care providers. CHCs were described as providing not only wages, but providing entry level jobs, mentoring, and career ladders for local community members. Placing a dollar value on all aspects of economic impact is not straightforward. It is still necessary to ask whether the resources would have a greater return on investment if they were invested in other ways.

In economic evaluations, not only do economists value health effects based on the savings that they can bring about and the productivity improvements that they bring about, but economists also examine the ways in which value is implied by the choices that are made. Logic based on the observation of implemented policy would suggest that there is a high implicit value on CHCs. This is evidenced by President Bush's commitment of substantial resources to the expansion of the community health center program and the overwhelming support the idea received in the legislature. This implies something about the importance placed on a variety of aspects of what CHCs do rather than necessarily on their cost-effectiveness. CHCs provide care with a high degree of local autonomy and local decision making. They tend to reach otherwise difficult to reach target populations. The have helped to limit health disparities. These reflect on the concepts of local control, federalism, federal government minimization, and some concern about the distribution of health outcomes that are all important components of the value system of at least a portion of the population in the United States. Variation in the expressed values is likely to focus on the role of local versus centralized control and the importance of any access to care versus access to specific providers in specific care systems with specific types of insurance.

What do we need to know about the cost-effectiveness and value of CHC services?
The following is a list of points that require further elaboration for a complete assessment of the value of federally qualified health centers in the short-term or long-term:

(1) Assemble a review of all studies of the effects of care at CHCs
  (a) The presence of CHCs
  (b) The addition of particular services or protocols to CHCs
(2) Group all studies in (1) by the subpopulation on which they focus
(3) Group all studies in (1) by the type of effect
(4) Cross-tabulate (2) and (3) to determine what is known about the treatment of specific conditions for specific populations and where gaps exist

(5) Project how the multiple effects on multiple populations described in (4) will interact in the short run
(6) Project the short-term health outcome effects of process changes
(7) Project the long-term health effects of the short-term health effects reported or modeled
(8) Project the quality of life or disability effects of the long-term health effects
(9) Translate the quality of life or disability effects over time into quality adjusted life years or disability adjusted life years
(10) Link all changes in process and outcomes to changes in costs
    (a) Describe by perspective
    (b) Costs and outcomes of community health center establishment
    (c) Costs and outcomes of community health center expansion
    (d) Costs and outcomes of other community health center program changes
(11) Model cost-effectiveness analysis of specific care provided at CHCs
(12) Model cost-effectiveness analysis of the set of care provided at CHCs
(13) Conduct cost-effectiveness analyses based on data from CHCs
(14) Conduct cost-effectiveness or cost-benefit analyses combining the impact of CHCs as health care providers and CHCs as economic engines
(15) Conduct cost-effectiveness or cost-benefit analysis that adds community empowerment to the analysis in (14)

How do we ascertain what we need to know?
There are many steps in ascertaining what we need to know about CHCs, their performance, and their value in the future. This section is not intended to be a detailed description of the research methods that could be used for economic and value-driven studies. Instead, this section will do two things. First, it will comment on the general approach to improving our understanding of the costs and effects in the short-term. Second, this section comments directly on the ways in which research on the costs and effects of CHCs may be brought up to the gold standard of cost-effectiveness studies in the long-term.

Short-Term Needs
A number of items on the list in the last section involve assembling a review of published articles and other work on the costs and effects of CHCs in general, for specific populations, and for specific conditions. Thus, interested parties need to dedicate resources to an ongoing review of articles pertaining to federally qualified health centers. This type of ongoing review will allow interested researchers and decision makers to map the portion of care provided at CHCs and the portion of the user population that have been studied. This will help to indicate the gaps in the research that need to be filled in order to make the most complete economic argument.

Data directly from CHCs and data from more general population surveys should continue to be combined to allow for the study of CHC users as a subset of the population or to allow for studies of the population that lives near CHCs.

CHC policy makers leaders, physicians, and community advisory boards must continue to offer collaborative opportunities with those who conduct research on CHCs. Those who conduct research need to continue to seek and use this type of input. Just as an economist should not be the only one involved in conducting cost-effectiveness research (clinical, epidemiological, and statistical colleagues are necessary), researchers should not interpret results regarding CHCs and the population around them without input from those more intimately involved with this integral part of the safety net system.

