

DIABETES IN RURAL AMERICA

by Betty Dabney and Annie Gosschalk

SCOPE OF PROBLEM

- Diabetes mellitus was the sixth ranking leading cause of death in 1999.⁷⁸
- Diabetes is an “ambulatory-care-sensitive” condition.⁷⁷

GOALS AND OBJECTIVES

America is in the midst of an epidemic of diabetes. Approximately 17 million Americans, 6 percent of the population, are diabetic, with another estimated

Six percent of the population are diabetic, with another estimated 16 million having “pre-diabetes.”¹⁻³

16 million having “pre-diabetes.”¹⁻³ Type 2 diabetes (formerly termed adult onset or non-insulin dependent) accounts for 90 to 95 percent of all cases and is primarily responsible for the increase in prevalence

over the past 10 years. Because the U.S. population is steadily aging and is also disproportionately increasing in high-risk groups, the prevalence of diabetes is expected to double by 2050.⁴

The nation’s vested interest in addressing this public health crisis is articulated as follows in the Healthy People 2010 goal relating to diabetes: “Through prevention programs, reduce the disease and economic burden of diabetes, and improve the quality of life for all persons who have or are at risk for diabetes.”⁵ Those at risk include rural Americans by virtue of their unique demographic profile. According to the Rural Healthy People 2010 survey, diabetes was identified as the third highest-ranking rural health concern after access and heart disease and stroke.⁶ Diabetes was consistently among the top five priorities in all four geographic regions. The South, more than the other three regions, rated diabetes as a priority—the second-ranked rural

priority in the South. The difference across the regions fell just short of statistical significance.⁷

This diabetes section emphasizes the following HP2010 objectives:⁵

- 5-1. Increase the proportion of persons with diabetes who receive formal diabetes education.
- 5-2. Prevent new cases of diabetes.
- 5-3. Reduce the overall rate of diabetes that is clinically diagnosed.
- 5-4. Increase the proportion of adults with diabetes whose condition has been diagnosed.
- 5-5. Reduce the diabetes death rate.
- 5-6. Reduce diabetes-related deaths among persons with diabetes.
- 5-7. Reduce deaths from cardiovascular disease in persons with diabetes.

PREVALENCE

Diabetes impacts every area of society. It occurs across all racial/ethnic and socioeconomic groups, but it is two to five times more common in African

Diabetes was identified as the third highest-ranking rural health concern after access and oral health.⁶

Americans, Hispanics, Native Americans, Pacific Islanders, and Asians.⁸⁻¹² The prevalence of diabetes varies by urbanicity and degree of rurality. In 1995, the self-reported prevalence of diabetes in non-metropolitan statistical areas (MSAs) of the U.S. was 17

percent higher than in central cities and 11.7 percent higher than all MSAs (3.6 percent, 3.19 percent, and 3.24 percent, respectively).¹³ The prevalence of

diabetes may vary significantly across different rural regions of the country. It is generally more common in the Southeast and Southwest.^{12, 14-16} Migrant farmworkers, estimated at 750,000 to 5 million, are also at risk. According to two studies of this group, diabetes rose in rank from the sixth most frequent diagnosis or reason for physician visits in 1980 to first place in 1986-1987.^{17, 18}

The issue of rural-urban disparities for diabetes is quite complex. Typically, diabetes is a more serious problem in rural areas as they adopt a more “developed” or urban lifestyle.¹⁹⁻²¹ As the differences between rural and urban lifestyles disappear, higher rural prevalences may reflect differences in socioeconomic, racial/ethnic, or age status, more so than rurality *per se*. However, rural-urban disparities in diabetes are more pronounced for African Americans.²²

The prevalence of diabetes may vary significantly across different rural regions of the country.

IMPACT

Diabetes was the sixth leading cause of death in the U.S. for the year 2000, accounting for a preliminary 68,662 deaths in 2000.²³ Death rates for diabetics are two times higher than for non-diabetics and higher for both genders and for all ages and races.²⁴ Diabetics are two to four times more likely to die from heart disease; those with pre-diabetes are twice as likely to die from heart disease.^{3, 25} Diabetes is the leading cause of deaths from kidney disease.²⁶

Mortality from diabetes is not geographically uniform and follows a similar pattern to prevalence rates, with age-adjusted death rates generally highest in the Southeast and Southwest.²⁷ As with prevalence, racial/ethnic differences account for much larger differences in mortality from diabetes than rural-urban differences.^{28, 29}

Diabetes is the sixth leading cause of hospitalization in the U.S. for men at least 45 years old and the

seventh overall cause for women of comparable ages.³⁰ In 1996, diabetes accounted for 3.8 million hospital discharges, 64 million physician office visits, 1.2 million emergency room visits, 14 million work-loss days, and 88 million disability days.³¹

Diabetes also has major consequences for virtually every system in the body that may become chronic, debilitating, and costly to the health care system and to quality of life. Besides cardiovascular disease, diabetes is a major risk factor for end-stage renal disease, peripheral neuropathy, nontraumatic limb amputations, blindness, lipid abnormalities, impotence, periodontal disease, infections, and depression.^{25, 26, 32-35} The duration of the disease is a major factor for development of complications.³⁶⁻³⁸ This is a major concern for the increasingly younger age of onset of type 2 diabetes.

