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Award Number: W81XWH-04-1-0703

TITLE: Co-Occurrence of Diabetes and Breast Cancer among Women by Ethnicity

PRINCIPAL INVESTIGATOR: Swann A. Adams, Ph.D.

CONTRACTING ORGANIZATION: University of South Carolina
Columbia, SC 29208

REPORT DATE: March 2006

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

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REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 01-03-2006		2. REPORT TYPE Final		3. DATES COVERED (From - To) 15 Jul 2004 - 14 Feb 2006	
4. TITLE AND SUBTITLE Co-Occurrence of Diabetes and Breast Cancer among Women by Ethnicity				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER W81XWH-04-1-0703	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Swann A. Adams, Ph.D. E-Mail: swann.adams@sc.edu				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
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13. SUPPLEMENTARY NOTES					
14. ABSTRACT: Health disparities are a source of concern for people at high risk of life-threatening diseases, and many public health agencies, both public and private. Consequently, elimination of these disparities has become a top priority for the nation as a whole. Over the last 30 years AA women have experienced a substantial <u>increase</u> in breast cancer deaths while EA women have experienced a substantial <u>decline</u> in deaths. The research indicates that later screening and poorer access to care can only partially explain these differences. Thus there is still much to be learned in this area. Recent research has shown a link between adult onset diabetes and breast cancer, but no research has examined this relationship in the context of ethnic disparities. We propose to utilize state Medicaid data to examine the association of diabetes and breast cancer among European American (EA) and African American (AA) women. We will first determine the percentage of AA and EA women with breast cancer among those diagnosed with and without diabetes. We will then determine the risk of developing breast cancer for EA and AA women among those with and without diabetes. With AA women ultimately bearing a disproportionately higher disease burden, it is imperative that we act quickly and thoughtfully to understand these ethnic differences with the ultimate goal being formulation of ethnic-appropriate public health policy and messages aimed at successful prevention and control. This research seeks to address an area of need that has been woefully neglected in the past.					
15. SUBJECT TERMS Diabetes, breast cancer, diet, physical activity, body weight, factors, epidemiology, case-control study					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			USAMRMC
U	U	U	UU	26	19b. TELEPHONE NUMBER (include area code)

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Introduction:

Despite advances in breast cancer research over the last two decades, there remain several important areas of public health concern that remain unresolved. Prominent among these is the complex issue of ethnic disparities in breast cancer incidence and mortality. While European-American (EA) women have experienced a 42% increase in incidence of BrCA from 1973 to 1999, AA have experienced a 50% increase (National Cancer Institute, 2002). The disparities are even more pronounced for BrCA mortality, with EA showing a 19% decrease and AA showing a 14% increase. Currently, mortality rates are 42% higher in AA than EA women in our state (versus the US differential of about 30%), even though incidence is 12% lower. This is due entirely to the difference between AA rates in SC vs. the US as a whole, as the EA rates are virtually identical here to those seen nationally. Not only does this difference cause tremendous hardship in the AA community, it also suggests fascinating and important research possibilities.

Numerous hypotheses have been proposed to explain these differences that range from socio-economic to biological, yet no clear picture has emerged (Simon & Severson, 1997). Previous research has shown an association between type 2 diabetes mellitus (DM) or biological markers of DM (i.e., blood insulin or glucose) and breast cancer incidence or mortality; to our knowledge, however, no research, has attempted to examine this link in the context of ethnic disparities (Michels *et al*, 2003). Several ecological observations lend promise to this proposed avenue: AA historically have a higher prevalence of type 2 DM, insulin resistance, and greater blood glucose and insulin levels (Haffner *et al*, 1997) (Mokdad *et al*, 2003). Additionally, basic science research has shown insulin to be a potent stimulator of cellular proliferation. All of these factors may contribute significantly to AA/EA disparities.

Specific Aims:

The specific aims for this study are:

- 1.) To compare the co-occurrence of DM and breast cancer between EA and AA women receiving Medicaid benefits and
- 2.) To determine and compare the relative risk of developing breast cancer among EA and AA individuals with and without DM.