Those who are more intimately involved with CHCs need an increased knowledge of high level cost-effectiveness research and knowledge about making economic arguments. There are many ways that interest groups or professional organizations can make this type of knowledge available to their members ranging from lectures over time, to articles in professional publications, to workshops for ½ day to a whole day. Several professional organizations may be able to provide this type of training and input.

Specific research that is short of state of the art cost-effectiveness analysis would include further delineation of the effects of CHCs on specific types of conditions for specific populations. Some of this research has been done and was described above. Other short run topics of interest for study would be the interaction between advantageous effects on different conditions within the same population and the effects of changes for a population on the group of individuals who are closest to them. Short-term cost savings analyses or cost-effectiveness analyses that do not include all effects could also be conducted.

The suggested extensions above could proceed from focusing on process measures (the least informative but easiest to study), to outcome measures, to cost measures.

Value-based studies conducted in the future should not occur haphazardly. Cost-effectiveness and cost-benefit analyses should be anticipated and planned in advance. While cost data can sometimes be assembled after a program is underway, the best cost-benefit and cost-effectiveness analyses are planned and carefully considered in advance rather than being left as an afterthought. Economic evaluations should be considered when planning most (if not all) analyses of treatments, programs, and policies at community health centers.

Longer-Term Needs

As a precursor to state of the art long-term analyses, simple analyses comparing the cost of care received in various settings for the target population will be useful in the future. Study design requires a choice for the care that will be compared with CHC care. On the one hand, the most commonly expected analysis would be to the care that they would receive if they were actually using the health care system but in a less coordinated way than they might be able to if they were accessing a CHC. However, this may not reflect the care actually being received by this population. The care that is actually being received by the population that is the target of CHCs is likely to be as near zero as possible (unless and until there is a true emergency) without the existence of the community health center. This is basically the "null" option, at least as far as the existence of the CHC is concerned. This is very close to what the World Health Organization (WHO) group working on generalized cost-effectiveness has recommended for modeling, considering what would happen if all treatment options were removed. In the case of an analysis related to CHCs, it is not that all treatment options are removed, only that all treatment options involving anything other than local emergency care are removed.

An approach to the economic and value-centered evaluation of CHCs that is more common in pharmacoeconomics and other clinical fields in which cost-effectiveness research is more mature is the notion of modeling medium-term to long-term outcomes. Modeling also has been used extensively in health systems research in international health. For example, much of the work on the second edition of *Disease Control Priorities* (an important international health planning book) has been based on modeling. The entire WHO-CHOICE framework relies on modeling. Modeling is an important approach for health system evaluation in international health. In that case, there may be a lot of data on at least some of the specific interventions being studied that were collected within a country, but there is often a need to make an assumption of how findings from another country (or sometimes even another region of the

world) generalize in order to construct an analysis that yields information that is useful for making a comparison among alternative treatments for which scarce resources might be used but for which a direct comparison is extremely unlikely.

Modeling requires the researcher first to set up a credible description of the course of the disease. This must pass a face validity test indicating that it includes the health states of interest and the chronological links between health states of interest that are clinically and mechanistically accurate. The model must then be "populated" with probabilities and costs that are credible. Ideally, these will be precisely measured and come from the peer reviewed literature. This is not always the case. Sometimes the values that are used in the model come only from expert opinion rather than the literature. This does not make the models invalid, but it should raise the bar for validating the model. Model validation is ideally achieved by running the simulation model for a population for which the characteristics and outcomes are known and comparing the predicted results with the known results. This is often done with a population for whom there has been sufficient follow-up in a longitudinal sense to observe a long-term path. The model can usually be validated only for the old treatment or natural history. It is more difficult and sometimes impossible to do this for a new treatment.

If a model uses scientifically valid information and passes the test of validation, then it can be used to predict outcomes and costs that have not been observed previously. The readers and users of such a model will ultimately make a decision (based on the model's description and transparency) as to whether or not the predictions that come from the model are valid and are worthy of being acted upon in the policy setting process.

Modeling can be used to estimate the influence of programs and policies not only on those who are most likely to directly use the services being modeled but also to estimate the effects on the entire target population. Further, once a model has been developed, it can be maintained and expanded over time to allow for additional comparisons including new treatments, programs, and policies.

