Racial/ethnic health disparities in chronic disease interventions and services across the socio-ecological model

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Abstract

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Many chronic disease interventions have focused on individual-level services, such as one-on-one behavioral counseling, education or self-management classes, or direct clinical care. However, a growing body of research indicates that social factors play critical roles in shaping health and are “root causes” of health disparities. The socio-ecological model (SEM) suggests that factors across the socio-ecological spectrum, from individual genetics and behavior to environmental conditions and policies across one’s lifespan, all contribute to individual health. The three studies presented in this dissertation examine the role or impact of chronic disease interventions across the socio-ecological model and racial/ethnic disparities in relation to each intervention. Study 1 monitors trends in individual-level diabetes services and care from 2001 to 2010 using national survey data, to examine if and to what extent individuals diagnosed with diabetes receive appropriate standards of clinical diabetes care or self-manage their condition

over time, and the extent of racial/ethnic disparities in care. Moving toward the outer rings of the SEM, Study 2 uses King County survey data to measure the impact of obesity-related policy change, specifically menu-labeling policy, on calorie information awareness and use in the region. It also examines whether there were disparities in outcomes by race/ethnicity and other socioeconomic factors. Study 3 takes a broader look at the practical issues confronting public health practitioners and partnerships in their progression from direct service interventions to activities addressing policies and social and environmental conditions. This qualitative, exploratory case study examines the experiences of a local community coalition, whose focus shifted from a direct-service orientation to impacting broader social determinants of health to address racial and ethnic health disparities. Findings from the three studies have policy implications regarding gaps that may exist in the receipt of appropriate clinical and self-care for people of color with diabetes, whether population-level policy changes are positively impacting higher risk groups, identifies factors that may facilitate or hinder community coalitions' shift to address broader social determinants, and highlight lessons learned and areas for technical assistance in making this transition.

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INTRODUCTION

Chronic diseases and conditions, including diabetes and obesity, constitute the leading causes of death and disability in the United States (1), with racial/ethnic minority populations bearing a disproportionate burden of many of these conditions. Over one-third of adults are obese, with the highest rates among Non-Hispanic Blacks and Hispanics (2). Similarly, the highest rates of Type 2 diabetes are experienced by American Indian/Alaska Natives, Non-Hispanic Blacks, and Hispanics (3). Many chronic disease interventions have focused on individual-level services, such as one-on-one behavioral counseling, education or self-management classes, or direct clinical care. However, a growing body of research indicates that social factors, or social determinants of health (SDOH), are crucial in shaping individual and population health and are "root causes" of health disparities (4-9). The socio-ecological model (SEM) illustrates the landscape of health influences and demonstrates how factors across the socio-ecological spectrum, from individual genetics and behaviors, systems-level processes, such as clinical care, to environmental conditions and policies across one's lifespan, all contribute to individual and population health (Figure 3.1) (10). Disparities in health can arise from inequities across this spectrum and suggest the need for interventions from individual to policy-levels, in order to eliminate disparities. The three studies presented in this dissertation examine the role or impact of chronic disease interventions across the socio-ecological model and racial/ethnic disparities in the context of each intervention.

The past decade has seen a move in healthcare systems to incorporate elements of the Chronic Care Model, which stresses improved coordination of care for patients with chronic conditions like diabetes, and includes connecting patients with resources such as chronic disease

self-management education, as a means to improve quality of care and outcomes (11-16). The increased value placed on improving processes of care has coincided with the rise of evidence-based chronic disease and diabetes self-management education (DSME) programs (17, 18). Despite this, evidence shows persistent disparities in both diabetes care and self-management practices among certain racial/ethnic sub-groups (19-32). Using Behavioral Risk Factor Surveillance System (BRFSS) data from the past decade, it is possible to examine whether changes in clinical processes and availability of health education resources have translated into positive changes at the individual-level and reduced racial/ethnic disparities. Study 1 updates and expands on past research which have typically examined two to four care indicators, by examining trends in the receipt of eight recommended diabetes clinical care and self-management indicators from 2001 to 2010, and the degree to which racial/ethnic disparities in clinical care and self-management exists and/or persist over time.

Moving toward the outer rings of the socio-ecological model, Study 2 examines the relationship between population-level policy changes and individual-level change. With escalating rates of obesity and related chronic diseases across the US, particularly among certain racial/ethnic groups (33-39), public health practitioners and policy-makers have been looking to policy, systems and environmental solutions for widespread change. In recent years, jurisdictions around the nation, including King County, WA, have implemented menu-labeling regulations requiring food outlets to post nutritional information for their food offerings, under the assumption that people will use this information to make more informed, healthier food choices, as indicated in past studies (40-44). While policy changes may improve population health, they may not necessarily reduce disparities. Given the high burden of chronic disease and obesity on certain racial/ethnic groups, it is critical to determine whether obesity-related policies, like menu-

labeling, contribute to reducing disparities. Study 2 examines the impact of menu-labeling policy on awareness and use of nutritional information by race/ethnicity and other socioeconomic characteristics. Under the Patient Protection and Affordable Care Act, nutritional-labeling requirements similar to those in King County will be required of chain restaurants and retail food establishments with 20 or more venues. Results from this study will reflect the extent to which people of color benefit from such policies and may be useful to the U.S. Food & Drug Administration, policy-makers and public health practitioners, as to whether menu-labeling alone is sufficient or if additional actions may needed to improve nutritional awareness and choices among the general public and communities of color.

Community coalitions have long-been seen as important stakeholders and partners in public health change and in health disparities efforts. The diversity of expertise, perspectives and community history within coalitions contribute to their ability to represent and reach out to a broad array of stakeholders, to identify and respond to community needs, and to influence change within the community (45-49). Many community coalitions were originally formed to address specific disease conditions and deliver services, such as health education classes and resources, to populations disproportionately affected by these conditions (49, 50). However, as a consequence of funding shifts, existing coalitions not previously focused on broader social determinants may experience difficulties transitioning from direct services to effecting policy, social or environmental changes. Using a local coalition focused on diabetes disparities as a case study, Study 3 explores the process involved in this shift from direct services to a SDOH focus, identifying factors that facilitated this shift and the challenges such a transition poses. Findings may provide insight to community partnerships and their member organizations on challenges to

anticipate in making this transition and what factors have facilitated this shift, and guide funders regarding what support may be needed to assist partnerships in this transition.

Chapter 2

Study 1: *U.S. trends in receipt of appropriate diabetes clinical and self-care from 2001 to 2010, and racial/ethnic disparities in care*

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Abstract

Purpose: The purpose of this study was to examine trends in the receipt of eight recommended diabetes clinical and self-care indicators from 2001 to 2010 and assess racial/ethnic disparities in care.

Methods: This observational study examined receipt of A1C tests, annual eye and foot exams, flu vaccination, diabetes self-management education (DSME), exercise, self-monitoring of blood glucose (SMBG), and self-feet examinations, among U.S. adults with diabetes, using national survey data from 2001 to 2010. Analyses included estimating proportions for each indicator by

year, testing differences in magnitude of change from 2001 to 2010 by race/ethnicity, and regression models to assess changes in care over time and factors associated with care.
Results: There were significant increases from 2001 to 2010 in A1C tests, annual foot exams, flu shots, DSME, and SMBG, but declines in eye and self-feet exams. DSME was positively associated with receipt of several care indicators. However, only half of respondents received DSME. White and Black Non-Hispanics respectively experienced improvements in at least three indicators. Hispanics experienced a significant increase in exercise but were consistently less likely than Whites to receive or engage in most care.
Conclusions: While improvements in several indicators were observed, patterns varied by race/ethnicity, with Hispanics falling short on most measures. DSME was strongly associated with most care and demonstrates the potential to improve receipt of recommended care by increasing DSME participation. With the Affordable Care Act (ACA), health professionals have a prime opportunity to leverage ACA provisions to increase access to recommended services, including DSME.

Diabetes is a leading cause of death and disability in the United States. It is associated with increased risk for stroke and heart disease and long-term complications involving the kidneys, eyes, feet, skin, digestion, teeth, gums, bones and joints (51). Approximately 95% of diagnosed diabetes in adults is Type 2, with racial/ethnic minority populations bearing a disproportionate burden of Type 2 diabetes, compared to whites (3). According to 2010 national survey data, 7.6% of Non-Hispanic white adults had diagnosed diabetes, compared to 9.1% of Asian Americans, 12.9% of African Americans, 13.2% of Hispanics, and 16.5% of American Indian/Native Americans (52-55). Diabetes prevalence is expected to rise due to increasingly obesogenic lifestyles, aging populations and the anticipated growth of racial/ethnic minority groups in the U.S.. The Centers for Disease Control & Prevention (CDC) expects the prevalence of diagnosed diabetes to increase 165% by 2050 (56). The increasing prevalence of diabetes has also had a significant impact on health care expenditures, with diabetes-related costs estimated at $245 billion in 2012, with the bulk of expenditures attributable to direct medical costs, such as hospital inpatient care and prescription medications (57). In light of escalating costs and health burden of diabetes, it is crucial that medical and public health systems strive to prevent diabetes and improve the health of those already diagnosed with diabetes by providing quality diabetes care and helping people with diabetes better self-manage their condition.

The Agency for Healthcare Research & Quality's (AHRQ) 2012 disparities report examined the quality of diabetes care based on patients' receipt of four recommended clinical services (A1C tests, eye and foot exams, flu vaccination) from 2008 to 2009, and found that disparities in the receipt of these services persisted or widened between Whites and other racial/ethnic groups and between high and lower income groups (32). The AHRQ report does not, however, assess patient self-management. Clarifying the extent to which people with

diabetes are receiving appropriate clinical care and properly self-managing their condition would provide useful indicators on the current quality of diabetes clinical care and whether additional action is needed to improve diabetes self-management.

This study focuses on standards of diabetes clinical care and self-management among adults diagnosed with diabetes, as recommended by the American Diabetes Association (58). This study examined trends in the receipt of recommended diabetes clinical care and self-management activities from 2001 to 2010 using national survey data, to determine if recommendations were met over the past decade and assess the extent of racial/ethnic disparities in these indicators.

Methods

The authors conducted an observational study, using Behavioral Risk Factor Surveillance Survey (BRFSS) data from 2001 to 2010 to examine trends in eight measures. Four clinical care services were evaluated: receipt of at least two hemoglobin A1C tests in the past 12 months, annual eye and foot exams, and flu vaccination. Self-care included examined whether respondents engaged in any physical activity or exercise in the past month, daily self-monitoring of blood glucose (SMBG), checked feet daily for sores or irritations, and received diabetes self-management education (DSME). Binary yes/no variables were created for each care indicator.

Analyses were limited to English or Spanish-speaking adults ages 18 years and older, who indicated having been told by a doctor that they had diabetes, excluding gestational diabetes. Although BRFSS does not differentiate between diabetes types, prevalence rates for types 1 and 2 suggest that most respondents had type 2. In unadjusted analyses, proportions were estimated for each care indicator from 2001 to 2010 for all respondents with diabetes, and stratified by race/ethnicity. Analyses included testing for trends in care from 2001 to 2010 and

stratified tests of proportions to examine possible differences in the magnitude of change from 2001 to 2010 in each indicator by race/ethnicity. Proportions were standardized to the age distribution of the 2000 U.S. Census population in comparisons across years (59). Multivariable logistic regression models were fit to compare odds for each indicator from 2001 to 2010, and identify factors associated with receipt of appropriate care and self-management.

Covariates chosen for inclusion in the regression models were based on predisposing, enabling and need characteristics outlined in Andersen and Newman's conceptual framework for health care utilization (60). Predisposing factors included age, gender, race/ethnicity, and education. Age was categorized into three age groups: 18 to 44 years, 45-64 years, and 65 years and older. Race/ethnicity was categorized into four groups: White Non-Hispanic, Black Non-Hispanic, Other Non-Hispanic and Hispanic. Education was grouped into no school to some high school, high school graduate or GED, some college, and college graduate. Enabling variables included income, marital/partner status, employment, health insurance status, having a regular health care provider, and having received diabetes self-management education. Annual household income was defined as less than $25,000, $25,000 to less than $50,000, and $50,000 and above. Marital status was grouped into two categories: "married/partnered" included respondents who were married or part of an unmarried couple; "single" included persons who were divorced, widowed, separated, or single. A binary variable was created to indicate whether a respondent had at least one person s/he considered a personal provider. Insulin use, a need variable, indicated respondent's diabetes severity.

Regression models for all clinical and self-care indicators except DSME, included DSME as a covariate in the model, since diabetes education and self-management programs are associated with diabetes clinical and self-care (61). Year was modeled as a categorical variable.

Multiple Wald tests were conducted to determine the significance of time (i.e., BRFSS survey year) and race for each care indicator. An exploratory analysis was also conducted to examine possible effect modification of race and DSME on each care variable. Corrections were not applied to account for multiple testing as this may contribute to type II errors and erroneous acceptance of the null hypothesis (62). All analyses were conducted using Stata/IC 12.0. Sampling weights were applied to construct population estimates and account for complex survey design and nonresponse (63).

BRFSS is a cross-sectional telephone survey, administered in English or Spanish, in which self-reported, health-related data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam. BRFSS constructs its probability sample using a disproportionate, stratified, random sampling design based on the density of known telephone numbers in a given area. Telephone numbers are classified into either high or medium density strata, with numbers from high density strata sampled at a higher rate. Across states and territories, the median response rate from 2001 to 2010 was 51.2%, with the lowest median rate in 2003 (42.4%) and highest median rate in 2010 (54.6%). Additional details regarding the BRFSS questionnaires, survey methodology and data quality are available at www.cdc.gov/brfss (64).

Results

U.S. Population with diabetes

A total of 355,620 BRFSS respondents with diabetes were included in the study sample. The study sample was predominantly older (46% were ages 45 to 64 years, 38% were 65 years and older), White Non-Hispanic (63%), married/partnered (62%), had a high school education or higher (80%), some form of health insurance (89%) and someone they considered a regular

provider (93%). Given the high proportion of retirement-aged respondents, only 36% indicated being employed, and 43% had an annual income less than $25,000. A quarter of respondents were taking insulin, and most respondents were overweight or obese (83%). Although there were a few differences within some subgroups between years, the composition of respondents was relatively consistent from 2001 to 2010 (Table 1.1).

Figure 1.1 and Table 1.2 show unadjusted, weighted proportions for clinical and self-care indicators over time. With respect to clinical care, there were significant increases from 2001 to 2010 in receipt of A1C tests, foot exams and flu shots (64.6 to 69.9%, $p<.01$; 64.2 to 67.7%, $p<.05$; and 42.9 to 50.5%, $p<.001$, respectively). However, there was a significant decline in eye exams (66.6 to 62.1%, $p<.01$). For self-care activities, there were significant increases in DSME (52.4 to 57.2%, $p<.01$), and SMBG (55.2 to 63.3%, $p<.01$), decline in self-feet checks (74.9 to 70.8%, $p<.01$), and no change in exercise.

Fully adjusted regression models validate some of these findings, showing increased odds for most clinical but not self-care indicators in 2010, compared to 2001 (Table 1.3). Odds for receiving A1C tests, annual foot exam and flu shot fluctuated and were higher in 2010 relative to 2001 ($p<.05$). Odds for receiving an eye exam fell over time and were lower in 2010 compared to 2001 ($p<.001$). There were fluctuations in odds for appropriate self-care from 2001 to 2010, with steadily higher odds for SMBG over time ($p<.001$), decreasing odds for self-feet checks ($p<.01$), and no significant differences in DSME or exercise in 2010 compared to 2001.

Receipt of appropriate clinical care

Being at least 45 years, married/partnered, having higher educational attainment, insurance or a regular provider, taking insulin and DSME were factors positively associated with receipt of most clinical care services (Table 1.3, $p<.05$). Black Non-Hispanics had higher odds of

getting annual foot and eye exams, but lower odds of getting a flu shot compared to White Non-Hispanics. Hispanics had lower odds of receiving any of the recommended clinical care services, except for eye exam, compared to White Non-Hispanics. Men were more likely to get an annual foot exam, but less likely to get A1C tests or eye exam than women. Respondents with annual household incomes of $25,000 or greater had higher odds of getting an eye exam ($p<.001$), and the highest income group had higher odds of getting a flu shot compared to the lowest income group ($p<.05$).

Engaging in appropriate self-management

Women, 18 to 44 year olds, those who were married/partnered, had at least a high school education, annual household income of $25,000 or greater, health insurance, a regular provider, or taking insulin had higher odds for participation in DSME ($p<.05$). Black Non-Hispanics also had higher odds of receiving DSME ($p<.001$), whereas Hispanics had lower odds ($p<0.01$), relative to White Non-Hispanics. Models that included DSME as a covariate demonstrated that receipt of DSME was associated with higher odds of SMBG and exercise ($p<.001$), but not self-feet checks. Other factors associated with SMBG included having health insurance, a regular provider and insulin use ($p<.001$). However, Hispanics, men, those with incomes greater than $25,000 or a college degree, were less likely to conduct SMBG ($p<.01$). Black Non-Hispanics and those taking insulin had higher odds of self-feet checks ($p<.001$), but men, college graduates, married/partnered respondents, those with incomes greater than $25,000, or were ages 18 to 44 years, had lower odds for self-feet checks ($p<.05$). In contrast to SMBG and self-feet checks, men, Other Non-Hispanics, those who were married/partnered, ages 18 to 44 years, with at least a high school education or incomes $25,000 or greater, had higher odds of getting any exercise ($p<.01$). Insulin users were less likely to engage in any physical activity ($p<.001$).

