



Dear Peer Education Program Director,

October 10, 2006

The *Breast Cancer and Environment Peer Education Tool Kit* culminates three years of dedicated effort by the Zero Breast Cancer leadership and staff, community partners and advisors, and peer education specialists in the San Francisco Bay Area. The teen breast cancer risk awareness curriculum tools that Zero Breast Cancer is making available to the broader community evolved from a formative community assessment to address the need for age-appropriate teen breast cancer outreach education in a community known for high breast cancer incidence.

The impetus to develop this program has been threefold: 1) to disseminate knowledge back to the community that resulted from the Adolescent Risk Factors Study (2003), 2) to involve the community in the Bay Area Breast Cancer and Environment Research Center's focus on girl's pubertal development as a window of susceptibility for potential breast cancer risk, and 3) to recognize that adolescence as an optimal stage to disseminate preventive health messages about breast cancer risk, empowering trained peer educators to convey timely information to their peers.

The goal of the Zero Breast Cancer Adolescent Education Program (2003-06) has been to create a peer education model to increase awareness of breast cancer facts, risk factors and environmental exposures relevant to adolescent lifestyle and health education settings. During the past school year, Zero Breast Cancer partnered with the Tamalpais Union High School District and the Sir Francis Drake High School Peer Resource program in Marin County, CA, to pilot test a single lesson module with trained peer educators and younger (9th-10th grade) students in co-educational classrooms.

An independent program evaluation showed that this project was highly successful. A high majority (85%) of students who received the "intervention" agreed that the peer presentation made them more aware of the risks of breast cancer, and that they learned new ways to reduce the potential risk of breast cancer. The majority of student participants were able to cite *personally relevant action steps* using suggested strategies from the lesson information.

Zero Breast Cancer has refined the curriculum module incorporating suggestions from teachers, students and peer education specialists. In the interest of disseminating the lesson module format, sample activities, instructional materials and resources to the health education community, we are posting the *Breast Cancer and Environment Peer Education Tool Kit* on our web site www.zerobreastcancer.org. We will continue to update this site in the future.

The accomplishments of the past three years would not have been possible without the lead support from the Avon Foundation and the To Celebrate Life Breast Cancer Foundation, as well as the Marin Community Foundation and the Bay Area Breast Cancer and Environment Research Center. The financial commitments of individual and community donors to Zero Breast Cancer have helped to sustain this initiative. A Community Advisory Committee composed of breast cancer advocates and breast cancer professionals from Kaiser Permanente, the Marin Cancer Institute, and the UCSF Comprehensive Cancer Center have provided ongoing guidance and expertise. Special thanks to Dr. Martin Forst, Evaluation Consultant; Betsy Barton, Research Associate; Katie Beacock, ZBC Education Committee, Beth Crawford, Director of Clinical Services, UCSF Cancer Risk Program; Carol Eber, Director of Instruction and Student Services, TUHSD; Shelly Norstad, Drake High Peer Resource; Drake High School faculty, peer educators and students; Fern Orenstein, California STD/HIV Prevention Training Center; Meyla Ruwin, Director, School Health Programs Department SFUSD, Ira Sachnoff, Peer Resource Consulting, Adrienne York, ZBC Executive Assistant and the Zero Breast Cancer Board of Directors, Staff and Volunteers. We also credit the sources in our Resources and References.

The web posting of the *Breast Cancer and Environment Peer Education Tool Kit* marks the completion of the Pilot Project phase and our intention to serve as advisors in the development of adolescent breast cancer peer education.

We hope that you will find the *Breast Cancer and Environment Peer Education Tool Kit* to be of value, and we once again thank our many partners and supporters of this groundbreaking program, and invite your feedback and comments.

Sincerely,

Susan Schwartz, MPA
Education Project Director

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Executive Director – Zero Breast Cancer



Breast Cancer and Environment – Peer Education Tool Kit *Zero Breast Cancer – Adolescent Education Project*

MBCW Peer Education Breast Cancer Awareness Pilot Project – (Drake High School, 2005-06)

Module Description: This breast cancer awareness module, targeting adolescent girls and boys ages 13 – 15, focuses on introducing breast cancer facts and factors and risk reduction practices in a single lesson presentation. Established risk factors are introduced as well as the relationship of physical activity, diet and avoidance of suspected environmental exposures to breast cancer risk reduction and prevention. A selected segment of the Adelphi University educational video *Teens Talk About Breast Cancer* is viewed and discussed as part of the lesson module. Trained peer educators (ages 15 – 18) lead structured participatory activities (from a lesson format) to help younger students learn about breast cancer, environmental exposures, and preventive health practices. At the lesson conclusion, students complete a written Personal Action Plan and are provided with a packet of breast cancer prevention information resources to share with others. Students complete pre-and post-test surveys prior to and after participating in the lesson presentation.

Learning Objectives:

At the completion of the breast cancer lesson module, student participants will be able to:

- Recognize the concept that Bay Area women have a 1:7 lifetime risk for developing breast cancer
- Identify the two primary risk factors for breast cancer as being a woman and growing older
- Understand that family history is risk factor that increases one's odds for developing breast cancer
- Recognize that inherited breast cancer genetic defects are rare (5 – 10%) but pose significant risk
- Identify one example of a suspected environmental exposure associated with breast cancer
- Comprehend that breast cancer incidence is not common in young adults and men (less than 1%)
- Be aware that Marin County's elevated breast cancer rates are the focus of many scientific studies.
- Understand that early detection and effective treatment of breast cancer improves survival
- Identify one method of breast cancer detection or screening (breast exam, mammography)
- Recognize one myth about the causes of breast cancer (example from the instructional video)
- Identify two *modifiable* risk factors for breast cancer (excessive alcohol use, tobacco exposure)
- Recognize that lifetime physical activity beginning in adolescence can reduce breast cancer risk

Academic Content Standards (Source: California Challenge Health Education Standards)

Health Standard 1 – The student understands and demonstrates ways in which his or her health and well being can be enhanced and maintained.

Health Standard 8 – The student will identify products, services and information that may be helpful or harmful to his or her health.

Methods

(Refer to Breast Cancer Awareness Peer Education Lesson/Presentation Outline and Action Planning Tool)

Instructional Materials

Breast Cancer Content Messages and Discussion Topics (Read Aloud)

Teens Talk About Breast Cancer Video (Adelphi University)

Selected Breast Cancer Vocabulary

Take-Home Packet of Breast Cancer Information Resources



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Lesson Content Source

MBCW Peer Education Breast Cancer Module Curriculum Guide

References



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Lesson Plan Outline: Breast Cancer and Environment

High School Peer Education Lesson/Presentation

Facilitator Outline Purpose: Research indicates that peer-to-peer education is the most effective way to communicate preventive health information and to reduce risky behaviors with youth. This lesson outline is designed to be used by youth peer leaders who are trained to lead a breast cancer lesson. Several options for interactive activities and dialogue have been created and may be used in a single lesson presentation or in a series. Specific activities* form the core of the single lesson module. Select which activities and instructional resources best fit your group size, skill level, and audience.

Title: What Should I Know About Breast Cancer?

Grade/Target Audience: High School Level 9-10

Suggested Time: 50 minutes – 1 hour, or a 90-minute lesson period

Materials:

- Presenter’s Script - Presentation Outline and ground rules for presentation
- Lesson goals and key words written on blackboard or butcher paper to include:
“Breast Cancer, Facts and Risk Factors, Risk Reduction, Environmental, Healthy Choices”
- Write Key Vocabulary Words on butcher paper or overhead
- Video “*Teens Talk About Breast Cancer*” (cue ahead to Question & Answer section – 6 minutes)
Alternate option: Preview *Breast Cancer, Genes, and Environment* power point
- List Headings on Board: Fact or Factor Myth Gray Area

Instructional Charts, Models and Posters:

- Chart – One in Eight (1:8) Lifetime Risk of Breast Cancer (chart can be made with 100 objects)
- Breast Anatomy: Simple Drawing (may use *Anatomy & Physiology of the Breast – WRS*)
- Healthy Nutrition Poster (*Catch a Rainbow Every Day*) or basket of colorful fruits/vegetables
- Physical Activity Poster (*I am...Exercise makes me feel good* /Health Edco.) or make your own
- Environmental Exposure Examples: Clear plastic bottles; plastic food containers; one cosmetic containing “phthalates,” a picture of charred meat; a cigarette, a sweater in a dry cleaning bag
- Breast Cancer Example (3-D breast model); tumor beads; or mini-breast teaching model
- (Sources: CONCERN Mini-Breast –TM; *Tumors and Diseases of the Breast* poster – Childbirth Graphics)
- Puzzle of Breast Cancer Risk – see Teen Brochure puzzle

Lesson Handouts – Module Templates:

- 1) Breast Cancer Top Twelve Messages – Make Cue Cards to Read (option- or use in a game)
- 2) Breast Cancer Facts, Risk Factors, & Health Tips (make copies on light green paper)
- 3) Breast Cancer Lesson Vocabulary (make copies on light blue paper)
- 4) Resources: Fact Sheet & Resource List; Teen Brochure: *What Should I Know About Breast Cancer?*



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- 5) Personal Action Plan
- 6) Evaluation Survey

Equipment Set-up:

- VCR/TV *Teens Talk About Breast Cancer* video can be “cued” ahead of time to Q & A section
- Optional equipment: Overhead Projector and/or Computer DVD Projector

PARTICIPANT AGENDA

(Before presentation peer educators will choose one - three activities from the five Activity options):

I. WELCOME, OVERVIEW OF GOAL AND OBJECTIVES (7-8 Minutes)

(Refer to Activity # 1*.)

WARM-UP ACTIVITY (10 minutes)

(Activity #1*)

Stand And Respond

II. CONTENT OF PRESENTATION – Activity Options (Allow 30 minutes)

(Refer to Activity #2)

Video Clip/ Slide Show and Overview of Fact Sheet - Group Discussion Activity

(Refer to Activity #3*)

Top Twelve Messages

(Refer to Activity #4)

Preventive Action & Health Tips

(Refer to Activity #5*)

Fact, Myth or Gray Area....Discussion Activity

III. WRAP-UP/ Action Planning- Making it Come Alive in Your Life (5 minutes)

IV. EVALUATION/ POST-ASSESSMENT (5 minutes)

I. WELCOME, OVERVIEW OF GOAL AND OBJECTIVES/GROUND RULES (7-8 minutes):

Goal/Overview: To increase teen knowledge about breast cancer, risk factors, and environmental factors

Objectives: At the conclusion of this lesson, students will have:

- Increased awareness of breast health prevention practices including basic information and warning signs,
- Understood the known and suspected risk factors for breast cancer, especially the environmental



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factors;

- Identified five actions they can take to reduce the risk of breast cancer, increased awareness of resources and name one piece of information they learned and will share with a family member or friend.

