

CHAPTER EIGHT

# **The Problem of Unwanted Variations**

## The Problem of Unwanted Variations

Variations that arise because of net differences in the incidence of illness among populations or because the patients living in different areas have different preferences for health care are “wanted” variations. However, as previous editions of the Atlas have demonstrated, most of the variation among regions can be explained by factors other than patient preference. Both the amounts and types of care provided are highly dependent on two factors: the capacity of the local health care system (which influences how much care is given) and the practice styles of local physicians (which determine what kind of care is given). Other factors might include patients’ access to care, advertising, and cultural issues.

The present edition of the Dartmouth Atlas shows that Michigan is like the rest of the nation. The Atlas documents:

- Systematic underuse of services known to be effective and wanted by most patients;
- Wide variations in the use of discretionary treatments, such as elective surgery;
- Wide variations in the intensity of care, such as hospitalizations for medical conditions, end of life care, and the use of prescription drugs.

The issue of unwanted variations is receiving increased public attention. The National Academy of Sciences recently convened the National Roundtable on Health Care Quality to assess the problem of quality of care in the United States. The Roundtable concluded:

*“Serious and widespread quality problems exist throughout American medicine. These problems, which may be classified as underuse, overuse and misuse of care, occur in small and large communities alike, in all parts of the country and with approximately equal frequency in managed care and fee-for-service systems of care.”*

In this chapter, “best practice” benchmarks are used to evaluate the extent of underuse of effective, wanted services, including mammography, screening for colorectal cancer, diabetic eye examinations and use of life saving drugs for patients with heart attacks. The overuse of discretionary surgery is evaluated by using benchmarks from health plans and hospital referral regions where patients have been fully informed about their treatment options and encouraged to choose surgery according to their own preferences. The issue of unwanted variations in the intensity of hospitalizations, end of life care, and the use of prescription drugs is framed within the context of our failure to find evidence that more of these kinds of care is better than less.

The problem of unexplained variations seems worthy of wide social debate. Our hope is that the Atlas will stimulate such a debate in Michigan.

## **The Underuse of Effective Medical Care**

Underuse represents a failure of physicians to provide – or of patients to obtain — diagnostic tests, preventive services and treatments that are proven effective in improving health status. The 1999 edition of the national Atlas and the Dartmouth Atlas of Health Care in Michigan confirm several of the findings of underuse cited in the Roundtable’s report. Among hospital referral regions, there are striking variations in the use of:

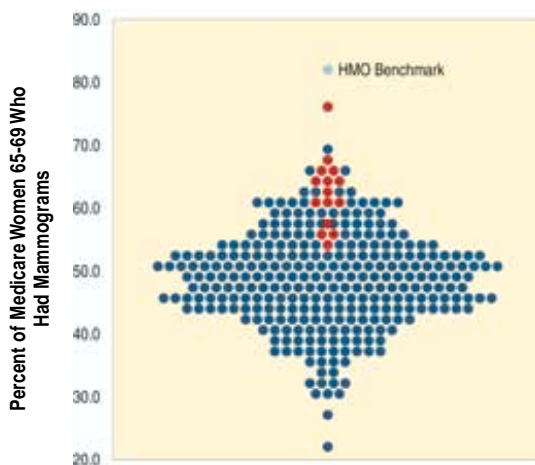
- Mammograms for Medicare women for whom clinical trials show the test saves lives;
- Eye examinations to help prevent complications of diabetes;
- Prescription drugs proven effective in lowering mortality rates of patients with heart attacks.

For services such as these, there can be little debate over the question, Which rate is right? The interventions are known to be effective, the benefits far exceed associated risks, and most people want such care. The right rate — the “best practice” benchmark — is the rate that results when eligible patients are provided with appropriate care.

## Screening for Breast Cancer

The United States Preventive Services Task Force recommends routine mammographic screening every one or two years for women age 50 to 69. Clinical trials provide convincing evidence of the effectiveness of this screening in reducing mortality from breast cancer. The Task Force found that there was not enough evidence to recommend universal screening for women over age 69, but opined that healthy women age 70 and over might benefit from routine mammography.

The frequency of mammography among female Medicare enrollees between 65 and 69 fell short of the Task Force's recommendation in 1995-96. No hospital referral region exceeded the "best practice" benchmark provided by Kaiser-Permanente South, a California health maintenance organization, in which 82% of Medicare seniors received breast cancer screening. The average rate of mammography in the United States was 49%, and varied by a factor of more than three, from less than 25% to over 76%.

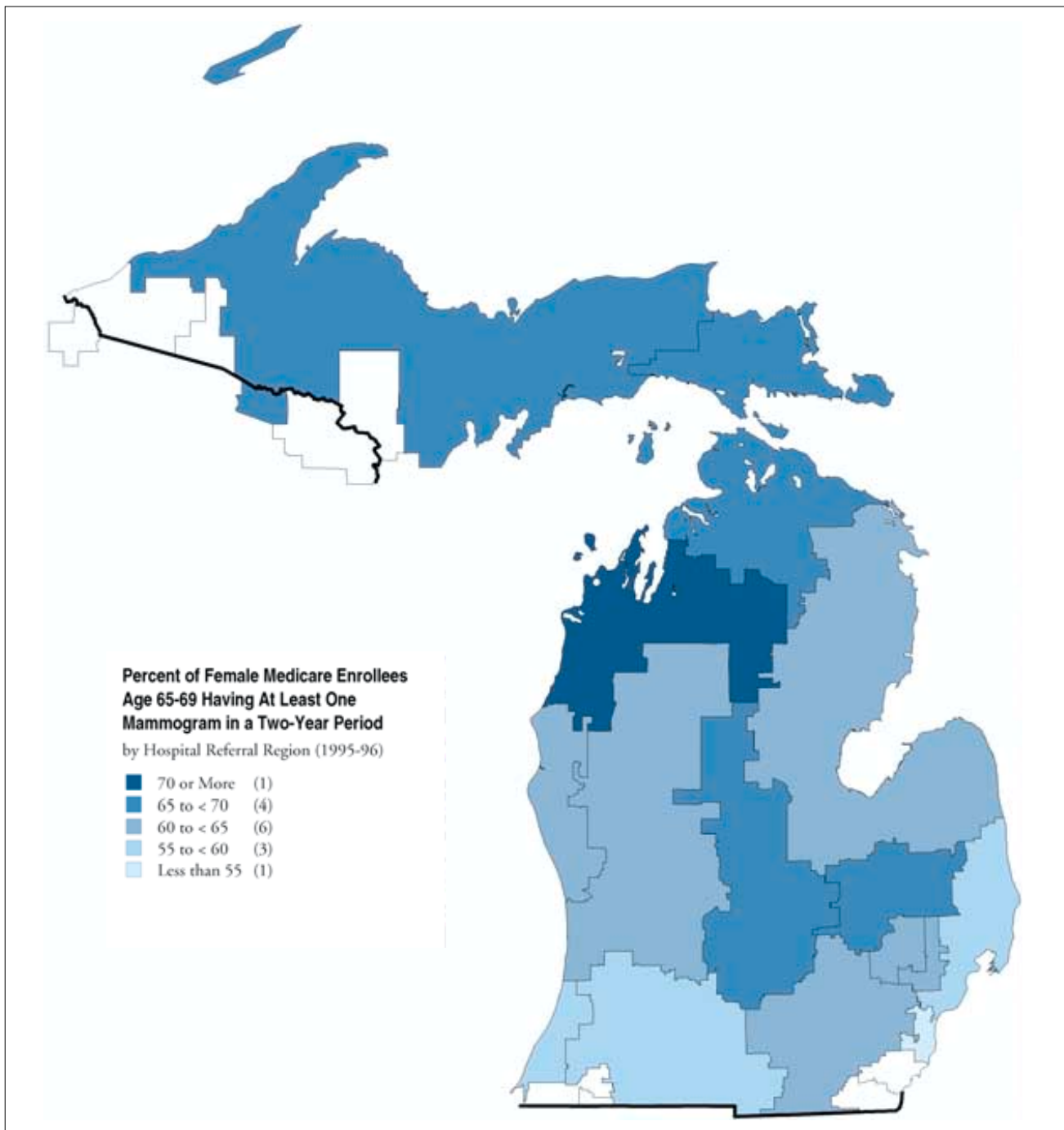


**Figure 8.1. Percent of Medicare Women Age 65-69 Who Had Mammograms (1995-96)**

*The target screening rate of the U.S. Preventive Services Task Force is one mammogram every one to two years for women between 65 and 69. Actual rates of screening ranged from less than 25% to 77%. Each point represents one of the 306 hospital referral regions in the United States. Red dots indicate rates for Michigan hospital referral regions.*

The rates in Michigan hospital referral regions were among the highest in the nation. The overall state average was 61%. Traverse City provided the national "best practice" benchmark for fee-for-service medicine with 77% of women receiving at least one mammogram in 1995-96. Petoskey (68%), Lansing (66%) and Flint (66%) were also relatively high; St. Joseph (56%), Detroit (55%) and Dearborn (55%) were relatively low, but still above the national average.