Racial/Ethnic differences in clinical and self-care

Some racial/ethnic differences were observed in clinical and self-care. In stratified, univariate analyses (Figure 1.2, Table 1.4), a significantly higher proportion of White Non-Hispanics received all four clinical services, DSME and engaged in SMBG and exercise, compared to Hispanics in 2001 and 2010 ($p<.01$). A higher proportion of White Non-Hispanics engaged in exercise and got flu shots compared to Black Non-Hispanics in 2001 and 2010 ($p<.05$). A higher proportion of Black Non-Hispanics received an annual foot examination compared to White Non-Hispanics in 2001 and 2010 ($p<.05$). In 2010, a higher proportion of Black Non-Hispanics conducted self-feet checks than White Non-Hispanics ($p<.01$). There were no other significant differences in care between racial/ethnic subgroups in 2001 and 2010.

From 2001 to 2010, White Non-Hispanics experienced significant increases in annual foot exams (64.2 to 68.0%, $p<.05$), flu shots (46.2 to 53.9%, $p<.001$), DSME (54.9 to 59.9%, $p<.01$), and SMBG (58.6 to 63.0%, $p<.05$), but declines in eye exams (68.8 to 63.5%, $p<.01$) and self-feet checks (74.0 to 68.9%, $p<.01$) (Figure 1.2). Black Non-Hispanics had significant increases in receipt of A1C tests (62.9 to 73.1%, $p<.05$) and flu shots (39.5 to 48.5%, $p<.01$). They also experienced a large increase in SMBG from 2001 to 2010 (54.9 to 74.8%, $p<.001$). Their increases in SMBG and A1C tests from 2001 to 2001 were larger than the increases experienced by White Non-Hispanics ($p<.001$ and .05, respectively). Other Non-Hispanics experienced a significant increase in receipt of flu shots (41.6 to 53.3%, $p<.001$) but decline in eye exams (68.1 to 57.9%, $p<.05$). There was only a significant increase in exercise among Hispanics (56.7 to 63.9%, $p<.05$). This increase was larger than the increase observed in White Non-Hispanics ($p<.05$). Although each racial/ethnic subgroup experienced improvements in certain care indicators over time, Hispanics were consistently less likely than White Non-

Hispanics to receive or engage in most clinical and self-care activities, both at baseline and in 2010.

DSME by Race-Ethnicity

In exploratory interaction models, there was significant interaction between DSME and specific race/ethnicities for SMBG, exercise, flu shot and annual eye exam. Without DSME, Hispanics had significantly lower odds compared to White Non-Hispanics for SMBG, exercise or getting a flu shot. However, Hispanics who received DSME had significantly higher odds for SMBG, exercise and flu shots (OR=2.03 (1.74, 2.36), p<.05, 0R=1.85 (1.59, 2.15), p<.001, and OR=2.00 (1.73, 2.32), p<.001, respectively) relative to White Non-Hispanics who also received DSME (OR=1.73 (1.65, 1.80), OR=1.39 (1.33, 1.45), and OR=1.44 (1.38, 1.50), respectively). There was also significant interaction between Black Non-Hispanics and DSME (p<. 01). Without DSME, Black Non-Hispanics had higher odds for getting an annual eye exam compared to White Non-Hispanics (OR=1.39 (1.27, 1.52) p<.001). With DSME, their odds for getting an eye exam remained relatively unchanged (OR=1.44 (1.26, 1.58)) but were significantly lower compared to odds for eye exam among White Non-Hispanics who also received DSME (OR=1.66 (1.59, 1.74), p<.01).

Discussion

Study findings show that approximately 50 to 71% of BRFSS respondents with diabetes received or engaged in key diabetes care or activities. While the positive trend in A1C testing, annual foot exams, flu shots, DSME and SMBG is encouraging, gains were modest. There were significant declines in annual eye and self-feet examinations, with no change in exercise. Having insurance, a regular provider, taking insulin, and DSME were strongly associated with most clinical and self-care indicators. In other words, those who had been educated about how to

manage their diabetes, or had access to healthcare or a provider they trusted, were more likely to seek appropriate care and engage in beneficial activities for their diabetes. These results confirm the latest assessment of diabetes quality of care (65) and expand on this evidence to highlight existing disparities.

It is unclear what contributed to increases in some services and activities but not in others. Over the past decade, improvements in processes of care due to innovations like Wagner's Chronic Care Model (16), availability of evidence-based diabetes and chronic disease self-management education programs, such as Stanford's Chronic Disease Self-Management Program (66), and expanded coverage of outpatient DSME under Medicare (67), may have contributed to the upward trend. However, improvements in care processes, and availability and insurance coverage of DSME programs, did not translate into improved care or increased receipt of DSME among all sub-populations. It is possible that people are less likely to get an eye exam, since it requires an additional medical visit which may pose a barrier for some. However, this would not explain why receipt of eye exams declined over time. With respect to declines in self-feet checks, it may be that progress in medical research and treatment has led to an increased reliance on medications over self-management activities or education.

It is also unclear why men, those earning less than $25,000 or had a college degree had lower odds for SMBG, and why both higher education and income were associated with lower odds of both SMBG and daily self-feet checks. These findings are counter to expectations that respondents with greater education and financial means would be more likely to engage in health-promoting behaviors. It could be that those with higher incomes or educational attainment may have less severity of disease or may be more focused on other self-management activities. It is not surprising that having health insurance or a regular provider were associated with higher

odds of most care indicators, as these factors are known to support access to services and improved self-management (68-70). Insulin use was also positively associated with all care indicators. Respondents on insulin may have more severe diabetes and may consequently be more aware of activities required to monitor their health. However, their health status may also impair their ability or interest in engaging in physical activity. Although respondents 18 to 44 years old had higher odds for physical activity and DSME, it is concerning that they were less likely to receive several clinical care services compared to their older counterparts. The literature is surprisingly scant in explaining why people in this age group may be less likely than older adults to seek or receive appropriate diabetes services. Barriers to care may be due to busyness, lower perceived need or disease severity. However, more research is needed to understand this pattern and how to improve receipt of recommended care among 18 to 44 year olds.

Despite potentially great variation in the types of diabetes self-management education available to respondents, those who participated in some type of DSME had higher odds for most clinical and self-care measures. This cross-sectional data does not allow us to establish causality, but these findings support past research demonstrating the positive role of DSME in encouraging people with diabetes to seek appropriate diabetes clinical care and perform recommended self-management activities (66, 71, 72). Participation in DSME is a reflection of several elements, including access to health care, being part of a health system and insurance plan that appropriately refers, offers and covers effective DSME, and personal factors that influence one's decision to participate in DSME (73). Unfortunately, only 57% of BRFSS respondents indicated receiving DSME. These results make a case for improving access to DSME among populations who are less likely to have received DSME and recommended standards of diabetes care.

With respect to disparities in care, Hispanics were less likely to experience significant improvement from 2001 to 2010 in most care measures and also had lower odds for most measures compared to White Non-Hispanics. Although Hispanics' self-care and receipt of services improved if they received DSME, as demonstrated in the interaction models, they had significantly lower odds of getting DSME. Older adults and men were also less likely to receive DSME. This may be due to barriers related to cognitive dysfunction, depression or mobility among older adults (74) and less flexibility or perceived need among men (75, 76). In light of epidemic proportions of Hispanics with diabetes and increased prevalence of diabetes among men and older adults (77), it is important to target these sub-populations with tailored DSME, such as culturally and language appropriate DSME for Hispanics, innovations like telephone-based or in-home strategies for older adults, and more effective recruitment of men (78, 79).

Although the data did show additional racial/ethnic differences in clinical care and self-management, some of these differences were in contrast to expected disparities in care. These findings show that Black Non-Hispanics were more likely to receive key clinical care or engage in self-management activities, such as annual foot and eye exams, DSME and self-feet checks, compared to Whites Non-Hispanics. Hispanics were also more likely to have gotten an annual eye exam. However, Black Non-Hispanics were less likely to get a flu shot, and Hispanics were less likely than White Non-Hispanics to receive or engage in five out of eight clinical and self-care measures.

It is possible that the certain racial/ethnic minorities who are aware of their diabetes diagnosis may be more motivated to seek recommended services and engage in appropriate preventive self-care practices. One recent study of 2005 to 2010 registry data found that African Americans with diabetes were more likely than Whites to receive recommended care. However,

they still experienced poorer outcomes (80). This implies that the improvements seen among Black Non-Hispanics in clinical and self-care measures in this study, may not necessarily translate into better health outcomes, and additional or tailored interventions may be needed to translate receipt of care into improved health in this sub-group. More research is needed to understand this gap between receipt of care and health outcomes, and explore ways to improve translation of care into better health among African Americans. In addition, the poorer odds of Hispanics receiving or engaging in recommended clinical and self-care suggests that they may experience barriers to care and education, beyond those related to insurance status and income. The existing literature shows that barriers related to culture, language, child care, transportation, health knowledge, time, cost and perceived need contribute to poorer health care utilization among Hispanics (81, 82). The Affordable Care Act (ACA) includes several provisions for diabetes prevention and care, as well as programs and research out of The Office of Minority Health and CDC, directed towards minority populations with diabetes (3). Expanding insurance coverage and programs may improve access to diabetes-related services and tailored education and outreach to Hispanics and other at-risk populations.

Limitations

There are some important limitations to note with BRFSS data. Given BRFSS' cross-sectional design, the data can only be used to examine associations not causality between variables. More people are relying on cell phones and opting not to have land-line telephones, which has contributed to poor response rates for telephone-based surveys (83, 84). Until recently, BRFSS did not include cell phone numbers in its sampling frame. Consequently, respondents with land-line telephones from 2001 to 2010 may not be generalizable to the broader US population. Studies have found lower rates of participation in public health surveillance surveys

in areas with higher percentages of African Americans and non-English speakers, including Spanish-only speakers, despite the fact that surveys like BRFSS are administered in English or Spanish (85, 86). This may further limit generalizability and application of BRFSS data to examine racial/ethnic disparities and may paint an overly rosy picture of disparities in diabetes care. In this analysis, Asians, Pacific Islanders, American Indian/Alaska Natives, and other Non-Hispanic race/ethnicities were combined into one larger group, since their subgroup sample sizes were too small to allow for stable estimates. Combining racial/ethnic groups can mask between group differences and potential disparities. Despite these limitations, BRFSS provides an opportunity to identify potentially important associations, and its greatest strength lies in the breadth of the survey, covering all 50 U.S. states and territories, including a large sample size that is nationally representative, to a certain degree.

Conclusion

The findings from this study provide some clarification on the current quality of diabetes clinical and self-care, how this has changed over time, and highlight existing disparities and areas for improvement. Having health insurance, a regular provider and DSME contributed to increased likelihood of receiving recommended diabetes clinical care or engaging in appropriate diabetes self-care activities. Hispanics and men fell short on most care measures. Although Black Non-Hispanics were more likely to receive recommended diabetes care, recent evidence shows that this may not necessarily translate into improved health. This study also confirms the importance of diabetes self-management education in promoting receipt of recommended services and self-care. The greatest return on investment may be in increasing receipt of DSME among people with diabetes. However, only half of the population with diabetes had received any form of DSME, and sub-populations with higher diabetes prevalence, such as Hispanics,

men and older adults, were the least likely to receive DSME. Disparities in care reflect the complexities of developing appropriate interventions and outreach to ensure that populations both have access to recommended care and experience improved health outcomes. With the rollout of the Affordable Care Act, improvements in receipt of appropriate diabetes care and self-management may be observed over time, including among at-risk sub-populations. Health care providers, educators and policy-makers have a prime opportunity to take advantage of ACA-related health care and promotion changes and expanded insurance coverage, and identify ways to leverage ACA provisions to increase access to recommended services and receipt of DSME.

Table 1.1. Characteristics of BRFSS respondents with diabetes from 2001 to 2010 (weighted percentages)

	All years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)
Race/Ethnicity											
White N-H	63 (253,696)	65 (10,105)	63 (13,332)	65 (15,495)	65 (18,510)	64 (23,969)	64 (25,690)	63 (34,636)	62 (33,835)	61 (37,284)	63 (40,840)
Black N-H	15 (44,672)	14 (1,820)	15 (2,222)	15 (2,738)	14 (3,396)	15 (4,035)	14 (4,516)	15 (5,867)	15 (6,072)	15 (6,720)	15 (7,286)
Other N-H	7 (22,550)	6 (1,069)	7 (1,350)	7 (1,431)	6 (1,392)	6 (2,225)	7 (2,377)	7 (2,908)	7 (3,023)	7 (3,294)	7 (3,481)
Hispanic	15 (29,566)	14 (1,448)	15 (1,578)	14 (1,795)	14 (2,078)	15 (2,666)	15 (2,981)	15 (4,025)	16 (3,838)	16 (4,308)	15 (4,849)
Age groups											
18 to 44 years	16 (32,539)	16 (2,164)	17 (2,592)	17 (2,798)	16 (3,033)	16 (3,558)	14 (3,341)	16 (4,026)	16 (3,710)	16 (3,672)	15 (3,645)
45 to 64 years	46 (155,342)	45 (6,438)	44 (8,133)	45 (9,736)	45 (11,449)	45 (14,891)	47 (16,167)	45 (21,198)	46 (20,551)	46 (22,541)	46 (24,238)
≥65years	38 (167,739)	39 (6,031)	40 (8,054)	37 (9,195)	39 (11,254)	38 (14,871)	39 (16,577)	39 (22,846)	38 (23,141)	38 (26,173)	38 (29,597)
Gender											
Female	50 (211,133)	52 (8,580)	52 (11,067)	51 (12,810)	50 (15,341)	50 (19,722)	49 (21,205)	50 (28,880)	50 (28,297)	49 (31,038)	50 (34,193)
Male	50 (144,487)	48 (6,053)	48 (7,712)	49 (8,919)	50 (10,395)	50 (13,598)	51 (14,880)	50 (19,190)	50 (19,105)	51 (21,348)	50 (23,287)
Education											
None to some high school	19 (64,661)	23 (3,427)	22 (4,025)	21 (4,459)	21 (5,146)	20 (6,253)	20 (6,719)	18 (8,623)	18 (8,117)	17 (8,628)	17 (9,264)
HS grad/GED	33 (123,147)	33 (4,959)	33 (6,468)	34 (7,419)	32 (8,823)	33 (11,671)	33 (12,503)	33 (16,725)	33 (16,515)	33 (18,242)	32 (19,822)
Some college	25 (90,864)	25 (3,504)	25 (4,523)	25 (5,453)	25 (6,378)	26 (8,416)	25 (9,091)	25 (12,219)	26 (12,330)	26 (13,805)	26 (15,145)
College grad	22 (75,647)	19 (2,676)	20 (3,701)	21 (4,323)	22 (5,287)	21 (6,868)	22 (7,656)	24 (10,321)	23 (10,263)	24 (11,502)	25 (13,050)
Income											
<$25,000	43 (142,187)	46 (6,146)	46 (7,816)	46 (9,322)	45 (10,923)	44 (13,694)	42 (14,445)	40 (18,465)	41 (18,597)	41 (20,351)	41 (22,428)
$25,000 to $49,999	29 (86,535)	30 (3,457)	31 (4,599)	30 (5,387)	30 (6,336)	29 (8,131)	29 (8,759)	28 (11,752)	28 (11,574)	28 (12,792)	27 (13,748)
≥$50,000	28 (72,121)	24 (2,433)	23 (3,192)	24 (3,724)	25 (4,448)	27 (6,326)	29 (7,231)	32 (10,343)	31 (10,438)	31 (11,482)	32 (12,504)
Married/Partnered											
No	38 (176,578	39 (7,192)	39 (9,197)	38 (10,635)	38 (12,817)	38 (16,316)	38 (17,936)	38 (23,866)	39 (23,786)	38 (25,949)	38 (28,884)
Yes	62 (177,791)	61 (7,400)	61 (9,533)	62 (11,023)	62 (12,834)	62 (16,907)	62 (18,026)	62 (24,038)	61 (23,437)	62 (26,240)	62 (28,353)
Employed											
No	64 (245,283)	63 (9,419)	63 (12,266)	63 (14,283)	64 (17,302)	63 (22,674)	63 (24,535)	64 (33,399)	64 (32,776)	64 (37,075)	66 (41,554)
Yes	36 (109,016)	37 (5,167)	37 (6,460)	37 (7,379)	36 (8,368)	37 (10,550)	37 (11,421)	36 (14,485)	36 (14,451)	36 (15,089)	34 (15,646)
Health insurance											
No	11 (30,036)	10 (1,316)	11 (1,828)	11 (2,010)	11 (2,476)	11 (2,999)	10 (3,085)	11 (4,117)	10 (3,663)	10 (4,047)	11 (4,495)
Yes	89 (324,816)	90 (13,292)	89 (16,913)	89 (19,665)	89 (23,196)	89 (30,240)	90 (32,937)	89 (43,847)	90 (43,644)	90 (48,227)	89 (52,855)
Regular provider											
No	7 (19,243)	7 (957)	8 (1,238)	7 (1,276)	7 (1,477)	7 (1,862)	7 (1,903)	8 (2,661)	7 (2,462)	8 (2,659)	7 (2,748)
Yes	93 (335,348)	93 (13,629)	92 (17,500)	93 (20,231)	93 (24,188)	93 (31,378)	93 (34,094)	92 (45,294)	93 (44,845)	93 (49,606)	93 (54,583)
BMI											
Normal weight	17 (55,120)	19 (2,643)	20 (3,367)	18 (3,604)	18 (4,031)	17 (5,304)	16 (5,543)	17 (7,188)	16 (7,105)	16 (7,988)	15 (8,347)
Overweight	33 (110,365)	35 (4,899)	34 (6,136)	34 (6,866)	33 (8,167)	33 (10,321)	33 (11,294)	32 (14,709)	32 (14,637)	32 (15,832)	32 (17,504)
Obese	50 (170,879)	47 (6,272)	46 (8,217)	48 (10,006)	49 (12,056)	50 (15,961)	51 (17,331)	51 (23,565)	52 (23,149)	52 (25,808)	53 (28,514)
Taking insulin											
No	73 (188,967)	73 (8,667)	74 (11,426)	74 (14,719)	75 (16,062)	74 (17,327)	74 (22,014)	73 (24,020)	72 (23,821)	71 (24,454)	70 (26,457)
Yes	27 (70,970)	27 (3,248)	26 (4,158)	26 (5,206)	25 (5,787)	26 (6,226)	26 (7,922)	27 (8,681)	28 (9,055)	29 (9,832)	30 (10,855)