Modeling does require having data on the epidemiology of the conditions that affect the CHC population. A key part of modeling is having scientific data on how a disease is likely to progress without or with treatment. Some conditions have insufficient epidemiological evidence to support a modeling exercise.

A final result of modeling would be the ability to compare entire systems of care that a CHC might offer and how they would affect both the population being treated at present and the entire target population for the CHC. While there is a resistance to taking away treatment options that are available at present and CHCs should not be compared to medicine administered is less developed countries, one premise of the approach espoused by the WHO group focusing on generalized cost-effectiveness analysis is that everything should be "on the table" for addition to the health system or removal from the health system. Decisions like this are truly system level decisions rather than incremental decisions tied to one condition or population at a time. Health systems with very limited resources that cannot create debt and that are responsible for a well defined target population are ideal for analysis in this context.

Modeling is clearly not the only way in which the analysis of cost-effectiveness and value will be improved and moved forward for CHCs. This section began with a call for relatively simple and straightforward cost-effectiveness analyses. Earlier in the paper a call was made for increasing the transparency of any cost-effectiveness analysis that is done. However, modeling will be a key component of moving the discussion forward at a system level. Modeling would combine

the talents and knowledge of epidemiologists, economists, clinicians, and local experts in the process of evaluating the value of CHCs.

What does the future hold?

Growing Importance of Economic Evaluation

First and foremost, as formal cost-benefit and cost-effectiveness analyses become a more important component of health policy making in general, they are also likely to become more necessary when conducting research on the value of CHCs. Thus far, there is extremely sparse evidence that has been generated using formal cost-effectiveness and cost-benefit research processes. There are standards for these two types of research. In many cases they are less well defined than methods for other aspects of medical and health services research, such as randomized controlled trials. However, the standards do exist and have existed for some time. Funders and policy makers should call on cost-effectiveness researchers to be as precise as possible in conducting this type of analysis. For funders and policy makers to be able to hold researchers accountable, they, members of their staff, and the reviewers they hire to evaluate research proposals, will need to become as technically sophisticated with respect to economic evaluation as possible. At the very least, they will need to become as technically sophisticated with respect to cost-effectiveness and cost-benefit analysis as they are with respect to randomized controlled trials. Bad research has the potential to lead to even more ill informed decisions than no research at all. Researchers and policy makers that do not understand the limitations of this type of research may try to apply it too widely and without considering other aspects of value.

Continued Evolution of Economic Evaluation

One difficulty with the potential increasing use of cost-effectiveness or value-driven analysis is the lack of standardization in general and the lack of sophistication about standardization specifically. In spite of the publication of *Cost-Effectiveness in Health and Medicine* in 1996, the panel that had written the text did not always make singular recommendations. The state of the art of cost-effectiveness analysis in particular at that time did not allow for that degree of standardization. Additionally, the state-of-the-art is not static. Many aspects of cost-effectiveness analytic methods have continued to evolve over the past nine years and will continue to evolve for the foreseeable future. While some analogous international panels have made recommendations that are closer to standards rather than only recommendations or summaries of the current state-of-the-art, there is even variation in the standards that have been recommended for the science. Standardization would enhance the potential for accountability as all parties could then understand how accountability is defined. However, standardization may also stifle innovation. This set of tradeoffs should be considered as any field sets new standards for itself and for those who perform research in an area.

Establishment of a Criterion for Interpreting Cost-Effectiveness Results

Even if there were agreement on the methods and everyone had a common understanding of the state-of-the-art for economic analysis this does not determine the fundamental criterion that will be used for decision making. As stated in the introductory section on the very meaning of value in health care, decision makers may want to only adopt new programs or preserve old programs if they are budget neutral in the short-run or may be willing so spend more resources in the short-run on the presumption that there will be improved health outcomes in the longer-run that are worth the extra expense of obtaining. The first criterion is reflective of a cost-benefit analysis, albeit a somewhat limited one. Even cost-benefit methodology is not intended to be focused on only short-run outcomes. A short-run cost-benefit analysis, often conducted from the perspective of the payer is much more reflective of a budget impact analysis rather than state of the art cost-effectiveness or cost-benefit working including valuation of outcomes. This

is a very high standard for new programs to meet. More importantly, few public health programs have been shown to be cost saving and even fewer will be cost saving from the narrow perspective of the payer. The entire purpose of a cost-effectiveness analysis (and presumably of a value-oriented analysis) is to determine whether the extra positive health results that occur are worth the extra spending and resources that are required.

