Transforming Population Health: Case Studies of Place-Based Approaches

The following is one in a series of four case studies that provide examples of place-based, multi-sector, population-based approaches to chronic disease prevention and health promotion. Many of these initiatives are working to achieve the Triple Aim\(^1\), and they have varying levels of evidence of their progress towards meeting each of the three aims of better health, improved care experience, and reduced costs. All of the cases include evidence of improvements in health outcomes, and some also show improvements in quality of care. A subset include evidence of reductions in utilization of health care services, and a few include data on concomitant cost reduction.

Nemours developed these cases to provide examples of population health innovation in the field. For the purpose of these case studies, the working definition of a “population health initiative” is one that attempts to impact the interrelated conditions and factors that influence the health of populations over the life course, be they social, economic, or physical environments; personal health practices; individual capacity and coping skills; human biology; early childhood development; and/or health services. The initiatives outlined in these case studies identify systemic variations in these interrelated conditions and factors and use the resulting knowledge to develop and implement policies and actions to improve the health and well-being of geographic populations.\(^2\) The glue that binds each initiative is the presence of an “integrator” that serves a convening role and works at a systems level to promote prevention and improve health and well-being. The cases span the country, illustrating successful models that improve the health of geographically defined communities in rural, suburban and urban areas; states; chronic disease populations; and populations defined by risk factors and/or socio-demographics.

While all the cases describe initiatives that are specific to their communities or states, they share common features. These population-based prevention initiatives:

1. Target a geographic population;
2. Focus on achieving a shared health outcome, which is usually prevention-related;
3. Engage public and private partners in multiple sectors, including community (child care, schools, work places, etc.), as well as health/health care;
4. Change policies at the systems level and practices at the individual, provider/practitioner level;
5. Use data to measure progress and continually improve interventions;
6. Work toward sustainability via innovative financing, for example developing new funding sources and payment mechanisms and reducing health care costs; and
7. Are facilitated by an “integrator”, an entity operating at the systems or population level to promote the health and well-being of a geographically defined population. An integrator is needed since historically the “systems” serving children and families are disconnected, funded by different sources, and therefore rarely well coordinated to meet the needs of individuals, families and communities. A wide array of organizations can assume the role of integrator, depending upon the requirements of the initiative, the context of the community, and the capabilities and resources of various stakeholders.
Cases studies outlining population-based approaches to prevention and wellness, all of which involve these seven common features, are cited below.

**Nemours**
Nemours works with partners in child care, schools, primary care and the community to halt and ultimately reverse the growing prevalence of childhood obesity among children in Delaware. To ensure sustainability, Nemours pursued both systems/policy and practice changes in these sectors where children spend most of their time. Preliminary results show a flattening of the overweight and obesity curve for Delaware children ages 2 to 17 between 2006 and 2008.

**Children’s Hospital Boston Community Asthma Initiative**
Children’s Hospital Boston created a comprehensive program that increases the capacity of health care providers, schools, and community groups to offer asthma education. They coupled this program with a Medicaid waiver to pay for bundled pediatric asthma services for high-risk patients, including coverage of non-traditional home visits and interventions by community health workers. For 800 children treated through September, 2011, significant reductions were achieved in emergency department visits and hospital admissions, and quality of life was improved for children and their parents, with dramatic results in just 6 months.

**REACH Charleston and Georgetown Diabetes Coalition, South Carolina**
The School of Nursing at the Medical University of South Carolina, in partnership with the multi-sector Racial and Ethnic Approaches to Community Health (REACH) Coalition, focuses on eliminating racial and ethnic disparities in diabetes in the African-American community, as measured by reductions in the lower-extremity amputation rate. In Charleston and Georgetown counties, rates of amputations per 1,000 diabetes hospitalizations decreased among African Americans. Clinical quality, evaluated based on annual chart audits from 1999 on, improved on a range of process and intermediate outcome measures, including annual foot exams, HbA1c control, and adherence to American Diabetes Association guidelines for self-management.