WARM-UP ACTIVITY/ INTRODUCTION TO PRESENTATION (10 minutes):

Peer Educator:

1. Prior to the presentation, practice the Activity #1 introduction to the subject and add your own questions. Prepare presentation materials listed and gather materials to distribute to the group.
2. Explain to participants the purpose of the first activity is to allow audience to tap into prior knowledge and begin the discussion regarding breast cancer through an interactive activity.
(Proceed with Activity #1*)
3. Hand out Lesson Vocabulary; Breast Cancer Facts, Risk Factors, (fact sheet), and Teen Brochure
4. Begin Content Presentation and ensure activity is completed in time allotted. If possible, share personal experience as it relates to topic (eg. “My aunt had breast cancer and survived; that’s how I got interested.”)

Content Presentation - Peer Educator:

1. Prior to the Content Presentation, practice presenting the information about breast cancer to other peer educators and/or the participants, and prepare the materials and handouts needed for the activity
2. Explain to audience that in order to reach the goal and objectives of the presentation, we will be examining the information and providing tools through interactive group activities. This will enable participants to identify concrete strategies that can be used in their daily lives at home and school.

II. CONTENT OF PRESENTATION:

Select from Activity 2 – 5; allow 30 minutes. Include activities with an asterisk* for single lesson.

(Refer to Activity #2)

Video Clip/ Slide Show and Overview using Lesson Vocabulary and Fact Sheet - Discussion Activity
After Activity 2, Peer Educators should have a visual “props” ready to share interesting facts to participants. These can be on poster board, overhead or butcher paper prior to presentation. Key concepts should include: Defining Breast Cancer, Review of Risk Factors including the environmental factors, tips on how to reduce the risk of breast cancer and where to find additional resources and information.

Activity #2 Option: Peer Educators should develop about 3 to 5 discussion questions to follow the video or slide show for small group discussion to include: what breast cancer is and symptoms, known and possible risk factors and preventative measures teens can take to reduce the risk of breast cancer, and how they can take action for controlling the environmental factors related to breast cancer, and support of friends/family and their communities. Divide the class into groups of 4-6 students and have each group identify a reporter, and recorder. Distribute question sheet to groups or post questions on butcher paper for each. To save time, ask each group to share out responses for only one of the questions to the larger group.



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(Refer to Activity #3*)

Top Twelve Messages

After Activity 3, Peer Educators should have a visual “props” ready to share out interesting facts to participants. These can be on poster board, overhead or butcher paper prior to presentation. Key concepts should include: Defining Breast Cancer, Review of Risk Factors including the environmental factors, tips on how to reduce the risk of breast cancer and where to find additional resources and information.

The teen brochure/fact sheets should be distributed to all students as a resource that includes answers to the questions, local and national resources. Peer educators can list additional local resources on the board.

(Refer to Activity #4)

Preventive Action & Health Tips

This is a “hands on learning” activity segment. Teachers can order posters and models from the resource list, or peer educators can make charts and visuals from the reference materials and gather familiar objects to use in sharing facts and health tips with participants. Activity 4 includes lists of suggested materials. Peer educators should be ready to demonstrate the concepts related to breast cancer risks and detection.

(Refer to Activity #5*)

5. Fact, Myth or Gray Area....Discussion Activity

Peer Educators will develop questions related to the breast cancer Teen Brochure and Fact Sheet to be distributed for group discussion. The brochure or fact sheet should be distributed to all students as a resource that includes information regarding the questions for this activity, especially known and possible risk factors, environmental factors and local and national resources.

Activity #5 Option: Tape placards to walls- one on the right side of the room, the “Gray Area in the middle of the room and the other on the left side of the room. This activity will allow students to process the information provided during the presentation and share their thoughts about some of the unknown information surrounding breast cancer. Explain that students will be asked to stand next to or in the area of the placard that best represents their opinion about the statement that the Facilitator will read aloud. (Fact, Myth, and Gray Area statements are listed on Activity #5; peer educators may add their own)

III. WRAP UP – ACTION PLANNING

“Are there any more questions before we conclude this topic today?”

Peer Educators: This is the time to list any difficult questions to research and get back to the class.

Personal Action Plan- Making it Come Alive in Your Life (5 –10 minutes)

Peer Educators: It is helpful to do a quick written activity to “firm up” what has been learned or talked about.



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Sample Script: *“The purpose of the Personal Action Plan is to identify at least one thing that you can change or do in your daily life to apply what you learned from the breast cancer presentation. Also think of who you can share this information with, and make a plan to do so.”*

Peer Educators: Read the directions out loud after distributing Personal Action forms to the group. If time permits, ask students to “share out” what they wrote or if they heard another person’s action plan that would be relevant to them as well. Another option is to “share out” with the person next to you.

IV. EVALUATION/ POST-ASSESSMENT (5 minutes - Peer Educators may help distribute surveys)

Directions: *“The purpose of the evaluation survey is to improve the presentation and measure what was learned and what was valuable to you.”* (Encourage all participants to take their time to complete each question and return the survey.) Collect surveys and give to classroom teacher.

After surveys are collected, review correct answers with students. Final comments/wrap-up:
*“How was this presentation? Do you have any comments or suggestions for next time?
Peer Resource (or identify other school staff) is available if you have further questions. Thank You.”*

Post Presentation Option: If an Open Forum or follow-up session to the breast cancer lesson is planned at your school for students who have further questions or concerns, announce this scheduled offering at the end of this presentation. School staff or a breast cancer expert can help facilitate this session.

End of Breast Cancer Presentation (See Activity # 1 – 5 and Lesson Templates)

The purpose of the Breast Cancer and Environment Peer Education Lesson Outline is to provide general information about breast cancer for educational purposes only. It not intended to substitute for the advice of a physician or other health care professional. The educational content is adapted from health education and government publications.



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Lesson Plan: Breast Cancer and Environment

Activity #1: Introduction – Warm Up*

Objectives:

- To present an overview of what students can expect during the breast cancer lesson
- To establish interest in the topics of breast cancer, environment, and modifiable risk factors
- To assess what students think or know about breast cancer

Materials/Preparation

- Classroom seating arranged so students can see the video monitor, posters, and presenters.
- Breast Anatomy: Simple Drawing (may use *Anatomy & Physiology of the Breast – WRS*)
- List the following key words on blackboard or butcher paper: Breast Cancer, Facts and Risk Factors, Risk Reduction, Environmental Factors, Healthy Choices
- Review Breast Cancer Messages (*Top Twelve Topics, and Message Background*), Fact Sheet – Factors and Health Tips, and Teen Brochure before facilitating this activity
- Option: Cue video to Q & A section: *Teens Talk About Breast Cancer* (Adelphi University).
- Alternate Option: Show power point: *Breast Cancer, Genes and the Environment* (NIEHS)
- Peer Leaders can distribute Lesson Vocabulary, Fact Sheet, and/or Teen Brochure immediately after this Warm Up Activity, if you are not using the video or slides

Lesson Activity Time: 10 – 15 minutes

Introduction – Warm-Up Activity: What Should I Know About Breast Cancer?

Introductions: Peer Educators – Who We Are/What We Do *Sample Script* (5 minutes)
Ground Rules (Confidentiality, Right to Pass, Attention to Speakers)
“Today we want to share some important information about breast cancer. This is a new project at our (specific name) high school. We will present some facts on what is known and not known about breast cancer. We’ll also give you some suggestions for what you can do to stay healthy now and in the future. Feel free to ask questions during any part of the lesson.”

Agenda: Raise Awareness of Breast Cancer, Risk Factors and Preventive Health
Present Some Basic Breast Cancer Facts and Statistics
Show a Brief Video (“Teens Talk About Breast Cancer”), or
Alternate: Show the Power Point (*Breast Cancer, Genes and Environment*)
Do Activities to learn about specific risk factors that we can control
Present examples of how we can apply this information to our lifestyle now
Ask you to write out a Personal Action Plan
Optional: Ask You to Take a Brief Survey at the end
Give you some take home resources to share with a parent or a friend



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INTRODUCTION* - Lesson Preview and Sample Script (3 Minutes)

“Many students at (_____) High School may know of an adult who has faced breast cancer or another life-threatening disease; or they may have questions about breast cancer.

“Today, we’re going to learn about some of the risk factors for breast cancer. We’ll talk about some new information that students our age (especially girls) can use to reduce the risk for breast cancer, starting now in the teen years.

We’re going to show part of a video called “Teens Talk About Breast Cancer” (or a power point) and take some questions after the video (or slides). Then we’ll show you some examples of suspected environmental factors, and what you can do to avoid or reduce your risk and exposures.

By the end of today’s class, you’ll be better informed about breast cancer overall. This class may help you understand how breast cancer affects some families, and what you can do personally to stay healthy now and in the next ten years. We’ll also talk about how researchers are trying to learn more about the causes breast cancer, to prevent or reduce the incidence.

WARM-UP Questions* - Sample Script (5 minutes)

- 1) Have you ever known someone with breast cancer? If you’re comfortable, please tell us about this person. (don’t need to use person’s name) Did you do something to support this person while they were dealing with cancer? Peer Leader: If possible, share a story about someone your have known with breast cancer or a life threatening illness, and what you or your family did to support that person.*
- 2) Do you know what breast cancer is? What have your heard or read about breast cancer? Do you have any ideas about the causes, or how breast cancer begins or develops? (“If you’ve been affected by cancer in your family, please participate if you want to”) Peer Leader: Before this project, I knew _____ about breast cancer.*
- 3) Is there something unique about Marin County (or your county) and the rates of breast cancer? What have you heard about, seen on TV, or read? What factors might play a role? Peer Leader: There can be several factors; your Fact Sheet talks about some of them.*
- 4) Raise your hand if you think that alcohol use can be a risk for breast cancer? Smoking? Chemicals in plastics? Getting bumped in the breast Genetic flaws?*
- 5) Any ideas on what we can do at our age to prevent or reduce our own risks for breast cancer? (Peer leader can list responses on the board, or use the Facts, Myths, and Gray Area categories*

Proceed to Activity # 2: View Q & A section of video Teens Talk About Breast Cancer, or
View Breast Cancer, Genes and Environment Slide Show (Power Point)

If you do not plan to show the video or the power point slides, proceed to:



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Alternate: Activity #3*

Breast Cancer Dialogue – Top Twelve Messages

* Essential parts of the 60-90 minute lesson presentation – Breast Cancer and Environment.