Work Accomplished:

The approved Statement of Work (with revised timelines) categorized the work objectives for the project into 4 discrete tasks, each with indications for the months from the study timeline in which these tasks will be accomplished.

STATEMENT OF WORK

CO-OCCURRENCE OF DIABETES AND BREAST CANCER AMONG WOMEN BY ETHNICITY

Task 1: Run-in Phase, Month 1-6:

This phase of the study ultimately took much longer than anticipated due to delays in obtaining administrative reviews from all South Carolina government bodies impacted by the data acquisition detailed in Task 2. It was necessary to obtain administrative review and approval from the University of South Carolina's Institutional Review Board (for the exempt status), The Department of Health and Environmental Control's South Carolina Central Cancer Registry, South Carolina's Medicaid Office, and South Carolina's Census Office before any data could be released even for data linkage prior to releasing to the investigator. Consequently, all approvals were obtained by December of 2004 and the agencies authorized the linkage and ultimate release of data (See Appendices A1-A3).

- a) Develop a Manual of Operations (MOP), a detailed document describing data transfer, data merging, and data management systems. The MOP content is based on our successful experience with other large-scale epidemiologic studies, and will describe how SAS, Excel, EpiInfo and other data management/tracking software will be completely integrated to manage and analyze the data.

The Manual of Operations was designed based upon the input from the two bodies from which the data for analysis were obtained: The South Carolina Central Cancer Registry and the South Carolina Budget and Control Board. Please see Appendix A4 for the complete MOP.

- b) Develop and pilot test the data transfer and merging procedures.

This task was conducted by the Medicaid office of the South Carolina State Budget and Control Board. Due to the integrated nature of all state databases this task was made easier by the unique identifier assigned to all records.

c) Phase in applicable state agencies

This project required the cooperation of several state agencies as described previously: The University of South Carolina, The Department of Health and Environmental Control's South Carolina Central Cancer Registry, South Carolina's Medicaid Office, and South Carolina's Census Office. Multiple meetings and telephone conversations were scheduled to accomplish this task.

d) Train staff in all data-related procedures.

The Principle Investigator, Dr. Adams, was responsible for this task. It involved familiarizing the project coordinator, Wendy McKenzie, with the project and goals. She was also introduced to all collaborating state agencies in order to facilitate communications between the groups. In addition, Dr. James Hebert, a Co-Principle Investigator on the project, donated a part-time graduate assistant (10 hours per week) to learn the process of handling large databases as well as assist Dr. Adams in all data-related procedures. Dr. Adams personally trained and worked with this student.

Task 2: Data Acquisition, Merging, Verification, and Interim Analyses, Months 7-12:

a) Transfer subject key to various state agencies for in-house data linkage. Only state agencies will hold the key to the de-identified data.

The primary data linkage was conducted by the Medicaid office of the South Carolina State Budget and Control Board. The South Carolina Central Cancer Registry ultimately provided a file of all breast cancer cases contained within their database to the Medicaid office for linkage with Medicaid claims records. All those records without a match (via unique identifier, name, and date of birth) were deleted. The final dataset that was transmitted to the Principle Investigator was ultimately stripped of all identifying information (name, date of birth, address, etc) with the exception of the unique identifier, to which only the Medicaid office retained the code.

b) Merge all data files

This task was accomplished by the Medicaid office of the South Carolina State Budget and Control Board.

c) Verify the accuracy of newly merged dataset (i.e., ensure that variables have linked across datasets to the correct individual)- to be performed by state agencies.

This task was also accomplished by the Medicaid office of the South Carolina State Budget and Control Board.

d) Receive newly linked data file with de-identified data

The principle investigator received the final linked data set and de-identified file in February of 2005.

e) Flag all outlier and illogical responses.

Dr. Adams worked with the student graduate assistant to conduct this task. As the data files involved a claims database, there was quite a large of amount of error in the database that required cleaning.

f) Verify all outlier and illogical responses, recontacting data sources, if necessary.