Table 1.2. Unadjusted, weighted proportions for diabetes clinical and self-care indicators, 2001 to 2010

		HbA1c		Annual foot exam		Eye exam		Flu shot		DSME		SMBG		Self-feet check		Exercise	
		%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
2001	All	64.6	1.3	64.2	1.2	66.6	1.1	42.9	1.0	52.4	1.2	55.2	1.2	74.9	1.2	63.0	1.0
	White N-H	68.1	1.4	64.2	1.4	68.8	1.3	46.2	1.2	54.9	1.4	58.6	1.4	74.0	1.3	66.9	1.1
	Black N-H	62.9	3.5	72.0	2.8	65.2	3.0	39.5	2.5	56.5	3.0	54.9	3.0	79.2	2.7	55.5	2.5
	Other N-H	70.4	3.8	70.5	3.4	68.1	3.7	41.6	3.2	49.0	3.8	57.9	3.6	78.2	3.4	65.2	3.4
	Hispanic	54.1	3.5	54.0	3.4	60.8	3.3	34.4	2.8	42.6	3.3	44.5	3.3	71.6	3.8	56.7	2.9
2002	All	68.2	1.2	66.7	1.3	64.1	1.3	45.4	1.0	55.7	1.2	55.9	1.3	75.2	1.1	64.2	1.0
	White N-H	68.6	1.4	66.8	1.3	66.3	1.3	46.9	1.1	56.0	1.3	58.7	1.3	73.3	1.2	66.1	1.0
	Black N-H	69.8	2.7	76.8	2.2	70.1	2.6	41.7	2.3	57.6	2.7	58.0	2.7	74.8	2.6	64.3	2.1
	Other N-H	67.2	5.2	63.2	6.5	55.1	5.7	45.6	3.9	57.1	4.5	47.6	5.4	69.8	4.6	66.9	3.6
	Hispanic	65.7	3.7	59.9	3.7	56.4	3.8	42.4	3.4	52.2	3.8	49.3	3.8	81.6	2.9	57.3	3.4
2003	All	65.9	1.2	67.4	1.1	61.3	1.2	44.5	1.0	54.2	1.1	57.0	1.2	73.7	1.1	64.3	1.1
	White N-H	69.1	1.3	69.4	1.2	60.2	1.3	46.7	1.1	55.3	1.3	60.4	1.3	71.9	1.4	68.2	1.1
	Black N-H	67.8	3.0	72.4	2.5	66.8	2.7	42.6	2.4	59.4	2.4	61.8	2.5	79.5	1.9	60.3	2.4
	Other N-H	60.7	6.1	71.5	4.3	60.4	5.5	42.9	3.7	47.3	5.2	44.7	4.6	75.7	4.8	62.8	5.3
	Hispanic	57.1	3.3	57.7	3.1	60.6	3.0	37.5	2.6	48.8	3.0	48.6	3.1	72.3	3.0	58.6	2.8
2004	All	68.9	1.1	66.8	1.1	62.0	1.1	46.3	0.9	56.6	1.1	59.6	1.1	71.3	1.2	66.4	0.9
	White N-H	71.2	1.2	67.2	1.2	63.4	1.3	48.2	1.1	58.8	1.2	62.9	1.2	71.7	1.3	69.3	1.0
	Black N-H	67.8	2.2	73.3	2.1	63.1	2.1	41.6	2.0	57.1	2.1	60.4	2.2	76.3	2.0	61.5	1.9
	Other N-H	72.1	4.5	63.6	4.3	62.2	4.4	50.3	3.7	55.3	4.2	60.3	4.3	72.4	4.2	68.6	3.5
	Hispanic	61.5	3.7	59.9	3.3	56.7	3.3	40.9	2.7	50.2	3.3	49.1	3.4	65.0	3.7	61.5	3.1
2005	All	64.3	1.2	66.1	1.3	60.5	1.2	39.9	0.8	54.3	1.2	60.5	1.2	73.3	1.1	60.8	1.0
	White N-H	68.8	1.5	68.6	1.3	61.5	1.4	42.8	1.1	56.9	1.4	65.0	1.2	72.6	1.5	64.5	1.0
	Black N-H	62.1	2.5	73.2	2.3	63.2	2.3	37.2	1.9	59.7	2.2	62.1	2.3	77.6	2.0	58.6	2.0
	Other N-H	63.5	4.4	71.9	3.3	62.6	4.0	47.0	3.3	48.9	4.1	65.4	3.7	75.2	3.7	66.4	3.1
	Hispanic	52.7	3.9	52.4	3.7	56.6	3.5	30.4	1.9	44.7	3.4	46.6	3.4	69.8	3.5	48.7	3.2
2006	All	68.2	1.0	67.8	1.0	64.1	1.1	45.8	0.9	54.7	1.1	63.3	1.1	73.7	1.0	65.7	0.9
	White N-H	68.9	1.2	67.4	1.3	63.6	1.3	50.3	1.2	57.4	1.3	64.9	1.4	73.2	1.2	69.2	0.9
	Black N-H	70.0	2.3	76.6	2.0	67.4	2.4	43.0	2.2	58.9	2.3	69.3	2.1	78.5	2.0	61.4	2.0
	Other N-H	69.4	3.7	70.6	3.4	67.4	3.5	44.8	3.3	49.4	3.6	63.2	3.2	76.8	3.1	67.1	2.8
	Hispanic	63.7	3.2	62.6	3.0	61.3	3.1	33.3	2.3	46.2	3.1	54.2	3.2	70.8	3.4	59.7	3.0
2007	All	69.6	1.2	69.4	1.1	66.3	1.1	52.1	0.9	57.7	1.2	62.4	1.2	74.5	1.1	65.5	0.8
	White N-H	70.8	1.2	70.6	1.1	65.5	1.2	55.6	1.0	61.2	1.2	66.4	1.1	73.0	1.3	67.8	0.8
	Black N-H	69.7	2.6	77.1	2.2	68.2	2.6	48.6	2.2	59.8	2.7	66.4	2.6	78.2	2.4	63.1	1.8
	Other N-H	69.0	5.3	69.1	5.1	73.0	3.3	53.7	3.4	58.2	4.9	57.9	5.0	74.5	4.4	71.2	2.4
	Hispanic	65.9	3.7	57.7	3.6	63.8	3.5	42.5	2.2	44.6	3.6	49.2	3.6	75.7	2.9	58.7	2.2
2008	All	68.6	1.0	67.2	1.1	62.2	1.0	49.9	0.8	56.3	1.0	62.8	1.0	71.8	1.0	63.7	0.8
	White N-H	70.1	1.1	66.7	1.3	62.2	1.3	51.7	1.0	56.1	1.3	64.2	1.3	69.8	1.2	66.0	0.9
	Black N-H	71.0	2.4	77.1	2.1	65.1	2.4	45.6	1.9	61.6	2.2	64.3	2.4	77.1	2.2	60.9	1.8
	Other N-H	69.8	3.3	72.3	2.8	62.3	3.5	51.7	2.7	52.7	3.5	60.8	3.3	74.0	3.3	68.7	2.5
	Hispanic	59.4	3.3	56.1	3.1	59.1	3.0	45.7	2.3	52.6	2.9	59.3	3.0	73.5	3.0	58.6	2.2
2009	All	67.6	1.2	68.4	1.2	63.8	1.1	49.5	0.9	56.9	1.1	61.9	1.1	70.1	1.2	63.2	0.9
	White N-H	70.2	1.3	72.1	1.1	63.7	1.2	52.6	1.0	58.1	1.2	63.4	1.2	69.2	1.4	64.6	1.0
	Black N-H	67.7	2.9	70.3	3.0	65.4	2.9	46.6	2.7	56.6	2.9	65.7	2.8	70.9	2.9	61.6	2.3
	Other N-H	69.6	3.9	69.5	4.0	67.3	3.7	54.5	3.0	57.2	3.9	56.2	4.0	71.4	3.9	65.4	2.7
	Hispanic	57.5	3.7	55.2	3.6	60.7	3.5	40.8	2.2	52.9	3.4	56.8	3.5	73.3	3.8	59.8	2.4
2010	All	69.1	1.0	67.7	1.0	62.1	1.0	50.5	0.8	57.2	1.0	63.3	0.9	70.8	1.0	64.0	0.7
	White N-H	69.6	1.2	68.0	1.2	63.5	1.2	53.9	1.0	59.9	1.1	63.0	1.2	68.9	1.3	65.1	0.9
	Black N-H	73.1	1.9	75.4	2.0	63.4	2.2	48.5	1.9	57.5	2.1	74.8	1.7	76.8	1.9	58.0	1.8
	Other N-H	63.6	3.8	66.2	3.7	57.9	3.5	53.3	2.8	57.3	3.5	54.3	3.7	68.9	3.9	71.2	2.3
	Hispanic	62.0	3.4	54.3	3.3	55.8	3.3	40.2	1.8	43.3	3.2	53.2	3.3	73.8	3.6	63.9	1.9

DSME: diabetes self-management education; SMBG: self-monitoring blood glucose
Proportions standardized to age distribution of US Census 2000 population.

Table 1.3. Odds Ratios for diabetes clinical and self-care measures

	A1C tests	Annual foot exam	Eye exam	Flu shot	DSME	SMBG	Self-feet check	Physical activity
	OR (se)	OR (se)	OR (se)	OR (se)	OR (se)	OR (se)	OR (se)	OR (se)
2002	1.19**	1.05	0.90	1.18**	1.14*	1.17**	0.96	1.06
	(0.07)	(0.06)	(0.06)	(0.05)	(0.05)	(0.06)	(0.07)	(0.05)
2003	1.11	1.10	0.86**	1.20***	1.01	1.22***	0.95	1.07
	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
2004	1.25***	1.02	0.82***	1.16**	1.12*	1.409***	0.86*	1.06
	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
2005	1.03	1.09	0.88*	0.87**	1.09	1.57***	0.91	0.91
	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
2006	1.13*	1.18**	0.91	1.07	1.12*	1.59***	0.92	1.04
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
2007	1.25***	1.13*	0.94	1.40***	1.17***	1.57***	0.94	1.08
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
2008	1.16**	1.13*	0.83***	1.33***	1.11*	1.59***	0.87*	0.91
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
2009	1.17**	1.19**	0.87**	1.27***	1.12*	1.53***	0.84**	0.90*
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
2010	1.19**	1.14**	0.79***	1.19***	1.08	1.50***	0.85**	0.96
	(0.06)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
Black N-H	0.97	1.55***	1.27***	0.68***	1.17***	0.99	1.18***	1.06
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Other N-H	0.97	1.02	1.06	0.95	0.92	0.92	1.10	1.14**
	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
Hispanic	0.87**	0.81***	1.15***	0.67***	0.89**	0.72***	1.02	1.00
	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)
18 to 44 years old	0.68***	0.78***	0.64***	0.55***	1.08*	1.06	0.75***	1.38***
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
≥65 years	1.09**	1.05	1.89***	2.47***	0.85***	1.01	0.96	1.07**
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Male	0.92***	1.17***	0.93**	1.03	0.83***	0.76***	0.88***	1.29***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
HS grad/GED	0.95	1.08*	1.09**	1.06*	1.48***	0.97	1.02	1.27***
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Some college	0.99	1.12**	1.16***	1.11**	2.01***	0.94	1.03	1.54***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)
College grad	1.09	1.14**	1.35***	1.22***	1.93***	0.908**	0.87**	2.00***
	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
$25,000 to $49,999	0.97	1.01	1.13***	1.05	1.16***	0.87***	0.90***	1.38***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)
≥$50,000	1.05	0.98	1.39***	1.07*	1.26***	0.77***	0.85***	1.96***
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Married/Partnered	1.11***	1.07**	1.06*	1.00	1.10***	0.99	0.95*	1.08***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Health insurance	1.82***	1.48***	1.75***	1.63***	1.15***	1.40***	1.02	1.04
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Regular provider	2.49***	1.94***	1.51***	1.58***	1.21***	1.69***	1.05	1.09
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
Taking insulin	1.91***	1.98***	1.52***	1.39***	2.23***	5.39***	1.18***	0.69***
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)
DSME	1.56***	2.08***	1.65***	1.51***	N/A	1.76***	1.04	1.44***
	(0.02)	(0.02)	(0.02)	(0.02)	N/A	(0.02)	(0.02)	(0.02)

* p<0.05, ** p<0.01, *** p<0.001

DSME: diabetes self-management education; SMBG: self-monitoring of blood glucose

Referent groups: 2001, White Non-Hispanic, 45-64 years old, Female, None to some high school, <$25,000, Single, No regular provider, Not taking insulin, No DSME

Table 1.4. Change in receipt of clinical and self-care measures from 2001 to 2010 (percent), by race/ethnicity

	ALL			White N-H			Black N-H			Other N-H			Hispanic		
	Change in %	95CI		Change in %	95CI		Change in %	95CI		Change in %	95CI		Change in %	95CI	
HbA1c 2x/year	4.43**	1.30	7.56	1.46	-2.15	5.07	10.19*¥	2.44	17.94	-6.86	-17.35	3.64	7.89	-1.67	17.46
MD foot exam	3.44*	0.49	6.40	3.78*	0.23	7.32	3.37	-3.40	10.13	-4.30	-14.16	5.57	0.27	-8.89	9.43
Eye exam	-4.45**	-7.39	-1.51	-5.30**	-8.71	-1.90	-1.83	-9.03	5.36	-10.19*	-20.05	-0.32	-4.98	-14.11	4.14
Flu shot	7.62***	5.20	10.03	7.75***	4.75	10.75	9.06**	3.03	15.09	11.66**	3.20	20.12	5.73	-0.73	12.18
DSME	4.81**	1.84	7.78	5.01**	1.51	8.52	0.96	-6.23	8.15	8.30	-1.82	18.41	0.75	-8.28	9.77
SMBG	8.13***	5.19	11.08	4.37*	0.86	7.88	19.95***φ	13.31	26.59	-3.66	-13.76	6.45	8.78	-0.30	17.85
Self feet check	-4.11**	-7.17	-1.05	-5.07**	-8.75	-1.38	-2.42	-8.88	4.04	-9.33	-19.50	0.84	2.20	-8.05	12.45
Physical activity	1.00	-1.37	3.37	-1.74	-4.50	1.02	2.44	-3.61	8.49	5.95	-2.08	13.97	7.14*¥	0.30	13.98

