

FORUM *translating research into quality health care for veterans*

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VA Health Services Research & Development Service

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The Cost of Providing VA Care: New Service Demands Require Answers to Complex Questions

By Robert H. Roswell, M.D., Under Secretary for Health

As the result of its remarkable transformation from a hospital-based health care system to a comprehensive, integrated care system, VA has improved both the quality of its care and the efficiency with which it is delivered. Yet VA continues to face significant cost challenges, principally because demand for VA care has risen sharply during the past few years, even though our resources for meeting that demand have not.

Simply put: we are treating more patients with fewer employees. In 1995, more than 200,000 VA employees provided care to 2.5 million veterans. This year, 183,000 VA employees will provide care to nearly 4.7 million veterans. However, well over 6 million veterans have enrolled in our system and not all can get the care they need. Close to 300,000 veterans are on waiting lists for appointments to get primary care and required specialty services.

This unmet demand for care has created a need for new treatment capacity while resources are severely limited. We must quickly determine the true cost of providing needed care so that we can maximize our treatment capacity with the limited resources we have.

VA has moved aggressively to make its primary care resources more efficient by increasing provider panel sizes and implementing a series of advanced access principles. The result has been "new" capacity at "marginal costs." Essentially, we are providing care to more patients with few or no additional staff at relatively little additional expense other than the cost of diagnostic services and medications. However, this approach to increasing capacity

has reached its limits in many areas. We must quickly acquire additional capacity to reduce the number of veterans who are forced to wait for needed care. If we are no longer able to absorb new workload with existing capacity at marginal costs, then we must build new capacity at full cost, or contract for needed services from non-VA sources. A thorough understanding of the costs associated with meeting the new demand for VA care will be essential if we are to obtain the best value from limited appropriated medical care dollars.

To date, accurately determining the cost of providing VA health care has proved difficult, for two reasons: the complexities of our health care delivery system and the historic lack of a compelling need to obtain this information. A simple cost distribution report that assigned appropriated medical care dollars to various cost centers within the hospital sufficed for many years. More recently, we have purchased sophisticated software to automate what was a manual process, and we have seen marginal improvements in our ability to determine the true cost of the care we provide.

But as a health care system funded almost entirely by a Congressional appropriation each year, the necessity to acquire accurate cost data has not provided the stimulus needed to get this information. Now we find ourselves with a need that we are ill prepared to meet. However, the use of our extensive health services research capability may help us address many of the challenges we now face.



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Director's Letter

As demand for VA health care services increases, we must improve our understanding of the costs of those services. This issue of **FORUM** focuses on the costs of VA care.

As Dr. Roswell notes, VA faces many challenges regarding treatment capacity and costs. HSR&D is committed to helping VA meet these challenges by funding high-quality economics research and cost-effectiveness studies. In February 1998, HSR&D hosted a meeting of VA and non-VA health economists, researchers, and managers to exchange ideas and pool resources on methods and strategies to determine VA health care costs. Key recommendations emerged from that meeting.

Since then, HSR&D has established the Health Economics Resource Center (HERC) at the Palo Alto VAMC directed by Paul Barnett, serving as a resource on costs for VA researchers and policy makers.

HSR&D also published a solicitation for proposals in cost analysis, offering VA economists and cost analysts the opportunity to lead their own studies and refine their methodologies. In addition, working meetings continue on an annual basis to strengthen the network of health economists and foster their information exchange.

We have made some strides in framing important research questions and developing methodologies to answer them. We will have to do more. I am confident that our HSR&D researchers will produce the knowledge we need to make better informed choices around costs.

John G. Demakis, MD
Director

For example, an extensive network of community-based outpatient clinics (CBOCs) now delivers the bulk of our primary care services. The costs associated with opening a new CBOC are relatively straightforward, and would typically include a lease for clinic space, salary costs for a physician, nurse practitioner, and several support staff, and small support service contracts for laboratory, radiology, and initial pharmacy services (with refills provided through our consolidated mail-out pharmacy system). By combining these costs and dividing that figure by an optimal panel size for the two providers involved, we should be able to derive a cost per patient per year, which could then be compared with capitated patient costs charged by contract service providers.

Unfortunately, this is only the beginning of a true cost-of-care determination, which should also include the Consolidated Mail Outpatient Pharmacy (CMOP) costs, the cost of specialty referral and diagnostic care provided to CBOC patients at the "parent" VA medical center, and the possible cost of hospitalization as well. These costs will vary with patient selection for enrollment in the CBOC, referral guidelines employed for specialty consultation, and the degree to which chronic disease is managed to avoid preventable hospital care.

