



**THE NORTH DAKOTA EXPERIENCE:  
ACHIEVING HIGH-PERFORMANCE HEALTH CARE  
THROUGH RURAL INNOVATION AND COOPERATION**

Douglas McCarthy, Rachel Nuzum, Stephanie Mika,  
Jennifer Wrenn, and Mary Wakefield

May 2008

**ABSTRACT:** Resource constraints and the desire to preserve the local economy have made necessity the mother of invention in North Dakota, driving health care providers and policymakers to try new approaches to care and to institute better practices relatively quickly. Collaboration to support primary care and the concept of a medical home, organization of care through cooperative networks of providers, and innovative use of technology to meet patient needs and hold down costs are examples of how North Dakota is able to provide its citizens with accessible, quality, and efficient health care despite the challenges of a rural setting. Rural communities have a unique context of community trust and interdependence, a social capital that allows them to innovate in meeting patients' needs. A strong sense of mission, vigilance to process and outcomes, and enhanced communication and collaboration among health care providers are key to improvements made in North Dakota health care.

Support for this research was provided by The Commonwealth Fund. The views presented here are those of the authors and not necessarily those of The Commonwealth Fund or its directors, officers, or staff, or of The Commonwealth Fund Commission on a High Performance Health System or its members. This and other Fund publications are available online at [www.commonwealthfund.org](http://www.commonwealthfund.org). To learn more about new publications when they become available, visit the Fund's Web site and [register to receive e-mail alerts](#). Commonwealth Fund pub. no. 1130.



## CONTENTS

About the Authors.....	iv
Acknowledgments.....	v
Overview.....	1
The North Dakota Health Care Environment .....	2
Example 1. Collaborative Chronic Disease Management .....	4
Example 2. Cooperation Through Rural Networks .....	9
Example 3. Cooperation to Promote Telemedicine and Telepharmacy .....	12
Policy Implications .....	18
Conclusion .....	19
Appendix A. Health System Performance Indicators on Which North Dakota Ranks Among Top 10 States .....	20
Appendix B. MeritCare Health System .....	21
Appendix C. Chronic Disease Management Pilot Program—Selected Results .....	23
Appendix D. Resources for Further Information.....	24
Notes .....	26

## LIST OF EXHIBITS

Exhibit 1 State Scorecard Summary of Health System Performance Across Dimensions .....	1
Exhibit 2 North Dakota Health Professional Shortage Areas, Critical Access Hospitals, and Network Affiliates.....	3
Exhibit 3 Clinical Outcomes for a Chronic Disease Management Pilot Program and a Control Clinic at MeritCare Health System .....	7
Exhibit 4 Financial Outcomes at Two MeritCare Primary Care Clinics Participating in a Chronic Disease Management Pilot Program.....	8
Exhibit 5 Services Funded by Grants Awarded to Northland Healthcare Alliance .....	11
Exhibit 6 Distribution of Telepharmacy Sites in the North Dakota Telepharmacy Project .....	14
Exhibit 7 Development of Pharmacy Sites in the North Dakota Telepharmacy Project .....	15

## ABOUT THE AUTHORS

**Douglas McCarthy, M.B.A.**, president of Issues Research Inc., in Durango, Colo., is senior research advisor to The Commonwealth Fund. He supports The Commonwealth Fund Commission on a High Performance Health System's Scorecard project, conducts case studies on high-performing health care organizations, and is a contributing editor to the bimonthly newsletter [\*Quality Matters\*](#). He has 20 years of experience in public and private sector research, policymaking, and management. During the 1990s, he was director of public policy at UnitedHealth Group, a research director in its Center for Health Care Policy and Evaluation, and a business manager for performance measurement tools and information services. He began his career as an internal consultant for a local government, where he supported quality improvement through operations research and information systems development. He has authored or coauthored reports and articles on a range of topics including health care quality, information privacy, technology assessment, and performance reporting. Mr. McCarthy received his bachelor's degree with honors from Yale College and a master's degree in health care management from the University of Connecticut. During 1996–97, he was a public policy fellow at the Humphrey Institute of Public Affairs at the University of Minnesota.

**Rachel Nuzum, M.P.H.**, is program officer for The Commonwealth Fund's State Innovations program, which aims to improve state and national health system performance by supporting, stimulating, and spreading integrated, state-level strategies for expanding access and promoting high quality, efficient care. Ms. Nuzum also works with the Fund's Commission on a High Performance Health System, coordinating site visits and contributing to Commission reports. Before joining the Fund in January 2007, Ms. Nuzum served as a health policy advisor in the United States Senate. She holds a B.A. in political science from the University of Colorado and an M.P.H. in health policy and management from the University of South Florida.

**Stephanie Mika** is a program assistant for The Commonwealth Fund's State Innovations program. Ms. Mika graduated from Stanford University in June 2006 with a B.A. in human biology. At Stanford, she was head course associate for the human biology program and taught weekly sections with lecture topics including social theory, cultural anthropology, population growth, economics, health care and health policy. She also served as research assistant at the Center for Infant Studies, where she earned the Firestone Medal for Excellence in Undergraduate Research.

**Jennifer Wrenn** has 12 years of experience as a professional grant and technical writer and consultant in the fields of medicine, teaching, youth and family services, and immigrant services. Her consulting services include: grant, report, and technical writing; grant reviewing; evaluation consulting; grantwriting workshops; collaboration-building; and program planning. Ms. Wrenn holds a B.S. in zoology from Colorado State University (Phi Beta Kappa) and a B.S. in medicine from the University of Iowa School of Medicine. She also holds certification in K-12 teaching and as a physician assistant.

**Mary Wakefield, Ph.D., R.N., F.A.A.N.**, is associate dean for rural health and director of the Center for Rural Health at the School of Medicine and Health Sciences, University of North Dakota, in Grand Forks. In addition to engaging in rural health research and program development, Dr. Wakefield serves on a number of public and private health-related advisory bodies, including the Commonwealth Fund Commission on a High Performance Health System. Previously, she held administrative and legislative staff positions in the U.S. Senate. Dr. Wakefield has served as a member of the Medicare Payment Advisory Commission, chaired the Institute of Medicine (IOM) Committee on Health Care Quality for Rural America and the Catholic Health Initiatives Board of Trustees, served on the editorial board for the *Journal of Rural Health*, and was a subcommittee chair for President Clinton's Advisory Commission on Consumer Protection and Quality in the Health Care Industry. She has presented nationally and internationally on public policy and strategies to influence the policymaking and political process, and she has authored many articles and columns on rural health and health policy. She was elected to membership in the Institute of Medicine in 2004. Dr. Wakefield received her B.S. in nursing from the University of Mary, Bismarck, N.D., and her M.S. and Ph.D. from the University of Texas at Austin. She is a fellow in the American Academy of Nursing.

## **ACKNOWLEDGMENTS**

The authors gratefully acknowledge Sister Thomas Welder and staff of the University of Mary, Bismarck, and the staff of Triumph Hospital, Mandan, for graciously hosting the site visit in cooperation with staff of the Commonwealth Fund Commission on a High Performance Health System. We are indebted to the individuals listed below who presented at the site visit and provided follow-up information on the programs and organizations in North Dakota that are described herein. We thank Kimberly Mueller for assistance in preparation of charts and manuscript.

# THE NORTH DAKOTA EXPERIENCE: ACHIEVING HIGH-PERFORMANCE HEALTH CARE THROUGH RURAL INNOVATION AND COOPERATION

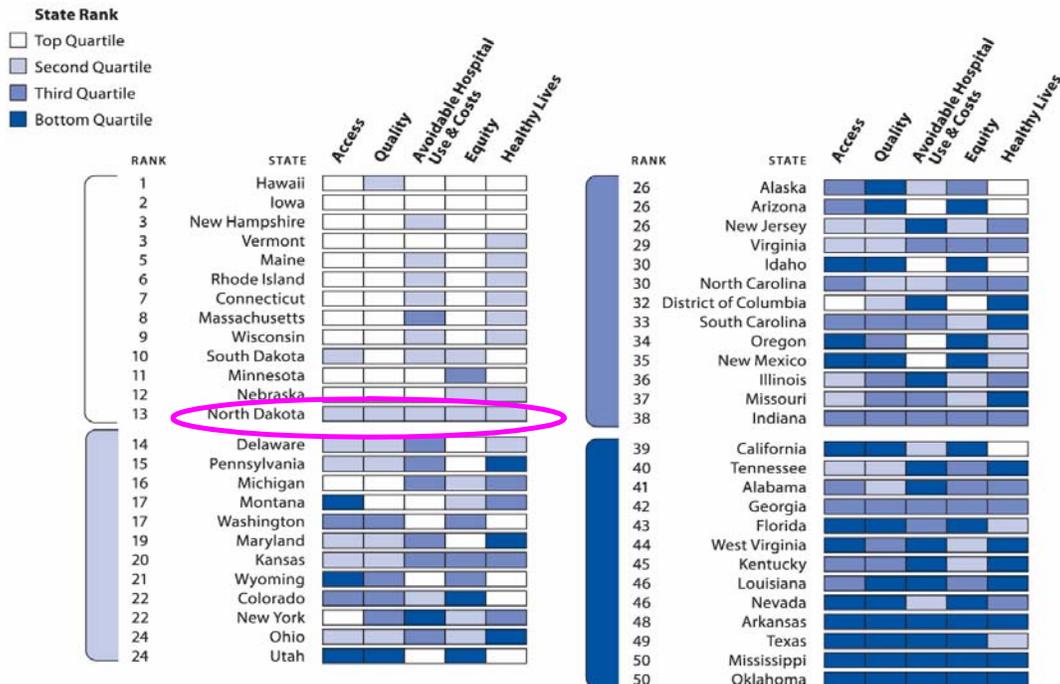
## OVERVIEW

North Dakota faces challenges common to other rural areas of the country that are relatively disadvantaged in attracting health care professionals and in deploying resources to serve small, geographically dispersed communities. Despite these challenges, the state's health care system appears to be performing better than many others in providing its citizens with accessible, relatively high-quality, and efficient health care services, as evidenced by the findings of two recent reports.