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Lesson Plan: Breast Cancer and Environment

Activity #2: Breast Cancer Facts and Factors – Video or Slide Show

Objectives:

- To increase teen knowledge about breast cancer facts, myths, and risk factors
- To learn about lifestyle and environmental factors that may contribute to breast cancer risk
- To increase awareness of breast cancer risk reduction activities relevant to teens and adults

Materials/Equipment/Room Set-up:

- VCR for *Teens Talk About Breast Cancer*; video can be cued ahead of time to the
- “Q & A” section. Optional equipment: Overhead Projector and/or DVD Projector.
- Peer leaders: Preview video Q & A (middle) section: *Teens Talk About Breast Cancer*
- Alternate option: Preview *Breast Cancer, Genes, and Environment* power point
- Peer leaders can prepare their own discussion questions for either the video or slide show
- Review Breast Cancer Messages (*Top Twelve Topics, and Message Background*)
- Copies of Lesson Vocabulary, Fact Sheet, and/or Teen Brochure to distribute after video

Lesson Activity Time: 10 – 12 minutes

Activity – Video Option*:

- ✓ Introduce video– (*Adelphi U*) “*Teens Talk About Breast Cancer*” (cue to Q & A section)
 - Peer leader Sample Script: “*We’d like to show you part of a video of some high school students in the New York area. They were filmed talking about breast cancer. This video was made in 2000. Some of these students had moms or relatives who had breast cancer previously.*”
- ✓ After the class views the video, Q & A segment
 - Peer leader Sample Script: “*This video was made 6 years ago. We know now that drinking more than one alcoholic beverage a day is associated with breast cancer. We also know more about exposures that may interfere with hormone levels and breast cell development earlier in life. Genetic risk and family history can also increase breast cancer risk, as you heard some students mention in the video.*”



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Activity – Power Point Option*:

- ✓ Introduce *NIEHS “Breast Cancer, Genes, and Environment”* power point (18 slides)
 - Peer leader Sample Script: *“We’d like to show you some slides about breast cancer factors how the environment and genetics may influence breast cancer risk for girls and women who may be more susceptible”*
- ✓ Feedback: *Name one breast cancer factor that you didn’t know before seeing the video/or slides*



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Lesson Plan: Breast Cancer and Environment

Activity #3: Breast Cancer Dialogue – Top Twelve Messages*

Objectives:

- To increase teen knowledge about breast cancer incidence and related risk factors
- To learn about established risk factors, lifestyle issues, and known and suspected environmental factors that may increase individual breast cancer risk
- To learn about breast cancer risk reduction strategies relevant to teens and adults

Materials/Preparation

- Review Breast Cancer Messages (*Top Twelve Topics, and Message Background*)
- Review information from Lesson Vocabulary, Fact Sheet, and/or Teen Brochure
- Make copies of Top Twelve Topics on cue cards to distribute for students to read
- Make copies of Top Twelve Topics on single sheet to distribute to the entire class
- Make copies of *Message Background* for classroom teacher and peer leaders

Lesson Activity Time: 15 minutes

Activity:

For the whole class, Top Twelve Topics can be read out loud. This can be done with cue cards (single message attached to each card) or another game created by Peer Leaders (see option). Each of the Top Twelve Topics corresponds to the Background Messages. After students read each message, Peer Leaders can add additional comments from the Background Messages. Peer Leaders can ask for student's questions, or add comments to the Fact, Myth, and Gray Area chart. Questions that cannot be answered by leaders can be noted for follow-up research.

- ✓ **Activity Option: Pictionary or Charades** (20 minutes)
Divide the Class into Two - Four Groups. Each group is given 3 to 6 messages. Teams of students can "act out," or draw pictures or illustration from the messages. The rest of the class can guess what the message is. Then ask one students to read the entire message.

To facilitate this game, Peer Leaders can place several objects on a table for students to use. This would include mini breast models, the breast cancer 1:8 risk chart, pictures of teens, adult women, older women and adult men; a 3_D breast model, a Puzzle of Breast Cancer visual, pictures of a families from different backgrounds, pictures of people being physically active, and pictures/objects of environmental exposures: e.g. tobacco, alcohol, soft plastics, weed killer, charred food. Include examples of fruits and vegetables, foods and cosmetics with readable ingredient labels, and a breast self-exam shower card. You can also include pictures of famous people who have had breast cancer, or a picture of a woman with a mastectomy or re-constructed breast. Include drawings of breast cells and genes. Students can use these objects or pictures to illustrate their individual messages.



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✓ **Wrap Up:** *Name one thing that you know more about now, or can do something about today.*

* Essential part of the 60-90 minute lesson presentation – Breast Cancer and Environment.



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Lesson Plan: Breast Cancer and Environment

Activity #4: Breast Cancer Preventive Actions and Health Tips

Objectives:

- To increase teen knowledge of modifiable factors associated with breast cancer risk
- To identify actions to reduce personal and environmental risks for breast cancer
- To learn about breast cancer detection and health resources relevant to teens and adults

Materials/Preparation

- Review Breast Cancer Messages (*Top Twelve Topics, and Message Background*)
- Review information from Lesson Vocabulary, Fact Sheet, and/or Teen Brochure
- Peer Leader can prepare script to present important information for models and examples
- Breast Cancer Facts, Risk Factors, & Health Tips (make copies on light green paper)
- Resource Packets: Options:
 - a) order bookmarks of cancer/breast cancer info and health tips for participants, or
 - b) make copies of Teen Brochure: *What Should I Know About Breast Cancer?*

Instructional Charts, Posters, and Models:

- **Chart – One in Eight Lifetime Risk of Breast Cancer** (a chart can be made with 100 ping-pong balls, marbles, or similar objects. 12 of the 100 items are one color; 88 are another color)
- **Puzzle of Breast Cancer Risks** – use enlarged puzzle graphic from Teen Brochure
- **Breast Anatomy:** Simple Drawing (or use *Anatomy & Physiology of the Breast – WRS*)
- **Breast Cancer Examples** (3-D breast model); tumor beads; mini-breast teaching models
- (Sources: CONCERN Mini-Breast –TM; *Tumors and Diseases of the Breast* poster – Childbirth Graphics)
- **Environmental Exposure Examples:** Clear plastic bottles; plastic food containers; one cosmetic containing “phthalates,” a picture of charred meat; a cigarette, a sweater in a dry cleaning bag (examples can be made from “Ten Suggestions to Reduce Your Exposures”)
- **Healthy Nutrition Poster** (*Catch a Rainbow Every Day*) or basket of colorful fruits/vegetables
- **Physical Activity Poster** (*I am...Exercise makes me feel good* /Health Edco.) or make a poster

Lesson Activity Time: 15 minutes

Activity – Topic Demonstration Presentation Guide for Peer Educators

“We’re going to show you some examples of what can increase breast cancer risk and what you can do to stay healthy and avoid specific exposures that may be a threat to your health.”



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Risk:

Explain the 1:8 lifetime risk of breast cancer - using poster or (ping pong ball) chart

“This chart shows that for every 100 women, 12 have a risk for developing breast cancer. That risk rises for women as they grow older. This does not mean that 1 in 8 women will actually develop breast cancer”

✓ **Puzzle of Breast Cancer Risk Factors**

Peer Leader can use the Teen Brochure or Puzzle Poster. “Since we don’t know the causes, we think of breast cancer as having known and suspected risk factors. Genetic mutations or mistakes that are inherited and family history are known factors that increase risk. Lifestyle factors that can make a difference are physical activity, nutrition, avoiding alcohol and tobacco. Environmental factors include everything around you like air, land, water, or chemicals in products we use at home or work. Here are some examples of some of the chemical of concern to scientists and what you can do to avoid them. These chemicals are suspected of disrupting hormone levels in the body:”

Environmental Exposures: Show Examples of Phthalates in cosmetics; Bisphenol-A in plastics bottles; PAH in charred food (Peer leader may distribute Ten Suggestions to Reduce Exposure to Suspect Chemicals)

- 1) Bisphenol-A used to make plastic containers pliable avoid storing water in heated plastics - microwave food in glass, not plastic containers,
- 2) Phthalates and fragrance in cosmetics - minimize their use, look for phthalate-free alternatives
- 3) PAH’s in charred grilled food - avoid eating this, cut off the charred parts on grilled foods
- 4) Second hand smoke exposure - avoid all second hand smoke, ask smokers to quit or go outside

Healthy nutrition Review posters, charts or examples of colorful foods to include in a healthy diet

Sample Script – Foods that Protect against Cancer

“Foods that are healthy and help to maintain a normal weight for our body type are plant-based, high in fiber, low in fat, and limit simple sugars like white bread and cookies. This type of diet can strengthen the immune system and help fight cancer and disease at the cellular level. It also can give you more energy. Scientists don’t know exactly what diet prevents breast cancer, but eating whole, healthy foods may help. These include Omega-3 fats in nuts and cold-water fish like salmon; whole grain foods like oatmeal or bran, 5-9 serving of fresh fruits and vegetables most days, and avoiding trans- fats in convenience foods. An environmental exposure to avoid with foods is to rinse all produce to minimize pesticide residue.

- ✓ Ask participants for examples of healthy nutrition, what’s easy and hard about it, what they can do.

Breast Cancer Early Detection Examples: Peer Leader shows, walks around with and invites students to examine the: 3-D breast model, tumor beads & chart, and mini-breast models. Peer leader shows the

“mammogram disc” and demonstrate how to locate the lump and tumor example embedded in the mini-breast model. Participants can look at 3-D model and pass around tumor beads and mini-breast models.

Sample Script – What is meant by early detection of breast cancer, using Mini Breast Model

“While we are moving through the room, please look at you (blue) Vocabulary and (green) Facts Sheets. “These are examples of what a breast lump or tumor looks or feels like inside the breast. Not all of these lumps are cancer. This gives you an idea of what women look for in breast self-exams and what doctors check to diagnose breast cancer. If you hold the mini-breast up to the light you can see a small disc. This is an example of what can be seen on a mammogram, but is too small to feel in an exam. With a flat hand and your middle three fingers, you can gently press down on the mini breast model and locate a lump.”



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Your Vocabulary List has several terms that describe the topic of breast cancer. We are focusing on prevention and risk reduction today, but its important to know what breast cancer looks like, how it is detected, and how to do breast self-exams and get regular health check-ups to catch breast cancer early.”