Suddenly, a simple cost comparison has become more complex, and several interesting research questions have been introduced. For example, does primary care in a tertiary or hospital setting increase specialty referrals, and thus the cost of care, when compared to similar care provided in a community setting, where specialty consultation may not be as available? And what effect do these referral practices have on the quality of care and clinical outcomes?

Another example of simple cost determinations taking on additional complexity is found in the use of atypical anti-psychotic medications. These new-generation medications are significantly more expensive than the drugs they replace, but do provide a lower side effect profile, which may improve patient compliance. A traditional examination of cost-to-benefit ratio might favor limiting provider access to these medications. However, in one network where their use was correlated with psychiatric care costs, it appeared that the addi-

tional cost of the medication was more than offset by a reduction in the utilization of costly inpatient mental health services.

Other costly medications employed in the management of conditions such as HIV infection and prostate hypertrophy have been associated with similar reductions in inpatient care costs. And still other medications that improve control of chronic diseases, such as diabetes, hypertension, and hypercholesterolemia, promise to reduce costly and debilitating long-term complications of these disorders. The use of pharmacy benefits management to address these complex questions has generated millions of dollars in savings and cost avoidance, but the area is very fertile for further health services research.

In still another example, we recently examined the cost of VA long-term care (LTC) provided in three types of settings. The VA-staffed nursing home per diem cost was a little over \$350, while the average contract community nursing home per diem cost was less than \$200, and the state veterans nursing home per diem cost was only slightly more than \$50, due to a discount resulting from the construction grant program typically employed in the construction of these facilities.

At first glance, this comparison seems to support significantly reducing our reliance on VA-staffed nursing home beds in favor of the other two types of LTC beds. However, an examination of actual care provided in VA-staffed LTC beds reveals that most patients are discharged to home, reflecting the rehabilitation outcomes that are often achieved by using these beds to provide post-acute rehabilitation care. Suddenly, a \$350 per diem looks very favorable when compared with an acute care per diem of close to \$1,000.

Clearly, we must pursue a more complete understanding of the cost of care we provide and how those costs are reflected in the clinical outcomes of the patients we serve. In the future, we may base our budgeting practices on the patient cohorts we treat, instead of using traditional methods of budgeting by supply or service lines within a medical center. We look to HSR&D to help frame today's research questions and provide us with the evidence we need for tomorrow's innovations. ■

Health Economics Challenged to Improve Cost-Effectiveness of VA Care

By Paul G. Barnett, Ph.D., Director, VA HSR&D Health Economics Resource Center

In his Commentary article, Dr. Roswell challenges VA to become a more efficient health care provider. Meeting that challenge will require an ambitious agenda of health economics and health services research. We must understand what factors determine demand for VA care, accurately identify the cost of that care, and combine cost and outcomes data to assess cost-effectiveness.

The sharp increase in demand for VA services is the logical consequence of some relatively new and some long-standing policies: reforms to VA eligibility criteria, incentives to regional networks to serve more veterans and the consequent creation of new satellite clinics, and finally, the lack of a Medicare prescription drug benefit.

HSR&D researchers have found how veterans' willingness to travel to obtain care is affected by the complexity of their health care needs, their alternate insurance coverage, and their access to private providers of the service that they need, among other factors. A rich new series of studies will be possible when the HSR&D VA Information Resource Center (VIREC) makes available linked Medicare claims and VA utilization data, now possible because of a recent memo of understanding between VA and the Centers for Medicare and Medicaid Services. Managers need additional research to help anticipate veterans' health care demands.

As Dr. Roswell notes, accurate cost data are needed to improve the VA health care system. Two new databases on the cost of all VA health care encounters are beginning to meet this need. HSR&D's Health Economics Resource Center (HERC) dataset is based on non-VA measures of the relative cost of different types of care and

department-level costs from the VA Cost Distribution Report. While HERC estimates are useful for many studies, they are limited by the assumptions used to create them. For example, they cannot be used to tell if a provider uses an atypical quantity of resources for a particular procedure. The second set of cost estimates is derived from the Decision Support System (DSS), the cost allocation system adopted by VA. Although the quality of DSS is improving, accuracy is limited by missing information on workload, especially medical procedures provided to hospitalized patients and care provided by contract providers. As these issues are resolved, DSS data will be able to answer most of our questions about the cost of VA care.

