West Virginia Medical Journal

October 2009 Special CME Issue
West Virginia State Medical Association

The Voice of Medicine in West Virginia

Sharing Knowledge, Building Networks, Improving Outcomes
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In honor of Breast Cancer Awareness Month, the WVSMA has published this special issue to promote the efforts of West Virginia physicians in the areas of research, collaboration and dedicated patient care.

**Scientific Articles**

- Building a Statewide Clinical Trials Network for Cancer Care in West Virginia
- Psychosocial Oncology Services in West Virginia
- Current Concepts in Breast Reconstruction
- Breast Cancer Screening, Incidence and Mortality in West Virginia
- Use of Radiation after Breast Conserving Surgery
- Breast Cancer in South Central West Virginia
- Smoking and Breast Cancer Screening in West Virginia
- Triple-Negative Breast Cancer in West Virginia
- The Role of Ultrasound in Breast Imaging
- Bonnie's Bus—Cancer Disparities in West Virginia: Philanthropy and Opportunities to Build Lasting Partnerships
- High Tech to High Touch: Integrating Community Voices

**Special Articles**

- Perspectives on Cancer Health Disparities in West Virginia
- Physician Perspective—Belonging to that “Special Club”

A special thank you to the following people for their hard work, attention to detail and incredible patience—without all of you, this special issue would never have made it to press!

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Sharing Knowledge, Building Networks, Improving Outcomes
The publication you have before you represents a great deal of work by the members of the publications committee, the individual contributors and especially Angie our managing editor. It is our hope that this special single topic issue on breast cancer will become a resource you will keep close at hand.

In my nearly 40 years of clinical medicine breast cancer has shown itself to be one of the most insidious devastating diseases I have dealt with. I have several times seen ladies who developed distant CNS metastasis causing facial paralysis, dizziness and other ENT symptoms as much as twenty years post treatment for their initial disease.

This is a disease that most of us have some personal experience with. I suspect all of you have a family member or close friend who has been touched by this cruel affliction which has such great physical and emotional impact.

Two years ago our family lost a great friend to breast cancer. Molly was a vibrant creative young woman. Her young daughter was the flower girl at my son’s wedding. Vicky and I have known her husband Michael since he was two years old. He is like one of our own and his beloved Molly was as well. Her initial diagnosis came at about age 36. Three years later in spite of the very best treatment available anywhere and a valiant fight she was taken from her family and friends. We all think of her often and miss her greatly.

I have great hope that the bright young minds who will follow us in the profession will conquer this cruel disease. Perhaps some will be inspired by this special issue.

Many thanks to all the contributors to this issue.

F. Thomas Sporck, MD
West Virginia Medical Journal
Editor
A Continuing Education Program

Title: Sharing Knowledge, Building Networks, Improving Outcomes—Breast Cancer Special Issue

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Featured Faculty: Faculty information listed with each article.

Course Materials: Related articles, process evaluation, content post-test.

About the Program and Objectives

The October 2009 special issue of the West Virginia Medical Journal provides an update for physicians on all aspects of breast cancer medicine in West Virginia. This program’s broad range of specialty topics provide all physicians with current information on significant advances in select areas of breast cancer research, surgical techniques, networks and partnerships within the State, diagnostic challenges and procedures and insight into the disparities present in our state. At the conclusion of the breast cancer issue, physicians will have an increased awareness and knowledge of the following:

- understand the availability of networks and clinical trials within West Virginia to improve patient care. Ensuring access to clinical trials in West Virginia requires strategies to overcome identified barriers as well as to create partnerships throughout the state.
- understand the background, best practices and availability of psychosocial oncology services.
- understand the current concepts of breast reconstruction and be able to discuss these with patients.
- inform physicians of statistical research on breast cancer screening, incidence and mortality rates in West Virginia.
- determine NCCN guidelines for management of early stage invasive breast cancer, and factors associated with the use of radiation.
- review actual patient experience, review modalities of treatment and discuss options that may improve perceived patient care.
- appraise the current status of breast cancer in one region of West Virginia and compare to national trends.
- learn about the relationship of smoking and breast cancer and how it relates to a lack of breast cancer screening. This correlation highlights the need for intervention for smoking cessation as well breast cancer screening.
- understand the molecular, genetic and histopathology involved in breast cancer as well as the changing pattern of early breast cancer in West Virginia.
- understand the factors that lead to health disparities in general and lead to an excess burden of cancer in our state. Help communicators and their partners reduce and/or eliminate cancer health disparities.
- understand the value of diagnostic ultrasound in evaluation of breast disease. To discuss the advantages and limitations of ultrasound when compared to other imaging modalities; to explore when ultrasound should be used initially or as an adjunct in evaluating breast disease.
- become familiar with WV legislative opportunities that have the potential to transform biomedical research and learn of philanthropic opportunities that have enabled scientific and clinical partnerships.
- knowledge of the community voices project that was key to the “Bonnie’s Bus” mobile mammography program.

Disclosure

It is the policy of the CAMC Health Education and Research Institute that any faculty (author) who presents a paper for an enduring material designated for AMA Physician’s Recognition Award (PRA) Category I or II credit, AANA credit or ACPE credit must disclose any financial interest or other relationship (i.e. grants, research support, consultant, honoraria) that faculty member has with the manufacturer(s) of any commercial product(s) that may be discussed in the educational presentation. Program Planning Committee Members must also disclose any financial interest or relationship with commercial industry that may influence their participation in this conference. All authors and faculty have disclosed that no commercial relationships exist.

Professional Continuing Education Credits

This enduring material has been planned and implemented in accordance with the essentials and standards of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the CAMC Health Education and Research Institute and the West Virginia State Medical Association. The CAMC Health Education and Research Institute is accredited by the ACCME to provide continuing medical education for physicians.

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Building a Statewide Clinical Trials Network for Cancer Care in West Virginia

Abstract
In the United States, mortality rates have been declining for certain tumors. For the majority of advanced stage cancer types, cure is unattainable but treatment is still evolving. Advances in the treatment of cancer can be achieved by enrolling patients in cancer clinical trials. Presently, less than 3% of adult cancer patients participate on clinical trials in the United States. Providing cancer care and access to clinical trials are a challenge in a rural state, with a dispersed population base, such as West Virginia. Building upon recognition of barriers to clinical trials awareness and access, oncology leaders in the state are in the formative stages of developing a statewide cancer clinical trials network. Realization of this network will have an enormous impact on cancer care in our state and perhaps can serve as a model for other community and physician teams for other diseases.

Introduction
Cancer is rapidly becoming the number one cause of mortality among older Americans (1,2). Even though the mortality from cancer is declining in some areas, treatment for the majority of cancers is still evolving. For many diagnoses, we still have only limited treatment options and it is extremely important for us to continue to explore new treatment options. In general, clinical trials are considered as the gold standard treatment options for most primary cancers. Unfortunately, only about 3% of adult patients across the country enroll in clinical trials (3-6). There are many reasons for this low accrual, which include lack of access, lack of awareness, financial concerns, transportation issues, and misconceptions about trials among many others. The National Cancer Institute (NCI), American Cancer Society (ACS), and American Society of Clinical Oncology (ASCO) are working hard to improve cancer clinical trial participation, especially for adult patients. One of the major reasons for this low accrual is more than 70% of the patients are treated in a community practice setting; but more than 70% of the clinical trials are done at academic centers (7). West Virginia faces many challenges due to unique socioeconomic profiles in rural settings and limited health literacy. Not surprisingly, cancer clinical trials accrual rates in West Virginia are among the lowest compared to many other states (7). The newly formed West Virginia Oncology Society (WVOS), Mary Babb Randolph Cancer Center of West Virginia University, David Lee Cancer Center of Charleston Area Medical Center, United Hospital Center, Clarksburg,
Schiffler Cancer Center of Wheeling Hospital, City Hospital of West Virginia University Hospital-East, Martinsburg as well as several other oncology and healthcare partners throughout West Virginia are working together to address this major cancer care issue in our state. If we are successful, the bar on the level of cancer care and access to clinical trials will be raised.

Cancer Care in West Virginia

Developing and successfully accruing patients to cancer clinical trials in West Virginia is vital to improving the quality of cancer care for all West Virginians as well as reducing the overall burden of cancer-related mortality in our state. Most of West Virginia’s cancer programs, including the David Lee Cancer Center (Charleston Area Medical Center, Charleston), Edwards Comprehensive Cancer Center (Marshall University-Huntington), Parkersburg Oncology Associates (Parkersburg); Schiffler Cancer Center (Wheeling Hospital), United Hospital Center (Clarksburg), Mary Babb Randolph Cancer Center (West Virginia University-Morgantown) as well as others are actively involved in cancer clinical trials (Table 1). These efforts are commendable and each program is working hard to make sure that patients gain access to cancer clinical trials. But despite their individual efforts clinical trial participation and accrual rates in West Virginia are small when compared to other settings and populations in the country.

Barriers to Cancer Clinical Trial accrual in West Virginia

Cancer mortality in Appalachia, especially in rural Appalachia, is higher than it is in the remainder of the United States. Many demographic factors coupled with systematic factors related to rural life in general, such as lower literacy rates, and low numbers of available cancer clinical trial studies create a challenge for West Virginia cancer providers to bring cancer clinical trials to their patients. Between April 2002 and March 2003, Coyne and colleagues conducted in-depth interviews with West Virginia cancer patients living in rural areas, who did not participate in clinical trials (8). Rural areas were defined by the United States Department of Agriculture’s Rural-Urban Continuum Codes. The study concluded that the two most critical barriers that influence a rural patient’s decision to participate in a clinical trial were lack of awareness by healthcare teams and lack of knowledge by patients.

Lack of awareness of appropriate clinical trials by physicians and other healthcare providers — This barrier is a critical piece of the puzzle to increasing clinical trial participation. Primary care and specialty physicians who are not affiliated with research institutions may be less aware of patient eligibility for clinical trials. Although physician referral is one of the most effective means of recruiting patients to clinical trials, some physicians may be reluctant to refer because they perceive an excessive administrative or financial burden to their practice. Physicians may also hesitate to inform patients of clinical trials based on their own attitudes and beliefs about trials and their assumptions about patient eligibility to enroll according to factors such as age, other existing conditions, cost, or ability to adhere to study protocol (9,10). Patients report that a recommendation by a physician to participate in a clinical trial is an important factor for the patient during the decision-making process (8).

Lack of knowledge about clinical trials by patients — One of the most serious barriers to proper overall utilization of health services as well as participation in clinical trials is the lack of knowledge on the part of healthcare consumers regarding the “where, when, and how” of services and programs. This problem promotes under-utilization of available programs and a sense of hopelessness. The Coyne study conducted with rural West Virginians suggested that cancer patients living in rural areas

<table>
<thead>
<tr>
<th>Center Location</th>
<th>Location</th>
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<tbody>
<tr>
<td>City Hospital, WVU- Eastern Division</td>
<td>Martinsburg</td>
</tr>
<tr>
<td>Community Comprehensive Cancer Center of Camden Clark Memorial Hospital</td>
<td>Parkersburg</td>
</tr>
<tr>
<td>David Lee Cancer Center, Charleston Area Medical Center</td>
<td>Charleston</td>
</tr>
<tr>
<td>Edwards Comprehensive Cancer Center, Marshall University</td>
<td>Huntington</td>
</tr>
<tr>
<td>Mary Babb Randolph Cancer Center, West Virginia University</td>
<td>Morgantown</td>
</tr>
<tr>
<td>Parkersburg Oncology Associates</td>
<td>Parkersburg</td>
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<tr>
<td>Raleigh General Hospital</td>
<td>Beckley</td>
</tr>
<tr>
<td>Saint Mary’s Medical Center</td>
<td>Huntington</td>
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<tr>
<td>Schiffler Cancer Center, Wheeling Hospital</td>
<td>Wheeling</td>
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<tr>
<td>United Hospital Center</td>
<td>Clarksburg</td>
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are uninformed about clinical trials but may be willing to participate if provided the information necessary for their decision-making (8).

A recent study done by Virani and colleagues found that discouragement by the oncologist (59.8%), monetary burden (53.4%), discouragement from the family physician (49.5%), travel or commuting distance and time to the clinical trial site (35.3%), and lack of information (35%) are the factors which most influenced the patients to participate or not to participate in cancer clinical trials (11). This study also emphasizes the need for patient education through community outreach programs and through educating physicians about cancer clinical trials in rural settings. Physicians should be trained to discuss clinical trial protocols and to address patient concerns regarding availability, utility and accessibility of clinical trials. Financial counseling can also play an important role in improving accrual rates. The need for more knowledge and awareness on the part of healthcare providers and patients is clear and represents one of the most significant barriers to cancer clinical trial participation.

In addition, at the request of and with the financial support of the National Cancer Institute, Agency for Healthcare Research and Quality commissioned a systematic review of the existing evidence on the recruitment of under-represented populations into cancer clinical trials. The report concludes that clinical investigators need effective strategies to improve participation of under-represented populations in cancer clinical trials (12).

The West Virginia Cancer Clinical Trials Network

Upon recognition of the barriers contributing to low cancer clinical trials accrual in the state, the newly formed West Virginia Oncology Society, Mary Babb Randolph Cancer Center, David Lee Cancer Center (Charleston Area Medical Center, Charleston), Edwards Comprehensive Cancer Center (Marshall University-Huntington), Schiffler Cancer Center (Wheeling Hospital), United Hospital Center (Clarksburg), City Hospital (Martinsburg, West Virginia University-Eastern Division) are working together to establish a cancer clinical trial network to address these issues. The vision of a West Virginia Cancer Clinical Trials Network – with an initial focus on breast cancer care in West Virginia – is one of major endeavors of the Bonnie’s Bus mobile mammography project. Many other organizations and foundations are also engaged in this effort, including Susan G. Komen for the Cure (Dallas, TX), Claude Worthington Benedum Foundation (Pittsburgh, PA), Mountains of Hope Cancer Coalition (Charleston, WV), and the American Cancer Society (South Atlantic Division, Atlanta, GA).

The West Virginia Oncology Society (WVOS) is a key collaborator in this effort. The West Virginia Oncology Society was formed in July of 2008 under the leadership of Drs. John Azar (Fairmont), Jondavid Pollock (Wheeling Hospital), James Frame (Charleston Area Medical Center), and Timothy Bowers (Martinsburg) to address the unique problems of cancer care providers and patients in West Virginia. The mission of the society is to engender and promote improvements in patient care, education, clinical trial accrual and pertinent economic and legislative issues as they affect all elements of oncology practice in the state of West Virginia. Since its inception, WVOS recognized that increasing clinical trial participation is a major goal. Recently the WVOS was accepted as a State Affiliate in the American Society of Clinical Oncology (ASCO) and will be ASCO’s 48th State/Regional Affiliate. ASCO, which is the largest organization of oncologists in the world, considers these state societies as vehicles to build advocacy and increase clinical trial access in the community. Other organizations such as Mountains of Hope Cancer Coalition, comprised of
individuals from community-based organizations, research and academic institutions, public and private agencies, patient advocacy groups, and other cancer control partners are supporting the new network. The need to make cancer clinical trials more readily available for West Virginians is noted in the West Virginia Cancer Plan. Mountains of Hope is working to educate the public and healthcare professionals about cancer clinical trials.

Susan G. Komen for the Cure and the Claude Worthington Benedum Foundation are supporting the effort to build the cancer clinical trial network by providing funding to the network to support clinical trial nurses at several facilities throughout the state. The American Cancer Society has indicated its strong support for the formation of a network and offers its Clinical Trials Matching Service (CTMS) as a tool to help with patient accrual. The CTMS is a free, confidential program that helps patients, families, and health providers find cancer clinical trials most appropriate to a patient’s medical and personal situation. The American Cancer Society uses the Trial Check database which lists over 6,000 active trials and is updated in real time.

**Status of the Network**

Over the past year meetings were held at Charleston Area Medical Center in Charleston; United Health Center in Clarksburg; Schiffler Cancer Center, Wheeling Hospital; Edwards Comprehensive Cancer Center at Marshall University in Huntington; City Hospital in Martinsburg; and the Western Maryland Health System in Cumberland, Maryland to engage administrators, clinical trial teams and physicians about the importance of a network approach to cancer clinical trials (Figure 1). The site visits demonstrated that all the organizations recognize the issue and are excited about the opportunity to collaborate on cancer clinical trials.

After identifying the challenges, strengths and weaknesses, need, and willingness to collaborate, steps have been taken to establish a partnership strategy with each program. Network goals are summarized in Table 2.

With the help of funding from the Susan G. Komen for the Cure and the Claude Worthington Benedum Foundation, Wheeling Hospital (Schiffler Cancer Center, Medical Oncology) will specifically accrue patients to breast cancer clinical trials of the National Surgical Adjuvant Breast and Bowel Project (NSABP). David Lee Cancer Center of Charleston Area Medical Center, which has an excellent clinical trial portfolio, will use this support to increase their accrual to cancer clinical trials. They have already hired a research nurse and have established a partnership with the oncology practice at Thomas Memorial Hospital in Charleston. United Hospital Center, which was part of the University of Pittsburgh Medical Center for their clinical trial affiliation has changed their clinical trial affiliation for NSABP protocols to West Virginia University. We are working together to enhance clinical trial activity in the Clarksburg area. City Hospital (West Virginia University - Eastern Division) has been working with WVU-Morgantown for the past two years. With this partnership, patients in the eastern panhandle for the first time have access to clinical trials in their community. At present there are four clinical trials open at City Hospital. We are continuing to explore the possibility of working together with the Edwards Comprehensive Cancer Center (ECCC) at Marshall University. The ECCC has a very robust clinical trial program that is ranked fifth nationally in clinical trials accrual among the NCI-

| Table 2. Goals of the West Virginia Cancer Clinical Trials Network. |

| 1. Build advocacy, increase clinical trial access and patient participation for cancer clinical trials in the state of West Virginia. |
| 2. Improve access to clinical trials to local / regional cancer providers so that patients from different parts of the state can receive state of art cancer treatment as close as possible, to their community and their oncologists. |
| 3. Form clinical trial partnerships among different cancer care providers/centers in the state, by carefully considering the strengths and weaknesses of each program and respecting the importance of maintaining their individuality and identity. |
| 4. Develop programs to increase the awareness of clinical trials among patients and physicians. |
| 5. Coordinate, and streamline the clinical trial activity in the state to attract more pharmaceutical industry, cooperative groups, and select investigator-initiated sponsored clinical trials to the state of West Virginia. |
Table 3. Current status of the West Virginia Cancer Clinical Trials Network (CCTN) – medical oncology providers and types of trials. In addition to these trials, most of the sites are participating in clinical trials from various major cooperative groups through the NCI-supported Clinical Trials Support Unit (CTSU).

<table>
<thead>
<tr>
<th>Facility (Location)</th>
<th>NSABP</th>
<th>ECOG</th>
<th>Pharma Trials</th>
<th>Investigator Initiated Trials</th>
<th>Network Funded Nurse</th>
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<tbody>
<tr>
<td>City Hospital (Martinsburg)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>David Lee Cancer Center (Charleston)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Edwards Comprehensive Cancer Center (Huntington)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mary Babb Randolph Cancer Center (Morgantown)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Schiffler Cancer Center, Medical Oncology (Wheeling)**</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X**</td>
</tr>
<tr>
<td>United Hospital Center (Clarksburg)</td>
<td>X</td>
<td></td>
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<td>X*</td>
</tr>
</tbody>
</table>

Notes: NSABP – National Surgical Adjuvant Breast and Bowel Project and ECOG – Eastern Cooperative Oncology Group, are National Cancer Institute sponsored national cooperative groups. Pharma trials – pharmaceutical industry sponsored clinical trials. *Site has trials accrual support through Mary Babb Randolph Cancer Center Clinical Trials Research Unit. ** Schiffler Cancer Center, radiation oncology group is a leader in RTOG clinical trials.

supported Clinical Trials Support Unit (CTSU) Independent Clinical Research Sites. The radiation oncology group of the Schiffler Cancer Center is one of most active members of Radiation Therapy Oncology Group (RTOG) in the country, and a leader in radiation therapy clinical trials in the state (Table 3). Discussions with the Western Maryland Health System have recently been initiated and future plans include discussions with facilities in southern West Virginia and Beckley areas. The goal is continue the dialogue with all the programs in the state to ensure that the clinical trial network is inclusive of as many oncology providers in the state as possible.

Summary

Nationally, cancer clinical research is in the midst of an enormous transition. Due to financial constraints and the need to complete clinical trials in a timely manner the federal government, industry, and cooperative groups are looking at innovative approaches to speed up the conduct of cancer clinical trials and expand access (13,14). One of the viable models, which is emerging rapidly is the establishment of clinical trial networks. Champions for the network approach vary. Clinical trial networks of Sarah Cannon Cancer Center and Accelerated Community Oncology Research Network, Inc. (ACORN) are examples of highly successful private community cancer care partnerships. Many university systems, such as Duke University, M.D. Anderson Cancer Center, University of California – Los Angeles, and the University of New Mexico have developed very successful community-academic center partnerships to enhance clinical trials participation. Our network concept is in its formative stage, but we are keenly aware of the existing models and we are looking at various models and options. The goal is to enhance awareness about the importance of cancer clinical trials, build advocacy, and enhance access and participation on clinical trials in the State of West Virginia. Bringing science and discovery from academic institutions to communities is one of the major goals of the National Institutes of Health and National Cancer Institute. This will facilitate cancer drug discovery and enable the drug approval process, and will get us closer to finding better anticancer treatments for millions of patients. Potentially, through the partnerships created by the West Virginia Cancer Clinical Trial Network, engines of economic growth for the state could be created leading to a more efficient statewide clinical research platform, while at the same time reducing the overall burden of cancer for all West Virginians.

References
1. A recent study done by Virani and colleagues found which of the following to be factors that influenced patients to participate or not to participate in cancer clinical trials.
   a. Lack of information
   b. Travel or commuting distance and time to the clinical trial site
   c. Discouragement by the oncologist
   d. Monetary burden
   e. All of the above

2. T or F Susan G. Komen for the Cure and the Claude Worthington Benedum Foundation are supporting efforts to build the cancer clinical trial network by providing funding to the network to support clinical trial nurses.

3. T or F Presently, more than 20% of adult cancer patients participate in clinical trials in the United States.

4. T or F All physicians should be trained to discuss clinical trial protocols and to address patient concerns regarding availability, utility and accessibility of clinical trials.
Objectives

To understand the background and best practices of the field of psychosocial oncology.
the extreme, can lower immunity and cause depression. (8)

**Best Practices**

In their defining 2007 report regarding cancer care, the Institute of Medicine (IOM) summarized that “today it is not possible to deliver good quality cancer care without using existing approaches, tools, and resources to address patients’ psychosocial health needs.” (9) The National Comprehensive Cancer Network (NCCN) – which has developed clinical practice guidelines for treatment of many aspects of oncology – has used the same multidisciplinary panel approach applied to their other guidelines to provide NCCN Distress Management Guidelines (available at www.nccn.org). These guidelines are for “the care of the psyche” and to “articulate common serious and treatable psychiatric syndromes, offer a differential diagnosis for distress and consider the psychological, social and spiritual component of symptoms like fatigue and pain.” (10) The panel employed the term distress to decrease the stigma of mental health issues and to reflect a degree of expected emotional symptoms.