Wrap-up: Take Home Resources for Breast Cancer Information – listed in Teen Brochure

| | |
|---|---|
| <i>Marin Cancer Institute (at Marin General Hospital)</i> | <i>Kaiser Permanente Medical Center</i> |
| <i>UCSF – Comprehensive Cancer Center (San Francisco)</i> | <i>The American Cancer Society</i> |
| <i>Planned Parenthood & Huckleberry Teen Clinic</i> | <i>Susan G. Komen Foundation</i> |
| <i>Tina Action Program (San Geronimo Valley)</i> | <i>The Avon Foundation</i> |
| <i>To Celebrate Life Breast Cancer Foundation</i> | <i>Zero Breast Cancer</i> |

Web-sites: Zero Breast Cancer (community-based research to find the causes of breast cancer))
Marin County Health Department (Marin Women’s Study and county-based research)
Northern California Cancer Center (Bay Area statistics, information on all cancers)
National Cancer Institute (research and information – all cancers)
National Institute of Environmental Health Sciences (cancer, genes and environment)
Cornell University -Breast Cancer & Environment (fact sheets –chemical carcinogens)
Safe Cosmetics Campaign (Environmental Working Group – suspect chemical database)



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Lesson Plan: Breast Cancer and Environment

Activity #5: Breast Cancer Facts or Factors, Myths or Gray Areas

Objectives:

- To increase teen knowledge about breast cancer and environmental risks
- To learn about known and suspected factors associated with breast cancer
- To identify breast cancer facts, myths and gray areas relevant to teens and adults

Materials/Preparation:

- View video Q & A section: *Teens Talk About Breast Cancer* (Adelphi University)
- Alternate option: View *Breast Cancer, Genes, and Environment* power point-slide show
- Review Breast Cancer Messages for Teens (*Top Twelve Topics, and Message Background*)
- Participants May Refer to Lesson Vocabulary, Fact Sheet, and/or Teen Brochure

Lesson Activity Time: 10 – 15 minutes

Activity*:

Peer leaders should be familiar with the video or slides, messages, and handouts before leading this activity. Fact, Myth & Gray Area can be used at the beginning of the lesson, adding words or questions to the categories as the lesson proceeds, or it can be used as a review activity. Leader determines correct category.

- ✓ List 3 Headings on blackboard or butcher paper: Fact/Factor; Myth; and Gray Area
- ✓ Choose students from the class (1 – 2 per category; or 6 total) to add words under each list
- ✓ Ask students to think about the information from the video and to refer to their handouts:
 - a) Top Twelve Topics
 - b) Vocabulary
 - c) Brochure or Fact Sheet
- ✓ Leader: “So let’s list what we know about breast cancer – is it a Fact, Myth or Gray Area?”
- ✓ Ask students, “What Do You Think? What Else Do We Know? What Have You Heard?”
- ✓ Leader’s Option: Read out Statements (below) and ask students to decide if they are a Fact or Factor, Myth or a Gray Area, and why they think it belongs in that category
- ✓ Feedback: Lead a discussion about what students know *now* that they didn’t know before

Examples of Breast Cancer Fact and Factors, Myths and Gray Areas

(Peer leader can read out the statements in parenthesis after the applicable category is chosen).

FACT Examples: (*Information Established in Science and Research*)

- *Breast Cancer risk increases as women get older, especially after age 50*
- *(Most breast cancer incidence is related to aging, and hormones present in a woman’s body).*
- *Early age of first menstrual period, and later age for menopause increases lifetime exposure to a woman’s own estrogen (these are breast cancer risk factors that we cannot control).*



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- *Giving birth after age 30, or not giving birth, are risk factors associated with breast cancer*
- *Some types of breast changes – abnormal growths in breast tissue - can be pre-cancerous*
- *Ionizing radiation (high doses to the chest area, earlier in life) is a known cause for breast cancer (Exposures at this level are rare. Also it's not the same as the sun's ultraviolet radiation).*
- *If your mother or sister had breast cancer, your risk is higher than the average woman (know your family history, get check-ups, review family history with your doctor or nurse).*
- *Genetic (inherited) traits account for a small percentage of breast cancers (5 – 10%). (genetic factors significantly elevate risk; there are medical interventions to reduce this risk)*
- *There are other factors related to breast cancer risk that we can control: (exercise, alcohol use, exposure to inhaled smoke or secondhand smoke, excessive weight gain as adults).*
- *Healthy habits (nutrition, exercise, not smoking, limiting alcohol) can make a difference to reduce or “modify” an individual’s cancer risk, and supporting good health overall*
- *Early detection helps to catch breast cancer early- this helps to improve survival rates (most women start to get regular breast exams at age 20 and mammograms at age 40).*
- *Exposures in the environment can trigger genetic changes in cells that may progress to cancer*

MYTH Examples: (Information or a Belief that is Not Based on Evidence)

- *Bumping or bruising of the breasts (i.e. accidents, sports injuries) can lead to breast cancer*
- *Breast implants increase breast cancer risk (it may be harder to detect with implants).*
- *Underarm deodorant (antiperspirant) causes breast cancer (the concern is with antiperspirant chemicals being absorbed near the breast area).*
- *Sleeping with a bra or wearing an under-wire bra can increase risk for breast cancer (some people think the issue is restricting circulation, or the metal in the under wire).*
- *Breast cancer does not occur in young women (it can affect women ages 20 -30's – but it's much less common).*
- *Abortion, or terminating a pregnancy can increase the risk for breast cancer (some internet sites carry this message; this topic has been studied – no evidence).*
- *It's not possible for men to develop breast cancer (it is extremely rare, but nearly 1% of all breast cancer cases do affect men).*

GRAY AREA (Suspected Factors for further Research)

- *Certain chemicals may interfere with the body's natural hormones that, in turn, can play a role in how breast cancer develops. Some chemicals may disrupt hormone functions in cells. (learn more about chemical agents and breast cancer – minimize use or exposure when possible).*
- *Some of the suspected chemicals are present in pesticides, solvents, flame-retardants, and plastics. Scientists are studying how these chemicals affect genes to decide which pose the greatest threat. (Your Fact sheet and resource packet have tips, web sites & sources for more information).*
- *Some teen girls may be more susceptible to exposures that may cause changes in breast cells during puberty. (This is a stage when girls may be more susceptible to factors in their environment, when the breast cells are growing rapidly and specializing for future reproduction and breastfeeding).*



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- *If you had breast cancer as a young adult woman, you won't be able to have children later (Chemotherapy may affect fertility but there are medical options. Every person's cancer is unique.)*
- *Stress and the body is a question as to how and when cancer occurs, and how people recover. (People have an interest in this area; researchers are studying how stress may relate to cancer).*



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Top Twelve Breast Cancer and Environment Messages for Teens

Breast Cancer *very rarely* occurs in teens or young adults. A woman in the Bay Area who lives to age 85 has a 1 in 7 lifetime risk (chance) of developing breast cancer.

The breast is a (mammary) gland that grows and develops rapidly in girls from age 8 – 17.

Breast cancer begins when normal cells start to change and grow out of control. *Breast cancer is like a puzzle* – many factors are thought to play a role in how this disease develops.

Men can develop breast cancer but *it is rare* - less than 1% of cases. All men have a small amount of breast tissue.

A *risk factor* is anything that *increases your chance* of getting a disease; it is not the same as the *cause*. The two main risk factors for breast cancer are *being a woman and growing older*.

Having a *family history*, a *genetic susceptibility*, or a *personal history* of breast cancer *does increase the overall risk* of breast cancer for certain individuals.

Lifestyle factors” related to breast cancer - such as physical activity, diet, tobacco and alcohol use are also known as “*modifiable*” – risk factors that you can do something about.

Adolescent girls, who are *physically active, maintain healthy diets* and who *avoid tobacco smoke* may be able to influence *some* of their long-term individual risks for breast cancer.

Being informed of *suspected environmental factors* for breast cancer helps people to use caution and make informed decisions involving their daily life exposures. Reading labels for suspected cancer-related chemicals in personal care and household products, and avoiding their use, is one example of the *precautionary approach*.

***Early detection*, also known as breast health practices, refers to breast exams for younger women and routine mammograms for middle-aged and older women.**

Treatments may include radiation, “chemo-therapy”, removal of the cancerous tissue in a confined area (“lump-ectomy”), or surgical removal of the breast (“mast-ectomy”) to save a woman’s life. Breasts can be re-constructed to a normal shape.

By taking action to reduce exposures suspected for breast cancer, a teen girl today may reduce some of her lifetime risks for this disease. By practicing healthy behaviors, young adults can reduce their overall risk for breast cancer and other future health problems.



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Breast cancer is the most common cancer in women. It is influenced by many, complex factors. The following information is for high school **peer educators**. This includes tips to reduce breast cancer risk:

Breast Cancer Facts - Lifetime, California, and Marin County

- **Breast Cancer very rarely occurs in teens or young adults. Most breast cancer occurs in women older than age 50.** However, being informed about breast cancer *now* can help you understand risk factors for this disease, including things you can do to stay healthy and aware.
- **Approximately 2-3 % of California women will develop breast cancer over the course of their lifetime.** Of those who develop breast cancer, fewer than 25% will die from the disease.* Each year there are about 20,000 new cases of breast cancer in California. Most women who get treatment in the early stages **survive** the disease, or live 5-years or longer after their diagnosis.
(* Northern California Cancer Center)

Each year in **Marin County** there are approximately 240 new cases of “invasive” breast cancer, and about 40 deaths from breast cancer. *Invasive* means the cancer is spreading in the breast or the body. Breast cancer affects all races and ethnicities. White women have the highest rates. African American women tend to have lower rates, but also lower survival rates. Hispanic and Asian women have the lowest rates overall. These rates are based on cancer data and the census.

A woman in the Bay Area who lives to age 85 has a **1 in 7 lifetime risk** (chance) of developing breast cancer. More than 70% of breast cancer affects women from ages 50-85. Women who develop breast cancer before age 40 to 45 may have different profiles of this disease. Women under age 25 have *very low risk* – less than 1%. Many factors can influence breast cancer risk.

- The **San Francisco Bay Area** has one of the highest breast cancer rates in the nation – the reasons are not clear, but scientists are studying several clues. Many researchers think that girls’ breasts may be more susceptible to exposures (like second hand smoke) during puberty and the teen years. These exposures can potentially make a difference in future breast cancer incidence.

What is Breast Cancer?

- **The breast** is a (mammary) gland that grows rapidly from age 8 – 17. It is made up of fatty tissue, connective tissue that supports the structures in the breast, and a “network” of *lobules* and *ducts* that can produce and deliver milk through the nipple for breastfeeding. Breasts come in all shapes and sizes. Breast shape or size *does not* determine if a woman will develop breast cancer. Breasts can swell or feel lumpy at certain times of the month during the regular menstrual cycle.
- **Breast cancer begins** when normal cells start to change and grow out of control. A variety of biological, environmental, and genetic factors may contribute to breast cell abnormalities. A girl’s breasts may be more susceptible to exposures during her teen years. It can take years or decades for cells to change, multiply out of control, and form a tumor. Most breast cancer begins in the *milk ducts*; it can also start in the milk producing *lobules*. Breast cancers can invade nearby tissues, or spread to other parts of the body through the bloodstream or lymphatic system.



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- **Breast cancer is like a puzzle** – many factors are thought to play a role in how this disease develops. The body’s reproductive hormones, diet, physical activity, family history, genetic “pre-disposition,” inherited traits, lifestyle, and environmental factors may either *increase* or *decrease* the odds for this disease over time. These *puzzle pieces* are known as risk factors.