Rates among BCBSM members were also high. Screening mammography was not analyzed for the Atlas, but it is one of the Blues' key quality indicators. BCBSM's Center for Health Care Quality monitors screening rates. In 1999, 68% of female BCBSM members between the ages of 52 and 64 had received at least one mammogram during the preceding two years.



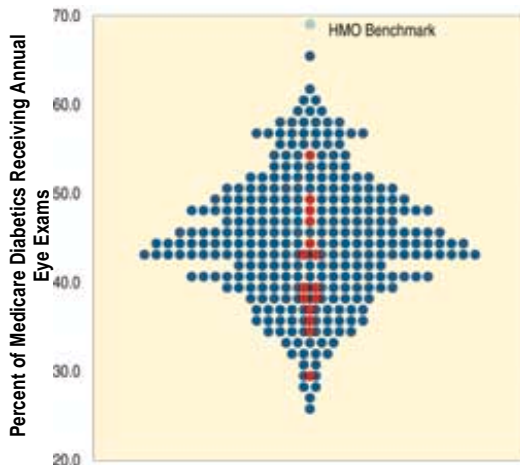
**Map 8.1. Percent of Medicare Women Who Had Mammograms (1995-96)**

Rates of mammography were high among female Medicare enrollees in Michigan, although all regions fell below the “best practice” model provided by Kaiser-Permanente.

## Annual Eye Examinations for Diabetics

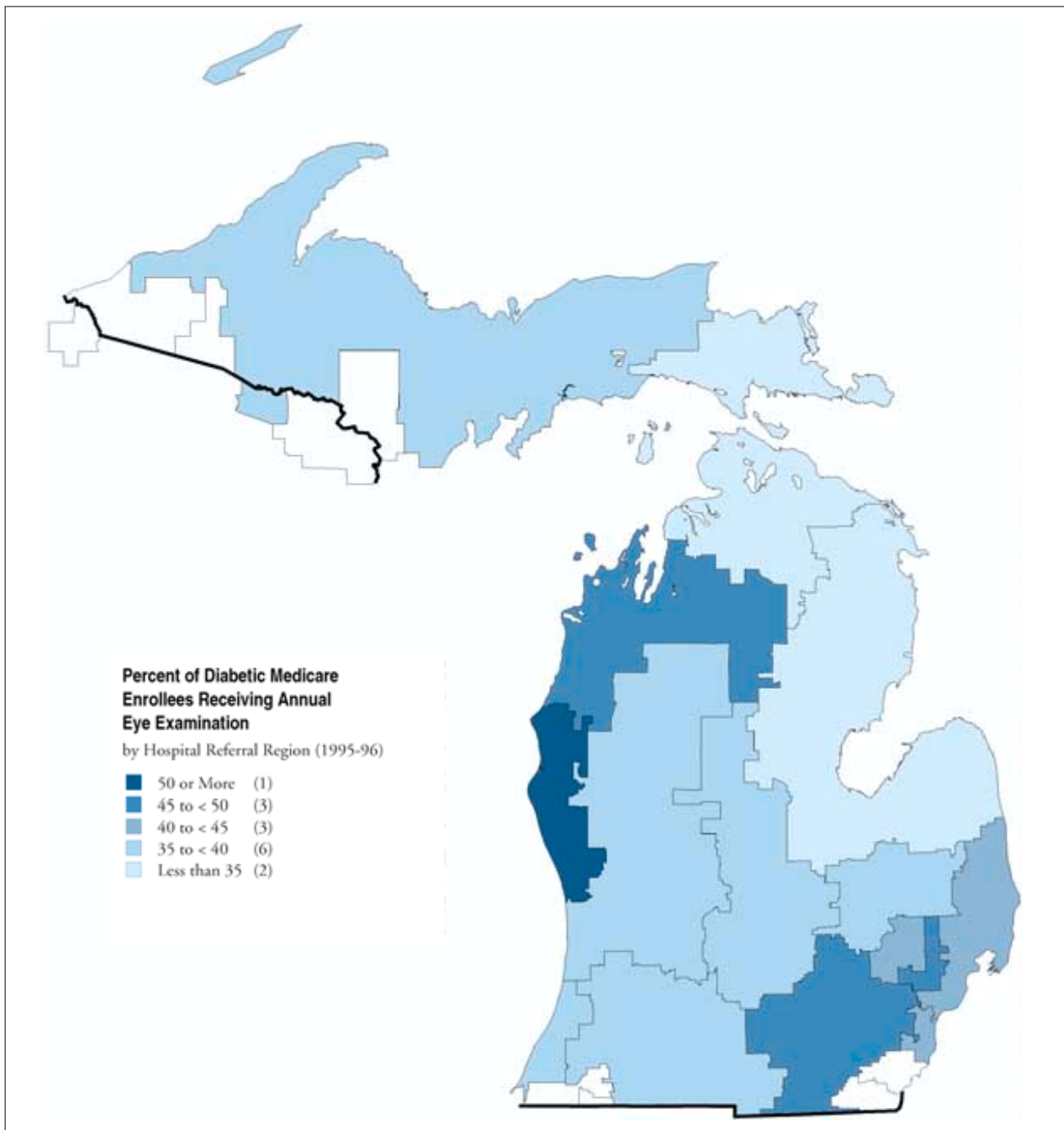
In people with both insulin-dependent and non insulin-dependent diabetes, randomized trials have confirmed that yearly retinal exams and treatment of eye disease reduce the risk of blindness. The American Diabetes Association recommends annual eye exams. In 1995-96, all hospital referral regions in the nation fell well short of the guideline recommendation for annual eye examinations for Medicare enrollees who were diabetics. Compliance with the guideline varied by a factor of more than 2.5, from 25.1% to 66.1%. No hospital referral region in the United States achieved the 69% benchmark provided by Kaiser-Permanente North.

Michigan hospital referral regions showed wide variation in compliance with the guideline. Muskegon, where 55% of diabetics had evidence of an annual eye examinations, scored highest on this measure of quality. In all other Michigan hospital referral regions, less than half of diabetics had eye examinations. Petoskey, which had the second highest compliance score for mammograms, ranked lowest among Michigan regions for eye examinations. In this region, only 29% of diabetics had the examination.



**Figure 8.2. Percent of Diabetic Medicare Enrollees Receiving Annual Eye Examinations (1995-96)**

*The Diabetes Quality Improvement Project recommends annual eye exams for all diabetics. Actual rates of compliance with the guideline ranged from 25% to 66%. Each point represents one of the 306 hospital referral regions in the United States. Red dots indicate rates in Michigan hospital referral regions*



**Map 8.2. Percent of Diabetic Medicare Enrollees Receiving Annual Eye Examinations (1995-96)**

In one hospital referral region, more than 50% of diabetic medicare enrollees received eye examinations. In two regions, less than 35% did.



## Beta Blockers and ACE Inhibitors for Heart Attack Patients

Since 1992, the Health Care Financing Administration has implemented a continuous quality improvement approach to ensuring quality of care for Medicare enrollees through the Health Care Quality Improvement Initiative. The first national project of this program is the Cooperative Cardiovascular Project, which focuses on the treatment of patients with acute myocardial infarction. Quality indicators based on clinical practice guidelines were developed by the American College of Cardiology and the American Heart Association. The clinical records of over 200,000 patients admitted for treatment of acute myocardial infarction were reviewed and patients who, according to the quality indicators, were “ideal” candidates were identified. Data were also collected to ascertain whether or not these “ideal” candidates had, in fact, received the necessary drug.

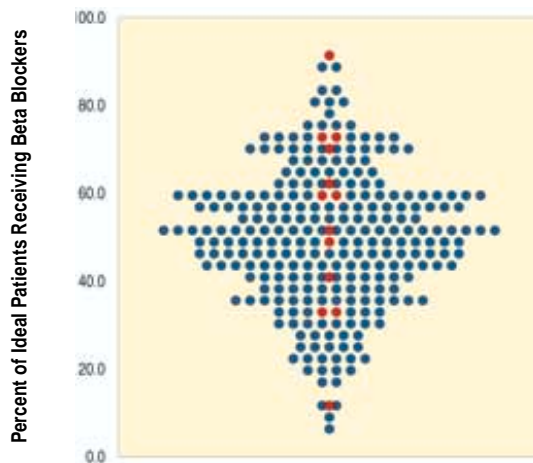
The data showed that a substantial number of patients judged “ideal” for treatment did not receive the appropriate interventions, despite the scientific evidence of their efficacy in reducing mortality. In a subsequent study, the proportion of patients who received the needed care was shown to vary substantially among the nation’s 306 hospital referral regions. The findings in the following two sections were originally published in the *Journal of the American Medical Association* in February 1999. (O’Connor GT, Quinton HB, et al, Geographic Variation in the Treatment of Acute Myocardial Infarction, *Journal of the American Medical Association*, February 17 1999 – Vol 281, No 67, 627-633). For more information, see *The Dartmouth Atlas of Cardiovascular Health Care*.

