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Instructions to Authors

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The Breast and Cervical Cancer Prevention and Treatment Act (BCCPTA) in Georgia: Women Covered and Medicaid Costs in 2003

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Abstract

The Breast and Cervical Cancer Prevention and Treatment Act (BCCPTA) provided states with an optional Medicaid eligibility category for uninsured women with breast and/or cervical cancers. The BCCPTA is the first and only such effort to use a population-based public health screening program, the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) to provide a pathway to publicly funded health insurance for otherwise uninsured low-income women. Georgia was one of the first states to adopt the BCCPTA and was one of only twelve states that provided Medicaid eligibility to women screened by non-NBCCEDP providers. We use 2003 Georgia Medicaid claims and enrollment data to investigate the scope of the state's BCCPTA enrollment and enrollees' costs as well as demographic characteristics of breast and cervical cancer patients in Georgia's BCCPTA and other Medicaid eligibility categories. Georgia's Medicaid coverage of women with breast and/or cervical cancer under BCCPTA accounted for over one-third of all women with these cancers covered by the state in 2003 alone. Those newly eligible under BCCPTA were more likely to have breast, as opposed to cervical, cancer and to be older than those women with breast/cervical cancers enrolled in Georgia Medicaid due to low-income, pregnancy or disability status. Georgia's Medicaid program spent over $29 million on BCCPTA enrollees in 2003 at a cost of over $12,000 per enrollee. BCCPTA enrollee costs were more similar to those for disabled women with these cancers, about $19,500, than to costs for low-income/pregnant women which equaled about $7,500. By expanding Medicaid coverage, BCCPTA can potentially bring women in at earlier stages of their cancer and provide needed coverage/treatment. Future research should examine the potential effect of BCCPTA on reduced morbidity and mortality among these low-income women.

The Breast and Cervical Cancer Prevention and Treatment Act (BCCPTA) in Georgia: Women Covered and Medicaid Costs in 2003

On October 24, 2000, President Clinton signed the Breast and Cervical Cancer Prevention and Treatment Act (BCCPTA). The BCCPTA, enacted as Public Law 106-354, gave states the ability to establish a new optional Medicaid eligibility category for uninsured women under 65 who had been screened under the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) and found to need treatment either for breast or cervical cancer or for a precancerous cervical condition. The NBCCEDP serves the uninsured with incomes below 250% of the federal poverty level (FPL). The first and only such effort to use a population-based public health screening program (NBCCEDP), BCCPTA was established as an effort to reduce the decades-old "treatment gap" for low-income women with no medical insurance by providing a pathway to publicly funded health insurance (Medicaid).

The BCCPTA has generated significant interest as a policy approach for addressing the challenges of the uninsured facing serious illness. Within a year of its passage, a majority of states had adopted the BCCPTA. Georgia adopted the BCCPTA pursuant to broad statutory authority by the Medicaid agency and began enrolling women in its BCCPTA program, the Women's Health Medicaid Program (WHMP), on July 1, 2001. From implementation through June 2006, BCCPTA enrolled approximately 4,800 women (Georgia Department of Community Health, 2006). Although BCCPTA mandated that women be screened by the NBCCEDP, states had options to also extend eligibility to women screened by non-NBCCEDP providers. Georgia is one of 12 states that selected this more expansive screening option. In 2005, only 25% of BCCPTA women were screened in health departments through Georgia's NBCCEDP screening program (known as "Breast Test and More"); the majority (75%) was screened by private providers (Department of Community Health, 2006).

Another distinction of BCCPTA from other Medicaid eligibility categories is that women are eligible for Medicaid only as long as they are "in treatment" for their cancers, but they can utilize any Medicaid covered service while eligible. If a BCCPTA woman is no longer in treatment at the time of recertification and if she is not eligible for Medicaid under other eligibility categories, she is disenrolled and usually referred back to her screening provider for follow-up care. The definition of "in treatment" is not explicit, however, and states differ in the timing and types of recertification required to confirm active cancer treatment. In order for BCCPTA women to get recertified in Georgia in 2003, they simply responded to Georgia's Medicaid program by letter every six months indicating that they were still in active treatment. Since this time, Georgia's Medicaid officials have considered a more formal process, whereby Breast Test and More staff could assist with the recertification process. Given the unique collaboration of states' screening programs and Medicaid agencies in determining eligibility, many NBCCEDP case managers assist women before, during, and after their treatment has ended. Although assisting with redetermination has become a logical role for these case managers, it is unclear what this change will mean for the percentage of women retaining coverage under BCCPTA eligibility.

BCCPTA Study

Despite successful enrollment, little is known about how states' adoption and implementation of the BCCPTA impacts low-income, uninsured women with breast and cervical cancer, nor how much it expands pre-existing Medicaid coverage of women with cancer. In 2004, Emory University received funding from the American Cancer Society (ACS) to examine the impact of BCCPTA in Georgia. This study uses quantitative data from Medicaid enrollment/claims and Georgia's Comprehensive Cancer Registry (GCCR) data to assess if: 1) implementation of BCCPTA shortened the length of time between initial diagnosis and eventual enrollment into Medicaid; 2) women enrolling in Medicaid do so at earlier stages of cancer post BCCPTA and hence, with greater treatment options; and 3) significant variation (e.g., urban/rural) in treatment patterns exist. As a first step, we use 2003 Medicaid claims and enrollment data to ask:

- *What is the scope of BCCPTA enrollment and costs in Georgia's Medicaid program?*
- *How does this fit into Georgia's overall coverage of women with breast or cervical cancer?*
- *What are the demographic characteristics of women enrolled in the BCCPTA program, or in other Medicaid programs?*

Assembling the claims/enrollment data is necessary to determine the procedure/diagnostic codes to identify women in Medicaid with evidence of breast and cervical cancers for our larger study. The resulting descriptive data are presented here to highlight the role that BCCPTA is playing in Georgia's Medicaid program.

BACKGROUND LITERATURE

Women facing critical health challenges are in need of health insurance. If early symptoms or chronic diseases are not medically managed, uninsured women are more likely to experience poorer medical outcomes or to be diagnosed at later stages of life-threatening diseases such as cancer; in turn, they experience a greater risk of death from breast cancer (ACP, 2000; CDC, 1998). The BCCPTA was developed to reduce both morbidity and mortality among women with such conditions.

Even prior to BCCPTA, Medicaid served as an important safety net for women with chronic health conditions and yet, there are relatively few studies specific to Medicaid enrollees with cancer (CDC, 1998). One earlier study showed that the Medicaid insured presented with more advanced disease. Further, both Medicaid enrolled and uninsured women diagnosed with local or regional stage disease had worse survival than privately-insured women, although there was no significant difference among women with distant metastases (Ayanian, Kohler, Abe, and Epstein, 1993). Another study found older, black women of lower socio-economic status treated in public hospitals (likely eligible for Medicaid) were more likely to have late stage breast or cervical cancer than younger, white, higher social class women treated in non-public hospitals (Mandleblatt, Andrews, Kerner, Zauber, and Burnett, 1991).

A study that linked Medicaid enrollment and Detroit cancer registry data found that Medicaid-insured women were more likely to have late-stage diagnosis, less likely to receive radiation if they had breast conserving surgery (BCS) and more likely to receive no surgery than other insured women (Bradley, Given, and Roberts, 2002). This linkage also provided new insight on racial disparities. Before controlling for Medicaid and area poverty, African-American women had a higher likelihood of each unfavorable outcome but after controlling, African-American women only differed in treatment choice. They were less likely to have any surgery and if they did, it was more likely to be BCS (Bradley, 2002). Thus low socioeconomic status, as evidenced by Medicaid enrollment, was a better predictor than race of disease stage at diagnosis.

Another study used Medicaid claims data to identify incident cases in Ohio's Medicaid population with registry data as the "gold standard" (Koroukian, Cooper, and Rim, 2003). The overall sensitivity was 68.7%, but varied by sub-group and was as high as 78% for those enrolled all year. A linkage of Medicaid and California registry data found that of the 14,305 matched cases, 70% were not enrolled in Medi-Cal (California's Medicaid program) either prior to or during the month of diagnosis (Perkins, Write, Allen, Samuels, and Romano, 2001). These authors concluded that despite difficulties in linking, such data can be used to assess access to care and cancer outcomes in this large, understudied and vulnerable population.

DATA AND METHODS

While BCCPTA women can be identified based on eligibility codes, other women with breast or cervical cancer in Medicaid programs can only be identified using diagnosis/procedure codes found in claims. We use calendar year 2003 claims to identify all women with evidence of these cancers. We compiled lists of diagnosis and procedure codes (and NDC chemotherapy codes) from publications, consultation with Georgia Medicaid staff, and with our team's clinical oncologist. We cast a broad net to find women with breast or cervical cancers in Georgia Medicaid but were conservative when using procedure codes without a cancer diagnosis (during the year) since this could lead to over-identification of cancer cases. The list of codes employed to derive the samples is shown in Table 1.

We identified all unique women with at least one claim with any of these codes from inpatient, outpatient, drug, and long-term care claims. From this pool of women, we excluded: 1) women over 65; 2) women dually enrolled in Medicare; and 3) women in a nursing home during the year. These exclusions were necessary since not all 'crossover' claims - those involving both Medicare and Medicaid payments - nor long-term care claims include all diagnostic, procedure, and payment detail. By making these exclusions, we identified a group of relatively younger women insured largely by Medicaid who were more comparable with those eligible for Medicaid through BCCPTA.

We then grouped women by the eligibility category on their first (cancer-related) claim during the year: 1) BCCPTA; 2) welfare or pregnancy-related; and 3) disabled women. Women with dependent children could qualify for Georgia Medicaid under welfare-related criteria at approximately 33% of the Federal Poverty Level (FPL); FPL for a family of three equaled $15,260 in 2003 (CMS,

Table 1
ICD-9 Breast and Cervix Cancer Diagnosis Codes, NDC Chemotherapy Codes, and CPT Breast and Cervix Procedure Codes

	Codes
Breast Cancer Diagnosis ICD-9 Codes	233.0,174.0-174.9,238.3,239.3
Cervix Cancer Diagnosis ICD-9 Codes	622.1,233.1,180.0-180.9
Chemotherapy NDC Codes	54569-3765-00, 54569-8602-00, 00555-0446-09, 00555-0446-63, 00555-0446-05, 00555-0904-01, 00555-0904-14, 00555-0904-05, 51552-0838-02, 63370-0251-10, 63370-0251-15, 63370-0251-25, 63370-0251-35, 00172-5656-49, 00172-5656-58, 00172-5656-70, 00172-5656-80, 00172-5657-46, 00172-5657-60, 00172-5657-70, 00172-5657-80, 38779-0341-03, 38779-0341-01, 38779-0341-04, 38779-0341-05, 62991-1151-02, 62991-1151-01, 00378-0144-91, 00378-0274-93, 00378-0274-01, 54868-3004-02, 54868-3004-01, 00054-4831-21, 00054-8831-25, 00054-4831-26, 00054-4834-13, 00054-4834-22, 00054-8834-25, 49452-7571-05, 49452-7571-01, 49452-7571-02, 49452-7571-06, 49452-7571-03, 00093-0784-06, 00093-0784-86, 00093-0782-56, 00093-0782-01
Breast Procedure CPT Codes	19160; 19162; 19180; 19182; 19200; 19220; 19240
Cervix Procedure CPT Codes	57520; 57522

2003). Pregnant women under 235% of the FPL would have qualified for Georgia Medicaid, and a woman with a disabling condition and on Supplemental Security Income (SSI), approximately 74% of the FPL, would have qualified in 2003 (VCU, 2006).