Due to the nature of the collection of the data, the data sources were not able to resolve the majority of the data errors. Unfortunately, this is a weakness in working with claims data. Thus most of those records with outliers or illogical responses were deleted from the final analytic dataset. The strength of working with such databases is the number of records still remaining were more than sufficient (>150,000 records) to allow ample power for all analyses.

g) Conduct simple descriptive analyses (e.g., cross-tabulations and univariate statistics).
See Tables below.

Table 1. Descriptive statistics of the Medicaid cohort.

	EA	AA	p-value
Diabetes			
Yes	6%	94%	
No	11%	89%	<0.001
Breast Cancer			
Yes	1%	1%	
No	99%	99%	0.58
Age	47	46	<0.001
Education (grade)			
< 8th	30%	25%	
9-12	58%	62%	<0.001
College	1.7%	12.8%	
Other	0.3%	0.2%	
Menopausal Status			
Pre	59%	60%	
Peri	12%	15%	<0.001
Post	29%	25%	
Breast Cancer Type*			
In-Situ	11%	13%	
Invasive	89%	87%	0.05
Grade of Breast Cancer**			
Well Differentiated	18%	9%	
Mod. Differentiated	30%	27%	<0.001
Poorly Differentiated	29%	41%	
Undifferentiated	1%	3%	
Unknown	22%	20%	

Task 3. Data Analyses, Months 13-16:

a) Perform all exploratory analyses to test for adherence to model assumptions.

Dr. Adams and the graduate assistant conducted all analyses for this project.

b) Test study hypotheses.

This task was conducted by Dr. Adams using the following methodology.

- Cross-sectional study design
- Medicaid data from 2000 to 2001 was linked with Central Registry records
- Inclusion criteria:
 - Reported AA or EA ethnicity
 - At least 1 month of Medicaid eligibility in either 2000 or 2001
 - Between 20 and 100 years of age
- ICD-9 codes (beginning with 250) were used to classify diabetes status for each subject
 - Only those subjects with a diabetes code on 2 separate occasions were classified as diabetic
- Cancer registry records and Medicaid ICD-9 codes were used to determine BrCA status

- For those subjects with only a Medicaid BrCA diagnosis, count had to be >1
- Used a 2x2 analytic approach to compare the **prevalence ratios** between AA and EA women

c) Conduct post-hoc analyses of study data

See tables below.

Table 2. Prevalence ratios for the relationship between diabetes, race, and breast cancer.

Model	PR (95% CI)
Diabetes only	2.7 (2.5 – 2.9)
Diabetes Race (AA vs. EA)	2.7 (2.5 – 2.9) 0.94 (0.89 – 1.00)
Diabetes Race Race*Diabetes	<0.001 0.003 0.004

Table 3. Prevalence ratios for the relationship between diabetes and breast cancer stratified by race.

Race	Variable	PR (95% CI)
EA	Diabetes	2.31 (2.03 – 2.64)
AA	Diabetes	2.93 (2.67 – 3.23)

Table 4. Adjusted* prevalence ratios for the relationship between diabetes, race, and breast cancer.

Model	b Estimate	P-value
Diabetes	0.88	0.003
Race	0.22	0.06
Race*Diabetes	-0.11	0.74

*Adjusted for education, menopausal status, rurality, median income, and percent African American

Table 5. Adjusted* prevalence ratios for the relationship between diabetes, race, and breast cancer.

Model	Estimate	P-value
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Diabetes	0.52	0.16
Race	0.16	0.21
Race*Diabetes	-0.22	0.61

*Adjusted for education, menopausal status, median income, and percent African American

Table 6. Adjusted* prevalence ratios for the relationship between diabetes, race, and breast cancer.

Model	Estimate	P-value
Diabetes	0.37	<0.001
Race	-0.04	0.31
Race*Diabetes	0.15	0.07

*Adjusted for menopausal status, median income, and percent African American

Table 7. Adjusted* prevalence ratios for the relationship between diabetes, race, and breast cancer.

Model	Estimate	P-value
Diabetes	0.37	<0.001
Race	-0.02	0.51
Race*Diabetes	0.15	0.07

*Adjusted for menopausal status only.

Table 8. P-values for the interaction of menopausal status with all other variables.