## Beta Blockers at Discharge

Rates of compliance with the guideline for prescription of beta blockers at the time of discharge for “ideal” candidates varied substantially among hospital referral regions across the United States, ranging from 5% of ideal candidates to more than 92%.

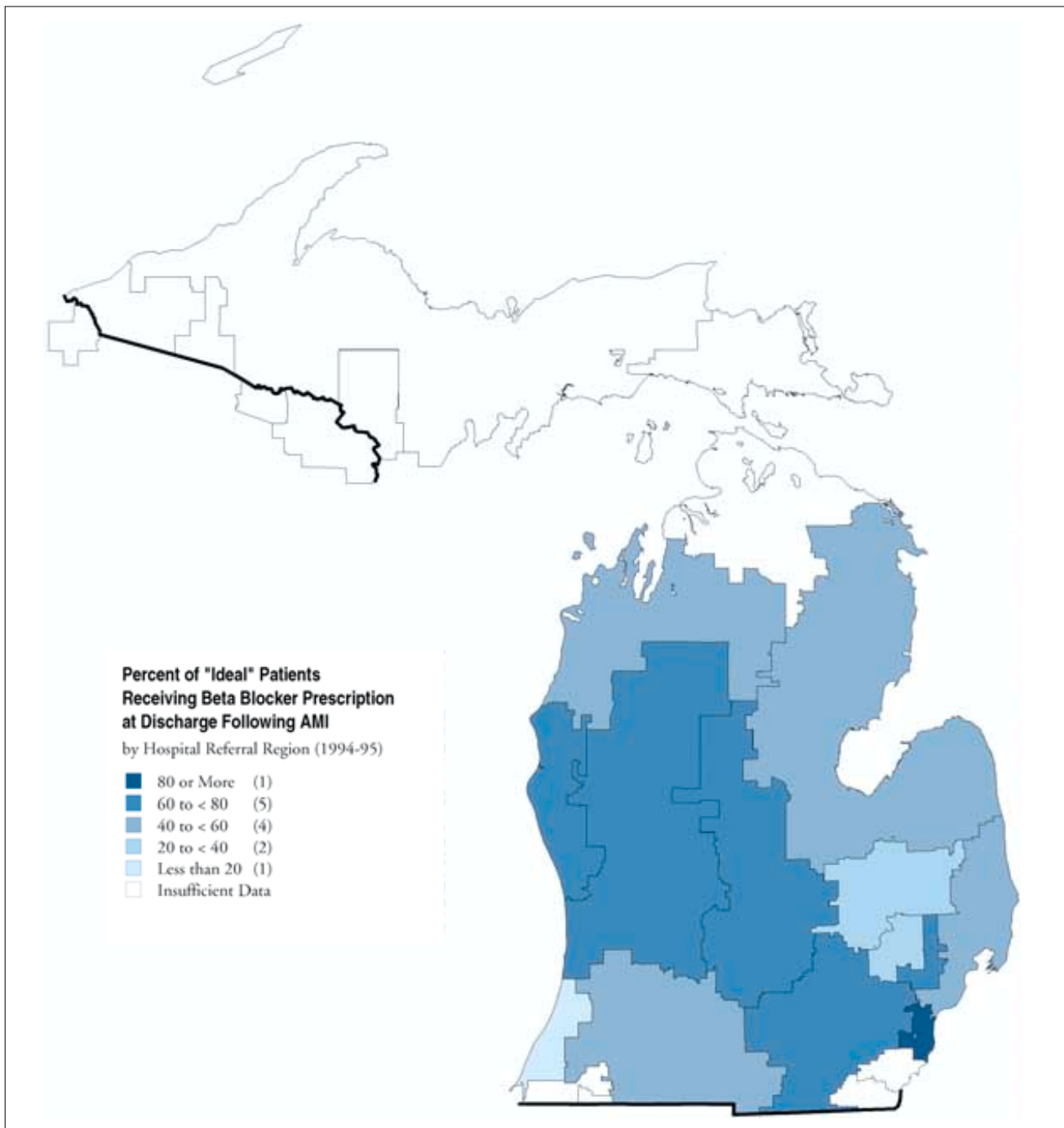
How does Michigan compare to other regions in the United States? There is wide variation both within Michigan and across the United States. Compliance with the guideline among physicians serving the Dearborn, Michigan region was the best in the nation: 92.7% of Medicare residents with heart attacks living in this region who were “ideal” candidates for beta blockers received this drug at the time of discharge. By contrast, the St. Joseph region was at the low end of the spectrum on this measure of quality; only 11.7% of “ideal” candidates received beta blockers. Importantly, the Medicare findings are mirrored in those from BCBSM data in the coronary artery disease chapter: Dearborn had one of the highest rates of post-event beta blocker use, and St. Joseph had one of the lowest.

Among BCBSM members who had acute heart attacks, underwent angioplasty or had bypass surgery during 1997, the use of beta blockers also varied (Chapter Five). In Ann Arbor, over 70% of patients received beta blockers at discharge, while in Flint, less than 50% did.



**Figure 8.3. Percent of Patients Considered “Ideal” for Beta Blockers After Acute Myocardial Infarction Who Received Prescriptions at the Time of Discharge (1994-95)**

*Among Medicare enrollees who had had heart attacks, prescriptions for beta blockers varied from 5% of “ideal” candidates to more than 90%. Red dots indicate rates in Michigan hospital referral regions.*



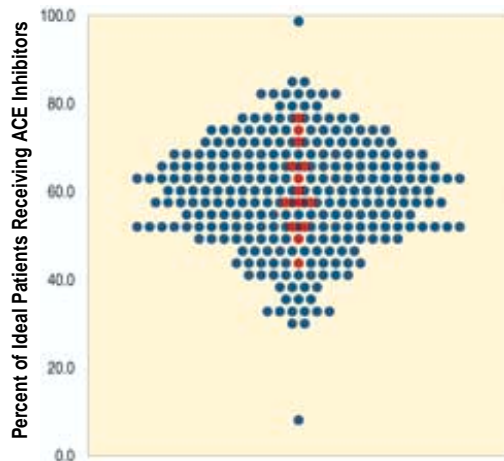
**Map 8.3. Percent of Medicare Patients Considered "Ideal" for Beta Blockers at Time of Discharge After AMI Who Received Prescriptions (1994-1995)**

Compliance with guidelines for use of beta blockers varied greatly among Michigan hospital referral regions.

