



National Report • Program Years 2003-2014

## *Summarizing the Second Decade of Progress Towards Breast and Cervical Cancer Control*



**U.S. Department of Health and Human Services**  
Centers for Disease Control and Prevention



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## Foreword

Since the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) was first implemented in 1991, this program has become and still is the only organized national cancer screening program that exists in the U.S. Built on a public health model, the NBCCEDP targets high risk women in low income communities. It focuses on outreach, education, screening, diagnostic testing, timely follow-up of abnormal findings, referral for treatment, professional development, quality assurance, monitoring of clinical data, and program evaluation to ensure high quality care.

This National Report reports data on the millions of women screened by the program over an 11 year period (2003-2014) including the number diagnosed with pre-invasive or invasive breast and cervical cancer. Without the NBCCEDP, many of these women may not have had access to cancer screening services. Numerous studies of the NBCCEDP published in peer-reviewed journals speak to the effectiveness and high quality of this program.

These accomplishments in saving lives through a high quality organized cancer screening program are a credit to the Centers for Disease Control and Prevention's (CDC) long-time program leadership along with the dedication and hard work of grantees on the ground in communities across the country—the states, DC, tribes and tribal organizations, and U.S. territories who receive NBCCEDP funding from CDC—and their clinical providers and community partners.

For all the NBCCEDP grantees, CDC staff, and partners who tirelessly work to make sure underserved women obtain quality breast and cervical cancer screening and diagnostic services, a sincere thanks to each and every one of you!

### **Faye L. Wong, MPH**

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## Executive summary

The National Breast and Cervical Cancer Early Detection Program (NBCCEDP) was authorized by the Breast and Cervical Cancer Mortality Prevention Act of 1990 to provide breast and cervical cancer screening and diagnostic services to low income, under- and uninsured women. Breast and cervical cancers are more often diagnosed at a later stage and cause more cancer deaths among medically underserved women. These disparities could be reduced if all women are able to receive appropriate screening, diagnostic, and treatment services. The NBCCEDP became a nationwide program by 1996, providing services to women who would otherwise not have access to potentially life-saving care. In Program Year (PY) 2014, the last year addressed in this report, the NBCCEDP funded all 50 states, the District of Columbia, 5 territories, and 11 Native American/Alaska Native tribes or tribal organizations. From PY1991 to PY2014, the NBCCEDP served 4.8 million women and provided over 12 million screening examinations. These services resulted in 55,262 invasive breast cancers, 17,811 pre-invasive breast lesions, 3,553 invasive cervical cancers, and 166,082 pre-invasive cervical lesions being diagnosed. Women who are diagnosed with breast or cervical cancer or pre-cancers through the NBCCEDP could be eligible for treatment through Medicaid under the Breast and Cervical Cancer Mortality Treatment Act of 2000.

This report provides an update to the previous report on the first 10 years of the NBCCEDP, presenting programmatic information along with screening, diagnostic and outcomes data for women served from PY2003 through PY2014. As the NBCCEDP evolves to engage a dynamic health reform environment, eligible women will continue to be provided cancer screening by the program. Additionally, greater emphasis will be given to improving clinic-level cancer screening rates in health systems that serve low income women. Moreover, community partners remain essential to improving breast and cervical cancer control for more low-income women.

# 1 The National Breast and Cervical Cancer • Early Detection Program (NBCCEDP) overview

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## 1.1. Background

Breast cancer is a significant burden among women and is the most commonly diagnosed cancer among women in the United States.<sup>1</sup> While the rate of deaths from breast cancer has decreased since 2004, it is the second most common cause of cancer deaths in US women.<sup>2</sup> Among Hispanic women, breast cancer is the number one cause of cancer deaths.<sup>1</sup> According to the most recent US Cancer Statistics report, 242,476 women were diagnosed with breast cancer, and 41,523 women died from the disease in 2015.<sup>1</sup>

Cervical cancer once was the leading cause of death for women in the United States. Over the past five decades however, incidence and mortality from cervical cancer have declined significantly, in large part because of the widespread use of the Papanicolaou (Pap) test to detect cervical abnormalities.<sup>3</sup> While recent trends suggest a decline in cervical cancer incidence and mortality overall, rates are considerably higher among Hispanic and African-American women.<sup>1</sup> In 2015, 12,845 women were diagnosed with cervical cancer, and 4,175 women died from the disease.<sup>1</sup>

Many deaths could be avoided by improving cancer screening rates among women at risk for breast and cervical cancer. Mammography screening every two years for women aged 50-74 years can reduce breast cancer mortality by approximately 26 percent according to a study conducted for the United States Preventive Services Task Force (USPSTF) review.<sup>4</sup> Pap tests can detect precursors of cervical cancer, which, if diagnosed and treated in a timely manner, can prevent the development of invasive disease.<sup>3</sup> Additionally, Pap tests can detect invasive cervical cancer at an early stage, when it is most curable. As of 2014, the USPSTF recommended mammograms every 2 years for women aged 50-74 years; Pap testing every 3 years for women aged 21-29 years; and Pap testing every 3 years or Pap testing with HPV testing every 5 years for women aged 30-65 years.<sup>5</sup>

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## 1.2. Creation of the NBCCEDP

Despite the availability of screening tests, deaths from breast and cervical cancer occur more frequently among women who are uninsured or underinsured. Mammography and Pap tests are underutilized by women who have less than a high school education, do not have a usual source of health care, live below the poverty level, or are members of certain racial or ethnic minority groups.<sup>6</sup> To help improve access to breast and cervical cancer screening among at-risk populations in the United States, Congress passed the Breast and Cervical Cancer Mortality Prevention Act of 1990, which authorized the Centers for Disease Control and Prevention (CDC) to create the National Breast and Cervical Cancer Early Detection Program (NBCCEDP).<sup>7</sup> This program, which Congress first funded at \$30 million in fiscal year 1991, has expanded nationwide with an appropriation of approximately \$155 million by fiscal year 2014. There have been two peer-reviewed journal supplements published that describe the activities and health impact of the NBCCEDP. A list of the peer-reviewed articles can be found in Appendix 1.

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## 1.3. Services provided

The NBCCEDP provides screening and diagnostic services for both breast and cervical cancers. To receive screening services through the NBCCEDP, a woman must be uninsured or underinsured and have an income equal to or less than 250 percent of the federal poverty level. Women ages 21-64 years old who meet these requirements are eligible to receive cervical cancer screening and diagnostic services. Women ages 40-64 years old who meet these requirements are eligible to receive breast cancer screening services. Special emphasis is placed on reaching women who are geographically or culturally isolated, or members of racial or ethnic minorities with higher disease burden. The NBCCEDP grantees have the flexibility to prioritize the population they serve based on their cancer burden, environment, available resources, and goals. Over half of the women screened through the program are from racial or ethnic minority groups. CDC's policy establishes that at least 75% of program-funded screening mammograms be provided to women ages 50-64 years given the higher incidence of breast cancer among older women.<sup>1</sup> In addition, a minimum of 20% of the women screened for cervical cancer must be those who have not been screened within the past 5 years or not been screened ever (i.e., rarely/never screened women) because this group is at highest risk for cervical cancer.<sup>3</sup>

Underserved women often face significant barriers to accessing and completing cancer screening and diagnostic services. In addition to paying for screening and diagnostic tests, the NBCCEDP provides patient navigation to help women access services and complete the screening process. For purposes of the NBCCEDP, patient navigation is defined as individualized assistance to help women overcome barriers and facilitate timely access to quality services, as well as the timely initiation of treatment services for those diagnosed with cancer. Priority for patient navigation is given to women who would otherwise not complete the screening process.

In order to provide high quality breast and cervical cancer screening and diagnostic services, the NBCCEDP is a comprehensive, organized program based on a public health model. This model spans from increasing awareness among women, through the screening and diagnostic continuum, to treatment referral for women diagnosed with cancer. The NBCCEDP includes eight overarching components that support the delivery of screening and diagnostic testing. These include



#### Public education and outreach

Increasing awareness and knowledge of breast and cervical cancer screening can motivate women to get appropriate testing. Strategies are implemented at the individual, organizational, and community levels to address barriers and impact behavior choices.



#### Quality assurance/quality improvement

To ensure that women receive appropriate and high quality clinical services, the receipt of NBCCEDP clinical services are compared against pre-determined quality indicators to ensure timely follow-up of abnormal screening results and referral into treatment.



#### Professional development

To increase knowledge of evidence-based clinical standards among providers, professional development helps to ensure that women receive appropriate screening, have timely follow-up of abnormal results, and experience improved clinical outcomes.



#### Partnerships

National and local partnerships are key to the effectiveness and reach of the NBCCEDP. Partners provide leadership, expertise, resources, and access to established professional and community networks that help grantees reach the right populations.



#### Patient navigation and case management

Helping women overcome barriers can result in obtaining adequate screening, rescreening, follow-up testing, and treatment in a timely fashion.



#### Data management

Patient-level data are collected on each woman screened through the NBCCEDP and are used to monitor program quality, trends, and outcomes. Grantee-specific feedback reports, based on their data, are generated bi-annually and used for quality improvement.



#### Evaluation

Assessing program performance is a critical step to ensuring quality delivery of program services and assessing program effectiveness and impact. Evaluation findings inform program planning and policy development.



#### Program management

Leadership at the grantee level is required to ensure that program policies and procedures are appropriately implemented, budgets are monitored, qualified staff are maintained to carry out the program, and there is effective communication and coordination between the grantees and CDC and with clinical and community partners.

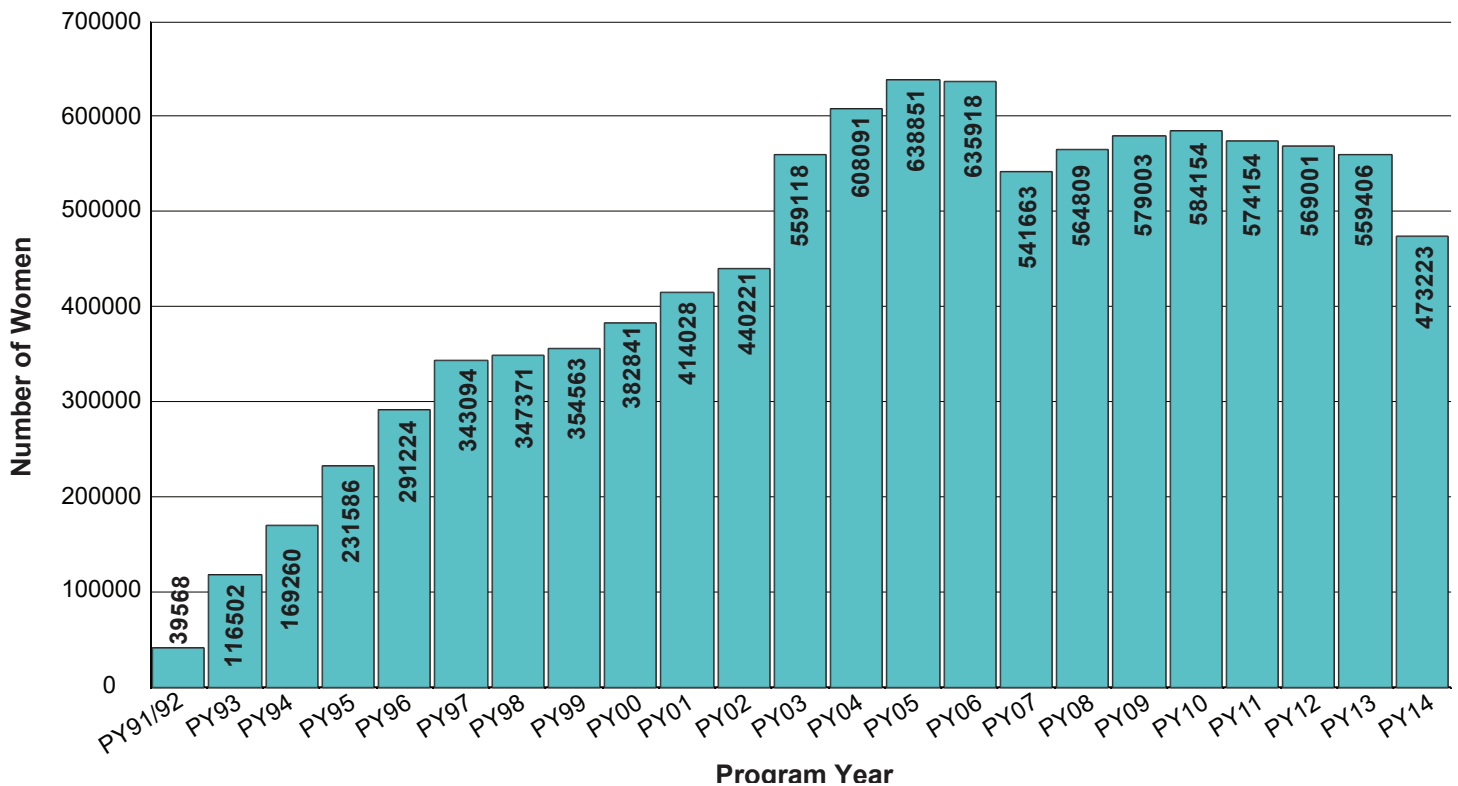


## 2. NBCCEDP participation

### 2.1. Women served

The NBCCEDP is dedicated to ensuring that eligible women in the United States receive high-quality screening services and prompt follow-up of abnormal findings. It is estimated that 9.8% of women in the U.S. were eligible for NBCCEDP breast cancer screening services and 11.1% were eligible for cervical cancer screening services from 2010–2012.<sup>8,9</sup> During that time period, the NBCCEDP served 10.6% of women eligible for breast cancer services and 6.5% of those eligible for cervical cancer services.<sup>8,9</sup> From PY1991 to PY2014, more than 12 million screening examinations were provided to 4.9 million women through the NBCCEDP.

**Figure 1.** Total Number of Women Served Through the NBCCEDP, PY91—PY14\*

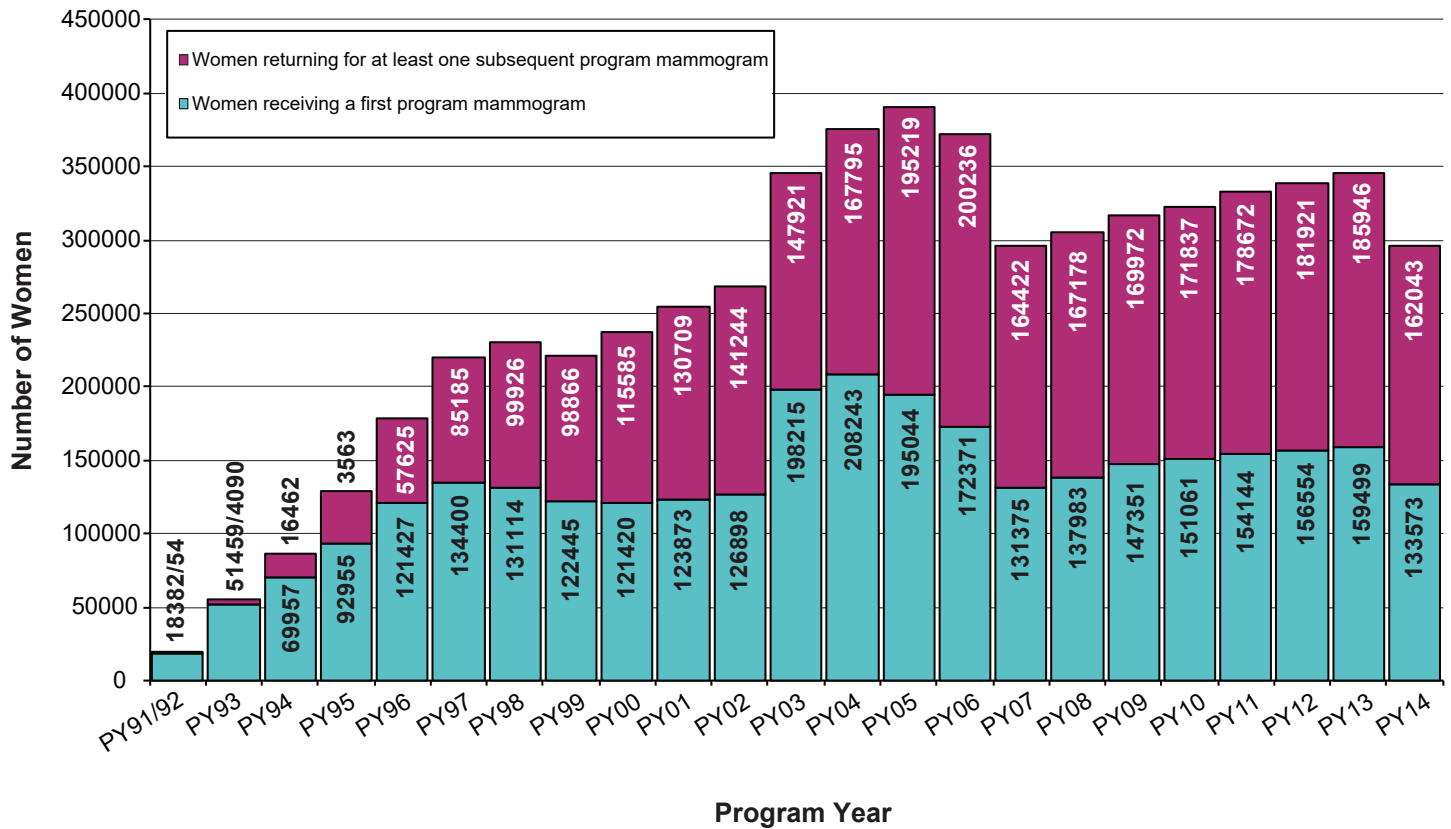


\*During this period, 4,903,903 women received at least one paid screening or diagnostic procedure through the NBCCEDP.

## 2.2. Number of women receiving mammograms

Through PY2014, more than 3 million women have received mammograms through the NBCCEDP (Figure 2). Since PY2003, approximately 300,000 to 400,000 women received mammograms each year. About half of these women received their mammogram through the program for the first time. Since PY2003, there has been a decline in the number of women receiving mammograms from 346,136 to 295,616 in PY2014.

**Figure 2. Number of Women Who Received Mammograms Through the NBCCEDP, PY91—PY14\***

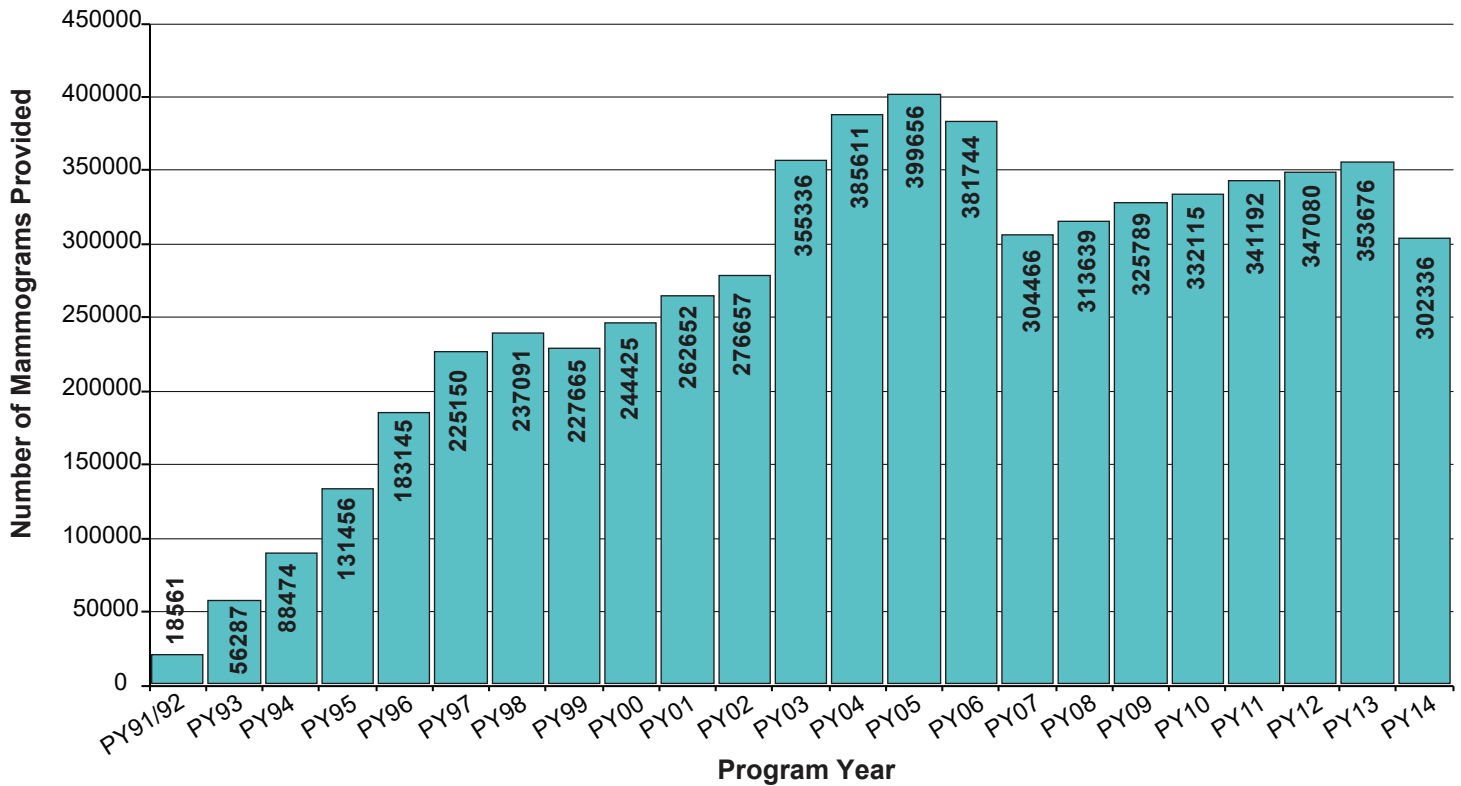


\*During this period, 3,059,743 women received at least one paid mammogram through the NBCCEDP.

### 2.3. Number of mammograms provided

Since inception of the NBCCEDP in 1991, approximately 6.1 million mammograms were provided with NBCCEDP funds (Figure 3). There was a steady increase in mammograms provided since PY2007. In PY2014, a decrease in the number of mammograms provided was observed. An additional 1.2 million mammograms were provided to women that were served through the NBCCEDP, but these mammograms were paid with other non-NBCCEDP funds.