Knowing the cost of health care is only a first step in improving efficiency. HSR&D researchers are continually improving methods for comparing resources used by different providers, while controlling for differences in severity of illness reported in administrative data.

Getting a Handle on Cost-Effectiveness

The goal of health care is to improve health. Efficiency improvements involve evaluation of more than just cost; outcomes and quality of care are equally important. This is the domain of cost-effectiveness research.

Dr. Roswell describes how one intervention, the use of atypical anti-psychotic medications, was so cost-effective that in one network it improved patient outcomes and reduced costs. Another highly cost-effective intervention is a conservative approach to the management of mild heart attacks. A recently published VA study showed this strategy saves cost without compromising outcomes.

Treatment innovations are rarely so cost-effective as these examples. More commonly, new interventions improve outcomes at a higher cost. Health economics research is needed to determine if innovations yield a sufficient number of quality-adjusted life years to justify their additional cost. In other words, we need to know whether they are cost-effective.

Cost-effectiveness is a new field; in fact, only six years ago a national panel published a consensus statement about the methods that should be used in this field of research. Cost-effectiveness research is an increasingly important part of the evaluation of new treatments. It can also be used to evaluate already adopted treatments that are expensive or yield little improvement in health.

Because our capacity to conduct this type of research is still limited, we need to set priorities for the areas where it is most needed. HERC has taken a step in this direction. We have estimated the prevalence and cost of the most common chronic diseases treated in the VA health care system; hopefully this information will be used to help identify areas where cost-effectiveness research is most needed.

As new information on cost-effectiveness is gathered, it must be incorporated into practice. Through the VA Quality Enhancement Research Initiative (QUERI), HSR&D is helping VA identify best practices and adopt them. It is not easy to get providers to adopt guidelines based on arguments of quality improvement. It will be even more challenging to get them to adopt recommendations based on cost-effectiveness concerns.

This work is important. Neither VA nor any other health care payer can afford to provide its patients with all possible care. It is our challenge to make the best use of the resources at hand to achieve the greatest possible improvements in veterans' health. ■

Research Highlight

Community-Based Outpatient Clinics Improve Access to Care and Patient Satisfaction, HSR&D Evaluation Shows

By Matthew Maciejewski, Ph.D., and Michael Chapko, Ph.D., Seattle HSR&D Center of Excellence

“CBOCs provided better access to care and CBOC patients were more satisfied with their care. In addition, total direct costs were lower for CBOC patients than for VAMC patients.”

VA's burgeoning network of community-based outpatient clinics (CBOCs) appears to be meeting several of its key objectives. A series of analyses by an HSR&D research team compared patients from selected CBOCs with patients from VA medical centers (VAMCs) in 1998 and found that CBOCs in the sample provided better access to care and CBOC patients were more satisfied with their care. In addition, total direct costs were lower for CBOC patients than for VAMC patients.

VA has been shifting its focus from hospital-based inpatient care to greater emphasis on primary and ambulatory care provided by a system of hospitals and community clinics. CBOCs, small to medium-sized clinics that are geographically separate from VAMCs and typically located in suburban and rural areas, are an important component of VA's plan and are designed to improve access to care for veterans. Their mission is to provide preventive and mental health care, promote health, and educate patients in a community ambulatory care setting.

The number of operating CBOCs has grown markedly over the past five years. Between 1995 and 1998, VA approved more than 230 CBOCs. At the end of fiscal year 1998, 139 CBOCs were in operation. As of mid-2001, 381 CBOCs had been approved, of which 306 were operating and 75 were pending. VA hopes to open up to 600 CBOCs by the end of FY 02.

CBOCs are primarily staffed and managed directly by VA providers and staff, but 41 percent of all CBOCs in FY 01 were staffed and managed by non-VA (e.g., contract) providers and staff. Three percent have both VA and non-VA providers.

Assessing CBOC Performance

In 1998, the VA Under Secretary for Health requested a system-wide performance evaluation to determine whether CBOCs were meeting their objectives of improving access to care, mental health, utilization, cost containment, quality of care, and patient satisfaction. A team of researchers from the Seattle, Little Rock, and Minneapolis HSR&D Centers of Excellence conducted the evaluation between 1998 and 2000. The purpose of the evaluation was to: 1) determine whether CBOCs were meeting their stated goals, and 2) determine whether CBOCs operated by VA staff differed from contractor-operated CBOCs in meeting these goals. Specific performance measures were developed and tested using available VA data.