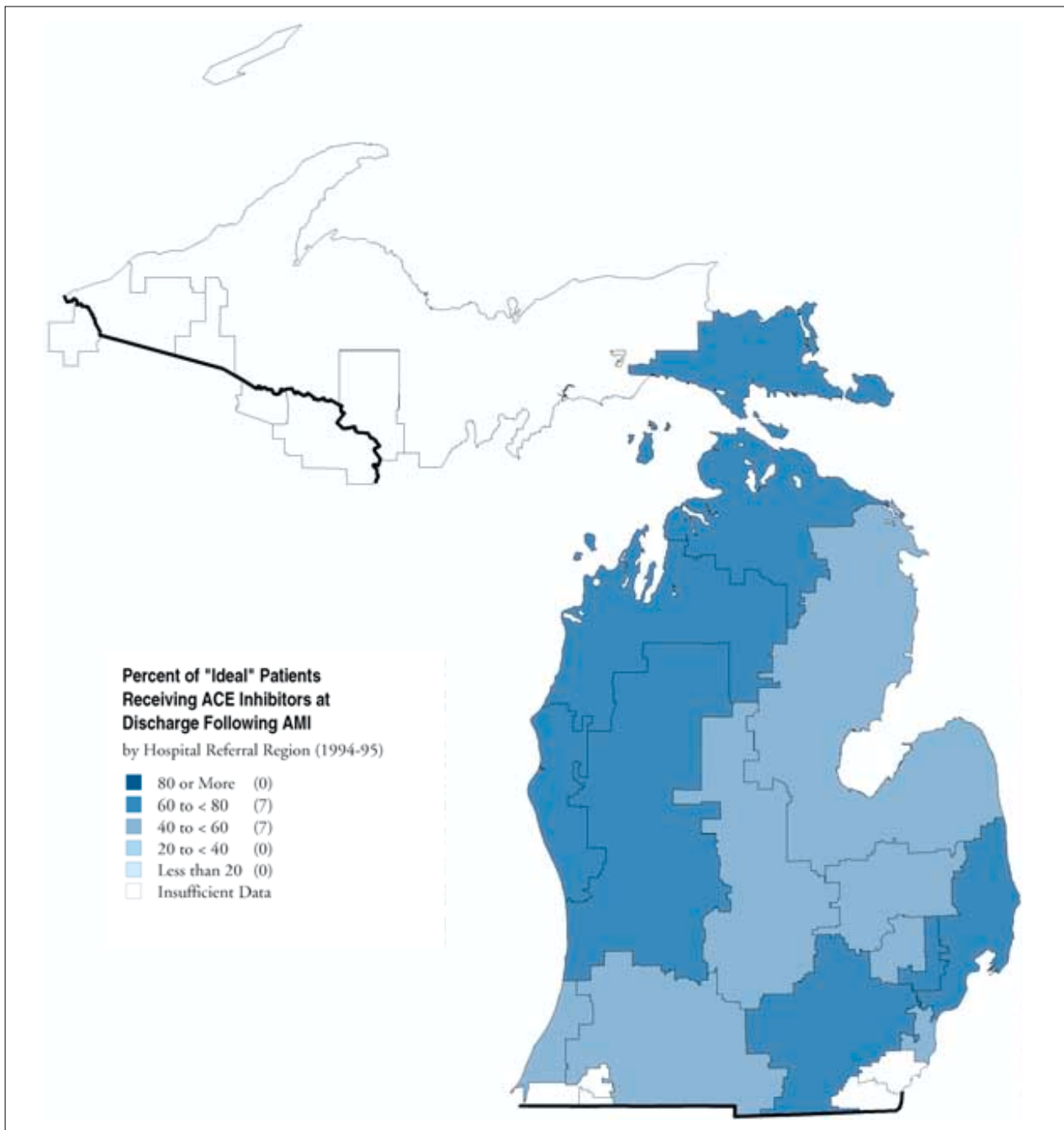
## The Use of ACE Inhibitors

Rates of compliance with the guideline for prescription of ACE inhibitors among post-heart attack patients considered “ideal” candidates for the therapy varied substantially among hospital referral regions in the United States, ranging from 100% (Wausau, Wisconsin) to less than 7%.

How did Michigan compare to other regions in the United States? All regions fell considerably below the “best practice” example. Muskegon (75%), Royal Oak (74%) and Traverse City (71%) had higher rates of compliance, while compliance in Flint and Kalamazoo was less than 50%.



**Figure 8.4.** Percent of Patients Considered “Ideal” for ACE inhibitors after Acute Myocardial Infarction Who Received Prescriptions at Time of Discharge (1994-95) Among Medicare enrollees who had heart attacks, prescriptions for ACE inhibitors varied from 7% to 100% of “ideal” candidates. Red dots represent rates in Michigan hospital referral regions.



**Map 8.4. Percent of Medicare Patients Considered "Ideal" for ACE Inhibitors After AMI Who Received Prescriptions (1994-1995)**

Compliance with guidelines for use of ACE inhibitors fell considerably below the "best practices" benchmark in all Michigan hospital referral regions.

## Why is There Underuse of Effective Services?

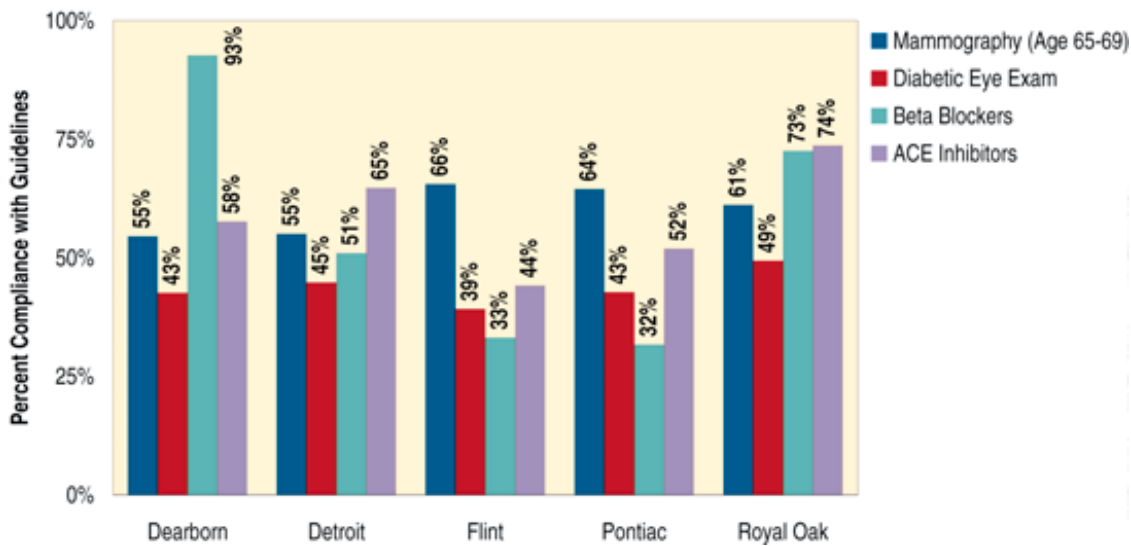
Why is there underuse of services that work — and that patients want — in a nation so amply endowed with medical resources? Underuse cannot be explained by an inadequate supply of either primary care physicians or specialist physicians, because underservice is prevalent in hospital referral regions with both high and low supplies of these resources. Nor is underuse related to access to physicians, or the continuity of ambulatory care. If undersupply is not the cause of underuse, then spending more is not the cure for the problem.

There is little consistency in the use of effective services; regions that approached the standard for “best practice” for one preventive service commonly did notably poorly on other preventive measures. Performance seems to vary in an idiosyncratic way, reflecting local physicians’ opinions and practice styles as well as the lack of systems to remind providers and patients about important services such as vaccinations and appropriate post-heart attack care. The extent of underuse, and the uneven nature of compliance with recommended guidelines, indicate that there is substantial opportunity to improve the quality of care by improving the processes through which preventive and therapeutic services are delivered.

Differing characteristics of patient populations might also play a role in this variation. Health researchers and community activists are developing strategies to improve the use of preventive services among particular social and cultural groups, although much work remains to be done.

The uneven nature of compliance with clinical practice guidelines and the opportunity for improvement can be seen graphically in the Medicare “effective services” profiles of five contiguous Michigan hospital referral regions (Figure 8.5). Heart attack victims living in Dearborn who were “ideal” candidates for beta blockers received excellent care: more than 92% of eligible patients received beta blockers. But among heart attack patients in Dearborn who needed ACE inhibitor drugs, the situation was not as favorable as it was for those who lived in Royal Oak, where 74% of ideal candidates received ACE inhibitors. Residents of Pontiac and Flint

who needed mammograms did better than those living in the Detroit and Dearborn regions, but heart attack patients in these two communities received substantially sub-optimal treatment with both beta blockers and ACE inhibitors. All Michigan hospital referral regions ranked below the United States average, and substantially below Kaiser-Permanente's 69% rate of providing eye examinations for diabetics. Data do not permit development of effective services signatures for BCBSM members at present, but information presented in other chapters of this Atlas suggest that similar variation exists for these services within the BCBSM population.



**Figure 8.5. The Effective Services Signatures of Five Hospital Referral Regions**  
*The figure gives the percent of patients receiving the appropriate services.*

## Underuse and Overuse of Surgery and The Quality of Clinical Science

Which surgical rate is “right?” Do patients in high rate areas suffer from overtreatment, while those in low rate areas receive less than adequate care? According to the Roundtable report, underuse represents the failure to receive effective treatments, and overuse means that patients are subjected to treatments for which the associated harms exceed the expected benefits. In many cases, overuse of a particular service might not actually harm the patient at all (e.g., urinalysis) but harms the system by adding unnecessarily to costs and wasting resources. How do we know when treatments are effective, and when harms exceed benefits? Answering this question depends fundamentally on outcomes research — clinical trials and cohort studies which evaluate the outcomes of care according to the treatment used. In many situations, however, judgments about overuse or underuse are extremely difficult or impossible because medical science is so poor that we cannot make accurate prognoses for the effects of given treatments. The research required to arrive at conclusions about harms and benefits has never been done.

The large variation in the incidence of back surgery is one example of how poor medical science inhibits the valid interpretation of outcomes. Rates of back injuries vary much less than rates of treatment, from which it can be inferred that in regions with low rates of surgery for back pain, the condition is being treated in other ways. From the perspective of the outcome that matters most — improvement in quality of life — the value of care has not been determined in a satisfactory way.