**Steps to Health King County, Seattle**
Public Health—Seattle & King County (PHSKC) convened the Steps KC collaborative, which involved more than 75 organizations working together to promote a comprehensive approach that coordinates programs and policy and systems changes at the individual, family, clinical, school and community levels. The goal of reducing the impact of chronic diseases through preventing and controlling asthma, diabetes and obesity is beginning to be realized, as evidenced by healthier behaviors, improved diabetic control, decreased days with asthma symptoms, and utilization reductions in asthma-related emergency room visits and hospitalizations.
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REACH Charleston and Georgetown Diabetes Coalition, South Carolina

Overview

Goals
- Eliminate racial and ethnic disparities in diabetes in South Carolina, beginning with a focused effort in Charleston and Georgetown Counties.
- Improve primary and secondary prevention of lower-extremity amputations (LEAs) in people at risk of and with diabetes.
- Reduce LEAs by 5% annually from 2000 to 2005 for a total of 25% reduction within 5 years.

Lead Organization, Integrator and Key Partners
- Medical University of South Carolina (MUSC) School of Nursing was the lead organization, in partnership with the Racial and Ethnic Approaches to Community Health (REACH) Charleston and Georgetown Diabetes Coalition, a community-academic partnership using community-based participatory action principles of partnership and research.
  - Coalition partners include health systems (hospitals, community health centers, and their providers); public health departments; social service agencies; lay voluntary organizations, sorority/fraternity Greek organizations, and professional organizations; area churches; public libraries; quality improvement organizations; universities; and statewide organizations. (see Attachment: Figure 1)
- The College of Nursing assumed the integrator role, building on 2 decades of experience that key members of its leadership had established in working with the African-American community in Charleston, and a request from Georgetown County to be part of the REACH proposal to the Centers for Disease Control and Prevention (CDC) in 1999.

Target Population/Geographic Area
- The African-American community at-risk for or with diabetes in Charleston and Georgetown counties; this is a 2-county area spanning 1,600 square miles along coastal South Carolina, with a total population of 366,000 in 2000, 110 – 115 thousand estimated to be African American.
- In 1999 when baseline data were collected, the Coalition identified more than 11,000 African Americans with diabetes who were enrolled in the health care systems of Coalition partners, including 3 federally qualified health centers, 1 academic health center, and 1 government health system. Of these 11,000 African Americans with diabetes, more than 60 had an LEA during 1998 – 1999.
Outcome Measures/Evidence to Date

- Outcomes in Charleston and Georgetown Counties:\(^1\)
  - Rates of amputations per 1000 diabetes hospitalizations: among African Americans decreased from 38.7 in 1999 to 21.7 in 2008, a decrease of 44%, compared with 22% among whites.
  - Rates of amputations per 100,000 population: among African Americans, decreased from 100.6 in 1999 to 71.3 in 2008, a 36% decline compared with a 31% decline among whites.
  - These reductions in both LEA rates between 1999 and 2008 were statistically significant at \(p < .0001\).

- Clinical quality, evaluated based on annual chart audits in Charleston and Georgetown Counties from 1999 on, improved on a range of process and intermediate outcome measures, including annual foot exams, HbA1c control, and adherence to American Diabetes Association guidelines for self-management. Disparities between African Americans and whites on these measures also decreased significantly.

- Environmental impact, as noted by a local neighborhood president and policy maker, “Our community has changed the way we take care of diabetes...ministers tell us how to take care of our health, churches are serving healthier foods, neighborhoods are building walking trails and forming exercise groups...” (Source #4, p. S73)

Year Initiated

- 1998 - The Coalition was formed in response to a call from CDC for REACH demonstrations projects that would reduce disparities in one (or more) of 6 areas, including diabetes.

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\(^{1}\) Based on recommendations from the South Carolina Office of Research and Statistics at the State Budget and Control Board and the South Carolina Department of Health and Environmental Control, Office of Chronic Disease Epidemiology and Evaluation, the Coalition recorded and reported outcome data by two methods, as noted.
**Full Description**

**The Problem:**
African Americans are almost twice as likely to have diabetes as the majority of Americans. In 1999, African Americans living in Charleston and Georgetown Counties were less physically active, ate a less healthy diet, and had higher rates of obesity compared with whites and members of other racial and ethnic groups. In addition, African Americans with diabetes living in Charleston and Georgetown Counties reported a lower quality of diabetes care, as well as higher rates of heart disease, amputations, and kidney disease, compared with whites and members of other racial and ethnic groups.