At the heart of the Distress Guidelines are screening tools for measuring distress including a Distress Thermometer (DIS-A) – similar to a 0/10 pain scale – and a problem list. These are recommended as a part of the initial evaluation and triage process. According to the NCCN algorithm, patient-reported scores of ≥ 5 represent a significant level of distress to be evaluated by those designated as the mental health arm of the oncology team. Scores of 4 or lower are considered mild and normal fears, worries and uncertainties that are manageable by nurses, oncology physicians and other designated members of the primary oncology team.

The following table illustrates some reasons for referring to mental health professionals according to the NCCN Distress Management Guidelines.

One study of outpatient clinics using the Distress Thermometer found that approximately one-third of patients with cancer were found to be experiencing significant levels of distress. This figure was greater in patients with tumors having a poorer prognosis. Other research has shown that throughout the trajectory of the illness the incidence of distress in North America ranges from 35% to 45%, while end-of-life distress affects 58%. Results also support that a significant proportion of that perceived distress goes unrecognized by the patient’s health care team (11).

To increase distress recognition and thereby reduce not only the emotional but also economic burden of cancer care, the Canadian Council of Health Services Accreditation (Accreditation Canada) added requirements to assess emotional distress as the sixth vital sign of cancer to its 2009 accreditation standards. (12) An argument could be made that a similar requirement in the US for assessment of distress is crucial. (13)

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**Table 1**

- Patients scoring ≥ 5 on the NCCN DIS-A Distress Thermometer
- Patients currently experiencing intense or overwhelming anxiety or any symptoms of:
  - Major denial
  - Psychosis
  - Dissociation
  - Delirium (disorientation, confusion, memory problems)
- Patients with previous history or family history of:
  - Depression
  - Substance abuse
  - Suicide attempt
  - Psychiatric hospitalization
  - Other psychiatric disorder(s)
- Patients displaying hostile or inappropriate behavior towards family or staff
- Patients who, during cancer treatment, require maintenance of:
  - Psychotropic medication
  - Steroids
- Patients experiencing difficulty making treatment decisions or complying with treatment
- Patients considering certain aggressive treatments such as HSCT
- Patients considering end-of-active treatment decisions
- Patients dealing with other concomitant life stressors
- Patients who have special issues with regard to:
  - Age
  - Support
  - Previous experience with cancer
  - Fertility
  - Spirituality/Values
  - Irrational Beliefs
  - Previous experience with death in family
  - Pain
Even though a preponderance of clinical research demonstrates that patients with cancer benefit from psychosocial care, and recommendations exist for attending to those needs by use of the NCCN guidelines, a 2005 study of NCCN member institutions surveyed showed that only 20% screened all patients with cancer according to these guidelines. Most institutions agreed that screening for patients’ mental health concerns was worthwhile, and 60% of the institutions surveyed reported that they either screened some of the patients or were testing a pilot program for screening. (14) In a 2007 study of oncologists who were members of the American Society of Clinical Oncology, less than one-third reported being at least familiar with the NCCN distress guidelines. Sixty five percent reported doing some type of routine screening, but only 14.3% of those used a screening instrument to assess distress. (15)

Psycho-oncology In West Virginia

To appreciate the types of psychosocial services offered by cancer treatment facilities in West Virginia, an informal survey was conducted by telephone interviews and web site references. While not all available resources may have been assessed, the following were reported:

- Only the inpatient setting of one hospital is reported to be using distress management guidelines as a matter of protocol.
- All of the hospitals providing cancer care report some level of social work services available to their patients with cancer, either via referral to a general social work service (often now housed in a case management department) or by a designated oncology social worker (who may have other services to cover as well).
- All hospitals provide some type of spiritual support, with most hospitals having pastoral care services provided either by employed or volunteer chaplains.
- Most hospitals provide support group leadership or referral.
- One hospital employs a full-time doctoral level psychologist available to cancer patients and their families via a Cancer Patient Support Program.
- One hospital provides referrals to a consulting psychiatrist via a Psycho-oncology Program.
- One hospital provides oncology counseling by appointment with a doctoral level counselor.
- One hospital has a full-time cancer patient navigator who is a social worker.
- One hospital reportedly is developing consulting psychological services with a local university psychology program.

Consider these limited services reportedly available in relation to the following burden of cancer in WV. (16)

- Approximately 29 West Virginians per day are diagnosed with cancer (over 10,500 per year).
- In 2006, a total of 4,616 West Virginians died of cancer, about 12 per day.
- Cancer is the second leading cause of death in WV, exceeded only by heart disease.
- One of every four deaths (22%) in WV is due to cancer.
- Cancer was the #1 cause of death among 45-74 year old West Virginians in 2008.
- Cancer is the #1 cause of years of potential life lost in WV.
- Age-adjusted cancer rates for West Virginia men and women exceed those of the US.

Given the number of visits per year in the larger cancer centers in WV (approximately 16,000 to over 25,000) and the reported levels of distress related issues needing to be addressed (from 33% to 58%), our observations and understanding of at least minimal psychosocial care suggest that patients with cancer and their families are clearly underserved when hospitals staff all mental health services through one or two positions and/or a few referral sources or support groups.

Clinical research suggests that distress management leads to positive cost benefit ratios both emotionally and financially, not only for patients and their families, but also for the institutions and clinicians providing oncology care. Cancer treatment programs in West Virginia should strive to comply with the Institute of Medicine’s new recommendations for integrating evidence based psychosocial services as the standard of care for cancer patients, with all cancer care providers ensuring that each patient receives psychosocial health care meeting these IOM standards, and also focus on the development and validation of psychosocial programs implementing NCCN Distress Management Guidelines.

References

6. Fallowfield L, Ratcliffe D, Jenkins V, Saul J. Psychiatric morbidity and its recognition by
5. T or F The National Comprehensive Cancer Network (NCCN) provides clinical practice guidelines for the management of emotional distress in the same manner as they provide guidelines for other aspects of oncology.

6. T or F A score of 5 or higher on the Distress Thermometer (DIS-A) is the only reason to refer a patient or family member for psychosocial services.

7. T or F Accreditation Canada standards require assessment of distress as the sixth vital sign.

8. T or F Most research shows that about one-quarter of patients with cancer report signiﬁcant levels of emotional distress.

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CME Post-Test
Current Concepts in Breast Reconstruction

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Abstract
Breast cancer affects many women, but with advances in detection and treatment, survival rates have increased. Thus, it is important to understand that there are many reconstructive options available to help ease the psychological burden of mastectomy. Reconstructive options include tissue expander/implants, biologics, and several autologous tissue options, including pedicled latissimus and TRAM flaps, free TRAM flaps, and perforator flaps. We present a discussion of reconstructive techniques, the risks and benefits of each, and individual patient considerations that will help physicians to guide treatment options.

Introduction
Breast cancer continues to be a prevalent diagnosis in our society, affecting one out of every eight women throughout their lifetime. Breast cancer is the second most common malignant tumor in females and the second leading cause of death of females in the United States (1). However, due to advances in detection and treatment options, breast cancer death rates have decreased, and as of 2008, there are approximately 2.5 million breast cancer survivors in the United States (2). This extraordinary number of survivors should expand the physician’s focus not only to breast cancer survival but also to quality of life after breast cancer. Therefore, it is important for physicians to be aware of the reconstructive options available following mastectomy to assist their patients in making informed decisions. Studies have shown that fewer than 10 percent of those undergoing mastectomy for breast cancer elect for reconstruction (3). Reconstruction has been shown to have a positive psychological benefit, eliminates a constant reminder of their disease and helps to alleviate feelings of deformity that follow mastectomy (5). Importantly, research has also shown that one of the major reasons for not choosing breast reconstruction was lack of education about the procedure (4). This article summarizes current concepts in breast reconstruction for physicians in order to better educate their patients about surgical options. We present many reconstructive options, associated morbidities, and risk factors that influence selection and outcome.

Implant Reconstruction
Implant reconstruction is currently the most common form of breast reconstruction. However, it is important to understand patient selection. Implants are best used for thin women with smaller breasts who are in need of a bilateral reconstruction in order to improve symmetry and avoid the need for a donor site. Donor abdominal or gluteal tissue is often inadequate for breast reconstruction in thin women. Implant reconstruction is typically preceded with a tissue expander (TE) placed deep to the pectoralis muscle and expanded on a weekly or biweekly basis until approximately 30 percent over-expansion is reached (6). Once the desired size and breast homeostasis has been reached, the inflated expander is replaced with an implant. The two stage nature of this procedure may be considered as a disadvantage to some patients. Now that skin sparing mastectomy has become more accepted, it is possible to fill the TE to near capacity at the time of mastectomy. It obviates or reduces the need for postoperative expansion and does reduce the chance of infection or TE loss due to filling. Some surgeons will perform immediate placement of a permanent implant following skin sparing mastectomy, however the risk of infection is greater (6). There are two implant options available—silicone and saline. It is important for patients to understand that research has demonstrated that silicone is a safe and effective reconstructive option and has not been linked to connective tissue disease. Silicone implants have a more natural feel and appearance, but are heavier and require a longer...
incision for placement. On the other hand, saline implants are less expensive and can be adjusted for size intra-operatively, but carry the risk of subsequent deflation. Please see Figure 1.

Figure 1.
An example of a cohesive gel silicone implant demonstrating that even cut in half, there is no loss of silicone.

The advantages of implant reconstruction include reduced operating times, decreased surgical morbidity, and no need for a donor site (6). However, there are certain complications specific to implants including capsular contraction, leaking/deflation, migration of the implant and a two stage surgical repair (6). It is also important to understand that implant reconstruction is not an option for those who have inadequate tissue envelope or when adjuvant radiation is anticipated.

Biologic Reconstruction

Another recent advancement in plastic surgery is the utilization of a biologic dermal matrix to support implant reconstructions. These dermal matrices are immunologically inactive, safe for use in humans, and serve to provide a structural framework for revascularization (7). This material has enhanced the effectiveness of many reconstructive options, especially immediate and delayed implant reconstruction. In order to facilitate implant reconstruction, the dermal sling is sutured to the chest wall and anterior rectus abdominus fascia, creating a pocket or hammock for subsequent implant or tissue expander placement. Then, the superior portion of the graft is sutured to the inferior aspect of the pectoralis muscle in order to completely cover the implant. The dermal graft serves many functions in improving the outcome of implant reconstruction. It serves as a protective barrier between the implant and skin and because of its superior tensile strength, it controls the position of the implant and inframammary fold (7). The biologic graft also decreases the force transmission to the implant itself. One study showed that the long term implications of biologic grafts include overall patient satisfaction with few complications, including no capsular contracture, hematoma, or seroma in a 6 month to 3 year follow up (7). Part of this long term success with dermal grafts may be partly attributed to its successful incorporation into native tissue. This is evidenced by graft revascularization with granulation tissue formation 3 months after expander placement (7). Recent evidence suggests that this dermal hammock may be used with TE and implant reconstruction following radiation. This would be a significant change from previous thoughts in which radiation was a relative contraindication for TE/implant reconstruction. Please see figure 2 and figure 3.

Figure 2.
Schematic showing how a biologic material can be sutured to the pectoralis muscle to help cover and stabilize an implant (left). The picture to the right shows the effectiveness of biologic and implant reconstruction prior to nipple reconstruction.

Figure 3.
This picture shows the neovascularization of the dermal matrix on the left and the native tissue on the right with a demarcation in the middle. This vascular in-growth is key to the success of the inferior dermal sling in breast reconstruction.
**Autologous Reconstruction**

Autologous reconstruction involves the transfer of tissue from various anatomical sites, while preserving its native vasculature. The use of autologous tissue offers a more natural appearing breast while avoiding implant related complications. In addition, this type of reconstruction provides better symmetry for women with larger, more pendulous breasts. Although autologous tissue has many advantages, it is important to understand that it also requires longer surgical times in addition to longer post-operative hospitalization. Autologous reconstruction comes in many forms, including pedicled, free, and perforator flaps, each with their own advantages and disadvantages.

**Pedicled TRAM Flap/Pedicled Latissimus Flap**

The pedicled transverse rectus abdominus (TRAM) flap is currently the most common type of autologous breast reconstruction. Originally described at Emory in 1982 by Hartramph, this approach involves the transfer of inframammary skin and subcutaneous tissue to the mastectomy defect. This is achieved by tunneling the tissue subcutaneously while preserving the deep superior epigastric vascular pedicle found within the rectus abdominus muscle. Because this represents the non-dominant blood supply to infraumbilical tissue, vascularization via the superior epigastric artery may need to be increased to improve outcomes in patients who are obese, smoke, or have a history of prior radiation. This can be achieved by division of the deep inferior epigastric artery approximately 10 to 14 days prior to reconstruction, resulting in increased vessel diameter of the superior epigastric artery. Complications of TRAM flap include abdominal wall laxity and weakness, fat necrosis, flap necrosis, bulging of inframedial breast fold, pulmonary embolus, and seroma (6).

Please see figure 4 and figure 5.

**Figure 4.**

Schematic showing the location of the vascular pedicle and central area of the abdomen which is available for breast reconstruction. The abdominal donor site can be divided into four zones with Zone 1 having the most reliable blood supply.

Another type of pedicled flap is the latissimus flap. This approach involves tunneling the latissimus dorsi muscle and thoracodorsal vascular pedicle through the axilla to cover the mastectomy defect (6). Due to its reliable blood supply, this method is good for patients who are obese or who have a smoking history. Latissimus flaps can also be used for salvage surgeries in which other methods fail in addition to replacing radiation-damaged tissue (6). This flap is also a good option for thin women who do not have sufficient abdominal tissue to achieve the TRAM flap, but usually requires implant placement in addition to the autologous tissue (8). Complications include capsular contracture, flap dehiscence, implant extrusion, necrosis, infection, seroma, and hematoma (9).

**Free TRAM Flap**

The free TRAM flap uses the same donor site as the pedicled TRAM flap but uses the dominant inferior epigastric artery as its blood supply. Therefore, larger amounts of tissue can be used without the fear of necrosis, which may be

Please see figure 4 and figure 5.

**Figure 5.**

Pre-operative right breast defect following distant mastectomy (left). On the right is a intra-operative photo of pedicled TRAM flap now inset on the chest. At a later date the left breast will be lifted and reduced to size match the new left breast.
advantageous in the reconstruction of larger breasts. In addition, the use of dominant blood supply increases the vascularity of the flap making this an excellent option for smokers, obese, and those with a history of radiation. However, free TRAM flaps do have several disadvantages including: increased difficulty, microvascular thrombosis, and longer surgical time as compared to its pedicled counterpart (6).

**Perforator Flap**

Perforator flaps are the newest type of flap reconstruction. The advent of perforator flaps evolved due the need to decrease the donor site morbidity that is often involved with the TRAM flaps. These flaps allow for the transfer of autologous skin and subcutaneous tissue from many different sites with minimal donor site morbidity. The multitude of donor site options essentially allows all patients to be potential candidates for this type of reconstruction. However, these flaps are challenging due to the wide variability in vascular

*Table 1: Summary of the methods for breast reconstruction*

<table>
<thead>
<tr>
<th>METHOD</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TE/Implant</td>
<td>no need for donor site</td>
<td>decreased aesthetic satisfaction in obese</td>
</tr>
<tr>
<td></td>
<td>improved symmetry with bilateral mastectomy</td>
<td>less natural feel and appearance</td>
</tr>
<tr>
<td></td>
<td>can be done at time of mastectomy</td>
<td>risk of capsular contracture, migration, deflation</td>
</tr>
<tr>
<td></td>
<td>reduced total operative time and surgical morbidity</td>
<td>requires multiple expansions in delayed reconstruction</td>
</tr>
<tr>
<td></td>
<td>can be done prior to radiation if expander is fully inflated</td>
<td>must be completed in multiple phases</td>
</tr>
<tr>
<td></td>
<td></td>
<td>higher risk of infection</td>
</tr>
<tr>
<td>Biologic</td>
<td>provides positioning and support for implant</td>
<td>expensive</td>
</tr>
<tr>
<td></td>
<td>additional protective layer between implant and skin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>useful when pectoralis major is damaged/congenitally absent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>decreased radiation-induced inflammation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>decreased capsular contracture</td>
<td></td>
</tr>
<tr>
<td>Autologous Tissue</td>
<td>avoids implant complications</td>
<td>requires longer post-operative hospitalization</td>
</tr>
<tr>
<td></td>
<td>can achieve ptosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>can be used in the face of radiation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>can treat with antibiotics if infected</td>
<td></td>
</tr>
<tr>
<td>Pedicled Latissimus Flap</td>
<td>good for salvage surgery</td>
<td>requires addition of implant</td>
</tr>
<tr>
<td></td>
<td>reliable coverage for those without sufficient abdominal tissue</td>
<td>requires noticeable scar on back</td>
</tr>
<tr>
<td></td>
<td></td>
<td>intra op position change</td>
</tr>
<tr>
<td>Pedicled TRAM Flap</td>
<td>better symmetry for larger breasts compared to implant</td>
<td>weakness in trunk flexion if bilateral abdominal wall hernia/laxity</td>
</tr>
<tr>
<td>Free TRAM Flap</td>
<td>improved vascularity for smokers/obese</td>
<td>longer surgical time compared to pedicled</td>
</tr>
<tr>
<td></td>
<td>less donor muscle required than TRAM</td>
<td>requires microsurgery</td>
</tr>
<tr>
<td>Perforator Flaps</td>
<td>decreased donor site morbidity</td>
<td>large learning curve (50-100 surgeries)</td>
</tr>
<tr>
<td></td>
<td>greater range of potential donor sites</td>
<td>variability of vasculature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>technically demanding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>requires long operative times (&gt; 7 hours)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GAP requires 2 separate procedures (if bilateral)</td>
</tr>
</tbody>
</table>
anatomy, require significant microsurgical expertise with a large learning curve of 50-100 procedures, and are significantly longer procedures. Contraindications for perforator flaps include liposuction, active smoking, and BMI >30 (10).

Two of the most common donor sites utilized in this type of reconstruction are infraumbilical abdominal tissue and gluteal tissue. The same infraumbilical tissue used for the TRAM flap reconstruction is used in the deep inferior epigastric perforator (DIEP) flap, with the advantage of avoiding disruption to the muscle and fascia. The perforating vessels that supply the skin and subcutaneous tissue are dissected in the plane of the muscle fibers, with subsequent transplant of the flap to the mastectomy defect and anastomosis of the vessels to the internal mammary artery and vein. This reconstructive option decreases donor-site morbidity, pain, and recovery time (10). Gluteal tissue is another potential donor site, but with a higher fat-to-skin ratio as compared to the abdomen. This flap is an ideal option for women with larger buttock regions or when abdominal tissue is not an option for the patient, in such cases as previous abdominal surgery or liposuction. Please see figure 6.

Like the DIEP flap, the gluteal artery perforator (GAP) flap minimizes donor-site morbidity and spares the underlying muscle. There are several ways of achieving this flap, including a superior and inferior approach. In both cases, an ellipse shaped incision is made and the transplant of tissue is made in the same fashion as the DIEP flap, with the gluteal artery serving as the vascular supply. Using the superior approach, the scar is concealed in swimsuits and undergarments but the pedicle length is shorter than the inferior approach, making the anastomosis more difficult. The inferior approach utilizes the natural crease of the inferior buttock, but leads to increased wound dehiscence and causes more pain while sitting due to the location of the incision (1).

Smoking

Active smokers with breast cancer who present for surgical reconstruction have significant potential complications for all types of breast reconstruction. Smoking puts the patient at risk for delayed wound healing and poor surgical results and its effects on reconstructive surgery are well documented. For example, TRAM flap reconstructions in this population are at increased risk for multiple flap complications, infections, delayed wound healing, and total flap necrosis (11). In addition, when tissue expanders are used there is an increased risk of infection and skin necrosis (6). Therefore, all smokers should be counseled about these risks and strongly encouraged to stop smoking at least four weeks prior to surgery. Even this short amount of smoking cessation leads to substantial risk modification, decreasing complication rates to that of a nonsmoker following TRAM reconstruction (11). This represents an important opportunity for both plastic surgeons and primary care providers to provide beneficial patient information while subsequently decreasing the complication rate accompanying breast reconstruction.

Obesity

Obesity continues to be a nationwide epidemic and an even greater problem in West Virginia. Therefore, it is critical for physicians to be aware of the complications unique to this population following reconstructive surgery. Overweight patients are at much higher risk of complications including flap failure, donor site complications, and skin flap necrosis. However, although obese patients do have higher complication rates, many plastic surgeons are still willing to perform breast reconstruction in this patient population in order to improve patient outcomes. Autologous reconstruction with a TRAM flap is a good option for obese patients. Research has shown no difference in satisfaction between normal weight and obese

Figure 6.
In DIEP reconstruction, this entire skin paddle is supplied by one vessel without the need for rectus muscle sacrifice (left). An example of a DIEP flap in which the vessel is dissected through the rectus muscle, sparing its function (right).
individuals who undergo TRAM flap reconstruction (12). However, obese patients do have decreased aesthetic satisfaction with expander/implant options. This difference in satisfaction is most likely due to the TRAM flap’s ability to recreate more variable breast shapes and achieve greater symmetry than implants in larger breasts (12). Therefore, it is important to educate obese patients that they do have reconstructive options following mastectomy that lead to positive outcomes.

**Radiation**

The patient’s potential need for radiation in conjunction with mastectomy presents an interesting challenge for plastic surgeons. Radiation not only increases complications such as capsular contracture, delayed wound healing, infection, and implant extrusion, but has also been a factor that has limited patient’s breast reconstruction options (6). It is important to understand that historically, irradiated tissue was a contraindication for implant reconstruction, mainly due to inadequate tissue expansion to envelope the implant following radiation. This array of complications left irradiated patients with only autologous muscle flap as a reconstructive option, which still has higher complication rates than those without radiation (13). However, recent advances utilizing biologic slings have allowed patients who require adjuvant radiation in conjunction with mastectomy alternative choices.

In the past, it was feared that leaving the skin behind during the mastectomy would leave the patient at increased risk for recurrence. Contrary to this belief, new research has shown that skin-sparing mastectomy does not affect the regional recurrence of breast cancer and instead, recurrence is a function of both the stage of disease and biology of the tumor itself (14). This new development, in addition to the advent of tissue expander/biologic reconstruction, has allowed patients to undergo a skin sparing mastectomy with immediate reconstruction. This procedure leaves the skin envelope intact with placement of a full tissue expander at the time of mastectomy. The TE is then replaced by implant at a later date, after the patient has completed radiation. Thus, this procedure eliminates the need for tissue expansion following radiation, making implant reconstruction a possibility for this population. However, it is important to note that while this is now an acceptable option, these patients are at higher risk for implant related complications (13).