Risk and Risk Factors

- There is no guaranteed way to prevent breast cancer. Learning about risk factors, exposure avoidance, and early detection is a **prevention strategy**. The two main **risk factors** for breast cancer include ***being a woman and growing older***. This means that every woman has *some* risk.
- A **risk factor** is anything that **increases your chance** of getting a disease; it is not the same as the **cause**. Having one or more risk factors *does not* mean that you will definitely develop breast cancer. Many women who have more than one risk factor *do not* develop breast cancer. The only known cause of breast cancer is high doses of *ionizing radiation* to the chest area earlier in life (example: for treating childhood cancer). Ionizing radiation can damage the DNA in breast cells. (Alternately, too much exposure to the sun’s *ultraviolet radiation* can cause skin cancer).
- **Factors that can’t be changed or are less controllable** include beginning menstrual periods before age 12, delaying childbirth past age 30 (or not having children), and going through menopause (the end of monthly periods) after age 55. These are *hormonal* or *reproductive* life events that *may* increase a woman’s risk for breast cancer. Most of these factors are related to the *estrogen* in the body. Estrogen is a naturally occurring hormone involved in growth and reproduction. Adult women who have been pregnant one or more times and have nursed their babies are thought to have a *reduced risk* for breast cancer. That is because pregnancy and breastfeeding complete the biological cycle of the human breast and **may protect against risk**.
- Having a **family history** or a **personal history** of breast cancer **does increase the risk** for certain individuals. A **family history** refers to a close relative such as mother or sister, and if they developed breast cancer at an early age, and if their cancer was in both breasts. A **personal history** means that a woman has already had a cancer in one breast. She is at increased risk for developing cancer in the other breast. Women’s health services offer frequent check-ups for those who have a personal or family history for breast cancer. It is important to know your family history for breast cancer on both your mother and father’s side, and discuss this with your doctor.
- **Studies show that only 5- 10% of all breast cancer is hereditary** (carried through the genes). Several genes (in the DNA) may be involved in hereditary cancer, including mistakes (known as **mutations**) in the BRC-1 and BRCA-2 genes. These genes are present in all humans. Flawed genes that fail to suppress (or control) abnormal cells that may grow to be tumors. **Cancer genetic counselors** help people with inherited mutations in the BRCA 1 & BRCA 2 genes to make medical choices and family decisions to better manage their *high* risk for breast cancer.
- There is growing evidence that **drinking more than one alcoholic beverage a day, and gaining extra weight after menopause** are two factors that can increase an adult woman’s risk for breast



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cancer. **Awareness** of this information helps people to make **healthy choices** to reduce their breast cancer risk overall. **“Lifestyle factors”** such as diet, physical activity, tobacco and alcohol use are also known as **“modifiable”** – **things that you can do something about.**

Protecting Your Health – Starting in the Teen Years

- **Risk reduction** means steps people take to avoid a disease; however, it does not mean the same as **prevention**. Risk reduction for cancer is a **“prevention strategy.”** Having one or more risk factors is not *destiny*. There are many things a person can do to reduce their breast cancer risk.
- **Adolescent girls**, who are **physically active**, maintain **healthy diets** and who avoid **tobacco smoke** *may* be able to influence *some* of their long-term individual risks for breast cancer. **Physically active** means a minimum of 20-30 minutes of exercise on most days of the week, or at least 4 hours per week. **Healthy diets** mean eating more high fiber foods, ideally 5 – 7 servings of *whole* fruits and vegetables each day, and reducing total intake of fat in the diet. Tobacco smoke exposure is preventable, this means avoiding all **second-hand smoke** as well.
- **Lifelong healthy choices** beginning in the teen years have the **potential** to reduce a woman’s risk for breast cancer. Being physically active, eating more plant-based foods, keeping a healthy adult body weight, and breastfeeding after childbirth are all considered to be **protective factors**.

Environmental Exposures and Precautions

- **Exposures in our environment** such as specific chemical agents found in plastics, household products, and pesticides may *potentially* play a role in the how breast cells begin to change and progress to a cancer for *some* individuals. Studies show that **exposure to second-hand smoke during a girl’s teen years** is associated with higher breast cancer risk. There is evidence that specific chemicals in personal care products and cosmetics may interfere with breast cell growth.
- Being informed of **suspected environmental factors** for breast cancer helps people to **use caution** and make informed decisions involving their daily life exposures. **Reading labels** for suspected cancer-related chemicals in **personal care** and **household products** is one important **precautionary approach**. Not re-using **plastic water bottles**, and **microwaving in glass** instead of plastic food containers, are two steps to reduce your body’s exposure to chemicals in plastics that can affect normal breast cells. Using a HEPA filter in a vacuum cleaner helps avoid recycling chemical dusts in the home. Avoiding chemicals in foods known to cause cancer, like **PAH’s** in fried or charred foods, is another **environmental precaution** to reduce cancer risk.

More About Breast Cancer and Early Detection

- **Early detection**, also known as **breast health** practices, refers to **breast exams** for younger women and routine **mammograms** for middle-aged and older women. These can **help detect or locate breast cancer** early and may possibly lead to more effective treatment before the cancer spreads beyond its original site. **Medical treatment advances and early detection** can help to



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improve a person's odds for surviving breast cancer. **Survivorship** means living 5 or more years after the diagnosis. Most women survive breast cancer and go back to their usual daily activities.

- **Men can develop breast cancer but it is rare** - less than 1% of cases. All men have a small amount of breast tissue. The body's own hormones and genetic factors can play a role in male breast cancer and other male cancers. Younger men have a slight risk for developing testicular cancer and can learn to do self-exams. Older men face the risk for developing prostate cancer. Men should be aware of breast cancer risk factors, especially if they have a family history.
- **Symptoms:** A lump or sudden swelling of the breasts may be "benign" ("be-9" =non-cancerous) or "malignant" (cancerous). Changes in the appearance of the breast or the nipple are possible warning signs. Pain or inflammation needs to be checked immediately by a doctor or a nurse. Mammograms (an x-ray of the breast), ultrasound, and other medical tests can help diagnose breast cancer. Because breast cancer doesn't always present with symptoms, regular check ups are important. Most women start annual breast exams at age 20 and mammograms at age 40.

Treatments: May include radiation, "chemo-therapy", removal of the cancerous tissue in a confined area ("lump-ectomy"), or surgical removal of the breast ("mast-ectomy") to save a woman's life. There are several medical specialists who help patients with treatment for breast cancer. Women have options to "re-construct" their breast with implants, or wear special bras after a mastectomy. Treatment can last several weeks or several months and may include temporary, but difficult, side effects such as fatigue, nausea and hair loss. Hair grows back after chemotherapy is over. There are counselors and support groups to help women cope with cancer.

- **Breast cancer affects families and friends** as well as individuals. There are many resources for breast cancer information and support, including hospital-based cancer centers, Internet sites, walk-a-thons, and community breast cancer groups. Visit www.zerobreastcancer.org.
-

Looking Ahead – Keeping Abreast

- By being educated and **informed about breast cancer** now, young men and women can understand what some family members and other adults in the community may be experiencing. You can talk more to friends and family about what you have learned in today's presentation.

By **taking action to reduce exposures** suspected for breast cancer, a teen girl today may reduce some of her lifetime risk for this disease. By **practicing healthy behaviors**, young adults can reduce their risk for breast cancer and other health problems, and feel more fit in the process. With regular breast health exams, a woman can increase her odds for a good treatment outcome.

There are **new discoveries, technology and knowledge** that will change how breast cancer is prevented, detected and treated for your age group in the years to come. Beginning today, "*keeping abreast*" of information on modifiable risk factors are steps to staying healthy.



Lesson Vocabulary

Cancer and Breast Cancer

Cancer – begins when normal cells change and grow out of control, resulting in a *tumor*. Many types of breast cancer are treatable. Others may be life threatening.

Breast Cancer is a malignant (cancerous) tumor that originates from cells in the breast, usually in the lining of the milk ducts, or in the “lobules” that produce milk.

Breast cancer is thought to be many different diseases. How it starts may depend on age, genes, exposure to estrogen over a woman’s life cycle, health habits, environmental factors and other unknowns.

Most breast cancers result from mutations (mistakes) that take place in breast cells after birth. Only 5 – 10 % of breast cancer mutations are related to an *inherited* defect, or mistake in the genes every person is born with.

A **tumor** is a collection of abnormal cells that multiply without any order, forming a *lump*. Not all tumors are cancerous. A harmless, or **benign** (be-9) **tumor** is a non-cancerous growth the *does not spread* to other parts of the body, and seldom threatens life. It is important to find out from a doctor if a breast lump is benign, or cancerous.

Invasive: cancerous cells that have broken through the borders of surrounding healthy tissue. Invasive breast cancers can spread to nearby tissue or other body sites.

Early Detection and Medical Treatment of Breast Cancer

Breast Exams – methods of detecting changes in the breast by “looking and feeling.” Young women are encouraged to learn about *breast self-exams** and do these each month. A doctor or nurse does a *clinical breast exam (check-up)* for an adult woman. *It is recommended that young women begin clinical breast exams, starting at age 20.*

Mammogram –a low-dose X-ray that gives a clear, detailed picture of the breast. Usually, women ages 35 - 40 will have their first mammogram, followed by regular mammograms through age 85. Mammograms detect changes early. A *Radiologist* is a doctor who reviews the mammogram (x-ray) and looks for abnormal changes or tumors that may or may not be cancerous.



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When Cancer is Caught Early, medical treatments can lead to better survival. It is important to know your family's history for breast cancer and get regular exams.

- *Breast self-exam and mammography information with video instruction is available through the Susan G. Komen Foundation (www.komenfoundation.org) or the American Cancer Society.

Lumpectomy – the removal of either a *benign* or *cancerous breast lump*, including a small amount of surrounding breast tissue. This surgery helps to keep the breast shape.

Mastectomy – the surgical removal of the breast tissue beneath the outer breast skin. Newer techniques spare some breast tissue to “re-construct” or re-shape the breast.

Radiation therapy – treatment that uses high-powered x-rays to get rid of cancer cells and prevent them from growing back. Temporary side effects can be skin soreness.

Chemotherapy – A treatment that uses powerful drugs to fight cancer cells in the body. *Temporary* chemotherapy side effects include tiredness, nausea, and hair loss. Treatment may take weeks or months. Hair grows back after chemotherapy.

Cancer support group – helps people with cancer to cope with their feelings, and learn what to expect as they go through their treatments and keep up with daily life

Environment, Gene and Lifestyle Risk Factors & Preventive Action

Risk Factor – anything that increases the *chance (odds)* of getting a disease.

Risk factors for breast cancer are known as:

Less-Modifiable -being a woman and growing older, having specific inherited mistakes in the genes, or a family history of breast cancer (mother or sister)

Modifiable - exposures and lifestyle health habits that we have some control over

Risk Reduction -actions you can take to reduce your odds of developing any disease. Risk reduction is action taken for prevention when the exact cause is an unknown.