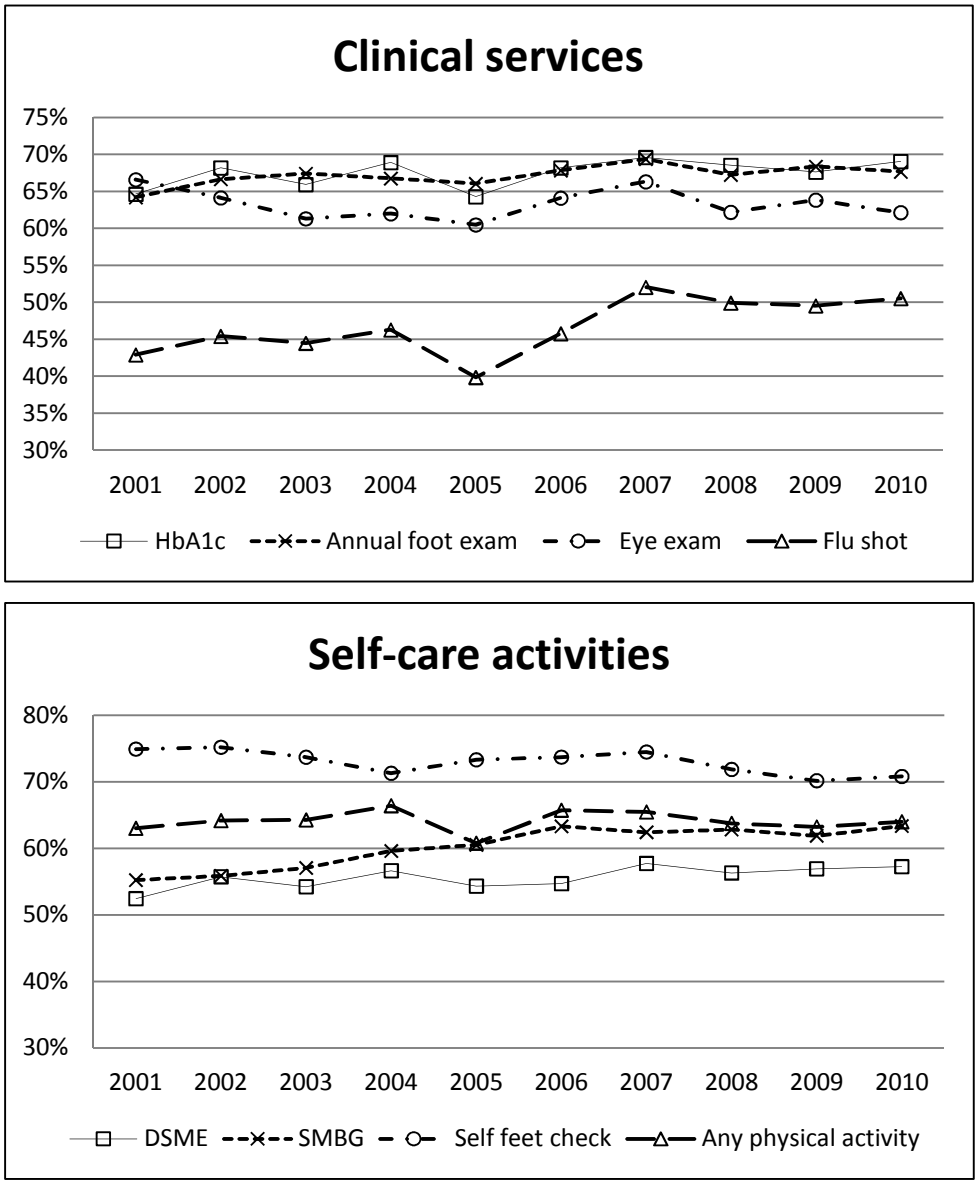
DSME: diabetes self-management education; SMBG: self-monitoring blood glucose

Change from 2008 to 2010: * p<0.05, ** p<0.01, *** p<0.001

Difference in absolute change from 2001 to 2010 compared to White Non-Hispanics (referent group): ¥ p<0.05, φ p<.001

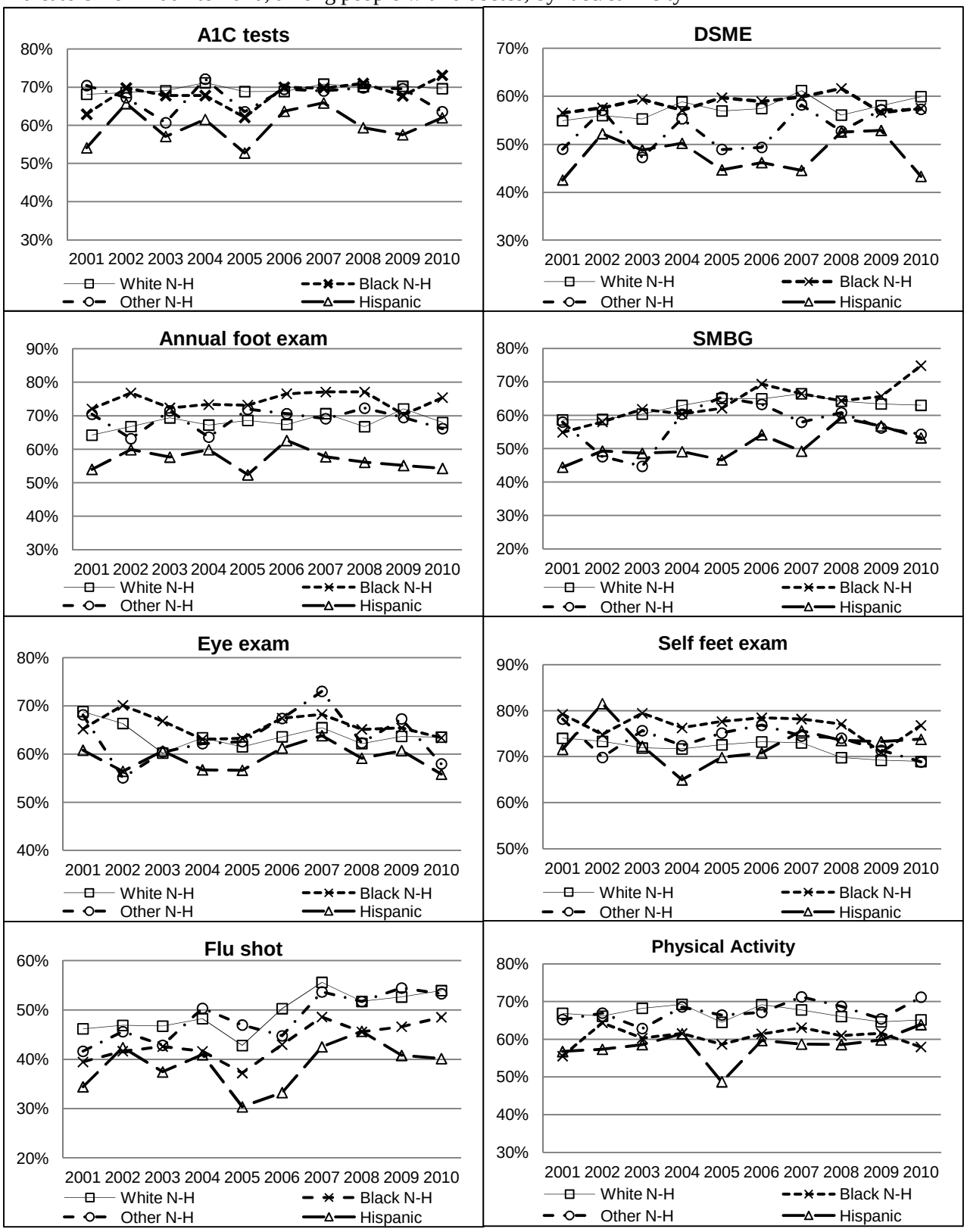
2001 to 2010 proportions standardized to age distribution of US Census 2000 population.

Figure 1.1. Unadjusted, age-standardized, weighted proportions for diabetes clinical and self-care Indicators from 2001 to 2010, among people with diabetes



DSME: diabetes self-management education; SMBG: self-monitoring of blood glucose
Proportions standardized to age distribution of U.S. Census 2000 population.
White square: DSME; X: SMBG; White circle: Self-feet check; White triangle: Any physical activity

Figure 1.2. Unadjusted, age-standardized, weighted proportions for diabetes clinical and self-care Indicators from 2001 to 2010, among people with diabetes, by race/ethnicity



DSME: diabetes self-management education; SMBG: self-monitoring of blood glucose
Proportions standardized to age distribution of U.S. Census 2000 population.
White square: White N-H; X: Black N-H; White circle: Other N-H; White triangle: Hispanic

Chapter 3

Study 2: ***Changes in awareness and use of calorie information following mandatory menu-labeling in restaurants in King County, Washington***

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ABSTRACT

Objectives

King County's menu-labeling regulation, effective January 2009, requires chain restaurants to provide calorie information. This study examined population-level impact of the regulation on calorie information awareness and use and explored potential disparities in outcomes.

Methods

We analyzed 2008-2010 Behavioral Risk Factor Surveillance System data from 3132 King County adult residents who reported eating at a regulated chain. Analyses used regression models to assess changes in calorie information awareness and use from pre- to post-policy implementation, by customer demographics, health status and restaurant type.

Results

Calorie information awareness and use increased significantly from 2008 to 2010. Unadjusted analyses indicate the proportion who saw and used calorie information tripled, 8.1% to 24.8%, from 2008 to 2010 ($p<0.001$). Fully-adjusted analyses show odds of seeing and using calorie information increased significantly overall ($p <0.001$). White, higher income, and obese respondents had greater odds of seeing calorie information. Women, higher income groups and those eating at a fast-food chain were more likely to use this information ($p<.05$).

Conclusion

Significant increases in seeing and using calorie information occurred after implementation of menu-labeling regulation. However, improvements varied across race, income and gender.

Introduction

In recent years, policy-makers and public health practitioners have looked toward population-level policies, such as posting calorie and other nutrition information at restaurants, to help curb epidemic levels of obesity and related chronic diseases (41, 87). King County, Washington began enforcement of a new menu-labeling regulation on January 1, 2009 - the second jurisdiction in the United States to do so after New York City. The regulation requires chain restaurants to provide calorie, saturated fat, carbohydrate and sodium information (88).

To date, research on the impact of menu labeling policies has primarily focused on pre-post changes in calorie information awareness and calories ordered or purchased among patrons intercepted at regulated chain restaurants using surveys and/or receipt data (89-95). These previous studies may not provide an accurate population-level estimate of menu-labeling awareness and use and are not ideal for examining which segments of the population are more likely to see and use menu labels. To assess population-level changes in nutrition information awareness and use, the local health department, Public Health-Seattle & King County (PHSKC), added questions to an ongoing telephone survey of King County residents from 2008 to 2010. This paper examines county-wide and subpopulation changes by individual-level demographics and health status in two outcomes: menu-labeling awareness (i.e., seeing calorie information) and information use (i.e., using calorie information) before and after policy implementation and examines the characteristics of restaurant customers more likely to see and use information after implementation.

Methods

We conducted an observational study of menu-labeling awareness and use in King County, using repeated cross-sectional, county-specific data from the Behavioral Risk Factor

Surveillance System (BRFSS) from May 2008 to December 2010. The pre-policy period was defined as May 1 to December 31, 2008, and post-policy as January 1, 2009 to December 31, 2010. A "regulated chain" was defined by the King County Board of Health as a food establishment with 15 or more locations nationwide (96).

Data Source

The Washington State Institutional Review Board approved inclusion of the menu-labeling module in Washington State BRFSS for administration to King County residents and use of these data for policy evaluation purposes. This survey was conducted among adults using standard BRFSS random digit-dial, landline telephone survey methodology developed by the United States Centers for Disease Control and Prevention (CDC)(97-99).

We pilot tested a module of menu-labeling questions in the King County BRFSS questionnaire from January through April 2008. The final version of questions was administered from May 1, 2008 through December 31, 2010. The outcomes, seeing and using calorie information, were based on responses to the questions: "*The last time you ate at or bought take-out food from <name of restaurant or store provided by respondent> did you see any information about the number of calories for the items you were interested in ordering?"*, and *"Did you use the calorie information you saw to help you decide what to buy?"*

Study participants

The sampling frame for the survey was English-speaking adults, 18 years and older, living in King County. Study analyses were limited to respondents who reported having eaten at a regulated restaurant in the past week, indicated by responding "Yes" to the question, "*Did you eat out in the past week?*" and named a regulated restaurant in response to the question, "*The last*

time you ate or got take-out food, what was the name of the restaurant or store?" Respondents who indicated, "Don't know", or refused to answer were not included in the final analyses.

Data Analysis

For descriptive purposes, we conducted univariate analyses to estimate the proportion of regulated chain patrons who saw or used calorie information over time within demographic subgroups. We tested differences in the proportion of all respondents who saw or used calorie information from pre- to post-policy, and also conducted stratified tests of proportions to examine possible differences in the magnitude of changes in calorie information awareness and use by race, gender, income, education, and weight and chronic disease status. We then fit a multivariable logistic regression model to compare odds ratios from pre- to post-policy for seeing and using calorie information, adjusting for race, age, gender, education, income, marital status, body mass index, chronic disease status and restaurant-type (Model 1). Covariates were chosen based on their potential influence on food choices (100-105). We conducted exploratory regression analyses by adding interaction terms to Model 1 to examine possible effect modification by race, gender and income on policy impact. We also fit a separate logistic regression model (Model 2) limited to the post-policy period (January 2009 to December 2010) including the same covariates as Model 1 to identify which sub-groups had higher odds of seeing or using calorie information only after the policy was in effect.

A policy indicator with three time periods was created to represent pre-policy (May-December 2008), post–policy year 1 (January-December 2009) and post–policy year 2 (January-December 2010). Race was categorized as Non-Hispanic White and non-White including Hispanic. Age was grouped into three categories, 18 to 30, 31 to 50, and 51 years and older, to follow age group dietary recommendations from the U.S. Department of Agriculture (106).

Education was grouped into: high school graduate or less, some college, and college graduate. Annual household income from all sources was defined as less than $35,000, $35,000 to less than $50,000, $50,000 to less than $75,000, and $75,000 and above. Marital status was grouped into two categories: anyone who indicated being married or a member of an unmarried-couple, and persons who said they were divorced, widowed, separated, or single. Body mass index (BMI) was grouped into normal weight (BMI<25), overweight (25≤BMI<30), and obese (BMI≥30 (107). Chronic disease status was a dichotomous variable representing anyone who had, versus had not, reported having been told by a health professional that s/he had diabetes (excluding gestational diabetes), heart disease or had a prior heart attack or stroke. A regulated restaurant was classified as "sit-down" if it provided both seating and table service (e.g. Applebee's, Denny's and IHOP). Otherwise, it was designated as "fast food" (e.g. McDonald's, Subway, Taco Bell and coffee, juice or dessert shops, such as Starbucks, Jamba Juice and Ben & Jerry's).

All analyses were conducted using Stata/IC 12.0. In accordance with CDC methodology (9-11), survey participant responses were weighted to equalize selection probability and to adjust for survey non-coverage and nonresponse when compared to King County population estimates (108).

Results

There were 8,737 King County BRFSS respondents during the study period. Nearly two-thirds (65.0%) indicated having eaten out in the past week. Among those who ate out, 72.8% ate at a regulated chain (i.e., 47.7% of the total King County BRFSS sample) (Table 2.1). The 3,132 respondents who ate at a regulated chain constituted the study population. The majority of the study population was Non-Hispanic white (82.3%), at least 31 years of age (77.6%), married or

partnered (68.7%), high income (54.2% with annual household incomes of $75,000 or more) and well-educated (54.9% had college degrees). A slightly lower proportion of older adults ate at a regulated chain compared to the whole King County BRFSS sample, 32.9% versus 38.6%, and a slightly higher proportion was overweight or obese, 62.5% versus 57.4%, respectively ($p<.05$). Other characteristics of those who ate at a regulated chain were not statistically different from the whole King County BRFSS sample. Seventy-three regulated chains were included in this analysis, with 48 designated as fast food and 25 as sit-down restaurants. Among those who ate at a regulated chain, the majority (87.8%) ate at a fast food chain and not a sit-down restaurant.

Changes in calorie information awareness and use from pre- to post-policy

In univariate analyses, the proportion that saw or used calorie information significantly increased ($p<.001$), tripling from 18.6% to 59.4% and 8.1% to 24.8%, respectively, from May 2008 to December 2010 (Figure 2.1, Table 2.2). Of note, the full effects of labeling on calorie information awareness and use were not apparent until a year after implementation and were sustained throughout the second year (Figure 2.1). Calorie information awareness increased significantly in all subgroups from pre- to post-policy ($p<.001$). Similarly, there were significant increases in information use in all subgroups ($p<.05$), except among those with a high school education or less (Table 2.2). However the amount of change in seeing and using calorie information differed across subgroups. The largest absolute increases in both outcomes were among white, older, wealthier, and more highly educated respondents. The absolute change in seeing calorie information was significantly greater in those with annual household incomes of $50,000 or above compared to those earning $35,000 per year or less, and greater in the higher education groups compared to those with a high school diploma or less. The amount of absolute change from 2008 to 2010 in calorie information use was significantly greater among college

graduates compared to those with a high school diploma or less, among married/partnered respondents compared to single respondents, and among those with an annual household income of $35,000 to $49,999 or at least $75,000 compared to the lowest income group ($p<.05$).

Our fully-adjusted regression model confirmed these upward trends in calorie information awareness and use, with odds for seeing or using information increasing significantly in each post-policy year compared to 2008 (Table 2.3, Model 1). The odds of seeing calorie information after policy-implementation were 4.95 (95%CI: 3.65, 6.71) in 2009 and 7.19 (95%CI: 5.27, 9.81) in 2010, compared to 2008 ($p<.001$). Across all time periods, Non-Hispanic Whites and those with annual household incomes of $35,000 or greater, had significantly higher odds of seeing calorie information compared to non-Whites and those in the lowest income group ($p<.05$). Similarly, the odds for calorie information use were significantly higher in 2009 (OR=2.73, 95% CI: 1.81, 4.12) and 2010 (OR=3.91, 95%CI: 2.63, 5.81), compared to 2008 ($p<.001$), and women and higher income groups ($50,000 or greater) had higher odds of using this information ($p<.05$) than their counterparts.