While the policy implications are worth considering in terms of the extra positive health result for extra spending, one difficulty with this type of value analysis that was not mentioned earlier is deciding what a “good buy” is. There are levels of spending per quality adjusted life year that have been defined at least informally as a “good buy”. Commonly used thresholds are $50,000 and $100,000 per quality adjusted life year. While these are used frequently and do provide some insight into the level of spending that is considered acceptable, they are not hard and fast and they have not been changed in years. Thus, the degree of certainty that these should be considered good buys in not high. If the results are in terms of clinical outcomes or intermediate outcomes (e.g., mortality or blood pressure), the degree of certainty about what an improvement is worth is even lower. Thus, judging whether more spending is worth the outcome that is obtained is non-trivial. Different decision makers working with different budget constraints and different underlying health conditions may reach different conclusions as to what is valuable. Once again, consideration of the distribution of outcomes and not just the level of outcomes is inescapable. There is no standard for interpreting the importance of the distributions and economic evaluation is not well attuned to making a distinction among alternative distributions of the outcome.

In addition to considering the cost per QALY or net benefit or savings associated with a new program or treatment option, results are frequently expressed in terms of a return on investment. Even this term can be used in ways that are more general than the strict interpretation of an accounting-based definition. In the spirit of a cost-benefit analysis, if a treatment, program, or policy is found to have a positive net benefit, the return on investment can be calculated. Given that health interventions generally take some time to have any positive effect (and more importantly take time to have a net positive effect when compared with the resources used for implementation), the return on investment effectively represents the interest rate that would have to be earned on the money that is spent in the program to obtain a dollar value of the benefits in the future. This figure can be used to summarize an entire path of spending and positive results. In policy discussions, this type of tool can be useful because it reduces all of the other discussion to a single number that can be used to rank programs either relative to each other or relative to some external standard, e.g. the rate of return on an investment in a bank.

The fact that return on investment can be used to refer to so many different things beyond simply the financial relationship indicates one other thing that will be important for the future of value-related analysis in relationship to CHCs—understanding the terminology of different cost-outcome analyses, and determining how these relate to the phrase return on investment. Cost-benefit analysis has been described, and its primary distinction from other forms of economic evaluation is that it uses only monetary values of the effects. This type of analysis is often reduced to a simple question of whether a new treatment, program, or policy has a positive net benefit, and consequently its rate of return. Cost-effectiveness analysis uses various indicators of clinical or quality of life outcomes. This is not directly translatable into a return on investment, but the outcomes can certainly be described in a way that juxtaposes them with the costs so that the investment and return are at least apparent. The same can be true of what are sometimes called cost-consequence studies in which the costs and outcomes are described relative to one another but there is no formal ratio calculated. In the return on investment sense

of things, any analysis other than a cost-benefit analysis will essentially be an investment-outcome analysis in which both are described. It would even be possible to describe both the investment and return in terms of the equivalent amount that would need to accrue annually for the total to accrue over the length of the study. Thus, return on investment is part of the language being used to discuss the economic evaluation of CHCs and the term needs to be made comprehensible for all concerned.

Health and Economic Status

One aspect of cost-effectiveness analysis that is likely to be more important in the future than at present (and that is not even formally included in many cost-effectiveness analyses) is the effect of seeking care and receiving care on the economic status of the patients, and, from a public health perspective, of the population in which the patients are located. The cost of medical care in the United States and the uncertainty about that cost has continued to increase. A cause of many (although certainly not all) personal bankruptcies is medical care expenditures. Community health centers have a role to play in minimizing the impact of the costs of treatment on individuals and in making sure that the population that the CHC is serving has the capacity to continue to support itself economically as well as it possibly can. In the future the value of health care provided by CHCs (regardless of its cost-effectiveness in the sense of a pure economic evaluation) is likely to be determined by its ability to minimize the impact on the economics of the families that are being served so that the families can continue to function in society. This concept is one that is difficult to value in monetary terms.