Environment –Everything around you that affects your health and some diseases such as: air, water, food, chemicals, where we live and work, and the effects of stress. Scientists are studying how *specific* environmental factors may affect breast cancer.

Carcinogen –any environmental factor that causes changes in genes that can result in the growth of cancer cells at the very early stages. Carcinogens can be biological,



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physical, or chemical. High doses of ionizing radiation to the chest (a treatment for Hodgkin’s disease) is a known *carcinogen* that causes breast cancer later in life.

*Zero Breast Cancer Adolescent Education Project **Vocabulary** Adapted from the following References:*

National Institute of Environmental Health Sciences- Community Outreach Resource Center,

Breast Cancer, Genes, Ethics, and the Environment Workshop and Breast Cancer Fact Sheet

University of North Carolina Chapel Hill Center for Environmental Health and Susceptibility, 2005

Vogel, C, Breast Cancer Questions and Answers for Young Women, 21st Century Press, 2001

Aronson, V., Everything You Need to Know About Breast Health and Cancer Detection, Rosen Publishing, 2000

Zero Breast Cancer’s has created this Vocabulary to provide general breast cancer information for educational purposes.

This information supplement is not intended to a substitute for the advice of a physician or a health care professional.



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Breast Cancer Glossary

Peer Educator Reference

Basic Cancer terms - Vocabulary for Peer Education Lesson Activities

Terms Related to Breast Health, Breast Cancer Detection and Treatment of Breast Cancer:

Breast Cancer: A disease that causes cells in the breast to change and grow in an uncontrolled pattern. Breast cancer is the most common form of cancer in women, and may be many different types of disease. Some people are born with abnormal cells, or may be more *susceptible* (likely to be affected) to factors that will cause cells to grow out of control. Cells can change abnormally during a person’s lifetime; some cells progress to cancers, others are controlled by cells that regulate, or suppress, tumor growth. Some breast cancers stay in one site and are not as much of a threat as cancers that are growing rapidly or invading other parts of the breast.

Breast Cancer Cells: Cells that line the milk ducts and/or cover the surface of lobular organs that produce milk - are common sites where breast cancer develops. Most breast cancer begins in the milk ducts. It may take 20 years or more for breast cancer to develop. There can be factors both inside and outside of the body that create the conditions for normal cells to change to cancer. Not all cell changes in breast cells will progress to cancer.

Breast reconstruction: The breast can be re-built by a surgeon after a mastectomy (breast removal), using spare tissue (skin, fat or muscle) from another part of the body. Implants may also be used in this procedure.

Breast implants: Sacs filled with salt water inside rubber-like shells that are surgically positioned (inserted) behind the breast tissue to enlarge the breast (this is one method of breast reconstruction to restore the shape)

Breast self-exam (BSE): Checking your breasts (looking and feeling) monthly, for changes or lumps. You can learn to do BSE or ask your doctor or nurse for instruction. The main idea is to get to know the look and feel of your breasts in your late teens so that you can check with your health provider if you note any changes over time. BSE *does not take the place* of regular clinical breast exams by a doctor or a nurse, beginning at age 20.

Chemotherapy: Treatment with powerful drugs that kill cancer cells. Chemotherapy is often combined with surgery and radiation to treat cancer when it has spread, or if the cancer returns, or to prevent further spread. Chemotherapy side effects (most are temporary) may include nausea, vomiting, loss of appetite and fatigue.

Clinical breast examination. A doctor or nurse physically inspects and feels the breasts for changes as part of a woman’s annual gynecological exam. Routine breast exams begin at age 20 and continue through adult life.

Mammogram: A low-dose X ray that gives a detailed picture of the breast tissue and some cancers.

Digitized mammogram-A mammogram that is recorded in computer code instead of on X-ray film.

Micro-calcifications are deposits of calcium in the breast that show up as white specks on a mammogram and *may be* an early sign of breast cancer. A **radiologist** reads a mammogram and decides if a cancer may be present

Mastectomy: The surgical removal of the breast, often followed by “reconstructive” surgery. Most surgeons now use a technique called “skin-sparing” surgery, so that the breast can be re-formed to a nearly normal shape

Oncologist: A doctor who specializes in cancer treatment by prescribing drugs and chemotherapy.

Benign (“be-9”) tumor: A non-cancerous growth that does not invade nearby tissue or spread to the body.



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Cancer: Changes in the body’s cells leading to abnormal cell division that can progress to a variety of diseases. Most cancers develop in many steps over a period of years or decades. Many types of cancers form a lump or mass called a **tumor** that can invade and destroy healthy tissue. Cancer cells can break away from the tumor and spread through the body through the bloodstream or the lymphatic system. **Not all tumors are cancer.** Cancers are named for the part of the body where they originated, even if they have spread. Cancers may develop over several years or decades. They may have both *known causes* and/or *risk factors*.

Carcinogen: Any agent -chemical, physical, or biological –that causes DNA damage that leads to cancer.

Diagnosis: The identification of a disease. Breast cancer can be diagnosed with a variety of medical tests.

First-degree relative: A parent, sibling, or child. Family history for cancer is concerned with this relation.

Immune system: The body’s complex defenses to fight infections and diseases, including cancer.

Incidence: The number of people who develop a disease, divided by the number of people at risk of developing the disease in a specific time period. Breast and other cancers are reported by incidence for every 100,00 people

In-situ cancer: Very early stage cancer that *has not spread* to surrounding healthy tissues.

Invasive cancer: A cancer that has broken through the borders and spread to surrounding healthy tissues.

Risk factor: Genetic alteration, a habit, or an environmental compound that increases chances for developing cancer. Many diseases and cancers are described in terms of “risk factors” – things that make us more likely to develop cancer. Some risk factors like gender, age, or family history are unavoidable. Others like alcohol intake, level of physical activity, and *adult* body weight can be modified, or changed, to lower one’s overall risk.

Tumor: An abnormal mass of tissue that results from too much cell division, and interfering with surrounding body tissues. Tumors have no useful purpose. They can be benign or malignant.

A **benign (“be -9”) tumor** is not cancerous, and does not invade surrounding tissue or spread to other parts of the body

A **malignant tumor** is cancerous; it can metastasize “me-tas-ta-size,” or spread to other parts of the body.

Biological and Cellular, and Hereditary and Genetic Terms Related to Cancer

Cell: The basic unit of all living things. Organs are made up of millions of cells. Each cell contains DNA (the genetic blueprint) and other essential components enclosed in a membrane. Organized cells can become tissues.

Cell division: A process in which a full-grown cell divides into two new ones.

DNA: DNA stands for deoxyribonucleic acid. The DNA molecule inside each cell carries genetic information (cell growth, division, and function) that is passed on from one generation to the next.

Gene: a segment of DNA, or heredity unit found inside all cells passed from parent to offspring. Genes determine hair and eye color and height, as well as susceptibility to certain diseases. Genes contain the information for making proteins in the cell. Breast cancer cells can be typed by genetic biomarkers. This genetic information helps doctors predict and decide what type of treatment will be effective.



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Genetic: Related to the genes and/or to inherited characteristics, as opposed to an environmental cause

Genetic susceptibility: An increased risk of developing a certain disease or disorders based on genetic traits.

Hereditary: Inherited, capable of being transmitted genetically from a parent to a child and through generations
Hormone: A chemical “messenger” produced in one part of the body by an endocrine gland (i.e. thyroid) or and organ (i.e. ovaries) that is transported to other parts of the body through the bloodstream. Hormones are involved in the body’s normal growth and development and sexual reproduction. Hormones such as *estrogen* and *progesterone* influence or regulate breast cells.

Mutation: A change in one or more genes that results in a new trait. It can be minor, harmful or have no effect on how the cell functions. Women and men with defects (mistakes) in the BRCA-1 and BRCA-2 genes have mutations in genes that would normally control or regulate breast cancer. They are in a high-risk category.

Introduction to Cancer (and Breast Cancer) Research Terms

Animal studies: Mice or rats are most commonly used to test for cancer-causing substances because they are small easy to handle and are generally similar to humans in their response to carcinogens. They can also be genetically engineered for breast cancer studies and they have a relatively short life cycle. Mice studies provide information on hormonal and chemical effects on the breast.

Bioinformatics: Using advanced computer techniques to analyze and keep track of large information in a biological laboratory study. Bioinformatics are used to analyze genome (genetic type) research.

Bio-monitoring: By collecting *samples* of body fluids and tissue from large groups or populations, scientists can analyze the presence of certain chemicals in the human body that may affect public health and diseases. Volunteers provide samples of saliva, urine, fat, or blood for laboratory study. The Marin Women’s Study is collecting biological specimens. Study volunteers can donate saliva or blood when they have a mammogram. This will help researchers study breast cancer in Marin County.

Carcinogen: A substance that causes cancer. Tobacco smoke is a *known* cancer carcinogen. Recent studies associate childhood exposure to second hand smoke with higher breast cancer risk in younger women. Breast cancer studies are looking at both *known* and *suspected* carcinogens. Bisphenol-A is a *suspected* carcinogen.

Environment: The combination of circumstances, physical conditions and outside influences surrounding and individual. Exposure to a wide variety of natural and manmade substances can play a role in cancer. Cancer risks associated with environmental chemicals *may* be present in the air, water, food and the workplace. Breast cancer may be influenced by environmental factors including lifestyle choices and habits, foods, nutrients, some prescription drugs, and exposures to natural and synthetic chemicals or toxins.

Environmental Health/Exposure Terms - Association with Cancer is Known or Suspected

Asbestos: A group of naturally occurring fibrous minerals used for insulating buildings and to make commercial textiles. Asbestos fibers and all commercial forms of asbestos are human carcinogens.

Atrazine: A commonly used pesticide that may pose a risk for **breast** and other cancers.



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Benzene: A colorless, flammable liquid with a sweet odor that is formed from both natural and man-made sources, including cigarette smoke. It is considered a human carcinogen.

Bisphenol-A: A chemical compound used to make clear and flexible (polycarbonate) plastics in DVD's, plastic water bottles and food can linings. Exposure over time to Bisphenol-A may pose a risk for breast cancer and prostate cancer. It can alter genes and cause other human health problems for children and adults. Exposures to Bisphenol A can be minimized by: 1) microwaving in glass; 2) not re-using scratched or heated plastic bottles.

Environment: The combination of circumstances, physical conditions and outside influences surrounding an individual. Exposure to a wide variety of natural and man made substances have specific relationships to cancer. Cancer risks associated with environmental chemicals *may* be present in air, water, food, or in the workplace

Environmental factors: such as viruses, sunlight and chemicals interact with cells throughout out lives.

Environmental risk factors: are influences in our surroundings, such as radiation, exposures, and infections

Environmental tobacco smoke (ETS): Also called second-hand smoke, is the combination of smoke emitted from the burning end of a cigarette, cigar, or pipe, and smoke exhaled by the smoker. ETS contains at least 60 known carcinogens. ETS, or second-hand smoke exposure is associated with breast cancer in younger women.