Gestational diabetes is associated with pregnancy complications, increased neonatal morbidity and mortality, birth defects, and increased risk for developing diabetes in both mother and child.^{1, 25, 39, 40}

Type 2 diabetes is closely associated with obesity, and the sedentary, high-fat American lifestyle is thought to be largely responsible for the epidemic sweeping the world.⁴¹ Obesity and lack of leisure activity are also more common in rural than in urban areas.³⁰

Other factors contributing to development of type 2 diabetes are genetics,⁴²⁻⁴⁵ lower socioeconomic status,^{9, 11, 12, 46-49} belonging to a minority group or the female gender, gestational diabetes, lack of early detection,⁵⁰⁻⁵² acanthosis nigricans,⁵³ and possibly exposure to certain environmental chemicals.⁵⁴⁻⁵⁶

BARRIERS

The American health care system has not been very effective in preventing, diagnosing, or managing diabetes, especially in rural and low-income patients.^{31, 57-61} Rural residents are less likely to visit doctors and to receive specialized care or adequate posthospital home health care.^{57, 62-66} Rural residence is also a significant risk factor for never receiving an ophthalmic examination,⁶⁵ which can detect early

signs of diabetic retinopathy. Other challenges to slowing the epidemic, irrespective of location, include personal lifestyle choices relating to diet and exercise (see the Nutrition and Overweight section).⁴⁹

PROPOSED SOLUTIONS

While improving all detection and treatment methods in rural areas is desirable, the Diabetes Prevention Program Research Group recommends prevention as the preferable approach.⁶⁷ The onset and progression of type 2 diabetes and its complications can be delayed or prevented by significant changes in lifestyle that are feasible to implement in rural communities, including modest exercise and weight loss.⁶⁷⁻⁶⁹

Where prevention has not been possible, the risk of developing complications can be minimized by effective metabolic control, regular examinations, and patient education.^{25, 26, 70-72} Based on strict review of published studies, the HHS Task Force on Community Preventive Services recommends four types of interventions for reducing morbidity and mortality from diabetes. These are case and disease management by health care providers, community-based self-management education programs for adults with type 2 diabetes, and home-based programs for children and adolescents with type 1 diabetes.⁷³

Most published community studies address only one component of diabetes education, prevention, detection, and care. While many innovative programs record short-term success, few demonstrate long-term improvement in clinical outcomes.⁷⁴ New cost-effective approaches need to be developed around a chronic disease model,^{75, 76} using the existing health care and public health infrastructure, and based upon preventive and routine patient care clustered at the community level by allied health professionals.

SUMMARY AND CONCLUSIONS

The prevalence of diabetes is somewhat higher in rural than in urban areas, but racial/ethnic,

socioeconomic, and lifestyle factors appear to be stronger risk factors for diabetes than rural residence. Compounding the problem in rural areas are limited resources to effectively diagnose and manage diabetes, reinforcing the need for an emphasis on prevention efforts. All types of prevention have a place in management of diabetes from a medical and public health perspective, but primary prevention is ultimately the most cost effective and the most desirable from an ethical standpoint. Unchecked, the diabetes epidemic will produce an intolerable burden on the health system and quality of life over the next generation.

MODELS FOR PRACTICE

The following models for practice are examples of programs utilized to address this rural health issue.

REFERENCES

1. American Diabetes Association (ADA). Diabetes Facts and Figures, 2000. <<http://www.diabetes.org/ada/facts.asp>>February 28, 2001.
2. ADA and National Institute of Diabetes, Digestive and Kidney Diseases (NIDDK). The prevention or delay of type 2 diabetes. *Diabetes Care* 25:742-749, 2002.
3. U.S. Department of Health and Human Services (DHHS). HHS, ADA warn Americans of 'pre-diabetes,' encourage people to take healthy steps to reduce risks. Updated statistics show 17 million with diabetes, 16 million more with pre-diabetes. Washington, DC: HHS Press Release, March 27, 2002.
4. Boyle, J.P.; Honeycutt, A.A.; Narayan, K.M.; et al. Projection of diabetes burden through 2050. Impact of changing demography and disease prevalence in the U.S. *Diabetes Care* 24(11):1936-1940, 2001.
5. U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2nd vols. Washington, DC: U.S. Government Printing Office, November 2000.

-
6. Gamm, L.; Hutchison, L.; Bellamy, G.; et al. Rural healthy people 2010: Identifying rural health priorities and models for practice. *Journal of Rural Health* 18(1):9-14, 2002.
7. Gamm, L., and Hutchison, L. Rural health priorities in America—Where you stand depends on where you sit. *Journal of Rural Health* (Forthcoming, Summer 2003).
8. King, H.; Aubert, R.E.; and Herman, W.H. Global burden of diabetes, 1995-2025. *Diabetes Care* 21(9):1414-1431, 1998.
9. Harris, M.I. Diabetes in America: Epidemiology and scope of the problem. *Diabetes Care* 21 (Suppl 3):C11-C14, 1998.
10. Knowler, W.C.; Pettit, D.J., Saad, M.F.; et al. Diabetes mellitus in the Pima Indians: Incidence, risk factors, and pathogenesis. *Diabetes and Metabolism Reviews* 6(1):1-27, 1990.
11. Carter, J.S.; Pugh, J.A.; and Monterrosa, A. Non-insulin-dependent diabetes mellitus in minorities in the United States. *Annals of Internal Medicine* 125:221-232, 1996.
12. Sundquist, J.; Winkleby, M.A.; and Pudaric, S. Cardiovascular disease risk factors among older black, Mexican-American, and white women and men: An analysis of NHANES III, 1988-1994. *Journal of the American Geriatrics Society* 49(2):109-116, 2001.
13. National Center for Health Statistics. *Current Estimates from the National Health Interview Survey*, Series 10 No. 199. DHHS Publication No. (PHS) 98-1527. Department of Health and Human Services, Centers for Disease Control and Prevention, 1998.
14. Willems J.P.; Saunders, J.T.; Hunt, D.E.; et al. Prevalence of coronary heart disease risk factors among rural blacks: A community-based study. *Southern Medical Journal* 90(8):814-820, 1997.
15. Michalek, A.M.; Mahoney, M.C.; and Calebaugh, D. Hypothyroidism and diabetes mellitus in an American Indian population. *Journal of Family Practice* 49(7):638-640, 2000.
16. Gilliland, F.D.; Mahler, R.; Hunt, W.C.; et al. Preventive health care among rural American Indians in New Mexico. *Preventive Medicine* 28(2):194-202, 1999.
17. Hicks, W. *Migrant health: An analysis*. Washington, DC: National Association of Community Health Centers, Inc., 1982.
18. Dever, G.E.A. Migrant health status: Profile of a population with complex health problems. Austin, TX: National Migrant Resource Program, Inc., Migrant Clinicians Network monograph series, 1991.
19. Lerman, I.G.; Villa, A.R.; Llaca Martinez, C.; et al. The prevalence of diabetes and associated coronary risk factors in urban and rural older Mexican populations. *Journal of the American Geriatrics Society* 46(11):1387-1395, 1998.
20. Cruz-Vidal, M.; Costas, R., Jr.; García-Palmieri, M.R.; et al. Factors related to diabetes mellitus in Puerto Rican men. *Diabetes* 28(4):300-307, 1979.
21. Haddock, L., and Torres de Conty, I. Prevalence rates for diabetes mellitus in Puerto Rico. *Diabetes Care* 14 (Suppl 3):676-684, 1991.
22. Slifkin, R.T.; Goldsmith, L.J.; and Ricketts, T.J. Race and place: Urban-rural differences in health for racial and ethnic minorities. Working Paper No. 66. Chapel Hill, NC: Cecil G. Sheps Center for Health Services Research, North Carolina Rural Health Research Program, 2000.
23. Minino, A.M., and Smith, B.L. Deaths: Preliminary data for 2000. *National Vital Statistics Reports* 49(12), 2001.
24. Gu, K.; Cowie, C.C.; and Harris, M.I. Mortality in adults with and without diabetes in a national cohort of the U.S. population, 1971-1993. *Diabetes Care* 21:1138-1145, 1998.