- North Dakota ranks in the top quartile of states on The Commonwealth Fund's *State Scorecard on Health System Performance*, which ranks states according to their performance across 32 key indicators of access, quality, utilization, equity, and health outcomes (Exhibit 1 and [Appendix A](#)).
- The latest *Dartmouth Atlas of Health Care* finds that North Dakota is one of the most efficient states in treating chronically ill Medicare patients in the last two years of life, with costs more than 25 percent below the national average.<sup>1</sup>

Exhibit 1

### State Scorecard Summary of Health System Performance Across Dimensions



SOURCE: Commonwealth Fund State Scorecard on Health System Performance, 2007

The Commonwealth Fund's Commission on a High Performance Health System made a site visit to North Dakota in July 2007 to learn more about the state's achievements, focusing on three key areas: 1) supports for primary care and the concept of a medical home (discussed below), 2) organization of care through networks of coordination and cooperation; and 3) the innovative use of technology to meet patient needs and hold down costs. Commission members were impressed by the spirit of cooperation that was evident in the dynamics of health care provision in North Dakota. This cooperative ethos is driven by resource scarcity and fostered by a rural community culture that enhances a sense of mutual accountability among health professionals and their patients.

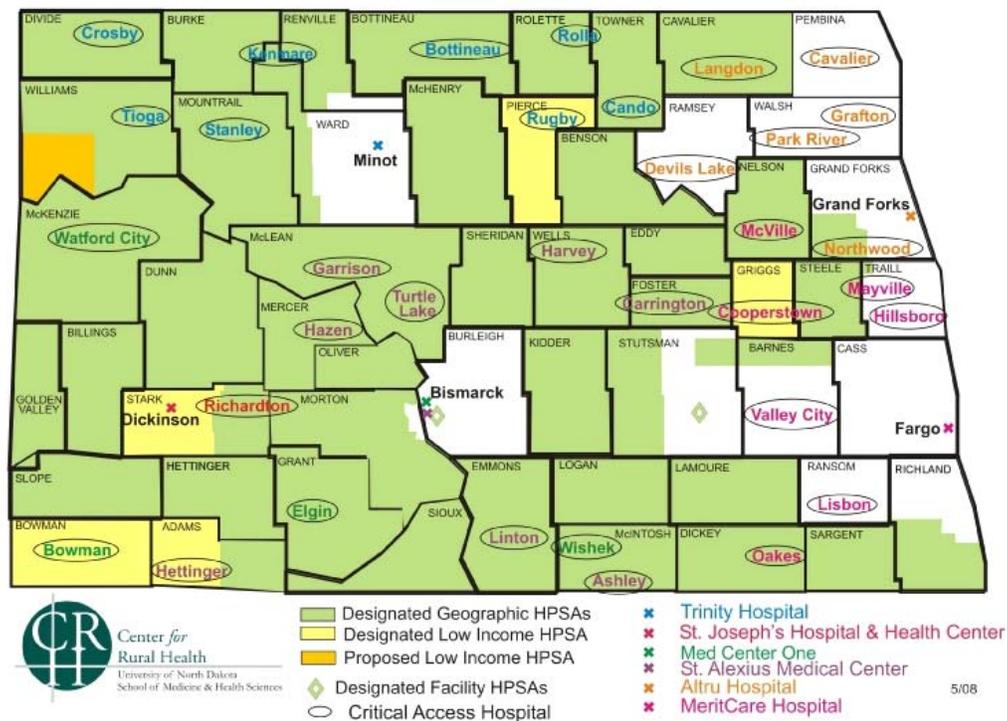
Health care providers, payers, and policymakers in rural North Dakota have learned that only through cooperative, interdependent relationships and a willingness to innovate in both the organization and regulation of services can they achieve the reach, care coordination, and economies of scale that are necessary for delivery of quality and efficient care in rural settings. These innovations provide insights and lessons that may be transferable to other rural areas of the country and to urban areas as well.

## **THE NORTH DAKOTA HEALTH CARE ENVIRONMENT<sup>2</sup>**

North Dakota has a population of approximately 640,000 people, with more than half the counties containing six or fewer people per square mile. Most of the population is white (92%), with a small minority of Native Americans (5%) representing four tribal nations. In addition, North Dakota cities have seen a recent influx of immigrants from Slovenia and Bosnia, as well as from Central and South America. Like other rural areas, North Dakota's population in general is older (the state has the highest proportion of people over 85 years old) and has lower average income than the population of urban states. In general, rural people tend to be less active, more obese, and have higher rates of smoking and alcohol use than their urban counterparts. These health behaviors in turn act as "trip wires" for chronic diseases such as diabetes, hypertension, and coronary artery disease.

These population and behavioral differences contribute to a different context for medical care in rural versus urban areas. For example, a common challenge facing rural areas is an inadequate array of health care resources such as skilled staff, facilities, equipment, and pharmacies. Over half the counties in North Dakota are designated Health Professional Shortage Areas (Exhibit 2), despite efforts to attract physicians through debt-forgiveness programs and to promote primary care among medical students at the University of North Dakota School of Medicine. Many small North Dakota towns have only one or two doctors, and these communities often find it difficult to replace retiring physicians.

Exhibit 2. North Dakota Health Professional Shortage Areas, Critical Access Hospitals, and Network Affiliates



Access to care is further challenged by wide physical distances between health care providers and organizations. In the past, “networking” was done by telephone and automobile. In many rural areas, paper medical records are still transported physically by car from one location to another. These barriers to coordination can contribute to treatment errors, decreased efficiency, and increased cost of care.

To help overcome these challenges, health care providers in rural North Dakota have established various cooperative arrangements and networks to share resources and expertise. These efforts can be compared to the regionalization in public education where one school or district serves several small rural communities. For example, six integrated delivery systems provide the majority of the health care in North Dakota through regional clinic networks and small rural hospitals linked to urban hospitals.<sup>3</sup> Virtual networks built on telemedicine and telepharmacy also promote integration, extend the rural workforce, and enhance communication by allowing physically distant providers and facilities to transmit and receive critical patient data instantaneously.

Many small North Dakota communities rely primarily on small Critical Access Hospitals (CAH) to meet their health care needs (Exhibit 2).<sup>4</sup> Of the 45 North Dakota hospitals, 31 are CAHs. These small hospitals act as a “health care central,” providing the gamut of care in their communities: pediatric, emergency, inpatient, skilled nursing, and home health services—all in a single physical location. By law, CAHs must be linked to tertiary care hospitals for referrals. Additionally, about 40 percent of the CAHs in North Dakota are part of formal networks. Some CAHs share administrators and equipment, such as information technology networks. These linkages strengthen CAHs through improved coordination, quality, and efficiency of health care.

Following are three examples of how cooperation among health care providers, payers, and policymakers promotes a high-performing health care system in North Dakota.

### **EXAMPLE 1. COLLABORATIVE CHRONIC DISEASE MANAGEMENT<sup>5</sup>**

Not-for-profit **MeritCare Health System** is the state’s largest integrated delivery system, with two hospitals in the Fargo–Moorhead area, 430 employed physicians, and 180 midlevel practitioners who provide care in 46 clinic sites in North Dakota and Minnesota. MeritCare has been recognized as a leading integrated health network and as one of the top-performing hospitals in the United States (see [Appendix B](#) for more on MeritCare). **Blue Cross Blue Shield of North Dakota** (BCBS-ND) is the dominant health insurer in the state, holding 80 percent of the market with 275,000 insured members in North Dakota.

BCBS-ND and MeritCare recently collaborated to conduct a chronic disease management (CDM) pilot at two of MeritCare’s internal medicine clinics (one intervention site and one control site) to test the assumption that care for chronic diseases, such as diabetes, is best and most efficiently provided in a patient’s “medical home”—their primary care physician’s office (see box). As an incentive to undertake and demonstrate this new approach, BCBS-ND provided MeritCare with a start-up grant of \$20,000 and agreed to share 50 percent of cost-savings generated in the first year of the pilot, such as through reduced hospital use.

### Care Coordination and the Medical Home

The concept of a *patient-centered medical home* has gained traction in recent years as the centerpiece of a primary-care based approach to health system improvement that is being championed by a range of stakeholders including employers, physicians, patients, and insurers.<sup>6</sup> Several pilots and evaluations of medical homes are under way in both the public and private sectors.