**Immediate versus Delayed Reconstruction**

When discussing reconstructive options with patients, it is important to include information regarding immediate versus delayed reconstruction. As previously mentioned, skin sparing mastectomy has played a huge role in the emergence of immediate breast reconstruction as an attractive option for many patients. In addition to preservation of the skin envelope and improved results with recent advances in tissue expanders and biologics, this option avoids the psychological trauma of an absent breast. Research has shown that women who undergo immediate reconstruction demonstrate significant gains in emotional well-
Patient expectations

Another important aspect to address during the pre-operative period is the patient’s expectations of the reconstruction. Patients must understand that the reconstructed breast will not exactly match the unaffected breast. Patients must also understand surgical options, risks, and benefits in order to make an informed decision. In order to better inform the patient, the plastic surgeon’s goal should be clearly outlined for the patient. The senior author’s goals include the patient’s ability to wear a bathing suit or a low cut dress without others knowing that reconstruction has taken place, with full understanding that the patient and intimate partner will be able to see the difference. Overall, good communication ensures that the patient’s goals and surgeon’s goals are congruent and is an important part of overall patient satisfaction with the results.

Conclusion

Although breast cancer remains a prevalent issue, advances in reconstructive surgery have enabled women to ease the psychological burden that accompanies the loss of a breast to cancer. With all of the reconstructive options that are available, it is crucial for physicians to understand the risks and benefits of each, and account for individual differences in patients that may impact their outcome. Both primary care physicians and general surgeons have an important opportunity to provide these patients with information about potential options and access to resources through referrals. The healthcare community must work together in order to ensure that these patients are not only survivors of breast cancer, but instead, give these patients a chance to once again be whole.

References


Please see CME Post-Test on the next page.
CME Post-Test

9. Currently, what is the most common form of breast reconstruction?
   a. Free TRAM flap reconstruction
   b. Implant reconstruction
   c. Pedicled Latissimus Dorsi flap reconstruction
   d. DIEP flap reconstruction

10. Which reconstruction method is a good option for salvage surgery?
    a. Pedicled Latissimus Dorsi flap reconstruction
    b. Implant reconstruction
    c. Biologic reconstruction
    d. Free TRAM flap reconstruction

11. What are two disadvantages of a free TRAM flap as compared to its pedicled counterpart?
    a. decreased vascularity
    b. longer operative times
    c. requires microsurgery
    d. requires addition of implant

12. T or F  Silicone implants are a safe reconstructive option and have not been linked to connective tissue disease.

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Breast Cancer Screening, Incidence, and Mortality in West Virginia

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Abstract

Situated entirely in the Appalachian region, West Virginia (WV) as a state is characterized by a diverse population, with a major portion of the population residing in rural areas. Breast cancer is the most commonly diagnosed cancer among women residents of the state. Using different data sources, we have reported the most recent screening, incidence, and mortality information associated with breast cancer in WV. In 2006, roughly one-fourth of women ≥40 years of age had not had a mammogram in the past two years. Socio-demographic factors were found to be associated with lack of mammography screening among these women. The leveling off of the increase in the in-situ breast cancer incidence rates in WV since 1999 is closely associated with the bottoming out of the proportion of women without mammography that has been seen since early this decade. Counties in southern and northern part of the state generally have higher invasive breast cancer incidence rates than those in the central part. Breast cancer-related mortality is higher among southern counties in comparison to counties in northern and central part of the state, with mortality rates higher than the national average in McDowell, Mingo, Wayne, and Mason Counties. There is a compelling need to increase access to mammography screening among women residents in the state.

Introduction

Breast cancer is the second leading cause of cancer-related mortality among women in the United States (US) after lung cancer (1). In 2007, ~178,480 women were expected to be diagnosed with invasive breast cancer and 40,460 women were expected to die due to breast cancer in the US (2). Risk factors for breast cancer include personal or family history of breast cancer, delayed pregnancy, use of oral contraceptives, hormone replacement therapy, early menarche, or late menopause (3). Screening mammography is considered to be the gold standard for identifying early stage breast cancer (4). The American Cancer Society (ACS) recommends annual mammography screening for all women ≥40 years of age with an average risk of breast cancer (5).

High poverty rates and health care disparities characterize the Appalachian region (6-8). Studies have reported higher incidence rates of cancer and other chronic diseases in Appalachia compared to the rest of the country (9-13). A recent study by Wingo and colleagues reported invasive breast cancer to be the most common type of cancer among Appalachian women (13). West Virginia (WV) is the only state situated entirely in Appalachia and has a large rural population characterized by poverty, low levels of education, and underserved healthcare needs. As is the case with the entire Appalachian region, breast cancer is one of the most prevalent cancers among women in WV (14). In 2004, self reported annual mammography screening rate among women aged ≥40 years in WV was 58.1%, which is lower than the national mammography screening rate of 58.3% and also below the Healthy People 2010 target of 70% (2,15).

Given the unique environmental and socio-demographic setting of

Objectives

Breast cancer is the most commonly diagnosed cancer among women in West Virginia (WV). The objectives of this study were to: 1) determine the proportion of women ≥40 years of age who have not had a mammography screening in the past two years in 2006 in WV; 2) determine socio-demographic and health care access factors associated with lack of mammography screening; 3) report incidence rates of invasive breast cancer by county; and 4) report breast cancer-related mortality rates by county.

Analysis of the 2006 Behavioral Risk Factor and Surveillance System (BRFSS) showed that 25.5% of women respondents ≥40 years of age in WV reported not having a screening in the past two years. Women in the age group 40-44 years, an annual household income of less than $25,000, without health insurance, without a personal doctor, and those who had not had a routine check up in more than two years were more likely to report not having a mammogram in the past two years. Counties in northern and southern part of the state had generally higher incidence rates as compared to those in the central part of the state. Southern counties especially McDowell, Mingo, Wayne, and Mason had a higher burden of breast cancer-related mortality as compared to counties in the central and northern (with exception of Marion and Taylor) part of the state.
the Appalachia, researchers have investigated the screening rates for breast cancer in the region. Studies have found mammography screening rates to be lower among women who are less educated, unemployed, residing in rural location, have low income, and lack health insurance (16,17). Though these studies provide useful information about breast cancer screening in the Appalachian region, the most recent estimate of the proportion of women who have not had mammography screening and factors associated with lack of mammography screening are not known for the state of WV. A review of the literature reveals that no previous study has collectively described breast cancer screening, incidence, and mortality for counties in WV. A lack of mammography screening among WV women. The purpose of this study is to: 1) determine the proportion of women ≥40 years of age who have not had a mammography screening in the past two years in 2006 in WV; 2) determine factors associated with lack of mammography screening; 3) report incidence rates of invasive breast cancer by county; and 4) report breast cancer-related mortality rates by county.

Data Sources and Methods

Given our study objectives, multiple data sources were used to ascertain breast cancer specific information for the state of WV. The study employed 2006 Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor and Surveillance System (BRFSS), WV Cancer Registry (WVCR), and the CDC Wide-ranging Online Data for Epidemiologic Research (WONDER) data to ascertain breast cancer screening, incidence, and mortality related information, respectively.

Established by the CDC, and undertaken on a collaborative basis between the CDC and state health departments, the BRFSS is a state-based surveillance system that tracks information related to health behaviors and risk factors on a yearly basis. Using random-digit-dialing telephone survey technique, trained interviewers collect information from non-institutionalized adults of 18 years of age or older. Further details about the BRFSS survey, design, and methodology have been described elsewhere (18).

In the 2006 BRFSS, the WV Bureau of Public Health (BPH) of the State Department of Health and Human Resources collected information related to mammography screening from women residents in the state. Women respondents were asked if they had ever had a mammogram, and how long had it been since their last mammogram. For the purpose of this study, the 2006 BRFSS data related to women ≥40 years of age in the state of WV was analyzed. The variables of interest were: age, education, annual household income, race, health insurance, access to a personal doctor, time since last doctor visit for a routine checkup, and whether the respondent was unable to see a doctor in the past 12 months because of cost. Though age was measured on a continuous scale in the 2006 BRFSS, it was categorized for analysis in this study. Since >95% of WV residents are white, respondents were classified into two groups for the purpose of analysis – white and others. The purpose of analyzing the 2006 BRFSS data was to determine the proportion of women ≥40 years of age in the state of WV who had not had a mammogram in the past two years and determine its association with different demographic and health care access characteristics.

Study analyses were conducted using SAS 9.1®. Weighted proportions and 95% confidence intervals (CIs) were generated using PROC SURVEYFREQ. Chi-square test was used to determine significant relationships for categorical variables. Logistic regression analysis (PROC SURVEYLOGISTIC) was conducted to determine the demographic and healthcare access-related characteristics that are associated with lack of mammography.

The study also utilized breast cancer incidence data generated by the WVCR and described in their “Cancer Incidence in West Virginia: 2008” report. Established in 1991, the WVCR collects data related to cancer diagnosed and/or treated among the residents of the state and reports incidence rates by type of cancer, gender, race, and other factors. For the purpose of this study, WVCR data related to the yearly trends in the age-adjusted incidence rates (/100,000) of in-situ breast cancer for the state of WV were used and reported in this study. In addition, county specific incidence rates (/100,000) of age-adjusted invasive breast cancer, as reported in the WVCR 2008 report were used.

Finally, the Compressed Mortality File (CMF) from the CDC WONDER was utilized to determine county level age-adjusted mortality rates (/100,000) for breast cancer in WV over a five year period from 2001-2005. Information related to state of residence, rural-urban status of the place of residence, age category, racial origin, gender, year of death, and International Classification of Disease (ICD) codes from ninth (ICD-9) and tenth (ICD-10) revision denoting cause of death, are included in the CMF. The ICD-10 codes for malignant neoplasm of breast (C50.0-C50.6 and C50.8-C50.9) were used to retrieve mortality data for breast cancer for counties in WV. Age-adjusted breast cancer rates were calculated using this information.

Results

Breast Cancer Screening In 2006 BRFSS, of the total 160,465...
women respondents' ≥40 years of age, 1,750 women were from WV. Nationwide, 23.4% (C.I. 22.9-23.8) of women respondents' ≥40 years of age reported not having a mammogram in the past two years. In comparison, 25.5% (C.I. 23.2-27.8) of women respondents' ≥40 years of age in WV reported not having a mammogram in the past two years. In terms of demographic distribution of the 1,750 women respondents in WV, ~38% were aged 65 years and above, 41.9% had attended or graduated college, 21% had an income of ≥$50,000, and 96.4% were white. Table 1 reports the proportion of women ≥40 years of age in WV that had not had a mammogram in the past two years by demographic categories. With respects to age, the proportion of respondents who had not had a mammogram in the past two years decreased significantly until the age of 64 years, and then reversed trend for those who were 65 years and above (p<0.001). As education level increased, the proportion of women who had not had a mammogram in the past two years also decreased significantly (p<0.001). The proportion of women who had not had a mammogram in the past two years decreased with increasing levels of annual household income (p<0.001). In terms of race, there were no significant differences observed in terms of the proportion of respondents who

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Actual Respondents(a) (N)</th>
<th>Weighted proportion of females ≥40 years who have not had a mammogram in the past two years (95% CIs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-44 Years</td>
<td>197</td>
<td>42.8 (35.1-50.6)</td>
</tr>
<tr>
<td>45-54 Years</td>
<td>429</td>
<td>24.6 (20.2-29.0)</td>
</tr>
<tr>
<td>55-64 Years</td>
<td>463</td>
<td>17.8 (14.1-21.6)</td>
</tr>
<tr>
<td>≥65 Years</td>
<td>661</td>
<td>24.8 (21.1-28.4)</td>
</tr>
<tr>
<td>Education***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>308</td>
<td>35.8 (29.8-41.8)</td>
</tr>
<tr>
<td>Graduated high school</td>
<td>706</td>
<td>25.8 (22.1-29.4)</td>
</tr>
<tr>
<td>Attended college/technical school</td>
<td>388</td>
<td>26.3 (21.2-31.3)</td>
</tr>
<tr>
<td>College graduate</td>
<td>345</td>
<td>15.4 (11.4-19.4)</td>
</tr>
<tr>
<td>Income***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $15,000</td>
<td>322</td>
<td>36.4 (30.5-42.2)</td>
</tr>
<tr>
<td>$15,000-$24,999</td>
<td>365</td>
<td>32.9 (27.4-38.4)</td>
</tr>
<tr>
<td>$25,000-$49,999</td>
<td>430</td>
<td>24.4 (19.9-28.9)</td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>187</td>
<td>19.7 (13.4-25.9)</td>
</tr>
<tr>
<td>Greater than $75,000</td>
<td>181</td>
<td>13.0 (7.4-18.7)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1,688</td>
<td>25.5 (23.2-27.9)</td>
</tr>
<tr>
<td>Other(^{b})</td>
<td>61</td>
<td>26.4 (14.3-38.5)</td>
</tr>
<tr>
<td>Total Females – West Virginia ≥40 years</td>
<td>1,750</td>
<td>25.5 (23.2-27.8)</td>
</tr>
<tr>
<td>Total Females – United States ≥40 years</td>
<td>160,465</td>
<td>23.4 (22.9-23.8)</td>
</tr>
</tbody>
</table>

\(^{a}\)Total number of respondents within each category could be different.

\(^{b}\)Other includes females who were Black, Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaskan Native, Multiracial, and those that reported "other race".

\(^{c}\)Includes all (United States) female respondents in 2006 BRFSS who were ≥40 years and had responded (Yes/No) to the question of whether they had a mammogram in the past two years or not. Remaining numbers/proportions in the table correspond specifically to West Virginia.

\(^{p}<0.001\)

CIs – Confidence Intervals
Figure 1.
Differences in the proportion of West Virginia females aged 40 years and above who had not had a mammogram in the past two years based on healthcare access characteristics, Behavioral Risk Factor Surveillance system (2006).

Bolded numbers represent the weighted proportion of females ≥40 years that have not had a mammogram in the past two years, West Virginia Behavioral Risk Factor Surveillance System 2006; Numbers in parenthesis represent 95% Confidence Intervals. **p<0.001

A) Health insurance

B) Personal doctor

C) Last routine checkup

D) Unable to see doctor in the past 12 months because of cost

had not had a mammogram in the past two years between those who were white and others.

Figure 1 presents the difference in the proportion of women respondents aged 40 years of age in WV who had not had a mammogram in the past two years by healthcare access characteristics. A significantly higher proportion of respondents without insurance had not had a mammogram in the past two years as compared to those with insurance (57.2% versus 21.9%, p<0.001). The proportion of respondents who had not had a mammogram in the past two years was higher among those who reported not having a personal doctor in comparison to those who had a personal doctor (59.9% versus 21.7, p<0.001). Respondents who had not visited a doctor for a routine checkup in more than 2 years were more likely to report not having a mammogram in the past two years in comparison to those who had a routine checkup in the last 2 years (75.2% versus 19.9%, p<0.001). Respondents who reported not being able to see a doctor in the past 12 months because of cost were more likely to not have a mammogram in the past two years in comparison to those who were able to see a doctor (46.8% versus 21.5%, p<0.001).

Table 2 presents the results of multivariate logistic regression analysis, which was conducted by regressing demographic and healthcare access characteristics on the variable describing whether or not women respondents had a mammogram in the past two years. In comparison to respondents who were 65 years of age and above, the odds of not having a mammogram in the past two years were 1.7 times (C.I. 1.1-2.6) higher among those in...
Scientific Article | 40-44 year age group. The odds of not having a mammogram in the past two years were lower (OR = 0.7; C.I. 0.5-0.9) among respondents in the age group 45-64 years as compared to those 65 years of age and above. The odds of not having a mammogram in the past two years were 1.8 times (C.I. 1.2-2.8) higher among respondents who had an annual household income of less than $25,000 in comparison to those with an annual household income of ≥$50,000. Respondents without health insurance were 1.9 times (C.I. 1.2-3.2) more likely to report not having a mammogram in the past two years as compared to those who had health insurance. The probability of not having a mammogram in the past two years was 2.9 times (C.I. 1.9-4.5) higher among respondents without a personal doctor as compared to those who had a personal doctor. Compared with respondents who had visited a doctor in the past two years for a routine checkup, those who had not had a routine checkup in more than 2 years were 8.5 times (C.I. 5.3-13.4) more likely to not have had a mammogram in the past two years. Finally, respondents who were unable to see a doctor in the past 12 months because of cost were 1.5 times (C.I. 1.1-2.2) more likely to not have had a mammogram in the past two years as compared to those who were able to see a doctor.

Trends in Breast Cancer

Screening and Incidence Figure 2 presents trends in the proportion of women ≥40 years of age that had not had a mammogram in the past two years (1990-2006) and age-adjusted incidence rates per 100,000 of in-situ breast cancer among women (1993-2005) in WV. The proportion of women who reported not having a mammogram in the past two years decreased from 44.2% in 1990 to 25.5% in 2006. However, since 2000 this proportion has remained fairly constant. Between 1993 and 2005, the age-adjusted incident rates of in-situ breast cancer increased from 11.1/100,000 to 25.1/100,000. As with screening, the incidence rate of in-situ breast cancer has remained fairly constant between 1999 and 2005.

Breast Cancer Mortality Figure 4 presents WV county specific age-adjusted average annual (2001-2005) invasive breast cancer incidence rates per 100,000 women. Counties with an incidence rate higher than that for the state were Cabell and Hancock. There was an uneven distribution of invasive breast cancer incidence rates among counties in WV, with counties in northern and southern part of the state having generally higher incidence rates as compared to those in the central part of the state.

Table 2. Results of logistic regression model determining factors associated with no mammography in the past two years among West Virginia females aged 40 years and older, Behavioral Risk Factor Surveillance System (2006).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Adjusted Odds Ratioa (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>40-44 Years</td>
<td>1.7 (1.1-2.6)**</td>
</tr>
<tr>
<td>45-64 Years</td>
<td>0.7 (0.5-0.9)**</td>
</tr>
<tr>
<td>≥65 Years</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>2.2 (1.3-3.6)***</td>
</tr>
<tr>
<td>Graduated high school</td>
<td>1.3 (0.8-1.9)</td>
</tr>
<tr>
<td>Attended college/technical school</td>
<td>1.4 (0.9-2.2)</td>
</tr>
<tr>
<td>College graduate</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
</tr>
<tr>
<td>≤$24,999</td>
<td>1.8 (1.2-2.8)**</td>
</tr>
<tr>
<td>$25,000-$49,999</td>
<td>1.3 (0.8-2.0)</td>
</tr>
<tr>
<td>≥$50,000</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1.2 (0.5-2.7)</td>
</tr>
<tr>
<td>Otherb</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Health insurance</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.9 (1.2-3.2)*</td>
</tr>
<tr>
<td>No</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Personal doctor</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2.9 (1.9-4.5)**</td>
</tr>
<tr>
<td>No</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Last routine checkup</strong></td>
<td></td>
</tr>
<tr>
<td>≤2 Years</td>
<td>8.5 (5.3-13.4)**</td>
</tr>
<tr>
<td>&gt;2 Years</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Unable to see doctor in the past 12 months because of cost</strong></td>
<td>1.5 (1.1-2.2)**</td>
</tr>
<tr>
<td>Yes</td>
<td>Reference</td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

*aAdjusted for all variables included in the table.
*bOther includes females who were Black, Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaskan Native, Multiracial, and those that reported “other race”.
***p<0.001; **p<0.01; *p<0.05
CI – Confidence Intervals
especially McDowell, Mingo, Wayne, and Mason had a higher burden of breast cancer-related mortality as compared to counties in the central and northern (with exception of Marion and Taylor) part of the state. Also, southern counties including Mercer, Logan, Cabell, Greenbrier, and Fayette had a high mortality rate for breast cancer in comparison to rest of the state.

Discussion

West Virginia is characterized by a geographically diverse population that is socio-economically underprivileged and is the only state whose borders are entirely within the Appalachian region. Breast cancer is the most commonly diagnosed cancer among women in the state and results in significant suffering and economic impact on its population (14). Our study was undertaken to report breast cancer screening and burden (as measured by incidence and mortality), respectively, in the state of WV. Using multiple data sources, this study describes the factors that are associated with lack of mammography screening, trends in in-situ breast cancer incidence rate, and WV county-specific distribution of invasive breast cancer incidence and mortality rate, respectively.

In terms of breast cancer screening, our results show that a higher proportion of women ≥40 years of age in WV had not had a mammogram in the past two years in comparison to the entire country. This result is consistent with previous studies that have found lower rates of mammography screening in WV in comparison to the entire country (19). In addition, the proportion of women who had not had a mammogram in the past two years seems to be bottoming out, with this proportion remaining fairly constant for much of this decade (2000-2006).
As determined in our study, socio-economic status seems to be an important factor contributing to the lack of mammography screening among women residents of the state. In our study, women without health insurance and from lower socio-economic strata (based on income) of the society were more likely to not have had a mammogram in the past two years. In their study of breast and cervical cancer screening among Appalachian women, Hall and colleagues found similar results, wherein women with health insurance were found to be more likely to be screened than those without insurance (17). Though Medicare and WV Medicaid cover mammography screening once every year for women enrollees, many WV women residents under 65 years of age with household income above Medicaid eligibility and without employer provided health insurance may not have coverage (20). In addition, women who are not continuously enrolled in the Medicaid program may not have regular access to screening services. Expanding public health insurance coverage to those underinsured or uninsured is one way of tackling this issue of access to screening.

A notable result of this study was the greater probability of not having a mammogram in the past two years among women without a personal doctor and who had not had visited a doctor in the past two years for a routine checkup as compared to women who had a personal doctor and had a routine checkup in the past two years, respectively. This result highlights the lack of screening among women without adequate primary care services and suggests the need for a patient centered medical home model of care delivery for women residents of the state. The basic premise of the medical home model is that patient care will improve if each patient has an ongoing relationship with a personal physician who leads a team of qualified healthcare professionals to provide continuous and comprehensive care to the patient. The concept of medical home model was recently discussed in the WV legislature. A medical home model will not only help improve mammography screening rates in the state, but also improve health outcomes and lower costs associated with breast cancer.

Given the lack of county level information from BRFSS, we could not establish the impact of geographic/rural location on screening. However, previous studies have documented the impact of “rurality” on screening, with women residing in rural areas being less likely to report having had a mammogram in the past two years as compared to women residing in metropolitan areas (21). With roughly 45% of the population residing in rural areas, geographical topography could be a major barrier towards perceived and actual access to mammography screening sites in WV. To alleviate the impact of socio-economic and geographic constraints on screening, the use of mobile screening units could be beneficial. The use of mobile mammography vans could significantly improve the access to mammography screening among underprivileged and rural women residents of the state. Prior studies have suggested the importance of mobile mammogram programs in improving access to breast cancer screening (17). The success of these mobile units in providing screening services to underprivileged women has also been documented (22).

Though roughly one-fourth of women in our study reported not undertaking a mammogram in the past two years, it is important to realize the significant decrease
in the proportion of these women since early 1990s. Credit goes to all the state agencies and state health care providers who have worked diligently over the years to reduce the burden of breast cancer in the state. One of the major programs that have contributed significantly to this decline in the proportion of women without screening is the West Virginia Breast and Cervical Cancer Screening Program (WVBCCSP). The WVBCCSP has played an instrumental role in providing easy access and payments for breast and cervical cancer screening and appropriate follow-up to uninsured and underinsured women residents of the state.