Herbicide: A chemical agent used in lawns and gardens that can destroy plants and weeds.

Ionizing radiation: An invisible, high frequency radiation that can damage the DNA or genes in the body.

Pesticide: .An agent used to destroy any type of pest (e.g. insect killers; termite control). Several pesticides *suspected* to interfere with normal sex and reproductive hormones warrant a **precautionary** approach. You can minimize pesticide exposure by always washing fresh fruits and vegetables before eating them.

Protective factors may be present in genes, or in the diet or other behaviors that help defend against cancer.

Phthalates: A class of industrial compounds used widely as plastic softeners, additives to perfumes and hairsprays, lubricants, and wood finishers, among other things. Phthalates are being studied for **breast** cancer.

Tobacco: Exposure to the carcinogens in tobacco products account for about one-third of all cancer deaths in the U.S. each year. Cigarette smoke contains more than 100 cancer-causing substances. Active smoking and exposure to second hand smoke (ETS) during the teen years are associated with some types of breast cancer.

Healthy Nutrition and Weight Maintenance Terms

Antioxidants: Chemicals (many found in foods and beverages) that protect against cancer. Antioxidants fight against the toxic forces or agents that can damage DNA through a process called “oxidative stress.” (Green tea is thought to be one source of powerful antioxidants, along with grapes, apples and green leafy vegetables.) Check with your teachers, your health department, or local agriculture department for food safety guidelines.

Body Mass Index (BMI): An index of *obesity (excessive overweight)* that uses weight and height to determine levels of body fat for children, teens and adults. The formula to calculate adult BMI is mass in kilograms (kg) divided by the square of height in meters (m²). You can check your BMI using a calculator on the National Institutes of Health web site. (www.health.nih.gov; link to body mass index)



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Carotenoids: Brightly colored particles found in the cells of vegetables, which may protect the body from cancer. **Beta-carotenes** (carotenoids) are found in carrots, peaches, cantaloupes, and sweet potatoes.

Cruciferous vegetables: The cabbage family - cauliflower, radishes, collards, kale and bok choy may protect against breast cancer. Broccoli contains a chemical that helps remove cancer-causing agents from cells. The best sources of these “micro-nutrients” are whole foods (not vitamin supplements or watery juices). Vitamins and minerals present in whole foods work together to eliminate toxins and boost the body’s immune system.

Dietary fat: Fat consumed as part of a person’s diet. Foods from animal sources are the major contributors of dietary fat (meat, poultry and dairy products). Fat is an essential nutrient that the body uses for energy and also for growth and repair and “insulation.” Some fats may “bind” with estrogen and potentially raise estrogen levels in the body over time. There are several types of dietary fats, of which the “trans-fats” (Omega-6 fatty acids) appear to increase the risk of certain diseases. That’s a good reason to *limit, but not eliminate* fat in the diet.

Energy expenditure Exercise or physical activity

Omega-3 fatty acids: Type of “polyunsaturated fatty acids” that the body absorbs from food. Found in cold-water fish (tuna, salmon) and in dark green leafy vegetables, flaxseeds and some vegetable oils (*good fats*).

Omega-6 fatty acids: Sources include corn oil and safflower oil used in cooking fried foods (*limit these*).

Phyto-estrogens: Naturally occurring compounds found in plants and legumes (such as beans, peas, soybeans and lentils) or plant products (such as whole grain cereals,) that act like “weak estrogens in the body.”

Basic Breast Development and Girl’s and Women’s Reproductive Cycles/Life Events

Estrogen: A family of hormones that promote the development of female (reproductive) characteristics

Mammary glands: Special organs in the breast that produce and secrete milk after childbirth for breastfeeding.

Menarche: The first menstrual period; which begins for girls at varying ages. Early menarche (before age 12) is considered to be *one* risk factor for breast cancer, possibly because it increases lifetime exposure to estrogen.

Menstruation: The discharge of blood-filled lining of the uterus also called the monthly “period.”

Menopause: The time in a woman’s life when her menstrual periods end, usually between ages 48-54. Later menopause (after age 55) is considered to be one risk factor for breast cancer and lifetime estrogen exposure.

Puberty: The stage during physical and sexual maturation when the body becomes capable of reproduction. Puberty may be a “window of susceptibility” for breast cancer while the breasts are changing and growing.

Adapted or Reproduced for Educational Purposes from:

Breast Cancer Questions & Answers for Young Women (Vogel, C., Twenty First Century Books, 200)

Breast Health and Cancer Detection (Aronson, V., Need to Know Library, Rosen Publishing Group, Inc. 2000)



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Cancer and the Environment, What You Need to Know, What You Can Do (U.S. Dept Health & Human Services)
National Institutes of Health, National Cancer Institute, National Institute of Environmental Health Sciences, 2003)

“Cancer Facts,” National Cancer Institute, (2005)

Good for You: Reducing Your Risk of Developing Cancer (American Cancer Society, Health Content Products, 2002)

“Medical & Scientific Glossary” Developed by the Cincinnati Breast Cancer & Environment Research Center (BCERC)
University of Cincinnati, Cincinnati Children’s Hospital Medical Center (2005); NIH Grant #ES/CA 012770-02



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Teacher Supplement

Basic Cancer Terms

Benign tumor: A non-cancerous growth that does not invade nearby tissue or spread to the body.

Cancer: Changes in the body's cells leading to abnormal cell division that result in a variety of diseases. Most cancers develop in many steps over a period of years or decades. Many types of cancers form a lump or mass called a *tumor*, which can invade and destroy healthy tissue. Cancer cells can break away from the tumor and spread through the body through the bloodstream or the lymphatic system. Not all tumors are cancerous. Cancers are named for the part of the body where they originated, even if they have spread. Cancers may develop over several years or decades and may have many causes or risk factors.

Carcinogen: Any agent -chemical, physical, or biological –that causes DNA mutations that lead to cancer.

Carcinoma: A type of malignant (cancerous) tumor that tends to arise from the body's surface (epithelial) cells such as skin cancer or breast or colon cancer. At least 80% of the all cancers are carcinomas.

Diagnosis: The identification of a disease.

First-degree relative: A parent, sibling, or child. Family history for cancer is concerned with this relation.

Immune system: The body's complex defenses to fight infections and diseases, including cancer.

Incidence: The number of people who develop a disease, divided by the number of people at risk of developing the disease in a specific time period.

In-situ cancer: Very early stage cancer that *has not spread* to surrounding healthy tissues.

Invasive cancer: A cancer that has broken through the borders and spread to surrounding healthy tissues.

Leukocytes: Also called white blood cells, type of cells that fight infection.

Local cancer: An invasive cancer that is entirely enclosed in the organ where it originated.

Lymph: The clear, almost colorless part of blood that seeps into spaces between the body's cells. The **lymphatic system** produces and stores white blood cells (leukocytes) that fight infection.

B-lymphocytes are white blood cells that produce antibodies and protect from infection and disease.

Lymph nodes: Glands in the lymph system that carry lymph fluid, similar to veins in the body.

Mortality ratio: The number of people who die from a disease, divided by the number of people at risk of dying from the disease in a specific time period.

Neoplasia: Abnormal growth of cells (that may be benign or cancerous)



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Oxidative stress: Physiological stress on the body that is caused by repeated damage by “free radicals” in cells that are not “neutralized” by “antioxidants.” O.S. is associated with aging and cancer development.

Pathology: The scientific study of the nature of disease, its causes and progression and consequences.

Pre-cancerous growth: Abnormal cells that don’t have all the features of a cancer cell.

Prognosis: The predicted outcome of a disease or disorder

Risk factor: Genetic alteration, a habit, or an environmental compound that increases chances for developing cancer.

Relapse or Recurrence: The return of cancer after initial treatment and a period of improvement.

Remission: Disappearance of cancer signs following treatment.

Tumor: An abnormal mass of tissue that results from too much cell division, and interfering with surrounding body tissues. Tumors have no useful purpose. They can be benign or malignant. A **benign tumor** is not cancerous, and does not invade surrounding tissue or spread to other parts of the body
A **malignant tumor** is cancerous; it can metastasize, or spread to other parts of the body.

Biological and Cellular; and Hereditary and Genetic Factors and Cancer

Cell: The basic unit of all living things. Organs are made up of millions of cells. Each cell contains DNA (the genetic blueprint) and other essential components enclosed in a membrane.

Cell division: A process in which a full-grown cell divides into two new ones.

Chromosomes: The threadlike structures inside the cell nucleus that contain about 1,000 genes, which carry hereditary information. There are 46 chromosomes in each cell in your body, except reproductive cells (egg and sperm) that contain only 23 chromosomes.

Differentiation: Refers to how mature (developed) cancer cells are in a tumor. Differentiated tumor cells resemble normal cells and tend to grow slower, compared to poorly formed cancer cells that grow faster.

DNA: DNA stands for deoxyribonucleic acid. The DNA molecule inside each cell carries genetic information (cell growth, division, and function) that is passed on from one generation to the next.

Enzyme: A substance in cells that speeds up chemical reactions in the body.

Familial cancers: Cancers that occur frequently in “cancer-prone” families in which defective or mutated (flawed) genes are passed on from one generation to the next. If a woman inherits **BRCA-1 and BRCA-2** genes, she has a higher risk of developing breast and/or ovarian cancer than the average woman’s risk.



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Gene: a segment of DNA, or heredity unit, found inside all cells passed from parent to offspring. Genes determine hair and eye color and height, as well as susceptibility to certain diseases. Genes contain the information for making proteins in the cell. Genes instruct cells to grow or not grow.
Genetic: Related to the genes or inherited characteristics, as opposed to another cause (e.g. environmental)

Genome: The complete genetic material of an organism.

Genomics: The comprehensive study of whole sets of genes and their interactions.

Genetic counseling: A communication process with a trained genetic counselor to review your genetic risk for a certain cancer. Your family history and personal medical history is discussed. Counseling may lead to genetic testing. Genetic counselors provide information and support to other family members.

Genetic markers: Alterations in DNA that may indicate an increased risk of developing specific cancers.

Genetic susceptibility: An inherited increase in the risk of developing a certain disease or disorder.

Hereditary: An inherited trait, capable of being transmitted genetically from both parents to a child.

Hormone: A chemical “messenger” produced in one part of the body by an endocrine gland (i.e. thyroid) or an organ (i.e. ovaries) that is transported to other parts through the bloodstream. Hormones are involved in the body’s normal growth, including sexual development and reproduction from puberty through adulthood. Hormones such as *estrogen* and *progesterone* influence or regulate breast cells.

Inhibitor: A drug that slows or blocks biological, chemical, or enzyme action (used in cancer treatment)

Hyperplasia: When cells in an organ are growing faster than normal, or grow in irregular patterns.