Compared to VAMC patients, CBOC patients had more primary care visits, shorter clinic waiting times, shorter travel distances, and greater satisfaction with care. CBOC patients and VAMC patients had similar hospital admissions, hospital length of stay, and waiting time for a follow-up visit after hospitalization. Direct primary care costs per visit and per patient were similar between the two groups, although total direct costs were lower for CBOC patients due to lower specialty and ancillary care costs. Indirect costs related to activities supporting patient care were excluded because the types of activities captured by indirect costs varied across facilities.

A second set of comparisons of patients in selected VA-staff CBOCs and contract CBOCs found that performance was similar for most measures. However, patients at contract

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Research Highlight

“VA saves veterans more than \$10 billion a year when the cost of care to VA patients is compared with what that care would have cost under Medicare regulations but provided in the private sector.”

HSR&D National Meeting to Address Diverse Populations

HSR&D will hold its National Meeting on Feb. 12-14, 2003, in Washington, DC. Hosted by the Center for Mental Healthcare and Outcomes Research, the meeting's theme is “Diverse Veteran Populations: Challenges and Opportunities.” Researchers, clinicians, and policy makers will come together to explore new methods to improve health care, with a special emphasis on the needs of diverse veteran populations. They will also be encouraged to articulate the linkages among scientific activities, VA policy development, and clinical service delivery. The meeting will feature invited speakers, competitively selected oral and poster presentations, workshops, and exhibits.

For more information, please visit the National Meeting web site at www.va.gov/hsrd2003.

VA Health Coverage and Services Produce Significant Savings for Veterans and Taxpayers Alike

By Ann Hendricks, Ph.D., Center for Health Quality, Outcomes and Economics Research, Edith Nourse Rogers Memorial VA Medical Center, and Gary Nugent, Gary Nugent and Associates

Most working Americans with health coverage are familiar with deductibles and co-payments for their medical care. Patients also bear some liability for costs they incur in public health care programs, including Medicare, Medicaid, and the VA. However, our study shows that VA saves veterans more than \$10 billion a year when the cost of care to VA patients is compared with what that care would have cost under Medicare regulations but provided in the private sector. We also found that VA saves taxpayers money by providing health care services directly rather than purchasing them through the private sector.

VA is more generous in its health care coverage than Medicare, in which more than half of VA patients are also enrolled. In dollar terms, this richer coverage saved VA patients at least \$8.4 billion in FY 2001, compared with what their out-of-pocket costs would have been if Medicare rules were applied to the VA budget. In addition, we estimate that VA saved its patients more than \$1.7 billion by providing care directly through VA medical centers rather than purchasing the same services from private-sector providers on a fee-for-service basis using Medicare reimbursement rates and Medicare deductibles and co-payments.

Taxpayers pay for approximately 97 percent of VA's annual medical care expenditures; veterans or their health insurers pay the rest. In fiscal year 2001, VA collected \$771 million — including \$234 million in first-party co-payments and \$537 million in reasonable charges paid by insurers — out of a \$21.6 billion medical care budget. For FY 2003, the goal for medical care collections is \$1.1 billion.

These estimates are based on our study “Evaluating VA Costs,” which was funded by HSR&D in 1998. This study asked the follow-

ing question: “If health care services provided by VA during a federal fiscal year were purchased in the private sector, would the cost to the taxpayer be greater than the cost of providing those services at VA medical facilities?” By comparing total expenditures for all health care services at six VA medical centers with the estimated cost of purchasing those services in the private sector using Medicare reimbursement regulations, we concluded that taxpayer cost (assuming current minimal VA patient liability) would be more than 20 percent greater under a hypothetical, fee-for-service payment system.

This study does not suggest what VA payments would be if VA patients used the private sector instead. There are several reasons why predicting payments to private sector providers is problematic. First, VA constrains demand for care by limiting the number of its providers. If choice of providers were not geographically limited, service use likely would be higher. Second, VA outpatient care tends to be hospital-based. In the private sector, most outpatient services are provided in doctors' offices or other ambulatory centers, which may be paid less than hospital-based sites. Finally, VA physicians are salaried or under contract, while Medicare providers are paid largely on a fee-for-service basis. These factors produce different incentives for VA compared to the private sector.