A medical home does not refer to a physical place but to an approach that assures that patients have superb access to care, that their care is well coordinated, and that they are engaged in their care. For providers, this means having information systems to support the delivery of high-quality care, providing integrated and comprehensive care with smooth information flow across a fixed or virtual care team, and receiving routine patient and clinical information feedback. And at the health system level, there need to be incentives and system supports to improve and innovate.<sup>7</sup>

Current research suggests that medical homes can contribute to more positive care experiences for patients, to higher-quality and more efficient care including better coordination of care and fewer medical errors, and to the elimination of racial and ethnic disparities in care.<sup>8</sup> A medical home can be especially important to better management of chronic conditions, with the potential to reduce unnecessary or avoidable utilization of care. Despite these benefits, only one-quarter to one-half of Americans currently have a regular source of care that meets even basic definitions of a “medical home.”<sup>9</sup>

Prior to the pilot, which began in 2005, payers typically contracted with outside disease management companies for this function. Because physicians didn’t have relationships with these companies, they expressed concern that they couldn’t control the messages their patients were receiving. Patients complained about receiving information from a source they didn’t know and trust.

The CDM pilot program was conceived as a way to redirect fragmented funding streams and services to promote comprehensive diabetes care by linking patients with a CDM nurse stationed in their primary care clinic or medical home. At the intervention clinic, physicians referred patients with diabetes to the CDM nurse for a one-on-one meeting to assess their knowledge of diabetes, set goals for disease self-management, establish their need for follow-up care by telephone or in-person, and make referrals for other needed services such as nutrition counseling by a dietitian.

MeritCare’s electronic medical record (EMR) system supported quality improvements by standardizing information collection using predefined templates and by tracking an expanded set of clinical metrics (beyond those available through claims data). These metrics helped patients track their progress in meeting self-management goals,

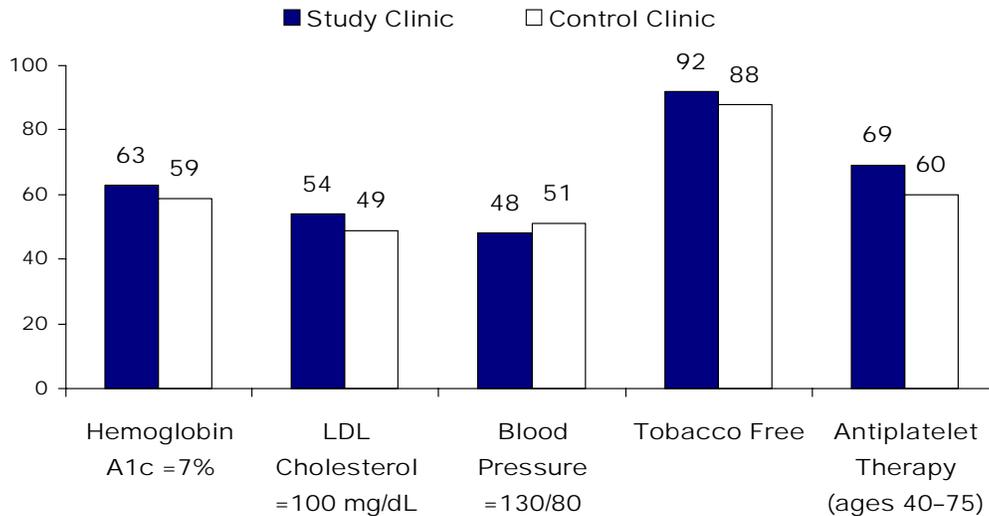
while also providing direct feedback to physicians on their performance in meeting aggregate outcome-based benchmarks. By generating “look-ahead” reports before patient visits, the EMR helps physicians and other clinicians more reliably deliver evidence-based care when patients are due for recommended chronic disease services.

The initial results of the pilot were promising.<sup>10</sup>

- There was an 18 percent increase in the proportion of patients who received a “complete care” bundle of five recommended services—a physician office visit, hemoglobin A1c test, eye exam, lipid test, and microalbumin test—at the intervention clinic (from 48.5% in 2003 to 57.4% in 2005), compared to a nonsignificant decline in this bundle of measures at the control site (from 57.3% in 2003 to 53.7% in 2005) (see [Appendix C](#) for results on individual process measures).
- By 2005, outcomes for patients in the intervention site were 5 percent to 15 percent better on four of five ambulatory measures (control of blood sugar and cholesterol, tobacco use, and aspirin therapy). Blood pressure control was an exception, with slightly better results at the comparison site (Exhibit 3).
- Hospital admissions decreased by 6 percent and ER visits decreased by 24 percent in the intervention group from 2003 to 2005, while increasing by 45 percent and 3 percent, respectively, in the control group (Appendix C).
- In 2005, total costs per member per year were \$530 lower than expected in the intervention group based on historical trends, saving an estimated \$102,000 for 192 patients in the pilot. Savings were even greater when comparing the intervention group to the control group (Exhibit 4).
- The pilot enhanced efficiency by shifting care of these patients from specialists to primary care physicians with increased use of midlevel providers including physician assistants and nurse practitioners.

### Exhibit 3. Clinical Outcomes for a Chronic Disease Management Pilot Program and a Control Clinic at MeritCare Health System

Percentage of diabetic patients (2005)



Note: LDL = low-density lipoprotein.

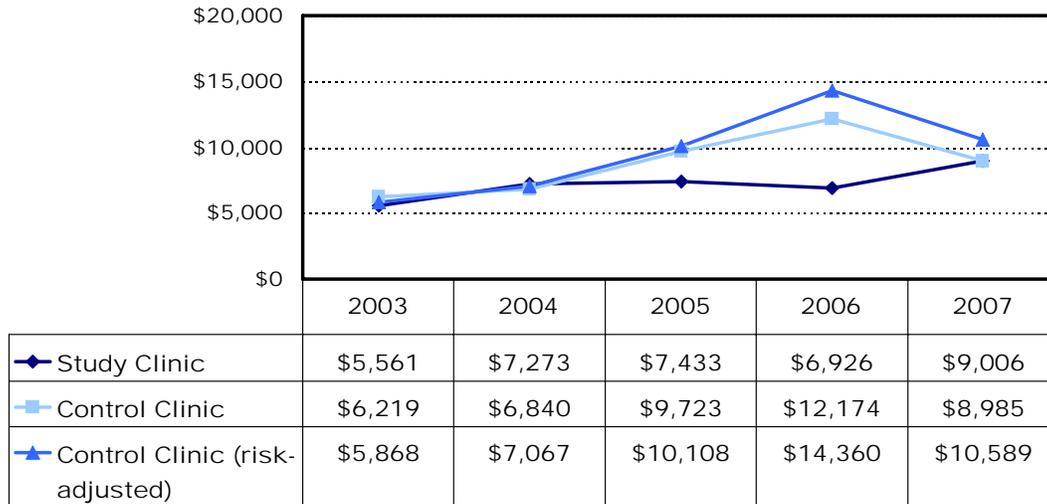
Source: Adapted from S. M. Gerlach, J. Rice, D. Hanekom et al., *Outcomes of a Provider-Based Diabetes Disease Management Pilot Program* (Fargo, N.D.: Blue Cross Blue Shield of North Dakota, Jan. 2007).

Participating physicians appear to have endorsed the new program because it frees them to see a greater number of patients, which in turn translates to increased income (MeritCare compensates its physicians based in part on their productivity). While they have to reengineer their office practices (with a multidisciplinary care team and new computer systems) to comply with program parameters, the new systems allow them to improve care and better meet performance goals. Patient engagement and satisfaction also appear to have improved because patients received more one-on-one time with nurses and providers they trusted at their medical home, and because nonadherence with treatment is picked up electronically, allowing for immediate follow-up with patients.

Seeing these advantages to clinical practice and patient care, physicians in the control site decided to adopt the chronic disease management program at their clinic in 2006. They found the program so compelling that they made this decision even without the benefit of receiving any payment incentives. Financial outcomes subsequently improved at the control clinic in concert with reductions in ER visits and hospitalizations (Appendix C), so that by 2007, both the original study clinic and the control clinic had similar costs per patient (Exhibit 4).

### Exhibit 4. Financial Outcomes at Two MeritCare Primary Care Clinics Participating in a Chronic Disease Management Pilot Program

Annual global expenditures per member\*



\* Pilot program began at the study site in 2005 and was adopted by the control site in 2006.  
Source: J. Rice and D. Hanekom, "The Advanced Medical Home: Yesterday, Today and Tomorrow," presentation at the Distinctively Blue and Focus on Providers Conference, Denver, Apr. 2008.

Leaders in the two organizations believe that the pilot was successful because the insurer was willing to take some business risk to test an innovation and to share savings from improved care with providers, while participating physicians and nurses were engaged with resources and tools to expand their capacity to improve care. According to participants, the program induced a commitment from primary care physicians to generate, trust, and use data to drive improvement, and helped shift the clinical paradigm from an episodic to a longitudinal focus and from individually provided care to team-based care. Information interchange complemented a strong collaborative relationship between medical directors at MeritCare and BCBS-ND.