-
25. Centers for Disease Control and Prevention (CDC). National Diabetes Fact Sheet: National estimates and general information on diabetes in the United States. Atlanta, GA: HHS, 1998.
26. CDC. Diabetes: A serious public health problem at a glance 2001. <<http://www.cdc.gov/diabetes/pubs/glance.htm>>March 2002.
27. Pickle, L.W.; Mungiole, M.; Jones, G.K.; et al. *Atlas of United States mortality*. Hyattsville, MD: National Center for Health Statistics, 1996.
28. Ricketts, T.C. (ed.). *Rural Health in the United States*. New York: Oxford University Press, 1999, 21.
29. Schorr, V.; Crabtree, D.A.; Wagner, D.; et al. Differences in rural and urban mortality: Implications for health education and promotion. *Journal of Rural Health* 5(1):67-80, 1999.
30. Eberhardt, M.; Ingram, D.; Makuc, D.; et al. Urban and Rural Health Chartbook. *Health, United States, 2001*. Hyattsville, MD: National Center for Health Statistics, 2001.
31. CDC. Statistics - Diabetes surveillance, 1999, 2000. <www.cdc.gov/diabetes/statistics/surv199/> June 2002.
32. Smith S.A., and Poland, G.A. Use of influenza and pneumococcal vaccines in people with diabetes. *Diabetes Care* 23(1):95-108, 2000.
33. Egede, L.E.; Zheng, D.; and Simpson, K. Comorbid depression is associated with increased health care use and expenditures in individuals with diabetes. *Diabetes Care* 25(3):464-470, 2002.
34. Griffiths, R.D., and Moses, R.G. Diabetes in the workplace. Employment experiences of young people with diabetes mellitus. *Medical Journal of Australia* 158(3):169-171, 1993.
35. Joachim, G., and Acorn, S. Stigma of visible and invisible chronic conditions. *Journal of Advanced Nursing* 32(1):243-248, 2000.
36. Florkowski, C.M.; Scott, R.S.; Coope, P.A.; et al. Age at diagnosis, glycaemic control and the development of retinopathy in a population-based cohort of type 1 diabetic subjects in Canterbury, New Zealand. *Diabetes Research and Clinical Practice* 52(2):125-131, 2001.
37. Motala, A.A.; Pirie, F.J.; Gouws, E.; et al. Microvascular complications in South African patients with long-duration diabetes mellitus. *South African Medical Journal* 91(11):987-992, 2001.
38. Porta, M.; Sjoelie, A-K.; Chaturvedi, N.; et al. Risk factors for progression to proliferative diabetic retinopathy in the EURODIAB prospective complications study. *Diabetologia* 44(12):2203-2209, 2001.
39. Becerra, J.; Khoury, M.; Cordero, J.; et al. Diabetes mellitus during pregnancy and the risks for specific birth defects: A population-based case-control study. *Pediatrics* 85(1):1-9, 1990.
40. Plagemann, A.; Harder, T.; Kohlhoff, R.; et al. Glucose tolerance and insulin secretion in children of mothers with pregestational IDDM or gestational diabetes. *Diabetologia* 40(9):1094-1100, 1997.
41. Mokdad, A.H.; Bowman, B.A.; Ford, E.S.; et al. The continuing epidemics of obesity and diabetes in the United States. *Journal of the American Medical Association* 286(10):1195-1200, 2001.
42. Medici, F.; Hawa, M.; Ianari, A. et al. Concordance rate for type II diabetes mellitus in monozygotic twins: Actuarial analysis. *Diabetologia* 42(2):146-150, 1999.
43. Poulsen, P.; Kyvik, K.O.; Vaag, A.; et al. Heritability of type II (non-insulin-dependent) diabetes mellitus and abnormal glucose tolerance—A population-based twin study. *Diabetologia* 42(2):139-145, 1999.