**Figure 3.** Number of Mammography Screenings Provided Through the NBCCEDP, PY91—PY14\*

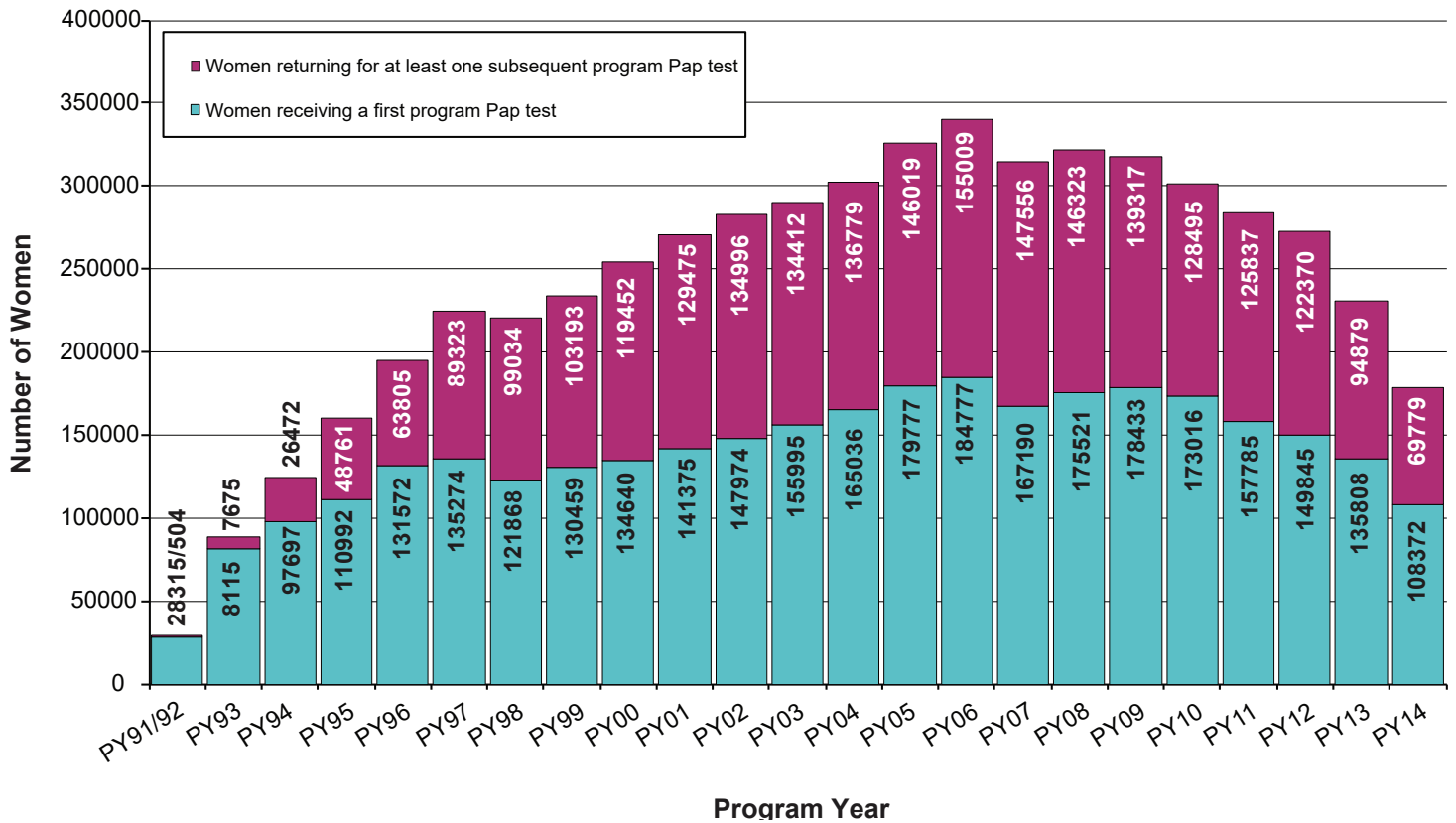


\*During this period, 6,094,203 mammograms were directly paid for with federal funds. An additional 1,200,589 mammograms paid for with non-federal funds were provided to women who received at least one other NBCCEDP-funded service.

## 2.4. Number of women receiving Pap tests

Nearly 3.2 million women have received Pap testing through the NBCCEDP since PY1991 (Figure 4). Almost half of the women returned for at least one subsequent Pap test. Since PY2006 the number of women receiving Pap tests annually has gradually decreased.

**Figure 4.** Number of Women Who Received Pap Tests Through the NBCCEDP, PY91—PY14\*

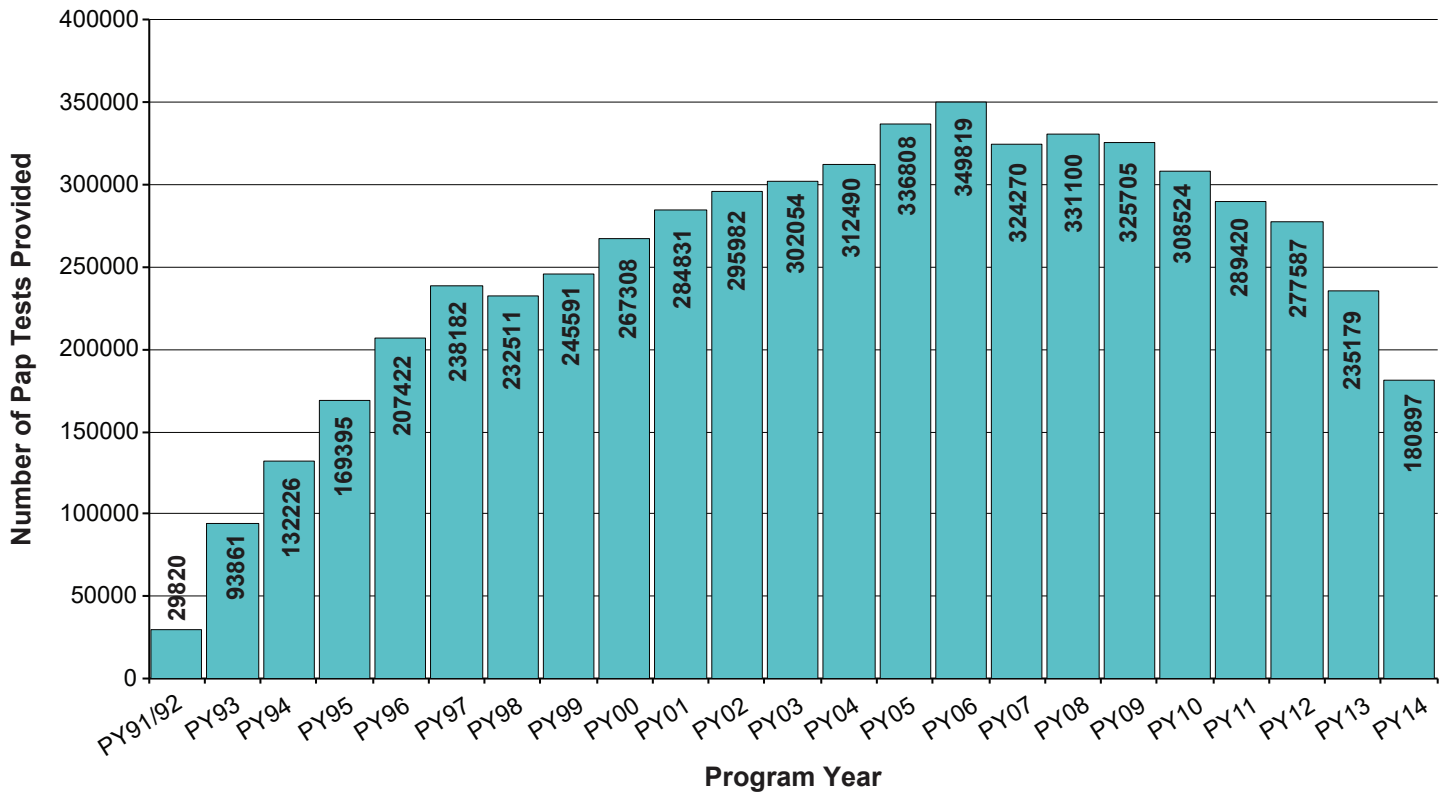


\*During this period, 3,192,836 women received at least one paid Pap test through the NBCCEDP.

## 2.5. Number of Pap tests provided

Almost 5.8 million Pap tests were provided with NBCCEDP funds (Figure 5). Consistent with the number of women receiving Pap tests, the number of Pap tests provided has decreased since PY2006. There were an additional 356,500 non-NBCCEDP funded Pap tests provided to women who were served by the Program.

**Figure 5.** Number of Pap Test Screenings Provided Through the NBCCEDP, PY91—PY14\*



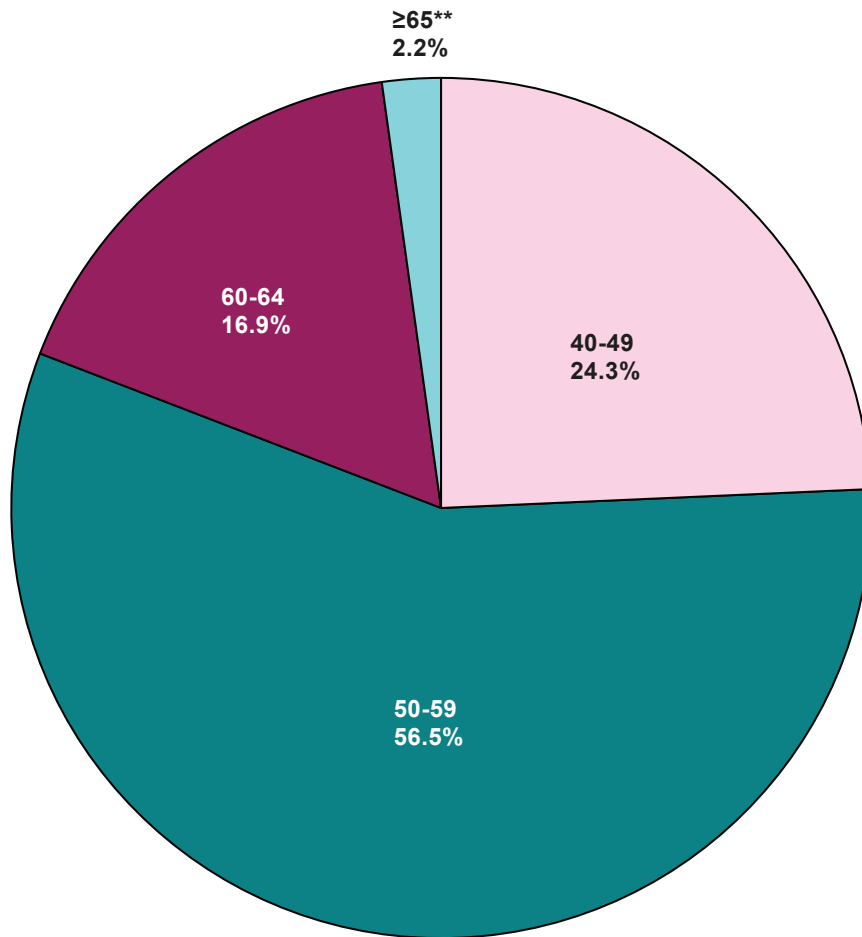
\*During this period, 5,770,982 Pap tests were directly paid for with federal funds. An additional 356,503 Pap tests paid for with non-federal funds were provided to women who received at least one other NBCCEDP-funded service.

# 3 • Breast cancer screening

## 3.1. Mammography age distribution

Figure 6 illustrates the age distribution among women who received a mammogram through the NBCCEDP from PY2003 to PY2014. At the time of their first program mammogram, over half of the women were aged 50-59 years which is consistent with the priority focus on women aged 50-64 years. Only 2.2% of women were over the age of 64 years. This reflects the fact that only a small number of women aged 65 years and older either did not qualify for Medicare or could not afford the Medicare Part B premiums.

**Figure 6.** Age\* Distribution of Women Who Received Mammograms Through the NBCCEDP, PY03—PY14

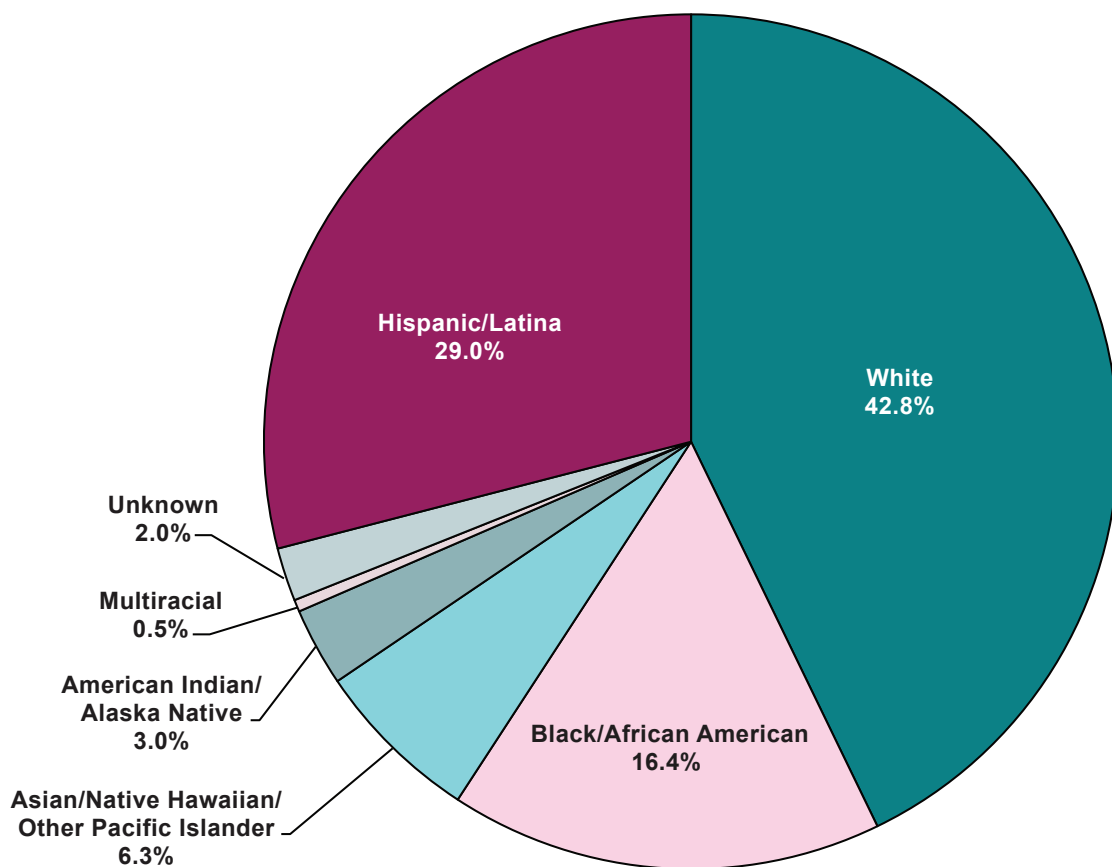


\*Age at time of first mammogram.

\*\*Most women 65 years of age or older were not served through the NBCCEDP because of eligibility for Medicare Part B coverage.

### 3.2. Mammography race/ethnicity distribution

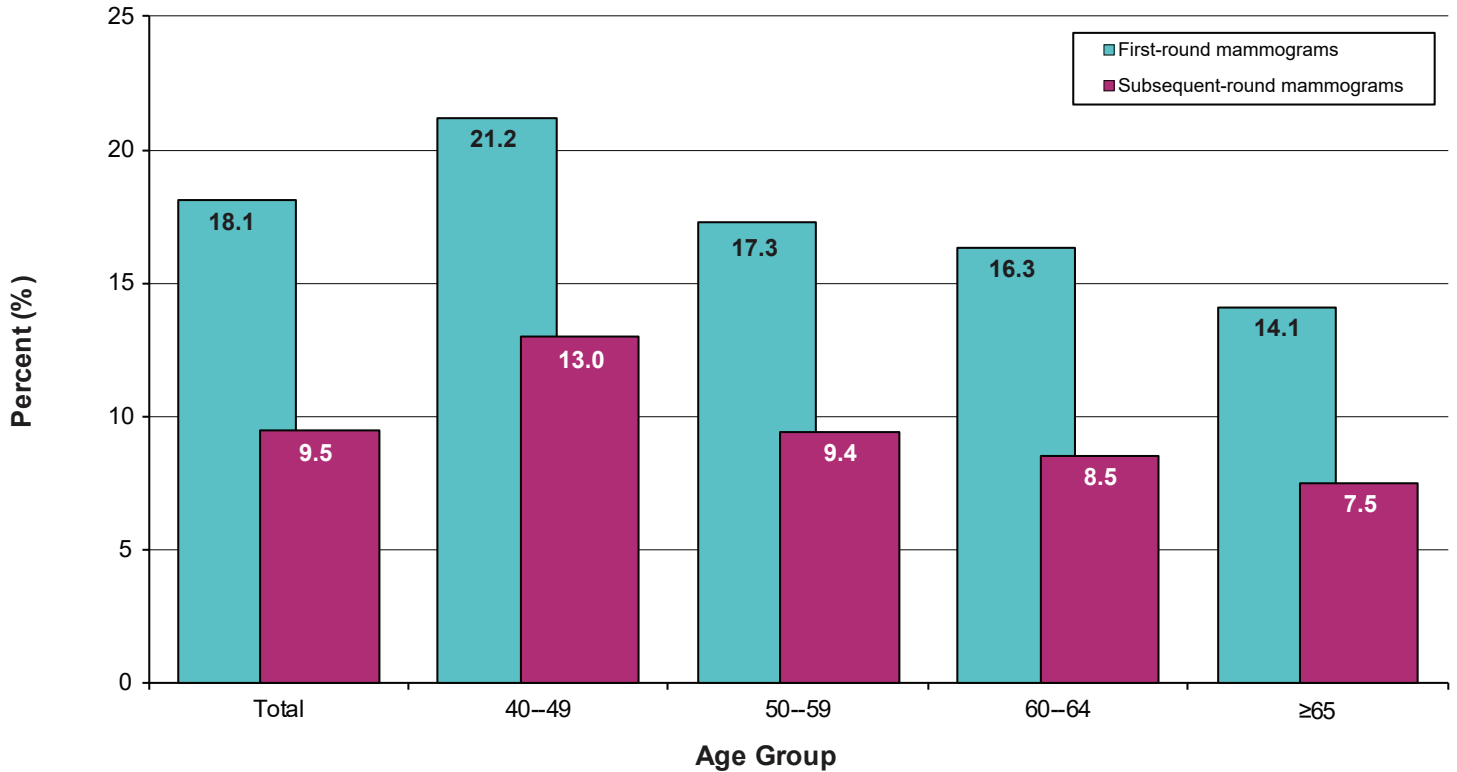
The racial/ethnic distribution of women receiving mammograms through the NBCCEDP was diverse. Figure 7 shows that 55% of the women were Hispanic/Latina, Black/African American, Asian/Native Hawaiian/Pacific Islander, American Indian/Alaska Native, or multiracial.



### 3.3. Breast cancer screening results

Abnormal mammogram results included findings of suspicious abnormality, highly suggestive of malignancy, and assessment incomplete. For women receiving their first program mammogram (first round) in the NBCCEDP, 18.1% were abnormal. For those whose mammograms were subsequent mammograms (subsequent round), 9.5% of screening mammograms were abnormal (Figure 8). The percentage of abnormal mammograms was highest among women aged 40-49 years and decreased with increasing age for both screening rounds.

**Figure 8.** Percentage of Screening Mammograms That Were Abnormal\* Among Women in the NBCCEDP, by Age Group and Screening Round, PY03—PY14



\*Includes the following mammogram results: "suspicious abnormality," "highly suggestive of malignancy," and "assessment incomplete."



Table 1 shows the distribution of breast cancer screening results by age groups and screening rounds. In the first screening round (i.e., first mammogram in the NBCCEDP), more than 75% of mammograms were either negative or benign findings among all age groups. Of the abnormal findings, most were classified as assessment incomplete. During subsequent rounds, the percent of abnormal mammograms was lower. Table 2 shows the distribution of breast cancer screening results by race/ethnicity groups and screening round. White women and black/African American women had higher percentages of abnormal screening results in both first and subsequent rounds.

<b>Table 1. Distribution (%)* of Breast Cancer Screening Results Among Women in the NBCCEDP, by Age Group and Screening Round, PY03—PY14</b>					
	<b>Age Group (Years)</b>				
	<b>Total</b>	<b>40--49</b>	<b>50--59</b>	<b>60--64</b>	<b>≥65***</b>
<b>First-Round Mammograms (n)**</b>	<b>1,898,667</b>	<b>495,597</b>	<b>1,067,883</b>	<b>296,431</b>	<b>38,756</b>
Negative	47.2	48.1	47.1	45.5	50.9
Benign	31.4	26.2	32.7	35.5	31.7
Probably benign	3.2	4.4	2.8	2.7	3.1
Suspicious abnormality	1.6	2.5	1.3	1.3	1.0
Highly suggestive of malignancy	0.6	0.6	0.5	0.8	0.7
Assessment incomplete	15.9	18.1	15.5	14.2	12.4
Unsatisfactory	0.1	0.1	0.0	0.0	0.1
<b>Total abnormal mammograms****</b>	<b>18.1</b>	<b>21.2</b>	<b>17.3</b>	<b>16.3</b>	<b>14.1</b>
<b>CBE Results (n)</b>	<b>1,691,589</b>	<b>442,567</b>	<b>952,322</b>	<b>261,599</b>	<b>35,101</b>
Normal/Benign	92.3	86.2	94.4	94.8	95.9
Abnormal	7.7	13.8	5.6	5.2	4.1
<b>Subsequent-Round Mammograms (n)**</b>	<b>2,101,517</b>	<b>197,685</b>	<b>1,274,059</b>	<b>573,461</b>	<b>56,312</b>
Negative	48.7	51.2	49.0	46.8	51.9
Benign	39.8	32.6	39.6	42.8	38.7
Probably benign	2.1	3.2	2.0	1.9	1.9
Suspicious abnormality	0.6	1.2	0.6	0.6	0.4
Highly suggestive of malignancy	0.1	0.1	0.1	0.1	0.1
Assessment incomplete	8.7	11.8	8.7	7.9	7.0
Unsatisfactory	0.0	0.1	0.0	0.0	0.0
<b>Total abnormal mammograms****</b>	<b>9.5</b>	<b>13.0</b>	<b>9.4</b>	<b>8.5</b>	<b>7.5</b>
<b>CBE Results (n)</b>	<b>1,850,475</b>	<b>173,950</b>	<b>1,125,750</b>	<b>502,685</b>	<b>48,090</b>
Normal/Benign	96.7	92.9	96.9	97.3	97.7
Abnormal	3.3	7.1	3.1	2.7	2.3
*Totals may not add to 100% due to rounding.					
**Mammography test results are categorized using the American College of Radiology Breast Imaging Reporting and Data System (BI-RADS).					
***Most women 65 years of age or older were not served through the NBCCEDP because of eligibility for Medicare Part B coverage.					
****Includes the following mammogram results: "suspicious abnormality," "highly suggestive of malignancy," and "assessment incomplete."					