In September 2007, the partners expanded the chronic disease management program to more clinic sites and conditions including hypertension and coronary artery disease. BCBS-ND will also add a generic drug incentive to help reduce costs. Since the pilot demonstrated the level of cost-savings that can be expected from primary-care-based disease management, the project financing has shifted to a more predictable payment of a disease management fee of \$175 per patient per year to support nurse care management, plus equal sharing of savings after accounting for the management fee. The

partners are refining metrics to set clinical process and outcome targets above the current achievement level. MeritCare is deliberating how incentives such as these can be translated from the corporate level to promote teamwork among physicians and other clinical staff.

BCBS-ND is planning to expand this program statewide in 2009 to include all primary care physicians who are able to provide a similar system of care. The goal is to facilitate the spread of a “medical home” concept that encompasses responsibility for both primary and secondary prevention of disease. BCBS-ND will reimburse physician practices \$100 per patient per year for sharing clinical process and outcome data similar to the current health plan HEDIS reporting measures.<sup>11</sup> Program participants will receive a Web-based quality management tool that can interface with and harvest data from existing clinical information systems and provide actionable data at the point of care. During the second year of this “pay-for-participation” program, BCBS-ND will negotiate outcome targets with participants designed to improve the health of North Dakota’s population.

Nationally, the CDM collaboration has been recognized as a model by the Blue Cross Blue Shield Association. The program also has been presented to the American College of Physicians to inform deliberations on promoting the concept of an advanced medical home. The impact of a program like this might be more pronounced in a rural state such as North Dakota where a sizable proportion of patients are insured by a single payer. Negotiating such a collaboration might be more difficult in markets with many competing payers, although some payers are banding together to offer performance incentives for the medical home as part of a collective program.<sup>12</sup>

### **EXAMPLE 2. COOPERATION THROUGH RURAL NETWORKS<sup>13</sup>**

Increasingly, health care providers across North Dakota and other rural areas of the United States are developing collaborative relationships to better serve their patients by sharing organizational infrastructure and service delivery. These networking relationships can take the form of common ownership of hospitals and clinics or virtual arrangements among independent organizations that share common interests.

**West River Health Services (WRHS)** provides health care to approximately 35,000 rural patients spread over 25,000 square miles of North and South Dakota and eastern Montana, a geographic area comparable to the size of several northeastern states combined. The network consists of a 25-bed critical access hospital (West River Regional Medical Center in Hettinger), a central community clinic attached to the CAH, and five

satellite rural health clinics established at the request of outlying communities. WRHS also provides a full range of diagnostic, imaging, therapeutic, home health, long-term care, and wellness services. Its mission is to provide the residents of rural areas with the same level of care enjoyed by residents of urban areas.

Every member of the WRHS team—a multi-specialty group of 16 physicians and 11 midlevel professionals (physician assistants and nurse practitioners)—allows use of all aspects of their skills and training. Given the opportunities of rural medicine, family doctors engage in a practice with robust continuity of care, following patients across inpatient and ambulatory care settings. Midlevel practitioners staff the satellite clinics and maintain regular telephone contact with physicians, who travel to each satellite clinic on a regular schedule. WRHS physician Cathy Houle, M.D., describes the experience visiting satellite clinics this way: “I’m much like a trapper checking a trapline. Then I return as a pack mule, hauling lab work and X-rays back to the hospital with me.” Clinics have electronic access to laboratory results and clinical notes, but the rest of the medical record must be duplicated until such time as WRHS purchases a full electronic medical record system.

The West River network consists of interdependent parts: each clinic is only financially viable as part of the whole, and similarly, the hospitals couldn’t survive without the clinic structure. A group practice also can be more appealing to prospective physicians than an isolated private practice, thereby enhancing physician recruitment in the rural areas served. Efficiencies and care coordination are made possible by the shared resources of a network organizational structure. Shared patients and shared resources facilitate the network’s aims of quality first, excellence in care, innovation in service, and treating patients like family. All of the hospital’s departments are actively engaged in quality improvement activities, such as participating in the Institute for Healthcare Improvement’s 5 Million Lives Campaign to improve patient safety.

**Northland Healthcare Alliance (NHA)** is a 10-year-old virtual network of 25 rural and urban, Catholic and non-Catholic hospitals and long-term care facilities that share services such as capital equipment purchasing and maintenance, accounts receivable and collections, employee benefits, group contracting, benchmarking, education, grant development, marketing, and others. The network benefits members through shared expertise and information among members, enhanced funding opportunities due to increased visibility with funding organizations, strengthened negotiation for joint contracting, and reduced isolation through collaborative activities.

Like many rural networks, NHA relied on grants (such as the federal Community Access Program) to fund start-up activities (Exhibit 5). To sustain operations for the long term, NHA has fused together a diversity of funding streams including dues and fees for services to meet its mission of enhancing value through increased access and quality and decreased costs. Tim Cox, president of NHA, says that it is not necessary to get consensus among all network members to create a new service, only that a critical mass of members have an interest in moving forward to meet a local need through joint action. In some cases, a service such as supply chain management developed for one member may be made available for shared use by other members.

An example of a profitable NHA program is a mobile magnetic resonance imaging (MRI) service that allows patients to receive care locally at a lower price than if they were referred out of the community. This cooperative venture not only captures revenue locally but also reduces patients' travel time and costs. Kimber Wraalstad, president and CEO of Presentation Medical Center in rural Rolla, North Dakota, says that critical access hospitals such as theirs could not have created or offered such critical services without support from NHA. For example, NHA provided critical support in securing grant funding to create new community health centers in three rural communities.

#### Exhibit 5. Services Funded by Grants Awarded to Northland Healthcare Alliance

<u>Applicant</u>	<u>Purpose</u>	<u>Award</u>
Northland Healthcare Alliance	Multiyear CAP <sup>†</sup> grants	\$1,990,523
Northland Healthcare Alliance	Telecare Network Health Management Project	\$820,840
Northland Healthcare Alliance	Rural Telemedicine Network	\$654,038
Northland Health Partners	Community Health Center	\$617,400
Sakakwea Medical Center	Behavioral Health Services	\$590,671
West River Regional	Managed Care	\$571,880
Garrison Memorial Hospital	Systematic Disease Management (Diabetes)	\$565,730
Northland Healthcare PACE	PACE <sup>‡</sup> Development	\$500,000
All Other Grants		<u>\$235,937</u>
	Total	\$6,547,019

<sup>†</sup> CAP = Community Action Program; <sup>‡</sup> PACE = Program of All-Inclusive Care for the Elderly. Source: Adapted from T. Cox, "Northland Healthcare Alliance," presentation to the Commission on a High Performance Health System, July 2007.

Other examples of joint services and activities include sharing an information technology specialist between organizations, promoting and enrolling eligible individuals in Medicaid and the State Children’s Health Insurance Program (SCHIP), and acting as a rural development site for the Program of All-Inclusive Care for the Elderly (PACE), which integrates Medicare and Medicaid financing to help seniors live independently.

The **Northwestern North Dakota Information Technology Network** is working cooperatively to develop hardware and software infrastructure for electronic medical records that can be shared by 10 Critical Access Hospitals and a tertiary-care hospital in North Dakota. This effort builds on a successful collaboration between two Critical Access Hospitals (Presentation Medical Center in Rolla and St. Andrews Health Center in Bottineau) that have realized efficiencies by sharing a single computer server and clinical information software implementation.

The **Rural Mental Health Consortium** provides on-site mental health services in four geographically isolated locations (Harvey, Bottineau, Rolla, and Kenmare) where there is a shortage of mental health professionals. Masters-level trained clinical nurse specialists provide assessment, intervention, and ongoing management services, with authority to prescribe psychotropic medications and provide counseling services eligible for third-party reimbursement. Without such an intervention, many residents of these underserved communities—including many Native Americans—would not be likely to receive any needed mental health services, says Kimber Wraalstad of Presentation Medical Center.

### **EXAMPLE 3. COOPERATION TO PROMOTE TELEMEDICINE AND TELEPHARMACY<sup>14</sup>**

The **North Dakota Telepharmacy Project** is a collaboration between the North Dakota State University (NDSU) College of Pharmacy, the North Dakota State Board of Pharmacy, and the North Dakota Pharmacists Association to “restore, retain, or establish pharmacy services in medically underserved rural communities.” Through the project, a licensed pharmacist at a central pharmacy supervises the processing of prescriptions by a registered pharmacy technician at a remote “telepharmacy” site. Telepharmacy is a form of telemedicine or telehealth, which is growing in use nationally (see box). In telepharmacy, a pharmacist communicates with the technician and the patient through audio and video computer links rather than in a face-to-face encounter. Technological innovation such as this enables a pharmacist to be virtually in two places at once. When these providers are spread thin over vast distances in rural underserved areas, this capability can be lifesaving.

The rationale for using telepharmacy is compelling. A national pharmacy shortage exacerbates the challenges of recruiting pharmacists to rural areas, especially where there is a declining population base. The inability to replace retiring rural pharmacists has led to a serious decrease in the availability of pharmacy services in rural North Dakota: over the past 20 years, 26 rural pharmacies closed in North Dakota and many others were at risk of closing. At the same time, critical access hospitals in frontier areas are challenged to meet pharmacist coverage needs as patient safety concerns and regulatory requirements have increased the demand for 24-hour pharmacist review of medications.