It cannot be said, on the basis of science, that surgical treatment of back pain works in the ways that patients and surgeons expect. Under a strict interpretation of the Roundtable criteria, such as the one the Food and Drug Administration uses in determining the value of drugs, any use of an unproven intervention in everyday practice is “overuse.” Indeed, if back surgery were a drug, rather than a procedure, its use would be forbidden by law until proof of efficacy had been established. Under the rules of everyday medical practice, however, most non-drug innovations escape rigorous evaluation. Indeed, only one clinical trial has been completed, a 1972 study in Norway. Another trial, the SPORT study, is just getting underway.

Even more surprising, only a few natural-history studies of the treatment of back pain are available to inform clinical decision making. Because of the paucity of scientific information, it is impossible to say, on the basis of evidence concerning outcomes, whether the observed rates constitute either underuse or overuse. Failure to evaluate the outcomes of care is, moreover, an incredible waste of the opportunity to learn what works and what patients want.

## The Overuse of Discretionary Surgery

In the absence of good scientific evidence of efficacy, outcomes researchers have sometimes relied on medical opinion to define overuse and underuse of care. Panels of experts are asked to make group judgments about whether the benefits of a particular intervention exceed its risks. Over the past 15 years, the RAND Corporation has used a group judgment process (The Delphi Approach) to develop detailed judgments about which groups of patients will benefit from surgery and which will not. RAND then applied the judgments to actual patients to classify surgery according to “appropriateness.” Surgery in cases in which the panel felt the benefits exceeded the risks was judged “appropriate;” for those patients for whom the risks exceed the benefits, surgery was classified as “inappropriate,” or unnecessary. The Roundtable report used these studies to estimate the extent of overuse of specific surgical procedures. For surgical procedures common in the Medicare population, the Roundtable’s estimates of overuse ranged from 17% of all cases (coronary angiography) to 32% (carotid endarterectomy).

Several studies have attempted to understand the relationship between inappropriate use of care, as defined by panels of experts, and geographic variations in surgical rates. While many researchers had assumed that areas with high rates of surgery would have a greater percentage of unnecessary or inappropriate care, the studies failed to confirm that hypothesis. Overuse as defined by experts accounts for very little of the variation seen among small areas.

Sparing patients from surgery that experts believe is inappropriate obviously improves the quality of care; and on purely ethical grounds, such care should not even be offered. However, overuse does not explain geographic variations, and the elimination of overuse is not sufficient to define what care patients actually want.

## Discretionary Surgery and the Question of Which Rate is Right

Increasingly, outcomes researchers are documenting the importance of patients' preferences in deciding which treatment best meets the individual's needs and wishes. A treatment is discretionary precisely because medical practice offers patients at least one other option. Most women with early-stage breast cancer, for example, have a choice between breast sparing surgery and mastectomy. Extensive clinical trials have shown that improvement in survival (the main goal of either treatment) is about the same for both options. However, other outcomes of the two interventions are not the same, and the choice between them involves trade-offs. The patient who undergoes lumpectomy will need radiation therapy, and faces a risk of local recurrence of her breast cancer. The patient who undergoes mastectomy avoids radiation and local recurrence, but must deal with the loss of her breast. Individual women differ substantially in how they evaluate the risks and benefits of these two treatment options. Breast sparing surgery is appropriate for some patients, and mastectomy is the right choice for others. Since the trade-offs must be made according to the preferences and values of individuals, the decision rightfully belongs to the patient — and not to panels of experts, managed care companies, surgeons, or patient advocates. The definition of unnecessary care must be expanded to include care that does not reflect what individual patients actually want. Unwanted care, even when effective, is unnecessary if another effective option is preferred. For example, a woman with early-stage breast cancer who, if properly informed, would want a lumpectomy, but whose surgeon instead prescribes a mastectomy, undergoes unnecessary surgery.

Clinical decisions governing the choice of treatment for benign prostatic hyperplasia, back pain and stable angina (chest pain) due to coronary artery disease involve similarly complex trade-offs between competing risks and benefits that require the patient's active involvement in the choice of treatment. The following pages illustrates that when this happens — when informed patients participate actively in decisions about their treatment — the rates of surgery are quite different than they are when physicians are the primary decision makers.



## Shared Decision Making and the Right Rate for Discretionary Surgery

If patients were informed about the risks and benefits of available treatments, and were actively involved in the decision making process, surgical rates would be based primarily on patient choice among the “appropriate” options, rather than the preferences of individual physicians or the recommendations of panels of experts. The rates of surgery that would result from the incorporation of informed patients’ choices into the decision making process would then be available as measures of how much surgery is necessary according to patients. We would also know whether the amount that informed patients want is less or more than the amount now being prescribed by physicians and experts.

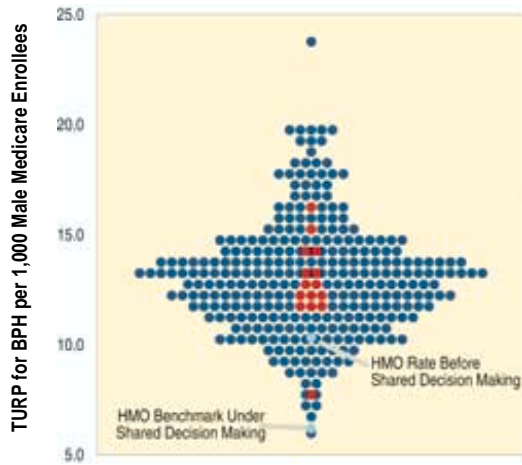
Under shared decision making, the demand for surgery — i.e., the rate of surgery — is different than the rate created when physicians decide. Several studies have found that the level of demand for surgery that results from shared decision making is substantially less than in circumstances in which patients are not involved in decisions about surgical options. Measured against the rate of demand that results from shared decision making, current rates of a number of common forms of surgery appear to represent overuse, including the prevailing rates of surgery for benign prostate disease and coronary artery bypass grafting. On the other hand, in the case of back surgery for spinal stenosis, the demand for surgery under shared decision making increased.

## Shared Decision Making and the Rate of Surgery for Benign Prostatic Hyperplasia

Benign prostatic hyperplasia is a common disease in men over the age of 50, and there is considerable debate about how — and whether — the condition should be treated. Outcomes research has clarified the theoretical reason for treatment, which is primarily to improve the quality of life by reducing the intensity of symptoms. Surgery is superior to doing nothing in improving urinary tract symptoms; foregoing surgery is superior to surgery in avoiding surgical complications, including impotence, incontinence, and retrograde ejaculation. Individual patients differ substantially in how they assess their own situations, including their feelings about sexual activity. Rational treatment choice (rational for the patient) should depend on how much his symptoms bother him (not the severity of symptoms, but the extent to which symptoms at any level of severity are considered bothersome) and the patient's concern about side effects, particularly the impact of surgery on sexuality.

There is nothing in a given patient's physical examination, clinical history, or laboratory test results that allows a physician to intuit which treatment a patient who was informed and involved in the decision making process would prefer.

Rates of prostate surgery in two health maintenance organizations were already substantially lower than the national average when a study of shared decision making was undertaken. Among men who participated in the study, rates dropped even lower — more than 40% below the health maintenance organization's baseline. There was no reduction in demand among men in the control groups. (A subsequent randomized clinical trial showed a similar result, but the trial was underpowered and the result was not statistically significant.)



**Figure 8.6. Rates of Transurethral Prostatectomy for Benign Prostatic Hyperplasia Among Hospital Referral Regions (1992-93), Compared to Shared Decision Making Benchmark in Two Staff Model HMOs**

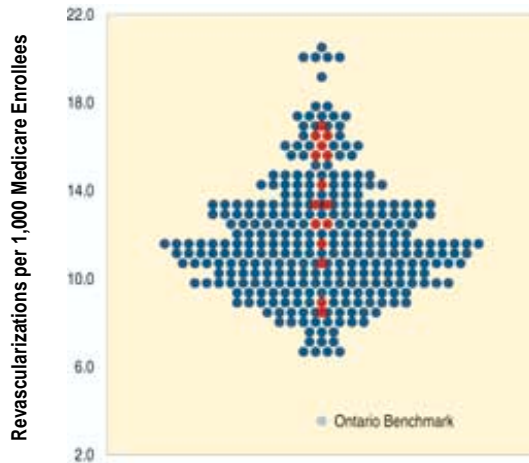
*The rate of surgery fell about 40% after implementation of shared decision making, although the rate prior to the intervention was lower than the national average. Rates in the control region did not change. Red dots indicate rates for Michigan hospital referral regions.*

## Shared Decision Making and the Rate of Surgery for Stable Angina

Stable angina (chest pain due to coronary artery disease) is a common disease in men over the age of 50. The condition can be treated in several ways, including revascularization procedures (coronary bypass surgery or angioplasty), prescription drugs, and lifestyle modification. For most patients with stable angina, treatment is undertaken primarily to improve the quality of life by reducing the intensity of symptoms. There are three basic options for these patients: bypass surgery (CABG), percutaneous coronary interventions (PCI) and medication. The “right” choice is dictated by the severity of the disease and, most importantly, by patients’ preferences among the various risks and benefits of the alternatives. For example, CABG surgery is more likely to reduce angina than either PCI or medication – but at an up-front risk of death or other morbid events. Only the patient can weigh the relative harms and benefits of these three choices.