**Intervention Model:**
Community-based participatory action with input from community members guided the intervention model. The Community Chronic Care Conceptual Model for REACH Charleston and Georgetown Diabetes Coalition includes 4 interacting dimensions to improve community-wide diabetes quality of care and outcomes and eliminate health disparities:

1. Informed, activated *community members*, including people with diabetes, their family and people providing social support, community members, and leaders (both formal and informal) who need to be informed and take action to improve diabetes-related care.
2. Informed, activated *community systems*, including all that can affect or influence health, such as churches and faith-based institutions, government, communications, safety and transportation, recreation, education, and the physical environment.
3. Informed, activated *health systems*, including area clinics, hospitals, home health agencies, public health departments, pharmacies, medical supply and equipment companies, insurance companies, and payers of care that have effective clinical systems and provide self-management education and support help diabetics to better manage their disease.
4. *Changed policies* and actions to improve economic, social, and health conditions at the national, regional, state, and local areas achieved by the above systems working together.

**Interventions:**
**Informing and Activating Community Members and Community Systems**
- Development and distribution of educational materials: foot care posters; Gold Card for Diabetes Care; Check Yourself to Protect Yourself: Take Care of Your Feet, a curriculum guide for preventing and managing diabetes; and *My Guide to Sugar Diabetes*;
- Training of community health advocates, students, and volunteers to provide basic foot care education using curriculum guide designed by REACH Coalition;
- Foot care education and screening in community sites, including neighborhood centers, senior centers, and churches;
- Free ongoing diabetes self-management education programs in worksites, health centers, neighborhood centers, senior centers, and churches;
- Nontraditional education, including activities and talk about diabetes to groups in local neighborhoods; these sessions featured various types of physical activities, including chair exercises, praise groups, walking groups, and discussions about diabetes;
- Social media campaign, including radio, television, and billboards on city buses and roads; message points for ministers, in church newsletters, and on church bulletin boards and paper fans;
- Creation of a faith-based diabetes program that matches patients treated at a local hospital with volunteers from a local church to provide social support for patients and help them get information from diabetes educators;
• Through a REACH partnership with local libraries, a “Learn about Diabetes at the Library” program partially funded by the National Network of Libraries of Medicine; and
• Activation of patients to participate in educational activities, remove shoes and socks, ask health care providers to check feet, and ask if therapeutic shoes or referral to a podiatrist was needed, achieved both working on site with patients at health care providers and in community settings where education was provided.

Informing and Activating Health Professionals and Health Systems
• Continuous focus on updating primary care and other health care providers on the latest evidence-based guidelines on foot care, including “hands on” skill building and continuing education updates at Diabetes Initiative’s Annual Primary Care Symposium and South Carolina Department of Health and Environmental Control’s winter symposium;
• Development by the College of Nursing of a 2-day continuing education program on effective foot care presented to more than 225 registered nurses from Charleston and Georgetown Counties and more than 2,000 nurses nationally (now available on DVD and on-line);
  o 15 local African-American nurses received tuition from REACH to attend the course and then volunteered their time to provide educational programs on preventive foot care to their communities (a “train the trainer” model).
• Development by the College of Nursing of a wound care certification course on the prevention and care of foot and leg ulcers that can lead to amputations. More than 15 RNs from the 2 counties became certified wound care specialists and provided these services in local hospitals, health centers, and the offices of local health providers;
• Distribution and review of evidence-based guidelines for diabetes care, foot examinations, and foot care at clinical sites;
• Addition of staff podiatrists at some clinical sites;
• Referral for therapeutic shoes, only when indicated (to avoid active marketing by several medical supply companies to all patients with diabetes);
• Performance of routine foot examinations by triage nurses so that follow-up by the primary care provider could focus on assessment and treatment of high-risk patients;
• Group visits for foot care education and diabetes management in some clinical sites;
• Multi-disciplinary continuous quality improvement teams in clinical care facilities focused on improving diabetes care, including system improvements, such as the addition of patient registries with audits;
• Use of diabetes flow sheets on health records and use of registries within several systems;
• Signs in examination rooms asking patients with diabetes to remove shoes and socks; and
• Audit and feedback related to ongoing diabetes care guidelines, including foot care.
Policies and Actions for Improving Social, Economic, and Health Systems