### **Telehealth, Telemedicine, and Telepharmacy**

Telehealth is a strategy to bridge geographic gaps between providers or between patients and providers using electronic information and communications technologies such as videoconferencing, transmission of diagnostic test results such as X-rays and laboratory tests, and remote monitoring of patient vital signs and clinical conditions. Applications of telehealth include the provision of clinical care (telemedicine) and of supportive services such as continuing medical education for providers or health promotion for patients.

Telemedicine can be used to connect providers for clinical consultations and decision support and to connect patients to primary or specialty care providers for diagnosis and treatment. This type of practice can be particularly useful in rural and remote areas where there is often a shortage of accessible health care professionals, providing a mechanism for patients in remote areas to receive timely care and attention without the burden of long-distance travel by providers or patients.<sup>15</sup>

Telepharmacy represents a unique and innovative way to deliver pharmacy services to rural areas using information and communication technology to incorporate safe practices of the traditional mode of delivery. In the United States, pharmacies are permitted to use pharmacy technicians to assist in filling prescriptions under the direct supervision of a licensed pharmacist. Some states, including North Dakota, Washington, Alaska, and Nebraska, have passed legislation or issued regulations enabling expanded scope of practice for pharmacy technicians or other health professionals supported by telepharmacy or through remote drug dispensing devices.<sup>16</sup>

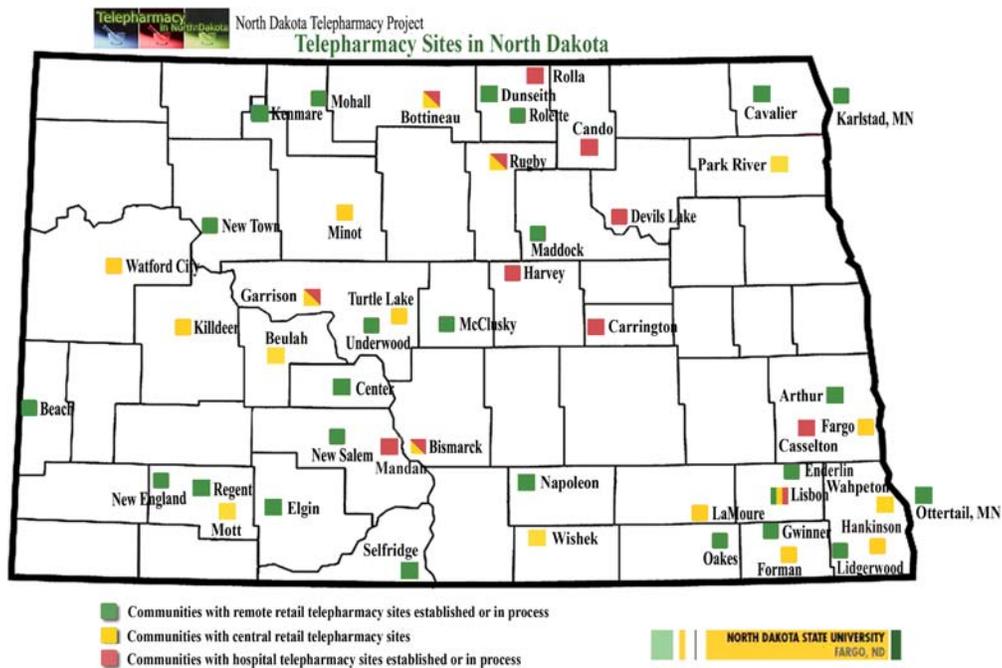
In recognition of the benefits of telehealth to improving health care accessibility, the U.S. government established the Rural Telemedicine Grant program in 1994. Beginning in 2002, a replacement program, the Telehealth Network Grant Program, aims to help communities build the human, technical, and financial capacity to develop sustainable telehealth programs and networks.<sup>17</sup>

In response to these pressures and with the backing of the North Dakota Pharmacists Association, the North Dakota State Board of Pharmacy issued administrative rules and permits for the provision of remote telepharmacy services. The Board acted under its existing legislative authority to “regulate and control the practice of

pharmacy” in the State, while also communicating with a legislative rules committee to keep the legislature informed of its action. Through the leadership of North Dakota Senator Byron Dorgan, Congress in 2002 established a federal matching grant program within the Health Resources and Services Administration’s Office for the Advancement of Telehealth that has awarded \$2.5 million to the NDSU College of Pharmacy to help fund the start-up costs of the telepharmacy network. Remote telepharmacy sites must be self-sustaining after one year of operation. To date, all have been successful.

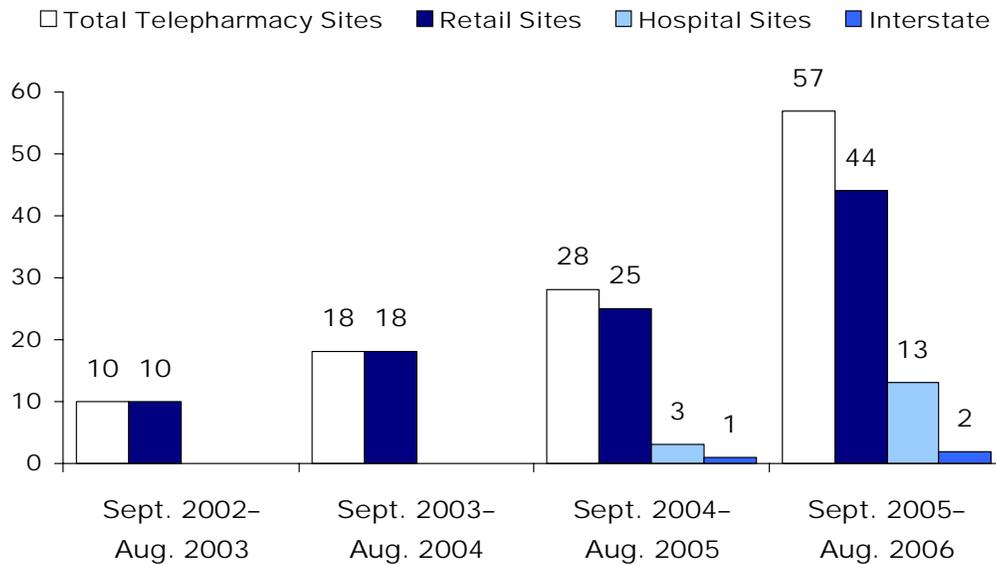
As of January 2007, 57 North Dakota sites were participating in the telepharmacy project, including 21 central pharmacies (retail and urban hospitals) and 36 remote telepharmacy sites (Exhibits 6 and 7). On average, remote retail telepharmacy sites are about 60 miles from central sites and fill about 70 prescriptions per day in communities with a population of about 800 people. The newest retail telepharmacy opened in spring, 2008, joining three established telepharmacies that are serving as contractors to Federally Qualified Rural Health Clinics participating in the federal “340B” Drug Pricing Program that makes prescription drugs available at a discounted prices to eligible patients.<sup>18</sup>

Exhibit 6. Distribution of Telepharmacy Sites in the North Dakota Telepharmacy Project



Source: North Dakota Telepharmacy Project, <http://telepharmacy.ndsu.nodak.edu/map.shtml>.

## Exhibit 7. Development of Pharmacy Sites in the North Dakota Telepharmacy Project



Source: North Dakota Telepharmacy Project, <http://telepharmacy.ndsu.nodak.edu/publications/documents/DistrictVTelepharmacy.ppt>.

Several rural hospitals are participating in the telepharmacy network through a partnership to ensure 24-hour pharmacist coverage at their institutions, in accordance with written agreements that establish standards of practice and assure compliance with regulatory requirements. Participating hospitals use a mobile telepharmacy cart that can be taken directly to the nursing unit so that the attending physician or nurse can consult with a pharmacist after-hours when the hospital pharmacy is closed. In 2008, the NDSU College of Pharmacy worked with Senator Dorgan to obtain additional federal funding to expand the hospital telepharmacy network so that more rural hospitals could benefit from 24-hour pharmacist coverage. Catholic Health Initiatives (CHI), which operates several rural hospitals in North Dakota, was selected from among three applicants to coordinate the expansion project among an equal number of CHI and non-CHI rural hospitals.

Pharmacists remain actively involved as the responsible health care provider to ensure quality assurance, drug utilization review, and patient counseling. For example, the remote technician first places the prescription and then the filled medication order under the document camera so that the pharmacist can verify the accuracy of the order before authorizing its release. Dispensing is then done by the pharmacist using the audio

and video links to counsel the patient. Participating pharmacists have terminals in their homes and can provide cross-coverage to one another when a colleague is unavailable because of vacation, illness, inclement weather, or professional training.

Results to date include the following:

- More than 40,000 rural citizens in 55 percent of North Dakota counties have access to pharmacy services in their community.
- The rate of dispensing errors was under 1 percent at telepharmacy sites, compared to a national average of about 2 percent.
- Participating rural pharmacy gross profits have doubled, achieving a margin at or above the national average.
- Each remote telepharmacy site generates about \$500,000 per year for the local community, yielding 40 to 50 new jobs and an estimated \$12.5 million annually that has been added to the state's rural economy.

This innovative program has shown that quality, affordable pharmacy services can be provided in remote rural areas without compromising safety and while still adhering to all regulatory requirements. Moreover, telepharmacy strategies can enable rural hospitals to meet accreditation requirements for pharmacy accessibility and consultation services. The start-up cost to create a functioning telepharmacy dyad (central site in communication with a remote site) is \$36,000. In contrast, an investment of up to \$250,000 would be required to set up an automated dispensing device at a remote location (an approach sometimes taken in other states). That amount is beyond the means of many rural communities and small rural hospitals.

