

## **PAP SMEAR RATES: PREDICTOR OF CERVICAL CANCER MORTALITY DISPARITY?**

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### **ABSTRACT**

Considered preventable by the National Cancer Institute, cervical cancer continues to be a severe health threat for women. Although efforts at early detection have resulted in a decline of 50% in incidence and mortality in the in the last 30 years, still more than 14,000 new cases of cervical cancer are diagnosed and more than 4,8000 women die of cervical cancer annually. Significantly higher cervical cancer mortality rates in Tuscaloosa County, Alabama, for African-American women prompted an investigation into the Pap smear rates for African-American and white women. The unexpected results of the analysis were that in all three years, African-American women had Pap smear rates higher than white women, 384.81 and 254.17 per 1,000 respectively. Obviously, the difference in pap smear rates does not explain the disparity in cervical cancer mortality in Tuscaloosa County. Further exploration of the causes is needed.

### **INTRODUCTION**

One purpose of health care is to reduce mortality from disease, accidents, and disasters. Disparity in mortality rates based on race and ethnicity is confounding in the present era of perceived equality. However, 2000-2004 data for Tuscaloosa County, Alabama, indicated a startling sevenfold increase in cervical cancer mortality for African-American women when compared to white women (Higginbotham, 2006). The Tuscaloosa County cervical cancer mortality rates during 2000-2004 revealed 3.27 per 100,000 of all women; 7.07 per 100,000 African-American women; and 1.40 per 100,000 of white women.

### **REVIEW OF LITERATURE**

Worldwide, cervical cancer kills 275,000 women annually (Cadman, 2006). In the United States (U.S.), more than 4,100 women die of cervical cancer annually (Hoyo, et al, 2005). In Alabama, cervical cancer mortality was more than 50% higher for African-American women than white women, with rates of 5.4 and 2.4 per 100,000 respectively (Higginbotham, 2006). Although cervical cancer incidence and mortality rates have declined dramatically over the past several decades, the cervical cancer incidence rate for Alabama between 2001 and 2005 is 9.9/100,000 (Alabama Statewide Cancer Registry, 2007). From 2002 to 2006, African American women (11.1/100,000) died from cervical cancer at a much higher rate than white women (7.9/100,000) (American Cancer Society, 2010). However,

more African American women (89.0%) reported having had a pap smear within three years than white women (87.8%) (James, et al, 2009).

### ***Cervical Cancers***

Adenocarcinoma, one of the most prevalent cervical cancers, accounts for 25% of cervical tumors, most often in younger women. Originating in the mucous producing gland cells of the endocervix, adenocarcinoma is associated with the human papillomavirus (HPV) and use of oral contraceptives. It is more difficult to treat than the next most frequent squamous cell carcinoma (Tiffen & Mahon 2006).

Most cervical tumors are squamous cell carcinomas. Most cervical cancers begin as an alteration of the transformation zone and originate from precursor lesions called cervical intraepithelial neoplasia (CIN) (Tiffen and Mahon, 2006, p. 528). Progression beyond the basement membranes and invasion of the cervical stroma is considered invasive or malignant. Due to the slow progression from CIN to invasive cancer early detection and treatment of precursor lesions can essentially eliminate mortality due to this cancerous process. Because the prognosis regarding which lesions will become invasive is uncertain, all patients should receive timely treatment for precursor lesions.

Laboratory analysis of cervical epithelial cells (Pap smears) is used to determine the progression of cervical cancer. Pap smear results are classified according to cell abnormalities. Of the three Pap Smear reporting systems, the Bethesda System is routinely used because of its clarity and differentiation. The report includes data on the adequacy of the specimen and a recommendation to repeat smears when the specimen is inadequate or the cells are abnormal (Hatcher et al., 2004).

Since the 1990's, management protocols have become more conservative treatment ranging from monitoring progression of low-grade squamous intraepithelial lesion to performing radical hysterectomy or radiation for invasive carcinoma. Other treatments include coloscopy, ablative therapies, excision or radiation (McFadden & Schumann, 2001; Hatcher et al., 2004).

Invasive cervical cancer is a preventable disease. Prevention is the key to effective treatment. Localized cervical cancer will advance to invasive disease within two to ten years (McFadden & Schumann, 2001).

### ***Risk Factors for Cervical Cancer***

A vast 99% of cervical cancers are caused by the human papillomavirus (HPV), the most frequently sexually transmitted infection in the United States. Of the more than 100 types of HPV, most are benign and resolve without intervention. Visible lesions or warts, known as condylomata acuminata, may be seen. High-risk HPV types tend to persist and are associated with development of precancerous lesions and cervical cancer. Although cervical cancer is associated with about 15 high-risk HPV types, invasive cervical cancer is predominantly caused by HPV 16 and 18 (Tiffen & Mahon 2006).