**Table 2. Age-Adjusted\* Distribution (%)\*\* of Breast Cancer Screening Results Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03—PY14**

	Race/Ethnicity						
	Total*	White	Black/ African American	Asian/Native Hawaiian/ Other Pacific Islander	American Indian/ Alaska Native	Multiracial/ Unknown	Hispanic/ Latina
<b>First-Round Mammograms (n)***</b>	<b>1,898,667</b>	<b>794,041</b>	<b>311,949</b>	<b>128,276</b>	<b>45,989</b>	<b>48,475</b>	<b>569,937</b>
Negative	47.1	43.4	41.9	58.9	56.0	50.3	50.8
Benign	32.1	33.5	35.2	24.4	27.3	29.2	30.7
Probably benign	3.1	3.4	3.4	2.0	1.9	3.5	2.9
Suspicious abnormality	1.5	1.8	1.6	1.2	1.0	1.6	1.2
Highly suggestive of malignancy	0.6	0.9	0.6	0.4	0.5	0.7	0.3
Assessment incomplete	15.6	17.0	17.2	13.0	13.2	14.6	14.0
Unsatisfactory	0.1	0.0	0.0	0.1	0.0	0.1	0.1
<b>Total abnormal mammograms****</b>	<b>17.7</b>	<b>19.7</b>	<b>19.5</b>	<b>14.6</b>	<b>14.7</b>	<b>16.8</b>	<b>15.5</b>
<b>CBE Results (n)</b>	<b>1,691,589</b>	<b>694,500</b>	<b>270,144</b>	<b>118,924</b>	<b>36,916</b>	<b>42,469</b>	<b>528,636</b>
Normal/Benign	93.0	90.5	92.3	96.8	94.9	93.6	95.0
Abnormal	7.0	9.5	7.7	3.2	5.1	6.4	5.0
<b>Subsequent-Round Mammograms (n)***</b>	<b>2,101,517</b>	<b>981,412</b>	<b>346,762</b>	<b>115,074</b>	<b>96,302</b>	<b>36,452</b>	<b>525,515</b>
Negative	49.1	46.0	43.8	61.2	62.3	53.0	51.5
Benign	38.7	40.9	43.2	29.0	27.8	35.3	36.9
Probably benign	2.2	2.5	2.5	1.6	1.2	2.0	2.0
Suspicious abnormality	0.7	0.8	0.8	0.6	0.5	0.7	0.6
Highly suggestive of malignancy	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Assessment incomplete	9.1	9.6	9.6	7.5	8.0	8.7	8.8
Unsatisfactory	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>Total abnormal mammograms****</b>	<b>9.9</b>	<b>10.5</b>	<b>10.5</b>	<b>8.1</b>	<b>8.6</b>	<b>9.6</b>	<b>9.5</b>
<b>CBE Results (n)</b>	<b>1,850,475</b>	<b>851,449</b>	<b>298,670</b>	<b>107,023</b>	<b>78,555</b>	<b>32,606</b>	<b>482,172</b>
Normal/Benign	96.2	95.5	95.4	98.4	96.8	96.2	96.6
Abnormal	3.8	4.5	4.6	1.6	3.2	3.8	3.4

\*Age-adjusted to the 2000 NBCCEDP population.

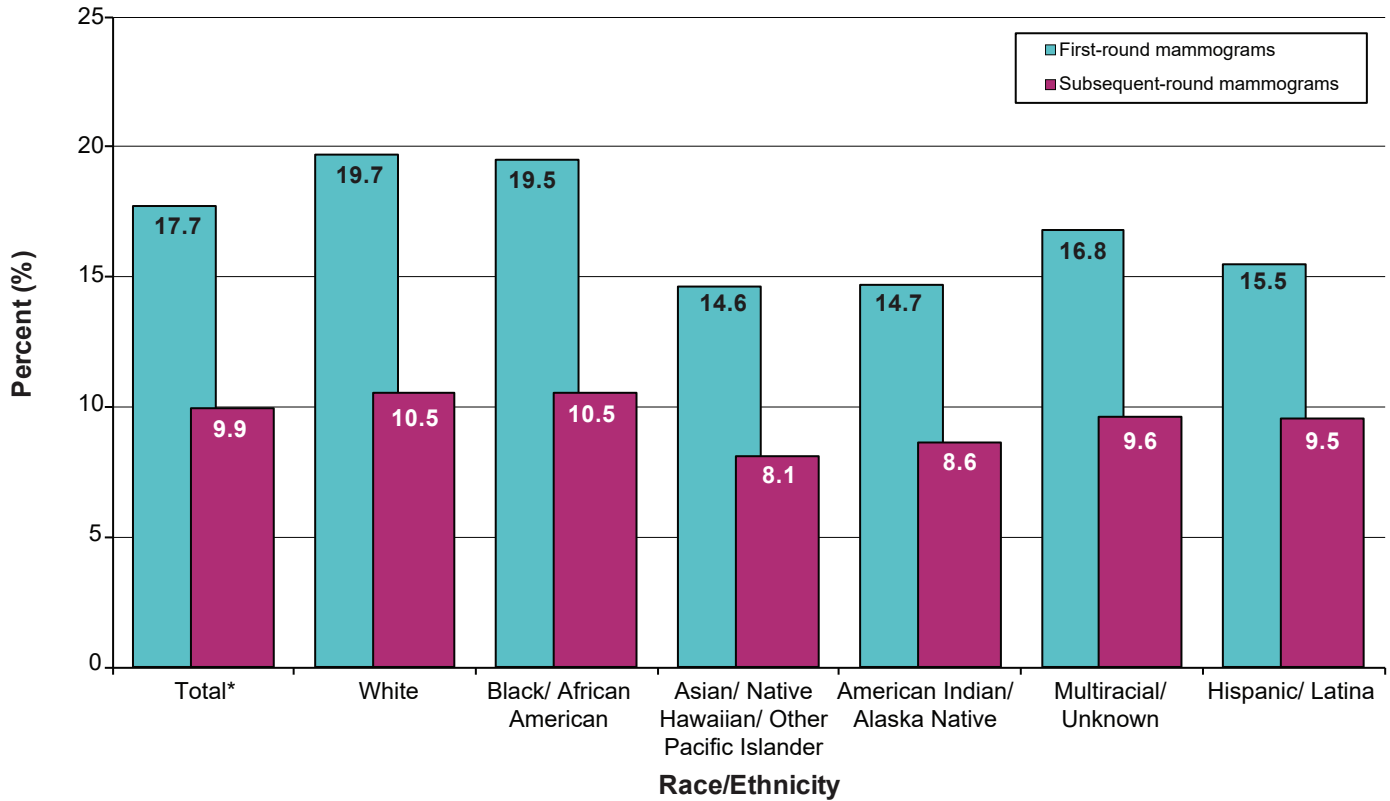
\*\*Totals may not add to 100% due to rounding.

\*\*\*Mammography test results are categorized using the American College of Radiology Breast Imaging Reporting and Data System (BI-RADS).

\*\*\*\*Includes the following mammogram results: “suspicious abnormality,” “highly suggestive of malignancy,” and “assessment incomplete.”

When age-adjusted to the 2000 NBCCEDP population, 17.7% of screening mammograms were abnormal among first-round mammograms and 9.9% among subsequent-round mammograms. Figure 9 depicts stratification by race/ethnicity, the percentages of abnormal mammograms were highest among white women and black/African American women, again for both first and subsequent rounds.

**Figure 9. Age-Adjusted\* Percentage of Screening Mammograms That Were Abnormal\*\* Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14**



\*Age-adjusted to the 2000 NBCCEDP population.

\*\*Includes the following mammogram results: "suspicious abnormality," "highly suggestive of malignancy," and "assessment incomplete."

### 3.4. Breast cancer diagnostic follow-up

Diagnostic follow-up for abnormal breast cancer screening results includes any additional imaging or surgical procedures as a result of an abnormal CBE, abnormal mammogram, or high level of concern by the patient or clinician. The rate of any diagnostic procedure was 234.5/1,000 mammograms for the first screening round, but lower at 132.3 for the subsequent screening round (Table 3). The biopsy rate was 47.6/1,000 mammograms for first round and 19.0 for subsequent round. For both first and subsequent screening rounds, these rates were highest among young women aged 40-49 years old and decreased with increasing age. Age-adjusted breast biopsy rates were 46.5 for first round and 20.1 for subsequent round and highest for white women and black/African American women (Table 4).

**Table 3. Rates\* of Diagnostic Follow-Up,\*\* Carcinoma in Situ, and Invasive Breast Cancer Among Women in the NBCCEDP, by Age Group and Screening Round, PY03—PY14**

	<i>Age Group (Years)</i>				
	Total	40-49	50-59	60-64	≥65
<b>First Round</b>					
Diagnostic follow-up**					
Any diagnostic procedure	234.5	310.1	213.0	195.5	156.5
Biopsy	47.6	60.9	42.7	45.0	33.2
Final diagnosis					
Invasive breast cancer	11.8	11.4	10.8	15.8	11.3
Carcinoma in Situ***	3.9	3.6	3.8	5.1	4.3
Carcinoma in Situ/invasive	15.7	15.0	14.6	20.9	15.6
<b>Subsequent Rounds</b>					
Diagnostic follow-up**					
Any diagnostic procedure	132.3	204.3	130.1	115.5	97.6
Biopsy	19.0	28.1	18.3	17.9	14.7
Final diagnosis					
Invasive breast cancer	3.2	2.8	3.0	3.9	3.3
Carcinoma in Situ***	1.7	1.5	1.6	2.0	2.1
Carcinoma in Situ/invasive	5.0	4.4	4.6	5.9	5.4
*Rates calculated per 1,000 mammograms.					
**Diagnostic follow-up may be initiated on the basis of an abnormal CBE, an abnormal mammogram, or a high level of concern by the patient or clinician.					
***Includes Lobular Carcinoma in Situ (LCIS), Ductal Carcinoma in Situ (DCIS), and all other Carcinoma in Situ.					

**Table 4. Age-Adjusted\* Rates\*\* of Diagnostic Follow-Up,\*\*\* Carcinoma in Situ and Invasive Breast Cancer Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03—PY14**

	Race/Ethnicity						
	Total*	White	Black/ African American	Asian/ Native Hawaiian/ Other Pacific Islander	American Indian/ Alaska Native	Multiracial/ Unknown	Hispanic/ Latina
<b>First Round</b>							
Diagnostic follow-up***							
Any diagnostic procedure	225.3	258.5	239.7	173.2	178.8	212.3	194.3
Biopsy	46.5	58.4	52.8	31.0	33.4	44.2	32.6
Final diagnosis							
Invasive breast cancer	12.2	17.3	13.2	7.6	7.7	12.6	6.2
Carcinoma in Situ****	4.1	5.3	4.4	3.3	4.1	4.1	2.5
Carcinoma in Situ/invasive	16.3	22.5	17.6	10.9	11.8	16.7	8.7
<b>Subsequent Rounds</b>							
Diagnostic follow-up***							
Any diagnostic procedure	140.8	150.8	146.9	128.5	118.6	138.4	134.8
Biopsy	20.1	23.6	23.3	13.0	16.0	19.0	16.2
Final diagnosis							
Invasive breast cancer	3.1	3.8	3.8	2.0	2.9	2.7	2.1
Carcinoma in Situ****	1.7	1.8	1.9	1.3	2.1	1.8	1.2
Carcinoma in Situ/invasive	4.8	5.7	5.7	3.3	5.0	4.5	3.3

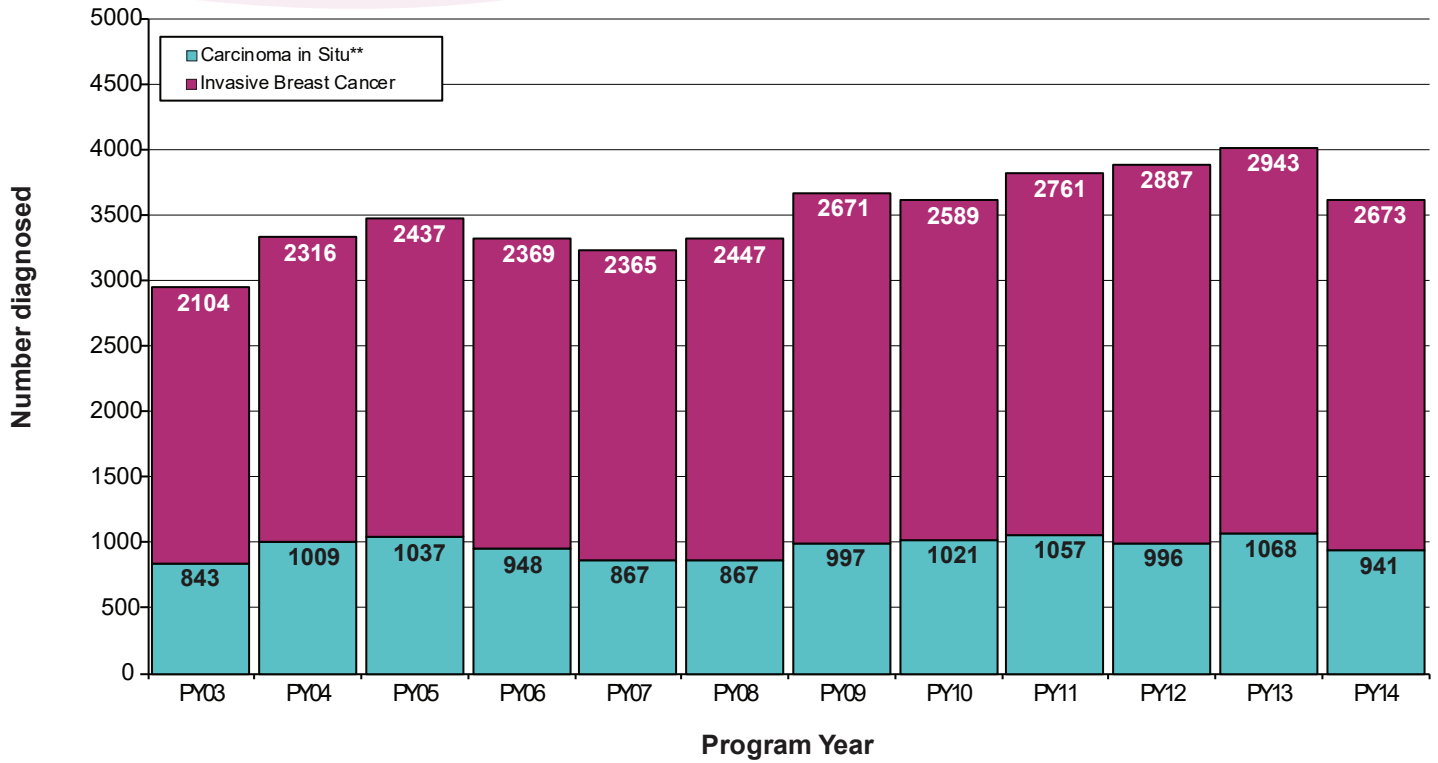
\*Age-adjusted to the 2000 NBCCEDP population.  
 \*\*Rates calculated per 1,000 mammograms.  
 \*\*\*Diagnostic follow-up may be initiated on the basis of an abnormal CBE, an abnormal mammogram, or a high level of concern by the patient or clinician.  
 \*\*\*\*Includes Lobular Carcinoma in Situ (LCIS), Ductal Carcinoma in Situ (DCIS), and all other Carcinoma in Situ.

### 3.5. Breast cancer detection

From PY03 through PY14, there were 42,213 breast carcinoma in situ and invasive cancers diagnosed (Figure 10). On average, more than 2,500 invasive breast cancers and about 1,000 breast carcinoma in situ lesions were diagnosed each year. The rate of detecting carcinoma in situ and invasive breast cancer per 1,000 mammograms was higher in the first screening round compared with the subsequent round at 15.7 and 5.0, respectively (Table 3). The rate of diagnosing invasive breast cancer was 11.8/1,000 mammograms for women having their first round mammogram and 3.2/1,000 for women having subsequent round mammograms. These rates were highest among women aged 60-64 years old for both first and subsequent rounds (Figure 11).

Among the different race/ethnicity groups, rates of carcinoma in situ and invasive cancer were highest for first round mammograms versus subsequent round mammograms (Table 4). Rates of invasive breast cancer were highest among white women for first round mammograms at 17.3 (Figure 12). For the subsequent round mammograms, invasive cancer rates were significantly lower than the first round but nearly equal among white women and black/African American women.

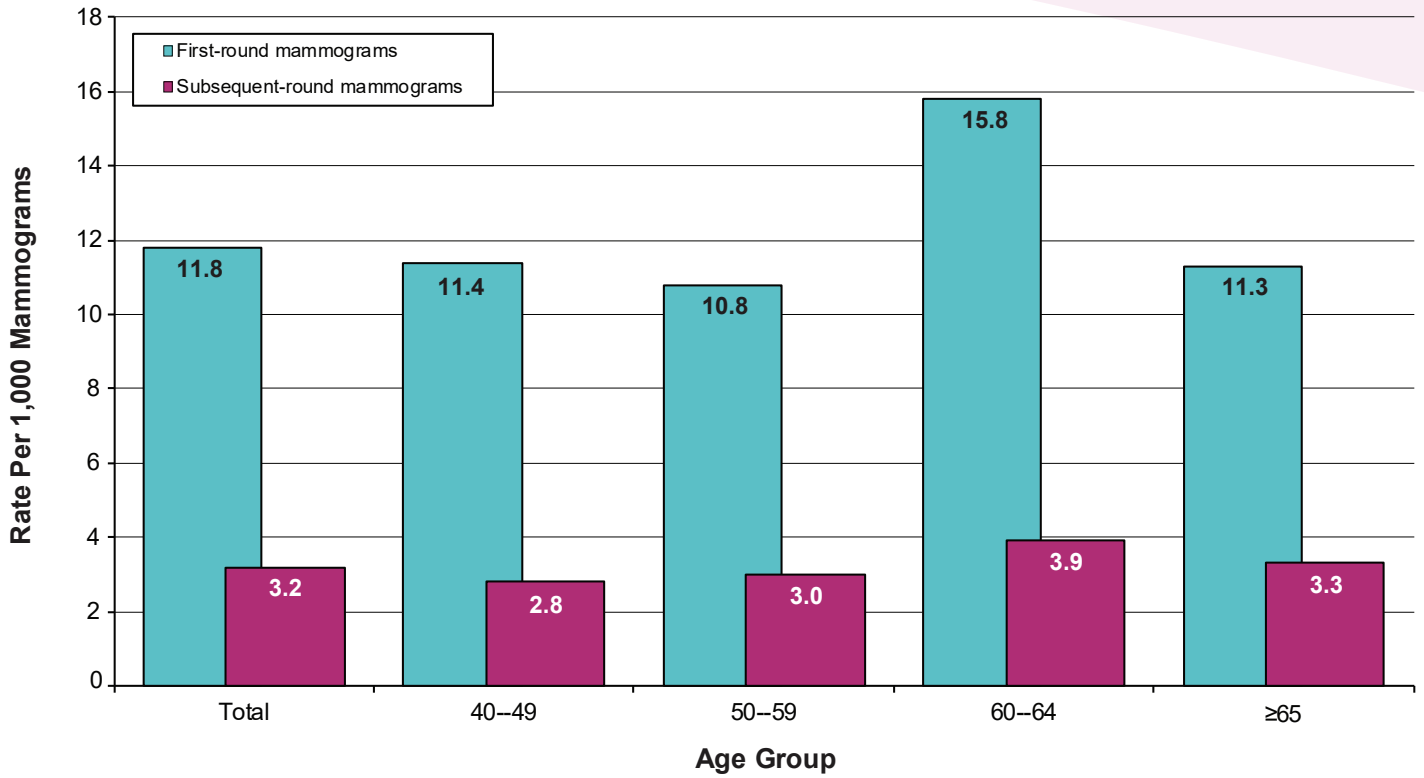
**Figure 10. Number of Breast Carcinoma in Situ and Invasive Cancers Diagnosed through the NBCCEDP, PY03--PY14\***



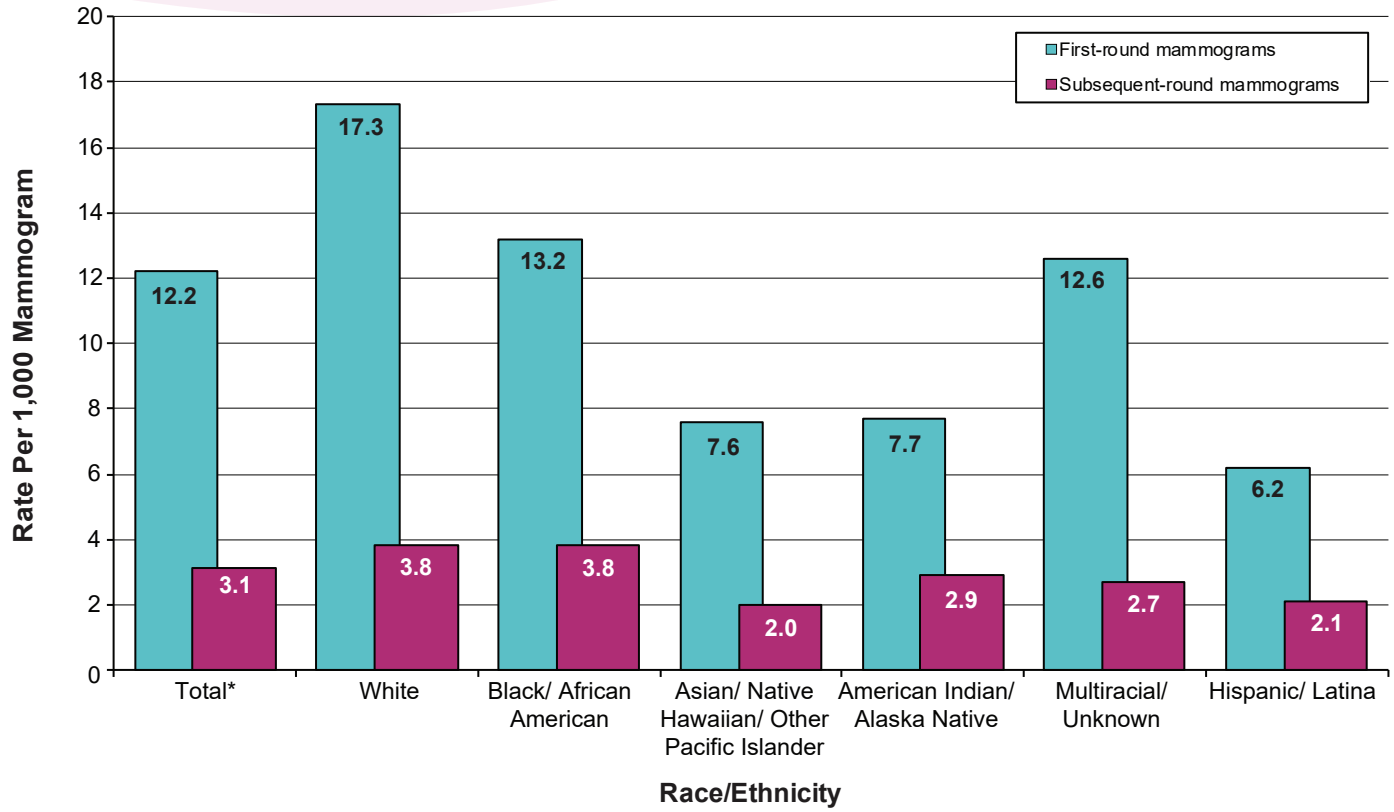
\*During this period, 42,213 breast carcinoma and invasive cancers were diagnosed among women receiving mammography screenings through the NBCCEDP.