Other types of telemedicine applications are being used by 28 sites within the Northland Healthcare Alliance to enable real-time physician consultations using audiovisual technology in specialties where there are professional shortages, such as dermatology, ENT (ears, nose, and throat), plastic surgery, burns, and speech therapy. At the community health center in Turtle Lake, North Dakota, for example, patients using telemedicine services save an average of seven hours in travel time per consultation. Telemedicine is also being used by some North Dakota home health agencies to monitor patients who live well over a hundred miles from a home health agency.

Most of North Dakota is a designated Mental Health Professional Shortage Area, and it is difficult to get trained therapists in urban areas to travel the distances needed to treat rural patients. Moreover, it is impractical to train rural therapists in specific therapeutic skills they may only rarely use. Alternative strategies include the use of midlevel and other providers (such as in the Rural Mental Health Consortium, described above) or delivering therapies using telemedicine technology. With the advent of cheaper technology, a telemedicine unit now costs only \$2,500 on each end, including an encrypted signal.

A telemedicine pilot in psychiatry conducted at the University of North Dakota School of Medicine compared the delivery of cognitive behavioral therapy (CBT) to patients with bulimia, the eating disorder, by telemedicine and through face-to-face encounters with therapists traveling to remote communities. Despite evidence for its effectiveness, CBT remains an underused therapy among clinicians, who have often not been trained to deliver this treatment modality.

- Outcomes in the psychiatry pilot program—including reductions in binge eating, eating disorder severity, and depression—were “roughly equivalent” among patients who were randomly assigned to receive treatment via telemedicine or through face-to-face encounters.<sup>19</sup>
- The average cost of therapy was only \$73 per case for telemedicine compared to \$230 per case for face-to-face care, which typically requires reimbursing providers to drive long distances for each appointment.
- In patient satisfaction surveys, patients expressed no preference for one method over the other, rating the physician–patient alliance equally well.

The major challenges to the telemedicine program were professional licensure issues across state lines, which forced patients in South Dakota to come to North Dakota for treatment, and the need for emergency backup at the remote site to intervene if a patient should become suicidal. Insurance reimbursement for telemedicine remains variable, although demonstrations such as this one may help to change these policies. While the efficacy of telemedicine psychotherapy for depression has not yet been proven, early indicators suggest that telemedicine is a viable strategy to deliver empirically supported therapies for psychiatric disorders in rural patients.

## **POLICY IMPLICATIONS**

North Dakota not only represents a model for other rural areas facing physician and facility shortages, but may provide lessons that can be transferable to urban areas as well. For example, physician and pharmacist shortages are not exclusive to rural areas. In fact, the lack of trained providers at all levels is becoming a national problem. Greater use of telemedicine and enhanced roles for midlevel practitioners as part of the primary care team may be universally applicable both in rural and urban settings.

Rural communities have a unique context of community trust and interdependence, a social capital that allows them to innovate in ways that may be seen as too risky by their urban neighbors. Resource constraints have driven local providers to try new approaches to care and to institute better practices relatively quickly. Preserving the local economy by keeping dollars in the community has been another incentive. A flexible regulatory approach was key to North Dakota's use of telepharmacy to improve health care access in rural communities.

The North Dakota Telepharmacy Project raises a number of interesting policy questions. For example, should pharmacists with their advanced training and knowledge become more clinically oriented and turn over some routine dispensing and data entry duties to technicians? Why is the error rate lower in telepharmacies than in on-site pharmacies? Could pharmacists' quality of life be enhanced if they practiced from home or were employed by several stores simultaneously? Should regulations be changed to allow these and other technologic innovations in other areas?

Regionalization and networking of services seems to support improved efficiencies and patient outcomes. Increased efficiencies didn't require centralization of services. Rather, enhanced communication was key to the improvements achieved in site visit organizations through the use and enhancement of primary care, collaborative networks, and technology. A strong sense of mission and collaboration and constant vigilance to both process and outcomes also appear to be important for long-term success.

Policymakers considering the future for U.S. health care may take a cue from well-functioning rural health care systems such as those described in North Dakota, where providers regularly collaborate to improve services for patients and achieve outcomes that are often superior to the current high-cost systems elsewhere. To launch this new generation of medicine, the nation may have to learn more than just technique from rural areas. It may need to relearn what it means to be a community of neighbors.

Meanwhile, those in rural areas have the opportunity to make rural health care even better than that received by those who live in urbanized areas, who must negotiate an often-fragmented delivery system, despite having greater resources.

## CONCLUSION

Geographic isolation, resource shortages, and the desire to preserve the local economy have fostered creativity in North Dakota, driving local providers and policymakers to try new approaches to care and to institute better practices relatively quickly. Providers regularly collaborate with each other and with policymakers to improve services for patients and achieve outcomes that are often superior to high-cost systems elsewhere. Enhanced communication and collaboration, rather than centralization of services, seem to be the keys to quality and accessible health care in North Dakota.

---

*The case study or studies included in this Fund report were based on publicly available information and self-reported data provided by the case study institution(s). The aim of Fund-sponsored case studies of this type is to identify institutions that have achieved results indicating high performance in a particular area, have undertaken innovations designed to reach higher performance, or exemplify attributes that can foster high performance. The studies are intended to enable other institutions to draw lessons from the studied organizations' experiences in ways that may aid their own efforts to become high performers. The Commonwealth Fund is not an accreditor of health care organizations or systems, and the inclusion of an institution in the Fund's case studies series is not an endorsement by the Fund for receipt of health care from the institution.*

**APPENDIX A. HEALTH SYSTEM PERFORMANCE INDICATORS  
ON WHICH NORTH DAKOTA RANKS AMONG TOP 10 STATES**

<b>Dimension and Indicator</b>	<b>Year</b>	<b>State Rate</b>	<b>All States Median Rate</b>	<b>Best State Rate</b>	<b>Rank</b>
<b>Access</b>					
Percent of adults (ages 18–64) insured	2004–2005	85.3	81.5	89.0	9
Percent of adults without time in past year when they needed to see a doctor but could not because of cost	2004	93.3	87.2	96.6	2
<b>Quality</b>					
Percent of adult diabetics received recommended preventive care (rank among 47 states)	2004	61.3	42.4	65.4	2
Percent of children ages 19–35 months received all recommended doses of five key vaccines	2005	85.0	81.6	93.5	8
Percent of surgical patients received appropriate timing of antibiotics to prevent infections	2005	80.0	69.5	90.0	3
Percent of high-risk nursing home residents with pressure sores	2004	7.6	13.2	7.6	1
Percent of nursing home residents who were physically restrained	2004	2.6	6.2	1.9	4
<b>Avoidable Hospital Use and Costs</b>					
Percent of long-stay nursing home residents with a hospital admission (rank among 48 states)	2000	10.4	16.1	8.3	9
Total single premium per enrolled employee at private-sector establishments that offer health insurance	2004	3,342	3,706	3,034	5
Total Medicare (Parts A & B) reimbursements per enrollee	2003	4,766	6,070	4,530	2
<b>Healthy Lives</b>					
Percent of adults under age 65 limited in any activities because of physical, mental, or emotional problems	2004	11.4	15.3	10.8	3

\* Note: Data for North Dakota were available for 30 of the 32 State Scorecard indicators. Refer to Appendices B1 and B2 in the *State Scorecard* for indicator descriptions and data sources (available online at [www.commonwealthfund.org/publications/publications\\_show.htm?doc\\_id=494551](http://www.commonwealthfund.org/publications/publications_show.htm?doc_id=494551)).

Source: J. C. Cantor, C. Schoen, D. Belloff, S. K. H. How, and D. McCarthy, *Aiming Higher: Results from a State Scorecard on Health System Performance* (New York: The Commonwealth Fund Commission on a High Performance Health System, June 2007).

## APPENDIX B. MERITCARE HEALTH SYSTEM<sup>20</sup>

Headquartered in Fargo, North Dakota, MeritCare Health System is the largest health care system and the largest private employer in North Dakota. MeritCare encompasses:

- Two regional hospitals in the Fargo-Moorehead area with 24,000 admissions annually
- Forty-six ambulatory clinic sites that provide 1.5 million patient visits each year to residents of more than 30 communities in southwestern North Dakota and northern Minnesota
- The region's largest provider of home health care.

The integrated delivery system has annual revenue of \$700 million and employs 7,200 individuals, including 430 physicians and 180 midlevel practitioners. MeritCare has been recognized for excellence in both clinical care and use of information technology.<sup>21</sup>

**Information Systems:** MeritCare clinics and hospitals are connected through an electronic medical record (EMR) system that includes laboratory test results, digitized radiological images, and prompts for recommended preventive and chronic care. In this way, primary care physicians in remote clinics can consult with specialists about a patient's care. The EMR system also is available to doctors caring for MeritCare patients at nonaffiliated community hospitals to improve care and efficiency. MeritCare has adapted third-party vendor software with its own forms and specialty-specific templates designed by clinicians who participate on an EMR steering committee and a clinical content group.