RESULTS

The data in Table 2 show that, based on administrative files, a total of 2,379 women were enrolled in Georgia's BCCPTA program at some point during 2003. These women were almost evenly split across the three non-teenage categories; roughly one-third were in each age group under 65. Based on those with race/ethnic data (91% of total), the women enrolled in BCCPTA in 2003 were predominantly white non-Hispanic (54%) with 32% categorized as non-Hispanic Black, 2% as Hispanic, and 2% as "other" ethnic groups. Given the significant proportion of missing race data, it is likely that the percent Hispanic is underrepresented. Survey data on families with children in Medicaid in 2003 indicate 5% of the higher income, and 10% of the lower income families, were Hispanic (Ketsche, 2007). BCCPTA women however, accounted for only 36% of the total 4,573 identified by claims/codes (1,655 BCCPTA, 1,887 welfare/pregnancy related and 1,031 disabled). Based on the costs of those ever enrolled in BCCPTA, Medicaid spent $29 million or about $12,400 per woman. The $27 million spent on BCCPTA enrollees with breast/cervical cancer claims represents 44% of costs for women ($61.6 million)

Table 2

Age, Race, Cost Breakdown for Women Ever Enrolled in BCCPTA, Women with Claims for Breast or Cervical Cancers and Eligible for BCCPTA on First Claim, Georgia Medicaid 2003

	All BCCPTA-Ever Enrolled in Year		BCCPTA w/ Breast/Cervical Cancer Claims and BCCPTA Eligible at First Claim		Women with Breast Cancer Claims and BCCPTA Eligible at First Claim		Women with Cervical Cancer Claims and BCCPTA Eligible at First Claim	
	N=2,379	%	Unduplicated N=1,655 Duplicated N=1,688	%	N=1,093	%	N=595	%
AGE								
<20	33	1%	23	1%	0	0%	23	4%
20-34	773	32%	335	20%	57	5%	284	48%
35-49	773	32%	631	38%	451	41%	194	33%
50-64	800	34%	666	40%	585	54%	94	16%
RACE								
Non-Hispanic White	1284	54%	809	49%	468	43%	355	60%
Non-Hispanic Black	762	32%	586	35%	439	40%	158	27%
Hispanic	59	2%	33	2%	16	1%	18	3%
Other	49	2%	39	2%	30	3%	9	2%
Missing	225	9%	188	11%	140	13%	55	9%
COSTS								
Total	$29,409,475	100%	$27,166,949	100%	$22,171,588	100%	$ 5,857,984	100%
Inpatient Services	$5,469,035	19%	$5,062,505	19%	$3,439,421	16%	$1,790,438	31%
Outpatient Services	$20,865,546	71%	$19,346,937	71%	$16,296,716	74%	$3,682,447	63%
Drug	$3,074,894	10%	$2,757,508	10%	$2,435,452	11%	$385,099	7%
COSTS PER ENROLLEE								
Total	$12,362	100%	$16,415	100%	$20,285	100%	$9,845	100%
Inpatient Services	$2,299	19%	$3,059	19%	$3,147	16%	$3,009	31%
Outpatient Services	$8,771	71%	$11,690	71%	$14,910	74%	$6,189	63%
Drug	$1,293	10%	$1,666	10%	$2,228	11%	$647	7%

identified by claims/codes. Both the BCCPTA and disabled eligibility category of women have costs that represent more of the total than they do of women covered because their per-person costs are significantly higher than those of low-income pregnant women. Most of the latter group are experiencing cervical cancers and at a much lower cost per case.

For BCCPTA and other groups of enrollees outpatient services (e.g. physician and other ambulatory services such as laboratory, screening, etc) are more expensive in total and per person due largely to their greater volume. While inpatient services (e.g. hospital accommodations, surgical services, etc) are more costly per event there is a lower rate of usage per person.

BCCPTA Eligible Women

We identified 1,655 unduplicated women with breast or cervical cancers with BCCPTA eligibility on their first cancer claim. The difference between this and the 2,379 *ever* enrolled in BCCPTA during 2003 is comprised of: 1) 29 women who did not have BCCPTA on their first claim, but who were enrolled during the year, and 2) 695 women in BCCPTA who either did not have a claim or had one outside of our identified diagnosis or procedure codes. Some of the 695 may have had precancerous cervical conditions (which qualify for BCCPTA). While we found such codes among their leading diagnoses, by and large, the leading diagnoses were not cancer-related. These 695 women could also have had disease in remission, but still considered "under treatment;" the great majority of them (almost 75%) either had no claim during the year (15%) or had at least one 'case management' claim/procedure (59%) listed by Georgia BCCPTA.

The split between breast and cervical cancer using the data based on claims is shown in Columns 2-3 in Table 2. Among the 1,688 duplicated (33 had claims for both) BCCPTA women with either cancer, breast cases accounted for 65%. Total payments for BCCPTA women with claims for breast or cervical cancer were $27 million, equal to $16,415 per woman. For breast cancer cases, total payments were $22 million, equal to $20,285 per woman. For cervical cancer cases, total payments were $5.8 million, equal to $9,845 per woman.

Welfare and Pregnancy Related Eligible Women

The Georgia Medicaid program serves many women with these and other cancers outside of BCCPTA. As shown in Table 3, almost 1,900 women with either cancer and in either welfare or pregnancy-related eligibility categories received treatment in 2003. (Data on the age/racial distributions should be compared with that in Columns 2-3 in Table 2 which are also derived based on claims/codes). These data indicate that women with breast or cervical cancers in these eligibility groups are far more likely to be under age 35 (78% versus 33%) than BCCPTA enrollees and indeed, more likely to be teenagers (19% versus 1%). Even accounting for missing race, they are more likely to be non-Hispanic Blacks than are BCCPTA enrollees.

In contrast to BCCPTA, cervical cancer was far more common among Medicaid patients in the welfare or pregnancy categories (77% of these 1,895 duplicated cases). The costs per case among these younger women are lower at $7,548 overall (total payments were $14 million). For those with breast cancer, the average cost per case was $12,200 (total payments were $5 million) while costs for cervical cancer cases averaged $6,234, with total payments of $9 million.

Disabled Women

Georgia and other states' Medicaid programs have historically served the low-income with disabling conditions. As shown in Table 4, a little over 1,000 women with evidence of breast or cervical cancers and disabled by these or other conditions were served in 2003. As among BCCPTA women, the cases are predominately breast cancer (72%), and the costs per woman are similar at almost $20,000. There are almost 300 disabled women with evidence of cervical cancer, and these cases are just as costly as for BCCPTA women at $19,718. Women in this eligibility category are likely to be older than either BCCPTA women or women in the welfare and pregnancy related categories with approximately 59% between the ages of 50 and 64.

CONCLUSIONS AND IMPLICATIONS

Prior to BCCPTA, many uninsured women with breast or cervical cancer qualified for Medicaid only when they were at late stages of disease and perhaps disabled by it (Ayanian et al., 1993). The time between diagnosis and treatment was likely long for uninsured women who could not either afford treatment or find doctors willing to provide charity care. The BCCPTA created a potentially new and quicker pathway into Medicaid. The data shown here indicate that BCCPTA women with breast cancer are more like the Medicaid disabled than those eligible through other avenues, in terms of age and costs, but are still younger and somewhat less expensive to serve. BCCPTA women with cervical cancers are certainly younger than the disabled women, and they have markedly lower costs. This may reflect detection/treatment at earlier stages of disease or a lack of co-morbidities among BCCPTA women compared with those the disabled possess.

When BCCPTA was created, there was little information for state policy makers

Table 3

Age, Race, Cost Breakdown for Women with Claims for Breast or Cervical Cancers and Enrolled in Welfare or Pregnancy-Related Category on First Claim, Georgia Medicaid 2003

	Women with Breast or Cervical Cancer Claims and Welfare or Pregnancy-Related Eligibility at First Claim		Women with Breast Cancer Claims and Welfare or Pregnancy-Related Eligibility at First Claim		Women with Cervical Cancer Claims and Welfare or Pregnancy-Related Eligibility at First Claim	
	Unduplicated N=1887 Duplicated N=1,895	%	N=440	%	N=1455	%
AGE						
<20	352	19%	47	11%	305	21%
20-34	1118	59%	138	31%	982	67%
35-49	363	19%	206	47%	163	11%
50-64	54	3%	49	11%	5	0%
RACE						
Non-Hispanic White	811	43%	147	33%	669	46%
Non-Hispanic Black	1051	56%	280	64%	774	53%
Hispanic	3	0%	1	0%	2	0%
Other	11	1%	4	1%	7	0%
Missing	11	1%	8	2%	3	0%
COSTS						
Total	$14,243,272	100%	$5,368,003	100%	$9,070,747	100%
Inpatient Services	$3,399,623	24%	$1,271,492	24%	$2,225,033	25%
Outpatient Services	$9,414,445	66%	$3,492,421	65%	$6,013,085	66%
Drug	$1,429,204	10%	$604,089	11%	$832,629	9%
COSTS PER ENROLLEE						
Total	$7,548	100%	$12,200	100%	$6,234	100%
Inpatient Services	$1,802	24%	$2,890	24%	$1,529	25%
Outpatient Services	$4,989	66%	$7,937	65%	$4,133	66%
Drug	$757	10%	$1,373	11%	$572	9%

regarding the costs that Medicaid would face since data on the costs of cancer treatment are often limited. Many states made estimates of anticipated BCCPTA costs but these have not been made available to researchers. In a study based on the Medical Expenditure Panel Survey (MEPS), Medicaid insured (age <65) had expenses close (93%) to those of the privately insured, but both had much higher expenses than the uninsured (Thorpe and Howard, 2003). The uninsured were also found to have lower provider encounters and fewer hospital admissions, perhaps indicative of less cancer care. On an annualized basis, the expenses for the Medicaid insured were $15,610 (Thorpe and Howard, 2003), lower but still quite consistent with the dollar amounts reported here for Georgia Medicaid women with breast cancer.

While BCCPTA women accounted for over one-third of the women under age 65 served by Georgia's Medicaid program in 2003 (the second year of BCCPTA), it is important to note the role Medicaid coverage plays independent of BCCPTA. Georgia Medicaid insured almost 2,000 younger women with breast and especially, cervical cancers among women in their pregnancy or welfare eligibility groups. That these young women end up using Medicaid for these diagnoses relates in part to screening for cervical cancer at younger ages than other cancers and that many women who are single heads of households and/or young married

Table 4:
Age, Race, Cost Breakdown for Women with Claims for Breast or Cervical Cancers and Enrolled in Disability Category on First Claim, Georgia Medicaid 2003

	Women with Breast or Cervical Cancer Claims and Disability Eligibility at First Claim		Women with Breast Cancer Claims and Disability Eligibility at First Claim		Women with Cervical Cancer Claims and Disability Eligibility at First Claim	
	Unduplicated N=1031 Duplicated N=1,042	%	N = 749	%	N=293	%
AGE						
<20	13	1%	3	0%	10	3%
20-34	98	10%	26	3%	73	25%
35-49	316	31%	215	29%	106	36%
50-64	604	59%	505	67%	104	35%
RACE						
Non-Hispanic White	356	35%	251	34%	109	37%
Non-Hispanic Black	497	48%	361	48%	142	48%
Hispanic	7	1%	6	1%	1	0%
Other	9	1%	6	1%	3	1%
Missing	162	16%	125	17%	38	13%
COSTS						
Total	$20,210,958	100%	$14,862,105	100%	$5,777,233	100%
Inpatient Services	$5,540,801	27%	$3,739,745	25%	$1,918,383	33%
Outpatient Services	$11,054,919	55%	$8,392,379	56%	$2,884,074	50%
Drug	$3,615,238	18%	$2,729,981	18%	$974,776	17%
COSTS PER ENROLLEE						
Total	$19,603	100%	$19,843	100%	$19,718	100%
Inpatient Services	$5,374	27%	$4,993	25%	$6,547	33%
Outpatient Services	$10,723	55%	$11,205	56%	$9,843	50%
Drug	$3,507	18%	$3,645	18%	$3,327	17%

mothers are likely to lack private insurance coverage (Guyer, Broaddus, and Dude, 2001). Given high cure rates for cervical cancer with early detection/treatment, both traditional Medicaid eligibility and the expansion through BCCPTA can serve as a critical safety net and perhaps help reduce morbidity and mortality related to this preventable cancer.

The NBCCEDP has just been reauthorized through fiscal year 2011. While funding has increased, it still falls far below that needed to cover all uninsured women for free or subsidized screens. If uninsured women still get screened and if screening leads to a cancer diagnosis, BCCPTA can provide needed coverage/treatment. Georgia's experience shows that 75% of the otherwise BCCPTA-eligible women received screening privately. If this experience can be generalized to other states, it is important that they consider expanding BCCPTA to women screened by any provider. Future research should examine the role of BCCPTA in bringing women into Medicaid at earlier stages and potentially, reducing morbidity and mortality as it was intended to do.

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Clinicians' Perception of Inmates' Satisfaction with Mental Health Services

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Abstract

A growing body of literature addresses the mental health needs of prison inmates; however, very little research has examined mental health services among this population. Based on the Behavioral Model of Health Services Use (Andersen Model), the current study examined clinicians' perception of inmates' satisfaction with mental health services. The study's main objective was to identify the effect of three major groups of predictor variables (predisposing, enabling, and need) on clinicians' perception with inmates' satisfaction with mental health services. The study utilized an exploratory, survey methodology. Although only a few variables were found to be statistically significant in the multivariate analyses, the findings of the study are a significant step in beginning to understand satisfaction of mental health services by inmates. The link between satisfaction and treatment outcome has great significance in the correctional environment, where staff and inmates may tend to see each other as adversaries.

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Clinicians' Perception of Inmates' Satisfaction with Mental Health Services

INTRODUCTION

The goal of this study was to describe mental health clinicians' perception of inmates' satisfaction with mental health services. A growing body of literature addresses the mental health needs of this popuation; however, very little research has examined mental health services among prison inmates (Morgan, et al., 2004; Steadman, et al., 1991). The current study takes a step in the process of examining satisfaction with mental health services in a correctional environment. Hence, the current study contributes to a body of literature that examines the complex issues related to prison mental health services (a sector of public mental health). The study was conducted at mental health units located within the Georgia Department of Corrections (GDC).