\*\*Includes Lobular Carcinoma in Situ, Ductal Carcinoma in Situ and Carcinoma in Situ not otherwise specified.

**Figure 11.** Rates of Invasive Breast Cancer Among Women in the NBCCEDP, by Age Group and Screening Round, PY03—PY14



**Figure 12.** Age-Adjusted\* Rates of Invasive Breast Cancer Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14



\*Age-adjusted to the 2000 NBCCEDP population.



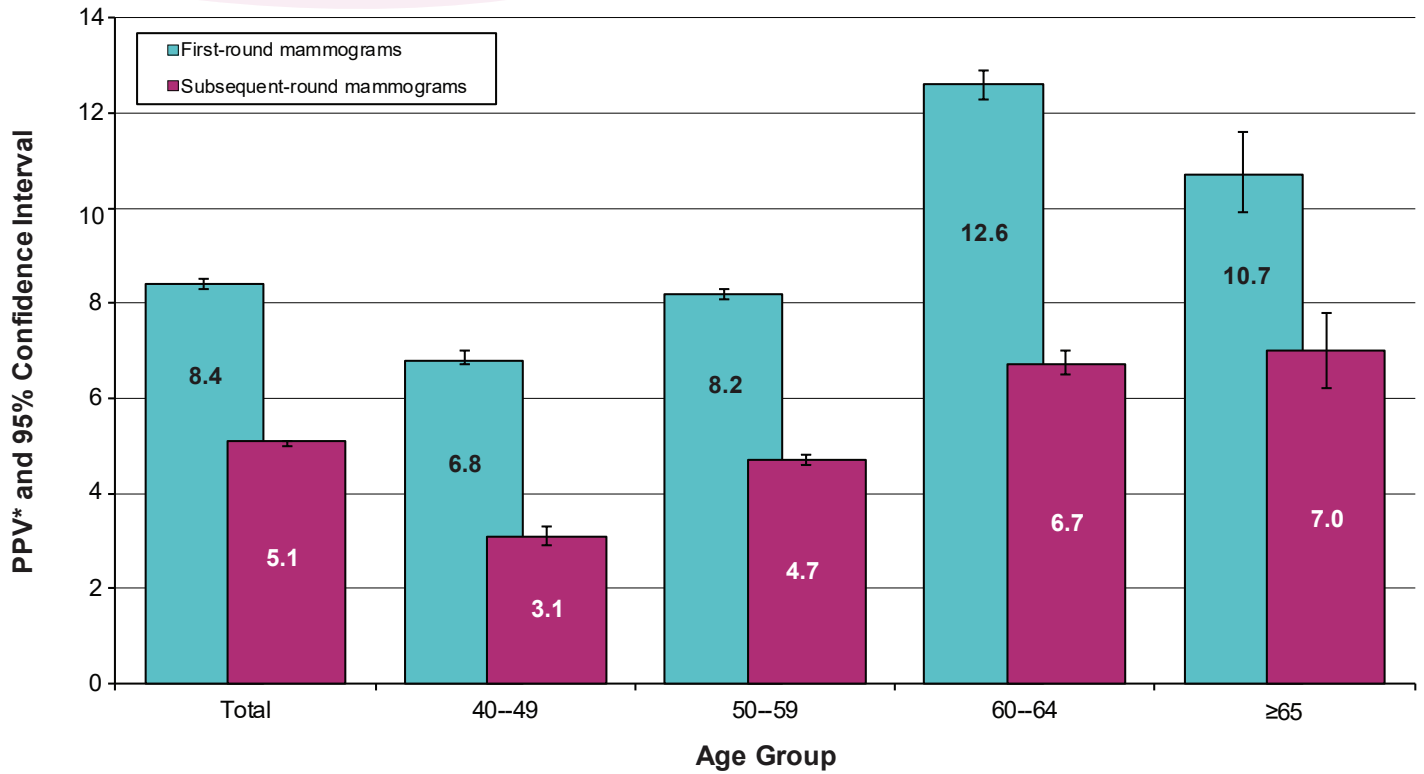
### 3.6. Accuracy of mammography results

Table 5 shows the positive predictive value (PPV) of abnormal mammogram results which includes findings of suspicious abnormality, highly suggestive of malignancy, and assessment incomplete. The PPV was highest for women who were undergoing their first round screening mammogram compared to women undergoing subsequent screening mammograms. The PPV was highest among women over the age of 60 years old for both groups (Figure 13).

Among the race/ethnicity groups, PPV was highest for white women undergoing their first round mammograms (10.5) and highest among American Indian/Alaska Native women (5.9), white women (5.7), and black/African American women (5.6) undergoing subsequent round mammograms (Figure 14).

<b>Table 5. Positive Predictive Value (PPV)* of Abnormal Mammography Results** Among Women in the NBCCEDP, by Age Group, Race/Ethnicity, and Screening Round, PY03—PY14</b>		
	<b>PPV* (95% Confidence Interval)</b>	
	<b>First Screening Round</b>	<b>Subsequent Screening Round</b>
<b>Total</b>	8.4 ( 8.3 -- 8.5)	5.1 ( 5.0 -- 5.1)
<b>Age Group (years)</b>		
40--49	6.8 ( 6.7 -- 7.0)	3.1 ( 2.9 -- 3.3)
50--59	8.2 ( 8.1 -- 8.3)	4.7 ( 4.6 -- 4.8)
60--64	12.6 (12.3 -- 12.9)	6.7 ( 6.5 -- 7.0)
≥65	10.7 ( 9.9 -- 11.6)	7.0 ( 6.2 -- 7.8)
<b>Race/Ethnicity</b>		
White	10.5 (10.4 -- 10.7)	5.7 ( 5.5 -- 5.8)
Black/African American	8.6 ( 8.4 -- 8.8)	5.6 ( 5.4 -- 5.9)
Asian/Native Hawaiian/Other Pacific Islander	7.2 ( 6.8 -- 7.6)	4.2 ( 3.8 -- 4.7)
American Indian/Alaska Native	6.7 ( 6.1 -- 7.3)	5.9 ( 5.4 -- 6.4)
Multiracial/Unknown	9.3 ( 8.7 -- 9.9)	5.0 ( 4.3 -- 5.8)
Hispanic/Latina	4.9 ( 4.8 -- 5.1)	3.5 ( 3.4 -- 3.7)
*The PPV was calculated by dividing the number of abnormal mammogram results leading to a final diagnosis of cancer by the total number of abnormal mammogram results.		
**Includes the following mammogram results: “suspicious abnormality,” “highly suggestive of malignancy,” and “assessment incomplete.”		

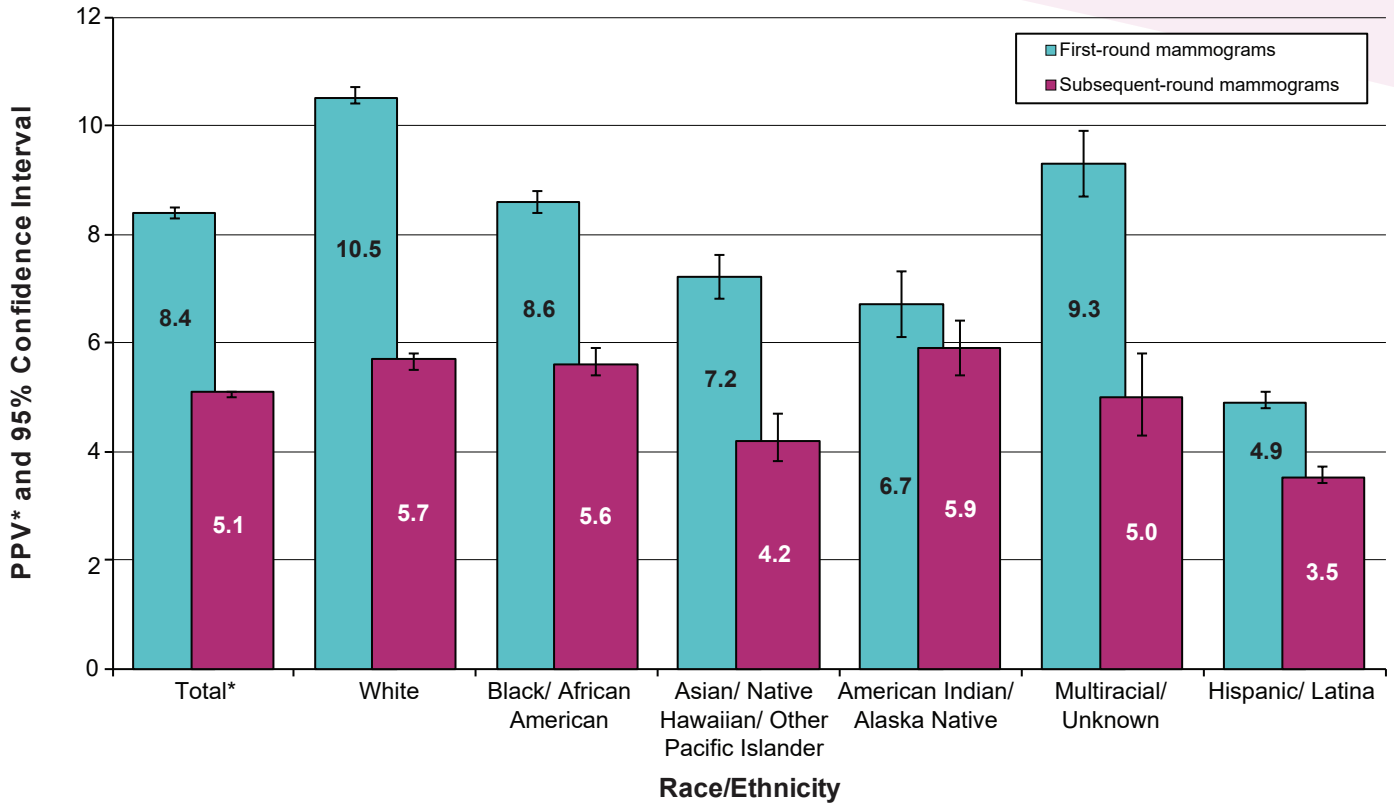
**Figure 13. Positive Predictive Value (PPV)\* of Abnormal Mammography Results\*\* Among Women in the NBCCEDP, by Age Group and Screening Round, PY03--PY14**



\*The positive predictive value (PPV) was calculated by dividing the number of abnormal mammogram results leading to a final diagnosis of cancer by the total number of abnormal mammogram results.

\*\*Includes the following mammogram results: "suspicious abnormality," "highly suggestive of malignancy," and "assessment incomplete."

**Figure 14. Positive Predictive Value (PPV)\* of Abnormal Mammography Results\*\* Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14**



\*The positive predictive value (PPV) was calculated by dividing the number of abnormal mammogram results leading to a final diagnosis of cancer by the total number of abnormal mammogram results.

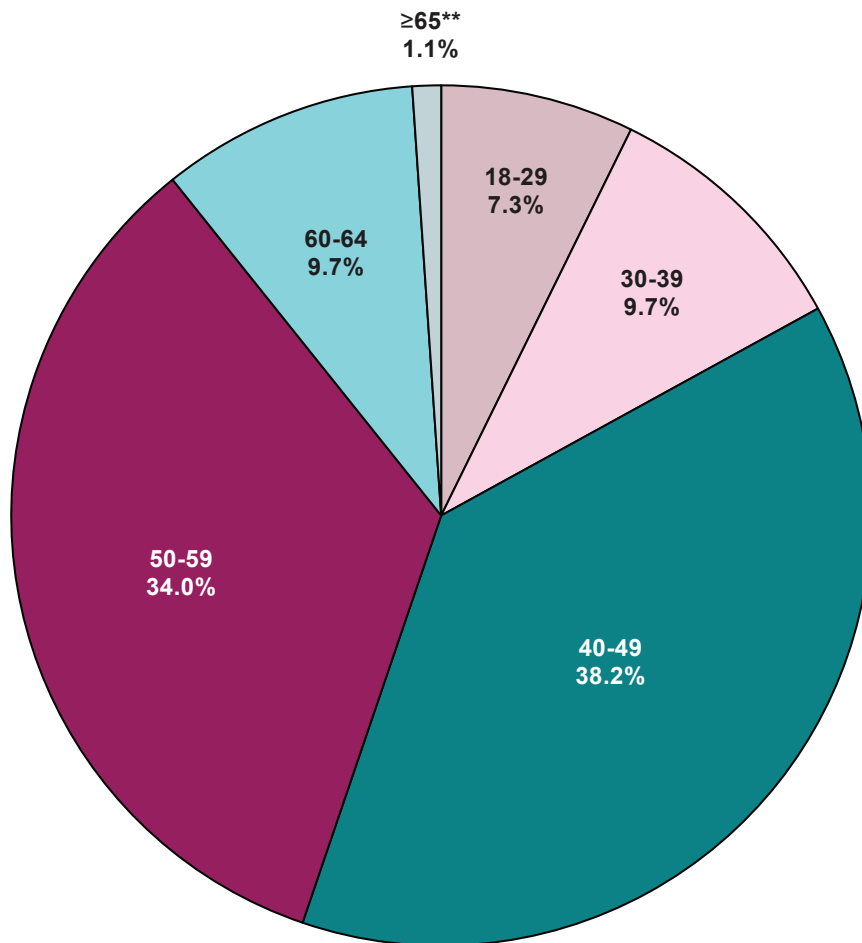
\*\*Includes the following mammogram results: "suspicious abnormality," "highly suggestive of malignancy," and "assessment incomplete."

# 4. Cervical cancer screening

## 4.1. Pap test age distribution

The age distribution of women receiving Pap tests through the NBCCEDP from PY2003 through PY2014 is illustrated in Figure 15. At the time of their first NBCCEDP Pap test, 72.2% of women were between the ages of 40 and 59 years old. Only 1.1% of women were age 65 years old or older given that most women this age are covered under Medicare.

**Figure 15.** Age\* Distribution of Women Who Received Pap Tests Through the NBCCEDP, PY03--PY14



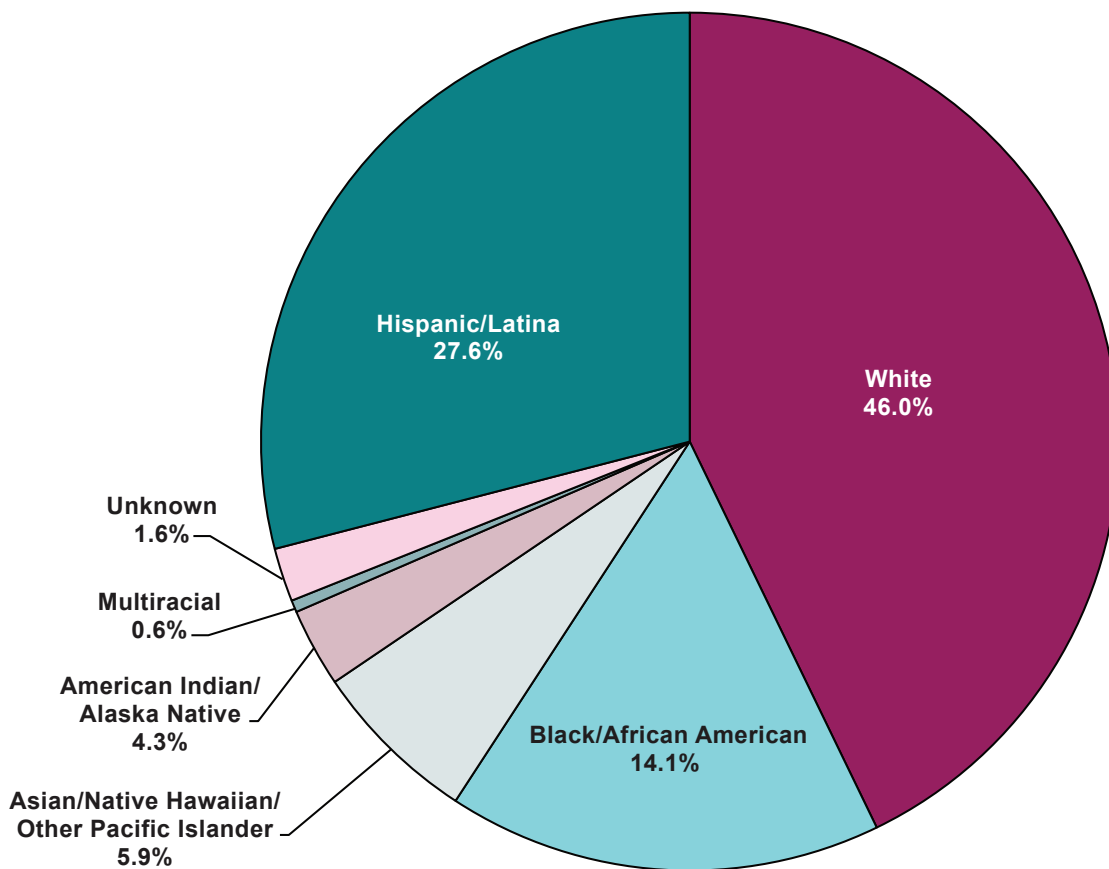
\*Age at time of first Pap test.

\*\*Most women 65 years of age or older were not served through the NBCCEDP because of eligibility for Medicare Part B coverage.

#### 4.2. Pap test race/ethnicity distribution

Just less than half (46.0%) of the women receiving their first Pap test through the NBCCEDP were white women, followed by 27.6% Hispanic/Latina women, and 14.1% black/African American women (Figure 16).

**Figure 16.** Racial/Ethnic Distribution of Women Who Received Pap Tests Through the NBCCEDP, PY03--PY14



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### 4.3. Pap test screening results

Abnormal Pap test results include squamous cell carcinoma, atypical glandular cells, high-grade squamous intraepithelial lesion, atypical squamous cells--cannot exclude high-grade squamous intraepithelial lesion, and low-grade squamous intraepithelial lesion. The distribution of Pap test results by age group and screening round is shown in Table 6. Most women had negative results in both the first and subsequent screening rounds. Younger women had a higher percentage of abnormal Pap test results in both rounds. Across all ages, the highest percentage of abnormal Pap test results were among women receiving their first NBCCEDP Pap tests (Figure 17). Women under the age of 40 years had higher percentages of abnormal results during the first screening round compared to subsequent screening rounds. There was little difference in percentages of abnormal Pap test results between the two rounds for women aged 40 years old and older.

**Table 6. Distribution (%)\* of Pap Test Results Among Women in the NBCCEDP, by Age Group and Screening Round, PY03--PY14**

	Total	Age Group (Years)					
		18--29	30--39	40--49	50--59	60--64	≥65***
<b>First-Round Pap Tests (n)**</b>	<b>1,929,857</b>	<b>154,422</b>	<b>196,983</b>	<b>757,413</b>	<b>632,710</b>	<b>169,445</b>	<b>18,884</b>
Negative	91.2	79.0	88.7	91.6	93.4	94.4	94.3
ASCUS†	4.5	9.1	5.5	4.5	3.5	2.7	2.6
LSIL†	2.0	8.4	3.0	1.6	1.1	0.7	0.6
ASC-H†	0.3	0.6	0.4	0.2	0.2	0.2	0.2
HSIL†	0.7	1.9	1.2	0.6	0.4	0.4	0.6
Squamous cell carcinoma	0.0	0.0	0.0	0.0	0.1	0.1	0.1
AGC†	0.3	0.1	0.3	0.3	0.3	0.3	0.3
Other	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Unsatisfactory	0.8	0.5	0.6	0.8	0.9	1.1	1.2
<b>Total abnormal Pap tests****</b>	<b>3.3</b>	<b>11.2</b>	<b>4.9</b>	<b>2.8</b>	<b>2.1</b>	<b>1.6</b>	<b>1.8</b>
<b>Subsequent-Round Pap Tests (n)**</b>	<b>1,579,033</b>	<b>60,910</b>	<b>103,151</b>	<b>506,806</b>	<b>662,308</b>	<b>227,434</b>	<b>18,424</b>
Negative	92.4	85.1	90.3	91.7	93.3	94.4	94.1
ASCUS†	4.3	8.1	5.5	4.9	3.8	2.9	3.2
LSIL†	1.5	4.8	2.4	1.7	1.2	0.9	0.7
ASC-H†	0.2	0.3	0.3	0.2	0.2	0.2	0.2
HSIL†	0.3	0.8	0.5	0.3	0.2	0.2	0.3
Squamous cell carcinoma	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AGC†	0.2	0.1	0.2	0.3	0.2	0.2	0.2
Other	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Unsatisfactory	0.8	0.7	0.7	0.7	0.9	1.0	1.1
<b>Total abnormal Pap tests****</b>	<b>2.2</b>	<b>5.9</b>	<b>3.3</b>	<b>2.4</b>	<b>1.9</b>	<b>1.5</b>	<b>1.4</b>

\*Totals may not add to 100% due to rounding.