**Continuous Improvement:** MeritCare uses "lean" management techniques (adapted from the Toyota Production System) to bring providers, care team members, and engineers together to map care processes and redesign systems to maximize value and efficiency. Using this process, for example, the psychiatry department decreased appointment callback time from two hours to five minutes. Likewise, a project that reengineered cardiolyte test scheduling reduced appointment waiting time from three weeks to next-day or second-day appointment availability. Other initiatives include the following:

- MeritCare has instituted Patient and Family Advisory Councils to provide a forum for active listening between MeritCare staff and members of the community. The collaborative work of these councils helps the organization assess community needs, identify obstacles to service, and improve care delivery.
- MeritCare is currently restructuring to integrate its vertical service (e.g., cardiology) lines within a horizontal matrix that tracks actual patient experience within each setting of care and across the continuum of care. This arrangement is expected to improve service and efficiency.

MeritCare publicly reports clinical performance results for the medical group and for individual clinics through the Minnesota Community Measurement initiative, a collaboration among medical groups, consumers, businesses, and health plans in Minnesota and surrounding areas. MeritCare’s internal medicine department shares physician performance results within the department to foster an environment of peer accountability. The department recently modified physician compensation to include the possibility for additional pay based on productivity and a quality bonus tied to the achievement of department-wide performance targets.

***Lessons Learned:*** MeritCare’s CEO Roger Gilbertson, M.D., believes that integrated care delivery helps align an organization to meet customer needs and results in better outcomes across the board, including both quality and efficiency. “In medicine we are still in the white water of transitioning to where the customer is in charge. Creating this type of culture change requires skilled leaders who don’t let up. You need strong and sustained intentionality to create that alignment,” he says.

**APPENDIX C. CHRONIC DISEASE MANAGEMENT PILOT PROGRAM—  
SELECTED RESULTS**

**Clinical Process Measures**

	Study Clinic		Control Clinic	
	2003	2005	2003	2005
<b>PCP Visit</b>	100%	97.95%	100%	99.26%
<b>HbA1c Test</b>	90.10%	93.85%	95.12%	95.59%
<b>Eye Exam</b>	74.26%	75.38%	75.61%	68.38%
<b>Lipid Test</b>	85.15%	92.31%	93.90%	91.18%
<b>Microalbumin*</b>	66.34%	77.44%	79.27%	79.41%
<b>All 5 Services</b>	48.51%	57.44%	57.32%	53.68%

Note: the study clinic adopted the intervention in 2005. PCP = primary care provider; HbA1c = hemoglobin A1c test.

\* Patient received microalbumin test or had known nephropathy (the prevalence of nephropathy was higher in the control group at baseline).

Source: Adapted from S. M. Gerlach, J. Rice, D. Hanekom et al., *Outcomes of a Provider-Based Diabetes Disease Management Pilot Program* (Fargo, N.D.: Blue Cross Blue Shield of North Dakota, Jan. 2007).

**Outcomes: Hospital Use**

	2003	2004	2005	2006	2007
<b>Average Annual Emergency Room Visits (per 100 Members)</b>					
Study Clinic	26.74	23.59	20.31	20.79	23.42
Control Clinic	24.22	17.65	25.00	33.63	30.19
<b>Average Annual Inpatient Admissions (per 100 Members)</b>					
Study Clinic	13.90	12.82	13.02	8.99	17.09
Control Clinic	12.50	8.09	17.65	18.58	12.26

Note: The pilot program began at the study clinic in 2005 and was adopted by the control clinic in 2006. Two new physicians joined the study clinic in 2007.

Source: J. Rice and D. Hanekom, "The Advanced Medical Home: Yesterday, Today and Tomorrow," presentation at the Distinctively Blue and Focus on Providers Conference, Denver, Apr. 2008.

## APPENDIX D. RESOURCES FOR FURTHER INFORMATION

### Contacts

- Howard Anderson Jr., R.Ph., Executive Director, North Dakota State Board of Pharmacy. 701-328-9535, <http://www.nodakpharmacy.com/>
- Timothy Cox, President, Northland Healthcare Alliance. 701-250-0709, <http://www.northlandhealth.com/>
- Shamayne Gerlach, Health Care Analyst; Jon Rice, M.D., Managed Care Director, Blue Cross Blue Shield of North Dakota. 701-282-1578, <https://www.bcbsnd.com/>
- Cathy Houle, M.D., West River Health Services. 701-567-4561, <http://www.wrhs.com/>
- Rhonda Ketterling, M.D., Internal Medicine, MeritCare Health System. 701-234-2000, <http://www.meritcare.com/>
- Charles Peterson, Pharm.D., Dean and Professor, College of Pharmacy, Nursing, and Allied Sciences, North Dakota State University. 701-231-7456, <http://pharmacy.ndsu.nodak.edu/>
- Mary Wakefield, Ph.D., R.N., Associate Dean for Rural Health and Director, Center for Rural Health, University of North Dakota. 701-777-3848, <http://ruralhealth.und.edu/>
- Steve Wonderlich, Ph.D., Director of Clinical Research, Neuropsychiatric Research Institute. 701-293-1335, <http://www.nrifargo.com/index.asp>
- Kimber Wraalstad, FACHE, President/CEO of Presentation Medical Center. 701-477-3161, <http://www.pmc-rolla.com/>

### Resources

- Healthy North Dakota, <http://www.healthynd.org/>
- National Rural Health Association, <http://www.nrharural.org/>
- North Dakota Rural Mental Health Consortium, 701-857-2199
- North Dakota State Rural Hospital Flexibility Program, <http://www.health.state.nd.us/OCA/CahFAQ.htm>
- North Dakota Telepharmacy Project, <http://telepharmacy.ndsu.nodak.edu/>

- Patient Centered Primary Care Collaborative, <http://www.pcpcc.net/>
- Rural Assistance Center, <http://www.raconline.org/>
- Rural Health Care Coalition, a bipartisan Congressional coalition, cochaired by North Dakota Congressman Earl Pomeroy, [http://www.pomeroy.house.gov/index.asp?Type=B\\_BASIC&SEC=%7B998F12BA-9704-463E-9F61-3EB414CBDA2C%7D](http://www.pomeroy.house.gov/index.asp?Type=B_BASIC&SEC=%7B998F12BA-9704-463E-9F61-3EB414CBDA2C%7D)
- Rural Policy Research Institute, <http://www.rupri.org/>
- U.S. Department of Health and Human Services, Health Resources and Services Administration, Office for the Advancement of Telehealth, <http://www.hrsa.gov/telehealth/>
- U.S. Department of Health and Human Services, Health Resources and Services Administration, Office of Rural Health Policy, <http://ruralhealth.hrsa.gov/>
- Western Interstate Commission for Higher Education, Frontier Mental Health Services Resource Network, <http://www.wiche.edu/mentalhealth/Frontier/frontier.asp>

## NOTES

<sup>1</sup> J. E. Wennberg, E. S. Fisher, D. C. Goodman, et al. *Tracking the Care of Patients with Severe Chronic Illness: The Dartmouth Atlas of Health Care 2008* (Lebanon, N.H.: The Dartmouth Institute for Health Policy and Clinical Practice, 2008). Available at [www.dartmouthatlas.org](http://www.dartmouthatlas.org).

<sup>2</sup> Background information was compiled by Mary Wakefield, Ph.D., R.N., associate dean for rural health and director of the Center for Rural Health, School of Medicine and Health Sciences, University of North Dakota, Grand Forks, and a member of The Commonwealth Fund Commission on a High Performance Health System.

<sup>3</sup> According to figures supplied by Blue Cross Blue Shield of North Dakota, these six integrated systems account for 87 percent of covered inpatient spending and 72 percent of professional services in the state. The six systems are: Altru Health System, with a 295-bed facility in Grand Forks and 185-plus physicians in six communities in northeastern North Dakota and Minnesota; Dakota Clinic-Innovis, with an 86-bed hospital in Fargo-Moorhead and 200 physicians in 22 locations in southeastern North Dakota and Minnesota; Medcenter One Health System, with a 215-bed facility in Bismarck and 130 physicians in nine clinics in central and southwestern North Dakota; MeritCare Health System, with two hospitals in Fargo-Moorhead and 400-plus physicians in 40-plus locations in southeastern North Dakota and Minnesota; PrimeCare Health Group, with a 308-bed hospital in Bismarck and 190 physicians in 20 locations in central North Dakota; and Trinity Health, with a 416-bed facility in Minot and 102 physicians in six locations in northwestern North Dakota.

<sup>4</sup> A Critical Access Hospital (CAH) is defined by the federal government as having 25 or fewer beds and located at least 30 miles from another hospital. More than one-quarter of the hospitals in the United States (1,286 of 4,919) are CAHs, almost all of which are in rural areas.

<sup>5</sup> Information on the chronic disease management program was provided by Jon Rice, M.D., director of managed care, and David Hanekom, M.D., medical director for Blue Cross Blue Shield of North Dakota; and Rhonda Ketterling, M.D., medical director at MeritCare Health System.

<sup>6</sup> A. Backer, "The Medical Home: An Idea Whose Time Has Come . . . Again," *Family Practice Management*, Sept. 2007 14(8):38–41; The Patient-Centered Primary Care Collaborative, [www.pcpcc.net](http://www.pcpcc.net).