Model	P-value
Diabetes	0.02
Race	0.002
Menopausal Status	<0.001
Race*Diabetes	0.09
Meno*Diabetes	0.41
Meno*Race	<0.001
Race*Diab*Meno	0.52

d) Conduct bi-monthly meetings to evaluate findings

Dr. Adams held meetings with Drs. Hebert, Mayer-Davis, and Cunningham to discuss the above findings and interpretation. After some discussion it was decided that the data should be re-analyzed utilizing additional data in a survival analysis. This would lend greater power to analyses and provide additional information.

Task 4. Manuscript Preparation, Month 17-18:

a) Prepare manuscripts.

This task is currently underway by Dr. Adams in conjunction with the collaborators Drs. Hebert, Mayer-Davis, and Cunningham.

b) Edit manuscripts.

This task is also being completed as the manuscript is prepared for final submission to a peer-reviewed journal.

c) Archive datasets for future analyses.

This task has been completed by Dr. Adams and the graduate assistant.

d) Plan future studies.

This task is completed. For more detail please see "Key Research Accomplishments".

KEY RESEARCH ACCOMPLISHMENTS:

Please see the above narratives (Tasks 2-3 and Tables 1-8) for research findings. In addition, Dr Adams has utilized the work from this research to serve as the basis for **four** other breast cancer and ethnic disparities grant applications listed below.

MAMMOGRAPHY SCREENING AND HISTOPATHOLOGICAL OUTCOMES AMONG AFRICAN AMERICAN AND EUROPEAN AMERICAN WOMEN IN SOUTH CAROLINA

P.I. Swann Arp Adams
Source: Department of Defense
Date Submitted: May 2005
Amount: \$899,312
Dates: 1/1/2006 – 12/31/10
Outcome: Not recommended for funding
Score: **Excellent- 1.8**

A PROSPECTIVE STUDY OF ETHNICITY, DIET, PHYSICAL ACTIVITY, AND BREAST CANCER AMONG ECONOMICALLY DISADVANTAGED WOMEN

P.I. Swann Arp Adams
Source: Department of Defense
Date Submitted: May 2005
Amount: \$906,140
Dates: 1/1/2006 – 12/31/10
Outcome: Not recommended for funding
Score: **Very Good- 2.1**

A PILOT STUDY OF FACTORS AFFECTING CANCER SURVIVAL AMONG AFRICAN AMERICANS

P.I. Swann Arp Adams
Source: Lance Armstrong Foundation
Date Submitted: July 2005
Amount: \$109,996
Dates: 1/1/2006 – 12/31/07
Outcome: Not recommended for funding
Score: **2.48**

SOUTH CAROLINA'S BREAST CANCER CONSORTIUM

P.I. James R. Hebert

Project Leader: Swann Arp Adams
Date Submitted: February 2006
Amount: \$10,343,532
Dates: 11/1/06 – 10/31/11
Outcome: Pending

REPORTABLE OUTCOMES:

Please see the above narratives (Tasks 2-3 and Tables 1-8) for outcomes which will be reported in the final manuscript. In this population in which SES and access to care are somewhat homogeneous, there are still disparities found in BrCA grade. Evidence that the effect of race on diabetes and BrCA may be mediated through factors related to SES. The higher prevalence of diabetes among African Americans as compared to European Americans may contribute to ethnic disparities seen in breast cancer. Upon the acceptance of the final manuscript to a scientific journal, the final copy will be sent to program officers.

References:

- Haffner,S.M., Howard,G., Mayer,E., Bergman,R.N., Savage,P.J., Rewers,M., Mykkanen,L., Karter,A.J., Hamman,R., & Saad,M.F. (1997) Insulin sensitivity and acute insulin response in African-Americans, non-Hispanic whites, and Hispanics with NIDDM: the Insulin Resistance Atherosclerosis Study. *Diabetes*, **46**, 63-69.
- Michels,K.B., Solomon,C.G., Hu,F.B., Rosner,B.A., Hankinson,S.E., Colditz,G.A., & Manson,J.E. (2003) Type 2 diabetes and subsequent incidence of breast cancer in the nurses' health study. *Diabetes Care*, **26**, 1752-1758.
- Mokdad,A.H., Ford,E.S., Bowman,B.A., Dietz,W.H., Vinicor,F., Bales,V.S., & Marks,J.S. (2003) Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA*, **289**, 76-79.
- National Cancer Institute. SEER Cancer Statistics Review 1973-1999. 2002. Bethesda, MD, National Cancer Institute. Ref Type: Report
- Simon,M. & Severson,R. (1997) Racial differences in breast cancer survival: the interaction of socioeconomic status and tumor biology. *Am J Obstet Gynecol*, **176**, S233-S239.