44. Herman, W.H.; Smith, P.J.; Thompson, T.J.; et al. A new and simple questionnaire to identify people at increased risk for undiagnosed diabetes. *Diabetes Care* 18(3):382-387, 1995.
45. Griffin, S.J.; Little, P.S.; Hales, C.N.; et al. Diabetes risk score: Towards earlier detection of type 2 diabetes in general practice. *Diabetes/Metabolism Research and Reviews* 16:164-171, 2000.
46. Adler, N.E., and Ostrove, J.M. Socioeconomic status and health: What we know and what we don't. *Annals of the New York Academy of Science* 896:3-15, 1999.
47. Krieger, N.; Williams, D.R.; and Moss, N.E. Measuring social class in U.S. public health research: Concepts, methodologies, and guidelines. *Annual Review of Public Health* 18:341-378, 1997.
48. Beckles, G.L.A., and Thompson-Reid, P.E. Socioeconomic status of women with diabetes—United States, 2000. *Morbidity and Mortality Weekly Report* 51:147-148, 159, 2002.
49. CDC. Behavioral Risk Factor Surveillance System, 2002. <<http://www.cdc.gov/brfss/>> June 2002.
50. Harris, M.I.; Klein, R.; Welborn, T.A.; et al. Onset of NIDDM occurs at least 4-7 years before clinical diagnosis. *Diabetes Care* 15(7):815-819, 1992.
51. Harris, M.I. Undiagnosed NIDDM: Clinical and public health issues. *Diabetes Care* 16(4):642-652, 1993.
52. Harris, M.I., and Eastman, R.C. Early detection of undiagnosed diabetes mellitus: A U.S. perspective. *Diabetes and Metabolism Research Reviews* 26:230-236, 2001.
53. Richards, G.E.; Cavallo A.; Meyer, W.J. III; et al. Obesity, acanthosis nigricans, insulin resistance, and hyperandrogenemia: Pediatric perspective and natural history. *Journal of Pediatrics* 107(6):893-897, 1985.
54. Longenecker, M.P., and Daniels, J.L. Environmental contaminants as etiologic factors for diabetes. *Environmental Health Perspectives* 109(Suppl 6):871-876, 2001.
55. Burg, J.R., and Gist, G.L. The national exposure registry: Analyses of health outcomes from the benzene subregistry. *Toxicology and Industrial Health* 14(3):367-387, 1998.
56. Institute of Medicine. Committee to review the health effects in Vietnam veterans of exposure to herbicides. *Veterans and agent orange: Update 2000*. Washington, DC: National Academy Press, 2001.
57. Weiner, J.P.; Parente, S.T.; Garnick, D.W.; et al. Variation in office-based quality. A claims-based profile of care provided to Medicare patients with diabetes. *Journal of the American Medical Association* 273(19):1503-1508, 1995.
58. Saaddine, J.B.; Engelgau, M.M.; Beckles, G.L.; et al. A diabetes report card for the United States: Quality of care in the 1990s. *Annals of Internal Medicine* 136(8):565-574, 2002.
59. Zoorob, R.J., and Mainous, A.G. III. Practice patterns of rural family physicians based on the American Diabetes Association standards of care. *Journal of Community Health* 21(3):175-182, 1996.
60. Schoepflin, H.M., and Thrailkill, K.M. Pediatric diabetes management in Appalachian Kentucky: Adherence of primary care physicians to ADA guidelines. *Journal of the Kentucky Medical Association* 97(10):473-481, 1999.
61. Bell, R.A.; Camacho, F.; Goonan, K.; et al. Quality of diabetes care among low-income patients in North Carolina. *American Journal of Preventive Medicine* 21(2):124-131, 2001.

-
62. Rosenblatt, R.A.; Baldwin, L-M.; Chan, L.; et al. Improving the quality of outpatient care for older patients with diabetes: Lessons from a comparison of rural and urban communities. *Journal of Family Practice* 50(8):676-680, 2001.
63. Saag, K.G.; Doebbeling, B.N.; Rohrer, J.E.; et al. Variation in tertiary prevention and health service utilization among the elderly. The role of urban-rural residence and supplemental insurance. *Medical Care* 36(7):965-976, 1998.
64. Dansky, K.H., and Dirani, R. The use of health care services by people with diabetes in rural areas. *Journal of Rural Health* 14(2):129-137, 1998.
65. Witkin S.R., and Klein R. Ophthalmic care for persons with diabetes. *Journal of the American Medical Association* 251(19):2534-2537, 1984.
66. Cheh, V., and Phillips, B. Adequate access to posthospital home health services: Differences between urban and rural areas. *Journal of Rural Health* 9(4):262-269, 1993.
67. Diabetes Prevention Program Research Group (DPPRG). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine* 346(6):393-403, 2002.
68. Uusitupa, M.; Louheranta, A.; Lindström, J.; et al. The Finnish Diabetes Prevention Study. *British Journal of Nutrition* 83(Suppl 1):S137-S142, 2000.
69. Tuomilehto, J.; Lindström, J.; Eriksson, J.G.; et al. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *New England Journal of Medicine* 344:1343-1350, 2001.
70. The Diabetes Control and Complications Trial Research Group (DCCT). The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *New England Journal of Medicine* 329(14):977-986, 1993.
71. UK Prospective Diabetes Study Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes. (UKPDS 34). *Lancet* 352:854-865, 1998.
72. UK Prospective Diabetes Study Group. Intensive blood-glucose control with sulfonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 352:837-853, 1998.
73. Evans, G.W., and Kantrowitz, E. Strategies for reducing morbidity and mortality from diabetes through health-care system interventions and diabetes self-management education in community settings. A report on recommendations of the Task Force on Community Preventive Services. *Morbidity and Mortality Weekly Report Recommendations and Reports* 50:1-15, 2001.
74. Brown, S.A. Studies of educational interventions and outcomes in diabetic adults: A meta-analysis revisited. *Patient Education and Counseling* 16(3):189-215, 1990.
75. Glasgow, R.E.; Hiss, R.G.; Anderson, R.M.; et al. Report of the health care delivery work group. Behavioral research related to the establishment of a chronic disease model for diabetes care. *Diabetes Care* 24(1):124-130, 2001.
76. Institute of Medicine. Committee on Quality of Health Care in America. *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academy Press, 2001.
77. Institute of Medicine. Appendix D: Ambulatory-care-sensitive conditions and referral-sensitive surgeries. *Access to Health Care in America*. Washington, DC: National Academy Press, 1993, 219-222.
78. CDC. WISQARS leading causes of death reports, 1999-2000. 2002. <<http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html>>2002.

Chapter Suggested Citation

Dabney, B., and Gosschalk, A. (2003). Diabetes in Rural America. Rural Healthy People 2010: A companion document to Healthy People 2010. Volume 1. College Station, TX: The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center.