An important relationship was seen in our study between decrease in the proportion of women without screening and increase in the incident rate of in-situ breast cancer. Early breast cancer detection due to screening was said to be one of the factors responsible for the increasing incidence of breast cancer in the US in early 1990s (23). This relationship could be the factor behind the increasing incidence rate of in-situ breast cancer from 1993 to 1999 as reported in this study. However, it is notable that the increase in in-situ breast cancer incidence has leveled off since early 2000, a trend which closely resembles the bottoming out of the proportion of women without screening. The earlier a woman is diagnosed with breast cancer, the better the prognosis. Therefore, there is a need to further strengthen the effort of improving access to mammography screening among WV women.

The study also reports notable information related to the incidence of invasive breast cancer and breast cancer mortality across WV counties. The burden of breast cancer in terms of incidence and mortality seems to be generally higher in the southern and northern part of the state as compared to the central part. In terms of breast cancer-related mortality, southern counties especially McDowell, Mingo, Wayne, and Mason have mortality rates that exceed the national breast cancer mortality rate (24). The high poverty index (25) of these counties could be a factor associated with greater breast cancer burden in these counties. The high mortality burden of breast cancer in southern counties calls for a concerted effort on the part of state healthcare administrators and policy makers, healthcare providers, and the overall community.

There are a few limitations in this study which must be considered. To document screening in WV, we used the 2006 BRFSS. Given the cross-sectional nature of the survey, causal inference cannot be made between variables studied in this paper. In addition, BRFSS results are based on self-reporting of screening among women, which may have lead to the introduction of self-report bias. In addition, the number of women under “other” race category was less than 50, which could have resulted in biased estimates. However, except for race, all variables in our study had a cell size greater than 50.

**Conclusions**

The proportion of women ≥40 years of age in WV who have not had a mammogram in the past two years was higher than the national estimates in 2006. In addition, this proportion seems to have been unchanged for most of this decade. Certain socio-demographic and healthcare access factors were associated with the lack of mammography screening among women in the state. The burden of breast cancer in terms of incidence and mortality is higher among southern and northern counties than counties in the central part of the state. There is an immediate need to renew focus towards improving breast cancer screening in WV, especially in southern counties which have high breast cancer-related mortality rates.

**References**

12. Barnett E, Halverson JA, Elmes GA, Braham VE. Metropolitan and non-


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**CME POST-TEST**

13. **T or F** Breast cancer is the second leading cause of cancer-related mortality among women in the United States (US) after lung cancer.

14. **T or F** Based on the analysis of 2006 Behavioral Risk Factor and Surveillance System (BRFSS) data, a higher proportion of women ≥40 years of age in West Virginia (WV) reported not having a mammogram in the past two years in comparison to the entire country.

15. Which of the following represents a plausible relationship between the rates of mammography screening and in-situ breast cancer incidence presented in this article?
   a. ↓mammography screening ~ ↑in-situ breast cancer incidence
   b. ↑mammography screening ~ ↑in-situ breast cancer incidence
   c. ↑mammography screening ~ ↓in-situ breast cancer incidence
   d. ↓mammography screening ~ ↓in-situ breast cancer incidence

16. **T or F** According to the article, the incidence and mortality rates of breast cancer were generally higher in counties in the central part of WV in comparison to counties in the southern and northern part of the state.
Dave Higgins, Steve Stockton and Paul Papadopoulos have the combined experience of being counsel of record in more than half of the state and local tax cases decided by the West Virginia Supreme Court over the last 15 years. When choosing a law firm to represent you in a state or local tax case in West Virginia, let our tax team’s experience work for you.

Experience does matter.

Dave K. Higgins
Steve B. Stockton
Paul G. Papadopoulos
Use of Radiation After Breast Conserving Surgery (BCS) for DCIS and Early Invasive Breast Cancer at Charleston Area Medical Center (CAMC)

A study of compliance with National Comprehensive Cancer Network (NCCN) Guidelines

Chad T. Dean1
Steven J. Jubelirer, MD1
Brian A. Plants, MD3
Christine A. Welch, MS1

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2CAMC, David Lee Cancer Center, Charleston, WV
3Charleston Radiation Therapy Consultants, Charleston, WV

Objective

1. Determine NCCN guidelines for management of early stage invasive breast cancer in those undergoing lumpectomy.

2. Determine factors associated with use of radiation therapy.

3. Discuss limitation of this and other studies

Abstract

The National Comprehensive Cancer Network (NCCN) recommends that patients with ductal carcinoma in situ (DCIS) and stage I/II invasive breast cancer receive radiation therapy following breast conserving surgery (BCS). The purpose for our study was to determine 1) the percentage of patients with DCIS and stage I/II breast cancer respectively who received radiation therapy. Patients with invasive breast cancer who were less than 70 years of age and who received adjuvant systemic therapy were significantly more likely to receive radiation.

The data from our study indicates that the use of radiation following BCS is high at our institution. Periodic review of treatment practices at local hospitals is valuable in assessing compliance with national guidelines and in improving quality of care.

Introduction

Multiple randomized trials have reported long-term results that demonstrate equivalent tumor control outcomes with breast conserving surgery (BCS) followed by radiation therapy as with modified radical mastectomy. Fisher et al (1) reported a 20-year update of the NSABP (National Surgical Adjuvant Breast and Bowel Project) study B-06, a randomized trial comparing mastectomy, BCS without radiation, and BCS with radiation. The cumulative incidence of recurrent tumor in the ipsilateral breast was 14.3% in women who underwent BCS and breast irradiation as compared to 39.2% in women who underwent BCS without irradiation (P< 0.001). The hazard ratio for death among the women who underwent BCS followed by breast irradiation, as compared to those who underwent total mastectomy, was 0.97 (95% CI, 0.83 to 1.14, p = 0.74). Hammer et al (5) from the Cleveland Clinic reported similar recurrence rates (i.e. 10-15%) following both BCS/radiation and mastectomy.

The National Comprehensive Cancer Network (NCCN) is a nonprofit alliance of the major federally funded comprehensive cancer centers. The NCCN has produced comprehensive guidelines for the care of 97% of all cancers seen by physicians. These guidelines are updated continually by disease-specific expert panels. The NCCN breast cancer guidelines recommend that radiation be used as a component of BCS for all patients with invasive breast cancer. The guidelines allow for the use of BCS (pathologically negative margin required) plus hormone therapy (Tamoxifen or aromatase inhibitor) without breast irradiation in women age 70 or older with clinically negative lymph nodes and ER positive breast cancer. The guidelines also recommend radiation after BCS for all patients with DCIS except those with low-grade lesions and tumors less than 0.5 cm. In such patients, radiation is considered optional.

Acknowledgements: The authors would like to thank Ebenetta M. Rhinehart and Kathi J. McCormick from the CAMC tumor registry and Sharon Ross from the Charleston Radiation Therapy Consultants, for their assistance with this study.
The purpose of our study was to determine 1) the percentage of patients with DCIS and stage I/II breast cancer who received radiation therapy after BCS in concordance with the NCCN guidelines and 2) patient and clinical factors that might influence the recommendations of radiation therapy in those who are eligible.

**Methods**

The CAMC Institutional Review Board (IRB) approved this study. The patients for this retrospective study were identified through the CAMC cancer registry. Inclusion criteria included any female with either DCIS or stage I/II invasive breast cancer (American Joint Committee on Cancer, sixth edition) that chose BCS during the years 2000 to 2007. Women who underwent a mastectomy following BCS due to positive margins, had bilateral breast cancer, presented for a second opinion only, and received no primary therapy at CAMC were excluded. Patients for whom BCS was contraindicated were excluded. This includes patients who 1) had received previous moderate or high dose radiation to the breast or chest wall; 2) were pregnant and would require radiation during pregnancy, 3) had diffuse suspicious or malignant appearing microcalcifications on mammography, 4) had widespread disease that cannot be incorporated by local excision through a single incision with a satisfactory cosmetic result; and 5) have positive pathologic margins despite attempts at re-excision.

Data were collected from the tumor registry and patients’

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Total Population</th>
<th>% Who Completed Radiation Therapy</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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</tr>
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<td>50-69</td>
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<td>59.62</td>
<td>53</td>
<td>85.48</td>
</tr>
<tr>
<td>&gt;70</td>
<td>20</td>
<td>19.23</td>
<td>16</td>
<td>80.00</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>97</td>
<td>93.27</td>
<td>82</td>
<td>84.54</td>
</tr>
<tr>
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<td>7</td>
<td>6.73</td>
<td>6</td>
<td>85.71</td>
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<td>68.27</td>
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<td>88.73</td>
</tr>
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<td>24.04</td>
<td>22</td>
<td>88.00</td>
</tr>
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<td>0.96</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Unknown</td>
<td>7</td>
<td>6.73</td>
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<td>86.57</td>
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<td>35.58</td>
<td>30</td>
<td>81.08</td>
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<td><strong>Radiation Facility in County of Residence</strong></td>
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<tr>
<td>Yes</td>
<td>76</td>
<td>73.08</td>
<td>62</td>
<td>81.58</td>
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<tr>
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<td>28</td>
<td>26.92</td>
<td>26</td>
<td>92.86</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt;1cm</td>
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<td>58.67</td>
<td>39</td>
<td>88.64</td>
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<tr>
<td>&gt;1cm</td>
<td>31</td>
<td>41.33</td>
<td>30</td>
<td>96.77</td>
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<td><strong>Surgical Margins</strong></td>
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<td></td>
</tr>
<tr>
<td>Positive/close</td>
<td>4</td>
<td>3.85</td>
<td>4</td>
<td>100.00</td>
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<tr>
<td>Negative</td>
<td>100</td>
<td>96.15</td>
<td>84</td>
<td>84.00</td>
</tr>
<tr>
<td><strong>Received Hormone and/or Chemo Therapy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37</td>
<td>35.58</td>
<td>32</td>
<td>86.49</td>
</tr>
<tr>
<td>No</td>
<td>67</td>
<td>64.42</td>
<td>56</td>
<td>83.58</td>
</tr>
<tr>
<td><strong>HER2/neu</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>18</td>
<td>17.31</td>
<td>17</td>
<td>94.44</td>
</tr>
<tr>
<td>Positive</td>
<td>3</td>
<td>2.88</td>
<td>3</td>
<td>100.00</td>
</tr>
<tr>
<td>Not Done</td>
<td>18</td>
<td>17.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>65</td>
<td>62.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ER Status</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>17</td>
<td>31.48</td>
<td>17</td>
<td>100.00</td>
</tr>
<tr>
<td>Positive</td>
<td>37</td>
<td>68.52</td>
<td>32</td>
<td>86.49</td>
</tr>
</tbody>
</table>
medical records and included the following: age; race; insurance status; employment status; presence or absence of a radiation therapy facility in county of residence; tumor size; surgical margins; treatment (surgery, radiation, adjuvant therapy such as chemotherapy/hormones); estrogen receptor status; HER2/neu status; radiation completion status; and reason for no treatment. Statistical analyses were performed using SAS. Results were considered statistically significant if $p < 0.05$.

**Results**

Data analysis was performed on 606 eligible patients. Of these, 104 (17.2%) were diagnosed with DCIS and the remaining 502 (82.8%) with stage I/II invasive breast cancer. Overall 93% of the patients received radiation therapy. Among patients with invasive breast cancer, 95% received radiation; in contrast only 85% of patients with DCIS received radiation therapy ($p = 0.0003$).

Table 1 and Table 2 show demographic and clinical factors that were observed for DCIS and stage I/II patients respectively. The mean age of patients was $58.5 \pm 11.7$ and $60.2 \pm 12.3$ for DCIS and stage I/II, respectively. When partitioned into age groups, the majority of patients in the DCIS and stage I/II groups were in the 50-69 age range. The majority of all patients were Caucasian, had some form of insurance, were employed, had a radiation therapy facility in the county in which they resided, had negative margins (DCIS = 96%; stage I/II = 96%) and had estrogen receptor positive tumors (DCIS = 68.5%; stage I/II = 78.6%). The majority of

### Table 2. Clinical and patient factors affecting radiation therapy completion in stage I and II patients.

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Total Population</th>
<th>% Who Completed Radiation Therapy</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Age</td>
<td>&lt;50</td>
<td>108</td>
<td>21.51</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>50-69</td>
<td>271</td>
<td>53.98</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>≥70</td>
<td>123</td>
<td>24.50</td>
<td>109</td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>473</td>
<td>94.22</td>
<td>448</td>
</tr>
<tr>
<td></td>
<td>All Others</td>
<td>29</td>
<td>5.78</td>
<td>27</td>
</tr>
<tr>
<td>Insurance Status</td>
<td>Insurance NOS</td>
<td>305</td>
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<td>295</td>
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<td>Medicare/Medicaid</td>
<td>176</td>
<td>35.06</td>
<td>164</td>
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<td></td>
<td>Self-Pay</td>
<td>8</td>
<td>1.59</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>13</td>
<td>2.59</td>
<td></td>
</tr>
<tr>
<td>Employment Status</td>
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<td>289</td>
<td>57.57</td>
<td>276</td>
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<td></td>
<td>Unemployed or Unknown</td>
<td>213</td>
<td>42.43</td>
<td>199</td>
</tr>
<tr>
<td>Radiation Facility in County of Residence</td>
<td>Yes</td>
<td>319</td>
<td>63.55</td>
<td>298</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>183</td>
<td>36.45</td>
<td>177</td>
</tr>
<tr>
<td>Tumor Size</td>
<td>&lt;1cm</td>
<td>123</td>
<td>26.00</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>≥1cm</td>
<td>350</td>
<td>74.00</td>
<td>335</td>
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<tr>
<td>Surgical Margins</td>
<td>Positive/close</td>
<td>20</td>
<td>3.98</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>482</td>
<td>96.02</td>
<td>455</td>
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<tr>
<td>Received Hormone and/or Chemo Therapy</td>
<td>Yes</td>
<td>330</td>
<td>65.74</td>
<td>322</td>
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<td></td>
<td>No</td>
<td>172</td>
<td>34.26</td>
<td>153</td>
</tr>
<tr>
<td>HER2/neu</td>
<td>Negative</td>
<td>328</td>
<td>65.34</td>
<td>312</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>44</td>
<td>8.76</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Borderline</td>
<td>19</td>
<td>3.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Done</td>
<td>13</td>
<td>2.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>98</td>
<td>19.52</td>
<td></td>
</tr>
<tr>
<td>ER Status</td>
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<td>21.43</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>352</td>
<td>78.57</td>
<td>341</td>
</tr>
</tbody>
</table>
DCIS patients had tumors less than 1 cm (58.7%) and did not receive adjuvant hormone therapy (64.4%). Among the stage I/II patients, 74% had a tumor ≥ 1 cm, 65.3% had a negative HER2/neu status, and 65.7% received adjuvant systemic therapy.

The proportion of DCIS patients receiving radiation therapy according to patient, tumor and treatment factors is listed in Table 1. On univariate analysis, there was no significant factor associated with the use of radiation therapy.

Among patients with stage I/II disease two factors were significantly associated with use of radiation on univariate analyses (Table 2): age and compliance with adjuvant systemic therapy. Almost all patients (98.2%) under age 50 received radiation therapy; in contrast, 88.6% of patients older than 70 received radiation therapy. In addition, those patients who received adjuvant hormone and/or chemotherapy were more likely to receive radiation compared to those who did not (97.6% vs. 89.0%, p < 0.0001).

The reasons for patients not receiving radiation therapy are shown in Table 3. For patients with DCIS, the most common reasons for not receiving radiation therapy were lost to follow up and physician decision. For patients with stage I/II, the most common reasons for not receiving radiation therapy were patient refusal and patient comorbidities.

**Discussion**

Using the results of the study by Buchholz et al. (7) as a benchmark, our data indicate that compliance to the NCCN guidelines is quite high. In our study, 85% and 95% of patients with DCIS and stage I/II breast cancer received radiation following BCS, respectively. In the study of Buchholz et al. (7), 82% and 94% of DCIS and stage I/II patients received radiation, respectively. However, lower rates of post BCS radiation have been reported by others. Bland et al. (8) reported radiation for DCIS and Stage I/II disease to be as low as 45% and 72%, respectively. However, it is important to note that Bland et al. studied patients from 1985 to 1995. More recently, Baxter et al. (9) reported that only 54% of DCIS patients received radiation treatment after BCS (Table 4).

Several clinical and patient factors were predictors of radiation therapy use in our study. Patients over the age of 70 years with stage I/II breast cancer were less likely to receive radiation therapy after BCS than those younger. The NCCN treatment guidelines (6) state that radiation therapy for patients ≥ 70 years with DCIS or invasive breast cancer is not mandatory if they have negative margins, small tumor

### Table 3. Reasons noted for patients who did not receive radiation therapy stage.

<table>
<thead>
<tr>
<th>Reasons Given for Patients Not Receiving Radiation Therapy</th>
<th>DCIS</th>
<th>Stage I/II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost to follow-up (No mention of radiation therapy in chart)</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Patient Refused – (No reason specified, worried about side effects, or never showed up for appointment)</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Co-morbidities (scleroderma, Alzheimer’s, post-op stroke, developed other cancer, age &gt; 90)</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Physician reason (negative wide margins, low grade tumor, patient referred to medical oncologist for treatment)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>27</strong></td>
</tr>
</tbody>
</table>

### Table 4. A Comparison of studies of patients with DCIS and Stage I/II breast cancer who completed radiation therapy following breast conservation surgery.

<table>
<thead>
<tr>
<th>Study</th>
<th>Years</th>
<th>DCIS % who Completed XRT</th>
<th>Stage I/II breast cancer (% who completed XRT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buchholz</td>
<td>1997-2002</td>
<td>82</td>
<td>94</td>
</tr>
<tr>
<td>Bland</td>
<td>1985-1995</td>
<td>45</td>
<td>72</td>
</tr>
<tr>
<td>Baxter</td>
<td>1992</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1999</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Winchester</td>
<td>1985</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>54</td>
<td></td>
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<tr>
<td>Baxter</td>
<td>1992</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1999</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Gold</td>
<td>1991-1996</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Nattinger</td>
<td>1983-1995</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1994</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>Dean (present study)</td>
<td>2000-2007</td>
<td>85</td>
<td>95</td>
</tr>
</tbody>
</table>
size, estrogen receptor positive disease, no involved lymph nodes, and low grade tumor. We found no significance with regard to the use of radiation in this patient subset. We found that those patients who did not receive adjuvant hormones and/or chemotherapy were less likely to receive radiation therapy. This finding has been reported by others (7) and may represent a patient’s overall noncompliance with medical direction.

Limitations of this study include its retrospective design, thereby restricting us to the use of the data at hand and limiting interpretations of our findings. A second limitation is the relatively small sample size which may not be enough to identify other factors associated with radiation use. A third limitation is that some clinical information remained missing even after a review of data from the CAMC cancer registry and the patient’s medical record. Radiation therapy is an outpatient procedure and may be underreported by the cancer registry. The cancer registry is charged with documenting the occurrence and incidence of cancer and not necessarily with documenting treatment and this has been reported by others (14,15). As an example, the initial review of patient information about post-BCS radiation from the CAMC cancer registry between 2000-2007 indicated that only 45% of stage I/II breast cancer patients received radiation. After the medical records were reviewed, the percentage of patients receiving post-BCS radiation increased to 95%. The above discrepancy underscores the need for more accurate record keeping and reporting of information (especially treatment) to the cancer registry.

In conclusion, we found that the use of radiation following BCS in patients with DCIS and early invasive breast cancer is high. Periodic review of treatment practices at community hospitals, such as ours, is valuable in assessing compliance with national guidelines, such as the NCCN, and improving quality of care.

References

Please see CME Post-Test on the next page.
CME Post-Test

17. The NCCN (National Comprehensive Cancer Network) breast cancer guidelines allow for the use of BCS (breast conserving surgery) plus hormone therapy without breast irradiation only in women who...
   a. are age 70 or older
   b. have clinically negative lymph nodes
   c. are estrogen-receptor (ER) positive
   d. have all of the above

18. All of the following are contraindications to breast conserving surgery (BCS) in patients with stage I/II breast cancer except...
   a. prior moderate/high dose radiation to the breast or chest wall
   b. diffuse malignant appearing microcalcifications on mammography
   c. positive pathologic margins despite attempts at re-excision
   d. tumor size ≥ 3 centimeters

19. Among patients with stage I/II breast cancer in the present study, none of the following factors was associated with the use of radiation except.
   a. Employment status
   b. ER status
   c. Insurance status
   d. Age
   e. Presence of radiation therapy facility in the county of residence

20. In the present study, factors significantly associated with the use of radiation therapy after BCS in those with DCIS include.
   a. Age
   b. Tumor size (< 1 cm vs. ≥ 1 cm)
   c. Insurance status
   d. Estrogen receptor status
   e. None of the above
A Physician Perspective: Belonging to That "Special Club"

By Paula F. Taylor, RPh, MD

A special friend who is also my colleague sent me a card recently and added the handwritten remark that “now you belong to a very special club; one that you never wanted to belong to…”

It began with a small tender lump in my left breast last fall. But I was taught in medical school that breast cancer never hurts or has painful lesions, so I thought I was being an over-reactive physician. Just to be sure, I made an appointment with my OB/GYN. When I pointed to the area and reported that I had noticed this tender lump, I was examined and told, “This is fibrocystic disease, don’t worry about it”. Not, “I’m pretty sure this is fibrocystic disease, but why don’t we get a mammogram just to be sure.” (I later supposed by this response that this was yet another physician who was taught that breast cancer doesn’t hurt…) I subsequently delayed getting my mammogram – who wouldn’t, given how uncomfortable they can be – and I had gotten it checked by my physician, right?

The mammogram. A few months had passed and my “fibrocystic lump” was ever present and now ached. I had an opening in my usually full schedule on a Friday and decided to have my cholesterol checked, (yes, I was also overdue on that one) and then got my mammogram. The weekend passed and while driving to work on Monday, I received a phone call from the nurse at the imaging center giving me the radiologist’s report that went something like, “…a spiculated mass consistent with malignancy” followed by advice that I meet with a surgeon that afternoon to arrange a biopsy. Gosh, should we really be telling patients their unfortunate findings while they are driving to work? Isn’t it bad enough that everyone is already on their cell phones while driving? After explaining that I had to be at work that afternoon, I arranged for the biopsy to be the next day. I then tearfully called my husband followed by my closest friend who is always there.

The biopsy. I had met my surgeon as a resident but did not know him well. He reviewed the mammogram with me and assured me that this was cancer, no doubt. We then proceeded with the biopsy and I was instructed to call the office on Thursday for path results.

The results. I have a friend who is also a pathologist and so I requested my initial report the day after my biopsy. Three days is a very long time when you are hoping that the surgeon misread that certainty of a malignancy…I guess that was the first time I crossed the barrier from being just the patient to being a physician wanting special treatment, although I didn’t really look at it that way; I just wanted my results. If some other person knew, shouldn’t I be next? It was obvious later that not everyone felt the same way I did.

The surgery. After choosing an exceptional surgeon based on several “who would you choose if it were your wife?” polls, I had to decide what procedure: lumpectomy, unilateral mastectomy or bilateral mastectomy and what day next week to get it done. My surgeon agreed to delay by a week so I could work my scheduled ER shifts and all was set. I tried not to lose it when I noticed that I had been mistakenly given someone else’s orders during the preadmission testing circus. I could get over that part, mistakes happen, right? Just for that extra feeling of security my daughter helped me mark my surgical site with a bright pink marker that night. Large pink letters that read “this one” on the left breast and “NOT” on the right with an added message just for fun of, “Take all of this if you have time “, written over my abundant abdomen. Fortunately, I had a relatively uneventful left mastectomy and except for the drains under my left arm that felt like two lobsters attached and hanging there, my follow up care went well.