APPENDICES

A.1

Exemption from University of South Carolina Institutional Review Board



OFFICE OF RESEARCH
ARNOLD SCHOOL OF PUBLIC HEALTH

June 1, 2004

Swann A. Adams
Arnold School of Public Health
Epidemiology & Biostatistics

Dear Dr. Adams:

In accordance with 45 CFR 46.101, paragraph 4, the proposal, "Co-Occurrence of Diabetes and Breast Cancer Among Women by Ethnicity" has been granted an exemption from the Institutional Review Board (IRB) review. No further action or IRB oversight is required, as long as the project remains the same. However, you must inform the IRB Liaison of any changes in procedures involving human subjects, (e.g. anticipated risks, revisions to informed consent, protection of confidentiality, or unanticipated events). Changes to the current research protocol could result in a reclassification of the study and further review by the IRB.

Signed informed consent forms (if applicable) and other research related records should be retained for a minimum of three years after termination of the study.

Please contact me if you have any questions or concerns.

Sincerely,

Robert F. Valois, Ph.D., M.P.H
Institutional Review Board Liaison
Norman J. Arnold School of Public Health

cc: Office of Research Compliance

A.2

Amendment of Solicitation/Modification of Contract

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE S		PAGE OF PAGES 1 2	
2. AMENDMENT/MODIFICATION NO. P00001		3. EFFECTIVE DATE 01-Aug-2005		4. REQUISITION/PURCHASE REQ. NO. W23RYX-4136-N735		5. PROJECT NO.(If applicable)	
6. ISSUED BY USA MED RESEARCH ACQ ACTIVITY 820 CHANDLER ST FORT DETRICK MD 21702-5014		CODE W81XWH		7. ADMINISTERED BY (If other than item 6) USA MED RESEARCH ACQ ACTIVITY ATTN:WENDY BAKER WENDY.BAKER@AMEDD.ARMY.MIL FORT DETRICK MD 21702-5014		CODE W81XWH	
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code) UNIVERSITY OF SOUTH CAROLINA STEVEN ETHEREDGE RESEARCH FOUNDATION 901 SUMTER STREET SUITE 501 COLUMBIA SC 29208-0001				9A. AMENDMENT OF SOLICITATION NO.			
				9B. DATED (SEE ITEM 11)			
				X 10A. MOD. OF CONTRACT/ORDER NO. W81XWH-04-1-0703			
				X 10B. DATED (SEE ITEM 13) 06-Jul-2004			
CODE 095A5		FACILITY CODE					
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer ☐ is extended, ☐ is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)							
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.							
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).							
X C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: "Approvals and Other Authorizations"							
D. OTHER (Specify type of modification and authority)							
E. IMPORTANT: Contractor ☒ is not, ☐ is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) 1. The purpose of this modification is to extend the period of performance to read as shown in this modification. This is being done at no additional cost to the Government and in accordance with the recipient's request dated 29 July 2005. 2. All other terms and conditions remain unchanged.							
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) PATRICIA A. EVANS / CONTRACTING OFFICER TEL: 301-619-7354 EMAIL: pat.evans@us.army.mil			
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA BY <i>Patricia A. Evans</i> (Signature of Contracting Officer)		16C. DATE SIGNED 09-Aug-2005	

EXCEPTION TO SF 30
APPROVED BY OIRM 11-84

30-105-04

STANDARD FORM 30 (Rev. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SUMMARY OF CHANGES

SECTION 00010 - SOLICITATION CONTRACT FORM

CLIN 0001

The CLIN extended description has changed from PERIOD OF PERFORMANCE: 15 JUL 2004- 14 AUG 2005(RESEARCH ENDS 14 JUL 2005) to PERIOD OF PERFORMANCE: 15 JUL 2004- 14 FEB 2006 (RESEARCH ENDS 14 JAN 2006).