MODELS FOR PRACTICE FOCUS AREA: DIABETES

Program Name: Diabetes Collaborative

Location: Laurel Health System, Wellsboro, Pennsylvania (Tioga County)

Problem Addressed: Diabetes and Access to Primary Care

Healthy People 2010 Objective: 1-9

Web Address: <http://www.laurelhs.org>; <http://www.tiogapartners.org>

SNAPSHOT

The Laurel Health System (LHS), with its six Federally Qualified Health Centers (FQHCs), is a participant in a national diabetes collaborative. The collaborative supports a systematic approach to diabetes care and management and development of an electronic registry of patient data in the primary care environment.

This model reflects improved access to quality primary care addressing medical conditions (such as diabetes, hypertension, and asthma) for which improved primary care management results in reduced hospitalization. It includes a diabetes electronic management system that:

- monitors patient care and ensures continuous, consistent care for the diabetic patient;
- supports effective self-management through exams, referrals for eye and foot care, nutritional counseling, and documentation of self-management goal setting; and
- estimates the financial impacts of this intervention with another tool, known as IMPACT.

The model enhances clinical care enhancement and promotes the effective use of a countywide health partnership to extend effective prevention and primary care interventions for diabetes to other providers and to people in the community.

THE MODEL

Blueprint: Beginning in January 2000, LHS's health centers were accepted for participation in the National Diabetes Collaborative. By participating, the health centers were able to establish a systematic approach to diabetes treatment and electronic management of patient data. Beginning with the patients in one of the six FQHCs, the program was implemented at all six centers over the next nine months. A key element in the program, the

The collaborative supports a systematic approach to diabetes care and management.

Diabetes Electronic Management System (DEMS), is a registry for all Laurel Health Center patients with diabetes. When a patient with diabetes schedules an appointment, a DEMS report is printed, attached to the patient's chart, and employed by the nurse or clinician with the patient in reviewing the patient's condition and engaging the patient in continuing self-management of diabetes. The registry supports ongoing analysis of the impact of this program upon patients' health status and cost of treatment. This analysis is supported by IMPACT software specially designed for organizations participating in the diabetes collaborative program. The diabetes collaborative model, fully implemented at LHS's FQHCs, is currently being extended, under the sponsorship of the countywide health partnership and regional Area Health Education Center (AHEC), to other primary care providers in this rural county.

Making a Difference: Beginning in January 2000, the use of DEMS and education for clinicians and office staff on diabetes management produced immediate small improvements in diabetes outcomes. These improvements increased and affected more patients as the program was extended to all of the six health centers over the next nine months. The program collects the following data on patients with diabetes: percent with Hemoglobin A_{1c} (HbA_{1c}) measured yearly; percent maintaining HbA_{1c} <8 percent, percent with annual foot exam, percent with influenza and pneumovax immunizations, percent controlling blood pressure at <135/85, and percent with an annual lipid profile performed. As of April 2002, there is documentation of an average HbA_{1c} of 7.1 in a population of 622 diabetic patients, with an average total cholesterol of 201 and an average LDL of 110. These factors have been demonstrated to decrease diabetic morbidity and mortality from secondary end organ failure (such as renal failure or heart failure secondary to diabetes). Cost savings for averted stroke, myocardial infarction, or coronary artery bypass graft are estimated at between \$10,000 and \$20,000 for each occurrence. Conversely, primary care revenue increased as a result of the more aggressive disease management in the first year of the program. The population of focus, 116 patients in the pre-collaborative year, yielded 115 diabetic patient visits with a revenue of \$5,410 compared to 550 visits and \$27,827 in the first year of the collaborative.

Beginnings: The model grew out of a community needs assessment sponsored by the countywide Tioga County Partnership for Community Health (TCPCH) in 1994. The assessment found the self-reported diabetes rate in Tioga County to be one-quarter higher than the national average (8 percent versus 6 percent, nationally). The 1998 county mortality rate for diabetes at 20.2/100,000 was 45 percent higher than the state average. Beginning in 1995, patient education and community health education components for diabetes were implemented by LHS, a local integrated rural health system within the county. LHS's Laurel Health Center Diabetes Education and Nutrition Counseling program was launched shortly after the

local study. In 1996, a few providers from among the six FQHCs began ongoing evaluation of HbA_{1c} levels and provision of specified care.

Challenges and Solutions: The diabetes collaborative is associated with a northeast regional cluster of such initiatives supported by U.S. Health Resources and Services Administration's Bureau of Primary Health Care. The program has become institutionalized in diabetes treatment within the LHS FQHCs. At the same time, additional grant funding has been attained from the Pennsylvania Department of Health by the county partnership (TCPCH) to extend the LHS diabetes collaborative model to other primary care providers inside the county but outside the LHS umbrella. The success of the diabetes collaborative has led LHS to seek similar benefits for other conditions. It recently became a participant in the national cardiovascular collaborative.

LHS and TCPCH communicate to the community and the larger world through its regular newsletters and websites. Staff of both organizations actively participate in state and national conferences in telling their story.

Many recent events reflect the successes that these organizations have had in their disease management efforts. In 1999, LHS's Diabetes Education and Nutrition Counseling program received the American Diabetes Association's Education Recognition Certificate for its diabetes self-management education program. This recognition, successful work within the diabetes collaborative, and state support for expansion of the diabetes management work to other providers are among a string of successes for LHS and the larger TCPCH that have contributed to an award of a Community Access Program grant in 2001 to support development of a Community Health Plan, a jointly sponsored LHS-TCPCH managed care organization.

PROGRAM CONTACT INFORMATION

Karen Usavage, RN, CRNP, Health Center Administrator
Laurel Health System, Diabetes Collaborative
15 Meade Street
Wellsboro, PA, 16901
Phone: (570) 724-5200
Fax: (570) 724-4885



MODELS FOR PRACTICE

FOCUS AREA: DIABETES

Program Name: Delta Community Partners in Care

Location: Clarksdale, Mississippi

Problem Addressed: Diabetes/Hypertension

Healthy People 2010 Objective: 5, 12

Web Address: None

SNAPSHOT

DCPIC attempts to reduce the barriers affecting its target population by providing outreach case management services.