Chemotherapy. In a word: horrible. I was one of those unfortunate few who had extensive side effects from the periodic infusions, so bad that the regimen had to be changed almost completely before my third cycle. After the first round of chemo I told my oncologist there had been a mistake. As he looked at me in horror I told him that I was supposed to get that regimen that makes you feel bad for a couple of days then you go back to work. (I had been very ill for over a week.) I also suggested that he and all of his fellow oncologists should be required to have one injection of Neulasta before they prescribe it and tell patients they will have “flu-like” symptoms. My experiences with the flu have never involved such excruciating bone pain. Fortunately, he kept me on as his patient and devotedly tried to help me find relief from ongoing and new symptoms, proving to me my earlier impression of oncologists in general as being the salt of the earth. This experience also confirmed my impression gained during my training that when patients with advanced cancer are given options for chemotherapy, the likely difference in quality of the potential extension of their time should be included. The end of the list of options should include the one of simply doing nothing. In my experience as a hospice physician I have heard enumerable times, “I wish I had known it would make me/him/her feel so bad before things got worse.”

Radiation therapy. The extranodal extension of my metastatic node qualified me for radiation therapy.

Objectives
1) To review actual patient experience with breast cancer. 2) To review modalities of the treatment regimen. 3) To discuss options that may improve perceived patient care.
The final decision to proceed with treatments wasn’t difficult. If I have a recurrence in the coming years I would rather say to my family, “I did everything they offered” rather than, “Gee, I should have taken the radiation therapy…” I was fortunate to have care from a bright and caring radiation oncologist who I trained with years ago. As my oncologist had done months earlier, this doctor also gave me more information than I could have asked for with supporting evidence for his choice of therapy. I was initially distressed by my treatment schedule offering only 715 am or 530 pm treatment appointments, but soon realized they were very flexible with my work schedule as well as offering other openings as they came available. I have gotten the impression that the technicians who provide my treatments are happy with their work; they are consistently pleasant and cheerful regardless of the time of day I see them. I have not yet encountered the predicted skin breakdown and I am unsure if I will recognize the predicted fatigue as I still have fatigue from my last chemotherapy round.

An important lesson: Be nice to your medical student, he may turn out to be your radiation oncologist!

**Physician and patient.** The burning question in all of this is what is the real difference for me in having breast cancer from a physician’s perspective? Have I been treated differently? In all honesty, I am unsure of some potential differences because I haven’t had breast cancer as a nonphysician. I have found it interesting that most of the healthcare workers (i.e. nurses, office staff) I have been involved with have seldom referred to me as “Doctor” even though they know I am one. They casually call me by my first name or refer to me as ‘Miss’. In my many interactions on only rare occasions has someone respectfully asked me my preference in how I should like to be addressed. During a four day period of hospitalization one nurse introduced herself to me and said, “I see that you are a physician. Would you like for me to address you as Dr. Taylor or as Paula?”

As the patient, I have also realized how important the extra things matter. Things like stopping by later in the day to see how your hospitalized patient is coming along; it isn’t a billable visit, but its worth is beyond measure. Also, making the occasional weekend or after-hours call to just check on a patient. I know that the calls to me were not the exception because I am a physician or colleague, because I have had reports from other patients who appreciate this extra care from the same oncologist. What a great way to practice! Never let a patient feel abandoned or forgotten.

I think the most difficult relationships in medicine are those that are formed when a physician is caring for a patient who is also a physician. I have been in this position myself, and we struggle with how different or same we treat our colleagues and how we both share information and offer advice and care planning. On many occasions I have asked my physician to be more paternalistic or to tell me what he would choose for his daughter or wife relative to my case. As the patient I want both; I don’t want to be treated any differently than anyone else and do want special treatment because part of being a physician is the oath to care for each other within our profession. Ideally, I think all patients should be given special treatment regardless of their background.

One thing that has become very obvious to me as a patient and physician is that those gestures including notes or cards sent to wish someone well really make a difference. A physician colleague called me when she found out about me and offered her support including placing my name on her prayer list at church. It is often easier to think my note won’t matter in the greater scheme of things but I have received many uplifting cards on very dark days during my treatment and they have meant so much.

I don’t know how my story will end, but I can’t help but feel that it has already been a good one. I have been lucky to have lived a happy full life, raised by a loving family, finding my soul mate, that one true love many of us never find, and having three wonderful enriching children who have been my greatest joy in living. As if that weren’t enough, I have also been honored to be a physician and have the trust and respect of my colleagues as well as my patients. I have been given the privilege of sharing my patients’ deepest concerns, secrets and fears, and I appreciate even more the weight that this carries. My cancer diagnosis does not define me or who I am; it is a storm I was destined to be in and I am weathering it with the unfailing support of my faith, my family and my friends and co-workers. I now belong to that special club and through the support and education I have been offered I hope to be a worthy member.

**CME Post-Test**

21. **T or F** Breast cancer is never painful.

22. **T or F** Mammogram is an acceptable modality used for screening for breast cancer.

23. **T or F** Many patients appreciate extra attention, including followup calls or extra visits.
Breast Cancer in South-Central West Virginia

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Introduction

It is estimated that 185,000 new cases of female breast cancer will be diagnosed this year in the US, with approximately 2,000 additional cases appearing in males. Breast cancer is the leading type of female cancer and the second cause of cancer-related deaths in women. The burden of this disease requires constant efforts to improve its outcomes, and the information derived from cancer registries provides valuable evidence to measure the quality of cancer care and often highlights opportunities for progress. Advances in diagnostic and therapeutic modalities are eventually reflected in the data carefully recorded over time. Charleston Area Medical Center (CAMC), a 900-bed tertiary care facility with a broad range of services, has a dynamic and engaged cancer registry, and its recorded data projects a reasonable cross-sectional image of the status and outcomes of specific cancer types. At CAMC, breast cancer is diagnosed and treated approximately 240 times a year. From 1998 to 2007, 2401 cases were recorded in the institution’s registry and were available for analysis. This review of ten years of available information creates a credible blueprint of the position of this disease in South-Central West Virginia.

Incidence

The rate of breast cancer diagnosis in the US has increased since the early 1990s, but fortunately the overall breast cancer death rate has decreased steadily. While rates of certain types of cancer can vary widely among states, the fluctuation of female breast cancer incidence is fairly narrow. However, a variation in incidence rates has been seen in the past decade that is open to interpretation. For instance, there has been a decline in the incidence of breast cancer between 1999 and 2003, associated with a corresponding decrease in the incidence of invasive cancer during the same period, the largest being observed in 2002-2003 (1). This kind of information must be interpreted with caution, particularly when attempts are made to compare, for example, rates between states or counties. This is due to a multiplicity of factors playing a role in the observed events and contributing to differences among groups over time, such as rates of breast cancer detection, populations represented in the data, reporting delays, variations in health care and behaviors, and others. For instance, the number of WV women over 50 years old reporting no mammogram has not decreased but remained stable at 22-23% between the years 2000-2006, while nationwide the trend appears similarly stable at 20%. (2)

As of 2005, West Virginia ranked 48th in the country for invasive breast cancer incidence, at 114.4/100,000 persons, while the US rate was 117.7/100,000 (3). For WV, this translates into approximately 1150 new cases of breast cancer a year. From 2001 to 2004, centrally located Kanawha County, which reports the largest number of yearly new cases in the state, exhibited an annual invasive breast cancer incidence of 122.6-128.4 per 100,000 (4).

Age distribution

The age distribution of 2401 cases is shown in Fig. 1, and Table 1 shows the remarkable similarity in age allocation with the rest of the country. The highest prevalence was seen among women in the 50-69 age groups (50% of all recorded cases). In the US, the median age of breast cancer diagnosis was 61 years during the 2001-2005 period (5). A small number of patients under 30 years of age were diagnosed.
intermittently during five of the ten years covered in this analysis.

**Stage**

The stage distribution is depicted in Fig. 2. Of the total cases, 1956 had pathological information, whereas 445 (18.5%) were unstaged. The stage distribution comparisons can be seen in Table 2. When the first and second five-year periods are examined separately, the number of unstaged patients, although still high, decreases to 14.9% in the most recent years. More notable was a statistically significant change in the percentages of Stages 0, I and IV seen in both periods, with a p value = 0.001 for Stage 0 and IV, and 0.043 for Stage I (Fig. 3). Although this trend toward an increase in earlier detection is real, Stage 0 cases in the population reported here are not approaching the dramatic increase in incidence seen in the US over the last fifteen years, where it now stands at 20% of incident breast cancers (6). However, the statistics cited in this narrative are skewed by the relatively large number of cases without pathological staging.

**Histology**

The most common histologic types reported during the 10-year period are shown in Fig. 4. As expected, invasive ductal carcinoma was the most frequent histologic diagnosis (61%), followed by ductal carcinoma in situ (DCIS). The incidence of DCIS increased from 7.4% in the first five years to 11.9% in the second five-year period, and this change was highly statistically significant, with a p value < 0.0001. This trend coincides with the observed increase in incidence of Stage 0 cases. Other types appearing infrequently during the 10-year period included inflammatory cancer (7 cases), cystosarcoma phylloides (9 cases), sarcoma (4 cases), metaplastic (4 cases), and Paget’s disease of the breast (3 cases). Lymphoma was reported in 6 cases during the period of interest, but no information is available to determine whether they were primary or secondary.

**Hormone receptors**

Estrogen (ER) and progesterone receptor (PR) positive and negative status was recorded in 1646 cases. Of these, 27.2% were reported as ER

---

**Table 1. Age distribution**

<table>
<thead>
<tr>
<th>Age</th>
<th>CAMC (%)</th>
<th>US* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 29</td>
<td>0.25</td>
<td>0.39</td>
</tr>
<tr>
<td>30-39</td>
<td>4.0</td>
<td>4.4</td>
</tr>
<tr>
<td>40-49</td>
<td>19.0</td>
<td>18.4</td>
</tr>
<tr>
<td>50-59</td>
<td>27.0</td>
<td>25.3</td>
</tr>
<tr>
<td>60-69</td>
<td>23.0</td>
<td>22.1</td>
</tr>
<tr>
<td>70-79</td>
<td>18.0</td>
<td>18.6</td>
</tr>
<tr>
<td>80-89</td>
<td>7.0</td>
<td>9.7</td>
</tr>
<tr>
<td>90+</td>
<td>0.76</td>
<td>0.9</td>
</tr>
</tbody>
</table>

* NCDB, Commission on Cancer, ACoS. Benchmark Reports, v.9.0 (yrs 2000-06, all states, N = 1,218,232)

**Table 2. Stage distribution**

<table>
<thead>
<tr>
<th>Stage</th>
<th>CAMC~ (%)</th>
<th>WV* (%)</th>
<th>US* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10.1</td>
<td>17.7</td>
<td>18.4</td>
</tr>
<tr>
<td>I</td>
<td>34.8</td>
<td>38.7</td>
<td>37.9</td>
</tr>
<tr>
<td>II</td>
<td>26.6</td>
<td>27.6</td>
<td>27.3</td>
</tr>
<tr>
<td>III</td>
<td>7.0</td>
<td>8.4</td>
<td>8.0</td>
</tr>
<tr>
<td>IV</td>
<td>2.8</td>
<td>4.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Unknown</td>
<td>18.5</td>
<td>3.0</td>
<td>4.8</td>
</tr>
</tbody>
</table>

* NCDB, Commission on Cancer, ACoS. Benchmark Reports, v.9.0 (yrs 2000-06, all states, N = 1,218,232)
~ CAMC registry, yrs 1998-07, N = 2401.
and PR negative. This percentage of negative receptor expression coincides with the general profile of breast cancers: about 65% are ER/PR positive, 25% are ER/PR negative, 10% are ER positive and PR negative, and 5% are ER negative and PR positive (7), with slight variations reported in the literature (8). The percentage of hormone-receptor negative tumors is significant, because the possibility of administering endocrine therapy to those patients is decreased, and triple-negative tumors (those which do not express human epidermal growth factor receptor type 2 or HER2, in addition to lacking estrogen and progesterone receptors) are a challenging problem given that treatment is restricted by the absence of a clear target (9).

### Treatment

Approximately 98% of 2401 cases were available to review treatment information and its delivery by age group, as shown in Tables 3 and 4. Hormonal and radiation therapy were utilized more often than chemotherapy overall: in fact, chemotherapy was not recommended 62% of the time (Table 3). However, chemotherapy was the most common treatment modality used for the 40-59 age group (Table 4), suggesting perhaps a more aggressive approach for younger patients.

Although menopausal status could not be ascertained, it is of interest to note that 52.5% of 1073 patients who received hormonal therapy were in the 30-59 age group (Fig. 5), even though the percentage of patients with ER/PR positive grouping was, as expected, higher in the older population (Fig. 6). A small percentage of patients did not receive the intended therapy or refused it (Table 3).

Surgical treatment was recorded in 1748 patients, or 72.8% of the 2401 cases registered. Table 5 illustrates the distribution of breast conserving therapy (BCT) by age group for the entire 10-year period. These results project the image of a reasonable 53% overall rate of breast conservation procedures, and suggests that the patients in the 70-90 age group

---

**Table 3. Treatment modalities**

<table>
<thead>
<tr>
<th></th>
<th>Hormonal (%/cases)</th>
<th>ChemoRx (%/cases)</th>
<th>RadioRx (%/cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received</td>
<td>45.6/1073</td>
<td>33.4/791</td>
<td>44.3/1048</td>
</tr>
<tr>
<td>Not recommended</td>
<td>54.3/1260</td>
<td>61.9/1466</td>
<td>53.1/1255</td>
</tr>
<tr>
<td>Refused</td>
<td>0.6/17</td>
<td>2.9/69</td>
<td>0.9/22</td>
</tr>
<tr>
<td>Not given</td>
<td>--------</td>
<td>1.6/40</td>
<td>1.6/38</td>
</tr>
<tr>
<td>Total*</td>
<td>97.8/2350</td>
<td>98.5/2366</td>
<td>98.4/2363</td>
</tr>
</tbody>
</table>


**Table 4. Treatment modalities received by age-group**

<table>
<thead>
<tr>
<th>Age</th>
<th>Hormonal (%/cases)</th>
<th>ChemoRx (%/cases)</th>
<th>RadioRx (%/cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30</td>
<td>0.18/2</td>
<td>0.3/3</td>
<td>0.3/4</td>
</tr>
<tr>
<td>30-39</td>
<td>3.6/39</td>
<td>7.5/60</td>
<td>4.6/49</td>
</tr>
<tr>
<td>40-49</td>
<td>18.8/202</td>
<td>29.9/237</td>
<td>21.7/228</td>
</tr>
<tr>
<td>50-59</td>
<td>30.1/324</td>
<td>36.1/286</td>
<td>28.2/296</td>
</tr>
<tr>
<td>60-69</td>
<td>22.2/239</td>
<td>18.8/149</td>
<td>22.9/241</td>
</tr>
<tr>
<td>70-79</td>
<td>18.7/201</td>
<td>6.3/50</td>
<td>16.6/174</td>
</tr>
<tr>
<td>80-89</td>
<td>5.8/63</td>
<td>0.7/6</td>
<td>5.2/55</td>
</tr>
<tr>
<td>90+</td>
<td>0.2/3</td>
<td>0/0</td>
<td>0.09/1</td>
</tr>
<tr>
<td>Total</td>
<td>1073/2350</td>
<td>791/2366</td>
<td>1048/2363</td>
</tr>
</tbody>
</table>

*Percentages of the cases receiving the therapy of interest.


<table>
<thead>
<tr>
<th>Age</th>
<th>BCT (cases/%)</th>
<th>Mastectomy (cases/%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30</td>
<td>6/0.3</td>
<td>1/0.05</td>
</tr>
<tr>
<td>30-39</td>
<td>36/2.0</td>
<td>37/2.1</td>
</tr>
<tr>
<td>40-49</td>
<td>177/10.1</td>
<td>158/9.0</td>
</tr>
<tr>
<td>50-59</td>
<td>268/15.3</td>
<td>195/11.1</td>
</tr>
<tr>
<td>60-69</td>
<td>225/12.8</td>
<td>183/10.4</td>
</tr>
<tr>
<td>70-79</td>
<td>146/8.3</td>
<td>166/9.4</td>
</tr>
<tr>
<td>80-89</td>
<td>59/3.3</td>
<td>74/4.2</td>
</tr>
<tr>
<td>90+</td>
<td>11/0.6</td>
<td>6/0.3</td>
</tr>
<tr>
<td>Total</td>
<td>928/53.0</td>
<td>820/47.0</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Age</th>
<th>BCT (Cases/%)</th>
<th>Mastectomy (Cases/%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30</td>
<td>4/0.5</td>
<td>0</td>
</tr>
<tr>
<td>30-39</td>
<td>21/2.6</td>
<td>18/2.3</td>
</tr>
<tr>
<td>40-49</td>
<td>67/8.5</td>
<td>86/11.1</td>
</tr>
<tr>
<td>50-59</td>
<td>107/13.7</td>
<td>101/12.9</td>
</tr>
<tr>
<td>60-69</td>
<td>90/11.5</td>
<td>83/10.6</td>
</tr>
<tr>
<td>70-79</td>
<td>57/7.2</td>
<td>88/11.2</td>
</tr>
<tr>
<td>80-89</td>
<td>19/2.4</td>
<td>34/4.3</td>
</tr>
<tr>
<td>90+</td>
<td>3/0.3</td>
<td>3/0.3</td>
</tr>
<tr>
<td>Total</td>
<td>368/47.1</td>
<td>413/52.8</td>
</tr>
</tbody>
</table>
still undergo a larger number of mastectomies as opposed to breast conservation, in contrast with patients in the remaining age-groups. In fact, when the first five years are compared with the second five-year period, a different conclusion emerges: the overall rate of breast conserving surgery is lower (47.1%) than the rate of mastectomies (52.8%), mostly on account of the 70-89 group and the 40-49 year-old patients as well (Table 6). These rates are practically reversed when the same analysis is performed in the second five-year period, demonstrating a 58% rate of breast conservation and a 42% rate of mastectomies for the entire cohort. (Table 7).

The 40-49 year-old group of patients had a 43.7% rate of BCT during the first five-year period (153 total cases in that age group) and this incidence climbed to 60.4% during the second five years of this analysis (182 cases). The current overall rate of 58% for breast conserving therapies compares well with the national rates: as of 2006, BCT was performed in 57% of 56,000 patients treated at 250 hospitals across the country, as reported by the National Cancer Data Base from the American College of Surgeons. This is almost double the 33-37% rate of BCT for the years 1994-1995, as reported for this region of WV by Jubelirer et al. (10).

Survival

Survival and mortality rates should be viewed with circumspection because a variety of factors affect their precise interpretation, just as is the case with incidence rates. Furthermore, survival information does not include
the experience of women receiving current therapies or exposure to recent therapeutic advances.

Mortality rates for female breast cancer have been declining consistently, but the trend in rates varies over time. From 1990 to 2005, the average annual percent decline has been approximately 2.2% (11). During 2005, the US mortality rate for female breast cancer was 25.0 per 100,000 per year, compared with WV 25.1/100,000 annual death rate. The same year Kanawha County reported a mortality rate of 23.4/100,000, with a trend in mortality interpreted as stable and similar to the US rate, while the trend for the state was falling and analogous to the US (12). The five-year survival rate for 1092 cases recorded at CAMC (all-cause mortality) is shown in Fig. 7, with a somewhat unanticipated 70.6% 5-year survival rate for patients with stage III breast cancer, although this was in synchrony with the rate reported for the institution by the National Cancer Database of the American College of Surgeons for stage III cases diagnosed during 1998-2001. These survival rates improved when the analysis focused on breast cancer specific mortality of the same 1092 cases, as seen in Fig. 8. Finally, the survival rates for breast cancer-specific and all-cause mortality for unstaged cases is shown in Fig. 9.

Discussion

The findings in this report confirm an increase in the incidence of stage 0 and I cases and a decrease in the numbers of patients with stage IV over the period of interest. These outcomes suggest that programs of prevention and early detection perhaps play a role in the presentation of patients with breast cancer in this area of the state. Interestingly, the decrease in incidence of breast cancer seen during 2002-2003 was not exclusively attributed to a decrease in the use of hormonal replacement therapy (13), but it was also credited to a decrease in mammography screening rates (14). Therefore, the information derived from cancer registries should be used to promote the proven mechanisms of prevention and early detection, particularly in light of reports underscoring the elevated mortality currently seen in younger women (15) and the rising incidence of breast cancer among female cancer survivors (16). Mammographic screening is not only effective in detecting breast cancer early, but it does reduce the
mortality of the disease. Magnetic resonance imaging is finding its place within the detection armamentarium, and the indications for its use are maturing rapidly. Thirty-five years ago approximately 75% of women diagnosed with breast cancer survived their disease 5 years, whereas today nearly 90% of them do. Treatment modalities continue to evolve, and the processes of care are also changing: breast centers are now providing comprehensive and multidisciplinary care for patients with breast disease, and careful recording of accurate data will continue to assist and motivate health care providers to improve the quality of care given to patients with breast disease.

References
Smoking and Breast Cancer Screening in West Virginia: Opportunities for Intervention

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Abstract
Smoking has been increasingly identified as a risk factor for breast cancer among women. West Virginia has high rates of smoking, which can be further examined in relation to breast cancer screening and smoking related variables. This study used 2006 Behavioral Risk Factor Surveillance System (BRFSS) data to examine the relationship between smoking related variables and breast cancer screening behaviors among women in West Virginia age 40 and older. Findings showed that approximately 21.6% of women in the sample were current smokers, with a majority of these women smoking every day (82.5%). Half of the women in the study sample had made at least one past year quit attempt. Current smokers were less likely to have had breast cancer screening in the past one or two years, and among these women who smoke, every day smokers were less likely to obtain breast cancer screening. Smokers who did not make a quit attempt during the past year were also significantly less likely to have had mammography screening. Study results highlight an unmet need and opportunity for intervention related to breast cancer screening among women who smoke, and especially those with higher smoking intensity. Smoking status and smoking intensity should be recognized as predictors of women who are less likely to obtain breast cancer screening. These women can be identified and targeted as an important high risk population with unmet need for smoking cessation and breast cancer screening interventions.

Introduction
Smoking has been identified as a behavioral risk factor associated with increased risk of breast cancer among women (1-6). While earlier studies were somewhat mixed on an association between smoking and breast cancer, recent research has suggested an increased risk using observational data and meta-analyses, including data from large prospective study designs. The California Teachers Study cohort was a large prospective study with baseline and 5-year follow-up data, which reported that current smoking was associated with increased breast cancer risk relative to non-smokers in women without family history of disease, but not among women with family breast cancer history (7-8).