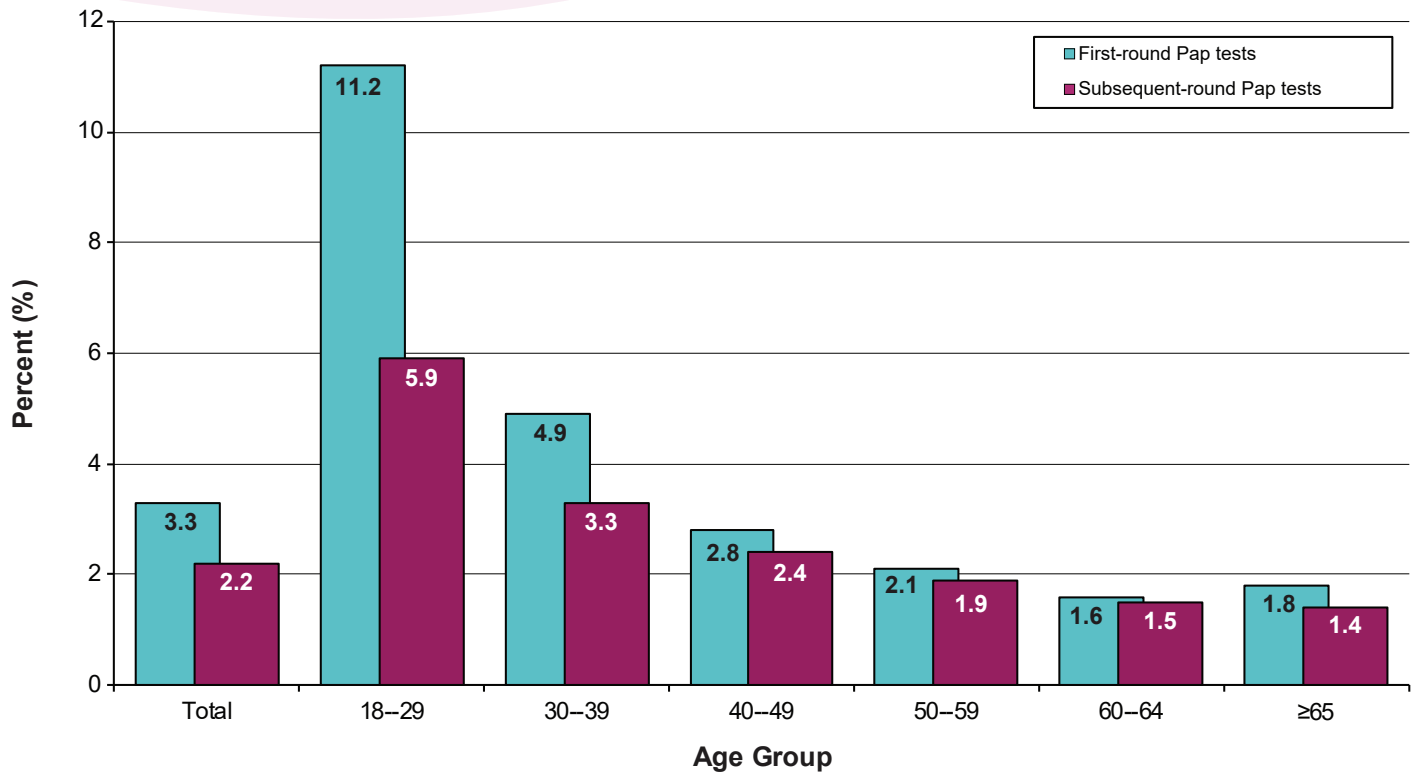
\*\*Pap test results are categorized using the Bethesda System.

\*\*\*Most women 65 years of age or older were not served through the NBCCEDP because of eligibility for Medicare Part B coverage.

\*\*\*\*Includes the following Pap test results: LSIL, ASC-H, HSIL, AGC, and squamous cell carcinoma.

†Abbreviations: ASCUS=atypical squamous cells of undetermined significance; HSIL=high-grade squamous intraepithelial lesion; LSIL=low-grade squamous intraepithelial lesion; AGC=atypical glandular cells; ASC-H=atypical squamous cells of undetermined significance--cannot exclude HSIL.

**Figure 17.** Percentage of Screening Pap Tests That Were Abnormal\* Among Women in the NBCCEDP, by Age Group and Screening Round, PY03--PY14

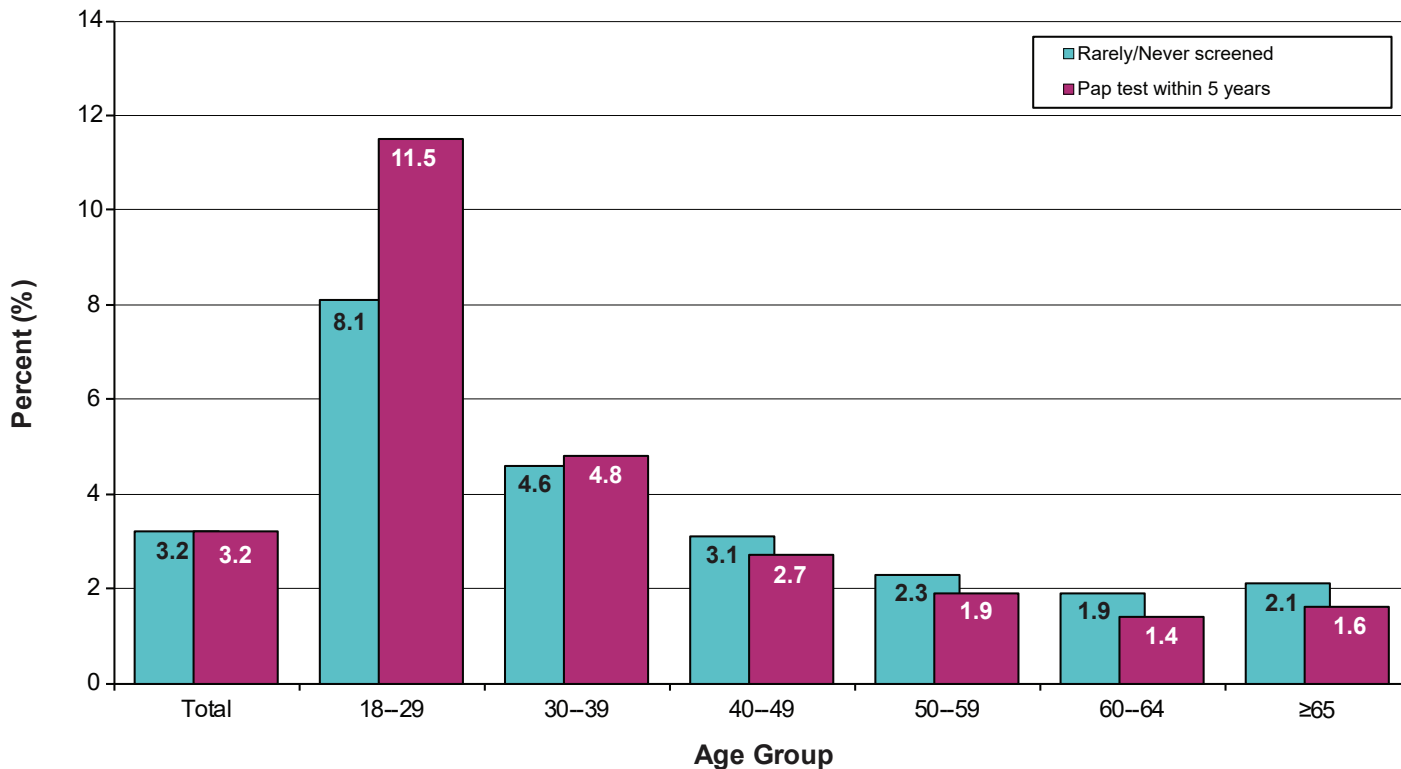


\*Includes the following Pap test results: low-grade squamous intraepithelial lesions (LSIL), high-grade squamous intraepithelial lesions (HSIL), atypical squamous cells of undetermined significance--cannot exclude HSIL (ASC-H), atypical glandular cells (AGC), and squamous cell carcinoma.



Among women receiving their first round Pap test, the percentage of abnormal results was equal among women who were rarely/never screened versus those who reported having a Pap test within the past 5 years at 3.2% (Figure 17a). For women aged 18-29 years old, the abnormal results were higher among women who reported receiving a Pap test within the past 5 years. For women aged 40 years old and older, the percentage of abnormal results were slightly higher among rarely/never screened women. Table 6a shows the distribution of these Pap test results. Among all women, more than 90% of results were negative, although younger women had higher percentages of abnormal results.

**Figure 17a. Percentage of Screening Pap Tests That Were Abnormal\* Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Age Group and Screening History\*\*, PY03--PY14**



\*Includes the following Pap test results: low-grade squamous intraepithelial lesions (LSIL), high-grade squamous intraepithelial lesions (HSIL), atypical squamous cells of undetermined significance--cannot exclude HSIL (ASC-H), atypical glandular cells (AGC), and squamous cell carcinoma.

\*\*Excludes women with missing or unknown screening history.

**Table 6a. Distribution (%)\* of Pap Test Results Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Age Group and Screening History‡, PY03--PY14**

	Age Group (Years)						
	Total	18--29	30--39	40--49	50--59	60--64	≥65***
<b>Rarely/Never Screened (n)**</b>	<b>551,902</b>	<b>43,466</b>	<b>50,407</b>	<b>204,657</b>	<b>192,564</b>	<b>53,901</b>	<b>6,907</b>
Negative	91.6	83.9	89.6	91.5	93.1	94.0	93.9
ASCUS†	4.2	7.2	4.9	4.4	3.5	2.8	2.5
LSIL†	1.8	6.4	2.6	1.6	1.0	0.7	0.6
ASC-H†	0.3	0.4	0.4	0.3	0.2	0.2	0.2
HSIL†	0.8	1.2	1.3	0.9	0.6	0.5	0.8
Squamous cell carcinoma	0.1	0.0	0.0	0.1	0.1	0.1	0.1
AGC†	0.3	0.1	0.3	0.3	0.3	0.4	0.4
Other	0.2	0.1	0.1	0.2	0.2	0.2	0.2
Unsatisfactory	0.9	0.7	0.7	0.8	0.9	1.2	1.3
<b>Total abnormal Pap tests****</b>	<b>3.2</b>	<b>8.1</b>	<b>4.6</b>	<b>3.1</b>	<b>2.3</b>	<b>1.9</b>	<b>2.1</b>
<b>Pap Test within 5 Years (n)**</b>	<b>1,150,563</b>	<b>87,942</b>	<b>121,036</b>	<b>465,829</b>	<b>370,586</b>	<b>95,956</b>	<b>9,214</b>
Negative	91.2	78.2	88.7	91.7	93.6	94.8	94.7
ASCUS†	4.5	9.6	5.6	4.6	3.4	2.6	2.5
LSIL†	2.1	8.6	3.0	1.6	1.1	0.7	0.5
ASC-H†	0.3	0.7	0.4	0.2	0.2	0.2	0.2
HSIL†	0.6	2.0	1.1	0.5	0.3	0.3	0.5
Squamous cell carcinoma	0.0	0.0	0.0	0.0	0.0	0.0	0.1
AGC†	0.3	0.2	0.3	0.3	0.2	0.2	0.2
Other	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Unsatisfactory	0.8	0.5	0.6	0.8	0.8	1.0	1.1
<b>Total abnormal Pap tests****</b>	<b>3.2</b>	<b>11.5</b>	<b>4.8</b>	<b>2.7</b>	<b>1.9</b>	<b>1.4</b>	<b>1.6</b>

\*Totals may not add to 100% due to rounding.

\*\*Pap test results are categorized using the Bethesda System.

\*\*\*Most women 65 years of age or older were not served through the NBCCEDP because of eligibility for Medicare Part B coverage.

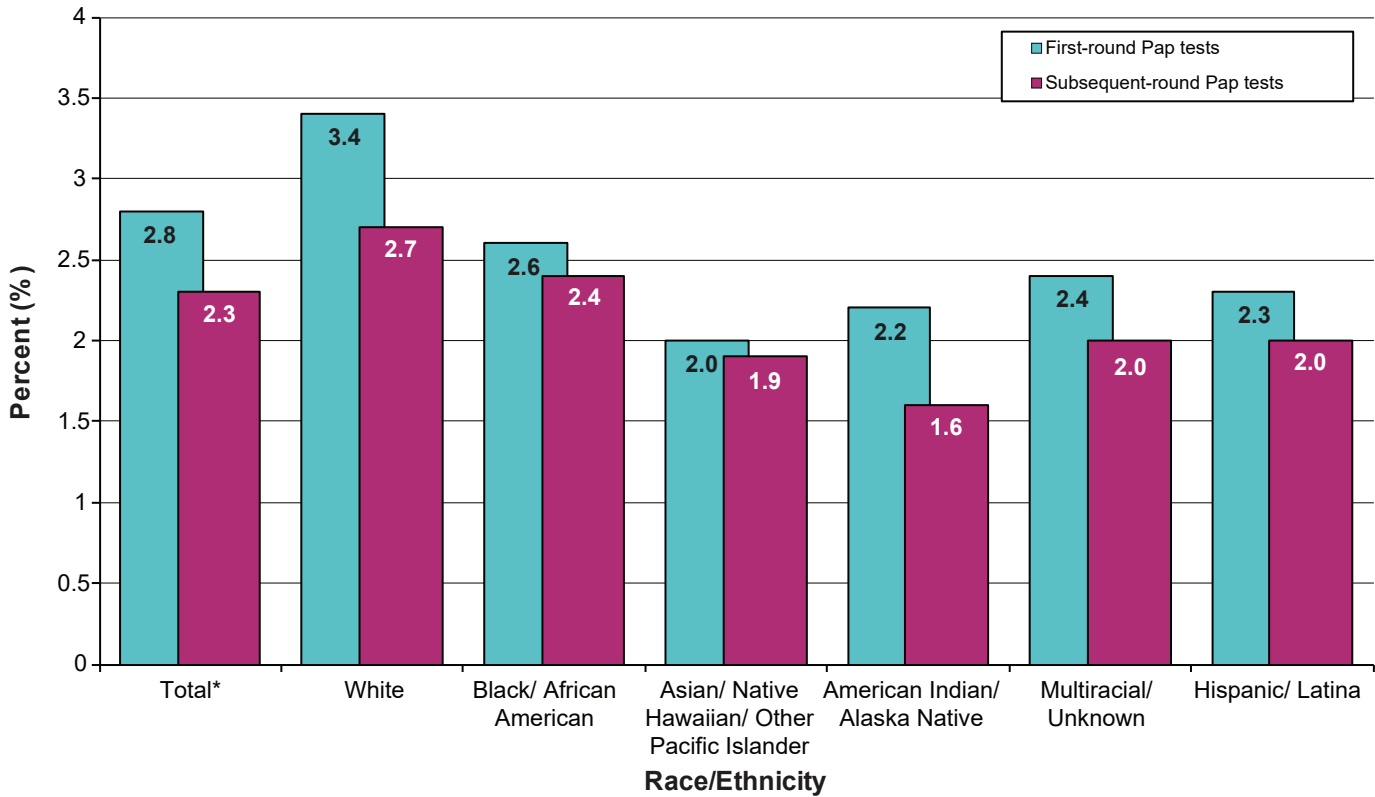
\*\*\*\*Includes the following Pap test results: LSIL, ASC--H, HSIL, AGC, and squamous cell carcinoma.

†Abbreviations: ASCUS=atypical squamous cells of undetermined significance; HSIL=high-grade squamous intraepithelial lesion; LSIL=low-grade squamous intraepithelial lesion; AGC=atypical glandular cells; ASC--H=atypical squamous cells of undetermined significance--cannot exclude HSIL.

‡Excludes women with missing or unknown screening history.

White women had higher age-adjusted percentages of abnormal Pap test results for both first and subsequent Pap tests rounds (Figure 18). The first round of Pap tests had slightly higher percentages of abnormal results than subsequent round Pap tests in all race/ethnicity groups. Among women who received their first round Pap tests, rarely/never screened women were slightly more likely to have abnormal results (Figure 18a). This was consistent in all race/ethnicity groups except for black women where the percentage was equal for rarely/never screened and Pap test within 5 years. Tables 7 and 7a show the age-adjusted distribution of Pap test results by race/ethnicity. More than 90% of women had negative results among all race/ethnicity groups.

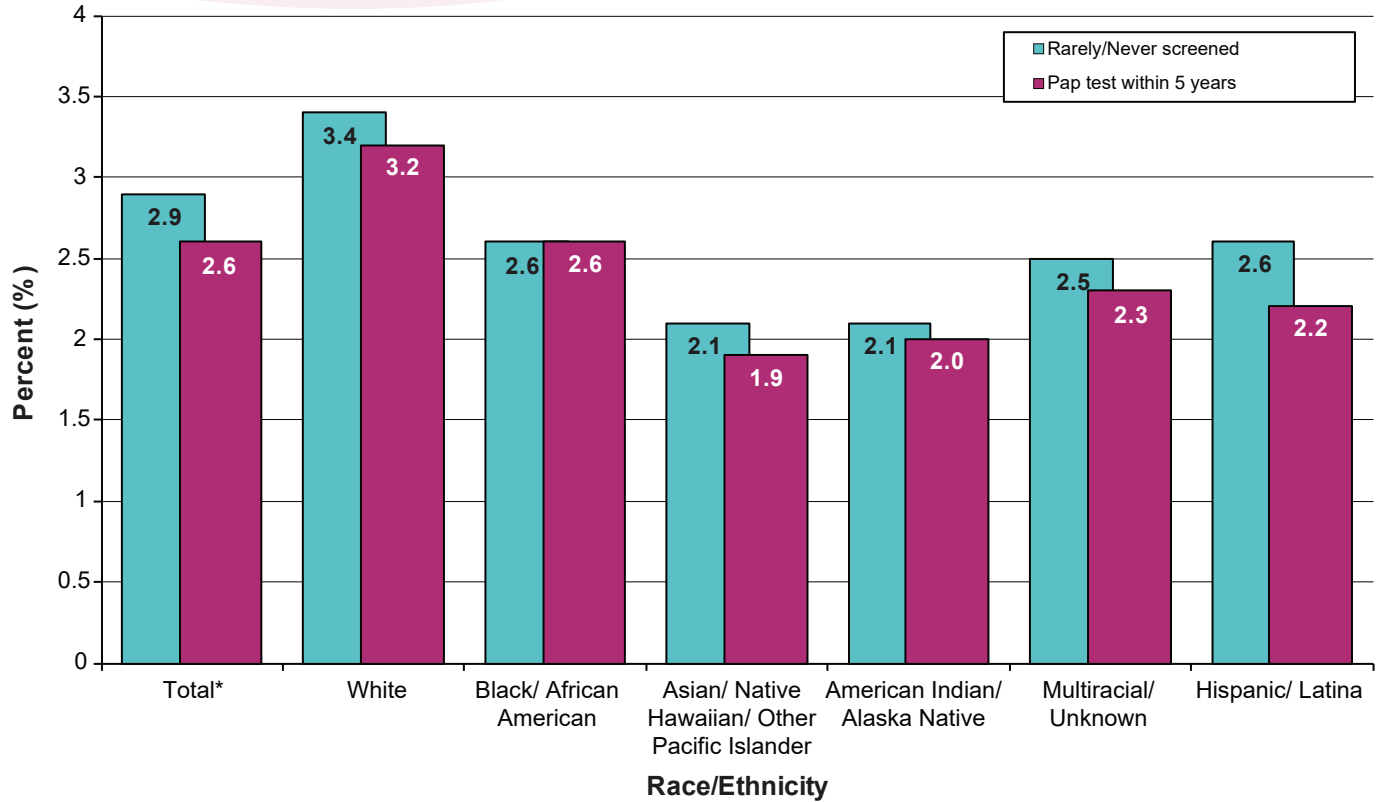
**Figure 18. Age-Adjusted\* Percentage of Screening Pap Tests That Were Abnormal\*\* Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14**



\*Age-adjusted to the 2000 NBCCEDP population.

\*\*Includes the following Pap test results: low-grade squamous intraepithelial lesions (LSIL), high-grade squamous intraepithelial lesions (HSIL), atypical squamous cells of undetermined significance--cannot exclude HSIL (ASC-H), atypical glandular cells (AGC), and squamous cell carcinoma.

**Figure 18a. Age-Adjusted\* Percentage of Screening Pap Tests That Were Abnormal\*\* Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Race/Ethnicity and Screening History\*\*\*, PY03--PY14**



\*Age-adjusted to the 2000 NBCCEDP population.

\*\*Includes the following Pap test results: low-grade squamous intraepithelial lesions (LSIL), high-grade squamous intraepithelial lesions (HSIL), atypical squamous cells of undetermined significance--cannot exclude HSIL (ASC-H), atypical glandular cells (AGC), and squamous cell carcinoma.

\*\*\*Excludes women with missing or unknown screening history.

**Table 7. Age-Adjusted\* Distribution (%)\*\* of Pap Test Results Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14**

	Race/Ethnicity						
	Total*	White	Black/ African American	Asian/Native Hawaiian/ Other Pacific Islander	American Indian/ Alaska Native	Multiracial/ Unknown	Hispanic/ Latina
<b>First-Round Pap Tests (n)***</b>	<b>1,929,857</b>	<b>874,680</b>	<b>278,672</b>	<b>117,770</b>	<b>65,163</b>	<b>43,495</b>	<b>550,077</b>
Negative	92.1	91.2	92.0	93.8	92.5	92.7	92.8
ASCUS†	4.0	4.4	4.3	3.0	3.9	3.9	3.8
LSIL†	1.6	1.9	1.5	1.2	1.2	1.4	1.4
ASC-H†	0.2	0.3	0.2	0.2	0.2	0.2	0.2
HSIL†	0.6	0.8	0.5	0.4	0.5	0.5	0.5
Squamous cell carcinoma	0.1	0.1	0.1	0.0	0.0	0.0	0.0
AGC†	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Other	0.2	0.2	0.2	0.1	0.8	0.2	0.2
Unsatisfactory	0.9	0.8	0.9	1.1	0.6	0.8	0.8
<b>Total abnormal Pap tests****</b>	<b>2.8</b>	<b>3.4</b>	<b>2.6</b>	<b>2.0</b>	<b>2.2</b>	<b>2.4</b>	<b>2.3</b>
<b>Subsequent-Round Pap Tests (n)***</b>	<b>1,579,033</b>	<b>778,282</b>	<b>186,104</b>	<b>79,633</b>	<b>124,955</b>	<b>29,565</b>	<b>380,494</b>
Negative	92.3	91.7	91.9	93.0	93.6	93.2	92.9
ASCUS†	4.3	4.6	4.7	3.6	3.7	3.8	4.0
LSIL†	1.6	1.8	1.6	1.3	1.1	1.4	1.4
ASC-H†	0.2	0.2	0.2	0.1	0.1	0.2	0.2
HSIL†	0.3	0.3	0.3	0.3	0.2	0.2	0.2
Squamous cell carcinoma	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AGC†	0.2	0.3	0.2	0.2	0.1	0.2	0.2
Other	0.2	0.2	0.2	0.1	0.6	0.3	0.2
Unsatisfactory	0.8	0.8	0.8	1.3	0.5	0.7	0.9
<b>Total abnormal Pap tests****</b>	<b>2.3</b>	<b>2.7</b>	<b>2.4</b>	<b>1.9</b>	<b>1.6</b>	<b>2.0</b>	<b>2.0</b>

\*Age-adjusted to the 2000 NBCCEDP population.

\*\*Totals may not add to 100% due to rounding.

\*\*\*Pap test results are categorized using the Bethesda System.

\*\*\*\*Includes the following Pap test results: LSIL, ASC--H, HSIL, AGC, and squamous cell carcinoma.

†Abbreviations: ASCUS=atypical squamous cells of undetermined significance; HSIL=high-grade squamous intraepithelial lesion; LSIL=low-grade squamous intraepithelial lesion; AGC=atypical glandular cells; ASC-H=atypical squamous cells of undetermined significance--cannot exclude HSIL.