These savings demonstrate that the VA can provide a richer benefit package at lower cost to U.S. veterans than they would be able to obtain through the private sector. Private health insurers use co-payments and other cost-sharing mechanisms in part to discourage patients from using unnecessary services, but VA has other methods for constraining care. ■

For more information, contact Dr. Hendricks at ann.hendricks@med.va.gov.

Research Highlight

Rural VA Primary Care Providers Compensate Effectively for Lack of Specialty Resources

By William B. Weeks, M.D., M.B.A., Veterans' Rural Health Initiative, White River Junction VT VA Medical Center; and Elizabeth M. Yano, Ph.D., and Lisa V. Rubenstein, M.D., VA Greater Los Angeles HSR&D Center of Excellence

“Because rural primary care providers have a broader range of responsibilities, rural areas may require higher levels of primary care staffing, making primary care inherently more costly in rural, when compared to urban, settings.”

Rural VA primary care providers appear to be doing more with more: compensating for limited access to costly specialty services with higher levels of primary care personnel and resources than in urban VA settings, while maintaining comparable quality of care and greater patient satisfaction, according to a recent study.

To achieve economies of scale, integrated health care providers commonly concentrate high-technology, high-cost services in high-population centers. This tends to restrict access to expensive health care technologies and specialty care in rural areas, making it more difficult to offer a full spectrum of health care services in these settings.

Yet research has shown that the health care needs of vulnerable patient populations living in rural settings are similar to those of their urban counterparts. This combination of limited specialty services and comparable service needs underscores the importance of access to primary care in rural areas, with possible implications for primary care practice management. It may also increase demand for primary care services.

We thought that rural primary care practices might adapt to higher levels of service demand either by expanding primary care duties across health care settings or by providing a broader range of services within the primary care setting. In addition, we thought that service expansion might be associated with increased personnel requirements in order to maintain quality.

To examine these possibilities, we used 1999 primary care organizational survey results and administrative records to compare primary care practice management and performance in 19 rural VA hospitals and in 103 urban VA hos-

pitals. In addition, we obtained prevention index scores, chronic disease index scores, and the scores of their individual components, as well as patient satisfaction scores from VA's National Ambulatory Care Survey for Fiscal Year 1999.

We used the primary care practice as the unit of analysis. Each practice that we examined was integrated within a single VA hospital and had a minimum responsibility of providing ambulatory primary care for assigned patients.

How Rural and Urban Practices Differ

Our analysis revealed three key findings:

■ *Rural hospitals are different than urban hospitals.* Compared to urban hospitals, rural VA hospitals served fewer patients, recorded fewer visits, were smaller, were less likely to be affiliated, and had fewer integrated specialty care services. In addition, the number of primary care personnel per patient seen was significantly higher in rural hospitals.

■ *Primary care practice patterns are different in rural settings.* Providers in rural settings were much more likely to provide inpatient care, be responsible for the management of phone calls during clinic hours, and coordinate referrals. They also had somewhat greater gatekeeper responsibilities and were more likely to have complete responsibility for a broader range of services than primary care providers in urban settings.

■ *Quality of care was comparable in rural and urban settings.* We found no differences in the composite chronic disease index or prevention index across settings. Of all the component scores, only the pneumococcal vaccination rate

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Organizational Profile

HERC: Conducting High-Quality Health Economics Research

“HERC helps VA researchers study the cost-effectiveness of health care and evaluate the efficiency of VA programs and providers. HERC’s mission is to develop and disseminate new economics information and products.”

HSR&D established the Health Economics Resource Center (HERC) to improve the quality of VA health economics research. HERC helps VA researchers study the cost-effectiveness of health care and evaluate the efficiency of VA programs and providers. HERC’s mission is to develop and disseminate new economics information and products.

HERC supports health services researchers and other VA staff who are undertaking health economics studies by answering questions on cost-effectiveness analysis; cost methods; cost determinations for innovative treatments, rehabilitation stays, and outpatient visits; VA cost data; and other related issues.

HERC uses three methods to focus on cost-determination questions: micro-costing, average costing, and the Decision Support System.

■ *Micro-cost methods* include three approaches — direct measurement, preparation of pseudo-bills, and estimation of a cost function.

■ *Average cost methods* combine relative values derived from non-VA cost datasets, VA utilization data, and department costs obtained from the VA Cost Distribution Report (CDR).