Both active and passive smoking have been shown to increase breast cancer risk among women, with an increased risk among women who had ever smoked and were exposed to passive smoke (1-3). Some studies have found this risk to be especially increased during premenopausal years (2,6). In a pooled analysis of studies with thorough passive smoking exposure assessment, Johnson (2005) reported passive and active smoking to be implicated as risk factors for premenopausal breast cancer (6). Observational studies have reported moderate or strong associations between smoking and breast cancer risk and meta-analyses have reported a moderately increased summary risk in women associated with current smoking vs. never smoking. Experimental studies have also supported biological plausibility of a positive

Objectives
Smoking has been increasingly identified as a risk factor for breast cancer among women. West Virginia has high smoking rates, which can be further examined in relation to breast cancer screening and smoking related variables. This study used 2006 Behavioral Risk Factor Surveillance System (BRFSS) data to examine the relationship between smoking related variables and breast cancer screening behaviors among women in West Virginia age 40 and older. Findings showed that current smokers were less likely to have had breast cancer screening in the past one or two years, and among these women who smoke, every day smokers were less likely to obtain breast cancer screening. Smokers who did not make a quit attempt during the past year were also significantly less likely to have had mammography screening. Study results highlight an unmet need and opportunity for intervention related to breast cancer screening among women who smoke, and especially those with higher smoking intensity. Smoking status and smoking intensity should be recognized as predictors of women who are less likely to obtain breast cancer screening. These women can be identified and targeted as an important high risk population with unmet need for smoking cessation and breast cancer screening interventions.
association of increased risk between smoking and breast cancer (4-5).

Smoking rates in West Virginia are the highest in the nation, with the state ranking first in adults who are current smokers (26.5%) from 2008 BRFSS data (9). National Survey on Drug Use and Health (NSDUH) data from 2004-2005 report past month smoking rates of 31.8% among West Virginia adults aged 26 and older, and West Virginia Adult Tobacco Survey data from 2005 report approximately one-fifth of adults in West Virginia are current smokers (10-11). Average aggregate county-specific smoking rates among adults in West Virginia (2001-2005) depicted by Figure 1 range from 21.0% to 40.9%, with 17 counties having smoking prevalence rates at or above 30.0% (12).

Smoking rates among adult females in West Virginia were also higher than the national average at 23.0%, and the average adult female smoker in West Virginia consumed 19 cigarettes per day (11). Smoking rates in 2005 were highest among young adult women in West Virginia and prevalence decreased with age; however, women 35-44 years had a smoking prevalence of 26.6%, women 45-54 years had a prevalence of 21.5%, and women 55 to 64 years had a prevalence of 19.9% (11).

As the second most commonly diagnosed cancer among women in the US, breast cancer is often successfully identified in early stages through screening intervention (13). Mammography screening is considered to be the gold standard for identification of early stage breast cancer, and the American Cancer Society recommends that all women ≥ 40 years of age with an average risk of breast cancer receive annual mammography.

**Table 1: Weighted Descriptive Statistics for Smoking Behavior among Women age 40 and older in West Virginia, BRFSS 2006**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Frequency</th>
<th>Weighted Frequency</th>
<th>Percent (%)</th>
<th>S.E. of Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking Status:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Smoker</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>384</td>
<td>105671</td>
<td>21.6</td>
<td>1.1</td>
</tr>
<tr>
<td>No</td>
<td>1389</td>
<td>383032</td>
<td>78.4</td>
<td>1.1</td>
</tr>
<tr>
<td>Smoking Intensity:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Smoker - now smokes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>every day</td>
<td>314</td>
<td>87144</td>
<td>82.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Current Smoker - now smokes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>some days</td>
<td>70</td>
<td>18526</td>
<td>17.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Past Year Quit Attempt:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopped smoking in past 12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>188</td>
<td>52420</td>
<td>49.9</td>
<td>2.9</td>
</tr>
<tr>
<td>No</td>
<td>194</td>
<td>52731</td>
<td>50.2</td>
<td>2.9</td>
</tr>
</tbody>
</table>
screening (13-15). Clinical breast exam by a health expert is also recommended annually for women age 40 and older as an important tool for breast cancer screening and early detection (15). Self-reported annual mammography screening rates among women in West Virginia were slightly lower than the national average at 58.1% (16).

Given high rates of smoking among women in West Virginia, recent research relating smoking to increased breast cancer risk, and the importance of mammography screening to early breast cancer detection, there is a need to further examine breast cancer screening and smoking status in West Virginia.

The purpose of this study is to:
1) examine smoking status and variables related to smoking among women in West Virginia age 40 and older using 2006 Behavioral Risk Factor Surveillance System (BRFSS) data; 2) determine if breast cancer screening behaviors (mammogram, clinical breast exam) differ by smoking related variables (smoking status, smoking intensity, and past year quit attempt) among women age 40 and older in West Virginia; and 3) examine if smoking related variables are predictors of breast cancer screening behaviors among West Virginia women age 40 and older.

**Methods**

Data for breast cancer screening behaviors and smoking related variables were obtained from the 2006 West Virginia Behavioral Risk Factor Surveillance System (BRFSS) Survey (17). The BRFSS is a cross-sectional telephone survey of non-institutionalized adults aged 18 years or older, and is conducted by the Centers for Disease Control and Prevention and state health departments. The BRFSS questionnaire concerns personal behaviors that increase risk for 1 or more of the 10 leading causes of death in the United States (17). BRFSS uses a multistage cluster design based on random digit dialing methods to select a representative sample from each state’s non-institutionalized residents and data collected from each state are pooled to produce nationally representative estimates (19-20). Additional details about the BRFSS, its design, and sampling procedures have been published elsewhere (19-20).

For these study purposes, 2006 BRFSS data from females ≥ 40 years of age in the state of WV were included for analyses and constituted the sample of interest. The primary outcome variables were breast cancer screening behaviors of whether women had a mammogram or a clinical breast exam in the past one/two years. Smoking related variables were smoking status (current smoker yes/no); smoking intensity (every day smokers; some day smokers); and past year quit attempt (stopped smoking in the past 12 months yes/no). Smoking related variables were included as independent predictor variables in logistic regression models. Demographic variables controlled for in analyses included age, education, income, race and health insurance status.

Data were weighted and analyzed using SAS version 9.2® to account for the complex sampling design (21). Weighted descriptive statistics and Wald’s Chi-Square test statistics were generated using PROC SURVEYFREQ to analyze the data and test for significant differences in breast cancer screening behaviors by smoking related variables. Logistic regression analyses were also conducted to examine the relationship of smoking related variables as predictors of breast cancer screening behavior among women in the study sample. The odds ratio of having a mammogram/
Results

Results for West Virginia women age 40 and older are presented from analyses using BRFSS data. Table 1 presents weighted descriptive statistics for smoking behavior variables, which are representative of the state population, and shows that 21.6% of women age 40+ in the sample are current smokers. Among these current smokers, 82.5% smoke every day and 17.5% smoke some days. Approximately half of the women in the study sample had made one quit attempt in the past year (49.9%).

Table 2 shows breast cancer screening behaviors among West Virginia women by smoking behavior variables. Smokers were less likely to be screened by mammogram or clinical breast exam in the past year or two years, and these differences were statistically significant by current smoking status. Only 47.0% of current smokers had a mammogram in the past year, while close to two-thirds of non-smokers reported having one (66.1%). Fewer smokers also reported having a clinical breast exam in the past year (54.6%) than non-smokers (66.9%). Screening behaviors differed significantly by smoking intensity. Every day smokers were significantly less likely than some day smokers to have had a mammogram in the past year or the past two years, and every day smokers were also significantly less likely to have had a clinical breast exam in the past two years than some day smokers. Past year quit attempt was not significantly associated with mammogram or clinical breast exam screening behaviors; however, the percent of women participating in screening was higher among those who reported a quit attempt during the past year.

Logistic regression analyses were conducted to examine the relationship between smoking behaviors and breast cancer screening behaviors as predictors. Table 3 shows statistically significant findings (p<0.01) that the odds of receiving a mammogram in the past year or two years were 40% lower among current smokers. Smokers who did not make a quit attempt during the past year were also significantly less likely to have had mammography screening in the past one or two years.

Discussion

Our findings highlight an unmet need and opportunity for intervention related to breast cancer screening among women who...
smoke, and especially those with higher smoking intensity. Smoking rates are high among West Virginia women, who would benefit from education and smoking cessation intervention. With an average smoking rate of 21.6% in our 2006 BRFSS sample of women at least 40 years of age, there is a need and an opportunity to bring cessation interventions to this population.

Prior studies have suggested an increased breast cancer risk among women who smoke; therefore, our study findings are especially relevant as they indicate that this high risk group is less likely to participate in annual and biannual breast cancer screening. It would be desirable for behavioral smoking cessation programs to include information on breast cancer screening locations and services to encourage this population to participate in annual mammograms and clinical breast exams.

Accessible breast cancer screening services provided across the state also include smoking cessation materials and contact information for the West Virginia quitline. Throughout its operation, the West Virginia quitline has sent tobacco cessation materials to thousands of women callers, and through Fiscal Year 2008 has averaged 1,150 women annually who enrolled for its services (22). Piloting a fax-to-quit program among women being screened for breast cancer could be another way to encourage quitting and self-referral to the quitline among women who smoke. Referrals could be faxed into the quitline, which would then proactively provide follow-up counseling to women who want to quit. There is a strong evidence base for providing education and reminder systems that facilitate integration of tobacco cessation services into clinical services, further engaging health providers in the quitting process (23).

A recent panel report by Canadian experts asserted that evidence from new studies strongly suggests smoking increases breast cancer risk and warned that girls and young women face special risks from exposure to tobacco smoke, particularly in stages of development (24). Statewide education and awareness needs to be further studied and addressed in terms of improving both smoking cessation and breast cancer screening intervention opportunities among women in West Virginia. This study was unique in examining the relationship between smoking behavior, as an identified risk factor for breast cancer, and breast cancer screening behaviors.

Findings suggest that smoking status and smoking intensity should be recognized as predictors of women who are less likely to be screened for breast cancer. These women should be targeted as an important high risk population subgroup with unmet need for both smoking cessation and breast cancer screening interventions.

References
18. Remington PL, Smith MY, Williamson DF, Anda RF, Gentry EM, Hogelin CG. Design, characteristics, and usefulness of state-based behavioral risk factor surveillance:
2.   T or F Smoking has been identified as a risk factor for breast cancer among women.

2.   T or F Current smokers were more likely to have had breast cancer screening in the past one or two years.

3.   T or F Smoking status and smoking intensity should be recognized as predictors of women who are less likely to obtain breast cancer screening.

31. T or F Study results suggest an unmet need and opportunity for intervention related to breast cancer screening among women who smoke.

Abstract

In 2007, the American Cancer Society ranked West Virginia 43rd in breast cancer incidence rates for individual states. Despite our improvements in medical care, the advanced pathological characteristics of breast cancer at diagnosis receive little attention. Consequently, we compared the changing pattern of early breast cancer in several cohort studies conducted at regional medical centers in West Virginia. The data used in this analysis was derived from 320 women presenting at West Virginia University Hospital (WVUH) between 1999 and 2004, with a diagnosis of invasive breast cancer. Details of age, tumor size and axillary lymph node status were compared with tumor registry information published from a cohort study of 191 patients from the Charleston Area Medical Center (CAMC) between 1990 and 1991. Only histologically documented adenocarcinomas of the breast were included. Tumor size was characterized using the TNM system and staged according to AJCC criteria. For comparative purposes, details from the two regional centers were compared with tumor characteristics from a large longitudinal cohort of 2,484 breast cancers from the Women’s Health Initiative (WHI) study. Baseline median age at diagnosis of women screened at WVUH was younger than patients at CAMC (52 vs. 60). Women diagnosed with triple-negative breast cancer at WVUH and CAMC had similar age distributions. Within the triple-negative patients at WVUH, 44% of patients were less than 50 years of age and 20% were less than 40 years of age. At CAMC, 35% were less than 50 years of age and 7% were less than 40 years of age. For women at WVUH, 61.5% presented with T1 tumors compared to 65.5% at CAMC. These figures were lower than the WHI average of 80.3%. In contrast, more women presented with larger T2 tumors at our medical centers compared with the national study, 32.6% versus 17.4% respectively. At WVUH, 2.3% of women had T3 tumors (≥5 cm) compared with 1% at CAMC. Similar to the WHI study, 35-42% of women at WVUH and CAMC were diagnosed at the T1c stage. Approximately, 30% were diagnosed with positive lymph nodes, compared to 23% in the national study. Combined breast cancer data from our medical centers show an increase in more advanced tumors and positive regional lymph node involvement at the time of diagnosis compared to national reports. Other factors such as obesity, diabetes, poverty and access to mammography screening could be influencing the poorer outcomes for women with breast cancer in West Virginia.

Introduction

Carcinoma of the breast is no longer viewed as a homogenous disease but is now understood as a heterogeneous group of tumor subtypes with distinct clinical presentations, responses to local and systemic treatments, and differences in overall survival. The most common types of breast cancer are invasive ductal and invasive lobular. According to the World Health Organization classification system, tubular and cribriform carcinomas have an overall favorable prognosis, assuming a small tumor size. (1)

Besides histologic type, additional well-established clinical and histopathologic characteristics used for risk assessment, predictive/prognostic purposes, and treatment decisions, include patient age, tumor size, histologic grade, estrogen and progesterone receptor status, human epidermal growth factor-2 (HER-2/neu) status, and lymph node status. The Nottingham histologic grade, which is the most common grading system, takes into account tubule formation, nuclear grade, and mitotic count. (2)

Most breast cancers are sporadic and due to multiple factors, including hormonal and environmental; however, about 5-10% of breast cancers are familial or hereditary. (3) Mutations of BRCA1 (chromosome 17q21) and BRCA2 (chromosome 17q22) have been identified in these families.
13q12–13q13) are responsible for 85% of hereditary breast cancer. The estimated lifetime risk for developing breast cancer in women with a BRCA1 or BRCA2 mutation is 56 to 87%, and the risk for developing bilateral/contralateral breast cancer is about 20% to 40%.

Molecular classification of breast cancer by microarray technique has led to the identification of at least three subtypes – luminal subtype, HER2 subtype and basal-like breast cancer. (4) Luminal subtypes of breast cancer are hormone receptor positive (ER) and are similar to the luminal epithelium of the breast. They are the most common subtypes of breast cancers, estimated to comprise around 60% of all breast cancers. These are divided further into two subtypes – luminal A and luminal B; the former expresses ER more and are associated with decreased expression of genes associated with increased proliferation.

Basal-like breast cancers constitute approximately 15% of all breast cancers, and are associated with poor outcomes (5). Basal-like tumors are usually negative for ER, PR, and HER-2/neu; however, their exact relationship to triple-negative tumors is still being elucidated. While some studies find them to be synonymous, (6) others find significant but not complete overlap (7). These tumors have poor prognosis secondary to the lack of targeted therapeutics due to their triple-negative state and because they are inherently aggressive and tend to be of a younger age at first diagnosis. This might account for the lower incidence of breast cancer in West Virginia. While some studies find the majority of triple-negative tumors are high grade invasive ductal carcinomas, as well as metaplastic and medullary carcinomas. (7) addresses the histopathology of triple-negative tumors, it is suggested by inference from experience with basal-like tumors that the incidence of breast cancer has remained relatively consistent with national averages, but there are a few counties in the state with higher mortality rates. Table 1 compares the breast cancer incidence rates of three states, including West Virginia, that have a relatively high proportion of the population living below the poverty line, against those of three states with much lower poverty levels. West Virginia is ranked 43rd in the breast cancer incidence rates and ninth in rank order. Table 1 also gives the corresponding breast cancer mortality rates.

Breast cancer incidence and mortality in West Virginia

The American Cancer Society estimated there were 182,460 new cases of invasive breast cancer and an additional 67,770 newly diagnosed cases of ductal carcinoma in situ across the United States in 2008. (12) Men comprise approximately 1% of all new breast cancer cases (1,990) and an estimated 40,480 patients died of breast cancer in the United States during this same time period. In West Virginia, there were an estimated 1,150 new breast cancers diagnosed and 310 deaths in 2008 as compared to 1,180 new cases with 280 deaths in 2007. (12) While the incidence of breast cancer has decreased nationally by 6.7% since 2002, this is predominantly in the ER receptor positive subtype of breast cancer. (4) In West Virginia, the incidence of breast cancer has remained relatively consistent with national averages, but there are a few counties in the state with higher mortality rates. Table 1 compares the breast cancer incidence rates of three states, including West Virginia, that have a relatively high proportion of the population living below the poverty line, against those of three states with much lower poverty levels. West Virginia is ranked 43rd in the breast cancer incidence rates and ninth in rank order. Table 1 also gives the corresponding breast cancer mortality rates. With the exception of Louisiana, mortality rates are similar between the two distinct socioeconomic communities. However, in West Virginia, as in many lower socioeconomic communities, women tend to have more completed pregnancies and tend to be of a younger age at first birth. This might account for the lower incidence of breast cancer indicated in this table but still

<table>
<thead>
<tr>
<th>Table 1. Breast cancer incidence and mortality in West Virginia compared with selected other States†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>West Virginia</td>
</tr>
<tr>
<td>Louisiana</td>
</tr>
<tr>
<td>Alabama</td>
</tr>
<tr>
<td>Connecticut</td>
</tr>
<tr>
<td>Massachusetts</td>
</tr>
<tr>
<td>Wisconsin</td>
</tr>
<tr>
<td>United States</td>
</tr>
</tbody>
</table>

*Average for years 1999-2003 per 100,000 women age-adjusted to 2000 US standard population.
#Numbers in parentheses are the rank orders among the 50 states.
There is also a failure to take into account the difference in breast cancer incidence, which itself can influence the risk of dying of the disease. This important point is illustrated in Table 1. When the data are examined as the ratios of incidence to mortality, the low ratio for West Virginia, Louisiana, and Alabama, reflect a reduction in the successful treatment outcome in these states. Furthermore, although the average breast cancer mortality rate for West Virginia over the years 1999-2003 (25.3/100,000) is similar to that for the country as a whole (26.0/100,000), marked variations of breast cancer incidence and mortality rates are observed between individual counties (data not shown). In 2002, more than a quarter of the 55 counties had mortality rates that were higher than the national average, ranging from 26.2 to 45.7/100,000 as reported by the West Virginia Comprehensive Cancer Program.

Table 2. Comparison of breast cancer cases at Charleston Area Medical Center, West Virginia University Hospital in Morgantown with the Women’s Health Initiative Breast Cancer Study.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Patients</td>
<td>191</td>
<td>369</td>
<td>2,484</td>
</tr>
<tr>
<td>Age (median)</td>
<td>60</td>
<td>66</td>
<td>64</td>
</tr>
<tr>
<td>Tumor size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 (&lt;2cm)</td>
<td>65.5%</td>
<td>61.5%</td>
<td>80.3%</td>
</tr>
<tr>
<td>T2 (2-5cm)</td>
<td>33.5%</td>
<td>31.6%</td>
<td>17.4%</td>
</tr>
<tr>
<td>T3 (&gt;5cm)</td>
<td>1.0%</td>
<td>6.9%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Tumor grade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>7.9%</td>
<td>6.9%</td>
<td>9.6%</td>
</tr>
<tr>
<td>II</td>
<td>15.7%</td>
<td>18.8%</td>
<td>29.4%</td>
</tr>
<tr>
<td>III</td>
<td>41.9%</td>
<td>35.8%</td>
<td>41.3%</td>
</tr>
<tr>
<td>Lymph node status</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Negative</td>
<td>72%</td>
<td>69%</td>
<td>77%</td>
</tr>
<tr>
<td>Positive</td>
<td>28%</td>
<td>31%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Additionally, the diagnosis of smaller tumors (≤2cm) increased 2.1% each year from 1988-99 and stabilized thereafter. (12) We have been able to identify similar trends at two of the large, tertiary referral medical centers in West Virginia. At Charleston Area Medical Center (CAMC), Jubelirer et al. (14) compared tumor registry data from 1990-1991 to the data from the previous 10 years. The author reported an increase in the proportion of breast cancers that were 2 cm or less in diameter and a decrease in the number of patients with positive lymph nodes. The reduction in clinically advanced disease at presentation (Stage III/IV) was associated with an increase in the number of patients whose initial diagnosis was made by mammography alone.

Even with these improvements, breast cancer patients in West Virginia continue to present with relatively more advanced tumors when compared to other subpopulations of women in the United States. Table 2 shows the stage at diagnosis for 191 women at CAMC between 1990 and 1991 as well as previously unpublished data of 369 women treated at West Virginia University Hospital (WVUH) in Morgantown, WV during 1999 and 2002. These findings are compared to the stage at presentation of 2,484 women diagnosed with breast cancer between 1993 and 1998 after their recruitment into the nationwide Women’s Health Initiative (WHI) trial. (15)

Baseline median age at diagnosis of women screened at WVUH was younger than patients at CAMC (52 vs. 60). For women at WVUH, 61.5% presented with T1 tumors compared to 65.5% at CAMC. These figures were lower than the WHI average of 80.3%. In contrast, more women presented with larger T2 tumors at our medical centers compared with the national study, 32.6% versus

Epidemiological and clinical features of breast cancer at two state medical centers

With the institution of screening mammography guidelines between 1980 and 1987, there was a doubling in the incidence of small breast cancers (≤2cm) with a concomitant decrease by 27% in the incidence of larger breast cancer (≥3cm).
17.4% respectively. At WVUH, 2.3% of women had T3 tumors (≥ 5cm) compared with 1% at CAMC. Similar to the WHI study, 35-42% of women at WVUH and CAMC were diagnosed at the T1c stage. Approximately, 30% were diagnosed with positive lymph nodes, compared to 23% in the national study.

The women in West Virginia, where a significant number of patients have limited access to health care, were more likely to have tumors greater than 2.0 cm and were more likely to have axillary nodal involvement at presentation as compared to those participating in the nationwide WHI study. This is best explained by the inevitable selection for women who had ready access to health care through the WHI program. (15)

What has emerged from a recent study published in 2008 by Vona-Davis, et al., (16) at WVUH is the presence of a high percentage of women with the aggressive triple-negative phenotype. We studied, by retrospective review, 620 patients with invasive breast cancer found in the West Virginia Hospital tumor registry. Of these women, 73.7% had ER positive disease and 67.7% PR positive disease. On the basis of the ER, PR and HER-2/neu assay results, 117 of the 620 (18.9%) breast cancer patients available for study were classified as triple-negative. Four hundred thirty three (69.8%) were ductal carcinomas, 55 (8.9%) were lobular carcinomas, 84 (13.5%) had both lobular and ductal features, and 48 (7.8%) were comprised other tumor types such as mucinous, tubular, and medullary carcinomas. Significantly, more of the ductal carcinomas were ER and PR negative compared to the pure lobular and mixed lobular/ductal tumors ($P < 0.001$; Table 3). Furthermore, 23.1% of the ductal, but only 5.5% and 7.1%, respectively, of the lobular and mixed lobular/ductal carcinomas were triple-negative tumors. (16)

Women diagnosed with triple-negative breast cancer at WVUH and CAMC had similar age distributions as compared to African American women. Within the triple-negative patients at WVUH, 44% of patients were less than 50 years of age and 20% were less than 40 years of age. At CAMC, 35% were less than 50 years of age and 7% were less than 40 years of age. This age distribution pattern is similar to the triple-negative tumors diagnosed in young, premenopausal, African-American 17-20 and British black (21) women.