U.S. Correctional System

The U.S. jail and prison population has more than doubled since 1985. In 1985 jails and prisons held an estimated 313 persons per 100,000 United States residents. In 1996 the number of inmates had increased to 615 men and women per 100,000 residents, or one in every 163 residents (Bureau of Justice Statistics, 1997). The latest data show that there are 726 persons per 100,000 residents (Bureau of Justice Statistics, 2004). Hence, the criminal justice "explosion" has continued into the new millennium.

Along with the increase in the prison and jail population, the number of inmates with mental disorders (prevalence rate) has increased substantially. Correctional officials and researchers have noted that a significant number of inmates suffer from a mental disorder (Beck & Maruschak, 2001; Daniel, Robins, Reid, & Wifley, 1988; Diamond, Wang, Holzer, Thomas, & Cruser, 2001; Dvoskin & Steadman, 1989; Hodgins & Cote, 1990; Steadman, Fabisiak, Dvoskin, & Holohean, 1987; Teplin, 1990; Torrey, 1995). Much of the increase in the number of mentally ill inmates has been attributed to the criminalization of persons suffering from a mental illness (Teplin & Voit, 1996). Despite the reason for the increase, there are twice as many persons with serious mental illness in jails and prisons as opposed to state mental hospitals (Torrey, 1995).

There is a belief that the prevalence of serious mental illness in correctional systems is between 6% and 15% (Elliott, 1997); however, there have been reports of mental disorders among prison inmates as high as 35% (Baskin, Sommers, & Steadman, 1991). Several factors account for the various rates, including differing definitions of mental disorder (Severson, 1992) and methodological limitations (Metzner, Cohen, Grossman, & Wettstein, 1998; Roesch, Ogloff, & Eaves, 1995). For example, many studies have not utilized probability sampling.

The influx of inmates suffering from a mental illness presents numerous challenges. Most notably, prison officials have had to reexamine their missions (Butterfield, 1998). Although the primary purpose of prisons is still punishment of offenders, prison staff should be prepared to provide treatment to inmates who suffer from a mental disorder.

Satisfaction with Mental Health Services

Consumer satisfaction has received a great deal of attention over the past two decades. Driving much of the attention has been the need and desire to focus on outcomes of health and mental health services. During the 1970s, many evaluators pushed for the inclusion of satisfaction ratings as a component of human service program evaluation (Larsen, et al., 1979). More recently, examination of consumer satisfaction in mental health services has increased due to clinicians' and researchers' desire to have an understanding of outcomes that reflects the consumer's perspective (Holcomb, et al., 1998). As a result of the increasing need and desire to include the client in the evaluation of programs, information on consumer satisfaction is becoming increasingly available (Pandiani, Banks & Schacht, 2002).

Larsen, et al. (1979) described three reasons for assessing consumer satisfaction. First, they state that when the client's perspective is taken into account, the evaluation of services is more complete. Second, legislative mandates were created to include consumers in the evaluative process. Finally, many mental health programs are publicly funded, leaving poor consumers with practically no alternatives to receive mental health services elsewhere. Thus, service decisions that relate to quality, adequacy, and appropriateness don't include consumer input. In addition to the above reasons for assessing consumer satisfaction, McCarthy, Gelber & Dugger (1993) noted that policy-makers believe that consumer satisfaction data can be useful in managing program development and resource allocation.

The above decisions have important implications for consumers who receive mental health services within the correctional environment. Almost nothing is known about consumer satisfaction with mental health services in the correctional environment. Although there is a proliferation of research about satisfaction with mental health services in the general population, a search of the literature revealed no studies of satisfaction of services within the correctional system. Some studies peripherally touched on the issue of satisfaction by examining health-related grievances by prison inmates (Anno, 1997). Other related studies have included satisfaction with involuntary treatment (Spensley, et al., 1980), and assessment of the relationship between consumer evaluation of community mental health services and incarceration after treatment in a statewide system of care (Pandiani, Banks & Schact, 2002). Finally, one study has focused on inmates' perception of mental health services, but did not specifically examine satisfaction with services (Morgan, Rozycki & Wilson, 2004).

Research Purpose

Conducting research in a correctional environment can be challenging yet rewarding. The impetus for this study came from the first author's experience of working in corrections as a correctional officer and later as mental health therapist. This study focused on the impact of a group of independent variables, selected on the basis of Andersen's Behavioral Model of Health Services Use (1995), on satisfaction with mental health services. The study's purpose was to identify variables from within the three domains of predisposing, enabling and need factors, and then test the influence of these variables on clinicians' perception of inmates' satisfaction with mental health services. Analyses were conducted specifically to address a set of exploratory research questions.

Given current regulations regarding use of prisoners in research, it is extremely difficult to study prisoners. Because it is so difficult to obtain permission to collect data directly from prisoners, we decided as a first step to study clinicians' perceptions of prisoners' satisfaction with their services. While clinicians' perception cannot be assumed to be the same as inmates, their perception can still be useful to evaluate services. Whenever prisoners can be studied, it would be interesting to see how clinicians views match inmates' as related to satisfaction with services.

Conceptual Framework

The current study utilized the Behavioral Model of Health Services use (also known as the Andersen model). The Andersen model (1995) is categorized as a systems model and is one of the most widely used frameworks for studying health services use (Proctor & Stiffman, 1998). The model focuses on three categories of variables that predict service use and outcomes such as satisfaction: predisposing, enabling, and need. Predisposing variables are client and service provider (clinician) characteristics that may influence use and outcome. Enabling variables are those that are hypothesized to positively affect outcomes. For example, in many studies, having health insurance is an enabling variable. However, that variable is not relevant in the correctional setting. The enabling variables chosen for this study have been shown to be correlates of outcome. For example, the experience of the clinician and working (therapeutic) alliance forged with the client. Racial match has been hypothesized as reducing disparities in service use and outcomes for minority clients. Need variables relate to the clinical condition of the clients. Figure 1 summarizes the independent variables as to whether they are need, enabling, or predisposing in the Anderson model.

Figure 1
Independent variables by classification

Predisposing	Enabling	Need
Age	Region of Institution	Mental Health Level
Gender of Clinician	Number of Clients	Diagnosis
Gender of Clients	Clinician's MH Experience	
Race / Ethnicity of Clinician	Clinician's Correctional Experience	
Race / Ethnicity of Clients	Racial Match	
Education of Clinician	Gender Match	
Professional Affiliation	Working Alliance	

Research Questions

1. What are clinicians' perception of inmates' satisfaction with mental health services?
2. Does an association exist between any of the predictor variables (predisposing, enabling, and need) and clinicians' perception of inmates' satisfaction with mental health services?

METHODOLOGY

Study Setting

The Georgia Department of Corrections (GDC) has approximately 53,000 inmates (8th largest in the U.S.), with more than 8,000 inmates receiving mental health services. There are thirty-eight state prisons in the state of Georgia. Thirty-five prisons are for men, and three are for women. A majority of the prisons are located in "rural" as opposed to "metropolitan" areas, especially many of the prisons built since the 1980s.

GDC's mental health program is operated in a "managed care" format with services being provided at seventeen of its thirty-eight institutions. GDC's mental health administrators' understanding of managed care parallels that of Dziegielewski, Shields, and Thyer (1998). According to Dziegielewski, et al. (1998), "managed care implies careful pretreatment assessments (including but not limited to the diagnosis of mental disorders), the use of structured outcome measurement tools, including patient satisfaction" (p 287). The program is administered by the GDC central office under the direction of a state mental health (MH) director. Currently, the state MH director is a doctoral level clinical psychologist with many years of experience in the correctional setting. At each institution, the MH program falls under the direct operational authority of the Deputy Warden for Care and Treatment. There is also a MH director responsible for administering the local MH program at each facility.

RESEARCH DESIGN

This study utilized a cross-sectional design to examine clinicians' perception of inmates' satisfaction with mental health services. Clinicians were used as respondents because of difficulties getting Institutional Review Board (IRB) approval to study prisoners. Although inmates would have made a better respondent group, examining satisfaction data via clinicians is still an appropriate method. Other studies have examined the clinicians' perception of consumer satisfaction, but those studies also examined the consumers' perception (Bloom & Trautt, 1978; Distefano, Pryer, & Garrison, 1980). Bloom & Trautt (1978) found that clients were more impressed with mental health services, but the clinicians in their study tended to have a deflated view of the services they provided. In contrast, Distefano, et al. (1980) found a high correlation (.75) between clinicians' perception of clients' satisfaction and the clients' reported satisfaction. We used a cross-sectional, correlational design in the current study to examine only the clinicians' perception. Thus, the current study lays the foundation for future studies that will explore inmates' satisfaction with mental health services.

Study Sample

A convenience sample was used for this study. The data came from a sample of mental health service providers/clinicians who work in the Georgia Department of Corrections (GDC). Prior to conducting the study, we met with key mental health staff members (i.e., state mental health director and facility mental health directors). The staff members were introduced to the study in a detailed presentation. During this time, questions were encouraged and any points of confusion were clarified. The state mental health director subsequently drafted a letter to all facility mental health directors explaining the study. A copy of this letter was included with the survey instrument, along with a letter from us. At the time of data collection, the GDC employed 341 clinicians at seventeen prisons where mental health services are provided (186 Master's degree, 26 Ph.D.s, 27 M.D.s, 78 psychiatric nurses, and 24 activity therapists). Thus, there was on average about twenty clinicians per prison; of course, some institutions (based on the number of inmates and level of overall need) require more staff than others. No other background data were provided by the GDC for the purpose of acquiring a sample for the study (e.g, age, race/ethnicity, or gender of clinicians). The final sample consisted of 107 respondents (30% of the total clinical staff), with 59 females and 45 males (3 respondents did not indicate gender). No information was obtained on any of the nonparticipants. The respondents were not compensated for their participation in the study.

Measures

The questionnaire consisted of four different sections: 1) working alliance, 2) perceived consumer satisfaction, 3) evaluated need, and 4) demographic information. A letter was attached explaining the purpose of the study and instructions on how to complete the questionnaire. Respondents were informed that participation was on a voluntary basis. Respondents were also informed that all information was anonymous and confidential. The questionnaire was pilot tested with the GDC mental health director, the program development consultant from the GDC office of health services, and the mental health directors at various prisons. Although the persons who participated in the actual pilot test were not actively providing clinical services within the GDC, all had done so in the past. Thus, each understood the type of mental health services potential study participants currently provide. It took approximately 20-25 minutes to complete the 6-page questionnaire.

Operationalization of Dependent Variable

Perceived consumer satisfaction: The dependent variable was perceived consumer satisfaction. This variable was measured by asking the clinicians to describe how a majority of their clients would respond to a satisfaction item. [e.g., How would you rate the services received from (therapist's name) 1 = excellent, 2 = good, 3 = adequate, 4 = disappointing, 5 = very disappointing].

Operationalization of Independent Variables

Working alliance: The Working Alliance Inventory (Therapist Form) (Horvath & Greenberg, 1989) was adapted for use in a prison environment and incorporated into the questionnaire for the participants to complete. The final version of this newly adapted scale consisted of 36 items like the original scale developed by Horvath & Greenberg. Clinicians were asked to focus on the typical (average) client on their caseload. The ratings were made on seven-point scales ranging from never (1) to always (7). Items that were worded positively indicated views consistent with a more positive working alliance, and items worded negatively indicated views consistent with a more negative working alliance. Prior to summing the items, negative items were reverse coded. The final 36-item scale had an alpha reliability of .93, and no items were dropped from the original item-pool. Higher scores indicated a stronger working alliance, and lower scores indicated a weaker working alliance.

Clinicians were also queried about various background variables to look at differences among the clinicians. The background variables included: Age (actual age of the clinician), Sex (sex of the clinician), Sex of Clients (sex of the clients on the clinician's caseload), Race/Ethnicity (race/ethnicity of the clinician), Education (highest level of education the clinician has obtained), Professional Affiliation (the profession which the clinician is most affiliated), Race/Ethnicity of Clinician's Caseload (each clinician was asked to describe her caseload regarding race/ethnicity. Specifically, the clinician was asked the race/ethnicity of the majority of her clients at the present time), Number of clients on the clinician's caseload (actual number of clients assigned to the clinician's caseload at the time of the study), Therapist's Mental Health Experience (therapist's mental health experience was measured by the total number of years of mental health experience each therapist had) and Therapist's Correctional Experience (therapist's correctional experience was measured by the total number of years of correctional experience each therapist had).

Evaluated Need: The level of need for mental health services was based on the GDC classification of mental health levels: level I, level II, level III, level IV, level V and level VI. Lower levels denote less need and higher levels denote greater need. Clinicians were asked to give the percentage of their caseload at each level at the time of the study. Clinicians were also asked to list the most prevalent diagnosis given to inmates on their caseload. Region: Region of state where prison is located (Northern, Central and Southern). These regional designations were developed by the GDC.