Scope of Analyses

Much cost-effectiveness research to date fits into the category of analyzing a single treatment or a combination of alternative treatments for a single condition. The effects of the treatment that are considered in economic evaluations rarely go beyond the patients being treated. This may work well for research on specific treatments but does not work nearly as well for the analysis of policies. The analysis of policies has the opportunity to consider a broader set of effects and should consider a broader set of alternatives. The relevant question is not necessarily just "should policy A or policy B be adopted" (in a way analogous to whether treatment A or treatment B should be used) but sometimes whether any policy should be adopted at all given the competing demands for resources necessary to promote the health and welfare of the populations that are affected by CHCs. Consideration of a broad set of alternatives will not only affect how the research is done but also the context in which the results are interpreted.

Tools that Will Be Used

The future may also change the tools that are being used for analysis and that are being made available to decision makers. In pharmacoeconomic analyses at this point in time, those who develop the models are not only being asked to explain them in reports and in the peer reviewed literature, but they are also being asked to provide the models to decision makers (both within pharmaceutical companies and within managed care organizations) for those who are going to be making decisions based on the results of the model to have a chance to examine the model first hand and to explore changing the assumptions in the model. The future of cost-effectiveness analysis in general and cost-effectiveness analyses specifically related to CHCs may bring a need to produce similar tools.

A simplified outgrowth of researchers providing copies of the models they are using to produce results is a set of what one might refer to as "plug and chug" equations. Such equations are made under a single set of assumptions and usually deal with a single type of treatment or policy with effects going no further than the patients themselves. Thus, a set of equations like this is likely to lack the elegance or grandeur of a holistic policy analysis and is also likely to lack

the adaptability of tools that can be given to the decision maker to explore the effects of changing assumptions. In fact, these are likely to be most appropriately used as a starting point for further discussion. In a sense, if there is nothing found to indicate the cost-effectiveness of a program, policy, of treatment alternative when using the most basic set of assumptions, it is unlikely that any change in the assumptions making them less plausible or less generalizable will make the results seem more likely to support a strong economic argument. Such a set of equations can be used in advocacy or used as the starting point to generate a call for more research to fine tune the estimates that are obtained. As long as the limitations of this type of tool are understood, the existence and use of such a tool is probably quite reasonable. At this point in time, given the lack of even short-term cost-effectiveness data for CHCs, gathering the data necessary to generate credible "plug and chug" equations would force careful consideration of the elements of cost-effectiveness and cost-benefit analyses and bring out details that are unlikely to exist in the literature at this point.

A final possibility for the future of cost-benefit, cost-effectiveness, and other value-oriented research with respect to CHCs is that there will be no formal and rigorous cost-benefit or cost-effectiveness studies forthcoming. While this result would be less desirable, there are other fields (at present health communication is in this state) in which the long-term epidemiological models are not well developed. In the case of broad-based health communication programs, this lack of formal cost-effectiveness analyses adhering to state-of-the-art standards is most likely due to the difficulty of linking changes in knowledge and attitudes to changes in behavior that will last over time and affect the long-term incidence of a variety of health conditions. With respect to CHCs, the long-term epidemiological models that have been designed with respect to the general population may not apply well to the CHC user population. This may be because the set of assumptions about having a consistent place at which to receive care, having a consistent primary care provider, and living in a particular environment in which the environmental risk factors are not extreme may be much different from the reality for the CHC user population. In that case, all the validation that has been done for the general population may not apply. The goal of a long-term cost-effectiveness model to evaluate the system of care that a CHC can provide may be little more than a dream in the end. Those funding the research, those conducting the research, and those using the research in the long run will have to come to some type of consensus on how far this field can push forward.

Conclusion

There is limited evidence that community health centers provide care that is cost-effective or that has a positive net benefit when analyzed in a technically correct and rigorous manner. The cost-effectiveness or positive net benefit can often be inferred from a combination of information on cost and information on the effects related to having access to care at a CHC, but few explicit cost-benefit or cost-effectiveness analyses have been conducted. More studies comment on the effectiveness or cost of CHC care. The lack of evidence to date points to the difficulty of generating this type of evidence, although it does not suggest that such research is an impossibility. In the future, more modeling of the effect of CHCs on population health will likely be required in order to position the discussion of CHC programs and policies. This modeling will need to be transparent and need to be incorporated into tools that can be easily shared and exchanged with decision makers and their staff. This type of economic evaluation work will allow decision makers to explore the effects of varying assumptions on the conclusions that are being drawn as the level of accountability increases. An understanding of this entire process and of the different ways in which the results of economic evaluations can be expressed will be a necessity for future discussions of policy related to CHCs and how to continue to move the policies forward to maximize the long-term health and welfare of the populations that are the targets of CHC care.