**Table 7a. Age-Adjusted\* Distribution (%)\*\* of Pap Test Results Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Race/Ethnicity and Screening History‡, PY03--PY14**

	Race/Ethnicity						
	Total*	White	Black/ African American	Asian/Native Hawaiian/ Other Pacific Islander	American Indian/Alaska Native	Multiracial/ Unknown	Hispanic/ Latina
<b>Rarely/Never Screened (n)***</b>	<b>551,902</b>	<b>265,788</b>	<b>73,695</b>	<b>47,838</b>	<b>25,953</b>	<b>12,908</b>	<b>125,720</b>
Negative	92.1	91.4	92.1	93.7	93.1	92.9	92.6
ASCUS†	3.9	4.2	4.2	2.9	3.7	3.7	3.7
LSIL†	1.5	1.7	1.4	1.1	1.1	1.3	1.4
ASC-H†	0.3	0.3	0.3	0.2	0.2	0.2	0.2
HSIL†	0.8	0.9	0.6	0.6	0.5	0.6	0.6
Squamous cell carcinoma	0.1	0.1	0.1	0.1	0.1	0.1	0.1
AGC†	0.3	0.4	0.3	0.2	0.2	0.2	0.3
Other	0.2	0.2	0.2	0.1	0.5	0.1	0.2
Unsatisfactory	0.9	0.9	0.9	1.1	0.5	0.7	0.9
<b>Total abnormal Pap tests****</b>	<b>2.9</b>	<b>3.4</b>	<b>2.6</b>	<b>2.1</b>	<b>2.1</b>	<b>2.5</b>	<b>2.6</b>
<b>Pap Test within 5 Years (n)***</b>	<b>1,150,563</b>	<b>516,395</b>	<b>163,664</b>	<b>54,979</b>	<b>36,035</b>	<b>23,514</b>	<b>355,976</b>
Negative	92.2	91.4	92.1	93.8	92.3	92.7	93.0
ASCUS†	4.1	4.4	4.3	3.1	4.0	3.8	3.8
LSIL†	1.6	2.0	1.6	1.2	1.2	1.5	1.4
ASC-H†	0.2	0.3	0.2	0.2	0.2	0.2	0.2
HSIL†	0.5	0.6	0.5	0.3	0.4	0.4	0.4
Squamous cell carcinoma	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AGC†	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Other	0.2	0.2	0.2	0.1	1.0	0.3	0.2
Unsatisfactory	0.8	0.8	0.8	1.1	0.7	0.8	0.8
<b>Total abnormal Pap tests****</b>	<b>2.6</b>	<b>3.2</b>	<b>2.6</b>	<b>1.9</b>	<b>2.0</b>	<b>2.3</b>	<b>2.2</b>

\*Age-adjusted to the 2000 NBCCEDP population.

\*\*Totals may not add to 100% due to rounding.

\*\*\*Pap test results are categorized using the Bethesda System.

\*\*\*\*Includes the following Pap test results: LSIL, ASC--H, HSIL, AGC, and squamous cell carcinoma.

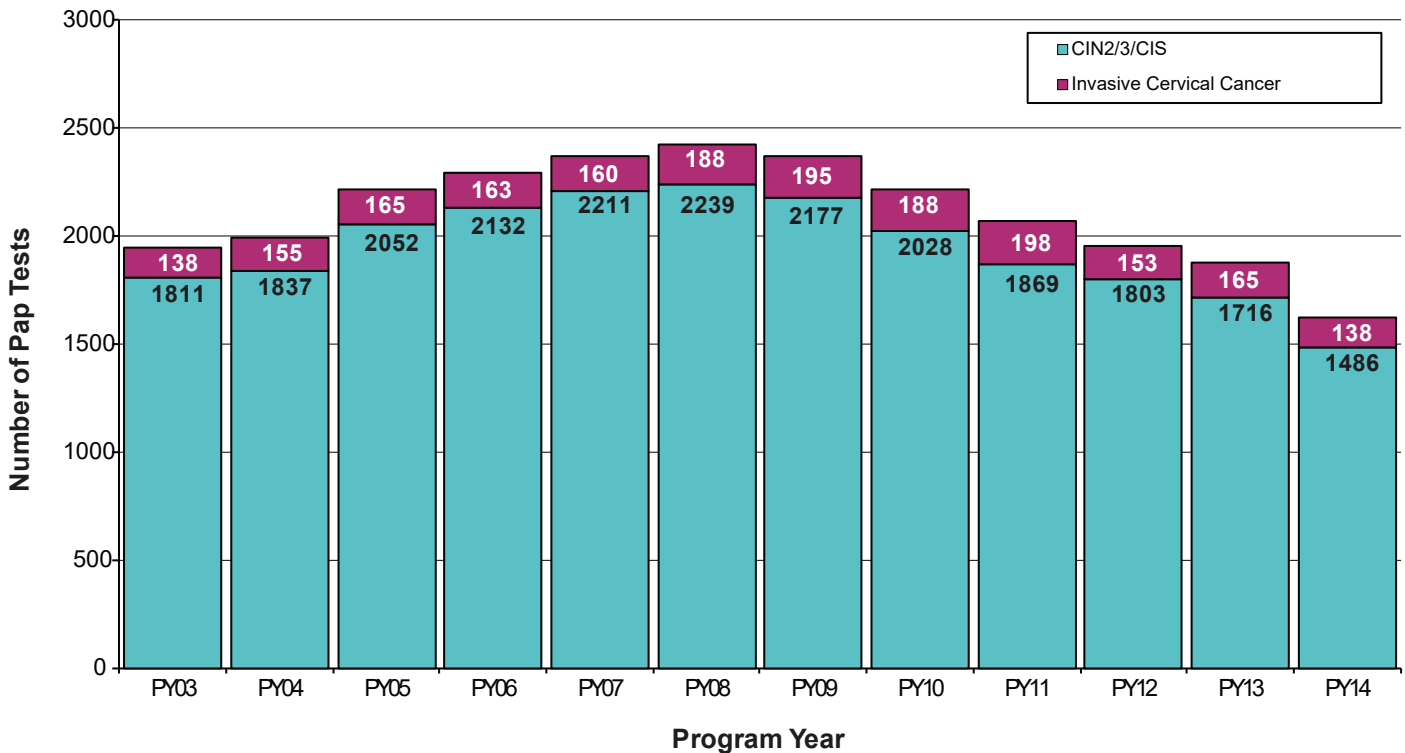
†Abbreviations: ASCUS=atypical squamous cells of undetermined significance; HSIL=high-grade squamous intraepithelial lesion; LSIL=low-grade squamous intraepithelial lesion; AGC=atypical glandular cells; ASC-H=atypical squamous cells of undetermined significance--cannot exclude HSIL.

‡Excludes women with missing or unknown screening history.

#### 4.4. Cervical cancer detection

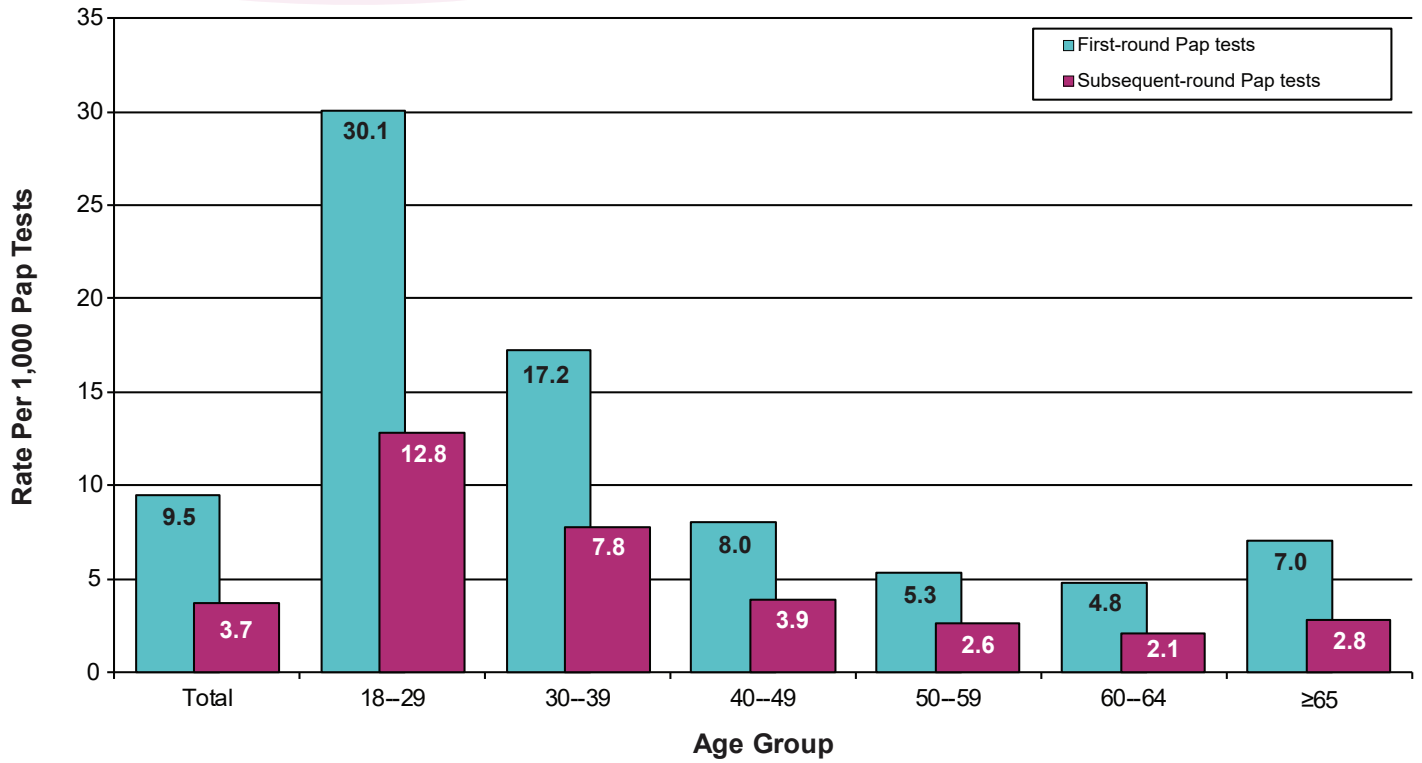
During PY03 through PY14, there were 25,367 cases of cervical intraepithelial neoplasia (CIN) 2 or worse diagnosed (Figure 19). CIN2+ includes CIN2, CIN3, carcinoma in situ, and invasive cervical cancer. Of the cases diagnosed, 2,006 (7.9%) were invasive cervical cancer. The number of CIN2+ cases diagnosed increased from PY03 to PY08, but decreased after PY08. Figure 20 illustrates the rate of CIN2+ diagnosed among women through the NBCCEDP. The rate of CIN2+ was 9.5/1,000 Pap tests for women having their first Pap test through the NBCCEDP and 3.7/1,000 for women having subsequent Pap tests through the NBCCEDP. The highest rate of 30.1/1,000 was among women aged 18-29 years who had their first NBCCEDP Pap test. For every age group, the rates of CIN2+ were higher among women receiving the first NBCCEDP Pap test compared to women receiving subsequent NBCCEDP Pap tests.

**Figure 19. Number of High-grade Cervical Intraepithelial Neoplasia (CIN) and Invasive Cervical Cancers Diagnosed Through the NBCCEDP , PY03--PY14\***



\* During this period, 25,367 cases of CIN2, CIN3, cervical carcinoma in situ and invasive cervical cancers were diagnosed among women receiving Pap tests provided through the NBCCEDP.

**Figure 20.** Rates of Biopsy-Confirmed Cervical Intraepithelial Neoplasia (CIN) 2 or Worse\* Among Women in the NBCCEDP, by Age Group and Screening Round, PY03--PY14



\*CIN 2 or worse includes CIN 2, CIN 3, carcinoma in situ, and invasive cervical cancer.



The rate of invasive disease was 0.9/1,000 Pap tests for the first round and 0.2 for the subsequent round (Table 8). While rates of CIN decreased with age, the rate of invasive disease increased with age. Rates of all CIN and invasive cancer were lower in subsequent rounds compared to first round screening.

**Table 8. Rates\* of Biopsy-Confirmed CIN\*\* and Invasive Cervical Cancer Among Women in the NBCCEDP, by Age Group and Screening Round, PY03--PY14**

	Age Group (Years)						
	Total	18--29	30--39	40--49	50--59	60--64	≥65
<b>First Round</b>							
Final diagnosis							
CIN 1†	11.1	45.4	18.4	9.1	5.1	3.3	2.5
CIN 2†	3.8	16.9	7.4	2.9	1.4	0.9	1.2
CIN 3/CIS†	4.8	13.0	9.1	4.2	2.8	2.5	4.4
Invasive	0.9	0.2	0.8	0.8	1.0	1.4	1.5
CIN 2 or worse†**	9.5	30.1	17.2	8.0	5.3	4.8	7.0
<b>Subsequent Rounds</b>							
Final diagnosis							
CIN 1†	7.6	23.5	13.3	8.8	5.8	3.9	3.4
CIN 2†	1.8	7.6	3.9	1.9	1.1	0.8	1.0
CIN 3/CIS†	1.7	5.1	3.8	1.9	1.2	1.1	1.6
Invasive	0.2	0.1	0.1	0.2	0.2	0.2	0.2
CIN 2 or worse†**	3.7	12.8	7.8	3.9	2.6	2.1	2.8

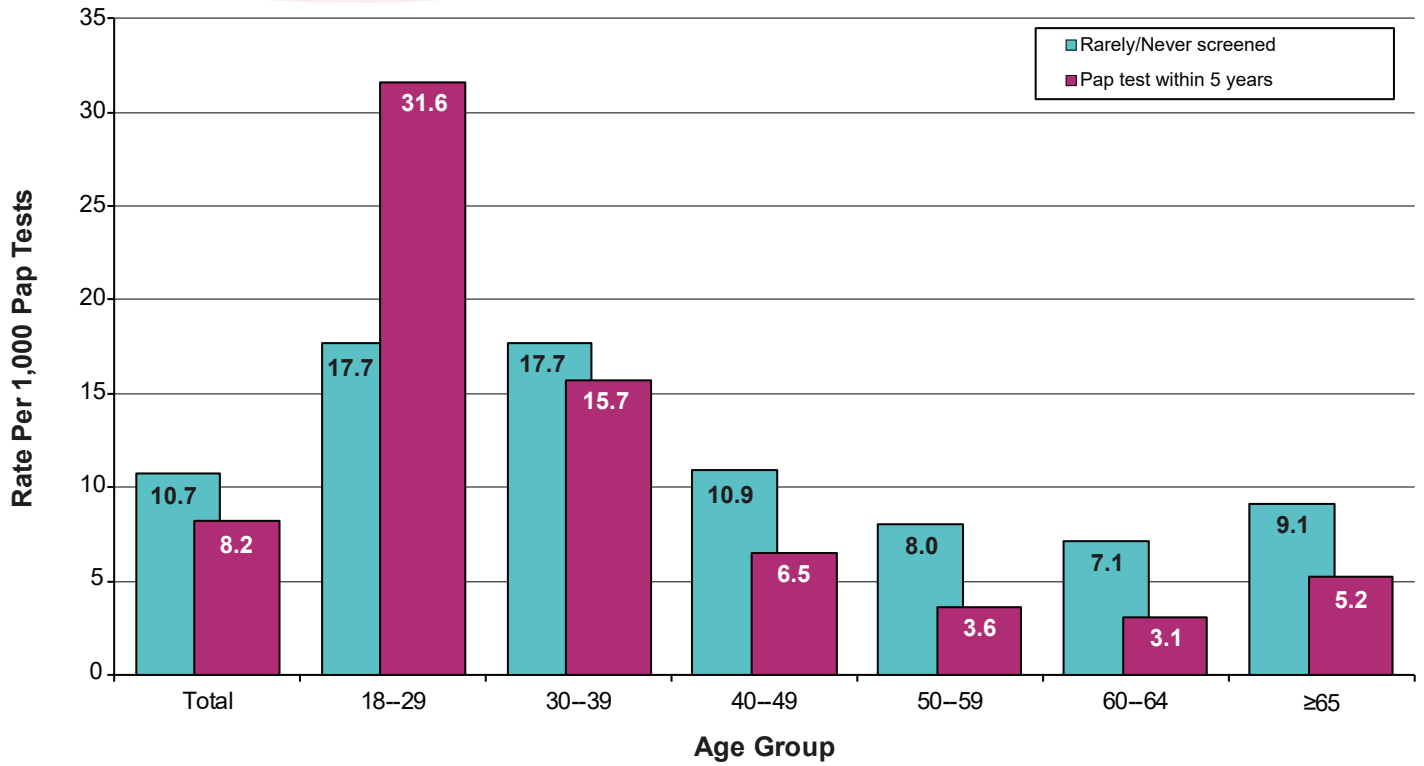
\*Rates calculated per 1,000 Pap tests.

\*\*CIN 2 or worse includes CIN 2, CIN 3, CIS, and invasive cervical cancer.

†Abbreviations: CIN=cervical intraepithelial neoplasia; CIS=Carcinoma in Situ.

Among women receiving their first NBCCEDP Pap test, the rate of CIN2+ was higher among the rarely/never screened women (Figure 20a). This finding was consistent among all the age groups except the youngest group of 18-29 year olds where the rate of CIN2+ was higher among the women who had received a Pap test within 5 years. Rarely/never screened women had a higher rate of invasive cervical cancer that increased with age (Table 8a).

**Figure 20a.** Rates of Biopsy-Confirmed Cervical Intraepithelial Neoplasia (CIN) 2 or Worse\* Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Age Group and Screening History,\*\* PY03--PY14



\*CIN 2 or worse includes CIN 2, CIN 3, carcinoma in situ, and invasive cervical cancer.

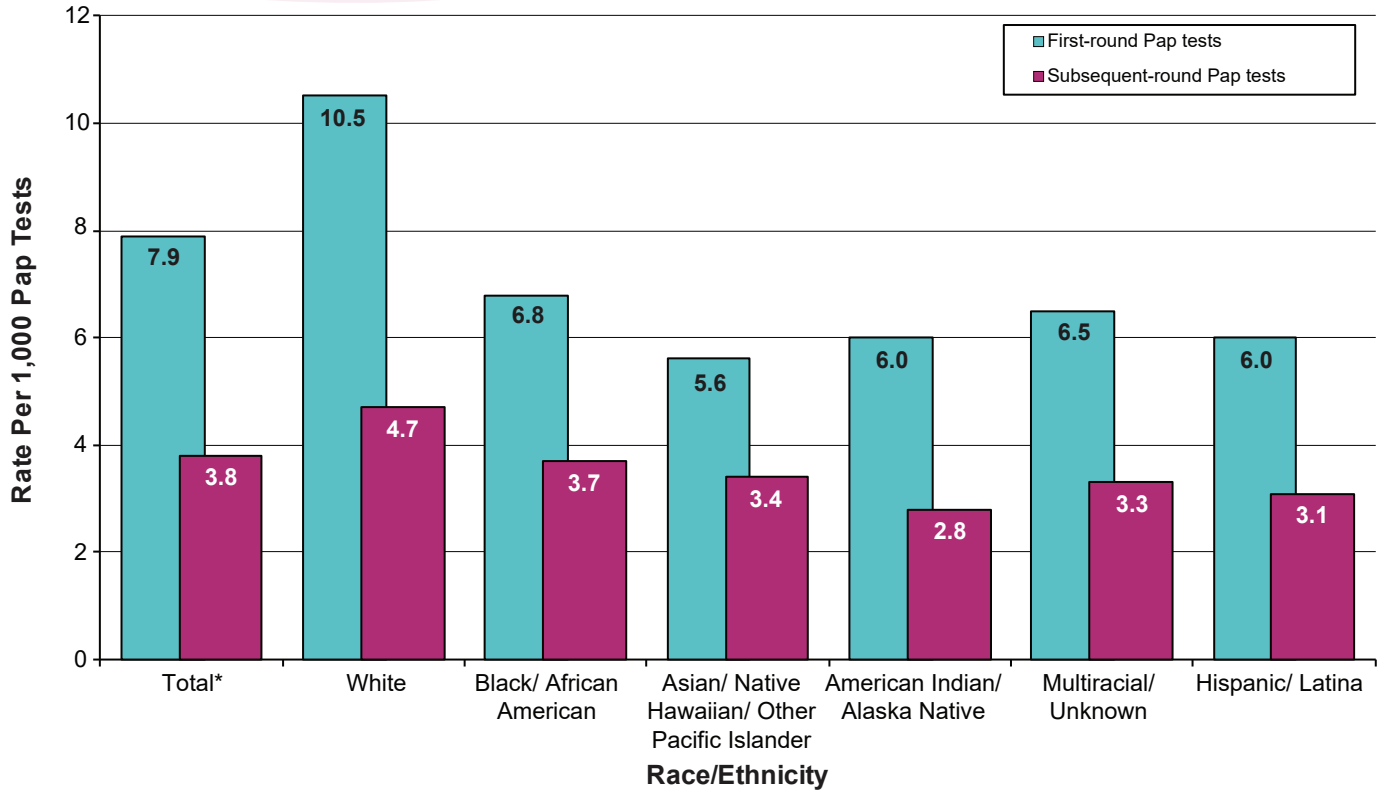
\*\*Excludes women with missing or unknown screening history.

**Table 8a. Rates\* of Biopsy-Confirmed CIN\*\* and Invasive Cervical Cancer Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Age Group and Screening History‡, PY03--PY14**

	Age Group (Years)						
	Total	18--29	30--39	40--49	50--59	60--64	≥65
<b>Rarely/Never Screened</b>							
Final diagnosis							
CIN 1†	9.3	30.9	15.3	9.0	5.2	3.3	2.6
CIN 2†	3.5	10.2	7.0	3.5	1.9	1.1	1.7
CIN 3/CIS†	5.7	7.4	9.6	6.1	4.4	3.8	5.4
Invasive	1.4	0.1	1.1	1.4	1.7	2.1	2.0
CIN 2 or worse†**	10.7	17.7	17.7	10.9	8.0	7.1	9.1
<b>Pap Test within 5 Years</b>							
Final diagnosis							
CIN 1†	11.2	47.7	18.7	9.1	5.2	3.3	2.6
CIN 2†	3.6	17.9	7.0	2.7	1.2	0.8	0.5
CIN 3/CIS†	4.0	13.5	8.2	3.3	1.9	1.7	3.6
Invasive	0.5	0.2	0.5	0.5	0.5	0.7	1.1
CIN 2 or worse†**	8.2	31.6	15.7	6.5	3.6	3.1	5.2
*Rates calculated per 1,000 Pap tests.							
**CIN 2 or worse includes CIN 2, CIN 3, CIS, and invasive cervical cancer.							
†Abbreviations: CIN=cervical intraepithelial neoplasia; CIS=Carcinoma in Situ.							
‡Excludes women with missing or unknown screening history.							