Delta Community Partners in Care (DCPIC) is a coalition of 19 partners serving a 10-county rural area in the Mississippi Delta region of northwest Mississippi. The region's economy is based primarily on agribusinesses associated with raising soybeans, cotton, and catfish. This is a historically underserved area for health care, where 29.5 percent of the population lives below poverty. Its target population is the uninsured or underinsured between the ages of 21 and 64 who have a diagnosis of diabetes, hypertension, or both. The demographics are 92.1 percent African American, 7.6 percent white, and 0.3 percent other.

DCPIC attempts to reduce the barriers affecting its target population by providing outreach case management services. These services include case management, financial assistance, transportation to provider clinics for assistance, referral and follow-up of social issues presenting barriers to a patient's response to care, individualized health education/self-care planning, and organized support services, such as support groups, walking groups, etc. Community health education programs are also provided for the community residents throughout the target area.

THE MODEL

Blueprint: DCPIC is a 501(c)(3) non-profit organization with a Board of Directors and elected officers. The original stakeholders are still involved in the program. The operation has grown to include 19 collaborative partners: four hospitals, four Federally Qualified Community Health Centers (FQHC), three rural health centers, two state department of health districts, one mental health center, three state agencies, and two federally funded agencies. Currently, funding is from the Health Resources and Services Administration (HRSA), and DCPIC has an advisory council composed of representatives from the partnership members. The lead agency for the HRSA grant is one of the original members and an FQHC. Staff includes five persons at the central office and a caseworker at each of the 19 clinical sites.

DCPIC uses a community-based case management model to improve the health status and risk factors in its target population. Caseworkers are trained social workers, nurses, and lay health workers who work directly with patients who have a diagnosis of diabetes, hypertension, or both. The caseworkers use a holistic approach, and the environment is such that the caseworkers and patients are able to learn from each other. As required by HRSA funding, they use several prevention indicators: reminders for doctors to perform foot checks, Hemoglobin A_{1c} (HbA_{1c}) tests every six months, and annual eye exams.

Making a Difference: From its modest beginnings, DCPIC has grown to provide comprehensive community-based education, prevention, and treatment services for 1,570 patients. In this growth, they developed extensive tools and materials for their program. A baseline survey provides a patient profile at enrollment; all tracking and data collection forms are standardized, and training materials have been developed for staff. Health status surveys, knowledge assessments, health profiles, and patient satisfaction surveys are used to gather information on the program's success. Indicators employed not only measure the effectiveness of the program but are also used to identify key policy issues for change. These indicators are decreases in multiple clinic utilization, emergency services utilization for primary care, the number of nights hospitalized, and the amount of sick and bed days; an increased knowledge of high blood pressure and diabetes, an increased utilization of primary care, health status changes, better blood pressure and sugar control, patient satisfaction, and improved overall health. The University of Mississippi Research Institute of Pharmaceutical Sciences provides ongoing statistical analysis and outcomes assessments.

In their Final Outcome Evaluation in 1999, prepared by the University of Mississippi Preventive Medicine Department, many successful outcomes were reported. Of the clients currently enrolled at the time the data were collected, emergency room utilization in the past year had decreased significantly from 1.01 visits to 0.65 from time of entry into the program to the time of the study. The number of outpatient visits in the last year decreased from 0.68 to 0.31; and of the patients hospitalized in the past year, the number of nights stayed decreased as well from 6.37 nights to 3.40. The number of sick days in the past year also declined, dropping from 26.74 days to 15.77. Not only did the physical health of the enrollees seem to improve but their knowledge of their conditions did as well. Knowledge of both hypertension and diabetes increased significantly, corresponding with an increase of the patients' ability to control their own blood pressure and blood sugar. A new study is currently being planned comparing patients who have been in the program since its inception to newer patients, for the 21 to 64-year-old age group.

Beginnings: DCPIC began as a vision of the Northwest Mississippi Regional Medical Center (NWMRMC) in Clarksville, from concerns in the local medical community. Greater than expected numbers of patients were

presenting in the emergency rooms or were found to have previously undiagnosed diabetes, were suffering strokes, or were requiring amputations. Young patients were also developing hypertension and strokes. The uninsured and underinsured chronically ill population faced many barriers in accessing health care services that resulted in poor health outcomes. Community meetings were held to identify these barriers as well as other existing problems within the health care systems.

It was originally a grassroots operation involving four hospitals, one community health center, three state agencies and three rural health centers, to serve a five-county area. DCPIC received a planning grant from the W.K. Kellogg Foundation for the period from May 1, 1994, through April 30, 1995. The planning committee consisted of representatives from NWMRMC, health care providers within a 15 to 30-mile radius of NWMRMC, and the Mississippi Division of Medicaid. During the planning stage, meetings were held with providers in each county. The planning was implemented in 1996, and funding ended in 1999. DCPIC had a HRSA Community Access Program (CAP) grant for evaluating sustainability.

Challenges and Solutions: Initial funding ended in 1999, creating a challenge to program continuation. DCPIC is brought to the attention of potential funders through presentations at state and national conferences as well as in published articles. Funding is continuously being sought; however, the program has maintained its focus.

PROGRAM CONTACT INFORMATION

Lela Keys
Delta Community Partners in Care
P.O. Box 1218
Clarksdale, MS 38614
Phone: (662) 624-3484
Fax: (662) 624-3203
E-mail: lbkeys2@bellsouth.net



MODELS FOR PRACTICE

FOCUS AREA: DIABETES

Program Name: Holy Cross Hospital Diabetes Self-Management Program

Location: Taos, New Mexico

Problem Addressed: Diabetes

Healthy People 2010 Objective: 5

Web Address: <http://www.taoshospital.org>

SNAPSHOT

The Holy Cross Hospital (HCH) Diabetes Self-Management Program (DSMP) is a participant in the NMMRA (New Mexico Medical Review Association) Diabetes Collaborative. HCH DSMP offers four curriculum visits covering 15 content areas from the National Standards and an integration of community specialists, at no cost to the patients, to provide a weekly exercise class, bimonthly coping skills education, a monthly diabetes support group, and annual foot exams. HCH DSMP also has an electronic patient registry using the DEMS-Lite software. Currently, the Diabetes Self-Management Program at Holy Cross Hospital can offer 100 percent access to quality diabetes education and support regardless of an individual's ability to pay.