Researchers in Ontario conducted a randomized clinical trial of shared decision making on the choice of treatment among patients with stable angina. The group of patients who participated in shared decision making chose coronary revascularization 22% less often than those whose decisions were made according to the protocols of “usual care.” This suggests that even the low prevailing rate in Ontario might be more than informed patients actually want.

If the rate of surgery chosen by the participants in the Ontario study reflects the average preferences of patients in the United States, then the amount of surgery now provided in the United States exceeds by a wide margin the amount that informed patients want. While it is unlikely that preferences about revascularization of patients with coronary artery disease in the United States and in Ontario are the same, the Ontario study provides further evidence that in order to find the “right” American rate (which will vary from region to region) it will be necessary to strengthen the American patient’s role in choosing the care that best fits individual preferences and needs.



**Figure 8.7. Distribution of Rates of Coronary Artery Revascularization Procedures (CABG and PTCA) for Coronary Artery Disease Among Hospital Referral Regions (1994-95) Compared to the Ontario, Canada Benchmark (1995)**

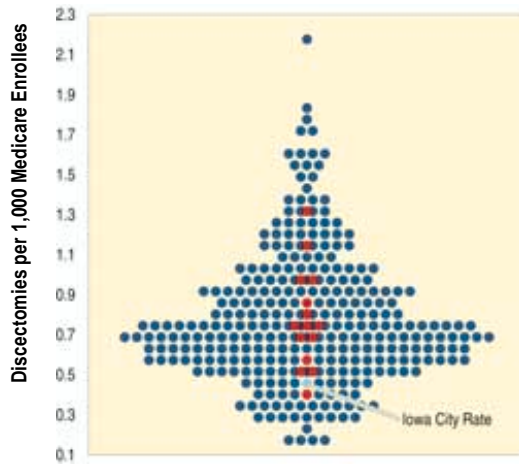
*The rate of invasive treatment in Ontario was substantially lower than any rate in the United States. The rate in Ontario was determined by studies of the population over age 64 conducted by Ontario's Institute for Clinical Evaluative Sciences. In a clinical trial in Toronto, patients who were randomized to shared decision making elected invasive treatments 22% less often than the controls, suggesting that fully informed Canadians might want less surgery than the amount now being performed in Ontario. The red dots indicate rates for Michigan hospital referral regions.*

## Shared Decision Making and the Rate of Surgery for Lumbar Disc Disease

Derangement of the lumbar disc is a common condition. It can be treated in several ways, including watchful waiting, medications (both anti-inflammatories and analgesics), exercise, and surgery. There has been one randomized trial and several cohort studies comparing the outcomes of these therapies. In general, surgery improves symptoms earlier in patients with chronic sciatica, but at the risk of repeat procedures becoming necessary, and long term outcomes are unknown. The vast majority of patients with acute back pain and sciatica improve with conservative therapy.

Researchers in Iowa City and a Seattle health maintenance organization conducted a randomized clinical trial of the effect of shared decision making on the choice of treatment for patients with back pain due to lumbar disc disease. The group of patients who participated in shared decision making choose surgery 30% less often than those whose decisions were made according to the protocols of “usual care.”

If the rate of surgery chosen by the participants in the study reflects the average preferences of patients in the United States, then the amount of surgery now provided in the United States exceeds by a wide margin the amount that informed patients want. The prevailing rate of back surgery in Iowa City in 1996-97 was among the lowest in the nation. Yet candidates for surgery from this region who participated in shared decision making chose surgery 30% less often than the control group.



**Figure 8.8. Rates of Discectomy for Lumbar Spine Disease among Hospital Referral Regions Compared to the Iowa City Shared Decision Making Benchmark (1996-97)**

*Rates of back surgery for lumbar disc disease in Iowa City were substantially lower than in most parts of the United States. In a clinical trial, patients who were randomized to shared decision making elected invasive treatments 30% less often than the controls, suggesting that fully informed patients might want less surgery than the amount now being performed in most parts of the United States. The red dots indicate rates in Michigan hospital referral regions.*

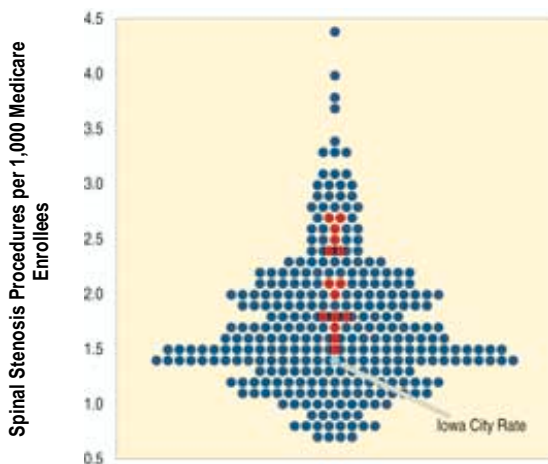


## Shared Decision Making and the Rate of Surgery for Spinal Stenosis

Spinal stenosis is a common disease in older Americans. For patients with the symptoms of spinal stenosis — predominantly back and leg pain — there are two treatment options: watchful waiting and surgery. There is no reliable evidence from randomized trials to guide patients in their choice of treatment strategy.

Researchers in Iowa City and a Seattle health maintenance organization conducted a randomized clinical trial of the effect of shared decision making on the choice of treatment among patients with back pain due to spinal stenosis. The group of patients who participated in shared decision making chose surgery 10% more often than those whose decisions were made according to the protocols of “usual care,” suggesting that this form of surgery might be underutilized in conservative hospital referral regions such as Iowa City.

If the rate of surgery chosen by the participants in the Iowa City study reflects the average preferences of patients in the United States, then the amount of surgery now provided in the United States might be less, in some hospital referral regions, than informed patients want.



**Figure 8.9. Distribution of Rates of Back Surgery for Spinal Stenosis among Hospital Referral Regions Compared to the Iowa City Benchmark (1996-97)**

*The rate of spinal stenosis surgery in Iowa City was substantially lower than in many parts of the United States. In a clinical trial in Iowa City, patients who were randomized to shared decision making elected invasive treatments 10% more often than the controls, suggesting that fully informed patients in some parts of the nation might want more surgery than the amount now being performed in low rate areas. The red dots indicate rates of surgery for spinal stenosis in Michigan hospital referral regions.*

## Over and Underuse of Prescription Drugs

The Dartmouth Atlas of Health Care in Michigan provides, for the first time, a descriptive epidemiology of variations in the use of prescription drugs among defined populations (Chapter Seven). Pharmacy data provides an important missing link in the database describing variability in medicine. But how can variations be interpreted?

In situations where clinical trials afford good evidence of benefit, and where the patients who are in need can be clearly identified, underuse can be documented. The underuse of beta blockers and ACE inhibitors discussed previously is a prime example of a problem in underuse that has serious and immediate consequences for patients. In these situations, there is reason for optimism that consensus on the need to optimize the quality of care can be achieved. Indeed, the mere documentation of underservice and feedback of this information could well lead to improvement.

In other situations, even though clinical trial information indicates efficacy, it might be very difficult to achieve a cost effective strategy. The use of statin drugs to lower cholesterol is a good example. The prevailing rate of the use of statin drugs (in Michigan) as well as the variations among regions, suggests underuse, particularly in light of the revised standard for care discussed in Chapter Five. Accumulating evidence indicates that this drug can reduce the risk of an initial heart attack as well as its recurrence. At least for some patients, these drugs might well be as effective as revascularization procedures in reducing the incidence of cardiovascular events, including chest pain. But the cost of the pharmaceutical agent, the variability in pharmacy benefits from one insurance plan to another and, perhaps most important, the absence of mechanisms for reallocating clinical resources invested in one form of treatment (e.g., revascularization procedures) to another (e.g., drug therapy) makes it difficult to optimize practice.