Age-adjusted rates of CIN2+ were higher among women who received their first NBCCEDP Pap test compared to subsequent NBCCEDP Pap tests for all race/ethnicity groups (Figure 21). The highest rates of CIN2+ were among white women. The rate of invasive disease was slightly higher among white women receiving their first round Pap tests but was similar among other race/ethnicity groups (Table 9). Among the women who received the first NBCCEDP Pap test, the rates of CIN2+ were higher among women who were rarely/never screened compared to those who had a Pap test within 5 years (Figure 21a). Rates of invasive disease were also higher among rarely/never screened women receiving their first round Pap test with white women having the highest rate at 2.0/1,000 Pap tests (Table 9a).

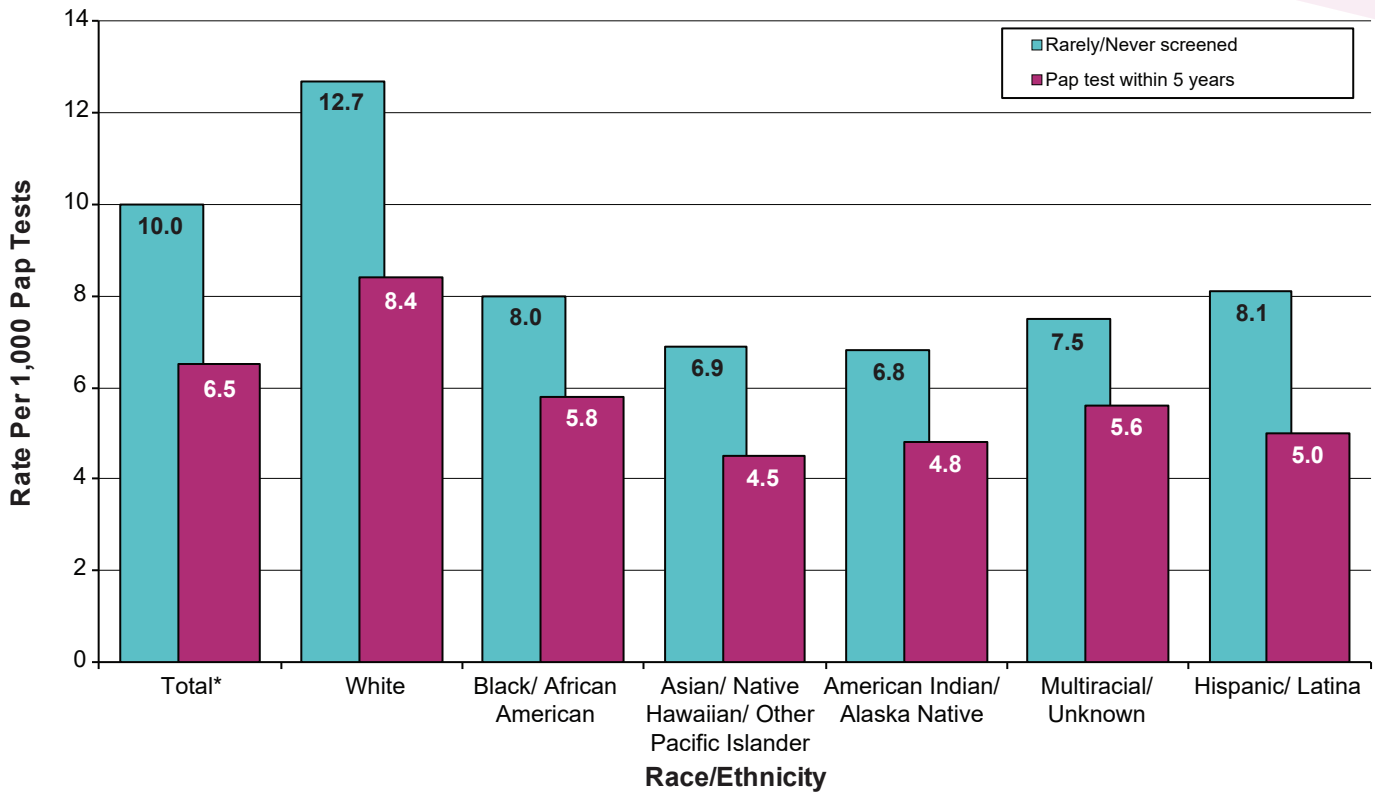
**Figure 21. Age-Adjusted\* Rates of Biopsy-Confirmed Cervical Intraepithelial Neoplasia (CIN) 2 or Worse\*\* Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14**



\*Age-adjusted to the 2000 NBCCEDP population.

\*\*CIN 2 or worse includes CIN 2, CIN 3, carcinoma in situ, and invasive cervical cancer.

**Figure 21a. Age-Adjusted\* Rates of Biopsy-Confirmed Cervical Intraepithelial Neoplasia (CIN) 2 or Worse\*\* Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Race/Ethnicity and Screening History\*\*\*, PY03--PY14**



\*Age-adjusted to the 2000 NBCCEDP population.

\*\*CIN 2 or worse includes CIN 2, CIN 3, carcinoma in situ, and invasive cervical cancer.

\*\*\*Excludes women with missing or unknown screening history.

**Table 9. Age-Adjusted\* Rates\*\* of Biopsy-Confirmed CIN\*\*\* and Invasive Cervical Cancer Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14**

	Race/Ethnicity						
	Total*	White	Black/African American	Asian/Native Hawaiian/Other Pacific Islander	American Indian/Alaska Native	Multiracial/Unknown	Hispanic/Latina
<b>First Round</b>							
Final diagnosis							
CIN 1†	8.6	10.7	7.3	5.9	5.4	7.5	7.3
CIN 2†	2.9	3.9	2.5	1.7	2.1	2.3	2.2
CIN 3/CIS†	4.1	5.4	3.4	3.2	3.1	3.4	3.2
Invasive	1.0	1.2	0.9	0.7	0.8	0.8	0.6
CIN 2 or worse†***	7.9	10.5	6.8	5.6	6.0	6.5	6.0
<b>Subsequent Rounds</b>							
Final diagnosis							
CIN 1†	7.8	9.7	7.8	5.4	4.8	6.6	7.1
CIN 2†	1.8	2.3	1.8	1.4	1.3	1.3	1.5
CIN 3/CIS†	1.8	2.2	1.7	1.9	1.4	1.7	1.5
Invasive	0.2	0.2	0.1	0.2	0.2	0.3	0.2
CIN 2 or worse†***	3.8	4.7	3.7	3.4	2.8	3.3	3.1

\*Age-adjusted to the 2000 NBCCEDP population.  
 \*\*Rates calculated per 1,000 Pap tests.  
 \*\*\*CIN 2 or worse includes CIN 2, CIN 3, CIS, and invasive cervical cancer.  
 †Abbreviations: CIN=cervical intraepithelial neoplasia; CIS=Carcinoma in Situ.

**Table 9a. Age-Adjusted\* Rates\*\* of Biopsy-Confirmed CIN\*\*\* and Invasive Cervical Cancer Among Women Who Received a First-Round Pap Test in the NBCCEDP, by Race/Ethnicity and Screening History‡, PY03--PY14**

	Race/Ethnicity						
	Total*	White	Black/African American	Asian/Native Hawaiian/Other Pacific Islander	American Indian/Alaska Native	Multiracial/Unknown	Hispanic/Latina
<b>Rarely/Never Screened</b>							
Final diagnosis							
CIN 1†	7.9	9.5	6.8	6.0	4.4	7.2	7.1
CIN 2†	3.0	4.0	2.5	1.5	2.3	2.5	2.6
CIN 3/CIS†	5.4	6.7	4.3	4.5	3.5	3.8	4.4
Invasive	1.6	2.0	1.2	1.0	0.9	1.2	1.0
CIN 2 or worse†***	10.0	12.7	8.0	6.9	6.8	7.5	8.1
<b>Pap Test within 5 Years</b>							
Final diagnosis							
CIN 1†	8.7	10.8	7.5	6.1	6.2	7.8	7.3
CIN 2†	2.6	3.5	2.4	1.9	1.9	2.0	2.0
CIN 3/CIS†	3.3	4.2	2.9	2.2	2.3	3.1	2.6
Invasive	0.6	0.7	0.6	0.3	0.6	0.5	0.4
CIN 2 or worse†***	6.5	8.4	5.8	4.5	4.8	5.6	5.0

\*Age-adjusted to the 2000 NBCCEDP population.  
 \*\*Rates calculated per 1,000 Pap tests.  
 \*\*\*CIN 2 or worse includes CIN 2, CIN 3, CIS, and invasive cervical cancer.  
 †Abbreviations: CIN=cervical intraepithelial neoplasia; CIS=Carcinoma in Situ.  
 ‡Excludes women with missing or unknown screening history.

#### 4.5. Accuracy of Pap test results

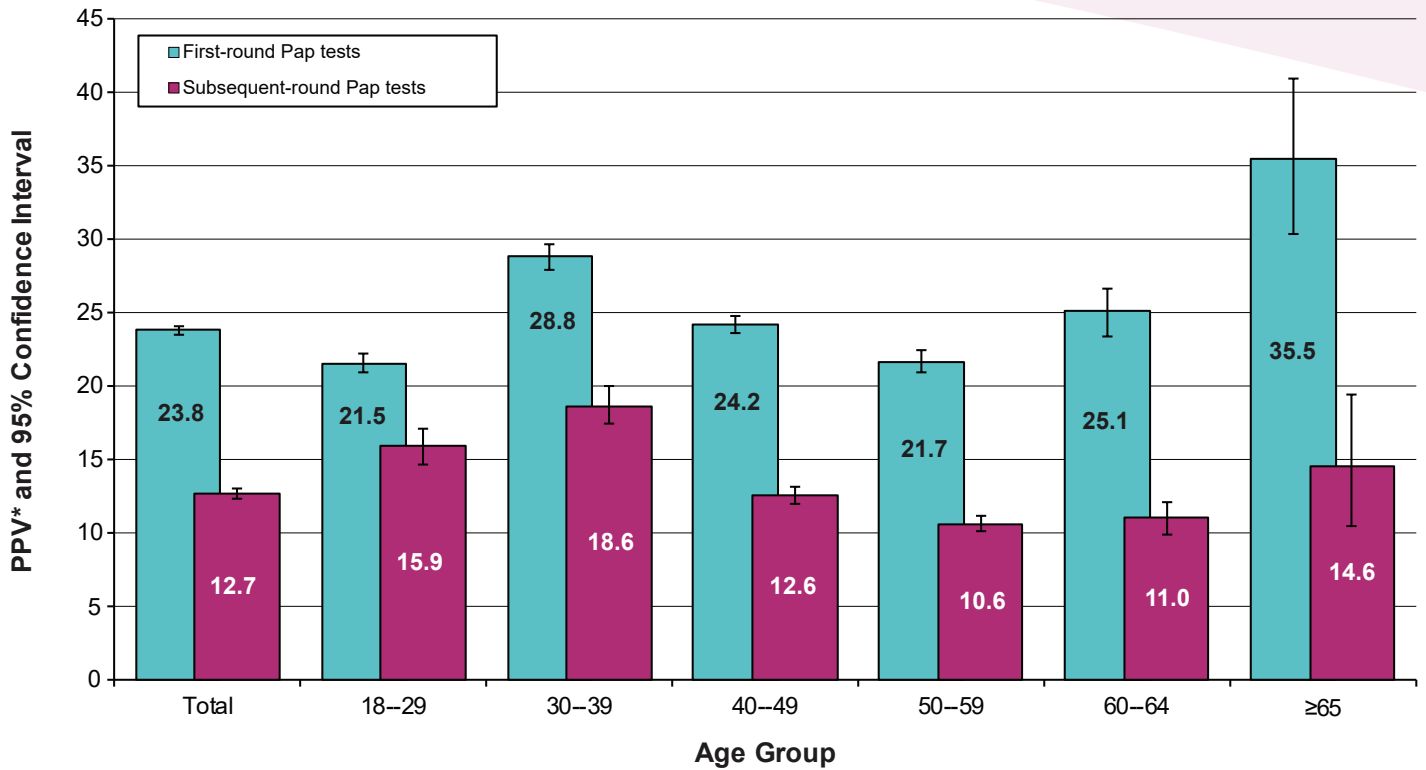
Table 10 shows the PPV of abnormal Pap test results. The PPV was highest for women who were undergoing their first-round Pap tests compared to women undergoing subsequent Pap tests. The PPV was higher among women receiving their first NBCCEDP Pap tests compared to subsequent NBCCEDP Pap tests for all age groups and all race/ethnicity groups. Among women receiving their first NBCCEDP Pap tests, the PPV was highest for women aged 65 years and older. In contrast, the PPV was higher for younger women among those receiving subsequent NBCCEDP Pap tests (Figure 22). White women had higher PPV during first NBCCEDP Pap testing, but no race/ethnicity differences during second-round Pap testing (Figure 23).

**Table 10. Positive Predictive Value (PPV)\* of Abnormal Pap Test Results\*\* Among Women in the NBCCEDP, by Age Group, Race/Ethnicity, and Screening Round, PY03--PY14**

	PPV* (95% Confidence Interval)	
	First Screening Round	Subsequent Screening Round
<b>Total</b>	<b>23.8 (23.5 -- 24.1)</b>	<b>12.7 (12.3 -- 13.0)</b>
<b>Age Group (years)</b>		
18--29	21.5 (20.9 -- 22.2)	15.9 (14.7 -- 17.1)
30--39	28.8 (27.9 -- 29.7)	18.6 (17.4 -- 20.0)
40--49	24.2 (23.6 -- 24.8)	12.6 (12.0 -- 13.2)
50--59	21.7 (21.0 -- 22.5)	10.6 (10.1 -- 11.2)
60--64	25.1 (23.4 -- 26.7)	11.0 ( 9.9 -- 12.1)
≥65	35.5 (30.4 -- 40.9)	14.6 (10.5 -- 19.4)
<b>Race/Ethnicity</b>		
White	26.2 (25.8 -- 26.7)	12.9 (12.4 -- 13.4)
Black/African American	21.7 (20.8 -- 22.7)	11.5 (10.5 -- 12.5)
Asian/Native Hawaiian/Other Pacific Islander	23.4 (21.7 -- 25.1)	14.6 (12.7 -- 16.7)
American Indian/Alaska Native	20.0 (18.3 -- 21.7)	13.6 (12.4 -- 15.0)
Multiracial/Unknown	22.6 (20.4 -- 24.9)	14.0 (11.6 -- 16.8)
Hispanic/Latina	20.2 (19.6 -- 20.9)	11.9 (11.2 -- 12.6)
<p>*The PPV was calculated by dividing the number of abnormal Pap test results** leading to a biopsy-confirmed high-grade lesion (CIN+ 2 or worse) by the total number of abnormal Pap test results.</p> <p>**Includes the following Pap test results†: LSIL, ASC--H, HSIL, AGC, and squamous cell carcinoma.</p> <p>†Abbreviations: CIN=cervical intraepithelial neoplasia; ASCUS=atypical squamous cells of undetermined significance; HSIL=high-grade squamous intraepithelial lesion; LSIL=low-grade squamous intraepithelial lesion; AGC=atypical glandular cells; ASC--H=atypical squamous cells of undetermined significance--cannot exclude HSIL.</p>		



**Figure 22. Positive Predictive Value (PPV)\* of Abnormal Pap Test Results\*\* Among Women in the NBCCEDP, by Age Group and Screening Round, PY03--PY14**

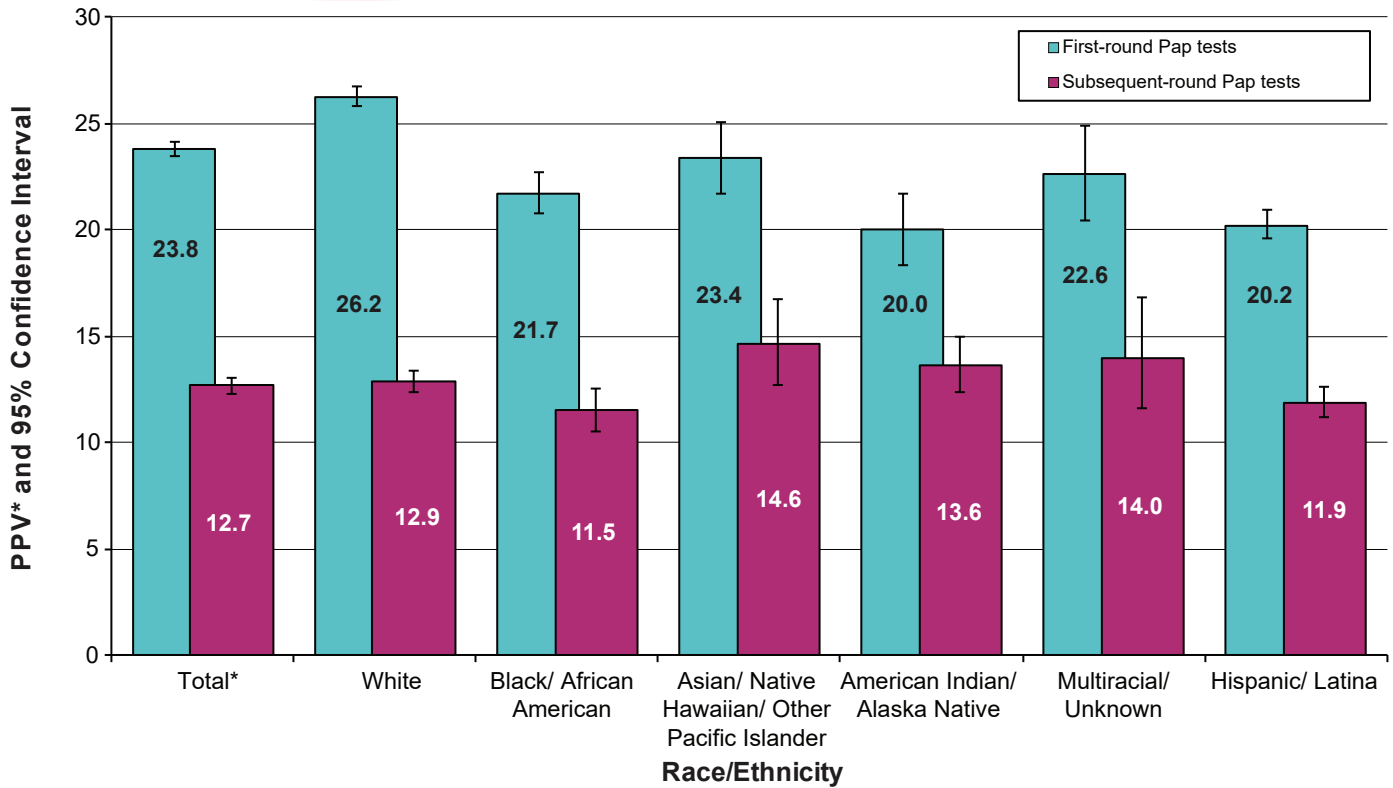


\*The PPV was calculated by dividing the number of abnormal Pap test results\*\* leading to a biopsy-confirmed high-grade lesion (CIN+ 2 or worse) by the total number of abnormal Pap test results.

\*\*Includes the following Pap test results†: LSIL, ASC-H, HSIL, AGC, and squamous cell carcinoma.

†Abbreviations: CIN=cervical intraepithelial neoplasia; ASCUS=atypical squamous cells of undetermined significance; HSIL=high-grade squamous intraepithelial lesion; LSIL=low-grade squamous intraepithelial lesion; AGC=atypical glandular cells; ASC-H=atypical squamous cells of undetermined significance--cannot exclude HSIL.

**Figure 23. Positive Predictive Value (PPV)\* of Abnormal Pap Test Results\*\* Among Women in the NBCCEDP, by Race/Ethnicity and Screening Round, PY03--PY14**



\*The PPV was calculated by dividing the number of abnormal Pap test results\*\* leading to a biopsy-confirmed high-grade lesion (CIN<sup>†</sup> 2 or worse) by the total number of abnormal Pap test results.

\*\*Includes the following Pap test results<sup>†</sup>: LSIL, ASC-H, HSIL, AGC, and squamous cell carcinoma.

<sup>†</sup>Abbreviations: CIN=cervical intraepithelial neoplasia; ASCUS=atypical squamous cells of undetermined significance; HSIL=high-grade squamous intraepithelial lesion; LSIL=low-grade squamous intraepithelial lesion; AGC=atypical glandular cells; ASC-H=atypical squamous cells of undetermined significance--cannot exclude HSIL.

# 5. Stage of cancer at diagnosis

## 5.1. Linkage to cancer registry data

In the first national report on the NBCCEDP covering 1991–2002, 74% of breast cancers diagnosed and 53% of cervical cancers diagnosed were found at early stage. During this time period, the stage of disease was based on the clinical presentation at the time of initial tissue diagnosis rather than on the final stage after surgery. In 2009, the NBCCEDP grantees began linking cancer cases diagnosed in the program to data from population-based central cancer registries in order to obtain registry-standardized stage information. Central cancer registries collect detailed information on cancers diagnosed throughout the United States, Puerto Rico, the U.S. Pacific Island Jurisdictions, and the U.S. Virgin Islands, specifically including tumor characteristics such as stage of disease. This current report provides Summary Stage data from women diagnosed with cancer in the NBCCEDP that were matched with the central cancer registries for 2004-2014.

## 5.2. Stage distribution of invasive breast cancer

Breast cancer stage at diagnosis is used to help determine appropriate cancer treatment and is an important predictor of cancer morbidity and long term survival. Table 11 shows the distribution of invasive breast cancer by age, race/ethnicity, and screening round for calendar years (CY) 2004-2013. There were 29,873 invasive breast cancer diagnosed. Almost half (14,510) were diagnosed at local stage.

**Table 11. Distribution (%)\* of Breast Cancer Stage at Diagnosis Among Women in the NBCCEDP, by Age Group at Diagnosis, Race/Ethnicity, and Screening Round, CY2004--CY2014\*\***

	Registry Summary Stage				
	Total	Localized	Regional	Distant	Unknown
<b>Women w/ Invasive Breast Cancers Matched to a Registry (n)</b>	<b>29,873</b>	<b>14,510</b>	<b>11,850</b>	<b>1,824</b>	<b>1,689</b>
<b>Age at Diagnosis</b>					
40-49	29.3	27.8	31.6	27.8	27.8
50-59	47.5	46.8	47.9	51.2	47.0
60-64	21.3	23.2	18.9	19.2	23.5
65+***	1.9	2.2	1.5	1.8	1.7
<b>Race/Ethnicity</b>					
White	59.2	59.9	57.6	61.3	62.6
Black	17.8	16.9	19.0	20.7	13.9
Hispanic	14.7	14.8	15.2	11.7	12.8
Other, Non/Unk Hisp	6.4	6.5	6.2	4.7	8.8
Unknown	1.9	1.8	2.1	1.5	1.8
<b>NBCCEDP Screening Round</b>					
First-Round Mammogram	77.0	72.1	81.0	88.8	77.9
Subsequent-Round Mammogram	23.0	27.9	19.0	11.2	22.1
*Totals may not add to 100% due to rounding.					
**Includes NBCCEDP-diagnosed cases matched to a Central Cancer Registry. SEER Summary Stage 2000 and year of diagnosis acquired from registry.					
***Most women 65 years of age or older were not served through the NBCCEDP because of eligibility for Medicare Part B coverage.					