THE MODEL

Blueprint: Susan Kargula, RN, MSN, CDE (Certified Diabetes Educator) began the Diabetes Self-Management Program in 1992 at Holy Cross Hospital as one of the hospital's community wellness programs. HCH DSMP serves the rural area in northern New Mexico, which encompasses Taos County (population size 26,556, population density =12) and several surrounding smaller rural areas such as Penasco, Questa, and Angel Fire. It is estimated that 2,586 individuals within the community have diabetes, and the ethnicity of the target population is predominately Hispanic (66.3 percent) and white. HCH DSMP offers four curriculum visits and follow up as necessary in an individual and group setting for adults with type 1, type 2, and gestational diabetes. The four curriculum visits cover the 15 content areas from the National Standards: "diabetes overview and initial assessment; blood glucose monitoring and use of results; medications; nutrition; exercise and activity; stress and psychosocial adjustment; family involvement and social support; relationships among nutrition, exercise, medication, and blood glucose levels; prevention, detection, and treatment of acute and chronic complications; foot, skin, and dental care; behavior change strategies; goal setting and risk factor reduction; problem solving; benefits, risks, and management options for improving glucose control;

preconception care, pregnancy, and gestational diabetes; and use of health care systems and community resources.”

Grant awards have made it possible for weekly exercise classes, bimonthly coping skills education, a monthly diabetes support group, and annual foot exams to be offered to patients at no cost by a community specialist. These community specialists include a medical director, exercise physiologist, stress reduction specialist, and certified pedorthist (a trained professional who specializes in designing or modifying footwear to alleviate problems associated with injury or disease—such as diabetic foot). To be considered for the program, patients must have written referrals through their primary care physician. If self-referred, a DSMP staff member assists the individual in obtaining a written referral prior to the initiation of services. The HCH DSMP staff also obtain registration information, insurance prior authorizations, Medicare coverage, and ensure coverage for uninsured patients through grants and hospital in-kind donations. The education portion of the program is either provided individually, or in some cases, in a group setting (exercise and stress reduction classes).

Making a Difference: As a participant in the NMMRA Diabetes Collaborative, HCH DSMP has a strong quality improvement plan. Also, HCH DSMP has an electronic patient registry using the DEMS-Lite software. The DEMS-Lite patient registry is used to identify patients, proactively manage their care, and track outcomes for the population. The program’s current goals include: Hemoglobin A_{1c} < 7.0 percent, LDL cholesterol < 100 mg, documented annual retinal eye exam, documented annual micro albumin, and documented annual sensory foot exam. The outcomes are tracked electronically, and annotated run charts are reviewed and posted monthly. In the prior 12 months, HSH DSMP recorded 869 participant visits. The participant distribution was 93 percent type 2, 6 percent type 1, and 1 percent gestational diabetes.

HCH DSMP’s overarching goal has been to transfer financial responsibility for education and management from the individual patient to public resources. In the long-term, providing “free” care for such services is not fiscally sound, nor does it ensure the viability of the program. It will also diminish public motivation to politically assist DSMP in achieving payment from governmental resources.

The program’s goal to provide 100 percent access to excellence in diabetes management and support will be reached by the following routes:

- Obtaining the American Diabetes Association (ADA) “Certificate of Recognition” for the diabetes management program on June 7, 2001, allows the program to provide Medicare reimbursement and enables 40 percent of the population to access services without undue hardship.

- With the ADA Certificate of Recognition and the move on December 5, 2000, to an independent location, HCH DSMP is well positioned to seek grants that will fund access to services for its underinsured patients.
- Relocation to an independent site diminishes fragmentation of financial services. Diabetes educators, prior to delivery of services, obtain registration and financial information as well as all insurance prior authorizations.

The program is presently in the planning stages of providing a diabetes support group (as funded by grant monies). In addition, because greater than 30 percent of the population is uninsured, the program is in the planning stages of developing a prescription assistance program that will provide patients with diabetes medications at no cost. Collaborating with the hospital discharge planning team, organizers are developing an inpatient diabetes education referral and education checklist to ensure that all patients admitted to Holy Cross Hospital with a primary or secondary diagnosis of diabetes will receive basic education and support before discharge.

Beginnings: What became the Diabetes Self-Management Program grew out of the current director’s pursuit of her Masters of Science in Nursing degree when she was granted a mentorship with a certified diabetes educator in 1992. She began to imbed this education into the HCH community wellness programs, with the goal of preventing diabetes complications in Taos County and surrounding areas. She began the diabetes education program at HCH the same year, initially offering the program on lunch hours at the hospital library with no source of funds.

Challenges and Solutions: Additional support for the program was garnered through establishment of a fee schedule for the program in 1998. More important, by obtaining an American Diabetes Association “Certificate of Recognition” in 2001, the diabetes education program became eligible for Medicare reimbursement. Such recognition increased opportunities to obtain grants to provide coverage to uninsured individuals with diabetes. The combined effect was to enable the program to acquire its own space and to assume responsibilities for registration and processing of charges for education.

Currently, HCH DSMP can offer 100 percent access to quality diabetes education and support regardless of an individual’s ability to pay. This excellent outcome was made possible through efforts to obtain the ADA Certificate of Recognition and grants awarded in the past year, as well as in-kind donations from the hospital. HCH DSMP has become a “central” area for referrals from 21 Taos area clinicians for diabetes education, resources, and support. In 2000, Diabetes Clinical Care Guidelines were adopted by the HCH Primary Care Committee. At that time, the certified diabetes educators requested and were approved to order lab work at their education sessions that were recommended within the Clinical Care Guidelines (HbA_{1c}, annual

HCH DSMP can offer 100 percent access to quality diabetes education and support regardless of an individual’s ability to pay.

micro albumin, and annual lipid profile). As a participant in the NMMRA Diabetes Collaborative, HCH DSMP has a very strong quality improvement plan.