In the case of common conditions in which the clinical circumstances are more ambiguous, where efficacy of therapy in the individual case is more problematic, and where a prescription is a common and anticipated result of a visit to a physician, the

use of prescription drugs is not driven by medical science. Among regions, practice styles differ, and so do costs. More research is needed to elucidate the patterns of practice in these circumstances. Why do physicians vary in their propensity to prescribe anxiety medications, antihistamines, and antibiotics? Why do physicians vary in their allegiance to “expensive” versus “cheap” antibiotics? Do individual practitioners have their own idiosyncratic “prescription signatures” similar to surgeons’ “surgical signatures?” The role of benefit structure also needs to be explored. How much of the variation can be explained by differences in benefit plans’ coverage of physician office visits?

The increasing effectiveness as well as the costs of prescription drugs suggest the critical importance of understanding the patterns of practice and improving the opportunity to realize more efficient uses of resources.

## Overuse and Underuse of Hospitals for Medical Conditions

Variations in rates of discretionary surgery reflect differences in choices among alternative ways of treating specific conditions. Variations in rates of use of hospitals for medical conditions raise a different set of issues (Chapter Three).

■ First, for most medical conditions, the supply of hospital beds is closely associated with the incidence of hospitalization, at least in larger geographic areas. This relationship cannot be explained on the basis of differences in illness rates among hospital referral regions.

■ Second, the effect of increasing hospital capacity is to decrease the threshold for admitting patients for virtually all acute and chronic medical conditions which can be treated on an inpatient basis.

■ Third, physicians are not aware of the propensity to hospitalize in their own hospital referral regions, or in the particular hospitals in which they practice; nor, when asked, do physicians practicing in regions with low rates of hospitalizations for medical conditions feel they are rationing hospital care.

■ Fourth, on an illness adjusted basis, the outcomes of treatment reflected in mortality rates are not better in regions with greater propensity to hospitalize. In other words, there is no marginal gain in terms of improved life expectancy. The marginal gain in quality of life, if any, is unknown.

## Overuse and Underuse of End of Life Care

Variations in the intensity of care provided at the end of life (Chapter Six) raise a set of issues similar to those associated with hospitalizations for medical conditions. The intensity of care (measured, for example, by the number of physician visits to medical specialists, the frequency of use of intensive care, and total spending in the last six months of life) varies substantially. The relative supply of medical resources and the intensity of care delivered in the last six months of life are directly correlated; but what about the value gained from spending more on the acute care of the very sick? Do the populations living in regions with more aggressive patterns of care live longer because more is spent on saving lives? Are we on the flat of the curve? Or, is it conceivable that more is actually worse — that in regions with greater intensity of care the risks might actually exceed the benefits?

Our investigation into these questions has yielded no evidence that more intervention results in better outcomes. The associations between Medicare spending in the last six months of life and mortality, even after correcting for a number of illness-related variables, were consistent with the flat-of-the-curve hypothesis that there is no marginal benefit from incremental increases in spending or intensity of care. In other words, populations living in regions with relatively low supplies of resources and low intensity of medical intervention do not appear to be losing life expectancy as a result of any “underuse” of care. Indeed, greater intensity of care, measured by use of intensive care units, was actually associated with a slight increase in mortality, a finding compatible with the hypothesis that more intervention is actually associated with worse outcomes. Moreover, according to the SUPPORT study\*, most patients prefer less intensive care at the end of life, and those who live in regions with lower intensity of care are more likely to receive the care they say they want (which is generally less than most people now receive).

\*The SUPPORT investigators: A controlled trial to improve care for seriously ill hospitalized patients: The study to understand prognoses and preferences for outcomes and treatments (SUPPORT). JAMA 1995; 274:1591-1598.

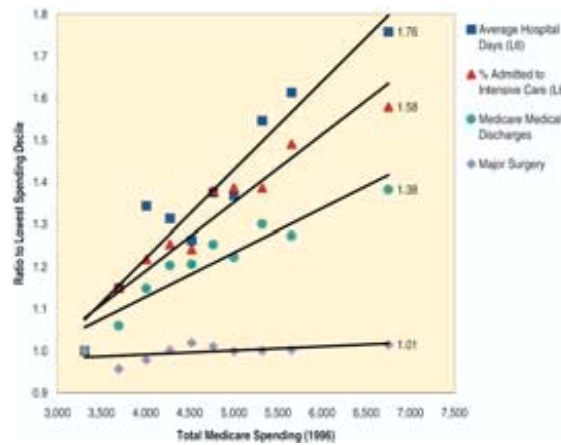
## What Does Greater Health Care Spending Buy?

Medical spending varies from region to region. When total spending is greater, what additional services are purchased that are not provided to those living in regions with less spending? Data limitations did not permit an analysis of spending in the Michigan Atlas. However, the analysis of Medicare data in previous Dartmouth Atlas studies shows that among the 306 hospital referral regions in the United States, more spending is associated with greater intensity of care: more hospitalizations for medical conditions, greater per capita use of intensive care, and more physician visits and diagnostic tests, particularly during the last six months of life. The link between higher spending and increased numbers of specialist physician visits is striking.

It is worth noting that more spending and more physician visits (which are associated with physician supply) are not associated with higher quality of care as measured by greater use of the kinds of care that clinical studies have shown to reduce mortality or morbidity. Women living in high spending regions do not get more mammograms; diabetics don't get more eye examinations; and heart attack victims living in these regions are no more likely to get the needed life saving drugs than those in living in less costly regions. Nor do patients in higher spending regions appear to receive more elective surgery.

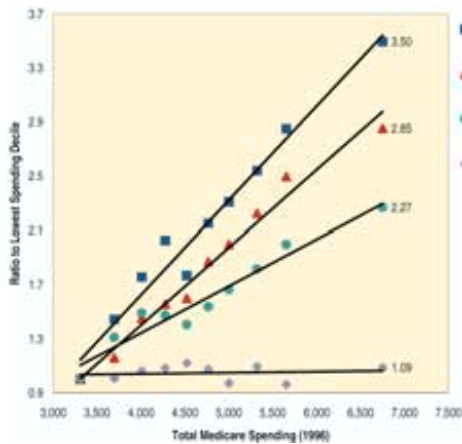
**Figure 8.10. a-c Spending Levels and the Production of Medical Services among Hospital Referral Regions**

Each figure shows the relationship between overall level of Medicare program spending for traditional (fee-for-service) Medicare and care and spending in selected sectors. The 306 hospital referral regions were ranked according to age, sex and race adjusted spending (1996) and grouped into deciles by per capita spending.



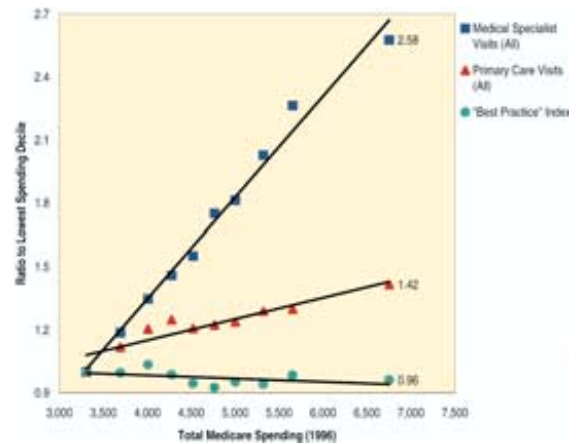
**Figure 8.10a. Measures of Intensity of Hospital Care**

Greater per capita spending was associated with more hospital days and increased likelihood of being admitted to intensive care during the last six months of life. It was also associated with higher rates of discharges for medical conditions. By contrast, the incidence of major surgery was not higher in regions with higher spending.



**Figure 8.10b. Intensity of Physician Services in the Last Six Months of Life**

Greater per capita spending was associated with more visits to medical specialists and general internists, but not to visits with family practice physicians. The likelihood of seeing ten or more physicians was strongly associated with overall spending levels.



**Figure 8.10c. Physician Visits and Use of Health Care Services Known to be Effective**

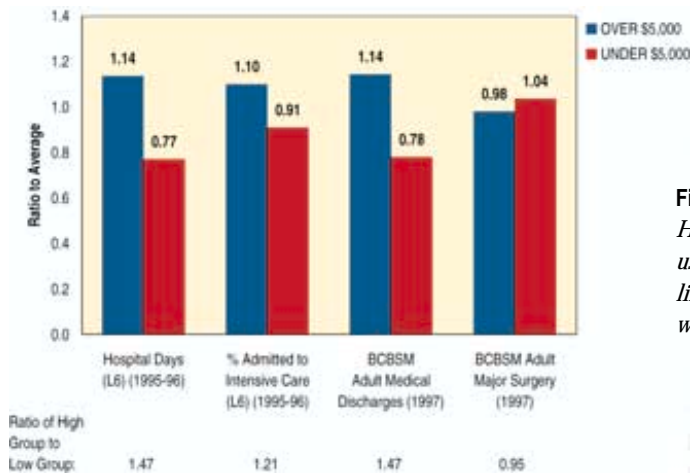
Greater spending was associated with more visits to specialists and primary care physicians, but not with better compliance with "best practice" guidelines for care such as mammograms or diabetic eye examinations.