Exploratory analyses did not find any significant effect modification (i.e., interaction) of policy implementation period by race or income, for either seeing or using calorie information. Nor did we find a significant interaction between policy implementation and gender on using calorie information ($p>.05$ in all cases, results not shown). However, effect modification by gender for seeing calorie information was significant, comparing both 2009 and 2010 to 2008 ($p=0.004$ and 0.02 respectively). Women had smaller increases in seeing calorie information from pre- to post-policy implementation, compared to men (men 2009 OR=8.15, 95%CI: 4.93, 13.45, vs women 2009 OR=3.23, 95%CI: 2.20, 4.76; men 2010 OR=10.94, 95%CI: 6.54, 18.30, vs women 2010 OR=5.11, 95%CI: 3.48, 7.52). In interpreting these results, we note that women

at baseline had significantly higher odds of seeing calorie information compared to men (OR=1.94, 95%CI: 1.13, 3.35), and that this difference by sex was much smaller in 2009 and 2010.

Disparities following policy-implementation

We also examined differences in seeing and using calorie information across subgroups using only data from *after* the menu-labeling policy went into effect (Table 2.3, Model 2). Fully-adjusted logistic regression models limited to this post-policy period (i.e., January 2009 to December 2010), showed that non-Whites had 0.63 (95%CI=0.44, 0.90) times the odds of seeing calorie information compared to Non-Hispanic Whites ($p<.05$). The odds for seeing calorie information were 1.42 (95%CI=1.03, 1.95) among obese compared to normal weight respondents. Those with annual household incomes of at least $35,000 had higher odds of seeing calorie information compared to those in the lowest income group ($35,000 to <$50,000: OR=1.88, 95%CI=1.20, 2.96; $50,000 to <$75,000: OR=1.99, 95%CI=1.28, 3.08; $75,000 and up: OR=1.79, 95%CI=1.18, 2.71, respectively). Women and wealthier respondents were more likely to use calorie information. Women had 1.37 (95%CI=1.01, 1.85) times the odds of using calorie information compared to men, and those with annual household incomes of at least $50,000 had 2.21 times the odds of using calorie information compared to the lowest income group ($50,000 to <$75,000: OR=2.21, 95%CI =1.27, 3.85; $75,000 and up: OR=2.21, 95%CI=1.29, 3.81). Those who ate at a sit-down restaurant had slightly lower odds (OR=0.62, 95%CI=0.39, 0.99) of using calorie information compared to fast-food patrons.

Discussion

Following implementation of menu-labeling regulation in King County, Washington, the proportion of customers eating at regulated restaurants that saw and used calorie information on

menus tripled – a significant increase. The results from this population-level study of regulated chain patrons are consistent with the findings from a point-of-purchase evaluation of the 10 leading regulated chains in King County, which also observed increases of similar magnitude in the percentages of customers who saw and used calorie information from pre- to post-regulation (94). Evaluations of menu-labeling in New York City found similar increases in consumer awareness and use of calorie information following implementation of its regulations (89, 90). Using estimates of King County's 3-year (2008-2010) adult average population (108), we estimate at least 600,000 more King County adults saw calorie information, and over 250,000 more used this information following policy implementation.

There were increases in awareness and use among all subgroups from pre- to post-policy. However, it is also important to note disparities in patron awareness and use of calorie information across demographic subgroups. Results from both regression models (Table 2.3) show that men, non-Whites including Hispanics, and the lowest income group (less than $35,000 per year) were less likely to see and/or use the calorie information than their counterparts. The reasons for this may vary depending on the subgroup. Men may have different priorities than women in their food choices, for example, favoring meat over fruits and vegetables, or being less likely to make dietary changes in order to lose weight (109). Non-White subgroups, particularly those of low socioeconomic status, may have less knowledge of healthy nutrition compared to Whites of higher SES (110). A larger proportion of the non-White population consists of immigrants or non-native English speakers who may have difficulty understanding and using calorie information posted in English. They may have a poorer understanding about the meaning of "calories" and how to interpret and use posted information. Lower income groups may not use calorie information if the purpose of their order is to maximize the amount of food purchased

relative to price (111). Lack of time, ordering habits or preferences may also contribute to lower use of calorie information (112, 113). During post-implementation, it is encouraging that obese adults were more likely to see calorie information than their leaner counterparts, suggesting the group that might benefit most from this information is also more likely to see it.

This study provides new information about the differential impact of menu-labeling across subgroups of customers and restaurant types. For example, there were no differences in calorie information awareness between fast food and sit-down restaurant diners. However, those who ate at a sit-down restaurant were less likely than fast food diners to use this information. This may be a reflection of patron differences. In our sample, those who ate at a sit-down restaurant were slightly older, and less likely to have a college degree or an annual household income of $75,000 or higher ($p<.05$, table not shown). As described earlier, those with lower SES and older patrons may be less likely to use this information for various reasons (e.g., limited nutrition knowledge or understanding of how to use calorie information). In addition, the reasons consumers choose to eat at a sit-down versus fast food restaurant may influence whether they use calorie information (e.g., special occasion).

Food choice is a complex process. Additional research is needed to understand the reasons for these disparities and to identify strategies to improve calorie information awareness and use among subgroups currently less likely to benefit from menu labeling. Further study is also needed to identify factors that influence consumers' use of menu-labeling information to make healthier food choices, to understand why consumers may choose higher calorie options over lower calorie options, and to determine whether and how restaurant-type may influence these decisions. Additional research is also needed on how to optimize the use of menu-labels. How information is formatted (114-116), the presence of promotional activities for specific

menu items (117), difficulties in understanding caloric information (118), and lack of interest in limiting caloric intake may affect use.

This study differs from the published point-of-purchase studies in that it is the first to demonstrate the impact of menu-labeling among an entire population of regulated chain restaurant patrons rather than among a selected sample. This increases the generalizability of the findings that awareness and use of calorie information increase after implementation of a menu-labeling regulation. Previous studies of menu-labeling regulation have primarily used point-of-purchase surveys and receipt information from a limited set of chain restaurants, typically fast food chains (89-91, 94, 95, 119, 120). Our BRFSS evaluation also provides an assessment of calorie information awareness and use over an extended period of time, 8 months pre- to 24 months post-policy implementation, a follow-up period longer than any of the studies to date on menu-labeling regulations. Our observation that the full effect of labeling may not be apparent until up to a year after implementation suggests that negative findings of some prior studies may have been due to their limited follow-up period (89, 95). In addition, this study is not limited to respondents who ate at fast food chains, but includes data from respondents who ate at any type of regulated chain, either fast food or sit-down, with 73 different chains represented. Therefore, these study findings may paint a more complete picture of population-level calorie information use and awareness patterns, and whether any changes in calorie information awareness and use are sustained or magnified over time. However, it is important to note that despite the positive trends observed in awareness and use of menu labels in this and other studies (6, 15), the evidence is mixed as to whether consumers will necessarily order fewer calories or choose healthier food options after having seen calorie information (89, 91-95, 119-122).

This study has limitations worth noting. First are threats to generalizability. Until recently (2011), BRFSS has been a landline telephone-based survey. The demographics of those who both have a landline telephone and agree to participate in a survey may not be representative of the entire King County population. Details regarding limitations in BRFSS have previously been described (123). For example, this study's sample was limited to English-speaking adults and had a higher proportion of Non-Hispanic whites than the 2010 U.S. Census' estimate of Non-Hispanic whites in King County (79.7% vs. 64.4%) (124). Even if the study sample were representative of the county, King County is not necessarily representative of other regions in the US. Another limitation is the lack of a comparison site. This was not possible due to the high cost of fielding the survey outside of King County. Third, this study did not capture the amount of calories purchased or consumed. Ascertaining this information via telephone survey would have been unreliable (e.g. poor recall of exact food items purchased up to a week ago) and expensive (e.g. asking multiple questions regarding all items purchased). A final limitation is that the BRFSS captures data for adults, so this study could not examine the effect of menu-labeling on children and adolescents.

Conclusion/Policy Implications

After implementation of a menu-labeling regulation in King County, awareness and use of calorie information among residents who ate at regulated chains increased significantly and across all demographic subgroups. These findings suggest mandatory menu-labeling contributes to improving consumer awareness and use of nutrition information. However, non-Whites, men, and lower income groups may be less likely to see or use this information than their counterparts. The reasons for these disparities require additional study to identify strategies to improve calorie information awareness and use.

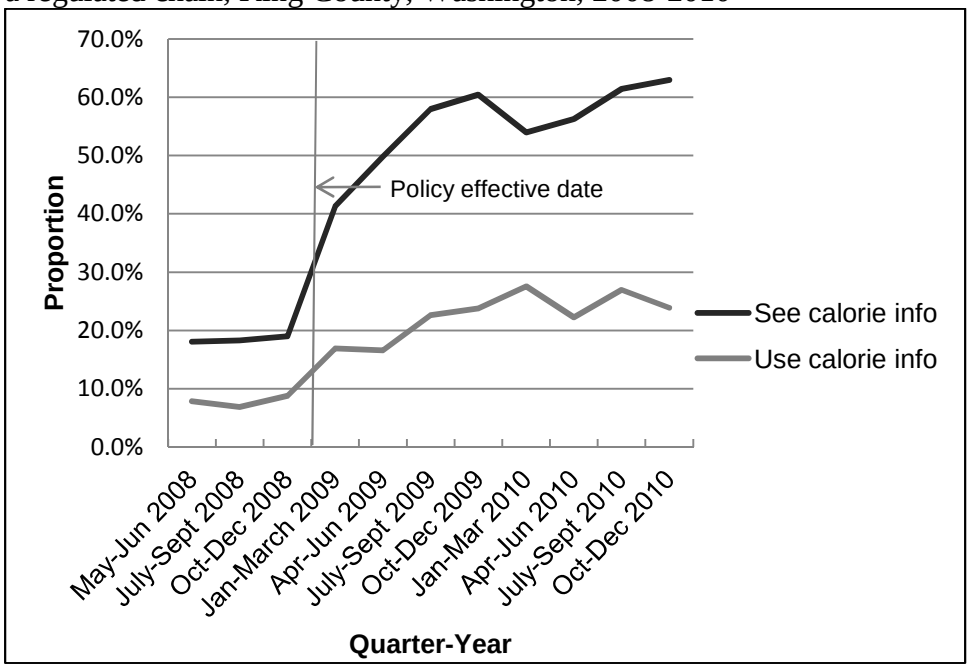
Under the Affordable Care Act, menu-labeling requirements similar to King County's will be required of chain restaurants with 20 or more locations nationwide (125). Lessons learned from King County and other jurisdictions that have studied the impact of their respective regulations may be useful as the Food & Drug Administration (FDA) further develops national menu-labeling regulations. The FDA, policy-makers and public health practitioners should consider whether additional approaches are needed to not only improve menu label information awareness and use among all customers, but also to help groups less likely to see and use menu-labels to better understand and translate calorie information into healthier food choices.

Table 2.1. Demographics of survey respondents, King County, Washington, 2008-2010

	Total BRFSS sample (n=8,737)		**Total who ate out (n=4,302)**		**Total who ate at regulated chain (n=3,132)**	
	Weighted %	**N**	**Weighted %**	**N**	**Weighted %**	**N**
Race/ethnicity						
White, Non-Hispanic	79.7	7,392	81.7	3,711	82.3	2,715
Non-White, including Hispanic	20.3	1,345	18.3	591	17.7	417
Age in years						
18-30	19.3	531	22.2	321	22.4	235
31-50	42.1	2,810	44.7	1,571	44.7	1,159
51+	38.6	5,396	33.1	2,410	32.9*	1,738
Gender						
Male	48.4	3,513	49.6	1,799	49.5	1,292
Female	51.6	5,224	50.4	2,503	50.6	1,840
Annual household (HH) income						
<$35K	21.1	1,975	17.3	797	17.9	588
$35K to <50	11.8	1,058	11.5	518	11.8	383
$50K to <75	16.2	1,299	16.6	693	16.1	500
$75K+	50.9	3,329	54.5	1,840	54.2	1,349
Marital status						
Single	31.8	3,541	31.0	1,587	31.3	1,157
Married/Partnered	68.3	5,149	69.0	2,696	68.7	1,962
Education						
High school graduate or less	20.2	1,619	19.2	753	20.1	560
Some college	24.5	2,267	25.6	1,164	25.0	839
College graduate	55.4	4,851	55.2	2,385	54.9	1,733
Weight status						
Normal weight	42.6	3,578	39.5	1,562	37.5*	1,115
Overweight	32.5	2,919	33.8	1,531	34.5	1,123
Obese	24.9	2,240	26.7	1,209	28.0	894
Chronic disease status (diabetes, CVD)						
Has diabetes or CVD	10.3	1,270	9.8	600	9.8	439
No chronic disease	89.8	7,467	90.3	3,702	90.2	2,693

*Significant difference compared to total King County BRFSS sample, $p<0.05$

Figure 2.1. Respondents' seeing and using calorie information over time among those who ate at a regulated chain, King County, Washington, 2008-2010



Note: Policy effective as of January 1, 2009.

Table 2.2. Unadjusted, weighted percent of respondents who saw and used calorie information over time, King County, Washington, 2008-2010

	See calorie information				Use calorie information			
	Pre-policy, 2008 %	Post-policy Year 1, 2009 %	Post-policy Year 2, 2010 %	Absolute % change from 2008 to 2010	Pre-policy, 2008 %	Post-policy Year 1, 2009 %	Post-policy Year 2, 2010 %	Absolute % change from 2008 to 2010
All study respondents	18.6	52.1	59.4	40.8***	8.1	19.7	24.8	16.7***
White	18.3	54.0	61.8	43.5***	8.1	22.2	25.8	17.6***
Non-White	20.3	43.9	49.4	29.1***	7.7	8.9	20.8	13.1*
18-30 years old	17.7	54.3	52.1	34.4***	4.3	20.7	20.1	15.9**
31-50 years old	21.9	56.2	63.2	41.2***	11.8	21.3	24.8	13.1***
>50 years old	14.5	45.0	59.6	45.1***	5.3	16.9	28.2	22.9***
Male	16.0	55.3	59.8	43.8***	6.4	19.3	20.0	13.6***
Female	21.0	48.9	59.0	38.0***	9.6	20.2	29.6	20.1***
<$35K household (HH) income	15.7	44.2	43.2	27.4***	4.7	12.2	12.5	7.7*
$35K to <50 HH income	20.2	52.0	65.1	44.9***	5.0	10.0	27.4	22.5***¥
$50K to <75 HH income	16.2	57.7	64.6	48.3***¥	9.9	24.9	25.2	15.3**
$75K+ HH income	19.6	52.9	64.8	45.2***¥	9.8	22.7	30.0	20.2***¥
Single	19.2	52.0	52.5	33.3***	7.1	19.6	17.5	10.5**
Married/Partnered	18.4	52.1	62.6	44.2**	8.5	19.9	28.0	19.6***¥
≤High school graduate	23.4	56.1	45.9	22.6***	8.2	16.7	14.1	5.9
Some college	15.7	47.5	61.7	46.0***§	6.0	18.7	22.0	15.9***
College graduate	18.3	52.7	63.5	45.1***§	9.1	21.4	30.0	21.0***§
Normal weight	20.8	48.4	56.0	35.3***	8.6	19.3	25.2	16.6***
Overweight	16.7	50.7	63.0	46.3***	8.5	20.0	26.2	17.7***
Obese	18.2	58.9	59.5	41.3***	6.7	20.0	22.6	15.9***
No chronic disease	19.0	52.1	59.0	40.0***	8.2	19.7	24.3	16.1***
Chronic disease	14.6	52.2	63.8	49.1***	6.8	20.0	30.2	23.5***

Change from 2008 to 2010: * p<0.05, ** p<0.01, *** p<0.001

Referent groups: White, 18-30 years old, <$35K HH income, unmarried/no partner, high school graduate or less, normal weight, no chronic disease

Difference in absolute change from 2008 to 2010 compared to referent group: ¥ p<0.05, § p<0.01

Sample sizes: See calorie information, 2008 (n=796), 2009 (n=979), 2010 (n=1086); Use calorie information, 2008 (n=792), 2009 (n=978), 2010 (n=1083)

Table 2.3. Fully-adjusted odds ratios from multivariable logistic regression models for respondents' seeing and using calorie information, King County, Washington, 2008-2010

	Model 1: All Time Periods[a]		Model 2: Post-Policy Implementation Period[b]	
	See calorie information OR (95% CI)	**Use calorie information OR (95% CI)**	**See calorie information OR (95% CI)**	**Use calorie information OR (95% CI)**
2009	4.95*** (3.65, 6.71)	2.73*** (1.81, 4.12)		
2010	7.19*** (5.27, 9.81)	3.91*** (2.63, 5.81)		
Non-White	0.69* (0.49, 0.96)	0.75 (0.49, 1.16)	0.63* (0.44, 0.90)	0.71 (0.44, 1.12)
31-50 years old	1.06 (0.73, 1.55)	0.96 (0.59, 1.54)	0.95 (0.62, 1.46)	0.80 (0.48, 1.33)
>50 years old	0.75 (0.52, 1.07)	0.93 (0.59, 1.47)	0.71 (0.47, 1.07)	0.90 (0.55, 1.46)
Female	0.96 (0.77, 1.21)	1.44* (1.08, 1.92)	0.84 (0.65, 1.08)	1.37* (1.01, 1.85)
$35K to <$50K household (HH) income	1.84** (1.20, 2.80)	1.47 (0.82, 2.62)	1.88** (1.20, 2.96)	1.49 (0.80, 2.78)
$50K to <$75K HH income	1.88** (1.26, 2.82)	2.26** (1.34, 3.81)	1.99** (1.28, 3.08)	2.21** (1.27, 3.85)
$75K+ HH income	1.77** (1.20, 2.60)	2.23** (1.34, 3.73)	1.79** (1.18, 2.71)	2.21** (1.29, 3.81)
Married/Partnered	0.95 (0.72, 1.25)	1.05 (0.74, 1.48)	0.97 (0.72, 1.31)	1.08 (0.74, 1.56)
Some college	0.94 (0.65, 1.35)	1.00 (0.62, 1.62)	1.03 (0.69, 1.53)	1.07 (0.64, 1.79)
College graduate	1.00 (0.70, 1.41)	1.30 (0.84, 2.01)	1.10 (0.75, 1.61)	1.40 (0.88, 2.23)
Overweight	1.03 (0.79, 1.36)	1.13 (0.81, 1.57)	1.07 (0.79, 1.44)	1.12 (0.78, 1.59)
Obese	1.32 (0.99, 1.76)	1.07 (0.75, 1.54)	1.42* (1.03, 1.95)	1.11 (0.75, 1.63)
Chronic disease	1.19 (0.87, 1.63)	1.36 (0.93, 2.00)	1.20 (0.85, 1.71)	1.32 (0.88, 1.98)
Regulated Sit-down restaurant	0.83 (0.59, 1.17)	0.77 (0.50, 1.18)	0.74 (0.51, 1.06)	0.62* (0.39, 0.99)

a: Model 1 includes policy time indicator variable to examine odds ratios for seeing and using calorie information from pre- (2008) to post-policy (2009 and 2010).

b: Model 2 limited to post-policy period (January 2009 to December 2010) to identify which groups had higher odds of seeing or using calorie information once policy was in effect.