PROGRAM CONTACT INFORMATION

Susan Kargula, RN, MSN, CDE
Holy Cross Hospital Diabetes Self-Management Program
1397A Weimer Rd.
Taos, NM 87571
Phone: (505) 751-5750
E-mail: skargula@taoshospital.org

MODELS FOR PRACTICE

FOCUS AREA: DIABETES

Program Name: White River Rural Health Center, Inc.
Diabetes Collaborative

Location: Augusta, Arkansas

Problem Addressed: Diabetes and Access to Primary Care

Healthy People 2010 Objective: 5, 12

Web Address: None

SNAPSHOT

The White River Rural Health Center, Inc. Diabetes Collaborative (WRRHCDC) is a self-contained Federally Qualified Community Health Center (FQHC) and a participant in the Arkansas Diabetes Collaborative and the National Diabetes Collaborative. It is funded by the Bureau of Primary Health Care (BPHC) and provides primary care and management of diabetes and associated conditions regardless of the ability of the patient to pay.

This model focuses on elimination of health disparities between populations of persons with diabetes. WRRHCDC uses continuous quality control outcome measurements based on the Cardiovascular and Diabetes Electronic Management System (CVDEMS) software program from BPHC. Improved clinical practices and other information are shared between sites. This model demonstrates that a network of FQHCs can cooperate to improve access and quality of health care for diabetics in rural areas.

THE MODEL

Blueprint: WRRHCDC, a 501(c)(3) non-profit organization, is part of the National Diabetes Collaborative (NDC), which is comprised of FQHCs across the U.S. WRRHC receives no additional funds for the DC, but it did receive staff training from BPHC during the first year. WRRHC covers a four-county area in east central Arkansas. This area is highly rural, and the main economic activity is farming. WRRHC is the only health care provider for three of the four counties, and there is only one local hospital. There are fewer than 5,000 residents in all but one of the communities.

While each FQHC is independent, they share information and clinical practices. They are organized into various levels, including state, “clusters” (regions composed of more than one state), and nationally. Currently, there are at least four additional FQHCs participating in the Arkansas DC.

WRRHCDC provides primary care and management of diabetes and associated conditions, regardless of the ability of the patient to pay. It provides all primary care on-site, including laboratory and radiology services. Staff at the WRRHCDC clinic consists of one licensed practical nurse and one medical doctor, one or two secretaries, and sometimes a certified nursing assistant as needed. A half-time nutritionist was recently hired. No donated or volunteer staff are used. Additional data entry staff will be hired as the program spreads to include multiple physician sites.

Information on newly diagnosed diabetes patients is entered into a diabetes patient registry. The registry is used to track the services needed and delivered. The software is the CVDEMS program provided by BPHC.

WRRHCDC serves all ages and also provides perinatal services. As an FQHC, it serves all individuals, regardless of their ability to pay. Their target population is approximately 20 percent black, 78 percent white, and 2 percent Hispanic. Almost half of their population is below 200 percent of the federal poverty level.

Making a Difference: WRRHCDC undergoes continuous quality improvement. CVDEMS software is used to track progress, practices, and outcomes at the level of the individual patient, specific provider, or clinic site. Data and outcomes are reported monthly.

Specific indicators reported by each site are percent of patients having HbA_{1c} <9.0 percent, having two HbA_{1c} determinations in one year >91 days apart, blood pressure <135/80, goal setting in self management, annual influenza vaccination, current pneumococcal vaccination, and annual lipid profile. Outcomes are determined monthly by searching the registry on the last working day of the month for all diabetic patients who have met the criteria for the past 12-month period. The percentage of patients meeting the goals is based on the total number of patients in the registry on that day.

In addition to the two original sites, two additional sites have been added, and the Collaborative expects to add eight sites in 2002.

Beginnings: The Collaborative began in January 1998 and is comprised of FQHCs across the U.S. The Arkansas DC originally consisted of two sites.

Challenges and Solutions: The strategic plan of WRRHC includes its commitment to the BHPC's objectives of 100 percent access, 0 percent disparities. The Diabetes Collaborative is only one of several programs at WRRHC committed to these goals. WRRHC also began participating in the BPHC's Cardiovascular Collaborative in April 2001, which operates under the same principles.

WRRHCDC
provides primary
care and
management of
diabetes and
associated
conditions,
regardless of the
ability of the patient
to pay.

So far, WRRHC has operated the DC with no additional funding or staffing levels. Their only source of external funding is BPHC, and WRRHC participates in as many of BPHC's initiatives as possible. The main challenge has been finding resources for retinal eye exams, podiatry, and other specialized services for treatment of complications, especially for patients who are unable to pay. These problems are ongoing. WRRHCDC is working with the Arkansas Department of Health Diabetes Coalition and Arkansas Disease Management Collaborative to review external funding opportunities to fund mobile services to cover rural areas.

WRRHCDC publicizes its successes to BPHC by participating in the latter's initiatives. Its public relations in the community consist of newspaper announcements, letters, and health fairs.

WRRHC feels that its participation in the DC was instrumental in WRRHC receiving Joint Commission on Accreditation of Health Organizations (JCAHO) accreditation in December 1998. WRRHCDC was chosen to participate as a "high intensity" site in a three-year study by the University of Chicago, beginning in 2001. This program is designed to enhance WRRHCDC clinicians' ability to assist in behavioral change in their patients, to develop better patient communication skills, to improve patient self-management, and to continue intensive continuous quality improvement efforts.

Stakeholders include the state primary care association for Arkansas Community Health Centers for technical assistance, the Arkansas Department of Health Diabetes Coalition for training staff and developing culturally appropriate patient educational materials, county Extension agents and local hospital dietitians for nutritional education, and University of Arkansas for Medical Sciences for teleconferencing support.

PROGRAM CONTACT INFORMATION

Brenda Kennedy, RN
White River Rural Health Center, Inc. Diabetes Collaborative
623 North Ninth St.
Augusta, AR 72006
Phone: (870) 347-2534
Fax: (870) 347-2882
E-mail: bkennedyrn@yahoo.com