<sup>7</sup> K. Davis, S. C. Schoenbaum, and A.-M. J. Audet, "[A 2020 Vision of Patient-Centered Primary Care](#)," *Journal of General Internal Medicine*, Oct. 2005 20(10):953–57.

<sup>8</sup> C. Schoen, R. Osborn, M. M. Doty, M. Bishop, J. Peugh, and N. Murukutla, "[Toward Higher-Performance Health Systems: Adults' Health Care Experiences in Seven Countries, 2007](#)," *Health Affairs* Web Exclusive, Oct. 31, 2007 26(6):w717–w734; A. C. Beal, M. M. Doty, S. E. Hernandez, K. K. Shea, and K. Davis, "[Closing the Divide: How Medical Homes Promote Equity in Health Care—Results From The Commonwealth Fund 2006 Health Care Quality Survey](#)" (New York: The Commonwealth Fund, June 2007).

<sup>9</sup> Ibid.

<sup>10</sup> S. M. Gerlach, J. Rice, D. Hanekom et al., *Outcomes of a Provider-Based Diabetes Disease Management Pilot Program* (Fargo, N.D.: Blue Cross Blue Shield of North Dakota, 2007). Patients in the intervention (n=192) and comparison groups (n=136) were similar at baseline in terms of age, gender, prospective risk score, and common comorbidities, except that patients at the comparison site were more likely to have nephropathy. Patients were excluded from the initial analysis if they had less than 31.5 months of continuous enrollment with BCBS-ND between

2003 and 2005 (to ensure adequate historical data), or if they had more than \$50,000 in expenditures in at least one year (high-cost outliers).

<sup>11</sup> The Healthcare Effectiveness Data and Information Set (HEDIS) is a set of performance measures maintained by the National Committee for Quality Assurance ([www.ncqa.org](http://www.ncqa.org)). Clinical measures include preventive services such as immunizations and cancer screenings, as well as chronic disease management for conditions such as heart disease, high blood pressure, diabetes, and asthma.

<sup>12</sup> For example, through the Bridges to Excellence Medical Home recognition program, physicians whose practices meet certain criteria can receive an annual bonus payment of \$125 for each patient covered by a participating employer. See [www.bridgestoexcellence.org](http://www.bridgestoexcellence.org).

<sup>13</sup> Information on rural networks was provided by Tim Cox, president of the Northland Healthcare Alliance; Kimber L. Wraalstad, president and CEO of Presentation Medical Center, Rolla, N.D.; and Cathy Houle, M.D., and Lori Hill, N.P., of West River Health Services, Hettinger, N.D.

<sup>14</sup> Information on telehealth in North Dakota was provided by Steve Wonderlich, Ph.D., director of clinical research at the North Dakota Neuropsychiatric Research Institute; Howard Anderson, E.D., executive director of the North Dakota State Board of Pharmacy; Charles Peterson, dean of the College of Pharmacy, Nursing, and Allied Sciences at North Dakota State University; Joan Galbraith, R.Ph., pharmacy director at Triumph Healthcare, Mandan; and John Skwieria, R.Ph., pharmacy director at Heart of America Medical Center, Rugby, N.D. Additional information was derived from C. D. Peterson and H. C. Anderson, "The North Dakota Telepharmacy Project: Restoring and Retaining Pharmacy Services in Rural Communities," *Journal of Pharmacy Technology*, Jan./Feb. 2004 20(1):28–39; C. D. Peterson, A. Rathke, J. Skwieria, and H. C. Anderson, "Hospital Telepharmacy Network: Delivering Pharmacy Services to Rural Hospitals," *Journal of Pharmacy Technology*, May/June 2007 23(3):158–65. More information is available from the North Dakota Telepharmacy Project Web site at [telepharmacy.ndsu.nodak.edu](http://telepharmacy.ndsu.nodak.edu).

<sup>15</sup> For a review of the evidence on telemedicine, see W. R. Hersh, D. H. Hickam, S. M. Severance et al., "Telemedicine for the Medicare Population: Update," *Evidence Report/Technology Assessment Number 131* (Rockville, Md.: Agency for Healthcare Research and Quality, Publication No. 06-E007, 2006). For a case-study of telemedicine in another rural state, see: D. McCarthy and K. Fox, "Case Study: University of Tennessee Health Science Center's Telehealth Network," *Quality Matters* (New York: The Commonwealth Fund, March 2006). Available at [www.commonwealthfund.org/publications/publications\\_show.htm?doc\\_id=360830#casestudy](http://www.commonwealthfund.org/publications/publications_show.htm?doc_id=360830#casestudy).

<sup>16</sup> M. B. Kimber and G. M. Peterson, "Telepharmacy—Enabling Technology to Provide Quality Pharmacy Services in Rural and Remote Communities," *Journal of Pharmacy Practice and Research*, Mar./Apr. 2006 36(2):128–33.

<sup>17</sup> United States House of Representatives Rural Health Care Coalition, Letter to the President, Jan. 31, 2006; Health Resources and Services Administration, *HRSA Telehealth 2005-06 Grantee Directory* (Washington, D.C.: U.S. Department of Health and Human Services, 2006). Available at [www.hrsa.gov/telehealth/grantee.htm](http://www.hrsa.gov/telehealth/grantee.htm).

<sup>18</sup> "The 340B Drug Pricing Program resulted from enactment of Public Law 102-585, the Veterans Health Care Act of 1992, which is codified as Section 340B of the Public Health Service Act. Section 340B limits the cost of covered outpatient drugs to certain federal grantees, federally-qualified health center look-alikes and qualified disproportionate share hospitals. Significant savings on pharmaceuticals may be seen by those entities that participate in this

program” (*Introduction to the 340B Drug Pricing Program*, Health Resources and Services Administration, Office of Pharmacy Affairs, [www.hrsa.gov/opa/introduction.htm](http://www.hrsa.gov/opa/introduction.htm)).

<sup>19</sup> J. E. Mitchell, R. D. Crosby, S. A. Wonderlich, et al. “A Randomized Trial Comparing the Efficacy of Cognitive Behavioral Therapy for Bulimia Nervosa Delivered via Telemedicine Versus Face to Face,” *Behaviour Research and Therapy*, Mar. 10, 2008 [published online ahead of print].

<sup>20</sup> Information on MeritCare Health System was obtained from a telephone interview with Roger Gilbertson, M.D., president and CEO, and Rhonda Ketterling, M.D., medical director, and from a review of materials on the corporate Web site, [www.meritcare.com](http://www.meritcare.com).

<sup>21</sup> Recognition of MeritCare’s performance has included the Verispan Integrated Health Network Top 100; Solucient 100 Top Hospitals, *Hospitals and Health Networks’ Most Wired Hospitals*, the Gallup Award for Healthcare Excellence, the National Research Corporation’s Consumer Choice Award, and the VHA Leadership Award for Clinical Excellence in Heart Care.

## RELATED PUBLICATIONS

Publications listed below can be found on The Commonwealth Fund's Web site at [www.commonwealthfund.org](http://www.commonwealthfund.org).

---

[\*States in Action: A Bimonthly Look at Innovations in Health Policy\*](#). Newsletter.

[\*Identifying and Evaluating Equity Provisions in State Health Care Reform\*](#) (April 2008). Brian Smedley, Beatrice Alvarez, Rea Pañares, Cheryl Fish-Parcham, and Sara Adland.

[\*State Medicaid Coverage and Access to Care for Low-Income Adults\*](#) (February 2008). Joel S. Weissman, Alan M. Zaslavsky, Robert E. Wolf, and John Z. Ayanian. *Journal of Health Care for the Poor and Underserved*, vol. 19, no. 1.

[\*States' Roles in Shaping High Performance Health Systems\*](#) (April 2008). Catherine Hess, Sonya Schwartz, Jill Rosenthal, Andrew Snyder, and Alan Weil.

[\*State E-Health Activities in 2007: Findings from a State Survey\*](#) (February 2008). Vernon K. Smith, Kathleen Gifford, Sandy Kramer, Jennifer Dalton, Patricia MacTaggart, and Michelle Lim Warner.

[\*What Public Employee Health Plans Can Do to Improve Health Care Quality: Examples from the States\*](#) (January 2008). Aaron McKethan, Terry Savelle, and Wesley Joines.

[\*Leading the Way? Maine's Initial Experience in Expanding Coverage Through Dirigo Health Reforms\*](#) (December 2007). Debra Lipson, Jim Verdier, and Lynn Quincy.

[\*State Health System Performance and State Health Reform\*](#) (September 18, 2007). Karen Davis and Cathy Schoen (commentary). *Health Affairs* Web Exclusive.

[\*Value-Driven Health Care Purchasing: Four States that Are Ahead of the Curve\*](#) (August 2007). Sharon Silow-Carroll and Tanya Alteras.

[\*Lessons from Local Access Initiatives: Contributions and Challenges\*](#) (August 2007). Karen Minyard, Deborah Chollet, Laurie Felland et al.

[\*Denver Health: A High-Performance Public Health Care System\*](#) (July 2007). Rachel Nuzum, Douglas McCarthy, Anne Gauthier, and Christina Beck.

[\*Aiming Higher: Results from a State Scorecard on Health System Performance\*](#) (June 2007). Joel C. Cantor, Cathy Schoen, Dina Belloff, Sabrina K. H. How, and Douglas McCarthy.