RESULTS

Descriptive Analyses

The mean age of the sample was 43.5 years (SD = 10.5, Range = 25-68, Median = 44). The men in the sample were older with a mean of 46.8 years (SD = 9.7, Range = 26-68, Median = 49.0). The mean age for women was 41.0 years (SD = 10.4, Range = 25-62, Median = 40.0). The mean number of years providing mental health services was 13.0 (SD = 10, Range = .50-40, Median = 10). Men tended to have more years of providing mental health services with a mean of 15.1 years (SD = 10.8, Range = 1-40, Median = 12.0), while women had a mean of 11.4 years (SD = 9.2, Range = .50-36, Median = 9.0). Likewise, men tended to have more years of experience in corrections with a mean of 7.1 years (SD = 5.6, Range = .50-18, Median = 5.0), while women had a mean of 4.5 years (SD = 3.9, Range = .50-14, Median = 3.0). The differences in length of time providing mental health services and in years of experience in corrections are likely accounted for by the age difference. The overall sample mean for years of experience in corrections was 5.6 (SD = 4.8, Range = .50-18, Median = 3). Statistical differences (based on gender) of some of the variables are included below in the bivariate section. Table 1 summarizes the characteristics of the sample.

Table 1
Background Characteristics of Sample

Characteristics	Frequencies (n=107)	%
Gender		
Female	59	55.1
Male	45	42.1
Race		
White	66	61.7
Black / African American	30	28.0
American Indian / Alaska Native	2	1.9
Asian / Pacific Islander	1	0.9
Other	2	1.9
Age		
20-29	12	11.2
30-39	24	22.4
40-49	30	28.0
50-59	28	26.1
60-69	5	4.6
Professional Affiliation		
Counseling	49	45.8
Psychology	31	29.0
Psychiatry	6	5.6
Social Work	6	5.6
Activity Therapy	4	3.7
Nursing	4	3.7
Marriage & Family Therapy	1	0.9
Highest Level of Education		
Associates	1	0.9
Bachelors	9	8.4
Masters	76	71.0
Doctorate (MD, PhD)	19	17.8
Racial Breakdown of Caseload		
Majority African American	53	49.5
Majority White	25	23.4
Equally Split	12	11.2
Number of Inmates Assigned to Caseload		
0 - 19	13	12.1
20 - 39	43	40.1
40 - 59	25	23.3
60 - 79	6	5.6
80 - 99	3	2.8
100 +	8	7.4
Years of Experience Providing MH Services		
0 - 10	56	52.3
11 - 20	27	25.2
21 - 30	16	14.9
31 - 40	6	5.6
Years of Experience in Corrections		
0 - 10	83	77.5
11 - 20	20	18.6

The scores for working alliance ranged from 110 to 186 (maximum = 252). The scores were normally distributed with a mean of 160.4, mode of 158, and median of 161. There was no statistically significant difference in scores between females and males.

Seventy percent of the participants responded that inmates on their caseload would report that level of satisfaction would be good. Fifteen percent of the participants responded that inmates would report that services were excellent. Finally, 15% of the participants responded that inmates on their caseload would report that services were adequate. None of the participants believed that inmates would state that mental health services are disappointing nor very disappointing, the two most negative responses that could be ascertained about level of satisfaction. Table 2 presents the findings of perceived inmate level of satisfaction for the sample.

Table 2

Clinicians' Perception of Inmate Level of Satisfaction (Sample)

Characteristics	n = 107	%
Excellent	16	15.0
Good	75	70.0
Adequate	16	15.0

When examining satisfaction across the various regions, we found a significant difference in how the clinicians perceived the level of inmate satisfaction. The northern and central regions were more closely aligned with the total sample, whereas the southern region had a greater deviation. Most interesting about the southern region was the fact that a large proportion of the respondents stated that most of the inmates on their caseload would report that the services received by the clinician would be adequate. Clinicians in the southern region had the smallest percentage of clinicians responding that inmates on their caseloads would report that services are good or excellent. There is no clear cut explanation for these differences in the regions. Approximately 50% of the clinicians in the southern region responded that the majority of inmates on their caseload were receiving level III mental health services. Additionally, clinicians in the southern region tended to have the highest proportion of inmates on their caseload diagnosed with a psychotic disorder. Thus, it is possible that level of need is a factor in why clinicians in the southern region believed that a greater proportion of inmates would report that services are only adequate. Table 3 presents the findings of inmate level of satisfaction for the various regions.

Bivariate Analyses

Given that the current study was exploratory, we conducted t-tests to see if the gender differences among the background variables (noted earlier) were statistically significant. There was a statistically significant difference between females and males on three of the variables: age, years of experience providing mental health services, and years of experience working in corrections. Perhaps the significant gender differences are because employment for women in corrections is a fairly new phenomenon, especially working in positions that have been traditionally held by men.

The second research question to be examined in this study was the association of the predictor variables (predisposing, enabling, and need) with clinicians' perception of their clients' satisfaction with prison mental health services. Each independent variable was tested at the bivariate level to assess its relationship with the clinicians' perception of

Table 3

Clinicians' Perception of Inmate Level of Satisfaction (Regions)

Characteristics	Frequency (n = 107)	%
Northern Region		
Excellent	4	12.1
Good	29	87.8
Central Region		
Excellent	8	19.5
Good	26	63.4
Adequate	5	12.1
Southern Region		
Excellent	4	11.4
Good	20	57.1
Adequate	11	31.4

inmate satisfaction. Once again, for the purpose of the bivariate analyses an artificial dichotomy was created for some of the independent variables. Other independent variables were collapsed in order to have fewer categories. Although clinicians' perceptions of inmate satisfaction were measured at the ordinal level, it is presumed that there is an equal distance between the range of responses in the scale and the scale is treated as interval data. We used an $\alpha = .10$ level of statistical significance.

Table 4 presents the results of the bivariate analyses of all the independent variables with clinicians' perception of inmate satisfaction. Different types of statistical analyses were utilized because of the level of measurement for the different independent variables. None of the predisposing or need variables were statistically significant. Only two of the enabling variables, geographic region and working alliance, were statistically significant. There was a moderate positive correlation (.478) between working alliance and clinicians' perception of inmate satisfaction. As a result, an increase in working alliance also revealed an increase in the level of satisfaction (based on clinicians' perception). There was also a statistically significant relationship between geographic region and clinicians' perception of inmate satisfaction. A one-way analysis of variance (ANOVA) of regional differences on satisfaction yielded a significant F of 3.68, which indicated that there was a statistically significant difference among the three regions on satisfaction ($p<.05$). A Tukey post hoc multiple comparison test indicated that there were statistically significant mean differences between the northern and southern regions.

Multivariate Analyses

Remaining consistent with the exploratory nature of the current study, multivariate analyses were conducted. Stepwise multiple regression was employed to test the direct effect of the predictor variables on clinicians' perception of inmates' satisfaction with mental health services. The order in which predictors were included was determined solely by their empirical relationships with the dependent variable and other predictors (Licht, 1995). As noted in the bivariate analyses, many of the variables were collapsed or recoded to create dichotomous categories. Region was transformed into two dichotomous dummy predictor variables coded 0 for the absence and 1 for the presence of a given category. The northern and central regions served as the dummy variables, with the southern region serving as the reference variable. Therefore, region was entered as two dummy variables. Region 1 and Region 2 were entered into the regression analysis as separate predictors. Only one variable, working alliance, remained in the final model. Working alliance was significant at the $\alpha = .01$ significance level ($b = .34$). The overall R^2 was .12, indicating that this final model accounted for 12% of the variance in clinicians' perception of inmates' satisfaction

Table 4
Correlates of clinicians' perception of inmates' satisfaction

Variable	Statistic	Value	Significance
Predisposing			
1. Gender	Pt.-Biserial	-.05	.60
2. Age	Pearson's *r*	.00	.97
3. Race/Ethnicity [1]	Pt.-Biserial	-.07	.43
4. Education	Pt.-Biserial	-.10	.27
5. Prof. affiliation	Pt.-Biserial	-.00	.99
6. Race/Ethnicity [2]	Pt.-Biserial	.11	.29
7. Diagnostic services	Pt.-Biserial	-.07	.44
8. Services to women	Pt.-Biserial	.04	.65
Enabling			
1. Region	*F* (ANOVA)	3.68	.02
2. # of clients	Pearson's *r*	-.01	.88
3. MH experience	Pearson's *r*	.00	.92
4. Correct. experience	Pearson's *r*	-.06	53
5. Working Alliance	Pearson's *r*	.45	.01
6. Racial match	Pt.-Biserial	.04	.69
7. Gender match	Pt.-Biserial	.11	.26
Need			
1. Evaluated need [3]	Pt.-Biserial	-.13	.20
2. Evaluated need [4]	Pt.-Biserial	-.10	.31

[1] Race/ethnicity of clinician
[2] Race/ethnicity of majority of inmates on the caseload
[3] Majority of caseload is at a certain MH level
[4] Most prevalent diagnosis given to inmates on the caseload

with mental health services. It appears that overall, working alliance accounted for most of the explained variance in satisfaction.

DISCUSSION

Although only a few variables were found to be statistically significant in the multivariate analyses, the findings of the study are a significant step in beginning to understand satisfaction of mental health services by inmates. The link between satisfaction and treatment outcome has great significance in the correctional environment, where staff and inmates may tend to see each other as adversaries.

There are some limitations to this exploratory study that must be acknowledged, including the particular sample and the measures used. First, the study participants were clinicians from the Georgia Department of Corrections. Although it is appropriate to measure satisfaction with services from the standpoint of the clinician, direct measurement from the client would have been preferable. Ideally, one would want to study level of satisfaction by examining the perceptions of the clients along with the perceptions of the clinicians. The same concept holds true for examining working alliance, a variable that is shown to be significant in this study. Second, given that this study was conducted in Georgia, the generalizability of the study's findings are limited; results might vary in other states. Third, the study design does not allow for any causal inferences.

Next, as related to interpretation of the findings, the reader should be cautioned about drawing any inferences at an individual level. Because this study used ecological correlations (i.e., aggregate-level variables), an ecological fallacy could occur when interpreting the results. That is, it may be a mistake to make an assertion about individuals as the unit of analysis based on the examination of groups (Rubin & Babbie, 2004). Given that the most appropriate data (i.e., individual-level data directly from the inmates) were not available, data in this study were collected from the clinicians. It should be noted that ecological results are no less meaningful, but should be interpreted appropriately (Hammond, 1973).

Finally, the lack of association observed for some of the predictor variables with the criterion variable may be related to operational precision. For example, the use of a single-item measure to assess satisfaction could be seen as a major flaw. One of the major arguments against using single-item measures is that one cannot estimate the internal consistency reliability of single-item measures (Wanous & Reichers, 1996). However, Wanous, Reichers, & Hudy (1997) noted that a total unequivocal rejection of single-item measures may be unwarranted. Their study, like the present study, examined overall satisfaction (except their study examined job satisfaction). They reasoned that because satisfaction is an intermediate construct, a single-item measure may suffice. They define an intermediate construct as one which falls between the extremes of a simple construct (e.g., expectancy) and a more complex construct (e.g., personality). Additionally, they noted that other factors may be considered when determining whether to use a single-item measure in lieu of a multiple-item scale (e.g., situational constraints limit or prevent the use of certain scales, or a single-item measure may be preferable to measure overall satisfaction rather than a scale that is based on a sum of specific facets of satisfaction).

Although the study has the limitations noted above, some of the findings of this exploratory study are consistent with the literature. The results of this investigation do shed partial light on factors that influence satisfaction with services in a correctional environment, and raise questions for future examination. As noted earlier, it would be interesting to see how clinicians views match inmates' as related to satisfaction with services. Also, future studies should be conducted to see how well satisfaction with services may impact other outcome variables such as compliance with treatment.

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Modifying And Validating A Quality Of Life Measure to Fit Your Patient Population

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Abstract

Introduction: A well-developed quality of life (QoL) instrument is valuable in identifying the burden of illness. We were interested in exploring whether existing QoL instruments were suitable for patients in our medical setting and, if not, whether this could be rectified by adapting an existing valid and reliable instrument to meet the specific needs of our patient population. For the purposes of this study, we chose to evaluate the quality of life of patients with breast cancer. Specifically, we were interested in two aspects of QoL in women with breast cancer. The first was whether existing instruments were pertinent to the women in our venue. The second research interest was dependent upon the first. If current instruments were found wanting, could this be rectified through the creation and validation of new domains of relevance to these patients?

Method: First, five patients were interviewed to ascertain QoL issues pertinent to women in our medical setting. Second, to determine regional appropriateness of existing breast cancer QoL instruments, a search was conducted to identify and review existing breast cancer specific QoL instruments. Third, an addendum was created (to be used in conjunction with an existing instrument identified through the search) that contained three QoL domains not typically found: Financial, Spirituality and Satisfaction with Medical Care. The addendum was then tested along with an existing instrument (FACT-B).

Results: Internal consistency for the new scales, Satisfaction with Medical Care, Spirituality, and Financial had alpha coefficients of 0.81, 0.80, and 0.63 respectively. The total score for FACT-B plus addendum was 0.69. Pearson's correlation coefficients were 0.49 for Financial, 0.64 for Satisfaction with Medical Care, and 0.70 for Spirituality. Total test/retest was 0.71.