- REACH worked with the Diabetes Initiative of South Carolina (the group charged by the South Carolina Legislature to develop guidelines for the care of people with diabetes), the South Carolina Department of Health and Environmental Control, the Carolinas Center for Medical Excellence, and the American Diabetes Association throughout South Carolina to develop standards that address access and quality of care, currently reflected in “South Carolina Guidelines for Diabetes Care – 2011”.

- The Coalition also achieved key changes in insurance coverage for diabetes care, foot care, and education:
  - The South Carolina Code of Laws Section 38-71-46 established the requirement for coverage of equipment, supplies and medications for diabetes in all health insurance policies. REACH worked with several FQHCs and primary care providers to develop "AADE accredited" programs that were eligible for reimbursement from Medicare, Medicaid and private insurance.
  - Coverage was also established for diabetes self-management education for all insurance plans, including South Carolina Medicaid patients who receive their education from programs that were recognized as quality providers of education. Coverage and referral to diabetes education programs for clients with diabetes served by the South Carolina Department of Vocational Rehabilitation.

The Integrator Role in the REACH Charleston and Georgetown Diabetes Coalition

In 1977 Dr. Carolyn Jenkins began working in community health nursing at a Charleston federally qualified health center. After joining the faculty at the College of Nursing, MUSC in 1979, she and a handful of nurses and social workers developed a community health approach and took students into the community, helping to build trust with the African-American community that had historically been very limited. A 1994 statewide initiative in diabetes created one of the few Centers of Excellence supported by the State, the Diabetes Initiative of South Carolina. This group worked collaboratively with communities to develop the REACH Charleston and Georgetown Diabetes Coalition, currently expanded and now known as SEA-CEED, the South Eastern African-American Center of Excellence in the Elimination of Disparities. By the time of CDC’s first REACH initiative in 1999, the foundation had been laid to assemble the Coalition and successfully apply. The Tri-County Black Nurses, a pro-active community-minded association, was especially helpful in supporting the Coalition, and days before the application was submitted, Georgetown County asked to be included, bringing more than a hundred letters of support from community leaders and organizations.

Key leaders in the College of Nursing have provided the essential link between the African-American community and its unique systems and institutions; the health care systems and providers in the two counties; and statewide professional associations and government entities, both executive and legislative branches. An appreciation of the importance of working both from the grass roots up and from the top branch.

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2 SECTION 38-71-46: Diabetes Mellitus coverage in health insurance policies; diabetes education.
(A) On or after January 1, 2000, every health maintenance organization, individual and group health insurance policy, or contract issued or renewed in this State must provide coverage for the equipment, supplies, Food and Drug Administration-approved medication indicated for the treatment of diabetes, and outpatient self-management training and education for the treatment of people with diabetes mellitus, if medically necessary, and prescribed by a health care professional who is legally authorized to prescribe such items and who demonstrates adherence to minimum standards of care for diabetes mellitus as adopted and published by the Diabetes Initiative of South Carolina. Source: http://doi.sc.gov/Documents/laws/t38c071.pdf

REACH worked with several FQHCs and primary care providers to develop "AADE accredited" programs that were eligible for reimbursement from Medicare, Medicaid and private insurance.

3 Codes G0108 for 60 minutes of individual education and G0109 for 60 minutes of group education were established. Reimbursement rates in 2011 were $55.41 for G0108 and $32.62 for G0109.
down has enabled the College of Nursing to be the “integrator” for the Coalition and serve the following essential roles:

- Convening and working with the many partners from the health care system and the multiple sectors of the community.
- Implementing an ongoing analysis of strengths, weaknesses, opportunities and threats related to improving diabetes outcomes at the community level.
- Developing a wide array of educational materials and tools, developing web sites to disseminate these materials, and training volunteers as well as health providers to use these materials effectively.
- Engaging traditional and non-traditional partners and modes of communication to reach all segments of the community.
- Leveraging the Coalition to work at the state policy level to establish evidence-based standards of diabetes care, improve access, and obtain payment for comprehensive diabetes care essential to effective prevention, treatment, and management.
- Facilitating the development of other coalitions and providing technical assistance to obtain independent financial support, contributing to the sustainability of many initiatives.
- Providing training and technical assistance in the tools of continuous quality improvement to advance clinical practice among all Coalition health care providers.