At WVUH, we found the mean size of the triple-negative tumors at diagnosis was greater than that of the non-triple-negative tumors ($P < 0.001$; Table 4) and this finding is similar to that observed at CAMC, as well as with a number of other studies. (19,22,23) Dent et al. (22) observed a positive correlation between tumor size and the presence of nodal involvement only in the non-triple-negative group thereby indicating metastasis occurred earlier in triple-negative tumors; a similar relationship was observed in the

| Table 3. ER, PR, HER2 status of breast cancer patients with ductal, lobular and mixed ductal/lobular histologic types in a recent study by WVUH (1999-2004).16 |
|-----------------|-------------|-----------------|-------------|
|                 | Ductal      | Lobular         | Mixed lobular/ductal | Other†  | Total population | P value  |
| ER+             | 307 (70.9)  | 48 (87.3)       | 68 (81.0)    | 34 (70.8) | 457/620         | 0.0153   |
| ER-             | 126 (29.1)  | 7 (12.7)        | 16 (19.0)    | 14 (29.2) | 163/620         |          |
| PR+             | 283 (65.5)  | 46 (86.8)       | 63 (75.9)    | 28 (59.6) | 420/620†        | 0.0015   |
| PR-             | 149 (34.5)  | 7 (13.2)        | 20 (24.1)    | 19 (40.4) | 195/620         |          |
| HER+            | 67 (22.6)   | 5 (16.7)        | 19 (36.5)    | 12 (35.3) | 103/620‡        | 0.0511   |
| HER-            | 229 (77.4)  | 25 (83.3)       | 33 (63.5)    | 22 (64.7) | 309/620         |          |
| Triple negative | 100 (23.1)  | 3 (5.5)         | 6 (7.1)      | 8 (16.7)  | 117/620         | <0.0001  |
| Non-triple negative | 333 (76.9) | 52 (94.5)       | 78 (92.9)    | 40 (83.3) | 503/620         |          |

ER estrogen receptor; PR progesterone receptor
d† Mucinous, tubular and medullary carcinomas
d‡ Some tissues were not tested for all characteristics.
Further validation of these results is warranted as data were compiled using relatively small samples of unequal size taken at different times from two medical centers.

**Conclusions**

Breast cancers lacking estrogen and progesterone receptors and HER-2/neu expression, otherwise known as triple-negative tumors, have a relatively poor prognosis as compared to tumors with the presence of estrogen and or progesterone receptors. Triple-negative disease is particularly common in young African-American women 17-20 and is more likely to be of high histologic and nuclear grade. (18,22) Additionally, these tumors have shorter relapse-free survival times than patients with other tumor receptor patterns and are more likely to develop distant metastases. (22,23)

Breast cancer patients in West Virginia, a predominantly rural Appalachian community, continue to present with relatively more advanced tumors as compared to other subpopulations of women in the United States. Of particular importance is the high percentage of women with the aggressive triple-negative phenotype occurring in younger women who present with more advanced disease. Since most triple-negative tumors are high grade and have a high incidence of recurrence and distant metastases, there is an urgent need for new therapeutic treatment approaches for triple-negative breast cancer for which, unlike other subtypes of breast cancer, standard adjuvant systemic treatment seems less effective. With improvements to access to care through screening mammography programs such as Bonnie’s Bus, the objective is to identify the particularly difficult subtypes of breast cancer at an earlier stage. By doing so, we hope

**Table 4. Clinical characteristics of triple-negative status**

<table>
<thead>
<tr>
<th></th>
<th>WVUH 1999-2004</th>
<th>CAMC 2002-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Triple-negative</td>
<td>Non-triple negative</td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>n (%)</td>
<td>n (%)</td>
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<tr>
<td>&lt;40</td>
<td>22 (20.0)</td>
<td>41 (9.4)*</td>
</tr>
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<tr>
<td>&gt;70</td>
<td>10 (9.1)</td>
<td>98 (22.4)</td>
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<tr>
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<tr>
<td>T1 (&lt;2cm)</td>
<td>34 (30.9)</td>
<td>245 (52.2)*</td>
</tr>
<tr>
<td>T2 (2-5cm)</td>
<td>58 (52.7)</td>
<td>179 (38.2)</td>
</tr>
<tr>
<td>T3 (&gt;5cm)</td>
<td>18 (16.4)</td>
<td>45 (9.6)</td>
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</tr>
<tr>
<td>I</td>
<td>2 (1.9)</td>
<td>63 (14.5)*</td>
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<tr>
<td>II</td>
<td>19 (17.6)</td>
<td>161 (36.9)</td>
</tr>
<tr>
<td>III</td>
<td>87 (80.5)</td>
<td>212 (48.6)</td>
</tr>
<tr>
<td>Nodal status</td>
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<td></td>
</tr>
<tr>
<td>Negative</td>
<td>54 (67.5)</td>
<td>277 (69.8)</td>
</tr>
<tr>
<td>Positive</td>
<td>26 (32.5)</td>
<td>120 (30.2)</td>
</tr>
</tbody>
</table>

* Represents a significant difference between groups where P < 0.001.
to reduce mortality throughout the state and in particular, those counties with mortality rates higher than the national average.

References

CME Post-Test

32. Triple-negative breast cancer is defined by negative findings for which of the following:
   a. Negative for estrogen, progesterone and HER1 receptors
   b. Negative for estrogen, progesterone and HER2 receptors
   c. Negative for estrogen, progesterone and BRCA1 receptors

33. Compared to other subtypes of breast cancer, triple-negative breast cancers have a:
   a. poorer prognosis
   b. better prognosis
   c. similar prognosis
Perspectives on Cancer Health Disparities in West Virginia

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Abstract

“Perspectives on Cancer Health Disparities in West Virginia” provides an overview of the factors that lead to health disparities in general, to the burden of breast and other cancers in our state, and highlights the deep-rooted values and characteristics that will help communities and their partners achieve parity.

Perspective on Cancer Health Disparities

“There is a critical disconnect between what we discover in cancer research and what we deliver to all American people. This ‘discovery to delivery disconnect’ is a key determinant of the unequal burden of cancer.” (1) The “disconnect” occurs when we, as health care providers and educators, fail to understand the relationship between historical and cultural factors and the attitudes, beliefs, and behavior of our communities. Understanding why cancer disproportionately impacts some West Virginians must be linked to the ability to translate that understanding into effective interventions. Bridging the disconnect requires health care providers to be culturally competent and patients to have access to high-quality health care services. Failure to bridge the disconnect results in an unequal burden of cancer in our communities, causing a cancer health disparity.

Cancer health disparities are population-specific differences in incidence, disease outcomes, and access to high-quality care throughout the cancer continuum. These health disparities negatively challenge the well-being of our communities. An overarching theme, health disparities occur for many reasons but, in general, only impact a select segment of the population—those who have the least resources, human and material, to cope with disease. The concept of ‘health disparities’ is complex and constantly under refinement, but includes;

- the systemic barriers that block access to cancer education and optimal screening, treatment, and survivor services,
- the reasons people don’t comply with lifestyle recommendations that will keep them healthy,
- the reasons some people get and/or die of certain cancers because of their race, ethnicity, socioeconomic status, genes, and geographic location, and
- the way people with cancer are treated differently depending on their class, race and ethnicity.

For all people, the main contributors to the unequal burden of cancer are lack of education and poverty. (2) Also, underserved populations have poorer health status and outcomes because of inequities in access to care; limited adoption of healthy behaviors; life-long gaps in access to routine preventive care; limited English proficiency; miscommunication in patient-provider interactions; and the prevalence of co-morbidities such as obesity, diabetes, and heart disease. (3) In West Virginia, health disparities also relate to lack of health insurance, having limited literacy skills, living in a poor, rural county, and, in our predominantly white population, being a racial or ethnic minority. (4)

Definitions of “access” must address both “knowing” something needs to be done and having the resources to get it done. Lack of access to care, especially lack of insurance, contributes greatly to a disproportionate vulnerability of underserved populations nationally and in our state. West Virginia ranks among the highest in the nation for people living below the poverty

Objectives

The objectives of this paper are to discuss:

1) the factors that lead to health disparities in general; 2) how health disparities relate to the excess burden cancer in our state; 3) the deep-rooted values and characteristics that will help communities and their partners reduce and/or eliminate cancer health disparities in West Virginia.
level and a quarter of residents between the ages of 18 and 64 are uninsured. (5) Uninsured adults in West Virginia are more likely to not see a doctor when needed due to cost than adults with coverage (6). Those uninsured who do see a doctor may not receive the same level of care as insured patients. This inequity may be a result of health practice “guidelines for cost containment.” “Medical profiling” may also be a factor, meaning the care provider may assume a poor, rural patient will not comply with a treatment regime, may not understand medical or drug-taking directives, or may not be able to travel for more specialized care. Not only is the patient denied the opportunity to participate in decision-making regarding his/her own health, but the patient may not even be aware that there are treatment options. (7)

West Virginia ranks high among the states in the percentage of adults at the lowest literacy level. People with limited literacy skills report poorer overall health; are less likely to be screened; present in later stages of disease; are more likely to be hospitalized; have poorer understanding of treatment, and have lower adherence to medical regimens. (8) Physicians, nurses, and other health care professionals have an opportunity to improve health by communicating with people in clear, uncomplicated terms and in a manner that is respectful of their cultural background. Lack of knowledge about potential communication barriers exacerbates health disparities and negatively impacts health outcomes. By taking the time to consider who a patient is in a cultural context, the physician, nurse or other health care provider can make a significant difference in the patient’s experience. Making a commitment to understanding the role of communications in the care and treatment of patients from diverse populations can improve the quality of care they receive and positively contribute to equality of care they receive. (9)

Summary

When national cancer data show that certain populations or groups of people have disproportionately high incidence rates or are at higher-than-average risk of death or prolonged illness, they are termed a “special or underserved population.” (10) In West Virginia, the incidence rate for breast cancer is lower than the U.S. rate, but the mortality rate for breast cancer in West Virginia is higher. (11) The high breast cancer mortality rate in our state is evidence of a health disparity. Some women may not be getting regular mammograms, they may be diagnosed with breast cancer at a later stage, and/or they are not receiving timely and appropriate treatment.

With limited resources and copious challenges, collaborations and partnerships are essential to improving cancer care in West Virginia. And these partnerships must include community advisors in every phase of development and delivery of programs and services. The Bureau for Public Health West Virginia Breast and Cervical Cancer Screening Program (BCCSP) provides screening to more than sixteen thousand women per year who are uninsured or under-insured and pays for further diagnostic tests and treatment when needed. Funded by the Centers for Disease Control and Prevention, it is an example of public, academic and community partnerships that come together to improve the
and screening programs for the people in their community.

An understanding of the history of rural people and how their receptiveness to health care is influenced by their history and culture can help to eliminate the disparities that perpetuate themselves in our culture. In order to reduce the unequal burden of cancer, issues such as quality of health care, adequate infrastructure and resources, transportation barriers, insurance coverage for all, increasing health literacy, and improving quality of life must be addressed. Financial limitations, transportation problems, and lack of insurance may appear to be barriers to early detection and treatment, when sensitivity to those issues can create an environment of openness to help stimulate creative thinking about options. To impact cancer health disparities, prevention, early detection, and treatment for all must be the focus with an eye to providing such services in a way rural West Virginians can welcome and embrace.

References

CME Post-Test

34. What is the key determinant of the unequal burden of cancer?
   a. race
   b. the discovery to delivery disconnect
   c. lack of access to care

35. What are the two main contributors to the unequal burden of cancer?
   a. Cost of and access to care
   b. Lack of insurance and high co-pays
   c. Poverty and lack of education

36. T or F Health literacy and cultural competence impact cancer health disparities in West Virginia

37. What is the role of partnership in reducing cancer health disparities in West Virginia?
   a. Maximizing resources
   b. Reducing duplication of effort
   c. Building political influence
Ears, nose and throat medical and surgical care | Audiological testing | Inhalant allergy testing and treatment | Hearing aid evaluation and placement services | Computed Tomography (CT) for sinuses and ears

Appointments
304.340.2200
Hearing Aid Center
304.340.2222
The Role of Ultrasound in Breast Imaging

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Michael T. Hogan, MD
Associate Professor of Radiology, West Virginia University School of Medicine

Abstract
This report describes several patients in whom diagnostic ultrasound played a significant role in the detection and diagnosis of breast masses. Diagnostic ultrasound was able to verify whether a breast mass was or was not present. Secondly, ultrasound was able to determine whether the mass was definitely benign and no further evaluation was necessary, or whether the mass was possibly malignant and needed a biopsy. The important role diagnostic ultrasound plays in breast imaging and its appropriate clinical applications are discussed.

Cases

Case 1
A 44 year old woman presented with a palpable mass in the left breast. Mammogram revealed a mass in the same location as the palpable mass (Figure 1). Ultrasound was performed to determine whether the mass was cystic or solid, and, if solid, what its morphologic characteristics were. The mass was found to be a definite benign cyst, and further work-up was avoided. In order for a mass to be called a simple benign cyst, it must be anechoic, it must have a sharp posterior wall, it must have well circumscribed walls, and it must have good through transmission. All of these findings were present in this case, and biopsy was avoided (Figure 2).

Case 2
A 42 year old woman presented with a palpable abnormality in the left breast. The mammogram, including additional views, was negative. Because a mass is not always visible on a mammogram, an ultrasound study was performed. The ultrasound revealed normal breast tissue, with no evidence of mass. No further work-up was necessary, and the patient was discharged.

Case 3
A 48 year old woman presented with a palpable abnormality at the one o’clock position in the right breast. There was no family or personal history of cancer. The mammogram was negative (Figure 3). Because of the palpable abnormality, an ultrasound was performed, and this revealed a solid mass with malignant characteristics. None of the criteria necessary to call a mass a simple benign cyst were present, plus the mass had an irregular and lobulated border (Figure 4), characteristics of malignancy.

Discussion
The importance of diagnostic and screening mammography in the evaluation of breast disease is well known. However, the importance of diagnostic ultrasound in the evaluation of breast disease is less well known. This article discusses the important role ultrasound plays in breast imaging.

Ultrasound is a safe, painless, and also reliable, noninvasive modality for evaluation of the breast. It does not use ionizing radiation. Instead, sound waves are emitted from a handheld transducer that is held in direct contact with the breast skin surface. These emitted sound waves travel through the breast tissue, and when they encounter different tissue interfaces in the breast, they are reflected back to the same transducer. The acoustic impedance of the different tissues determines the characteristics of the waves that return to the transducer (1). The returning sound waves are then processed, and an image is formed.

Whenever there is a palpable mass in a patient under thirty years old, or in a pregnant or lactating woman, ultrasound should be the first modality used for further evaluation of the mass. Patients in these categories tend to have dense breasts, which are not well evaluated.

Figure 1.
Mammogram showing a mass of uncertain etiology.
by mammography. The sensitivity of mammography decreases as breast density increases; therefore, lesions may not be detected by mammogram. The lack of ionizing radiation also makes ultrasound an ideal modality for evaluation of these patients.

Characterization of a mass found on mammography is the most frequent clinical use of breast ultrasound (2). Whenever a mass is discovered on a mammogram, ultrasound can determine whether the mass is a simple benign cyst, and the workup can be terminated, or whether the mass is solid, and biopsy may be necessary. The accuracy of breast ultrasound in differentiating a cystic from a solid mass has been reported as high as 98% to 100% (2). Using strict criteria, and if the classic signs are present, some solid masses can also be identified as benign. The classic ultrasound morphology of a lymph node is so distinctive that it can be called benign with no biopsy being necessary (3). If another benign-appearing solid mass is present, such as a fibroadenoma, it would be classified as probably benign. It would then be followed by ultrasound at six, twelve, and twenty-four months to verify stability (4). Using the Stavros criteria, a set of criteria used to assess solid, nonpalpable breast masses, a radiologist can obtain greater than 95% specificity for benignity, eliminating the need for biopsy (5). In a large study performed in 1995 by Stavros et al., strictly adhering to the Stavros criteria led to a negative predictive value of 99.5% and a sensitivity of 98.4% (2). Stavros described several benign and malignant characteristics of masses by ultrasound. Benign characteristics include having four or fewer gentle lobulations, intense homogeneous hyperechogenicity, a thin, echogenic capsule, and being wider than tall (2). The most important benign characteristic is having no malignant characteristics. If a mass has any of the malignant characteristics, it should be biopsied. Malignant characteristics include acoustic shadowing, microlobulation, microcalcifications, ductal extension, angulated margins, and intense hypoechochogenicity (2).

If there is a palpable mass in a patient over thirty years old, and the mammogram is negative, ultrasound allows the radiologist to visualize the palpable area and to determine if it is caused by a solid mass, a cyst, or normal breast tissue. Especially in dense breasts, these entities are very difficult to distinguish on mammography. In addition, some masses that are completely occult on mammography can be visualized on ultrasound, as in Case 3. If normal breast tissue is visualized on the ultrasound, the workup is terminated. The negative predictive value of a negative mammogram combined with a negative ultrasound has been found to be almost 100%, in the setting of a clinically palpable finding (5). If a cyst or normal lymph node is seen, the workup is also terminated. If another benign appearing solid mass is diagnosed, follow-up by ultrasound is recommended. If any other solid mass is seen, biopsy is necessary.

Ultrasound is also used to evaluate silicone implants for possible rupture. Ultrasound is more sensitive for detection of silicone implant rupture than mammography, but less sensitive than MRI. If there are classic findings of implant rupture on ultrasound, the patient can be spared the expense of an MRI. If there is solid clinical suspicion for implant rupture with a negative ultrasound, MRI should then be considered (5).

Some masses are seen very well with two-view mammography; in these cases, stereotactic biopsy could be employed. However, many masses are seen better with ultrasound, or are not seen at all on a mammogram. In such cases, ultrasound can be used by the radiologist for visual guidance in obtaining a sample for pathologic evaluation. Ultrasound can be used for both fine needle aspiration and core biopsy (6). A vacuum-assisted biopsy device can also be employed during ultrasound-guided biopsy (7).

Being familiar with the limitations of ultrasound is just as important as being aware of the common applications. Ultrasound is not a screening procedure, and should not be used for annual screening (5).
Mammography is the modality used for annual screening, as it is the only modality at this time that has been shown to reduce breast cancer related death rates (9). Ultrasound is also not the modality of choice for evaluating calcifications. Calcifications are a very important finding associated with several benign and malignant conditions involving the breast, and evaluation of their size, shape, and distribution in determining benignity or malignancy should be assessed by mammography, and not ultrasound. Calcifications can often not be seen on ultrasound, and if they are seen, the important characteristics that allow a radiologist to assess for malignancy cannot be accurately assessed.

Conclusion
Ultrasound is a very attractive and essential breast imaging modality.

It is safe, painless, reliable, and noninvasive. For a patient under thirty years old, or for a pregnant or lactating woman, it should be the first breast imaging procedure used to evaluate a breast mass. As an adjunct to mammography or palpation, it can accurately distinguish normal breast tissue, a simple benign cyst, a benign solid mass, a probably benign solid mass, or a solid mass that requires biopsy. Whether as a starting point, or as an adjunct to mammography and palpation, ultrasound is a crucial component in the evaluation of breast disease.

References

CME Post-Test

38. The first imaging procedure that should be used to evaluate a new lump in a 28 year old is:
   a. Mammography
   b. Ultrasound
   c. MRI
   d. CT

39. Which imaging modality is the only one proven to decrease mortality due to cancer related deaths when used for annual screening?
   a. Mammography
   b. Ultrasound
   c. MRI
   d. CT

40. Which imaging modality should be used initially in evaluation of a pregnant woman with a palpable mass?
   a. Mammography
   b. Ultrasound
   c. MRI
   d. CT

41. Which of the following is a malignant characteristic on ultrasound?
   a. Four or fewer gentle lobulations
   b. Intense, homogeneous hyperechogenicity
   c. Thin, echogenic capsule
   d. Shadowing
Supporting efforts to raise awareness and find a cure.
Bonnie’s Bus – Cancer Disparities in West Virginia, Philanthropy and Opportunities to Build Lasting Partnerships

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Beverly Robinson, MSW3
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5Supported in part by Susan G. Komen for the Cure, Dallas, TX and Claude Worthington Benedum Foundation grants.

Abstract
The State of West Virginia (WV) has significant cancer health disparities, substantiated by the fourth highest cancer mortality rate in the nation. In October 2007, Jo and Ben Statler donated $5 million dollars to the Mary Babb Randolph Cancer Center to establish a mobile mammography program (Bonnie’s Bus) and endowed research positions at West Virginia University. This opportunity paved the way for an additional $2.5 million dollars of funding through a match program afforded by WV Eminent Scholars Program and $700,000 of private foundation (Susan G. Komen for the Cure and Claude Worthington Benedum) support to begin to craft a statewide clinical trials network linked to health care institutions across our state. An overarching strategic approach being developed by the Mary Babb Randolph Cancer Center with partner agencies and healthcare institutions across our state is to build capacity through highly interactive and collaborative partnerships by developing highly interactive and collaborative partnerships, partnerships by developing strategic approaches being developed by the Partnerships. Partnerships. Partnerships. Partnerships. Partnerships. Partnerships.

Introduction
West Virginia (WV) is the only state in the nation whose borders are entirely contained within the geographic region of Appalachia. The cancer burden in our state is significant and cancer health disparities are very evident. While overall cancer incidence in WV is comparable to national norms, cancer mortality rates (208.6 deaths per 100,000 versus US national average of 184.0) are the fourth highest in the nation (1). Many WV counties have cancer mortality rates significantly above the national average; McDowell County is one example (1-3). McDowell, one of WV’s southernmost, poorest, and most underserved counties, in a recent report has been found to have the 7th highest breast cancer mortality rate in the nation (3). Incidence and mortality rates for lung cancer, gynecological and hematological malignancies (e.g., leukemia and non-Hodgkin’s lymphoma) and other tumors also exceed the national average (1,2). Major risk factors for cancer include cigarette smoking/smokeless tobacco consumption and obesity (2nd highest rates in the nation), an aging population (highest median age in the nation at 38.9 years), and among the highest prevalence of HPV-16 infection in nation for the past 50 years. Low screening rates (e.g., uninsured and underinsured), low literacy coupled with ineffective or inefficient communication of screening and healthcare opportunities to patient populations (resulting in reduced access to care and screening), and geographic challenges in getting back and forth from place of residence to points of healthcare delivery in a rural state such as WV further compound the cancer burden. These data imply that many WV communities experience limited access to cancer prevention and early diagnostic/therapeutic interventions, including access to and enrollment in clinical trials. Importantly, even when these services are available, community participation may be low. There is a particular distrust for clinical trials research among many communities (4-6). Clinical trials find better ways to prevent, diagnose, or treat cancer—challenges faced by many of our communities as alluded to above, prevent the delivery of state-of-the-art cancer treatment. There is an urgent need to examine and resolve these challenges, particularly those that hinder access to and implementation of life-saving cancer prevention and screening methods and provision for clinical trials access among WV’s most underserved communities. An overarching strategic approach being developed by the Mary Babb Randolph Cancer Center with partner agencies and healthcare institutions across our state is to build capacity through highly interactive and collaborative partnerships by developing or ineff...
scientific research platforms and clinical programs that fit the cancer profile (by addressing cancer health disparities) in WV and in Appalachia more generally. We are also poised to assume national cooperative partnerships as well to further grow a strong program to treat cancer.