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Modifying and Validating A Quality Of Life Measure to Fit Your Patient Population

Quality of life (QoL) means different things to different people. Consequently, measuring QoL is a subjective task and no universal definition for the term has been developed (Olschewski, Schulgen, Schumacher, Altman, 1995). Schipper and Levitt (1985) reported that the most difficult aspect of evaluating QoL is defining what is to be measured. However, the majority of QoL instruments incorporate at least three domains in response to the World Health Organization's (WHO) definition of health: "Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity (WHO, 1947)." Moreover, Olschewski et al. (1995) reported that most QoL researchers agree that the QoL construct is multidimensional and that well-developed instruments should assess a patient's emotional, social and physical well-being. In addition to incorporating the aforementioned domains, we believe that a well-developed QoL instrument should meet six criteria (Table 1).

For the purposes of this study, we chose to evaluate the quality of life of patients with breast cancer. The National Cancer Institute (2006) reported that 12.7% of U.S. women will develop breast cancer at some time in their lives. Breast cancer is the second leading of cause of cancer death (after lung cancer) of women in the US and, excluding skin cancer, the most commonly found cancer in women (American Cancer Society, 2005). In Georgia, breast cancer is the leading cause of death among women and accounts for 32% of all new cancer cases. It estimated that 4,520 women will develop breast cancer in the state of Georgia in 2007.

The ACS estimates that 88% of those diagnosed with breast cancer will survive five years after diagnosis, 80% will survive after ten years, 71% will survive after 15 years and 63% after 20 years (ACS, 2005). As survival rates are increasing, the medical community has recognized the need to evaluate the impact of breast cancer on the quality of this survival rather than concentrate solely on typical outcome measures such as tumor response, time to progression, and disease-free survival (Levine, Guyatt, Gent, 1988). Additionally, as treatments for breast cancer become more complex and aggressive, the need to evaluate the impact of these treatments on a patient's quality of life has been deemed necessary as well. Thus, a well-developed QoL instrument is valuable in identifying the burden of illness associated with breast cancer and serves to guide caregivers about optimizing treatment plans for patients.

We were interested in two aspects of QoL in women with breast cancer. The first was whether existing instruments were pertinent to the women in our venue. The second research interest was dependent upon the first. If current instruments were found wanting, could this be rectified through the creation and validation of new domains of relevance to these patients?

The geographical and social context of our work was that of a large academic medical center (AMC) in Augusta Georgia - a region of the country widely acknowledged to face a number of socioeconomic challenges and also recognized by many to have a populous with deep-seated religious faith.

The authors did not intend to develop a new QoL instrument but rather to adapt an existing validated questionnaire to become institutionally competent. Olschewski et al reported, "If one feels that important specific aspects are missing in a particular questionnaire, it is in most cases possible to add additional components to the existing measuring

Table 1

Core domains and criteria for QoL instruments

DOMAIN		
1.	Physical health	The physical health domain usually refers to the patient's assessment of pain, ability to provide self-care, degree of mobility and response to treatment side effects.
2.	Mental health	The mental health domain examines emotional and cognitive well-being such as depression, anxiety, fear, concentration, and memory. This domain may also include issues related to self-esteem and body image.
3.	Social health	The social domain assesses the patient's relationships with a significant other, family members, friends and colleagues.
CRITERIA		
1.	Psychometric properties: a. Reliability b. Validity	a. Reliability: Tests for reliability should establish the instrument's ability to yield stable scores over time (for stable patients) and to ensure that items are highly correlated. b. Validity: The instrument should also possess varying types of validity (i.e., measuring what is intended to be measured). Types of validity include: i. Content validity (i.e., the ability to cover the content domains of the construct). ii. Face validity (i.e., the ability to measure what is important to patients). iii. Predictive validity (i.e., the ability to predict factors that determine a patient's QoL). iv. Criterion validity (i.e., the ability to demonstrate the measure correlates with a "gold standard").[4,5,7]
2.	Responsiveness	The instrument should be able to respond to changes in a patient's condition.
3.	Short recall	The instrument should minimize recall bias by assessing recent time periods. Asking a patient to recall periods longer than four weeks is not recommended.
4.	Balanced questions	The instrument should contain both positive and negative items. A quality of life instrument should strive to measure positive changes (e.g., renewed sense of spirituality) as well as negative changes (e.g., physical discomfort) that occur in the course of the disease and its treatment.
5.	User-friendliness	The instrument should be short and designed for patient-administration (i.e., the survey tool should be able to be completed in 10 to 20 minutes for a patient of average literacy).
6.	Patient perceptions	The instrument should measure the patient's perception of his or her own quality of life and not the physician's perception of the patient's quality of life.

instrument without changing its original structure." Therefore, we set out to assess the appropriateness of existing measures for our patient population and (based on these findings) develop an addendum to the most appropriate existing instrument. Our ultimate goal was to address the specific needs of breast cancer patients in our institution.

METHOD PHASE I

Participants

Five women participated in the interview process. Women were deemed eligible for the interview if they met the following criteria: (a) at least 18 years of age, (b) had a diagnosis of breast cancer, (c) had no underlying psychiatric illness or other cancer diagnosis, (e) were able to speak, read, and understand English, and (f) willing to participate in the study.

Design and Procedure

Semi-structured interviews were conducted with five patients with varying stages of breast cancer to ascertain QoL domains relevant to breast cancer patients in our institution. Spouses or friends of the patients were also invited to participate in the interviews.

Results

From the interviews, it became apparent that QoL measures should incorporate more than the three domains as outlined by the WHO. All five patients raised the issue of religion and/or spirituality and most voiced financial concerns. Another area of concern was the stigmatization that often results after a cancer diagnosis and the desire for friends and family members to abstain from treating them differently. It was also recommended that the medical community strive to "listen better" and offer compassion and emotional support to patients, particularly to those women who had little or no social support. The findings from the interviews resulted in the development of an addendum that contained three additional domains relating to financial well-being, satisfaction with medical care and spirituality.

The financial well-being sub-scale contains five items that addresses the impact breast cancer has on financial stability as well as ability to afford expenses related to the disease. Six questions were added to address satisfaction with medical care and seven questions were added to address whether breast cancer had a positive or negative effect on spirituality. Five-point Likert scales were used for all three additional domains in the addendum ranging from 0 (Not at all) to 4 (Very much). (Table 2)

METHOD PHASE II

Design and Procedure

A search of medical and social sciences electronic databases using the keywords "breast cancer," "quality of life" "questionnaire" and "instrument" was conducted to identify existing breast cancer specific QoL instruments.

Results

Five quality of life measures relevant to this study and specific to breast cancer were found. These instruments were reviewed to ascertain their ability to meet basic design requirements as well as their ability to address the issues gleaned from the patient interviews (Table 3).

The authors determined that the FACT-B most closely fit the desired criteria as a validated, user-friendly QoL tool for breast cancer. The FACT-B has well-established reliability and validity and has demonstrated ability to assess change in performance status. The instrument contains both positive (e.g., I am able to enjoy life) and negative (e.g., I feel sad) items and can be completed in 10 minutes [Brady, Cella, Mo, Bonomi, Tulsky, Lloyd, Deasy, Cobleigh, Shimoto, 1997].

METHOD PHASE III

Participants

Participants were 39 patients with varying stages of breast cancer who were currently undergoing treatment at the AMC. Thirty-two (82%) of the women

Table 2
Addendum to FACT-B
"Place a mark in one box to indicate how true each statement has been for you in the past seven days."

DOMAIN	*NOT AT ALL*	*A LITTLE BIT*	*SOME-WHAT*	*QUITE A BIT*	*VERY MUCH*
Financial well-being					
• I have difficulty dealing with my health insurance company. (R)					
• I am able to pay for travel expenses related to my medical appointments (e.g., gas, hotel, food).					
• I am able to afford items I would like to have as a result of my illness (e.g., wigs, prosthesis, special food).					
• I have difficulty obtaining health, disability or life insurance. (R)					
• I am able to financially support myself and my family.					
Satisfaction with medical care					
• I feel comfortable communicating with my doctors and nurses about my illness and treatment.					
• I am inconvenienced as a result of waiting to receive medical care. (R)					
• My doctors and nurses offer me compassion and emotional support.					
• The hospital staff (e.g., receptionists, lab technicians, etc.) treat me in a pleasant manner.					
• My doctors and nurses communicate clearly with me concerning my illness and treatment.					
• I am satisfied with my overall medical care.					
Spiritual well-being					
• I attend worship services.					
• I pray or meditate.					
• Maintaining my religious/spiritual beliefs has been difficult since discovering my illness. (R)					
• I have found (or renewed) a belief system since discovering my illness.					
• My belief system offers me comfort .					
• I have hope for my future.					
• Due to my illness, I have made positive changes in my life.					

Table 3

Overview of existing Breast Cancer QoL instruments relevant to the study

Number of survey items	Data collection method (time to complete)	Survey origins	Survey integrity	Gaps in survey
1. **Quality of Life - Breast Cancer Version** [Ferrell & Grant]				
46	Self-report	Developed to measure physical, psychological, social and spiritual well-being of breast cancer patients.	Reliability and validity of the instrument were established with a mail survey to 686 members from the National Coalition for Cancer Survivorship (294 were breast cancer survivors).	Does not address quality of care and contains one question concerning financial well-being. Survey tested on breast cancer survivors. Therefore, use with newly diagnosed or treated patients may be questionable.
2. **Breast Cancer Chemotherapy Questionnaire (BCQ**) [Levine, Guyatt, Gent, 1988]				
30	Administered by interviewer (10-15 minutes)	Developed to measure the impact of adjuvant chemotherapy for patients in clinical trials with stage II breast cancer.	Established reliability and validity components.	Does not address issues pertaining to financial or spiritual well-being. Additional burden on faculty and staff due to mode of administration.
3. **European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Breast Cancer (EORTC-QLQ-BR23)** [Aaronson, et al., 1993]				
23	Self-report	Designed to accompany a 30-item core tool (EORTC-QLQ-C30) that assesses five functional scales (physical, role, cognitive, emotional and social), three symptom scales (nausea, pain, fatigue) and a global QoL dimension.	Designed for use in international settings.	Cross-cultural reliability and validity of the instrument have not yet been established. The instrument does not address spirituality or satisfaction with medical care.
4. **The Breast Cancer Quality of Life Scale** [Gordon, 2000]				
273	Self-report (35 minutes)	Addresses social, financial, spiritual, psychological, physical, and sexual well-being as well as quality of medical care. Measures positive and negative aspects of breast cancer.	Adequate reliability and validity. Further refinement needed.	Compliance may become an issue when administering a survey that requires 35 minutes for completion.
5. **Functional Assessment of Cancer Therapy Scale with Breast Cancer Module (FACT-B**) [Brady, et al., 1997]				
36	Self-report (10 minutes)	FACT-G assesses a patient's physical, social, emotional and functional well-being. Breast cancer module has nine additional items FACT-G (27) + Breast cancer module (9) = FACT-B.	Reliability and validity of the FACT G have been well established. Appeal of the FACT-G is that it is a general cancer module that can be adapted with various reliable and valid subscales (e.g., lung, prostate and others).	Does not address spirituality, satisfaction with medical care or financial concerns.

Table 4
Demographic and Clinical Characteristics of study population (Phase III)

CHARACTERISTIC	RESULTS	
	Number	%
Race		
Caucasian	22	56
African American	15	39
Not stated	2	5
Age (years)		
Mean	51.6	-
Standard deviation	12.3	-
Range	25.0 - 80.0	-
Education level		
High School or GED	19	49
Trade or Technical School	7	18
Some College	6	15
College Degree	3	8
Graduate Degree	2	5
Missing	2	5
Income		
Under $10,000	15	39
$10,001-$25,000	10	25
$25,001-$50,000	10	25
$50,001-$75,000	3	8
Data not stated	1	2
Marital Status		
Single	5	13
Single (with significant other)	2	5
Separated	3	8
Divorced	6	15
Widowed	8	20
Married	14	36
Data not stated	1	3
Clinical Status		
Early Breast Cancer	16	41
Metatastic Breast Cancer	16	41
Inflammatory Breast Cancer	3	8
Recurrent Breast Cancer	1	3
Data not stated	3	8

Table 5

FACT-B plus Addendum: Internal Consistency/Test-Retest

DOMAIN	*COEFFICIENT ALPHA*	*TEST/RETEST*
FACT-G		
• Physical (7–items)	.88	.64
• Social (10–items)	.79	.85
• Emotional (6-items)	.76	.74
• Functional (7-items)	.82	.86
"B" component of FACT		
• Additional Concerns (Breast) (9-items)	.71	.83
Cultural competence Addendum		
• Financial (5-items)	.63	.49
• Satisfaction with Medical Care (6-items)	.81	.64
• Spirituality (7-items)	.80	.70
Summary data		
• FACT-B total score	.72	.64
• Addendum total score	.75	.71
• FACT-B plus addendum total score	.69	.71

agreed to complete the survey again at a second visit. All respondents were ambulatory.