The Coalition has demonstrated “that the combined resources of all partners create power far beyond that of individuals. Providing opportunities to learn about each partner’s culture benefits the coalition as a whole. Health care professionals provide the ‘science of diabetes,’ while the community determines how to translate this science into practice. By working as equal partners, we can eliminate health disparities in diabetes in South Carolina.” (Source #6, p. 80)

Evaluation/Measurement Strategy

The impact and outcome evaluation was coordinated by the MUSC College of Nursing. Medical chart audits were performed by the College of Nursing. The South Carolina Department of Health and Environmental Control’s Chronic Disease Epidemiology team analyzed data related to amputations collected by the South Carolina Office of Research and Statistics.

The evaluation plan included annual collection of qualitative and quantitative data as follows:

- Number and type of community interventions including educational activities on preventive foot care for health care providers, community groups, and people with diabetes (data sources: coalition records of activities, events, programs, etc.);
- Annual focus group transcripts and community stories from people living with diabetes from all socio-economic levels, health care professionals, and community leaders to illustrate community behavior and environmental changes (data sources: focus group transcripts, stories from news media, reports from community health workers, and stories of changes captured from community meetings);
- Annual review of patient care records to evaluate the changes in quality of care and the behavior changes by health care providers (data source: outpatient primary and specialized medical records from care providers in 5 health systems in Charleston and Georgetown Counties). Criteria for review were based on provider adherence with the American Diabetes Association’s Clinical Practice Recommendations, 1999 and any annual updated recommendations for care from the Association; and
- Race-specific data for diabetes-related LEAs to evaluate changes in health status related to diabetes-related amputations, racial disparities, and overall population changes (data source: South
The College of Nursing leadership made a deliberate decision to use this strategy for evaluation and measurement in order to remain true to the goals of having as broad an impact on the community and the state as possible. The activities and materials developed by REACH were shared and implemented throughout the state by the Diabetes Initiative of South Carolina. “Check Yourself to Protect Yourself: Take Care of Your Feet,” for example, was shared with diabetes community coalitions throughout South Carolina, across the United States, and in several other countries. All Diabetes Initiatives of South Carolina Board and Council members received copies of the training materials and shared them with others statewide. All materials on the REACH website are available to anyone who visits the website, and groups that requested the materials were encouraged to download them. Hence, doing comparative studies using control groups, for example, was considered difficult because materials and approaches were so widely available. The Coalition was also sensitive to a lack of trust in the African-American community regarding clinical studies, given a history with clinical trials in the 1950s and 1960s later revealed to be unethical in their assignment of treatment to African Americans as compared with white patients.

Results to Date

- In Charleston and Georgetown Counties, lower-extremity amputations rates improved significantly for African Americans over the period 1999 – 2008. While the disparity decreased, it was not eliminated. The rate of LEAs per 100,000 population in 2008 was still approximately 3 times greater for African Americans than the rate for whites, a decrease from 1999 when it was more than 4 times greater. The LEA rate per 1,000 diabetes hospitalizations among African Americans was approximately twice that of whites, a ratio that did not change over the period because LEAs per 1,000 hospitalizations both for African Americans and for whites declined at approximately the same rate. (See Attachments, Figures 2 and 3)

- Clinical quality, evaluated annually based on an analysis of chart audits from 1999 to 2008, improved, and disparities between African Americans and whites on these measures also decreased significantly.
  - Annual foot exams for African Americans who visited a provider at least once during the year were greater than 90% by 2008 (and greater than 85% for whites).
  - Testing for HbA1c for African Americans increased from 76.8% in 1999 to >97% in 2008; initial disparity of 10% compared to whites was eliminated.
  - Annual lipid testing increased from 47% to almost 90%, and disparities decreased by almost 20%.
  - Annual kidney testing improved from 13% to 56% and the initial disparity of almost 50% was eliminated.
  - Health care providers documented better adherence to American Diabetes Association guidelines for self-management, from 41% to 94% of patients.