Primary epidemiological risk factors for the development of cervical cancer are (a) smoking, (b) infection of HPV or chlamydia, (c) use of oral contraceptives, (d) immunosuppression, (e) diet low in fruits and vegetables, (f) three or more full-term pregnancies, (g) younger than 17 years old at the time of the first full-term pregnancy, (h)

poverty, (i) use of diethylstilbestrol, and (j) family history of cervical cancer (American Cancer Society, 2010b; Tiffen & Mahon, 2006). The correlation between a higher incidence of invasive cervical cancer and low income level may be due to a lower use of preventive care, lack of medical screening, and a higher incidence of HPV (McFadden & Schumann 2001).

### ***Screening Recommendations***

The importance of Pap smear testing to detect and treat cervical cancer early cannot be over estimated. Approximately 50% of women diagnosed with cervical cancer had never had a pap smear prior to the present one used to diagnose the cancer. An additional 10% had not had a Pap smear in the previous five years (Tiffen & Mahon, 2006). Although opinions regarding when and how often to begin regular pap smear screening vary the Alabama Department of Public Health developed guidelines for health care providers in the State based on published guidelines of the American Cancer Society and the American College of Obstetricians and Gynecologists (Alabama Department of Public Health, 2008). Those are presented in Figure 1.

## **BACKGROUND**

The Office of Performance Review of the U.S. Department of Health and Human Services (DHHS) Human Resource Service Administration (HRSA) initiated a meeting of numerous grant recipients, health care providers, and other interested parties in Tuscaloosa, Alabama, to discuss health issues of concern to the community. The goal of the meeting was to establish strategic partnerships to address health issues in the community to improve health outcomes. The Tuscaloosa Strategic Partnership identified three issues of concern and the group sub-divided into teams to address specific issues. The work of the team addressing the issue of cervical cancer mortality disparity in Tuscaloosa County is described in this manuscript.

The team's initial response to the cervical cancer mortality rate was that lack of access to affordable Pap smears was the problem. Equipped with the knowledge that cervical cancer can be *prevented* with risk reduction strategies and *cured* if identified via Papanicolaou (Pap) tests and treated promptly, led to the immediate response that African-American women must not be screened with Pap smears. The team identified several resources available in Tuscaloosa County to provide free or low-cost Pap smears; therefore cost of the procedure was not the root problem. Convinced that affordable Pap smears were available, the team needed to collect data on Pap smear rates in order to plan strategies to reduce the cervical cancer mortality disparity by promoting Pap smear screening. The team anticipated finding racial disparities in cervical cancer detection via Pap smears for women of Tuscaloosa County.

The research hypothesis is: African-American women are being screened for cervical cancer via Pap smears less frequently than white women. The null hypothesis is: There is no statistically significant difference in Pap smear rates of African-American women and white women in Tuscaloosa County, Alabama.

### Low Risk Patient:

- Family Planning Program:
  1. When to start performing Pap smears - Women should have their first Pap test approx. 3 years after first sexual intercourse, or by age 21, whichever comes first.
  2. Women under the age of 21 who have unreliable abnormal Pap smear history from outside provider or have delivered a baby:
    - a. If patient indicates an unreliable history of abnormal smear(s) from outside provider, begin annual smears.
    - b. If patient has delivered a baby in the past, begin annual smears.
  3. If patient requests an IUD/IUS and has not had a Pap smear in the previous 12 months, obtain Pap, then follow routine pap regimen based on age.
  4. Screening regimens for low-risk patient based on age:
    - a. Adolescent patients 20 years of age and younger – Once Pap smears are initiated, obtain “Thinprep only” until the age of 21; HPV not performed in this age group.
    - b. Women 21 – 29 years of age – obtain annual smears with HPV reflex test if result indicates ASCUS until the age of 30.
    - c. Women  $\geq$  30 years of age – obtain Pap smear and HPV testing, regardless of cytology results. If both tests are negative, perform routine screening of both tests in 3 years. If abnormal result(s), follow management based on result.
- ABCCEDP Program:  
Biennial smears (every 2 years) with HPV reflex test if result indicates ASCUS. If obtain 3 negative paps (including ASCUS with negative HPV) in a 60-month timeframe, space paps to every 3 years.