**Philanthropic Opportunities**

On October 17, 2007 West Virginia University (WVU) announced the largest philanthropic gift in its history - $25 million dollars given by Jo and Ben Statler (7). The first $5 million of the gift was given to the Mary Babb Randolph Cancer Center for the purchase of a mobile digital mammography unit (*The Bonnie Wells Wilson Mobile Mammography Program also known as Bonnie’s Bus* – see Figure 1) and endowment funds to support the launch of this program to provide breast cancer screening services for underserved residents in rural parts of the state with limited or no access to screening mammography. Additionally, these funds created two endowed positions in breast cancer research — the Jo and Ben Statler Eminent Scholar and Chair in Breast Cancer Research and the Bonnie Wells Wilson Eminent Scholar and Distinguished Professor in Breast Cancer Research. This latter portion of their gift, for endowed faculty positions, enabled the Cancer Center to leverage an additional $2.5 million from the State of West Virginia under a matching Eminent Scholars Recruitment and Enhancement (ESRE) Program, which is specifically earmarked for the recruitment of clinical trial investigators and scientists in breast cancer and other tumor types. Cancer Center senior leadership collaborated on this important legislative initiative specifically to begin to address cancer health disparities encountered in our state by focusing on breast, lung and gynecological malignancies. This afforded the Cancer Center a powerful opportunity to begin to build vital research capacity. Thus, the overall impact of the gift to the Cancer Center represented $7.5 million in new funding.

It is important to realize, on the threshold of the launch of Bonnie’s Bus, the deliberate manner in which the program is being developed — to specifically engage community and statewide partners including healthcare professionals throughout the state to ensure the best possible care for women, who choose to participate in this mobile mammography service. This will take time to evolve and we must build trust among all sectors – our clients, communities and healthcare partners. We anticipate screening many women, who unfortunately will go on to have a diagnosis of breast cancer established, and recognize that early detection saves lives (8-10). We must ensure that these women get access to the best possible care they can get as close to their home as possible— hence the notion of beginning to craft a statewide clinical trials network.

**Building Capacity Through Partnerships**

The Statler gift garnered national attention, which paved a new way forward to begin to construct other opportunities (11,12). The WV Affiliate of Susan G. Komen for the Cure, Dallas, TX – 3-year grant $300,000

Claude Worthington Benedum Foundation, Pittsburgh, PA – 2-year grant $400,000

Total funding $8.2 million

<table>
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<tr>
<td>Jo and Ben Statler gift to Mary Babb Randolph Cancer Center:</td>
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<tr>
<td>• Bonnie Wells Wilson Mobile Mammography Program</td>
<td>$2.5 million</td>
</tr>
<tr>
<td>• Jo and Ben Statler Eminent Scholar and Chair in Breast Cancer Research*</td>
<td>$1.5 million</td>
</tr>
<tr>
<td>• Bonnie Wells Wilson Eminent Scholar and Distinguished Professor in Breast Cancer Research*</td>
<td>$1.0 million</td>
</tr>
<tr>
<td>WV Eminent Scholars Recruitment and Enhancement (ESRE) Program (*match afforded by Statler gift)</td>
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<tr>
<td>Susan G. Komen for the Cure, Dallas, TX – 3-year grant</td>
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<td>Claude Worthington Benedum Foundation, Pittsburgh, PA – 2-year grant</td>
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<tr>
<td><strong>Total funding</strong></td>
<td><strong>$8.2 million</strong></td>
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Cure (WV Komen) in Charleston worked with the Cancer Center on several pilot projects focusing on the roll-out of Bonnie’s Bus. Subsequently, the Susan G. Komen for the Cure (Dallas, TX) national office invited the Cancer Center’s application to the Breast Cancer Mortality Report Grants program, a nationally peer-reviewed research grants program, building on discussions and our plans to begin to construct a statewide clinical trials network for cancer patients and especially newly diagnosed breast cancer patients through Bonnie’s Bus participation. In April 2008, the Susan G. Komen for the Cure awarded a $300,000 grant over 3 years to the Cancer Center, supporting year one launch activities for Bonnie’s Bus and support toward developing a statewide clinical trials network in years two and three, which are described in more detail in this supplement. The Cancer Center also had the good fortune to engage the Claude Worthington Benedum Foundation (Pittsburgh, PA) to further support the formative phases of the WV statewide cancer clinical trials network and through a competitive review process secured an additional grant award of $400,000 over 2 years. Simply stated, the gift by the Statlers enabled the opportunity to bring the best aspects and interests of various partners to the table to address breast health disparities in WV.

Jo and Ben Statler
John (“Jo”) and Benjamin (“Ben”) Statler were approached by Bonnie Wells Wilson in 2002 to endow a fund to honor Bonnie’s mother, Jo’s mother, Jo’s mother, who died in 1992 from breast cancer. She was a lifelong resident of western Monongalia County, WV and did not have access to early screening mammography services that may have saved her life. The opportunity to memorialize her life for the benefit of other West Virginians was very important to Jo and Ben Statler. Jo and Ben Statler

Susan G. Komen for the Cure
The mission of the WV Affiliate of Susan G. Komen for the Cure (WV Komen) is simply to understand the breast health needs of the various communities throughout the state and raise funds to provide grants that address those needs. The need for a mobile mammography unit for the state was a directive from WV Komen’s founders. This has always been seen as one of the answers to ‘access to quality care’ and information on follow-up care for WV’s rural setting. In addition, it is important to WV Komen to be involved with initiatives that recognize socio-economic diversity to address breast health issues, and they have worked to build bridges toward greater relationships in rural community programs to bring welcome support to ideas that further the efforts of local programs.

WV Komen began its relationship in 2007 with the Cancer Center by funding a grant, Targeting a Screening Program for WV Counties with Excess Breast Mortality (PI: J. Halverson, PhD), that generated a statewide map of breast cancer mortality as well as potential routes of interest for a future mobile unit. WV Komen saw this as a critical infrastructure piece toward a future unit. WV

In summary, the Statler gift provided the vital departure point to leverage additional funds provided through initiatives developed by the WV State Legislature and competitive private foundation grants (Table 1).
Komen is devoted to providing and identifying collaborative avenues to ensure that all partners are aware of what is available and information on how to apply for necessary funding. Through WV Komen efforts, Komen national and community health representatives held follow-up visits with Cancer Center leaders to further identify strategies to support the mutual mission of reducing breast cancer health disparities in WV. This resulted in the competitive review and an award via the Breast Cancer Mortality Report Grants program for the launch of Bonnie’s Bus and to begin to build a statewide trials network. It is undeniable that the timing of the Statler gift for a mobile mammography unit was key, which allowed these efforts to move forward much more rapidly. The WV Affiliate Community Grant program continues to work toward funding on a local level for programs influencing awareness, screening and treatment in the state. WV Komen anticipates ongoing funding toward this venture to ensure expanded awareness of not only mammography but those critical steps following diagnosis and follow-up care. This program also brings the resources for clinical trials as a necessary part of expanded care throughout the state. WV Komen has benefited greatly from these emerging opportunities to address cancer disparities and breast health in particular with the establishment of a statewide mobile mammography unit.

Claude Worthington Benedum Foundation

Michael (Bridgeport) and Sarah (Blacksville) Benedum were WV natives, who wished to give back to their home state just as Jo and Ben Statler have done. The Claude Worthington Benedum Foundation is an independent foundation established in 1944 by Michael and Sarah Benedum. They named the Foundation in memory of their only child, Claude Worthington Benedum, who died in 1918 at the age of 20. The Benedums expressed their wish that grant-making be focused in WV and southwestern Pennsylvania, their native and adopted homes. Since its inception, the Foundation has authorized grants totaling more than $316 million in the areas of education, health and human services, community development, and economic development.

With the support of the Benedum Foundation, the Cancer Center will develop ways for breast cancer and other cancer patients to receive needed treatment through a new formative statewide clinical trials research network, which is being set up in conjunction with the launch of Bonnie’s Bus. Clinical trials nurses and other research personnel will be stationed in key locations around the state to allow cancer patients to receive state-of-the-art treatment regardless of where they live. This was an important consideration for Benedum’s participation—that this effort would build on existing infrastructure. The Benedum Foundation was also motivated by specific interests in this endeavor to provide a way to encourage and provide additional resources related to breast cancer at the regional and community levels; provide additional information, which may be useful in public policy development (e.g., reimbursement, reshaping of services, advocacy); shore up rural providers who are struggling to provide access to care; and focus on quality and improving care.

With the support of all these donors, the Cancer Center is leading networking and system-building efforts to ensure that the mobile mammography program promotes breast-screening services to WV women lacking access, provides timely and appropriate care, including access to clinical trials as needed; and builds the case for state and third party reimbursement support for early detection of breast cancer and access to care. The Cancer Center will evaluate and disseminate results to stakeholders to ensure improved health and economic outcomes and therefore future programmatic sustainability. The Cancer Center will invest in and maximize community participant engagement through focus groups and targeted marketing, and build infrastructure to link newly-diagnosed women regardless of location to a clinical care pathway “referral tree” and to clinical trials so that all WV women gain timely access to appropriate state-of-the-art care through community, regional, and statewide networks of providers.

Final Thoughts

The Statler gift has provided an unprecedented opportunity for the Mary Babb Randolph Cancer Center to embark on new collaborative partnerships across WV to more formally address the numerous cancer disparities that are encountered in the region. As Bonnie’s Bus rolls out and the formative statewide clinical trials network takes shape future health initiatives may benefit from analysis of the impact of this type of gift. It is especially important as well to recognize efforts of the WV State Legislature (Senate Bill 287) by affording additional opportunities to match dollar-for-dollar endowed funds to build vital capacity for biological, biotechnological and biomedical sciences; energy and environmental sciences; nanotechnology and material science; and biometrics, security, sensing and related identification technologies research and economic development through the West Virginia Research Trust Fund challenge. This mechanism has the potential to leverage an additional $35 million dollars of endowed...
support at WVU and $15 million dollars at Marshall University, which would represent a $100 million total investment in our research and economic portfolios in WV. The momentum and impact provided by the Statler’s generous gift cannot be overstated in addressing cancer health disparities in our state. This special supplemental issue of the West Virginia Medical Journal focuses on breast cancer and improving access and care in our state, which have been greatly afforded by the generosity of the Statlers and the new partnerships that have emanated from this opportunity.

References

CME Post-Test

42. T or F The state of WV has the fourth highest cancer mortality rate in the country.

43. The Jo and Ben Statler Gift to the Mary Babb Randolph Cancer Center has enabled:
   a. The creation of Bonnie’s Bus Mobile Mammography Program
   b. Linkage to the WV Eminent Scholar Program
   c. Leveraged funding from private foundations to begin to build a formative statewide clinical trials network in WV
   d. All of the above

44. West Virginia has significant cancer health disparities contributed by:
   a. First or second highest rates of cigarette smoking tobacco consumption and obesity in the nation.
   b. Oldest median age (38.9 years) in the nation.
   c. Among the highest prevalence of HPV infection in the nation.
   d. All of the above.

45. The West Virginia Research Trust Fund:
   a. Was announced in March 2008 that affords opportunities to match dollar-for-dollar funds to build vital capacity for biological, biotechnological and biomedical sciences among other economically driven technologies.
   b. The funds are held in endowed accounts in perpetuity.
   c. Marshall University is eligible to raise $15 million dollars and West Virginia University is eligible to raise $35 million dollars over a 5-year period.
   d. All of the above.
Congratulations to

Jame Abraham, MD

on his installation as the

Bonnie Wells Wilson Distinguished Professor and Eminent Scholar in Breast Cancer Research

Dr. Abraham leads WVU’s highly regarded Comprehensive Breast Cancer Program. He is esteemed by his colleagues, treasured by his patients, and internationally recognized as a leader in his field. He has published widely and is a pioneer in understanding the effects of chemotherapy on the brain.

He spearheaded the creation of the West Virginia Oncology Society and is leading the development of a statewide clinical trials network.

Thank you, Dr. Abraham, for all you do. West Virginia is fortunate to have a physician of your caliber on its team.

The position of the Bonnie Wells Wilson Distinguished Professor and Eminent Scholar in Breast Cancer Research is made possible by a generous gift of Jo and Ben Statler.
From High Tech to High Touch: Integrating Community Voices in Mobile Mammography Outreach

The “Community Voices” project has been supported in part by Susan G. Komen for the Cure, Dallas, TX and Claude Worthington Benedum Foundation grants.

Abstract

Providing mobile screening mammography services across the state of West Virginia (WV) presents unique challenges. The ability of new machines to screen for breast cancer is modern medicine at its best. The use of the mobile unit, “Bonnie’s Bus”, holds promise for getting this high tech equipment to women in rural areas of West Virginia where it is most needed. Cancer detected in early stages is more treatable and women have a better chance of becoming survivors. The key to the program’s success resides with the women who come for the screening, the extension network of community members who help set up and assist women to access the screening system, and community health care providers who care for the women if cancer is found. Linking “community voices” with the programs funded under the WV Komen grant screening programs provides a winning solution for West Virginia and the women served by Bonnie’s Bus. Information obtained from five focus groups of 58 community leaders and women residing in rural WV was used to develop the mobile program. Building upon established relationships with the West Virginia Breast and Cervical Cancer Screening Program (WV BCCSP) coordinators and providers, outreach and information gleaned from WV communities, is being used to develop community partnerships based on mutual trust and respect to advance the common goal of decreasing breast cancer related illness and death in West Virginia women.

Background

The “Community Voices” project in 2008-2009 became a Komen funded component of the Bonnie’s Bus program to provide outreach, community development, communication links, technical assistance, research support, and evaluation mechanisms in association with other WV cancer screening and treatment activities.

Trust can be an issue for (academic) health care providers when attempting to change long held attitudes and behaviors of women in remote communities where mobile screening mammography services have potential to improve care. Lack of trust for outsiders has been identified as a belief held by rural Appalachian families. For WV mobile mammography screening to succeed, involved health care providers need to earn trust and be available - to be ‘insiders’. A 1997 study of breast self-examination in West Virginia found that 35% of the women stated they did not want to know of a cancer diagnosis. These women also showed less motivation to participate in health promotion than other study participants and did not know of any benefits to performing routine Breast Self Examination (BSE) (2). These same beliefs have been reported regarding attitudes of women towards mammography. Davis and colleagues suggest that to impact disparities in cancer care, treatment and communication must be “accessible, acceptable, and culturally considerate.” (3) Appalachian communities have an unique culture and are justifiably proud of their heritage and accomplishments; loyalty to family and community is a strong asset in their continued existence. There is a reluctance to respond to outsiders; past participants of focus groups in West Virginia stated they received their health care information from family members.
who they trust. They often do not discuss health related problems with those outside the family.

Before sending Bonnie’s Bus into the first community, the mobile mammography team at West Virginia University’s Mary Babb Randolph Cancer Center (MBRCC) worked with communities in Berkeley, Brooke, Logan, McDowell, and Monongalia counties that would be locations for the mobile screening in order to identify and build upon their mutual strengths and resources. Screening for breast cancer in Appalachia has unique challenges; community collaboration using our Community Voices approach provides solutions.

Description

The Community Voices approach to engaging communities was designed to help community members themselves identify needs, set methods, and analyze what happens – a “community-based participatory research” (CBPR) method. Fundamental characteristics of a CBPR project are: community members are directly involved (participatory); members of the community and the researchers work together (cooperative); community and research members learn from each other (co-learning process); changes are at the community level (systems development) with local communities able to continue the changes (capacity building); and community members can increase control over their lives (empowerment). CBPR achieves a balance between research, i.e., developing new knowledge, and actual program development/implementation, i.e., making something happen that has the potential to help the community (6).

Early steps focused on understanding the community, its history and culture by talking to community leaders and conducting focus groups using CBPR methods. The authors thought that community leaders’ information would be valued to the extent it could be applied when “Bonnie’s Bus” rolled into their communities, so a proven approach to community engagement was desired. Community leaders have the ability to make decisions as to where screening might best be held, how to contact residents, what to include in the information that is sent to residents, and so on. One key in building the relationship is identifying where the community needs and desires overlap with the services offered. When leaders feel that they are respected and acknowledged, i.e., true partners, activities can move to the next step—involving and organizing community residents in the actual screening visit.

In summary, we found the essential elements of CBPR require the approach to:

- Use key issues that the community leaders have helped identify – those that overlap with services that can be provided – to ASK community members to become involved in finding solutions.
- Start with identifying the community assets – what individual skills and talents community members already possess.
- Find out if there are already community projects underway such as health fairs or extension service educational sessions that can be built on as valuable assets
- Make a defined role for participants so they know what they are being asked to do and thank them for being willing to help. Ask people to help you build a network of community resource people who they know can help – nurses, doctors, teachers, community workers, and so on.
- Work with these identified resource people to expand the network of community members to work together to solve their problems – empower them.

More detailed information on CBPR resources is available online at the Points of Light website (10), http://www.pointsoflight.org/downloads/pdf/A_Matter_of_Survival_Worksheets.pdf

Methodology

The purpose of the Community Voices project was to identify women’s attitudes and beliefs about mobile mammography and to develop an effective community recruitment procedure. We first developed a focus group/key informant guide for participants to share their knowledge, feelings, and beliefs about women’s health issues, breast health, mobile mammography, ideas about things that are unique to their communities, and a brief questionnaire to collect demographic information, plus where and how they receive their health information and health care services. Fifty-eight participants from five groups, including formal (mayor, council members) and informal (pastors, women’s clubs) community leaders, completed an informed consent and 54 of the 58 completed the questionnaire. Sessions were audio recorded, transcribed verbatim, and analyzed (i.e., coded) for community recommendations.

Findings

Almost one-third (31%) of participants were aged 40 to 49 years, 53% were aged 50-64 years, and 16% were older than 65. Household income ranged from less than $10,000 to more than $60,000 with the mode being $20,000-$30,000. A majority
(52%) of participants had a high school diploma or its equivalent, but the groups ranged from less than a 9th grade education to those with advanced degrees. Three-fourths of the women had health insurance and 79% had a primary health care provider, but only 60% had a mammogram in the last year.

Examples of recommendations from focus groups in West Virginia communities are listed in Table 1. Protocol suggestions were to ensure advanced notice (6-8 weeks), to educate people about what screening includes, to provide a comfortable waiting area, good parking, short wait times, to provide refreshments, and to schedule around community celebrations with balloons, banners, and flags around the Bus. In addition, it was suggested the program “be organized”, important information and advertisements include an 800 number and the program inform a community if walk-ins are welcome in addition to scheduled appointments. Some of the messages that the women thought useful in advertising the screenings included “This is for you – do it for yourself- you’re worth it.” “If you don’t take care of yourself, you can’t be there to take care of others.” Many of the participants came to the focus group with a friend so the suggestion to “take a friend with you” was no surprise. These protocol suggestions were incorporated in marketing the program, and to date over 100 appointments have been scheduled for the first six months of the scheduled visits.

Finally in the focus groups we determined that women would have a number of questions and that a packet or checklist should be sent to all women making appointments for care. The participants told us that regardless of the “date and place” messages, we needed to address time and money issues. Incorporating their suggestions, information packets were prepared to include details about the appointment, screening guidelines, documentation needed for the appointment (including payment options), how long the visit would likely last, and how the results would be provided to their primary care provider and the woman screened.

**Discussion**

A frequent challenge of previous community projects has been unrealistic expectations. This was evident in questions that surfaced in the focus groups, e.g., could the first stop of Bonnie’s Bus in a community really screen 50 women in one afternoon – could screening five women be considered a good first step to getting the system in place? Being clear as to what can be offered, answering questions in advance as to cost and availability, and having a prepared plan for how to move from screening to treatment if cancer is identified are essential components of building and keeping the trust of a community in this project. The mobile unit team remains committed to working with the community partners for a sustainable program. The community partners are essential to maintaining the desire and enthusiasm for helping women and their health care providers see the value in using the services offered. Measuring results such as decreasing deaths from breast cancer will take years, but measuring the difference in the value of community involvement in developing solutions, rather than telling communities what they “should” do, can be measured quickly in terms of how residents value and use Bonnie’s Bus. Our focus will start with increasing the number of women screened and improving access to earlier
treatment. Those committed to Bonnie’s Bus Mobile Mammography Project understand the issues facing many West Virginia residents including lack of insurance, poverty, rural access impediments, and a limited provider workforce. If the Community Voices approach assists women to improve their comfort, increase affirmative decisions to be screened, and enhance clinician’s knowledge of a system of resources available to promote continuity of care, mobile mammography screening has the potential to improve outcomes for WV women. By building on the strengths of both Cancer Center leaders and the community, we are confident that integrated “community voices” can decrease the health care burden and improve the quality of life in WV.

References
1. Patton, C.M. Rural Appalachian women: A vulnerable population in de Chesnay, M(eds) Caring for the Vulnerable, 2005; 277-282, Jones & Bartlett; Sudbury, MA

CME Post-Test

46. T or F The Community Voices approach to engaging communities was designed to help community members themselves identify needs, set methods, and analyze what happens

47. To impact disparities in cancer care, research has found that treatment and communication must be “accessible, acceptable, and _________________.
   a. Applicable to all cultures
   b. Culturally considerate
   c. Primarily done by physicians
   d. Primarily done by nurses

48. Which of the following is NOT a component of Community Based Participatory Research Methodology (CBPR)?
   a. Empowerment
   b. Capacity building
   c. Randomization
   d. Systems development

49. T or F In CBPR, one key in building the relationship is identifying where the researchers needs and desires overlap with the services offered in the community.
This dedicated issue of the West Virginia Medical Journal is jointly sponsored by CAMC Health Education and Research Institute, a continuing education enduring material.

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Answers (please circle your response)

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7. T F 20. a b c d e 33. a b c 46. T F
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13. T F 26. a b c d 39. a b c d
### Course Evaluation

#### Score Presentation 1 to 5

- Extent to which the course objectives were met
- Potential impact on your practice
- Appropriate, qualified authors
- Avoided commercial bias or influence
- Article topics

Your **overall evaluation** of the course

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1. Building a Statewide Clinical Trials Network for Cancer Care in West Virginia
2. Psychosocial Oncology Services in West Virginia
3. Current Concepts in Breast Reconstruction
4. Breast Cancer Screening, Incidence and Mortality in West Virginia
5. Use of Radiation after Breast Conserving Surgery
6. Breast Cancer in South Central West Virginia
7. Smoking and Breast Cancer Screening in West Virginia
8. Triple-Negative Breast Cancer in West Virginia
9. The Role of Ultrasound in Breast Imaging
11. High Tech to High Touch: Integrating Community Voices
12. Perspectives on Cancer Health Disparities in West Virginia
13. Physician Perspective—Belonging to that “Special Club”

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What practice gaps were covered by the material presented in this issue?

__________________________________________________________________________________________________

What will you do differently in your practice as a result of your participation in this course?

__________________________________________________________________________________________________

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__________________________________________________________________________________________________

Suggestions for future topics?

__________________________________________________________________________________________________

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