  These changes were due to improvements in health systems, such as registries with audits and feedback-reminder systems, and patients asking their providers about their numbers for control of diabetes.

- In 2008, SC Department of Health and Environmental Control reported that the costs associated with 22 amputations in Georgetown County were $1,204,200, and the costs associated with 105 amputations in Charleston County were $4,492,300. According to these statistics, the average hospital cost in 2008 for one LEA was $54,736 and $42,783 in Georgetown County and Charleston County, respectively. The College of Nursing is in the process of obtaining...
Institutional Review Board Approval to determine the "costs of saving a leg" so that the net cost of preventing LEAs can be evaluated.

- Regarding impact of the Coalition, community leaders have made statements such as the following: “REACH has made a difference for our community—we offer classes on diabetes, computer and exercise classes to learn about diabetes, and even have community gardens to help people eat healthier foods. We know what to do to prevent many of the problems caused by diabetes, especially foot care and amputations. . . More people know what to do to better manage their diabetes and take care of their feet; they monitor their sugar, check their feet, and even tell their doctors what they need. . .” (Source #4, p. S73)

Program Funding
Funding has been from CDC REACH; the South Carolina Department of Health and Environmental Control; the Diabetes Initiative of South Carolina; the Foot Care Program, College of Nursing, and the Skin Integrity Clinic Internal Medicine, Medical University of South Carolina. Several of the entities within the Coalition have created their own 501(c)(3)s in order to enhance sustainability by generating small grants in the range of $30,000. The Coalition annual budget averages about $1 million per year, including CDC REACH funding (including indirect costs from the University), funds raised by the Coalition, and in-kind donations of community groups. The Coalition has approximately 9 funded subcontracts with local organizations and agencies.

Current Status/Future Plans
Reach Charleston and Georgetown Diabetes Coalition is ongoing as part of SEA-CEED (South Eastern African-American Center of Excellence in the Elimination of Disparities); a Community Transformation Grant has been obtained based upon the REACH success.

Citation and Sources

Nemours developed these case studies to provide examples of population health innovation in the field. This case study was prepared by Julianne R. Howell, PhD, Anne De Biasi, MHA, Daniella Gratale, MA and Debbie I. Chang, MPH, using the following sources, and was issued in January, 2012:

1. Telephone conversation with Chesley Richards, CDC, November 14, 2011
2. Telephone conversation with Pattie Tucker, Acting Director of REACH, November 15, 2011, who suggested the MUSC REACH Program as one with demonstrated outcomes and provided additional materials on November 16th with the required information
3. Telephone conversations with Carolyn Jenkins, DrPH, APRN-BCADM, RD, LD, FAAN, Principal Investigator, Medical University of South Carolina, December 19, 2011 and January 5, 2012.
5. CDC REACH US Medical University of South Carolina College of Nursing Center of Excellence www.cdc.gov/reach/communities/pdf/Charleston_SC.pdf accessed 11/15/11
ATTACHMENTS

Figure 1 REACH Charleston and Georgetown Diabetes Coalition
Figure 2: Charleston and Georgetown Counties Lower-Extremity Amputation–Rates by Race

Source: Figure 3 C. Jenkins, et al., “Efforts to Decrease Diabetes-Related Amputations in African Americans by the Racial and Ethnic Approaches to Community Health Charleston and Georgetown Diabetes Coalition,” Family & Community Health: January/March 2011 - Volume 34 - Supplement p S75.
Figure 3: Charleston Georgetown Counties Lower-Extremity Amputation–Rates per 1000 Diabetes Hospitalizations.

Source: Figure 4 C. Jenkins, et al., “Efforts to Decrease Diabetes-Related Amputations in African Americans by the Racial and Ethnic Approaches to Community Health Charleston and Georgetown Diabetes Coalition,” Family & Community Health: January/March 2011 - Volume 34 - Supplement p S75.

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