## Michigan Conforms to the National Pattern

The patterns of Medicare spending and production of medical services in Michigan conform to national patterns. Low spending hospital referral regions provided fewer hospitalizations for medical conditions (among both Medicare enrollees and BCBSM adults) and had practice patterns that favored lower intensity of care for the very sick (as measured by end of life physician visits and use of intensive care units). Discretionary surgery rates and the use rates for certain services known to be effective were unrelated to overall spending.

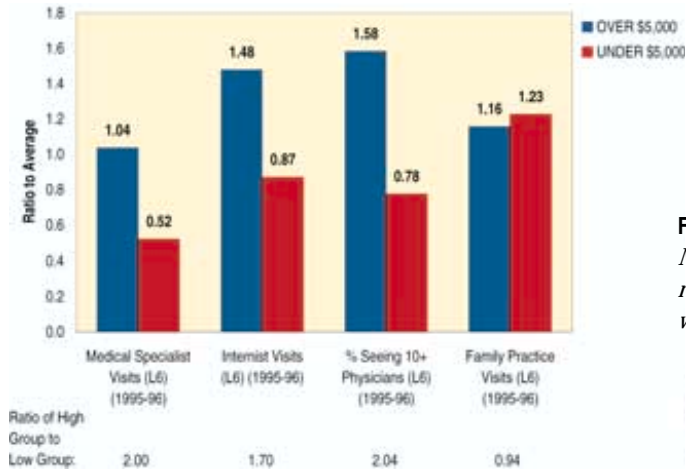
**Figure 8.11a-c Spending Levels and the Production of Medical Services in Michigan Hospital Referral Regions**

*Michigan hospital referral regions were divided into two groups according to rank in per capita Medicare spending. In the high spending group, Medicare spending in 1996 was 33% higher on a per enrollee basis than in the low cost group (\$5,907 versus \$4,430).*

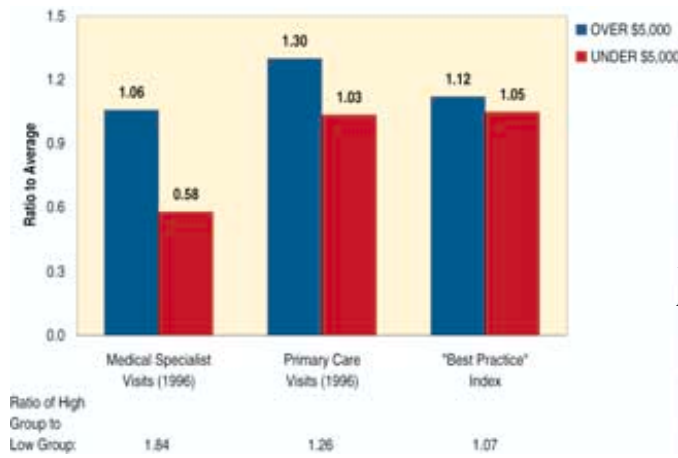


**Figure 8.11a. Hospital Services**

*Hospital days per 1,000 Medicare enrollees in their last six months of life, use of intensive care among Medicare enrollees in their last six months of life, and hospitalizations for medical conditions among BCBSM adults were all higher in high spending regions; rates of elective surgery were not.*



**Figure 8.11b. Physician Services During the Last Six Months of Life**  
*Medical specialists visits and visits to internists were higher in high cost regions but, as in the nation as a whole, rates of visits to family practitioners were not.*



**Figure 8.11c. Physician Services on an Annual Basis**  
*As in the nation as a whole, spending more bought more visits to both primary care and medical specialists, but not better care in terms of rates of delivery of effective care.*

## The Challenge of Practice Variations

The return of double-digit increases in the cost of care, the growing number of uninsured, and the rising concern that the “solutions” of the 1990s are no longer working are focusing the nation’s attention, once again, on the reform of health care. The fundamental problems facing the nation are revealed in the study of geographic variations. Our hope is that the problems they point to will be addressed in the renewed debate over the future of American health care.

The following questions need to be asked:

- Why does a nation so endowed with health care resources fail to do the simple things that are known to improve health (such as the administration of life-saving drugs to heart attack victims)?
- Why does a nation that is the world leader in biomedical sciences neglect the evaluation of health care outcomes, leaving wide gaps in the scientific basis for clinical decision making (such as those in surgical practice)?
- Why, in a nation dedicated to the principles of individual rights and autonomy, are clinical choices made in a way that fails to assure that individual preferences are paramount in the choice among treatments (such as for breast cancer or chest pain due to angina)?
- Why, on an illness and price adjusted basis, does the nation spend twice as much on health care for some communities as for others, without evidence of benefit (such as high-intensity end of life care or hospitalizations for common medical conditions)?
- Why do we fail to set limits and reallocate excess capacity to productive means (such as prescription drug benefits or coverage for the uninsured)?

Why not begin by debating these issues in Michigan? We hope these questions will serve to energize community dialogue and lead to constructive solutions in Michigan.

**Chapter Eight**  
**Table Notes**

Measures of mammography among female Medicare enrollees age 65-69 and eye examinations for diabetic Medicare enrollees (columns 2 - 3) are unadjusted, and are expressed as percents of enrollees receiving the preventive services in 1995-96. Measures of “ideal” patients receiving beta blockers and ACE inhibitors in 1994-95 (columns 4 - 5) were obtained from reviews of clinical records; the numbers in the table are the proportions of acute myocardial infarction patients considered “ideal” candidates for specific treatments actually receiving the treatment, and are adjusted for differences in population age and sex. Rates of transurethral prostatectomy (TURP) (1992-93), invasive cardiac procedures (1994-95), and surgery for conditions of the spine (1996-97) (columns 6 - 9) are adjusted for population age, sex and race, and are expressed as rates per 1,000 Medicare enrollees.

See the Appendix on Methods for details on codes used to identify procedures, adjustment methods, and methods used to calculate proportions in Medicare patients. Methods used to define “ideal” candidates for treatment, and other details of the analysis of quality of care for patients following acute myocardial infarction, are available in O’Connor GT, Quinton HB, et al, “Geographic variation in the treatment of acute myocardial infarction,” *JAMA*, 1999;281:627-633.

## CHAPTER EIGHT TABLE

## Variations in Quality Measures by Hospital Referral Region (1994-95, 1995-96, 1996-97)

Hospital Referral Region	Percent of Medicare Women Age 65-69 Having At Least One Mammogram in Two-Year Period (1995-96)	Percent of Diabetic Medicare Enrollees Having Annual Eye Exam (1995-96)	% of "Ideal" Patients Receiving Beta Blockers at Discharge (1994-95)	% of "Ideal" Patients Receiving ACE Inhibitors at Discharge (1994-95)	TURP for BPH per 1,000 Male Medicare Enrollees (1992-95)	Invasive Cardiac Procedures per 1,000 Medicare Enrollees (1994-95)	Lumbar Discectomy per 1,000 Medicare Enrollees (1995-97)	Decompression for Lumbar Stenosis per 1,000 Medicare Enrollees (1995-97)
Ann Arbor	64.1	46.6	69.9	63.3	12.7	11.6	0.6	1.8
Dearborn	54.5	42.6	92.7	57.6	12.1	13.4	0.5	1.6
Detroit	55.0	44.8	51.0	64.7	13.5	14.1	0.7	1.5
Flint	65.6	39.2	33.1	44.1	16.0	16.7	0.8	2.7
Grand Rapids	61.4	35.8	60.3	66.0	14.4	9.1	1.0	2.4
Kalamazoo	57.5	36.4	49.2	49.1	12.3	16.2	0.7	2.6
Lansing	66.1	39.8	73.7	57.9	12.0	13.4	1.3	1.7
Marquette	65.0	38.4			12.0	12.6	0.7	1.8
Muskegon	62.2	54.7	63.3	75.3	12.5	8.6	1.0	2.1
Petoskey	67.9	28.9		60.0	11.8	10.6	0.8	2.5
Pontiac	64.5	42.7	31.7	51.9	13.2	12.5	1.1	2.0
Royal Oak	61.2	49.4	72.6	73.7	14.2	15.7	0.5	2.0
Saginaw	60.1	34.1	41.1	53.2	15.4	15.7	0.7	2.7
St. Joseph	56.0	37.8	11.7	56.7	7.6	16.4	0.8	1.8
Traverse City	76.9	48.4	58.3	70.5	12.0	16.6	0.4	2.3
Michigan	60.9	42.2			13.3	13.5	0.7	2.0
United States	49.0	45.3	49.5	59.3	13.1	11.7	0.7	1.6