Demographic data for the study patients describe a population that is 60% Caucasian and 40% African American, mean age 52 years (range 25-80), 70% had a high school or technical school diploma, and two-thirds (66%) had an annual income of less than $25,000 per year. (Table 4)

Patients were deemed eligible for Phase III of study if they met the same eligibility criteria as those outlined for Phase I.

Materials

Once screened and written informed consent was documented, three instruments were administered to each patient: (a) a baseline demographic questionnaire, (b) the established FACT-B survey instrument and (c) the regionally appropriate addendum to FACT-B developed by the investigators. The baseline demographic questionnaire obtained information regarding age, race/ethnicity, educational level, household income, marital status, and assessment of clinical status.

Design and Procedure

Patients were asked to read each question and indicate how true each statement had been for them during the previous seven days. All patients completed the measure during an outpatient clinic visit. At all times, a study investigator was available to answer any questions or concerns. Questionnaires were generally completed between 10 and 15 minutes. To assess test/retest reliability, patients were asked to complete the FACT-B and the addendum again at their next visit, approximately three-to-four weeks later.

RESULTS

Reliability

Alpha coefficients for all sub-scales of the FACT-B ranged from 0.71 to 0.88. As all subscales were above .70, these scales can be considered reliable. The Satisfaction with Medical Care and Spirituality subscales of the addendum had alpha coefficients of 0.81 and 0.80 respectively, indicating acceptable internal consistency. The Financial sub-scale had an alpha coefficient of 0.63. Alpha coefficients for FACT-B (0.72) and Addendum (0.75) can be considered reliable. The FACT-B plus addendum had a reliability score of .0.69. Pearson's correlation coefficients for sub-scales of the FACT-B ranged from 0.64 to 0.86. Test/Retest correlations for the Financial, Satisfaction with Medical Care, and Spirituality subscales of the Addendum were 49, 64, and 70 respectively. Test/Retest FACT-B total score was 0.64, Addendum was 0.71 and FACT-B plus addendum was 0.71. (Table 5).

Validity

Two measures of validity were used to determine extent to which the instrument measured the concept of QoL in breast cancer patients. The first method involved content validity and included a review of items by a panel of researchers to include psychologists and medical oncologists. The second method involved correlating the FACT-B plus addendum with the FACT-B. There was a moderate to strong correlation between FACT-B and FACT-B plus addendum (r = 0.78). (Table 5).

DISCUSSION

The literature is replete with evidence that breast cancer screening and treatment centers should endeavor to listen to and respond to issues and concerns raised by their constituents (Hamilton, et al., 2003, Emens and Davidson, 2003, Rust, 2003). In aspects of care that range from ease of clinic scheduling to expanding car parking facilities to enhanced patient knowledge of post-treatment risks of recurrence, patients represent a fundamental, yet often overlooked, source of knowledge and ideas as to how to improve the standard of care.

For women with breast cancer, this research created a QoL tool that, upon initial evaluation, appears relevant for patients in our institution. On receipt of a diagnosis of breast cancer, women enter a “medical world” where they are confronted with new terminology, potentially conflicting information and advice, a myriad of medical and surgical therapeutic options, and almost certainly, less-than-certain, potentially life altering, decision-making points (Freedman, 2003).

It is within this context that physicians must develop a trusting, caring relationship that facilitates the delivery of the appropriate and needed healthcare services. A key component of this relationship is successful provider-patient communication. To that end, the FACT-B plus our addendum provides a catalyst to this relationship.

The authors recognize a variety of limitations to this research. First, our sample size was limited. Second, our patient population was somewhat skewed towards the lower end of the socioeconomic strata (both in economic and educational terms) and may not represent issues pertinent to women in higher socioeconomic groups. Third, all data is self-report and comes with a range of limitations in terms of accuracy and honesty.

Notwithstanding the limitations, the study may offer value to individuals attempting to measure the quality of life of their patients without having to "reinvent the wheel" by creating a brand new instrument. Future studies could examine the utility of adapting and validating existing measures to meet the needs of women in various regions, stages of breast cancer or for women in different racial and ethnic groups.

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Multi-Level Evaluation of a Perinatal Health Program in Rural Southeast Georgia

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Abstract

Problem: Infant mortality has declined steadily in the past decade, however, significant disparities associate with lack of adequate perinatal health services and barriers to access disproportionately impact women residing in rural areas. In Georgia, data suggest significant challenges with respect to birth outcomes, and this problem seems to be exacerbated in rural regions of state. The objective of this presentation is to report on the impact of a regional perinatal health care collaborative implemented in rural southeast Georgia.
Method: Analysis of pre-intervention and post-intervention birth outcomes (gestational age, birth weight and infant mortality) served as the focal point programmatic evaluation. Differences in mean gestational age and mean birth weight were analyzed using a t-test ($\alpha = 0.05$). Proportional differences in low birth weight and infant mortality were assessed using the chi-square test ($\alpha = 0.05$). Differences were investigated relative to race (white and non-white).
Results: Analysis of white participants showed no significant difference in any birth outcomes investigated. Furthermore, analysis of non-white PHP participants suggested significant improvements in all birth weight ($p < 0.001$), gestational age ($p = 0.007$), low birth weight ($p = 0.002$), and infant mortality ($p = 0.007$).
Conclusion: The perinatal health program in southeast Georgia demonstrated considerable effectiveness as measured through pre-intervention and post-intervention birth outcomes. The potential for improved health outcomes of high risk pregnant women and infants as a result of adequate perinatal care may also lead to the achievement of Healthy People 2010 within this region.

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Multi-Level Evaluation of a Perinatal Health Program in Rural Southeast Georgia

Despite aggressive efforts by the U.S. health care system to assure that prenatal care is effectively received by all women beginning in their first trimester of pregnancy, about 70,000 women reportedly receive no care prior to delivery each year (Taylor, Alexander, & Hepworth, 2005). Although the proportion of U.S. women beginning first trimester care has increased to more than 83% since 1999, this continues to be inadequate in terms of the Health People 2010 objectives. Healthy People 2010 strives for at least 90% of U.S. women initiating care in the first trimester (Healthy People 2000). As racial disparities in infant mortality continue to increase at an alarming rate, research suggests the discrepancy between Caucasians and African Americans, mainly concerning little change in late or no prenatal care use among the latter population (MMWR, 2000). The fact that women at greatest risk of poor pregnancy outcomes utilize access to prenatal care the least has led many U.S. states initiating regionalized perinatal care systems (McCormick, Shapiro, & Starfield, 1985; Swyer, 1993). Perinatal care at a regional level has been recognized as an effective means to reducing perinatal morbidity and mortality due to improved access to appropriate levels of maternal and neonatal care (Perkins, 1993; Gortmaker, Clark, Graven, & Sobel, 1987; Shenai, Major, Gaylord, Blake, Simmons, Oliver, et al, 1991).

In the State of Georgia, infant mortality has declined steadily in the past decade, as in the United States overall (Samuelson, Buehler, Norris, & Sadek, 2002); however, there has been no change in the proportion of preterm births over the past ten years, indicating a current lack of knowledge and effective interventions regarding the causes of preterm delivery (Grason, Hutchins, & Silver, 1999). As the number of preterm deliveries increase, the costs for the initial perinatal care can exceed $150,000 (Brannen, Phillips, Sowell, Vickers, 2000); not including indirect costs. Social workers and hospital case managers consistently identify the psychosocial stress that families endure when they experience adverse pregnancy outcomes (Brannen, Phillips, Sowell, Vickers, 2000). Recent studies also imply a difference in academic achievement, professional attainment and weekly income levels of adults who were low birth weight (Strauss, 2000). For example, a study conducted on high school children found that compared with normal birth weight children, low birth weight children manifested deficits of 3 to 5 points in age-standardized tests of academic achievement at age 17 that had persisted with little change from age 11 (Breslau, Paneth & Lucia, 2004). The Perinatal Health Partners Program (PHP) was created to address acute and chronic issues that are associated wit high-risk pregnancies in Georgia. Specifically, this program was designed in response to a regional perinatal health strategic plan and was implemented to positively impact the perinatal health in 24 southeast Georgia counties ((Greta O'Steen (personal communication, November 13, 2006). The PHP combines in-home case management with nursing assessment and care coordination for the high-risk pregnant woman and her infant with the expressed purpose of improving birth outcomes. The Center for Rural Health and Research at Georgia Southern University was contracted to provide an objective, multi-level evaluation of programmatic activities over the span of three years. The purpose of this paper is to report the key findings associated with PHP among ten Georgia counties in the Southeast Health District (9 – 2).

METHODS

Perinatal Health Partners Program (PHP)

The mission of the PHP is to develop and sustain a regional system of perinatal care that maximizes health outcomes for southeast Georgia women and infants (Greta O'Steen (personal communication, November 13, 2006)). The target area for this evaluation was restricted to 10 counties in the Southeast Health District (9 – 2), a rural health district in southern Georgia. The specific target population for this evaluation were all women served by PHP who were defined "medically high risk" (see below) for adverse outcomes based on current health status, and prior obstetric and gynecologic histories, as well as all subjects who were referred for service via their primary care physician. The success of PHP depends on a well defined network of local medical providers, regional birthing hospitals, public health and community agencies. PHP also maintains a close relationship with the regional tertiary care center, enabling PHP to access specialty care for high risk women.

A key PHP project component included an intensive, in-home medical case management approach to perinatal care. "Medically high-risk" is defined as receiving a diagnosis (with the history of with a previous pregnancy or with current pregnancy), among the following criteria (Greta O'Steen (personal communication, June 6, 2007)):

- Miscarriage (2 or more)– Second Trimester Pregnancy Loss
- Previous Fetal/Neonatal Death (If baby dies due to prenatal complications).
- Prior Premature Delivery or PROM
- Incompetent Cervix
- Diabetes – Gestational Type I or Type II
- PIH – Pre-eclampsia
- Pre-term Labor
- Multiple Gestation with Complications
- Pre-existing Medical Conditions (i.e. HTN, Lupus, Auto-Immune Disease, Cardiac Disease, Epilepsy, HIV, STC.)
- Individuals with fetal abnormality with their current pregnancy, or physician ordered bed rest, are also considered "medically high-risk" on a case-by case basis.

"Medically high-risk" women were identified early in pregnancy and offered intensive, in-home, nurse-based case management services as well as one-on-one education tailored to meet their unique medical, cultural and linguistic needs. Supports such as child care and transportation vouchers were available to help women keep their prenatal appointments. Case management was also offered to medically fragile infants discharged from tertiary care centers.

Description of Data

Data for PHP patients were tracked and maintained in a Microsoft® Access database. All data entry was handled at the public health district administrative offices according to PHP mandated protocols. Additionally, all patient records were maintained with PHP personnel and evaluators never had access to the original records. The database was transmitted electronically to the Center for Rural Health and Research at Georgia Southern University and data tables were extracted for the analysis. The electronic data file was comprehensive and included information regarding specific aspects of client demographics, client assessment profiles, referring diagnosis, pregnancy history, and birth outcomes associated with this case management effort. Extracted data were analyzed descriptively and inferentially using SPSS® for Windows. For the purpose of this paper, specific variables included birth weight, gestational age, and infant death for both the current delivery event, as well as prior delivery events.

Data Analysis

Data analysis focused on recorded changes in birth outcomes (birth weight, gestational age, and mortality) among women "prior to" and "after" PHP enrollment. Data associated with birth outcomes prior to PHP enrollment are classified as "pre-intervention data". Likewise, data associated with outcomes after enrollment are classified as "post-intervention data". Data were stratified according to race, but, due to relatively small numbers, subjects were classified as either "Caucasian" or "non-Caucasian". Proportional differences in low birth weight births and infant mortality were investigated using a chi-square test ($\alpha = 0.05$). Additionally, odds ratios and 95% confidence intervals were calculated to assess the strength of observed associations. Differences in mean birth weight and mean gestational age were also analyzed using a t-test to investigate pre-intervention and post-intervention outcomes ($\alpha = 0.05$).

RESULTS

Demographic Profile of Subjects

From June 30, 2003 to July 31, 2006, a total of 713 women were enrolled in PHP. The majority of PHP participants were Caucasian (57.1%), and 42.9% of PHP participants were non-Caucasian. More specifically, 31.8% of subjects were black, 10.8% were Hispanic, and 0.3% were multi-racial. Over 58.0% of all PHP participants were either 20 – 24 years (30.0%) or 25 – 29 years (28.3%) old. Subjects aged 30 – 34 (17.3%) or 35 – 39 (11.9%) comprised 29.2% of all participants. The mean age of all PHP enrollees was 27.8 years. Nearly equal proportions of PHP participants reported being either married (37.3%) or single (38.3%), and the marital status for over 18.0% of subjects was not reported. Of women, 33.6% reported having less than a high school education, while 24.1% of women reported having only a high school education. Of the remaining subjects, 10.0% had experiences at the junior college level and 9.8% of subjects had some technical college training. The educational attainment of 18.1% of participants was not reported.