### 5.3. Stage distribution of invasive cervical cancer

Table 12 shows the distribution of invasive cervical cancer at diagnosis by age, race/ethnicity, screening round, and screening history between CY2004 and CY2014. There were 1,602 cervical cancers diagnosed. Nearly 90% were among women receiving their first round Pap test, 40.6% of whom were rarely or never screened.

**Table 12. Distribution (%)\* of Cervical Cancer Stage at Diagnosis among Women in the NBCCEDP, by Age Group at Diagnosis, Race/Ethnicity, Screening Round and Screening History, CY2004--CY2014\*\***

	Registry Summary Stage				
	Total	Localized	Regional	Distant	Unknown
<b>Women w/ Invasive Cervical Cancers Matched to a Registry (n)</b>	<b>1,602</b>	<b>651</b>	<b>659</b>	<b>164</b>	<b>128</b>
<b>Age at Diagnosis</b>					
18-29	2.9	4.9	1.8		1.6
30-49	50.2	54.5	47.3	43.9	50.8
50+***	46.9	40.6	50.8	56.1	47.7
<b>Race/Ethnicity</b>					
White	58.4	55.9	58.3	63.4	65.6
Black	12.8	12.4	13.8	12.8	9.4
Hispanic	19.9	22.9	19.4	13.4	15.6
Other, Non/Unk Hisp	7.4	6.9	7.3	9.8	7.8
Unknown	1.4	1.8	1.2	0.6	1.6
<b>NBCCEDP Screening Round</b>					
First-Round Pap Test	89.8	87.3	92.4	91.5	87.5
Subsequent-Round Pap Test	10.2	12.7	7.6	8.5	12.5
<b>Screening History (First-Round)****</b>					
Unknown	17.8	18.1	17.0	17.7	20.3
Rarely/Never Screened	40.6	33.0	48.0	48.2	32.0
Screened w/in Past 5 Yrs	31.4	36.1	27.5	25.6	35.2

\*Totals may not add to 100% due to rounding.  
 \*\*Includes NBCCEDP-diagnosed cases matched to a Central Cancer Registry. SEER Summary Stage 2000 and Year of Diagnosis are acquired from registry.  
 \*\*\*Most women 65 years of age or older were not served through the NBCCEDP because of eligibility for Medicare Part B coverage.  
 \*\*\*\*Screening history prior to the first Pap test received through the NBCCEDP.

## 6. Program evaluation

Program evaluation is central to a successful program. Evaluation in the NBCCEDP is used to assess the quality, implementation, effectiveness, and efficiency of the program and to provide guidance for program planning and improvement. Evaluation aims to better serve program clients, staff, and partners.

### 6.1 Minimum data elements (MDEs)

Grantees maintain a data system to monitor and track women served by the program to ensure high-quality screening and diagnostic services are provided and initiation of treatment is timely for women diagnosed with cancer. Demographic and clinical information is collected on each woman served.

Twice a year, grantees report to CDC a standardized record on every screening encounter provided through the program. The data are called the minimum data elements (MDEs) and represent the subset of data required by CDC to monitor screening performance.

Each MDE record describes a screening cycle that contains information on patient demographics, symptoms, screening history, screening tests and results, diagnostic tests and results, final diagnosis, and initiation of treatment, if needed. A unique patient identification number facilitates the tracking of screening services provided to a woman over time. Individual grantees use their data to help ensure women receive complete and timely care, and to guide program planning, evaluation, and quality assurance/quality improvement.

A comprehensive set of MDE reports are produced semi-annually following each data submission. CDC uses grantee-specific reports to monitor grantee performance, provide feedback, and direct resources and technical assistance. These semi-annual reports describe both the national aggregate program and individual grantee programs, focusing on clinical services and outcomes, the population served, quality of the data, and quality of clinical care. A list of data collected in the MDE can be found in Appendix 2.

### 6.2. Clinical performance indicators

Clinical performance indicators are a subset of the MDEs used to measure clinical performance by assessing reach to priority populations and timeliness of follow-up services and treatment initiation. Table 13 provides a description of the core clinical performance indicators, related targets, and results for PY2014.

**Table 13. National Breast and Cervical Cancer Early Detection Program Performance Indicators**

Indicator Type	Indicator	CDC Target	2014 Results
Screening Priority Population	Percentage of initial program Pap tests that are conducted among rarely or never screened women	> 20%	35.40%
	Percentage of screening mammograms provided to women > 50 years of age	> 75%	84.80%
Cervical Cancer Diagnostic Measures	Percentage of abnormal screening results with complete diagnostic follow-up	> 90%	92.60%
	Percentage of abnormal screening results with time from screening test result to final diagnosis < 90 days	≥ 75%	88.90%
	Percentage of women diagnosed with HSIL, CIN2, CIN3, CIS, or invasive carcinoma with treatment started	> 90%	93.00%
	Percentage of women diagnosed with HSIL, CIN2, CIN3, or CIS with time from date of diagnosis to treatment started < 90 days	≥ 80%	94.40%
	Percentage of women diagnosed with invasive carcinoma with time from date of diagnosis to treatment started < 60 days	≥ 80%	93.40%

**Table 13. National Breast and Cervical Cancer Early Detection Program Performance Indicators**

Indicator Type	Indicator	CDC Target	2014 Results
Breast Cancer Diagnostic Measures	Percentage of abnormal screening results with complete diagnostic follow-up	> 90%	95.30%
	Percentage of abnormal screening results with time from screening test result to final diagnosis < 60 days	≥ 75%	93.80%
	Percentage of women diagnosed with breast cancer with treatment started	> 90%	97.70%
	Percentage of women diagnosed with breast cancer with time from date of diagnosis to treatment started < 60 days	≥ 80%	92.40%

### 6.3. Performance management

In 2006, the NBCCEDP implemented a performance management system using the core clinical quality indicators to inform program improvement and performance-based funding. Prior to implementing performance improvement, many grantees did not meet several of the performance indicators. After implementation, there was significant improvement in grantees meeting the indicators. An analysis of this system found that it was effective in driving program improvements.<sup>10</sup>

### 6.4. MDE validation

An evaluation of data quality was performed to assess the accuracy of the MDE data. A sample of records were selected from six of the largest grantees which accounted for more than 30% of the MDE data. Demographic and clinical information regarding screening, diagnostic, and final diagnosis was abstracted from the medical records and compared to data submitted in the MDEs. The MDEs were found to be valid and consistent with sociodemographic and clinical data within medical records.<sup>11</sup>

### 6.5. Economic evaluation of the NBCCEDP

Because health care resources are limited, it is important to compare the costs and benefits of the program. As the largest organized cancer screening program in the United States, the program seeks to maximize the benefits of breast and cervical cancer screening and diagnostic services. Given the current climate of increasing health care costs and limited resources, there is high interest in the economic analyses of delivering preventive health services. Economic analysis of public health programs, such as the NBCCEDP, have become increasingly important as decision makers attempt to identify the most efficient strategies in which to provide cancer screening services to age-eligible populations. Such economic evaluations involve the collection and analysis of detailed cost data for various program activities; the findings could be used to help identify best practices to increase program effectiveness, reduce program costs, and improve efficiency in program operations and performance.

Several published studies assessed the benefits of the NBCCEDP; two of these studies looked at the life-years saved.<sup>12, 13</sup> For breast cancer screening, 100,800 life-years were saved compared to screening in the absence of an organized program. For cervical cancer screening, 10,369 life-years were saved. Interestingly, when comparing life-years saved per woman (0.0560 for breast and 0.0060 for cervical), the NBCCEDP was more effective than other preventive health services such as measles and rubella vaccinations at 0.0080 life-years saved, colorectal cancer screening with FOBT at 0.0041 life-years saved, and hypertension screening at 0.011 life-years saved.

# 7 • Spill-over effect of the NBCCEDP

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## 7.1. WISEWOMAN Program

In 1993, Congress began funding the Well-Integrated Screening and Evaluation for Women Across the Nation (WISEWOMAN) program by expanding the legislation that authorized the NBCCEDP to include screenings and interventions for chronic disease risk factors.<sup>14</sup> WISEWOMAN provides low-income, under- or uninsured women aged 40–64 years with the knowledge, skills, and opportunities to improve diet, physical activity, and other lifestyle behaviors to prevent, delay, and control cardiovascular and other chronic diseases. The WISEWOMAN services are provided to women who participate in the NBCCEDP. WISEWOMAN and NBCCEDP are often considered “sister” programs; in many cases, funded NBCCEDP and WISEWOMAN programs share staff, resources and referral networks. CDC currently funds 21 WISEWOMAN programs in states and tribal organizations.

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## 7.2. Treatment Act

The Breast and Cervical Cancer Mortality Prevention Act of 1990 prohibits use of program funding for treatment services. Therefore, grantees had to work with treatment providers to obtain low cost or free services for women diagnosed with cancer by the NBCCEDP. In 2000, Congress passed the Breast and Cervical Cancer Prevention and Treatment Act, which gave states the option to offer women in the NBCCEDP access to treatment through Medicaid. In 2001, with passage of the Native American Breast and Cervical Cancer Treatment Technical Amendment Act, Congress expanded this option to American Indians/Alaska Natives who are eligible for health services provided by the Indian Health Service or a tribal organization.

By 2005, all states had elected to participate in the Medicaid Treatment Act. In order for a woman to be eligible for Medicaid under this option, she must 1) have been screened for and found to have breast or cervical cancer, including precancerous conditions, through the NBCCEDP; 2) be under age 65; and 3) be uninsured and otherwise not eligible for Medicaid. Most states actually expanded the coverage option to include women who were screened or diagnosed with cancer by a NBCCEDP-funded provider even though their services were not paid with NBCCEDP funds and to women who would qualify for the NBCCEDP but were not screened or diagnosed with cancer by a NBCCEDP-funded provider. States may also choose the presumptive eligibility option that allows them to enroll women in Medicaid for a limited period of time before full Medicaid applications are filed and processed, based on a determination by a Medicaid provider of likely Medicaid eligibility.

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## 7.3. Care coordination

From 2010 to 2012, NBCCEDP supported a Care Coordination Demonstration Project through which 11 grantees were awarded funds to develop and implement care coordination models for breast and cervical cancer screening in collaboration with healthcare system partners. The primary objectives were to create and implement changes in operational systems, policies, and/or practices to improve the coordination of cancer prevention and early detection activities; and to provide patient navigation services to low-income women who were not being screened through the NBCCEDP. Grantees worked with Federally Qualified Health Centers (FQHCs), county health departments, community clinics, hospitals, university health systems, and Urban Indian Health Clinics.

Grantees delivered individual-level and systems-level services through patient navigators. Navigators provided patient education, community referral, and appointment scheduling assistance. Other services provided by grantees included transportation assistance, appointment reminders, identification of financial resources, survivorship support, mental health referrals, and support for cultural/religious issues. A total of 10,263 women were navigated and received 16,743 breast and cervical cancer screening and diagnostic exams.

Several lessons were learned through this pilot project including that it is important for public health programs to maximize their familiarity with the infrastructure of programs they partner with to serve underserved populations, place greater emphasis on services that support screening, set standard quality measures and develop data training to ensure quality services, and promote care coordination as an important public health practice.

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#### 7.4. Colorectal Cancer Control Program

In August 2005, CDC funded five sites to implement the Colorectal Cancer Screening Demonstration Program (CRCSDP), a four-year initiative to assess the feasibility of implementing a public health screening program for colorectal cancer. Modeled after the NBCCEDP, CRCSDP grantees engaged local health care providers to offer colorectal cancer screening to low-income, uninsured, and underinsured men and women.

As the CRCSDP neared its end in 2009, preliminary evaluation results demonstrated its effectiveness in recruiting and screening the priority population. CDC funded a new, five-year initiative called the Colorectal Cancer Control Program (CRCCP) from 2009-2015, expanding the number of grantees to 29. The CRCCP continued to provide direct screening services to low income, underinsured persons, but emphasized activities to increase screening among the larger population. In 2015, the CRCCP funded another five-year cycle<sup>15</sup> with a new focus on partnering with health systems and clinics that serve disadvantaged populations and have low screening rates. In particular, grantees are encouraged to implement the evidence-based strategies identified in *The Guide to Community Preventive Services*<sup>16</sup>, such as patient and provider reminder systems in these clinics. The CRCCP's goal is to increase colorectal cancer screening rates among men and women aged 50 years and older to 80%. The CRCCP currently partners with more than 500 clinics reaching more than 900,000 men and women aged 50-75 years. On average, screening rates were increased by six percentage points in the first program year.



## 8 • Expanding the program

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### 8.1. Partnerships and collaborations

National, state and community partnerships, such as those with the American Cancer Society, Susan G. Komen for the Cure, the Avon Foundation, state comprehensive cancer coalitions, and many other local organizations, comprise another critical component for the success of the NBCCEDP. Partnerships assist the NBCCEDP with reducing cancer incidence, morbidity, and mortality through prevention, early detection, treatment, rehabilitation and palliation by expanding its reach, capacity and resources. Partnerships and collaborations with state, local, and tribal health departments, coalitions, advocacy groups, academic institutions, community-based organizations, and the medical community represent a great avenue to disseminate health promotion and disease prevention interventions among underserved women. Through these collaborations, the NBCCEDP has an increased understanding of and access to priority populations which include program-eligible women.

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### 8.2. Health systems change

Following the design of the CRCCP, the NBCCEDP has expanded its activities to include working with health systems to reach underserved women and reduce “missed opportunities” among women seeking other health care services. Grantees can leverage their relationships with health care clinics that have traditionally provided cancer screening services to incorporate implementation of effective strategies to increase screening rates for all health system patients. Grantees can work with health systems to conduct a comprehensive assessment of each health care delivery system to include breast and cervical cancer screening rates, functionality of the health system’s electronic health record to use data, patient and system process flow, policies for cancer screening, support services through patient navigation and community outreach, and use of evidence-based interventions as described by the *Guide to Community Preventive Services*<sup>16</sup> or other strategies that support cancer screening.

By providing support to help additional underserved women navigate into and through the cancer screening process, grantees can help increase cancer screening rates for a larger number of women. Reaching women, especially disparate populations who may not be routinely accessing health care systems, where they live and work is essential for increasing breast and cervical cancer screening more widely. Collaborating with local community organizations that provide other services to low-income individuals can assist grantees with identifying women with unmet healthcare needs and connecting them to clinical care.

## 9 • Future directions

This report follows the first national report and presents the practices and outcomes for the NBCCEDP's second decade of screening and diagnostic services. As the NBCCEDP continues to provide screening and diagnostic services to low-income, under- and uninsured women, the program will work to ensure that additional low-income women receive appropriate screening for breast and cervical cancer. As the health care environment evolves, the NBCCEDP must remain flexible in order to effectively reach our target populations. Newly insured, low-income women will continue to face barriers that must be addressed. Through health system interventions, environmental approaches, and community programs linked to clinical services, the NBCCEDP can reach a larger percentage of low-income women. Future reports will assess the impact of this changing health care environment and how the NBCCEDP has responded to the unmet needs of underserved women.

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# Appendices

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## Appendix 1. NBCCEDP Publication List

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**Appendix 2. NBCCEDP Minimum Data Elements (MDEs) • Version 6, effective January 1, 2009**

**All Patient Section**

<b>Category</b>	<b>Data Item Name</b>	<b>Purpose</b>
<b>Enrollment Location</b>	State, Territorial, or Tribal Program of Screening	Grantee FIPS or Tribal Program code
	County of Screening	FIPS code for the county of the primary B&C provider
	Enrollment Site	Point of enrollment into the program
<b>Patient/Record Id</b>	Patient ID Number	Patient’s identification number
	Record Identifier	Uniquely identify one record among many for a woman
<b>Patient Demographics</b>	County of Residence	FIPS code for the county of residence
	State or Territory of Residence	FIPS code for the state or territory of residence
	Zip Code of Residence	Zip code of residence
	Date of Birth	Date of birth
	Race 1 - 5	Up to 5 self-identified race groups
	Hispanic or Latino Origin	Hispanic or Latino origin
<b>Clinical Breast Exam screening information</b>	Breast Symptoms	Breast symptoms reported by the woman
	Clinical Breast Exam (CBE)	Provider’s assessment of the Clinical Breast Exam
	Date of Clinical Breast Exam (CBE)	Date of CBE
	Clinical Breast Exam Paid by NBCCEDP Funds	If CBE was paid for with NBCCEDP funds
<b>Cervical screening information</b>	Previous Pap Test	If a woman has had a previous Pap test
	Date of Previous Pap Test	Date of previous Pap test
	Indication for Pap Test	Reason for Pap test or cervical visit
	Cervical Diagnostic Referral Date	Enrollment date of patient referred to program for diagnostic evaluation after abnormal Pap performed outside the program
	Bethesda System Used	Whether the Pap test results for a woman were reported using the 1991 or 2001 Bethesda System Categories
	Specimen Adequacy of Screening Pap Test	Specimen adequacy as noted under the Bethesda System
	Specimen Type for Pap Test	How specimen was collected (LBT / conventional)
	Results of Screening Pap Test (Bethesda 1991)	Results of screening Pap test using the 1991 Bethesda System
	Results of Screening Pap Test (Bethesda 2001)	Results of screening Pap test using the 2001 Bethesda System
	Other Screening Pap Test Results	Specify other screening Pap test results
	Date of Screening Pap Test	Date of screening Pap test
	Screening Pap Test Paid by NBCCEDP Funds	If Pap test, laboratory services, or pelvic exam were paid by NBCCEDP funds

**All Patient Section**

<b>Category</b>	<b>Data Item Name</b>	<b>Purpose</b>
	Result of HPV Test	HPV test result
	Date of HPV Test	HPV test date
	HPV Test Paid by NBCCEDP Funds	If HPV test was paid by NBCCEDP funds
	Diagnostic WorkUp Planned for Cervical Dysplasia or Cancer	Clinical recommendation for immediate diagnostic workup
<b>Initial Mammogram Information</b>	Previous Mammogram	If a woman has had a previous mammogram
	Date of Previous Mammogram	Date of previous mammogram
	Indication for Initial Mammogram	Reason for mammogram
	Breast Diagnostic Referral Date	Enrollment date of patient referred to program for diagnostic evaluation after abnormal breast screen performed outside the program
	Mammography Test Results	Results of mammography using the American College of Radiology lexicon (V6 added Assessment Incomplete- need Film Comparison)
	Date of Mammogram	Date of mammography
	Mammogram Paid by NBCCEDP Funds	If mammogram was paid for by NBCCEDP funds
	Diagnostic WorkUp Planned for Breast Cancer	Clinical recommendation for immediate diagnostic workup
<b>Internal Use</b>	MDE Version Number	MDE version used for submitting data

### Additional Cervical Procedures Section

Category	Data Item Name	Purpose
<b>Cervical Diagnostic Procedures</b>	Colposcopy without Biopsy	If colposcopy without biopsy was performed
	ColposcopyDirected Biopsy	If a colposcopydirected biopsy was performed (v6 specifies Colpo w/biopsy and/or ECC)
	Loop Electrosurgical Excision Procedure (LEEP)	If LEEP was performed
	Cold Knife Cone	If CKC was performed
	Endocervical Curettage alone (ECC)	If ECC was performed
	Other Procedures Performed	If other diagnostic procedures were performed
	Description of Other Procedures Performed	Specify other diagnostic procedures performed
	Cervical Diagnostic Procedures Paid by NBCCEDP Funds	If one or more diagnostic procedures were paid with NBCCEDP funds
<b>Cervical Diagnosis Information</b>	Status of Final Diagnosis	Status of final cervical diagnosis
	Final Diagnosis	Final cervical diagnosis
	Final Diagnosis–Other	Specify final cervical diagnosis of “other”
	Date of Final Diagnosis	Date of final cervical diagnosis
	Stage at Diagnosis	Stage at diagnosis for women with invasive cervical cancer (v5 legacy)
<b>Cervical Cancer Treatment</b>	Status of Treatment	Status of treatment for precancerous lesions and cervical cancer
	Date of Treatment Status	Date of treatment status

### Additional Breast Procedures Section


Category	Data Item Name	Purpose
<b>Additional Breast Imaging Procedures</b>	Additional Mammographic Views	If additional mammographic views were performed
	Ultrasound	If an ultrasound was performed
	Film Comparison to evaluate Assessment Incomplete	If a film comparison was performed to evaluate an assessment incomplete mammogram result
	Final Imaging Outcome	Final imaging outcome following assessment incomplete mammogram result
	Date of Final Imaging Outcome	Date of final imaging outcome
<b>Breast Diagnostic Procedures</b>	Repeat Breast Exam/Surgical Consultation	If a repeat breast exam and/or surgical consultation was performed
	Biopsy/Lumpectomy	If a biopsy or lumpectomy was performed
	Fine-needle/Cyst Aspiration	If a fine-needle or cysts aspiration was performed
	Other Procedures Performed	If other diagnostic procedures were performed
	Description of Other Procedures Performed	Specify other diagnostic procedures performed
	Breast Diagnostic Procedures Paid by NBCCEDP Funds	If one or more diagnostic procedures were paid for with NBCCEDP funds
<b>Breast Diagnosis Information</b>	Status of Final Diagnosis	Status of final diagnosis
	Final Diagnosis	Final breast cancer diagnosis
	Date of Final Diagnosis/imaging	Date of final diagnosis
	Stage at Diagnosis	Stage at diagnosis for women with invasive breast cancer (v5 legacy)
	Tumor Size	Tumor size for women with invasive breast cancer (v5 legacy)
<b>Breast Cancer Treatment</b>	Status of Treatment	Status of initiation of treatment for breast cancer
	Date of Treatment Status	Date of treatment status

### Registry Acquired Data Items, NBCCEDP Cancer Records Only

Category	Item Name	Purpose
Registry data acquired through data linkages on breast and cervical cancers diagnosed through the NBCCEDP	Registry Linkage Status	If record linkage attempted or matched
	Registry Date of Diagnosis	Confirm NBCCEDP diagnostic outcomes, facilitate record matching, and provide standardized cancer stage data
	Registry Histologic Type	
	Registry Behavior	
	Registry Summary Stage	
	Registry Collaborative Stage Derived AJCC Stage Group	
	Registry Collaborative Stage Tumor Size	
	Registry Collaborative Stage Extension	
	Registry Collaborative Stage Lymph Nodes	
	Registry Collaborative Stage Mets at Diagnosis	
	Registry Primary Site	







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