DELIVERIES AND PERFORMANCE

The following Delivery Schedule item for CLIN 0001 has been changed from:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 15-JUL-2004 TO 14-AUG-2005	N/A	USA MED RESEARCH AND MATERIEL COM JUDY PAWLUS COMMANDER USAMRMC ATTN: MCMR-RMI-S BLDG 504XX FORT DETRICK MD 21702 FOB: Destination	FORM9

To:

DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
POP 15-JUL-2004 TO 14-FEB-2006	N/A	USA MED RESEARCH AND MATERIEL COM JUDY PAWLUS COMMANDER USAMRMC ATTN: MCMR-RMI-S BLDG 504XX FORT DETRICK MD 21702 FOB: Destination	FORM9

(End of Summary of Changes)

A.3

DHEC Institutional Review Board Certification



INSTITUTIONAL REVIEW BOARD

FWA00003803

Public Health Statistics & Information Services

2600 Bull Street,

Columbia, S.C. 29201

Telephone: (803) 898-4144 Fax: (803) 898-3722

December 13, 2004

Swann Arp Adams, Ph.D.
Research Assistant Professor
SC Cancer Center / USC School of Public Health
15 Medical Park, Ste 301
Columbia, SC 29203

Dear Dr. Adams:

I have reviewed the protocol related to the project entitled, *Co-Occurrence of Diabetes and Breast Cancer Among Women by Ethnicity*. The review focused on DHEC involvement in the study.

This study utilizes existing data and appears to present no more than minimal risk to the participants. South Carolina cancer registry data will not be used to identify subjects. The data set to be provided to the researcher will not contain direct identifying information, and the data set will not be used to try to identify individual subjects. In accordance with 45 CFR 46.110, the DHEC portion of the study has been granted an **Expedited** Certification under the approved (expedited) research category list item #5. Approval of this research is contingent upon you informing this office of any changes in procedures involving human subjects (e.g., anticipated risks, implementation of informed consent, protection of confidentiality, or unanticipated events).

This IRB certification is valid through December 13, 2005. If your study continues beyond this time period, you must reapply for certification with this office. Please reference the IRB certification #IRB.04-015 with any correspondence with this office.

Sincerely,

A handwritten signature in black ink, reading 'Murray B. Hudson'.

Murray B. Hudson, MPH, Director
Public Health Statistics and Information Services
and Chair, DHEC IRB

cc: IRB.04-015 file
Susan Bolick-Aldrich
Mary Grace Johnson

Appendix A4
Manual of Operations

Data Regarding the Co-Occurrence of Diabetes and Breast Cancer Among Women by Ethnicity

Data Source

- The Medicaid data are taken from Medicaid recipient files, January 1993 through May 2003; and from Medicaid inpatient, outpatient, pharmacy, and HIC records from Q1 1993 to Q4 2002.
- The breast cancer data are from the South Carolina Central Cancer Registry data recorded for submission to the CDC, covering years 1996 through 2001.

Data Selection

- The population consists of all those women of Caucasian or African-American ethnicity found to be Medicaid recipients between 1993 and 2002.
- For each woman, it was determined from the Medicaid records whether any of the following were present: a diagnosis of diabetes (ICD-9 codes beginning with 250), a prescription for a drug used for the treatment of diabetes, or a diagnosis of breast cancer (ICD-9 codes 198.81, 233.0, and codes beginning with 174). The month and year of the first occurrence of each were noted. If there was both a diagnosis and prescription indicating diabetes, only the earlier date was kept.
- Data on breast cancer from 1996 to 2001 provided by the South Carolina Central Cancer Registry was linked to the data from Medicaid. Among the population of female Medicaid recipients mentioned above, there were found 2,717 cases of breast cancer present only in the Medicaid data; 3,061 cases recorded only in the SCCCR data; and 1,514 cases of breast cancer present in both the SCCCR and Medicaid records.