### High Risk Patient:

- Family Planning Program
  1. Regardless of age - the following conditions require more frequent Pap smears:
    - < An immunocompromised patient, i.e., HIV positive, organ transplant, chemotherapy (if within 5 years of last treatment), chronic steroid use (defined as continuous use x 6 months or longer)
    - < A woman exposed to diethylstilbestrol (DES) in utero
  2. Screening regimens for high-risk patient based on age:
    - a. Adolescent patients 20 years of age and younger – obtain a Pap smear annually; HPV test not performed in this age group.
    - b. Women 21-29 years of age – obtain annual smears with HPV reflex test if result indicates ASCUS.
    - c. Women  $\geq$  30 years of age – obtain annual smears with HPV reflex test if result indicates ASCUS.
- ABCCEDP Program  
Regardless of age - the following conditions require annual Pap smears with HPV reflex test if result indicates ASCUS:
  - < An immunocompromised patient, i.e., HIV positive, organ transplant, chemotherapy (if within 5 years of last treatment), chronic steroid use (defined as continuous use x 6 months or longer)
  - < History of cervical cancer (HSIL or worse on Pap smear)
  - < Smoker
  - < More than 1 sex partner in the last 3 years
  - < A woman exposed to diethylstilbestrol (DES) in utero

Figure 1. Pap Smear Protocol - Pap smear Testing Guidelines (Alabama Department of Public Health (2008). Clinic Protocol Manual Revised February 2008, p. 29)

## METHODS

First, the team identified the laboratories that analyzed Pap smear specimens collected by health care providers in the county. A telephone survey of selected Tuscaloosa County healthcare providers was completed to determine the laboratories used to analyze Pap smears. Those providers included the county health department; 17 OB/GYN physician practices; and two primary care centers. Because three major labs were identified, the team made the assumption that other healthcare providers (nurse practitioners, family practice physicians) who obtain Pap smears for health screening would likely use the same laboratories as the groups surveyed.

A secondary analysis of laboratory reports of Pap smears analyzed from 2003-2005 was conducted. Data on the number of Pap smears analyzed and demographic data of race and age for the patients were requested from the labs for 2003-2005.

The team faced several obstacles in obtaining and analyzing the data. One of the labs did not have data on race for their patients. This lab analyzed only 15% of the total Pap smears. Racial comparisons were made on the remaining 85%.

To calculate Pap smear rates, 2000 Census data for Tuscaloosa County was used. The number of females between 10 and 84 was used to correspond with the youngest and eldest patient receiving a Pap smear. Certainly not all females between those ages would be recommended to receive Pap smear screening. However, no account of the actual female population who should be screened was available. Readers are cautioned not to interpret the data to mean that the portion of 1000 who did not receive Pap smears should have had them. Some would have not yet become sexually active and some would have had hysterectomies, thus not needing the screening. Census data used was categorized as white and non-white as limitation.

## FINDINGS

Results were that Tuscaloosa County Pap smear rates for 2003-2005, per 1,000 women show a 297.25 total for all women; 254.32 for white women; and 387.11 for African-American women. The conclusion of the results reveals that Pap smear rates were NOT the reason for the disparity in cervical cancer mortality rates. The null hypothesis is rejected, as is the research hypothesis. This is because African-American women actually had a significantly *higher* Pap smear rate than did white women.

## DISCUSSION

Disparities in screening and mortality rates are not explained by the findings of this study. Same-year comparisons of screening prevalence and mortality rates are not expected to correlate precisely due to the time lapse between routine screening, diagnosis, and cancer death. The authors acknowledge this limitation and recommend longitudinal studies to track diagnosis and mortality rates of women who are and are not adhering to cervical cancer screening guidelines.

Other factors to consider as a reason for the disparity will include the woman's age at diagnosis; socioeconomic status; follow-up for abnormal results; the woman's general health; availability of transportation; religious beliefs; a fear of treatment and outcomes; stage of

cancer at time of diagnosis; and cultural issues. Some cultural issues include the reluctance of African-American women to “participate in agencies viewed as serving primarily Caucasian women, or that are located in areas perceived to be anti-African-American” (Kiger, 2003). There is the issue of women of low socioeconomic status and minority women being at risk for not adhering to cancer screening guidelines (Loerzel & Bushy, 2005). Religious beliefs, may affect health screening behaviors. According to Kiger, 2006, “prevention is not emphasized in many low-income communities, where religious beliefs may teach that everything is in God’s hands.” (p. 309)

System barriers such as the lack of insurance or being underinsured; no primary care physician; transportation issues; child care issues; and communication within the healthcare system are factors contributing to the disparity, according to Loerzel & Bushy (2005). Human barriers include low educational levels; low socioeconomic status; fear of the test itself (actual or perceived discomfort); fear of results indicating illness; trust; communication skills; previous negative experience with cancer screening; previous diagnosis of cancer; lack of knowledge regarding risk factors for cancer; cultural beliefs associated with cancer; (Loerzel & Bushy, 2005; Kiger, 2003); and “women with previous abnormal findings were less likely to follow-up in a timely manner” (Loerzel & Bushy, 2005 p. 84).

## **CONCLUSION**

The Tuscaloosa Strategic Partnership provided multiple educational programs about cervical cancer, risks, prevention, detection, and treatment. A study using focus groups of women with cervical cancer who *did not follow-up with healthcare* after learning of having an abnormal Pap smear to ascertain underlying causes is also currently in the works. Future study of the risk factors of women diagnosed with cervical cancer would be helpful to primary care providers in patient teaching and health screening recommendations.

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