Referent groups: Year 2008 (in Model 1), White, 18-30yr, <$35K, unmarried/no partner, High School graduate or less, Normal weight, no chronic disease, Regulated Fast food chain

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Chapter 4

Study 3: ***Expanding from direct services to social determinants to eliminate disparities - Lessons from the Seattle & King County REACH Coalition***

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Abstract

A growing body of research indicates that societal factors play critical roles in shaping health and are “root causes” of health disparities. In response, many funders have shifted their funding priorities toward interventions addressing root causes or “social determinants of health” (SDOH). The Seattle & King County REACH Coalition was formed in 1999 to eliminate racial/ethnic diabetes disparities. Its early efforts largely involved direct services, such as diabetes classes. In response to funding shifts, the Coalition moved from direct services to efforts directed at changing environmental and institutional factors, and policies contributing to disparities. The transition did not come easily and may mirror the experiences of other community partnerships and organizations focused on direct services. This exploratory case study examines the experiences of the REACH Coalition in shifting from direct-services to impacting broader SDOH to address racial/ethnic health disparities, and discusses lessons learned and the challenges such a transition poses.

There is a growing body of scientific literature stressing the importance of social determinants of health (SDOH) in contributing to racial and ethnic health disparities; and the need to address determinants such as policies, systems, and the environment, to more effectively and sustainably reduce health disparities (5, 8, 126, 127). This has translated into shifts among key funders, including the Centers for Disease Control & Prevention (CDC), to prioritize interventions involving policy and environmental changes over direct services to reduce disparities. Many community coalitions were originally formed to address specific disease conditions and deliver services, such as health education classes and resources, to populations disproportionately affected by these conditions (49, 50). However, as a consequence of funding shifts, existing community coalitions not previously focused on broader social determinants may experience difficulties transitioning from direct services to effecting policy, social, or environmental changes.

The objectives of this qualitative case study were 1) to identify factors that may facilitate or hinder a coalition's ability to shift or expand from direct services to addressing broader social determinants, and 2) to identify ways to support coalitions to successfully make this transition. We used the Seattle & King County REACH Coalition as a case study because of its mission to eliminate racial and ethnic health disparities, and its shift in strategies due to funding changes. ("REACH" stands for "Racial & Ethnic Approaches to Community Health"). We also discuss lessons learned from the Coalition throughout this process, and the legacy of the Coalition at the conclusion of REACH funding. Findings from this study may help coalitions similar to REACH assess internal capacities and readiness to pursue SDOH activities. Results may also help coalitions and funders understand the challenges coalitions may experience in shifting from an

individual-level to a policy-, systems-, and environmental-level perspective; and devise appropriate technical assistance to address these challenges.

Background. *Seattle & King County REACH Coalition.* The Seattle & King County (SKC) REACH Coalition's mission is to eliminate diabetes-related disparities among African Americans, Asians, Pacific Islanders, and Latinos/Hispanics in King County. The Coalition is comprised of a diverse range of organizations focused on community health and/or services for communities of color. These include the local health department, Public Health-Seattle & King County; the University of Washington; a healthcare quality non-profit organization; community-based organizations and clinics that provide services to the region's communities of color; and local branches of national organizations, such as the American Diabetes Association and YMCA.

CDC REACH Funding. The SKC REACH Coalition was formed in 1999 as part of the CDC's first phase of REACH, "REACH 2010" (1999-2007), a demonstration research grant which funded community coalitions grounded in community-based participatory research (CBPR) principles, to develop and implement activities to eliminate racial and ethnic health disparities in at least one of six health priority areas (50). In REACH 2010, the Coalition provided culturally and linguistically-tailored diabetes education, support groups and self-management classes to specific racial and ethnic groups, and supported improved electronic monitoring of diabetes for its focal populations (128).

In the REACH US request for applications released in 2007, the CDC described REACH US as an initiative that "addresses racial and ethnic differences in health disparities, rather than focusing primarily on a disease perspective"; supports strategies that "impact population groups rather than individuals"; and builds on the practice and evidence-base generated by REACH 2010. This second phase of REACH funding (2007-2012) signaled a shift away from a disease

focus and expansion in the desired approach for tackling health disparities, compared to REACH 2010. As with REACH 2010, REACH US also promoted coalition activity that applied community-based participatory approaches (129).

During REACH US, the Coalition used a train-the-trainer model to equip clinics, faith-based organizations, community based organizations, and small businesses to deliver "Reaching Up and Out", the Coalition's tailored diabetes education and self-management curriculum (130). They also implemented environmental and community-level interventions to promote healthy eating and active living, and trained community members in strategies, such as Digital Storytelling, that could be used to educate the community and elected officials on policy issues important to the health of people of color, particularly those with diabetes (131).

Public Health-Seattle King County (PHSKC) was the lead fiscal organization for the Coalition throughout REACH 2010 and REACH US, providing administrative oversight, coordination and evaluation. Three Coalition member organizations were contracted to conduct day-to-day activities to accomplish REACH 2010 and US goals. These three community organizations have a specific focus on working with African Americans, Asians and Pacific Islanders, and Hispanics, respectively. Researchers at the University of Washington were also contracted to provide evaluation expertise. Community members and staff from volunteer Coalition partner agencies were involved in Coalition discussions and decision-making, with contracted agencies carrying out most action steps.

REACH Conceptual Framework. The socio-ecological model (SEM) served as the conceptual framework for REACH's activities (Figure 3.1) (10). In REACH 2010, the Coalition was predominantly focused on individual-level changes through diabetes education and self-management classes, and support groups, with some activities geared toward influencing

community norms and improving coordination of diabetes clinical care. With REACH US, the Coalition attempted to shift its focus from direct services to the outer circles of the SEM to effect changes in the community, environmental, and organizational settings, and policy (132). The CDC defined SDOH as "the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics" (133). They provided the Coalition with several ecological models illustrating the linkages between social, environmental, and policy factors and individual health; and examples of what they considered SDOH-oriented activities.

Methods

We identified interviewees from REACH Coalition member organizations that were part of the Coalition from REACH 2010 through REACH US, and could thus speak to the experiences of their organization and the Coalition in shifting from service delivery activities in REACH 2010 to SDOH-oriented activities in REACH US. These included staff from organizations with differing degrees of Coalition involvement (i.e., contracted or volunteer partner) and different levels of management at each of the contracted organizations.

An interview guide was developed to solicit respondents' thoughts and experiences about this shift. Open-ended, semi-structured interview questions were asked about respondents' organizations (e.g., mission, primary activities), role(s) at their respective organizations and in REACH, perspectives on REACH's shift to SDOH, how this change impacted their work, successes and challenges experienced, factors that facilitated or hindered them in this transition, and what they would like to see sustained from REACH. These general themes were based on Coalition evaluation needs and a conceptual model on factors influencing organizational shift

from service delivery to social determinants action, based on theories regarding organizational change and coalition capacity (Figure 3.2) (134-138). Interview transcripts and codes were reviewed by two evaluators. We used a modified grounded theory approach to data analysis (139). An iterative process was used to develop the codebook. Initial interviews were used to develop a preliminary codebook, which was modified as themes emerged and were confirmed in subsequent interviews. Atlas.Ti software was used for data management.

Results

We conducted thirteen interviews with respondents from seven REACH Coalition member organizations: the lead fiscal/coordinating agency, four contracted partner agencies, and two volunteer organizations. Organization types included a local health department, a university, two community-based health clinics, a community-based organization, a research center, and a quality improvement organization. Respondents included seven in leadership (e.g., directors, managers), five line staff (e.g., health educators, community organizers or advocates), and one evaluator. Key themes regarding barriers and facilitating factors for shifting to SDOH-activities are presented below (Table 3.1). Themes regarding what respondents wanted sustained from REACH are also summarized.

Barriers/Challenges. *Conceptualizing "Social Determinants of Health".* All respondents provided similar definitions of social determinants, though they did not necessarily emphasize the same aspects. Some focused on mobilizing communities for advocacy or promoting systems-level changes within organizations, others on influencing population-wide policies. Almost everyone said they or their staff initially felt ill-equipped or intimidated by the concept of SDOH or how to do this work. One manager felt that addressing SDOH was too broad and difficult for the public health sector to tackle since root causes of disparities included poverty and racism.

Nevertheless, most indicated experiencing an evolution in their understanding and appreciation of SDOH over the course of their involvement with REACH.

The Coalition also experienced challenges in defining what it meant to collectively address social determinants in tangible objectives and activities. Although the CDC provided examples of SDOH-oriented activities and socio-ecological models for action (e.g., Figure 1), most respondents still felt a lack of clarity in what was expected from them by the CDC and looked to PHSKC, the Coalition's lead agency, for guidance.

"The Coalition spent a lot of time…talking about what [SDOH] meant and figuring out how to take part in that sort of work… We weren't as knowledgeable about doing [SDOH], so that had to be more directed from Public Health [PHSKC] on how to make that shift."

Most Coalition partner organizations were accustomed to interventions which met the direct needs of their focal populations (e.g., need for tailored diabetes education or services). They felt the CDC's SDOH examples were not salient to their populations or were not sure how to implement them. Some felt it would have been helpful to have a conceptual model on how to actually implement these SDOH activities. Several thought there was a disconnect or too large a gap between SDOH-activities, like promoting healthy corner stores to increase access to healthy foods, and eliminating disparities; and mentioned evidence that showed policy efforts may improve population health but may also widen disparities. Two high-level managers, both of whom expressed support for SDOH-activities, thought that evidence-based interventions that experienced success in one community were not necessarily generalizable to the Coalition's communities.

Coalition Group Process. When the REACH US grant began, the Coalition had been together for eight years and considered itself a cohesive, well-functioning partnership. The mission of the

Coalition remained the same, to eliminate diabetes disparities in its focal populations. However, a few respondents were worried the shift from 2010 to US cut off momentum and REACH branding established in REACH 2010. Some felt the transition to REACH US forced the Coalition to backtrack in the coalition development process, requiring it to re-define and establish new goals and objectives that responded to both community needs and CDC expectations to implement SDOH strategies. It had already planned to use a train-the-trainer model for wider dissemination of its tailored diabetes curriculum, but the Coalition required two years of group processing to identify additional strategies to more broadly impact their communities. Many respondents observed that it was a challenge to engage or find a role for everyone at the Coalition table during this process. At the start of REACH US, some partners were worried that they or others might not be the appropriate people or organizations to have at the REACH table to pursue SDOH activity. Whereas others thought existing partners were appropriate, but in order to address SDOH, a multi-sector partnership (i.e., sectors beyond public health) was necessary. They felt that new partners, particularly those more experienced with SDOH activities, were probably needed at the Coalition table to gain momentum, and Coalition partners needed to be at other partnerships' tables to represent REACH focal communities and promote the development of equitable and effective policies and protocols.

Nearing the end of REACH US funding, several respondents were worried about the future of the Coalition. They thought the Coalition had come a long way and felt it was a waste to lose and disassemble that. The Coalition had strategized on ways to sustain itself, but partners resented feeling like they had to reinvent themselves in order to be responsive to funding, while remaining true to the Coalition's underlying mission. Though respondents understood the direction that funding was going in, they felt that the move away from direct services toward a

focus on changing policies, systems, and environments, was too “all or nothing”, and failed to support infrastructure and relationships that had already been built and to maximize these for a more comprehensive approach.

Organizational Barriers. Several organizational factors hindered or slowed Coalition partners’ shift toward SDOH action, such as size of partner agency, funding, competing priorities, leadership/management, and staffing. The smallest contracted partner had an established infrastructure, but given its size, it had a much smaller budget and workforce compared to other partner agencies. This translated into less flexibility for both institutionalizing REACH diabetes classes into agency activities without additional funding, and having the capacity to conduct SDOH activities. Funding was a critical issue for all partner agencies, particularly for the community-based organization (CBO) and clinics. A few respondents noted that with the economic downturn, funding had become increasingly tight, and CBOs, community clinics, and other community-oriented groups often had to compete for the same pot of limited funds. Many commented on the challenge of staying true to their agency’s core mission while needing to be flexible and responsive to available funding. Most of the respondents in leadership commented on the challenge of juggling competing priorities, such as meeting direct, immediate community needs (e.g., clinical care), while also fulfilling grant expectations that potentially went beyond an agency’s typical scope (e.g., changing the environment, influencing policies).

Staff roles and backgrounds (e.g., education, motivations, past experience with SDOH) influenced how readily Coalition partner agencies’ were able to transition to SDOH action. Those who were more accustomed working directly with community respondents (e.g., line staff, such as health educators) were generally slower to shift from a direct service mentality to engaging in SDOH strategies. Several educators saw their role in SDOH efforts as meeting the

immediate needs of the community. They viewed higher level SDOH activities, particularly policy-related, to be in the realm of leadership.

"My thought about [my role] was dealing with the community directly versus policy."

"I think it's just hard working around this stuff. That's why I stayed in my little area because I am a program person."

"[Leadership] needed to get [staff] to shift and focus on the policy work and try to help them understand how that can make a difference."

One manager observed that CBOs tend to attract people with a personal investment in an issue or community, want to have a hands-on connection to the community they are serving, and consequently may be resistant if they feel they are straying too far from that. Ironically, several managers indicated having staff who were engaged in SDOH-oriented activities but did not necessarily define or see it as such (e.g., community mobilization activities, developing organizational policies to support workforce wellness).

All respondents from contracted agencies struggled with the loss of an individual-level focus and initially found it difficult to switch from direct, community-oriented program work to policy, systems, and environmental-level activities. Several, mostly line-staff, said they struggled with the lack of specificity in their roles or activities at the beginning of REACH US, while the Coalition was still trying to figure out SDOH strategies to pursue. Some expressed frustration about the perpetual cycle of grants ending and feeling like they needed to reinvent the wheel, while finding ways for their organizations to maintain some level of continuity.

The two respondents from REACH's volunteer organizations were less likely to express frustrations or challenges with the SDOH shift. This was likely due in part to their respective organizations, both of which were involved in promoting systems-level changes; and their roles

in the Coalition, which was not necessarily to carry out activities, but to participate in Coalition discussions and decision-making, and share expertise. Nonetheless, both noted observing at Coalition meetings, the frustration among contracted agency staff in trying to identify SDOH strategies that were meaningful and appropriate for their focal populations.

Facilitating Factors. *Supportive leadership and collaborative principles.* Having supportive Coalition leadership was critical to getting Coalition partners more comfortable with the idea and implementation of SDOH action. Respondents from all contracted partner agencies expressed appreciation for the key role the Coalition's program director had in supporting partners' strengths, being flexible, and meeting them where they were at. They looked to the director and other REACH staff, based out of PHSKC, for guidance during early REACH US. In other grants where PHSKC was also the lead agency, some partners sensed the power differential between the lead and partner agencies, and felt management at PHSKC did not truly value community input. With respect to REACH, however, they commented on valuing the collaborative process fostered by the REACH director and willingness of PHSKC, as represented by the director and staff, to take a back seat and follow a flexible versus prescriptive approach to SDOH. The director thought it important to allow time for meaningful group process, according to community-based participatory principles, and not force or dictate steps which would undermine progress. Despite feeling pressure to report progress and outcomes to the CDC, the director recognized that Coalition partners needed time to get past the immediate intimidation of "doing SDOH", and recognize there was flexibility in the CDC's expectations.