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Assessing Health Center Cost-Effectiveness: Cost-Effective for Whom?

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Drs. Frick, Shi, and Gaskin should be commended for their very thorough and exhaustive review of the challenges of defining cost-effectiveness analysis as it relates to health centers. One is certainly left with the impression that assessing health center cost-effectiveness can be approached from many different angles, and that an overly narrow analytical framework can lead to some misleading or incomplete conclusions about health centers as providers of medical care. One important conclusion that I draw from this excellent review is that in order to be clear as to how to proceed with assessing health center cost-effectiveness, one must first answer the question, "cost effective for whom?" Approaches to assessing health center cost-effectiveness may differ greatly depending on the answer to this fundamental question.

The most typical way that cost-effectiveness analysis has been conducted is from the perspective of medical providers. Like most other medical providers, health centers are interested in assessing different treatment options for specific conditions, keeping up with state-of-the-art technologies, treatment guidelines, and training of medical staff, as well as being able to maximize their limited resources in a way that provides the most benefit within the scope of services they provide.

From the perspective of health center patients—especially those who are low income uninsured—cost effectiveness also means effective treatment without having to choose between incurring large and financially crippling medical bills or forgoing necessary care. To the extent that health centers can provide for all of the needs of their uninsured patients, then cost-effectiveness from the perspective of both the provider and patient will likely converge. But to the extent that followup diagnostic and specialty services are recommended but not directly provided by health centers, and are otherwise not easily available to uninsured persons in the community, then cost-effectiveness from these two different perspectives may diverge greatly. From the perspective of uninsured patients, it seems that it would be more appropriate to assess health center cost-effectiveness within the broader context of the health care safety net.

This naturally leads into an even broader view of assessing health center cost-effectiveness from the perspective of the neighborhood or community that is served by the health center. Not only do CHCs serve as a safety net for the uninsured, but they also serve as a major provider of care to other low income Medicaid, Medicare, and even privately insured patients, either because there is an absolute shortage of providers in these areas or because other providers generally decline to see these patients due to low reimbursement rates. In addition, health centers are often located in low income rural and urban areas with a high proportion of racial/ethnic minorities who may also face language and other cultural barriers to care. The authors pointed out the importance of a few studies that assessed health center effectiveness from the perspective of the community or target population it is intended to serve, rather than just the individual health center users. In sum, simply knowing that health centers are cost-effective providers of medical care to their users may tell us very little about its impact on the larger community or target population.

A community perspective on cost-effectiveness also allows for consideration of the broader role that health centers play in their communities, including public health functions, emergency preparedness, and centers for community action that—either alone or in collaboration with other social service agencies—may facilitate other important functions not directly related to medical care. A community perspective would also include the impact of health centers on the local economy that the authors discussed.

Perhaps one issue that the authors did not directly address was health center cost-effectiveness from the perspective of legislators and policymakers, as well as the taxpayers they represent. Expanding the number of health centers is one lever that policymakers have used to address the general societal problem of the uninsured and their lack of access to medical care. Policymakers require information on health center cost-effectiveness relative to other policy options they could consider, such as expanding health insurance coverage either through public coverage programs (e.g. Medicaid) or by subsidizing the purchase of private insurance coverage. For policymakers, the central question is the cost-benefit of devoting scarce public dollars to health centers relative to devoting the same level of funding to expanding health coverage. Such an analysis also should recognize that these two policy options are not mutually exclusive, as new health centers can increase coverage in a population by screening patients for eligibility, and expansions in health coverage will mean more paying patients for health centers, potentially increased revenues, and expanded capacity to treat both insured and uninsured patients.

REACTION PAPER TO:
"Health Center Cost-Effectiveness and Value"
Kevin D. Frick, Leiyu Shi, Darrell Gaskin

Submitted by:
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How relieved I was to see that the authors of this paper included the concept of "value" in their consideration of cost-effectiveness. It is sometimes easy to forget this component of cost-effectiveness, and fall prey to (in the words of Oscar Wilde) "knowing the price of everything and the value of nothing." In fact, in my readings about cost-effectiveness and cost-benefit analysis, I have not seen the concept of "value" explicated as articulately as the authors do here. That said, the authors cite the difficulties of measuring this more qualitative aspect of the community health center model. It would be beneficial to have a clearer concept and methodology for conducting this type of research, and perhaps this could be fleshed out somewhat in the break out sessions. For those of us who came of age in the 1960s, the values at the heart of the community health center movement in terms of broader community development and empowerment are what drew us to CHCs as a career.