■ *Decision Support System (DSS)*, a computerized cost-allocation system adopted by VA, allocates costs to VA health care products and patients’ stays.

HERC recently released files with encounter-level estimates of the cost of all VA care provided since October 1997. “This is the first comprehensive set of estimates of the cost of VA hospital stays and outpatient visits,” said HERC Director Paul Barnett, Ph.D. “We’ve developed these files so that they may be easily combined with demographic and clinical data in the VA discharge and outpatient care files.” HERC has published two guidebooks for using these files.

HERC has documented research use of the national encounter-level extracts of DSS.

HERC technical reports describe its evaluation of DSS data. HERC has also published a guidebook on micro-costing methods and a bibliography of VA cost studies.

HERC will create a number of new resources for researchers, including documentation of a new DSS department-level database. It also plans to develop new information about VA data on the cost of pharmacy, prosthetics, and contract care.

■ *Training:* HERC offers an introductory course on VA health economics. The course describes VA financial and utilization databases, methods of determining VA cost, cost-effectiveness analysis, medical decision models, and measurement of economic outcomes. Presentations from the course are available at www.herc.research.med.va.gov/Train_Seminar.htm. HERC is planning an advanced economics teleconference seminar.

■ *Consulting:* Need consulting services or the expertise of a VA health economist? HERC offers a consulting service to help researchers who have questions about economics. In addition, HERC maintains a directory of VA health economists who are interested in becoming co-investigators on new projects.

■ *Research:* Currently, HERC economists are involved in ongoing research targeting a variety of issues important to veteran health care, including treatments for heart disease, HIV, lung cancer, and substance use disorders. These studies help inform VA decisions on whether new health care interventions are sufficiently cost-effective for system-wide use.

Established in 1999, HERC is located at the VA Palo Alto Health Care System in Menlo Park, CA. For more information about HERC’s work, visit the HERC web site at www.herc.research.med.va.gov, send e-mail to herc@med.va.gov, or call 650/617-2630. ■

CBOCs had fewer primary care and specialty visits, and longer average waiting times for a follow-up visit after a hospitalization. The lack of adequate cost data for contract CBOCs precluded a “make-or-buy” analysis of costs between VA-staff CBOCs and contract CBOCs.

These results, from the CBOC Performance Evaluation Project, were published in a series of five papers in the July 2002 issue of *Medical Care*.

More Cost Findings To Come

In 2001, the study team obtained funding to conduct a follow-up analysis of CBOC costs using the Decision Support System (DSS) cost accounting system for fiscal years 2000 and 2001. The research team will examine 110 CBOCs and their affiliate VAMCs according to cost per primary care visit, primary care cost per patient, specialty care cost per patient, and total cost per patient. In addition, costs of patients in VA-staff CBOCs and in contract CBOCs will be compared. At the conclusion of this follow-up study, the research team will identify the validity of cost data for CBOCs and report important cost differences between CBOCs and VAMCs and between VA-staff CBOCs and contract CBOCs. ■

For more information, contact Dr. Maciejewski at matthew.maciejewski@med.va.gov.

was statistically different and higher in rural settings. However, patients in rural settings appeared to be more satisfied with the care they received: They rated their overall quality of care higher than those using urban VA hospitals and they reported fewer problems with access to care, courtesy of providers, use of pharmacy services, and both visit-specific and overall coordination of care.

Within the VA system, we found that rural settings were associated with expanded primary care duties: providers were more likely to provide continuity across patient care settings and they provided more services. These additional responsibilities were associated with higher staffing levels, comparable quality of care, and greater patient satisfaction.

The limited availability of some types of specialty services that we found in the smaller rural settings is not surprising. Hospitals serving larger populations have more resources, can provide a broader complement of specialty services, and may have enough patients with relatively rare conditions to justify special programs. To compensate, primary care providers in rural settings appear to provide a broader range of services than those in urban areas.

Our findings suggest that rural practices maintained high levels of performance by hiring additional personnel. We therefore saw a degree of substitution in rural primary care settings — more time, resources,

and responsibilities in primary care to offset less time, resources, and responsibilities in specialty care.

Because rural primary care providers have a broader range of responsibilities, rural areas may require higher levels of primary care staffing, making primary care inherently more costly in rural, when compared to urban, settings. Researchers and managers should be cautious in comparing primary care expenditures across rural and urban settings. However, they should also look for lower overall costs in rural settings, where primary care providers appear to be an effective substitute for higher-cost specialists. ■

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