Data Set

- The data set is held in the tab-delimited ASCII file bcdiabdata.txt.

Variable List

Variable Name	Description	Comments
deidlink	De-identified patient linker	
diabdiag	Flag for diabetes diagnosis	1 = diabetes diagnosis 0 = none
diabpharm	Flag for diabetes prescription	1 = diabetes prescription 0 = none
monthdiab	Month of earliest diabetes diagnosis or prescription	
yeardiab	Year of earliest diabetes diagnosis or prescription	
agediab	Age at earliest diabetes diagnosis or prescription	
bcmdcddiag	Flag for breast cancer diagnosis in Medicaid data	1 = breast cancer diagnosis 0 = none
monthbcmcd	Month of Medicaid breast cancer diagnosis	
yearbcmcd	Year of Medicaid breast cancer diagnosis	
bccrdiag	Flag for breast cancer diagnosis in SCCC data	1 = breast cancer diagnosis 0 = none
seq	Sequence number	0 = only one primary 1 = first primary 2 = second primary 3 = third primary
lat	Laterality	1 = right: origin of primary 2 = left: origin of primary 3 = one side only, not specified 4 = bilateral, origin not specified 9 = laterality not specified
grade	Grade of the reportable tumor	1 = well differentiated 2 = moderately differentiated 3 = poorly differentiated 4 = undifferentiated anaplastic 5 = t cell 6 = b cell 7 = null cell 8 = nk cell 9 = unstaged

beh	Behavior of reported tumor	2=carcinoma in situ 3=malignant, primary type
dgs	SEER summary stage 2000 at the initial diagnosis	0=in situ 1=localized 2=regional, direct extension only 3=regional, regional lymph nodes only 4=regional, direct extension and regional lymph nodes 5=regional, NOS 7=distant 8=not applicable 9=unstaged
dmor	Morphology - describes the type of the tumor being reported using ICD-O-3 codes.	refer to International Classification of Disease for Oncology Third Edition
yearbc	Year of SCCC breast cancer diagnosis	
agebc	Age at breast cancer diagnosis, from SCCC	
vital	Vital status from SCCC	1 = alive 0 = deceased
yeardeathbc	Year of death from SCCC	
agedeathbc	Age at death from SCCC	
county	County of residence, from Medicaid	Recorded as a two-digit number. See Appendix A for details.
marital	Marital status, from Medicaid	S=SINGLE, NEVER MARRIED D=DIVORCED W=WIDOWED ML=MARRIED, LIVING WITH SPOUSE MS=MARRIED, SEPARATED, VOLUNTARILY NOT LIVING WITH SPOUSE LS=LEGALLY SEPARATED MI=MARRIED, INVOLUNTARILY SEPARATED U=UNKNOWN
race	Race, from Medicaid	1 = Caucasian 2 = African-American
agefound	Age at first appearance on Medicaid rosters	If the recipient appears before Jan 1, 1993, then January of 1993 is used

monthfound	Month of first appearance on Medicaid rosters	If the recipient appears before Jan 1, 1993, then January of 1993 is used
yearfound	Year of first appearance on Medicaid rosters	If the recipient appears before Jan 1, 1993, then January of 1993 is used
income	Income limit associated with Medicaid payment category	Text field stating income limit
edcurr	Current educational status, from Medicaid	0=UNKNOWN 1=PRESCHOOL, GRAMMAR, HIGH SCHOOL 2=COLLEGE OR TECHNICAL SCHOOL 3=LITERACY TRAINING 4=HIGH SCHOOL EQUIVALENCY 5=SPECIAL CLASSES 6=VOCATIONAL REHABILITATION 7=OTHER FULL TIME EDUCATION 9=NONSTUDENT
edatt	Educational level attained, from Medicaid	00=ILLITERATE OR NO FORMAL EDUCATION 01=GRADE LEVEL 1 REACHED 02=GRADE LEVEL 2 REACHED 03=GRADE LEVEL 3 REACHED 04=GRADE LEVEL 4 REACHED 05=GRADE LEVEL 5 REACHED 06=GRADE LEVEL 6 REACHED 07=GRADE LEVEL 7 REACHED 08=GRADE LEVEL 8 REACHED 09=GRADE LEVEL 9 REACHED 10=GRADE LEVEL 10 REACHED 11=GRADE LEVEL 11 REACHED 12=GRADE LEVEL 12 REACHED 13=COLLEGE LEVEL 13 REACHED 14=COLLEGE LEVEL 14 REACHED 15=COLLEGE LEVEL 15 REACHED 16=COLLEGE LEVEL 16 REACHED 17=SOME GRADUATE EDUCATION 18=SPECIAL EDUCATION 19=VOCATIONAL TRAINING 20=UNKNOWN 21=OTHER
elmonths1993	Number of months eligible for Medicaid during 1993	
elmonths1994	Number of months eligible for Medicaid during 1994	
elmonths1995	Number of months eligible for Medicaid during 1995	
elmonths1996	Number of months eligible for Medicaid during 1996	