Referral Profile of Subjects

Among the 713 enrollees, the most common referring diagnosis recorded was pre-existing medical conditions (23.8%) as indicated by Table 1, followed by gestational diabetes (11.4%) and pregnancy induced hypertension (10.5%).

Table 1
Referring Diagnosis of Enrolled PHP Patients

Indicator	Percent
Pre-existing Medical Conditions	23.8
Gestational Diabetes	11.4
Pregnancy Induced Hypertension	10.5
Prior Spontaneous Abortion	9.1
Premature Rupture of Membrane	8.1
Pre-Term Labor	8.1
Prior Pre-Term Labor	7.7
Prior Infant/Fetal Death	6.2

Low Birth Weight

Among Caucasians, (Table 2), no significant difference in the proportion of low birth weight births was noted (p = 0.101) when comparing pre-intervention outcomes to post-intervention outcomes. Additionally, the trend as indicated by the risk ratio calculation (OR: 1.5, 95%CI: 0.9 – 2.6) may suggest an improved outcome (95% confidence intervals associated with this estimate were not significant). Among non-Caucasian participants, a significant improvement in birth weight was evident as indicated by chi-square analysis (p =

0.002). The point estimate suggests that the odds of having a low birth weight birth were 2.3 greater among women not enrolled in the PHP (OR: 2.3, 95%CI: 1.3 – 3.8). Analysis on an aggregate indicates that PHP participants were significantly less likely to have a low birth weight birth (p = 0.001) as indicated by chi-square analysis. Based on risk ratio calculations, the odds of having a low birth weight birth among women not enrolled in the PHP program were 1.9 times greater as compared to women enrolled in PHP (OR: 1.9, 95%CI: 1.3 – 2.7).

Table 2

Analysis of Proportion of Birth Weight Outcomes for Pre-Intervention and Post-Intervention Subjects (Caucasian, Non-Caucasian, and All Subjects)

CAUCASIAN SUBJECTS				
	% Low Birth Weight	% Normal Birth Weight	p-Value	Odds Ratio (95% CI)
Pre-Intervention Birth Outcome	27.3% (n = 35)	72.7% (n = 93)	0.101	1.5 (0.9 – 2.6)
Post-Intervention Birth Outcome	19.6% (n = 40)	80.4% (n = 164)		
NON-CAUCASIAN SUBJECTS				
Pre-Intervention Birth Outcome	39.3% (n = 46)	60.7% (n = 71)	0.002	2.3 (1.3 – 3.8)
Post-Intervention Birth Outcome	22.2% (n = 37)	77.8% (n = 130)		
TOTAL SUBJECTS				
Pre-Intervention Birth Outcome	33.1% (n = 81)	66.9% (n = 164)	0.001	1.9 (1.3 – 2.7)
Post-Intervention Birth Outcome	20.8% (n = 77)	79.2% (n = 294)		

Mean Birth Weight

No statistically significant improvement in mean birth weight was noted among Caucasian women (p = 0.102) when comparing pre-intervention data to post-intervention data; however, it is important to note that the recorded average birth weight among Caucasian subjects did improve. Among non-Caucasian women, birth weight was significantly improved following PHP involvement (p < 0.001). Moreover, post-intervention data suggest a statistically significant improvement in mean birth weight (p < 0.001) among all women included in this study.

Gestational Age

There was no significant change in mean birth weight (p = 0.998) in reported gestational age based on tests of significance among Caucasian subjects (Table 4). Among non-Caucasian women, data suggest a significant improvement in gestational age following PHP intervention (p = 0.007). When all women were aggregated and analyzed as a single cohort, mean gestational age was not significantly improved (p = 0.074). It is important to note this is a marginal p-value. It is evident that the mean gestational age among this cohort did improve following PHP intervention, albeit not significantly.

Table 3

Analysis of Mean Birth Weight for Pre-Intervention and Post-Intervention Subjects (Caucasian, Non-Caucasian, and All Subjects)

CAUCASIAN SUBJECTS			
	Birth Weight (grams)	Std Deviation	p-Value
Pre-Intervention Birth Outcome	2917.0	917.1	0.102
Post-Intervention Birth Outcome	3079.8	772.2	
NON-CAUCASIAN SUBJECTS			
Pre-Intervention Birth Outcome	2607.2	941.7	<0.001
Post-Intervention Birth Outcome	2988.1	824.3	
TOTAL SUBJECTS			
Pre-Intervention Birth Outcome	2768.4	939.9	<0.001
Post-Intervention Birth Outcome	3033.5	796.1	

Table 4

Analysis of Mean Gestational Age for Pre-Intervention and Post-Intervention Subjects (Caucasian, Non-Caucasian, and All Subjects)

CAUCASIAN SUBJECTS			
	Gestational Age (weeks)	Std Deviation	p-Value
Pre-Intervention Birth Outcome	37.3	4.2	0.998
Post-Intervention Birth Outcome	37.3	3.0	
NON-CAUCASIAN SUBJECTS			
Pre-Intervention Birth Outcome	36.1	4.6	0.007
Post-Intervention Birth Outcome	37.4	3.0	
TOTAL SUBJECTS			
Pre-Intervention Birth Outcome	36.7	4.4	0.074
Post-Intervention Birth Outcome	37.3	3.0	

Infant Death

Although relatively few infant deaths among all women occurred over a three year period, calculated infant mortality rates for pre-intervention and post-intervention data were 52.8/1,000 and 18.6/1,000, respectively. According to Table 5, no significant difference in infant mortality was noted (p = 1.000) among Caucasian participants (OR: 1.2, 95%CI: 0.3 – 5.5). However, the odds ratio is trending in the correct direction thereby suggesting potential improvement in this birth outcome. Among non-Caucasian women, PHP enrollment had a significant positive impact on infant mortality (p = 0.007). Non-Caucasian women not enrolled in the program have a greater likelihood of experiencing an infant death based on risk ratio calculations. Specifically, the odds of an infant death were 5.1 times more likely as compared to PHP enrollees (OR: 5.1, 95%CI: 1.4 – 19.0). Moreover, all women enrolled in the PHP program are less likely to experience an infant death (p = 0.018) as compared to post-intervention data. Risk ratio estimates indicate that infant deaths were 2.9 times more likely among women not enrolled in the program (OR: 2.9, 95%CI: 1.2 – 7.5).

Table 5

Analysis of Proportion of Infant Deaths for Pre-Intervention and Post-Intervention Subjects (Caucasian, Non-Caucasian, and All Subjects)

CAUCASIAN SUBJECTS				
	% Infant Death	% Survival	p-Value	Odds Ratio (95% CI)
Pre-Intervention Birth Outcome	2.3% (n = 3)	97.7% (n = 125)	1.000	1.2 (0.3 – 5.5)
Post-Intervention Birth Outcome	1.9% (n = 4)	98.1% (n = 203)		
NON-CAUCASIAN SUBJECTS				
Pre-Intervention Birth Outcome	8.5% (n = 10)	91.5% (n = 108)	0.007	5.1 (1.4 – 19.0)
Post-Intervention Birth Outcome	1.8% (n = 3)	98.2% (n = 166)		
TOTAL SUBJECTS				
Pre-Intervention Birth Outcome	5.3% (n = 13)	94.7% (n = 233)	0.018	2.9 (1.2 – 7.5)
Post-Intervention Birth Outcome	1.9% (n = 7)	98.1% (n = 369)		

DISCUSSION

Based on comprehensive and multi-level evaluation of PHP, intensive and coordinated programmatic efforts appear to be having a positive effect. Overall, PHP served 713 high-risk pregnant women from June 30, 2003 to July 31, 2006. This program was able to reach women of many socioeconomic subgroups. Most participants were Caucasian; with 42.9% of PHP participants self-identified as non-Caucasian. Among the non-Caucasian group, over 74.0% of subjects were African American. For most birth indicators examined, outcomes were significantly improved for all women enrolled in the program. Interestingly, significant improvements in birth weight, gestational age, and infant mortality were not observed for Caucasian women participating in PHP, but improvements in these indicators for African American women were prominent.

Post intervention analyses reflected a major improvement in the mean birth weight among all PHP participants. The same improvement trend was noted in the non-Caucasian population. Among the Caucasian population of participants, the data did show an improvement in the average birth weight; however, gestational age among all participants and specifically Caucasian participants showed no significant improvement. There was improvement among all participants in mean gestational age. The PHP intervention among the non-Caucasian population did show significant improvements with respect to gestational age.

When considering infant death, women not enrolled in the PHP program were 2.9 times more likely to experience infant death as compared to currently enrolled women. Data showed no significant difference among Caucasian PHP participants; however, a trend in the positive direction suggests potential improvement for this birth outcome. Non-Caucasian women not enrolled in PHP were 5.1 times more likely to experience infant death, in contrast to those enrolled in the program.

Although the failure to demonstrate significant improvements among Caucasian women was evident, most indicators did improve from a trend perspective. The lack of statistical significance may be explained by the fact that pre-intervention birth outcomes appeared much improved as compared to their non-Caucasian counterparts. This finding would be consistent with the literature which has documented numerous racial disparities in perinatal health.

The PHP program fully addresses the perinatal needs of the ten participating counties in the Southeast Health District. The network plans to expand into the district's remaining six counties in 2007. These six counties, which do not receive Perinatal Health Partner services, have the highest number of Neonatal Intensive Care Unit admission rates to Memorial Health University Medical Center (Greta O'Steen (personal communication, November 13, 2006)). As Perinatal Health Partners expands district wide, it projects a reduction in the number of pre-term deliveries by ten percent, thus providing a healthcare savings cost of more than $3.6 million over a three-year period. Many area residents (20.1%) are medically uninsured (US Census Bureau: Small Area Health Insurance Estimates, 2000) and 22% live in poverty (US Census Bureau, 2000), compared to 13% in Georgia (US Census Bureau, 2000). The Southeast Health District (SEHD) population of 319,128 is 70% Caucasian, 24% African American, 5% Hispanic and 1% other ethnicities (OASIS, 2000).

It is anticipated that program expansion will continue to show a reduction in pre-term deliveries within the district and will continue to provide an additional savings costs in healthcare expenditures for participants. The continuation of the Perinatal Health Partners Program within the Southeast Health District would help in improving birth outcomes among at-risk populations within the southeast region of the state as well as the entire state of Georgia. The potential for improved health outcomes of high risk pregnant women and infants as a result of adequate perinatal care may eventually lead the achievement of Healthy People 2010 in the United States.

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Relationship of Fruit and Vegetable Servings and Self-Reported Diabetics in the Southeast and Northeast

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Abstract

According to the American Diabetes Association, most diabetic patients are not consuming the recommended 3-5 servings of vegetables and 2-4 servings of fruits a day. This study examined fruit and vegetable servings of self-reported diabetics (N=35,407) in select southeastern and northeastern states using Behavioral Risk Factor Surveillance System (BRFSS) 2005 data. The estimate for both fruit and vegetable servings and self-reported diabetes was determined using multivariate logistic regression, adjusting for sociodemographics and geographic region. The results indicated a significant difference between fruit and vegetable servings for diabetics and non-diabetics ($p<0.0001$). A higher percentage of diabetics in the northeast consumed more than three servings of fruit and vegetables when compared to diabetics in the southeast. Respondents in the northeast were 21% more likely to consume five or more servings of fruit and vegetables and 16% less likely to be diabetic than those in the southeast after adjusting for age, race, sex, and geographic region. In conclusion, diabetics in the northeast consumed more servings of fruit and vegetables than did those in the southeast. Multiple factors influence fruit and vegetable consumption and diabetes and should be considered when developing targeted nutritional interventions. Diabetes educators, nurses, and physicians can encourage diabetic patients to consume more fruit and vegetables and motivate them to continue eating fruit and vegetables.

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Relationship of Fruit and Vegetable Servings and Self-Reported Diabetics in the Southeast and Northeast

INTRODUCTION

Diabetes is an increasing problem in the United States. Currently, there are 20.8 million children and adults in the United States, or 7% of the population, who have diabetes. While an estimated 14.6 million have been diagnosed, 6.2 million people (or nearly one-third) are unaware that they have the disease. Similarly, most diabetic patients are not consuming the recommended 3-5 servings of vegetables and 2-4 servings of fruit a day (American Diabetes Association [ADA], 2006).

Diet and exercise are considered important components of treatment for adults with type 2 diabetes. In a survey of 2,000 adult diabetics, the most frequently reported barriers in diabetes self-management were adherence to diet and exercise (Glasgow, 1997). Only 60% of individuals with diabetes in the National Health Interview Survey report that they "follow a diabetic diet," and several non-U.S. studies have reported that actual nutrient intake among individuals with diabetes may be suboptimal (Harris, 1996; Toeller, 1996; Eeley, 1996; Campbell, 1989; Virtanen, 2000).