"I don't think the CDC was clear in the FOA in what they wanted. I don't think that they knew clearly what it was that they wanted, so I think it left a lot of room for interpretation… and so I

think it gave us more of an opportunity to then interpret that in a way that seemed to make more sense for us and our communities."

"I think people have come to a place and they're comfortable with that place. I think now people don't feel like, 'Oh, you're forcing me.' I think they're now going, 'Yeah, I can see the value of it, but I'm still going to do the things that I also think are important, but I also see why we're doing this other thing, as well'. And I think that's a very healthy place to be."

In addition, partners found the technical assistance and resources they received from REACH staff (i.e., program director, evaluators, and diabetes educator) helpful. These included discussions and trainings about SDOH, data for intervention planning, assistance with evaluating activities, and diabetes/nutrition expertise for healthy eating activities.

Incremental steps and concrete strategies connected to community. The concept of doing SDOH work intimidated most respondents. Prior to REACH US, some Coalition members, mainly those in leadership positions, had prior experience with SDOH activities. These respondents were most willing to volunteer in REACH activities at the systems- and policy-levels. Most line staff, on the other hand, were accustomed to coordinating or conducting activities like health education classes, addressing the individual and inter-personal levels of the socio-ecological model illustrated in Figure 1. While a train-the-trainer model for disseminating the REACH curriculum to other organizations was a natural progression from teaching classes directly to community members, moving to influencing polices seemed too great a leap for some. As the Coalition brainstormed strategies beyond the individual and inter-personal levels, the strategies that resonated most with members were those more proximal to the inner circles. These strategies and activities were concrete, versus the seemingly nebulous realm of policy development, and allowed respondents to be more closely connected to the community. Strategies that fit with

Coalition interests and community needs were those that improved access and availability to healthy foods and physical activity, such as community kitchens and youth soccer leagues, and mobilizing community to speak out about their needs through use of digital stories.

Digital storytelling was a "game changer", according to one manager. Several respondents said that digital stories helped bridge the gap in many staff members' minds between direct services and SDOH action. Digital storytelling is a process in which community members identify an issue of importance to themselves and their community, and share their personal experiences or "stories" with the issue. These stories are digitally-recorded onto DVD, often including music and visuals to illustrate the topic (140). REACH helped community members package their stories. These stories were then used to share with other community members, leaders, and elected officials to raise awareness about diabetes and bring attention to the perspectives, health needs, and success stories of the community.

"Digital stories have been really important in how [staff] see their work…I don't think they understood how their work connected to [SDOH] until they started making these stories and using them."

"*I think people making their stories is a powerful way to get them involved. Like after they did that, they joined the [youth leadership] group, and they joined our healthy youth peer educators group and they were like all over that. I think the digital story thing is huge. I think it's huge for our agency, I think it's meaningful for patients, I think it's a tangible way for us to say, this is something we can do to address these issues in our community that people respond to and care about."*

Regarding policy, members were less hesitant if they had something specific to participate in. When the REACH director invited them to get involved with the Washington State

Diabetes Network's Leadership team and workgroups, several REACH members joined, since this provided them an established platform from which to apply their diabetes expertise to shape policy recommendations to improve diabetes prevention and services for their populations.

Organic opportunities for change; Leveraging Successes. Some respondents observed that the Coalition became more responsive to natural or organic opportunities for action, rather than feeling they needed to create or force opportunities for SDOH change. When a key community center was faced with a severe reduction in hours due to city budget cuts, staff and participants from REACH diabetes groups rallied to fight against this. They spoke about the importance of the community center as a space where they could gather and learn about taking care of their health, and shared their digital stories with elected officials. This experience bolstered their confidence and willingness to speak out about diabetes and health, as evidenced by their increased enthusiasm to participate in subsequent city council meetings and legislative days.

When the owner of a local Mexican restaurant expressed a desire to improve the healthfulness of his establishment's menu offerings, a leader in the Latino community connected him with REACH. They worked together to create a diabetes-friendly menu, and he hoped that his move in this direction would encourage other Latino restaurateurs to also consider improving the healthfulness of their menus (141). His efforts were covered in a local TV news segment, which caught the attention of a local high school group that contacted him for help with their plans to promote diabetes awareness and healthy eating in their school and community. This led to their collaboration with REACH. The success of REACH's work with the restaurant owner and high school group encouraged others in the Coalition to pursue similar restaurant activities. *"I think it's the progression and seeing what it can do, and seeing that, 'Wow, if we mobilize communities, we can actually get something done. We can actually get a restaurant excited*

about changing their menus, and then maybe push that out and do that in larger settings. We can get a community center to change its hours of operation. We can talk to elected officials and have them know what our concerns are. We can rally and have our communities write letters and sign postcards and get funding back to something that we lost'."

Organizational factors influencing readiness. In addition to Coalition leadership, aspects of organizational leadership, workforce readiness, and infrastructure supported partner agencies' transition towards SDOH action. Partner agencies with leadership that understood the connection between SDOH and disparities, and had a history of engaging in SDOH activities were the most ready to support the Coalition's SDOH efforts. They were also more likely to have staff that were comfortable with engaging in SDOH activities and had past experience or education about SDOH. One agency was originally formed by community mobilizers wanting to meet the needs of their focal populations. Staff from this organization were the quickest to identify and implement SDOH strategies in REACH. They were also more likely to present and champion their SDOH intervention ideas to organizational leadership. At the start of REACH US, the REACH coordinator at one agency hired a community mobilizer to focus on fostering connections with other organizations and leaders, in anticipation of future collaborations to improve the community environment to promote healthy eating and active living. Line staff from all contracted partner agencies were more likely than managers to express insecurities about doing SDOH work. Some respondents, mostly those in leadership or involved in community mobilization, were eager for this shift, despite their insecurities.

REACH Legacy: Partnering to Promote Health Equity. When asked about REACH strengths, the concept of legacy was very important to respondents. They highlighted the much-needed culturally tailored diabetes curriculum and resources the Coalition had created and disseminated,

the reputation and branding it had achieved for its diabetes expertise and cultural competency, and its commitment to promoting health equity. Several spoke of the influence the Coalition had had on their respective agencies in catalyzing institutional change, and expanding staff capacity around SDOH and promoting health equity. Everyone mentioned the added value of working in long-term partnership. Although several partners already collaborated with other Coalition agencies independently of REACH, some said that the trust built within the Coalition strengthened their commitment to REACH and desire to seek opportunities to continue partnering with other Coalition partners.

Discussion

Despite the extensive literature on community coalitions and organizational change, respectively, we found very few studies focused directly on this issue of coalitions or partnerships shifting focus or strategies in a significant way in response to funder expectations or for sustainability purposes (142-144). We found that organizational factors at partner agencies played crucial roles in how easily the Coalition responded to these changes. The literature regarding organizational change, diffusion of innovations, and public health dissemination confirm the importance of these factors in readiness for change or implementation of an innovation (134, 135, 145). Receptiveness and readiness to move from direct services to promoting broader social, environmental changes varied by organization, and depended on aspects of each organization's mission, leadership and staff. Agencies with leadership, staff, and infrastructure that supported and had previous experience with SDOH-oriented activities were more prepared, compared to the other agencies, to engage and move the Coalition forward in this direction. A key facilitating factor was having REACH staff at agencies who were champions of SDOH action and in leadership roles (e.g., director or manager). They were most ready to

identify openings for change within their organization and in the community (e.g., staff training in SDOH, worksite wellness policies, joint-use agreements to expand community physical activity options), and leverage small successes into positive next steps. Given their position within their agency, they were able to consistently promote these actions to agency leadership and line staff. The most proactive of partner agencies also hired a REACH community mobilizer to specifically focus on SDOH opportunities.

Studies show that larger organizations are often less nimble due to increased bureaucracy or inertia associated with size (146-148). Interestingly, the larger community agencies in the Coalition were the most responsive to the SDOH shift, due to alignment with their agencies' mission and having appropriate staff, leadership, and infrastructure. Due to their size, these organizations were able to both institutionalize REACH diabetes classes into their regular activities, and support expansion to SDOH-promoting activities, such training and mobilizing community members using digital stories. The greatest strain was on the smaller community-based organization, which had fewer resources, smaller infrastructure, and staff who were more accustomed to focusing on direct-service activities.

Coalition partnerships that adhere to community-based participatory principles or approaches (CBPA) are powerful entities by which to meaningfully engage communities of color and address their needs and interests, such as providing appropriate health resources and improving the conditions in which they live, work, and play. CBPA include collaborative, equal power-sharing, and use community strengths to focus on relevant issues (149). Unfortunately, partnerships grounded in CBPA may find it difficult to expediently conform to funder expectations within grant time frames. Equitable collaboration and building group consensus take time. Strengths of the REACH grants were their duration and focus on CBPA, which

allowed for establishing strong, trusted coalitions nation-wide that could devise interventions built on community strengths to meet community needs. The longevity of the Coalition contributed to its strengths. It had built a reputation for its culturally tailored diabetes expertise and activities, and for its commitment to eliminating disparities and promoting equity. This reputation was critical to the Coalition making inroads in its SDOH activities.

In addition, what a community determines it needs and wants may not fit with predetermined goals or strategies outlined in available funding. This exemplifies the issue raised by Trickett regarding the use of community-based participatory research as a worldview or instrumental strategy (150). It is logical to fund strong community partnerships for efforts intended to reshape community norms and surroundings. When community-based participatory principles are espoused as a worldview, partnerships are free to work interactively with and within communities, in ways that fit with community interests and have stakeholder buy-in. However, when CBPR or CBPA are used as a tool, partners may feel like puppets of the funder or lead fiscal agency, instead of stakeholders with genuine, equal say in what issues or strategies to prioritize and how to implement them. This was a problem partners experienced with PHSKC and the local university on other grants.

Supportive leadership was critical to the success of the Coalition. Grants are often prescriptive in what kinds of interventions should be done and how they should be implemented. The REACH US grant allowed for flexibility, but more importantly, Coalition leadership minimized the intimidation partners initially felt, by meeting them where they were at, and allowing time for partners to coalesce, regroup around this new focus, and devise a new action plan. The REACH director sought ways to build on partners' strengths and encouraged small steps versus large. The mistrust that partners felt towards PHSKC in other grants was avoided or

alleviated in REACH, due to Coalition leadership and staff commitment to CBPA, and their stepping back from dictating how or what should be done.

Regarding Coalition membership, respondents indicated that some Coalition partners were unprepared for this shift, and new partners, either those with SDOH experience and/or from non-health sectors, were likely needed to contribute to the expertise at the table. With the change in grant requirements from REACH 2010 to US, it is possible that staff at partner agencies assigned to Coalition activities may have needed to change, in order to meet new grant expectations (e.g., assigning staff with more SDOH experience or orientation). However, personnel change was not necessarily feasible at each partnering agency. The Coalition director was committed to supporting existing coalition members and believed that given appropriate support and time, members would grow more comfortable with the new focus and find a role for themselves. This did, in fact, happen, with some members joining other groups as REACH representatives to be a voice for equity and ensure that decisions were made in consideration of their potential impact on communities of color and other vulnerable populations. Near the conclusion of REACH, partners indicated that their understanding about SDOH and their capacity to address it had expanded as a result of their work with REACH.

While Coalition members conceptually understood the socio-ecological model and how broader social determinants contributed to disparities, they initially struggled with what it meant to address SDOH as a partnership, identifying appropriate strategies for their focal populations and how to implement them. They appreciated the importance of policy changes to even the playing field and promote equity (127), but not all members felt comfortable working at this level or did not know how to begin approaching this type of work. Examples of evidence-based SDOH action shared by the CDC and Coalition leadership did not necessarily resonate with

members. This raises two issues regarding 1) the need not only for SDOH conceptual models, but models for implementation and dissemination of interventions, and 2) generalizability of evidence-based public health interventions. During REACH, variations of the socio-ecological model and examples of SDOH efforts were provided to grantees, but no conceptual framework for how to approach dissemination or implementation. As discussed earlier, diffusion of innovations and dissemination models could be useful in preparing partnerships for change. These models provide insight into individual and organizational characteristics, external influences, and steps involved in dissemination and can help groups evaluate what additional elements need to be in place for successful dissemination (145, 147, 151, 152).

The experience of the REACH Coalition illustrates some of the difficulties in translating and implementing evidence-based practices (EBP). Despite CDC and Coalition leadership providing evidence-based examples of SDOH activities to REACH grantees, many respondents felt these were not appropriate or would not work with their focal populations. Green et al outline challenges in the implementation and translation of EBP into public health practice, describing the importance of adapting practices to meet the needs of end users (145). This recommendation is borne out by the Coalition's process. The Coalition required a lot of time to identify suitable EBP, and synthesize and adapt these strategies to be relevant to its focal populations. The practices that partners rallied around were in closest alignment with agencies' existing activities, leveraged staff strengths and passions, and allowed for greater community participation in promoting their own health.

Digital storytelling emerged as a powerful tool for SDOH action among REACH partners. For many, it helped bridge the divide between direct services and activities promoting social, environmental, and policy changes. Over 20 digital stories were created by respondents

from REACH diabetes classes about their respective experiences with diabetes. REACH partners continued to make digital stories with community members about other issues (e.g., smoking cessation, physical activity). They were successful in building the capacities of community members and REACH staff at partner agencies for community mobilization and advocacy around issues important to the Coalition's focal populations. Community members found the process of developing, packaging and sharing their stories empowering. This process boosted their confidence to tell their stories and gave them a tool to use when speaking to others about the issues covered in their respective stories. Partners appreciated that digital storytelling was not limited to one topic, but was a flexible tool that could be used to address a variety of issues and for different purposes (e.g., empowering community members, educating community or policy-makers). The use of digital stories was so popular and successful at one partner agency, that another REACH partner asked this agency to train their staff in digital storytelling. This led to several REACH staff being trained in digital storytelling and to a closer partnership between two REACH agencies around digital stories, resulting in the MOVE map (153).

Recommendations to funders and partnerships. Recent funding opportunities, such as the CDC's Communities Putting Prevention to Work and Community Transformation Grants (154), suggest that funders are prioritizing multi-sector partnerships focused on the outer rings of the SEM. This is logical, under the assumption that such partnerships do not require extensive time to get up to speed on SDOH action and already have key sectors, beyond public health, at the table to effect broad-scale changes. However, it would be short-sighted for funders to elect against funding existing coalitions, like the SKC REACH Coalition, that have the potential and desire to address broader SDOH. Funders, like the CDC, must consider the degree to which they value these community coalitions and wish to support them toward change. While such

coalitions may not be immediately prepared to dive into environmental, systems, and policy-level activities, it would be a failure not to take advantage of the social capital and strengths within these coalitions, and help them expand their capacities to address broader social determinants, through appropriate assistance and guidance. Funders and lead agencies should ensure that all staff involved, from leadership to line staff, are properly trained in SDOH and dissemination models at beginning stages, to ensure that everyone is engaged and on the same page, and have opportunities at the outset to identify potential roles for themselves in the process. Although CBPA are often time-consuming, funders need to build in appropriate time and technical assistance to allow for true collaborative process. When it comes to addressing racial and ethnic health disparities, CBPA are more likely to ensure buy-in of key stakeholders in communities of color, which can be leveraged for immediate and future endeavors.

Frieden makes the case that interventions addressing broader SDOH have the greatest potential to improve population health (155). While this may be true for population health, funders must also recognize that not all population-level approaches reduce disparities and may sometimes inadvertently widen them (156, 157). This suggests that more comprehensive or focused interventions may be needed among sub-groups experiencing poorer health status to complement population-level approaches. In keeping with respondents' suggestions, when it comes to working with communities of color and eliminating disparities, a "both/and" versus "all or nothing" approach is needed. Sub-groups experiencing poorer health are faced with a complex web of barriers across the socio-ecological model, from misconceptions promoted in one's culture to poor access to health care, and thus tailored approaches across the SEM are needed in addition to population-level approaches.

Partnerships with limited SDOH experience who wish to move in this direction will need to assess buy-in and readiness of all partners for SDOH action and be prepared to retrace coalition development stages toward a shared vision and goals around SDOH. They should take stock of existing capacities to engage in SDOH action, and assess whether staffing and existing partners are appropriate (e.g., hiring community mobilizer) and whether new partners are also needed. They should identify where their efforts are currently focused in the socio-ecological model and determine how far along the spectrum they are comfortable going. Although the scientific literature documents several examples of successful SDOH interventions, partnerships need to take the time to decide which activities are in alignment with community needs and interests and adapt them in a way that is most meaningful to their communities.

Limitations

Some study limitations should be noted. Our study involved one coalition, which included self-reported information from thirteen respondents, whose experiences may not be generalizable to those of other partnerships. Given the nature of the REACH grants, the SKC REACH Coalition was similar in background and approach to many other REACH and CBPR/CBPA coalitions nationwide. Although the Coalition's experience may not be exactly the same as others', its lessons learned may still provide helpful insight for others in a similar situation. Regarding self-report bias, two of the authors were involved as evaluators for the Coalition. They had established trust with respondents and could verify the accuracy of responses through their own participant observations and triangulation with Coalition documents, such as progress reports.