elmonths1997	Number of months eligible for Medicaid during 1997	
elmonths1998	Number of months eligible for Medicaid during 1998	
elmonths1999	Number of months eligible for Medicaid during 1999	
elmonths2000	Number of months eligible for Medicaid during 2000	
elmonths2001	Number of months eligible for Medicaid during 2001	
elmonths2002	Number of months eligible for Medicaid during 2002	
agedeath	Age at death, from Medicaid	
countycr	County of residence, from SCCC	See Appendix A
maritalcr	Marital status, from SCCC	1 = single 2 = married 3 = separated 4 = divorced 9 = unknown
racecr	Race from SCCC	1 = Caucasian 2 = African-American
ruca	Rural-Urban Commuting Areas (RUCA) code, ZIP-based approximation version 1.1	See Appendix B
medianage	Approximate median age of ZIP, based on Zip Code Tabulation Areas (ZCTAs™)	See Appendix C
edu1	Percent of population 25 years or older educated to less than 9 th grade (based on ZCTAs™)	See Appendix C
edu2	Percent of population 25 years or older educated 9 th grade to less than high school graduation (based on ZCTAs™)	See Appendix C
edu3	Percent of population 25 years or older educated high school graduation to less than 4 years college (based on ZCTAs™)	See Appendix C
edu4	Percent of population 25 years or older educated 4 years college or more (based on ZCTAs™)	See Appendix C

homesize	Average household size, in persons (based on ZCTAs™)	See Appendix C
medincome	Median income (based on ZCTAs™)	See Appendix C
perpoverty	Percent of population below poverty level (based on ZCTAs™)	See Appendix C
perwhite	Percent of population of Caucasian ethnicity (based on ZCTAs™)	See Appendix C
perblack	Percent of population of African-American ethnicity (based on ZCTAs™)	See Appendix C

Appendix A

South Carolina County Codes:

1 = ABBEVILLE
 2 = AIKEN
 3 = ALLENDALE
 4 = ANDERSON
 5 = BAMBERG
 6 = BARNWELL
 7 = BEAUFORT
 8 = BERKELEY
 9 = CALHOUN
 10 = CHARLESTON
 11 = CHEROKEE
 12 = CHESTER
 13 = CHESTERFIELD
 14 = CLARENDON
 15 = COLLETON
 16 = DARLINGTON
 17 = DILLON
 18 = DORCHESTER
 19 = EDGEFIELD
 20 = FAIRFIELD
 21 = FLORENCE
 22 = GEORGETOWN
 23 = GREENVILLE
 24 = GREENWOOD
 25 = HAMPTON
 26 = HORRY
 27 = JASPER
 28 = KERSHAW
 29 = LANCASTER
 30 = LAURENS
 31 = LEE
 32 = LEXINGTON
 33 = MCCORMICK
 34 = MARION
 35 = MARLBORO
 36 = NEWBERRY
 37 = OCONEE
 38 = ORANGEBURG
 39 = PICKENS

40 = RICHLAND
41 = SALUDA
42 = SPARTANBURG
43 = SUMTER
44 = UNION
45 = WILLIAMSBURG
46 = YORK

Note: Codes greater than 46 indicate counties in other states or unknown counties.