Previous studies suggest individuals with diabetes may not follow recommended guidelines for diet and exercise, although there have been no nationally representative studies in the United States examining nutritional intake among adults with type 2 diabetes. Culture in different parts of the United States determines the type and frequency of food one eats. However, an extensive literature review found few studies analyzing the differences in diet between North and South in the United States. Previous studies analyzing BRFSS data have studied fruit and vegetable consumption in different states (Serdula & Coates, 2000; Serdula & Gillespie, 2000). However, previous studies have not measured the association between fruit and vegetable servings, self-reported diabetes, and geographic region (Montonen, 2005; Snowdon, 1985; Li, 2000).

The purpose of this study was to examine the fruit and vegetable consumption of diabetics in select southeast and northeast states in the U. S. The authors hypothesize diabetics in select northeast states will consume more servings of fruit and vegetables than those in select southeast states.

MATERIALS AND METHODS

Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance Survey (BRFSS) data from 2005 were used to accomplish the study's objectives (Centers for Disease Control and Prevention [CDC], 2006). BRFSS collects information on health behaviors and risk factors for various diseases by using random-digit dialing telephone survey techniques. One adult resident above 18 years was randomly chosen from each household to answer survey questions. The instrument consisted of core questions and state-optional modules. The core questionnaire consisted of items that measure the fruit and vegetable servings, state of residence, and diabetes status. Inclusion criteria were diabetics and non-diabetics age 18 and older who live in New Hampshire, Vermont, Massachusetts, Georgia, Alabama, and Mississippi. Those who were diabetic only while pregnant were excluded. The data contained detailed information on age, race, sex, diabetes status, fruit and vegetable consumption, and geographic region. The main independent variable was geographic region, which included northeastern and southeastern states.

The outcome or dependent variables were diabetes and fruit and vegetable servings. Diabetes was measured by asking the respondents if they have ever been told by a doctor that they had diabetes. Fruit and vegetable consumption was based on self-reported daily average number of servings. Fruit and vegetable servings were calculated according to the BRFSS categories of less than 1 per day or never, 1 to less than 3 times per day, 3 to less than 5 times per day, 5 or more times per day. The age group included 7 categories which were 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, and 75 and above. The seven categories of race were White, Black, Asian, Hawaiian and Pacific Islander, American Indians and Alaskan Natives, other races, and mixed races.

STATISTICAL ANALYSIS

Data were analyzed using SAS, Statistical Software Package (SAS Institute Inc., Gary, NC, 1999). Descriptive statistics were calculated to examine the mean age of the participants living in both regions. The proportion of residents and diabetics in the southeast and northeast were adjusted for age according to the standard 2000 US population. A t-test was used to determine if there were significant differences in the mean age of respondents in the northeastern and southeastern states. Chi-Square tests were conducted to determine the difference between race in the southeast and northeast, sex in the southeast and northeast, fruit and vegetable servings in the southeast and northeast, and diabetes status in the northeast and southeast. The relationship between diabetes and fruit and vegetable servings was determined by using a Chi-Square test. The association of fruit and vegetable servings of diabetics and non-diabetics in the southeast and northeast was determined using the Mantel-Haenszel Chi-Square Test. The fruit and vegetable servings of diabetics were estimated for age group, race, sex, and geographic region using a logistic regression model.

RESULTS

Demographic characteristics of respondents in the southeast and northeast were summarized in Table 1. The sample consisted of 35,407 participants. People in the northeast were slightly older (mean age 46 years) than people in the southeast (mean age 45 years), (p <0.0001). However, age structure was similar for the northeast and southeast (p <0.0001). In the 35-44 age group, 20.16% of participants lived in the southeast and 20.58% lived in the northeast. In the southeast, there were 52.76% of whites, 33.65% of blacks, 36.85% who consumed 1 to less than 3 fruit and vegetable servings a day, and 8.99% who were diabetic. In the northeast, there were 64.78% of whites, 10.41% of blacks, 37.07% who consumed 3 to less than 5 fruit and vegetable servings a day, and 6.34% who were diabetic. Although survey participants were predominately white, there were more African Americans in the south than in the north (p <0.0001). For gender, there were equal proportions of males and females in both regions (p = 0.46). For fruit and vegetable servings, more respondents consumed >3 servings per day (p <0.0001). Finally, there were more self-reported diabetics in the south than in the north (p <0.0001). In Table 2, 37.61% of diabetics and 36.34% of non-diabetics reported that they consumed 3 or less than 5 fruit and vegetables servings a day. Fruit and vegetable servings of self-reported diabetics and non-diabetics in both regions were similar (p = 0.0807). When comparing fruit and vegetable servings in diabetics and non-diabetics in the two regions, more diabetics in the northeast ate three or more servings of fruit and vegetables than did diabetics in the southeast (p <0.0001), as depicted in Table 3. In the southeast, 37.46% of diabetics ate 3 to less than 5 fruit and vegetable servings a day. Similarly in the northeast, 38.01% of diabetics ate 3 to

Table 1
Characteristics of respondents in Southeastern and Northeastern States

Demographic Characteristics	Southeastern states N=13700	Northeastern states N=21707	Test for difference p-value
Age: mean (std dev)	44.59(0.15)	45.87(0.12)	<.0001
18-24	13.96%	12.08%	<.0001
25-34	19.23%	17.32%	
35-44	20.16%	20.58%	
45-54	18.21%	18.60%	
55-64	13.25%	13.94%	
65-74	8.27%	8.56%	
75+	6.93%	8.91%	
Race			
White, NH	52.76%	64.78%	<.0001
Black, NH	33.65%	10.41%	
Asian, NH	2.24%	1.59%	
Hawaii/PI, NH	0.00%	0.55%	
AI/AN, NH	7.57%	2.40%	
Other, NH	1.31%	3.04%	
MR, NH	2.47%	17.23%	
Sex			
Male	48.21%	47.76%	0.4621
Female	51.79%	52.24%	
Fruit and Vegetable Servings			
<1 per day or never	5.92%	3.51%	<.0001
1 to less than 3 times per day	36.85%	30.59%	
3 to less than 5 times per day	36.07%	37.07%	
5 or more times per day	21.15%	28.83%	
Diabetes			
Yes	8.99%	6.34%	<.0001
No	91.01%	93.66%	

less than 5 fruit and vegetable servings a day.

Multivariate logistic regression analysis was performed on fruit and vegetable consumption (5 or more servings) and diabetes (Table 4). After adjusting for age, race, sex and geographic region, people aged 75 and older were 50% less likely to consume five or more servings of fruit and vegetables and 21 times more likely to be diabetic than those younger than 75. People aged 45-74 were 15 times more likely to be diabetic and 41% less likely to consume 5 or more servings of fruits and vegetables than those aged 18-44.

Women were 21% less likely than men to consume the recommended servings. Women were 1.7 times more likely then men to be diabetic.

African Americans were 2.18 times more likely to consume 5 or more servings of fruits and vegetables and 7.71 times more likely to be diabetic when compared to whites. Asians, Hawaiians, Pacific

Table 2

Association of Diabetes and Fruit and Vegetable Servings

	Diabetes Yes	No	Test for difference p-value
Fruit and Vegetable Servings			0.0807
Less than 1 per day or never	4.90%	5.10%	
1 to less than 3 times per day	32.41%	34.90%	
3 to less than 5 times per day	37.61%	36.34%	
5 or more times per day	25.08%	23.66%	

Islanders, American Indians, Alaska Natives, and other races were 19% less likely to consume 5 or more fruit and vegetable servings and 8.51 times more likely to be diabetic than whites.

Respondents in the northeast were 1.2 times more likely to consume 5 or more servings of fruit and vegetables than those in the southeast. Respondents in the northeast were 16% less likely to be diabetic than those in the southeast.

DISCUSSION

Diabetics consumed more servings of fruits and vegetables than non-diabetics. Respondents in the northeast were more likely to consume five or more servings of fruit and vegetables and less likely to be diabetic than those in the southeast after adjusting for age, race, sex, and geographic region.

This study confirmed the authors' hypothesis that self-reported diabetics in the northeast consumed more servings of fruit and vegetables than in the southeast. Previous studies analyzing BRFSS data have studied fruit and vegetable consumption across the United States, not specifically northeast and southeast states (Ford, 2001; Nelson, 2002). Also, previous studies have not measured the association between diabetics, fruit and vegetable consumption, and geographic region (Serdula & Coates, 1995; Serdula & Gillespie, 2000).

Fruit and vegetable consumption differences in the south and north may be influenced by food preferences, physiological state, nutritional knowledge, education, perceptions of healthy eating, and psychological factors, income, employment status, work schedule, transportation, language barriers, physical activity, stress levels (Raine, 2005; Essa, 2001).

Serdula and Gillespie's (2000) study supports the influence of a variety of factors in diabetes self-management. The authors conclude that differences in smoking, obesity, stress levels, physical activity, and other lifestyle behaviors may explain these differences in diabetics, fruit consumption, and geographic region. In addition, blood glucose monitoring, insulin therapy, and a balanced diet should be considered when considering diabetics and their fruit and vegetable consumption.

According to the American Diabetes Association, most diabetic patients are not consuming the recommended 3-5 servings of vegetables and 2-4 servings of fruit a day (ADA, 2006). Diabetics' higher consumption of fruits and vegetables in this study support a previous study stating diabetics consume more fruit and vegetables than non-diabetics (Serdula & Coates, 1995.) However, other previous studies indicate that diabetics' nutrient intake may be lower than non-diabetics (Li, 2000; CDC, 2006; Ford, 2001; Serdula & Gillespie, 2000).

One of the strengths of this study is that it determines the association between diabetes, fruit consumption, and geographic region (Southern versus Northern states) through the use of current BRFSS data. Previous studies analyzing BRFSS data have examined fruit and vegetable consumption in different

Table 3
Association of Fruit and Vegetable Servings of Diabetics in Southeast and Northeast States

	Southeastern Diabetes		Northeastern Diabetes		Test for difference
	Yes	No	Yes	No	p-value
Fruit and Vegetable Servings					<.0001
Less than 1 per day or never	5.57%	5.95%	3.08%	3.54%	
1 to less than 3 times per day	32.89%	37.27%	31.11%	30.53%	
3 to less than 5 times per day	37.46%	35.96%	38.01%	37.03%	
5 or more times per day	24.08%	20.82%	27.81%	28.90%	

Table 4
Multivariate Logistic Regression Analyses of Fruit and Vegetable Consumption and Diabetes

Independent Variables	Fruit and Vegetable Consumption* OR (95% CI)	Diabetes OR (95% CI)
Age		
18-44	Reference	Reference
45-74	0.592 (0.36-0.96)	15.2 (4.69-49.24)
75+	0.502(0.26-0.97)	21.05 (5.63-78.69)
Race		
White, NH	Reference	Reference
Black, NH	2.18 (1.3-3.67)	7.71 (2.73-21.73)
Asian, Hawaii/PI, AI/AN, Other NH	0.81(0.45-1.46)	8.51 (2.62-27.65)
Sex		
Male	Reference	Reference
Female	0.79 (0.51-1.21)	1.71 (0.71-4.10)
States		
Southeastern	Reference	Reference
Northeastern	1.21 (0.74-1.99)	0.84 (0.28-2.54)

*Fruit and vegetable consumption indicates 5 or more servings

states without exploring differences between aggregate region or overall association (Ford, 2001; Nelson, 2002).
However, previous studies have not measured the association between these three variables (Serdula & Coates, 1995; Serdula & Gillespie, 2000; Raine, 2005).

Another strength of this study is its use of BRFSS data when examining fruit and vegetable consumption in diabetics in the northeast and southeast. BRFSS is a reliable and widely used instrument, used by the CDC to measure health beliefs and behaviors across the United States (CDC, 2006).

A weakness of the current study is that the results cannot be generalized to the entire United States population. This study's sample excluded individuals below the age of 18, where nutritional choices are more important, and also those with gestational diabetes. Diabetes and fruit consumption are associated with other factors such as fat intake, stress levels, health problems, and other chronic diseases. These differences in results may be affected by unmeasured conditions such as physical activity, job stress levels, or quality of life. Since the BRFSS is a self-report measure, researchers should consider the validity of the answers. This may have changed the actual proportions of diabetics and fruit consumption. Also, respondents may not be aware of their condition when answering the diabetes question. Participants may be diabetic and identify themselves as non-diabetic if their physicians have not diagnosed them.

This study presents many implications for the field of public health. Physicians, nurses, diabetes educators, diabetics and their family members may all benefit from the results of this study. Diabetes educators, nurses, and physicians can encourage diabetic patients to consume more fruit and vegetables and motivate them to continue eating fruit and vegetables. With the help of dieticians, they can design and implement diabetes education programs to inform the general public, such as the obese population, to consume more fruit and vegetables and lower their risk of diabetes. The results can provide guidance for diabetes education programs in the northeast and southeast to improve their current curriculum and focus on modifying lifestyle behaviors such as diet, exercise, smoking, alcohol consumption, and stress levels.

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