In fact, as I discovered in studying CHC history, it is interesting to note that no one, not even the early CHC advocates, expected, or espoused the idea, that CHCs would be or should be cost-effective. Creating CHCs was seen as the price that society should pay to overcome, or at least decrease, inequities in the receipt of health care. This is probably why the authors could not find many links to the topic of CHC cost-effectiveness in their Pubmed search. They cite several post-2000 studies that deal with process or outcome without including cost analyses. Nonetheless, there are several earlier studies that do incorporate estimated cost-savings, and which, I believe, were conducted with the rigor they seek. It would have been helpful to have had the benefit of the authors' critique of these studies in terms of whether they offer a framework or starting point for the broader future research they recommend.

They do get at this somewhat in their excellent elaboration of points that need to be completed to assess the value of CHCs in the short- and long-term. This meta-analytical-like approach offers an opportunity to garner the best evidence from the past and to continually add to it as studies are conducted in the future. I am similarly intrigued by the idea of "modeling" and would appreciate a concrete example of its application in the study of CHCs.

It was dispiriting to read that "long-term cost-effectiveness model(ing) to evaluate the system of care that a CHC can provide may be little more than a dream . . ." However, the authors have laid out important principles and methods for research that, even if done short-term and in a more limited way, can over time create a body of evidence on CHC cost-effectiveness that is lacking today.

Commentary: Health Center Cost Effectiveness and Value
Sara Rosenbaum

Kevin Frick, Leiyu Shi, and Darrell Gaskin have illuminated the knowledge gap surrounding health centers in the context of classic economic valuation. My question (and I suspect the authors' as well) is whether, compared to other unanswered questions, filling this knowledge gap should be high on the health center research agenda.

The authors emphasize that their conclusions do not imply a lack of evidence regarding health centers' effectiveness or quality. In exploring the absence of economic valuation research, the authors point to three important factors applicable to many issues in health care: the generally slow "evolution of economic valuation in much of medicine and public health;" the general uncertainty regarding the meaning of "value" in health care; and the difficulties associated with true comparisons, a basic precondition to valuation research. The authors chart the complicated path that funders and researchers would need to travel in order to succeed in the design and conduct of health center economic valuation studies.

I question whether traversing this path makes much sense. I realize that in the current political and policy climate -- in which economic valuation analysis is ascendant, the concept of "value" is equated in the minds of most laypersons with economic value to any particular purchaser, and the presumption is against expenditures that do not meet this bar -- it may be heretical to assert that the economic value questions are not the most important ones. In a nation racked by deep economic inequalities, entrenched health disparities, and the absence of an equitable means for justly allocating health resources across society, the importance of economic valuation pales compared to other research questions related to the design and operation of health centers.

As the authors note, economic valuation works best as an analytic technique when applied to emerging technologies, not broad, widely diffused, and established health care practice norms. Economic valuation is a tool for understanding the effects of highly specific interventions that readily lend themselves to controlled comparison in an array of settings and over a defined time period. None of these pre-conditions to valuation accurately frames the issues facing health centers. Health centers are an enormously rich intervention, whose "whole" has proven to be far greater than the sum of its parts. Simply defining "value" in this context becomes almost impossible. Now entering its fifth decade, health centers are a venerable presence in U.S. health policy and practice, not an emerging technology. And the notion of well-done comparative research is ironic: by law, health centers must be located in communities in which the basic idea of choice is absent.

Instead of surrendering to the view that economic valuation is the "best evidence" and investing in studies of marginal utility, I believe that we should instead focus on research whose outcome may better advance the health of communities and populations. That is, of course, unless the pressing policy questions on the table are the comparative value of doing nothing for medically underserved communities, regulating the medical home supplier market by dictating medical practice sites, or incentivizing private medical home suppliers to locate in poor communities (and in this regard of course, the panoply of failures is astounding, beginning with the charitable tax exemption when applied to health care and proceeding through a half century of financial inducements).