Conclusion

Positive changes in public policy, the environment, and social factors hold great promise in promoting population health and reducing health disparities. Community-based partnerships focused on communities of color are powerful assets for promoting changes in SDOH in ways that are salient and acceptable to their focal populations. The experiences of the Seattle & King County REACH Coalition in their transition from direct services to SDOH action, demonstrate the challenges presented by a shift in perspectives and strategies. This transition did not come easily for most Coalition partners. However, despite initial uncertainties, the Coalition was able to successfully maneuver its way towards implementing modest SDOH interventions and position themselves for future action along the outer rings of the socio-ecological model. The results from this case study may help others understand the difficulties coalitions may experience in shifting from an individual-level to a social, environmental, or policy-level perspective; devise appropriate technical assistance to address these challenges; and leverage facilitating factors to ensure a successful transition.

Figure 3.1. Landscape of Influences on Health Disparities and Arenas for Policy Action (10)

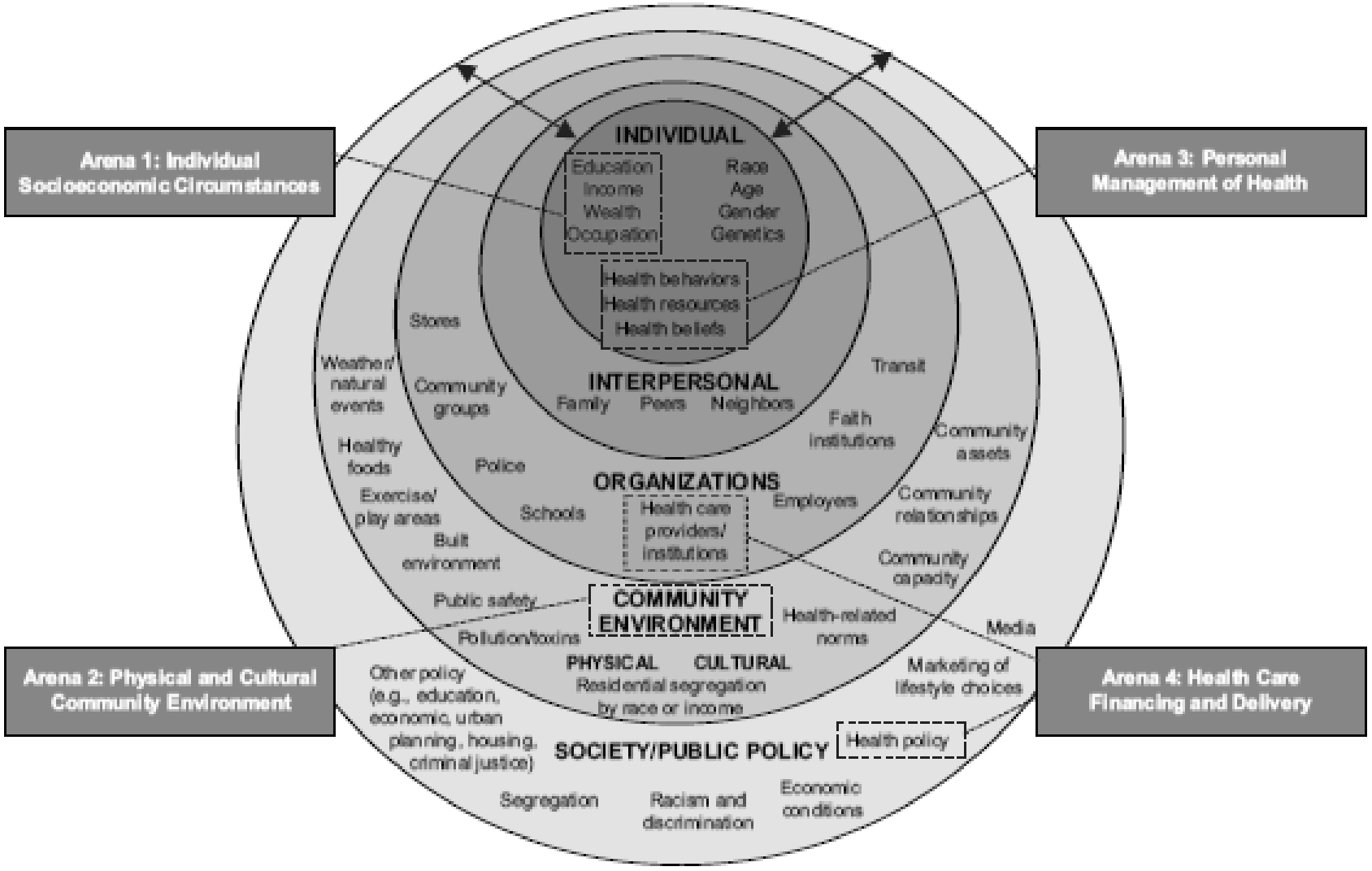

Figure 3.2 Factors influencing organizational shift from services to social determinants action

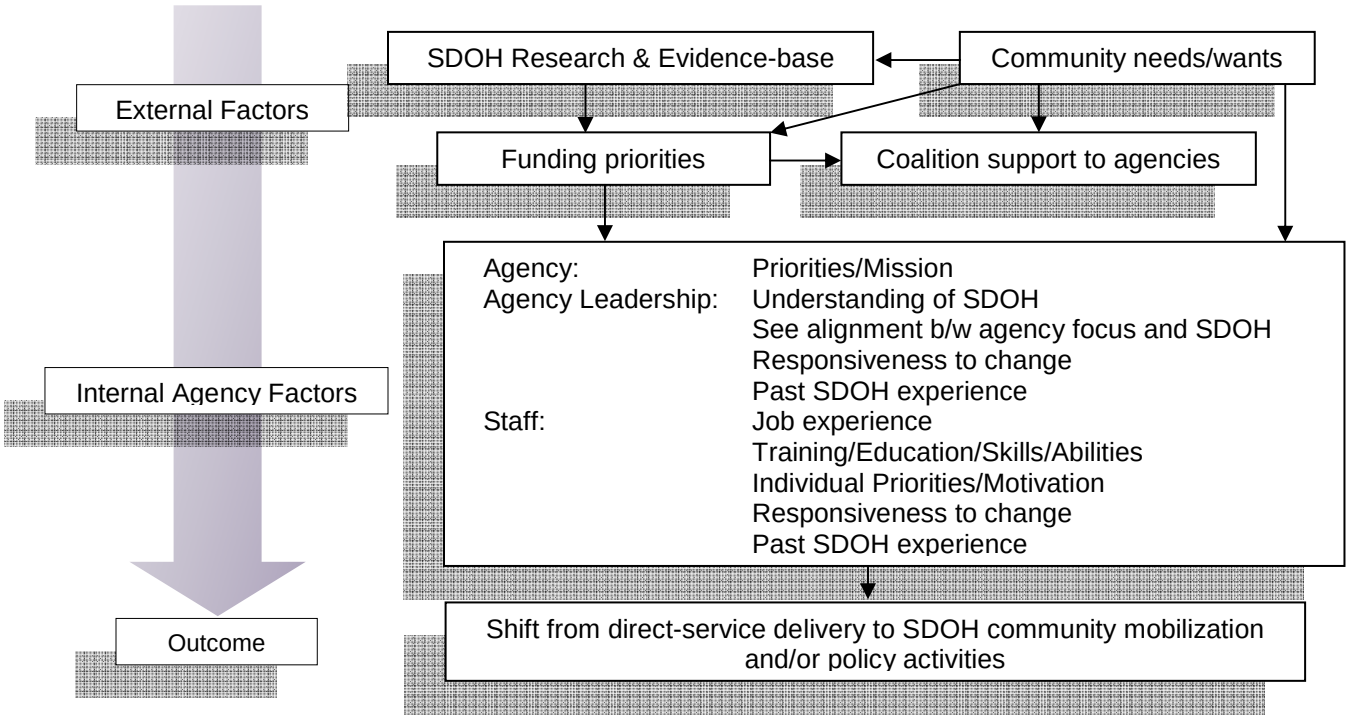

Table 3.1. Barriers and Facilitating Factors for shifting to SDOH action

Barriers/Challenges.	**Facilitating Factors.**
Conceptualizing "Social Determinants of Health" • Intimidated by concept of SDOH or how to do this work • SDOH too broad for public health to tackle • Difficulty defining how to collectively address SDOH in tangible objectives and activities. • SDOH examples not salient to focal populations • Perceived disconnect/gap between SDOH-activities and eliminating disparities • Concern population-level efforts may widen disparities or not benefit focal populations *Coalition Group Process* • Worried shift from 2010 to US cut off momentum and REACH branding • Need to retrace coalition development process • Challenge to engage, find role for everyone • Question if people at REACH table appropriate • Need partners from other sectors, with SDOH expertise • Shift to population-level change, away from direct services, too "all or nothing *Organizational Barriers* • Smaller agencies: limited resources, funding • Competing priorities of population-level approaches and meeting community needs • Need staff and leadership buy-in for SDOH action • Staff passion/preferences for direct contact with focal populations • Staff roles and backgrounds: limited education and/or experience in SDOH	*Supportive leadership and collaborative principles* • Flexible versus prescriptive approach • Meeting people where they are at • Technical assistance and resources around SDOH, planning, evaluation, and expertise *Incremental steps and concrete strategies connected to community* • Starting with activities more proximal to SEM's inner circles • Strategies and activities that allow staff connection to community • Digital storytelling *Organic opportunities for change; Leveraging Successes* • Responsive to natural opportunities for action versus forcing opportunities for SDOH action • Being prepared to build on small successes *Organizational factors influencing readiness* • SDOH-oriented leadership, workforce readiness, and infrastructure supportive of SDOH • Mission alignment and past experience with SDOH activities • Staff specifically focused on SDOH

Chapter 5

CONCLUSION

Summary

Health disparities arise from a complex interplay of variables ranging from individual-level behaviors and genetics to social/environmental factors (4-9, 126). Solutions for eliminating disparities logically require interventions across this socio-ecological spectrum. This dissertation research examined chronic disease interventions that spanned across the socio-ecological model, from individual and systems-level interventions, such as self-management and clinical care, to policy and social/environmental changes.

Study 1 examined whether people with diabetes received recommended diabetes clinical care and appropriately self-managed their diabetes from 2001 to 2010, and assessed the extent of racial/ethnic disparities in care. Among respondents with diabetes, there were significant increases from 2001 to 2010 in A1C tests, annual foot exams, flu shots, DSME, and SMBG, but declines in eye and self-feet exams. Having health insurance, a regular provider and DSME were associated with receiving recommended diabetes clinical care or engaging in appropriate self-care. Some interesting patterns in racial/ethnic disparities were observed. Hispanics fell short on most care measures. A relatively high proportion of Black Non-Hispanics received or engaged in several recommended services or care. Despite this, Black Non-Hispanics tend to suffer poorer health outcomes related to diabetes, which indicates a breakdown between appropriate care translating into improved outcomes in this sub-group (80). This study also confirmed the importance of diabetes self-management education in promoting receipt of recommended services and self-care. The greatest return on investment may be in increasing receipt of DSME among people with diabetes. Although the vast majority of respondents had health insurance

and/or a regular provider, only a little over half of respondents had participated in any type of DSME. Of note, sub-populations with higher diabetes prevalence, particularly Hispanics, men and older adults, were the least likely to receive DSME. Disparities in care reflect the complexities of developing appropriate interventions and outreach to ensure that populations both have access to recommended care and experience improved health outcomes.

Study 2 moved to the outer rings of the socio-ecological model, and examined the impact of a population-level, obesity-reduction policy on population health and disparities. Following implementation of mandatory menu-labeling at chain restaurants in King County, WA, the proportion of respondents who saw and used calorie information tripled from pre-policy (2008) to post-policy period (2009 to 2010). White Non-Hispanic, higher income, and obese respondents had greater odds of seeing calorie information. Women, higher income groups and those eating at a fast-food chain were more likely to use this information. Although there were increases in awareness and use among all subgroups from pre- to post-policy, there were some disparities in patron awareness and use of calorie information across demographic subgroups. Men, non-Whites including Hispanics, and respondents in the lowest income group were less likely to see and/or use the calorie information than their counterparts. Despite population-level improvements in nutritional awareness and use, these gains were not experienced universally, reflecting a twist on Rose's prevention paradox. ("A measure that brings large benefits to the community offers little to each participating individual." (158)) In the case of menu-labeling, although the overall King County population appeared to benefit from menu-labeling, sub-groups of the population experienced differential benefit. These findings point to the need for further research to understand the reasons for these disparities and identify strategies to improve calorie information awareness and use among these subgroups.

Study 3 examined the experiences of the Seattle & King County REACH Coalition in expanding from a direct-service orientation to addressing broader social determinants of health. This transition was motivated by a shift in CDC funding, which prioritized SDOH approaches as means to more effectively eliminate racial/ethnic health disparities. The experiences of the REACH Coalition demonstrate the challenges presented by a shift in perspectives and strategies. Although the transition did not come easily for many in the Coalition, it was able to successfully maneuver its way towards implementing modest SDOH interventions and position itself for future SDOH action. Receptiveness and readiness for change within the Coalition varied by organization, and depended on aspects of each organization's mission, leadership, staff and infrastructure. Coalition leadership was crucial in supporting this shift, as were allowing sufficient time for change, taking incremental steps, being responsive to naturally occurring opportunities to promote SDOH change, and concrete strategies and tools, like Digital Storytelling. Lessons for partnerships and funders include assessing organizational partners' capacities and buy-in for SDOH, examining appropriateness of current membership and whether new partners are needed, allowing enough time and appropriate assistance with conceptualizing SDOH into concrete, meaningful strategies, meeting people where they are at, and allowing for a more flexible versus prescriptive approach to gain buy-in from coalition partners.

Implications

The findings from this dissertation research point to a need for "both and" instead of "all or nothing" solutions to tackle health disparities. Whitehead and Dahlgren confirm the need for both-and solutions. In their 2006 WHO report, they describe three main approaches currently applied to reducing disparities: "focusing on people in poverty only, narrowing the health divide, and reducing social inequities throughout the whole population", and stress that all three must

build on each other (159). Their recommendations support the need for comprehensive, coordinated solutions across the socio-ecological model, from focused individual-level interventions, to policy interventions that decrease barriers and improve conditions for healthier lifestyles among those at increased risk for disease. Population-level approaches have the potential to raise the health of the whole population but not equally, leaving certain sub-groups, usually the same sub-groups (e.g., low income, racial/ethnic minorities), behind. As demonstrated in King County's menu-labeling policy, there were county-wide improvements in nutritional information awareness and use, but benefits were not distributed evenly across sub-populations. At-risk populations and people with disease still need targeted intervention. In this case, the policies needed are those that will ensure these sub-groups' access to and receipt of recommended care and services.

In this regard, the Affordable Care Act holds great promise. The ACA provides an opportunity for a natural policy experiment in which large scale, comprehensive reform is being enacted, that includes prevention and treatment at the individual care level, incentivizing improved processes of care and promoting healthier food choices at a population-level. Study 1 makes are case for increasing availability and receipt of DSME among people with diabetes and improving access to key care services in certain sub-groups, such as Hispanics. The ACA mandates the inclusion of certain types of diabetes-related screenings and care in "essential health benefits" that are covered in any health plan (160). In addition, quality of care and case coordination may be improved through electronic health records (EHR) requirements and tying reimbursements to promotion of preventive practices and reductions in readmissions for preventable problems (161, 162). Although health care providers, systems and patients will require some time to get accustomed to ACA-related requirements and provisions, it is expected

that these changes will translate into improvements in processes and quality of care and help reduce diabetes disparities.

Lastly, the reasons why communities of color are disproportionately impacted by chronic conditions are wide-ranging, and include complex issues like racism and poverty, i.e., social determinants of health. The ACA includes a federal mandate for menu-labeling. However, as seen in Study 2, this may not translate into nutrition awareness or obesity-reduction for communities of color. Clearly, efforts that extend the benefit of policy changes to racial/ethnic minorities are needed. Although the ACA includes grant funding for community programs addressing social determinants of health, racial/ethnic minorities often feel disenfranchised from civic engagement or powerless against reforming policies that negatively impact them (163, 164). This heightens the importance of community partnerships in efforts to address disparities. When collaborative principles are followed, trust is built and stakeholders are more likely to be engaged and support partnership efforts. Well-functioning partnerships can then leverage existing strengths in the community to improve the health of communities of color.

Although some improvements in health knowledge, behavior and care were observed over time in the population and within certain racial/ethnic subgroups, racial/ethnic minorities continue to fare less well than their White counterparts. The Affordable Care Act offers some promise in leveling the health playing field with its health insurance mandate, provisions for preventive care and other essential care, and health-promotion policies, such as menu-labeling. However, any discernable diminishment in disparities will require the proactive involvement and partnership of communities of color, public health practitioners and policy-makers to ensure equitable benefits and the political will to move this agenda forward.

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