Mutation: A change in one or more genes that results in a new trait. It can be minor, harmful, or have no effect on how the cell functions. The BRCA-1 and BRCA-2 gene mutations increase breast cancer risk.

Nucleus: The most prominent component of a cell containing hereditary information (chromosomes)

Oncogene: An altered gene that normally directs cell growth. An oncogene promotes uncontrolled growth of cancer. This altered gene can be inherited, occur randomly (an error) or be prompted to act by an environmental exposure to a cancer causing agent.

Receptor: a protein inside or on the surface of the cell, capable of binding to a specific substance (such as hormones – e.g. estrogen) and bringing about biological changes (i.e. cell growth)

Proteins: Molecules in the cell that perform a wide variety of functions such as chemical reactions that support life (e.g. releasing enzymes for digesting food). Specific proteins are related to cancer progression.

Tissue: a group or layer of cells, such as the skin or breast, grouped together to perform certain functions.

Tumor suppressor gene: A gene or “cell guardian” whose normal function is to prevent abnormal cells from dividing. Certain mutations in tumor suppressor genes (such as BRCA genes) can progress to cancer.

Virus: smaller than a single cell or bacteria and cannot reproduce outside a living organism. Viruses can cause infectious diseases. Examples of viruses: Hepatitis B (HBV) and hepatitis C (HCV) and AIDS.



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Introduction to Cancer Research Terms

Animal studies: Mice or rats are most commonly used to test for cancer-causing substances because they are small and easy to handle, and are generally similar to humans in their response to carcinogens. Mice studies provide information on hormonal and chemical effects on the breast.

Bioinformatics: The science of managing and analyzing biological data using advanced computing techniques. Especially important in analyzing genome research data.

Biomonitoring: By collecting *samples* of body fluids and tissue from large groups or populations, scientists can analyze the presence of certain chemicals in the human body that may affect public health and diseases. Volunteers provide samples of saliva, urine, fat, or blood for laboratory study.

Clinical Trial: A type of research study that uses volunteers to test new methods of screening, prevention, diagnosis or treatment of a disease. It may be conducted in a clinic or medical center.

Epidemiology: The study of the patterns of diseases in human populations, and the factors that influence these patterns. . Epidemiologists study groups of people over time to observe whether a specific lifestyle habit (lack of exercise) or exposure (alcohol, tobacco) is associated with cancer. Epidemiology is the study of the incidence, distribution, and control of disease in a population.

Laboratory Experiments: Researchers use human cells grown in the laboratory to study how exposures to potential carcinogens may cause changes at the molecular and genetic level in cells.

Proteomics: The study of the full set of proteins (the proteome) encoded by a genome

Prospective: A study that follows a specific group of people in their everyday lives. Many long-term cancer studies use this method to observe how similar groups develop specific diseases.

Environmental Exposures Including Those Known or Suspected for Breast Cancer

Asbestos: A group of naturally occurring fibrous minerals used for insulating buildings and to make commercial textiles. Asbestos fibers and all commercial forms of asbestos are human carcinogens.

Benzene: A colorless, flammable liquid with a sweet odor that is formed from both natural and man-made sources, including cigarette smoke. It is considered a human carcinogen.

Atrazine: A commonly used pesticide that may pose a risk for breast and other cancers.

Biomarker: A substance sometimes found in the blood, other body fluids or tissues. A high level of a biomarker may mean that a certain type of cancer is in the body. Some biomarkers are associated with tumors. Other biomarkers indicate exposure to environmental chemicals.



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Bisphenol-A: A chemical compound used in hard plastics and food can linings that may pose a risk for breast cancer.

Carcinogen: A substance that causes cancer.

DNA Adduct: An example of a biomarker, an environmental chemical that enters the body and binds to DNA, causing DNA damage. These chemicals may possibly cause or lead to cancer.

DDT –a pesticide widely used in the U.S. until it was banned in the 1970's. DDT is still used in some countries to control agricultural pests. DDT is a known human carcinogen.

Environment: The combination of circumstances, physical conditions and outside influences surrounding and individual. Exposure to a wide variety of natural and man made substances are responsible for cancer. Cancer risks linked with environmental chemicals *may* be present in the air, water, food and the workplace

Environmental factors: such as viruses, sunlight and chemicals interact with cells throughout out lives.

Environmental risk factors: influences in our surroundings, such as radiation, toxins, and infections.

Environmental tobacco smoke (ETS). Also known as Second-hand Smoke: the combination of smoke emitted from the burning end of a cigarette, cigar, or pipe, and smoke exhaled by the smoker. ETS contains at least 60 known carcinogens. Early exposure to ETS is associated with breast cancer in younger women.

Herbicide: An agent that destroys plants and weeds.

Ionizing radiation: An invisible, high frequency radiation that can damage the DNA or genes in the body.

Latent period: The time between exposure to an environmental carcinogen and the development of cancer.

Linear dose response: A type of response in the body where the cancer risk changes at the same rate as the exposure – if the exposure increases, cancer risk increases at the same rate (e.g. alcohol and breast cancer)

Pesticide: An agent used to destroy any type of pest, like bugs that eat plants (e.g. insecticides, herbicides)

Protective factors may be present in specific protective genes, or in the diet, that help prevent cancer.

Phthalates: A class of industrial compounds used widely as plastic softeners, additives to perfumes and hairsprays, lubricants, and wood finishers, among other things. Phthalates are suspected carcinogens.

Perfluorooctanoic acid (PFOA): Used to manufacture various non-stick consumer products, including Teflon cookware and Gore-Tex clothing. PFOA's are suspected carcinogens.

Polychlorinated Biphenyls (PCB's): A group of over 200 industrial chemicals that were widely used before they were banned in 1974. PCB's continue to be released in the environment and are found in other mammals, human body tissues and breast milk.

Synthetic: An artificial substance not found in nature, for example: synthetic chemicals.

Susceptible: A term used to describe someone who is more likely to develop a disease.



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Threshold dose response: a type of response in which, at very low exposures, there appears to be no detectable increased risk for disease; this establishes a threshold (level) below which no risk is detected

Tobacco: Exposure to the carcinogens in tobacco products account for about *one-third of all cancer deaths* in the U.S. each year. Cigarette smoke contains more than 100 cancer-causing substances. Smoking tobacco and exposure to second hand smoke (ETS) during the teen years is associated with breast cancer.

Toxicology: The science of poisons, including their source, chemical composition, action, tests and antidotes (treatment to reverse their effects).

Xenobiotic: An environmental chemical compound, or natural substance that is foreign to the body.

Healthy Nutrition and Body Weight Maintenance Terms

Antioxidants: Chemicals (many found in foods and beverages) that protect against cancer. Antioxidants fight against the toxic agents that can damage DNA. (Green tea is a one source of antioxidants, along with grapes, apples and green leafy vegetables). Consult with your health department for food safety guidelines.

Body Mass Index (BMI): An index of *obesity* that uses weight and height to determine levels of body fatness for adults, aged 20 and older. The formula to calculate BMI is mass in kilograms (kg) divided by the square of height in meters (m²). (*The National Institutes of Health web site offers a BMI calculator*).

Carotenoids: Brightly colored particles found in the cells of vegetables, which may protect the body from cancer. **Beta-carotenes** (carotenoids) are found in carrots, peaches, cantaloupes, and sweet potatoes

Cruciferous vegetables: The cabbage family - cauliflower, radishes, collards, kale and bok choy may be protective for breast cancer. Broccoli contains a chemical that removes cancer-causing agents from cells.

Dietary fat: Fat consumed as part of a person's diet. Foods from animal sources are the major contributors of dietary fat. There are several types of dietary fats, of which the "trans-fats" (*Omega-6 fatty acids*) appear to *increase the risk* of certain diseases. Fat is an essential nutrient that protects and maintains the body.

Energy expenditure Exercise or physical activity

Fiber: The remains of plant stem walls found in beans and whole grains and fruits and vegetables. Fiber moves food through the digestive track, eliminating toxins and carcinogens from the body.

Isoflavones: Substances found in soy products that can act as "weak estrogens;" which are being studied as possible breast cancer preventive agents. (Doctors may advise *against* soy for women with breast cancers)

Omega-3 - fatty acids to include: Type of "polyunsaturated fatty acids" that the body absorbs from food. Found in cold-water fish (tuna, salmon) and in dark green leafy vegetables, flaxseeds and some vegetable oils. The Omega-3 fatty acids are considered "healthy fats" that strengthen the immune system.

Omega-6 - fatty acids to limit: Sources include corn oil and safflower oil used in cooking fried foods.



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Phytoestrogens: Naturally occurring compounds found in plants and legumes (such as beans, peas, soybeans and lentils) or plant products (such as whole grain cereals,) that can act like “weak estrogens

Simple sugars: Found in white bread, white rice, cookies, cakes, candy and sweetened beverages (limit)

Trans-Fatty Acids: Contained in hydrogenated fats (margarine), fried foods, processed foods (avoid).

Basic Breast Development, and Girl’s and Women’s Reproductive Health Life Cycle Events

Areola: A circular area surrounding the nipple that appears darker than the rest of the breast.

Endometrium: Tissue lining a woman’s uterus; the organ where a baby grows during pregnancy.

Estrogen: A family of hormones that promote the development of female (reproductive) characteristics.

Lobules: The milk-producing lobe parts of the breast; lobules are like sacs that connect to the milk ducts.

Mammary glands: Special organs in the breast that produce and secrete milk (for breastfeeding a baby)

Menarche: The first menstrual period; which begins for girls at varying ages. Early menarche (before age 12) is considered a risk factor for breast cancer, possibly because it increases lifetime exposure to estrogen.

Menstruation: The discharge of blood-filled lining of the uterus, frequently called the monthly “period.”

Menopause: The time in a woman’s life when her menstrual periods end, usually between ages 48-54.

Milk ducts: Tubes in the mammary (breast) gland that lead from the milk-producing lobules to the nipple.

Nulliparity: Condition of not bearing children. Nulliparity is one risk factor associated with breast cancer.

Pregnancy: A pregnancy carried to term (live birth) before age 30 completes the natural biological cycle of the breast and is associated with reduced breast cancer risk. Breastfeeding is also considered protective.

Puberty: The stage of adolescence in which an individual becomes physiologically capable of sexual reproduction. The onset of puberty, when the breast is developing, may be a critical stage for exposures.

Progesterone: Female hormone involved in the menstrual cycle and development of mammary glands

Thelarche: The beginning of development of the breasts in the female, sometimes called “breast buds.”

Terms Related to Breast Health, Breast Cancer Detection and Treatment of Breast Cancer:

Benign (proliferative) breast disease: a group of non-cancerous conditions (of the breast) that may increase the risk of developing breast cancer. Examples include “hyperplasia” of the ducts or lobules.

Biopsy: A procedure in which breast tissue is surgically removed to test for abnormal cells or cancer.



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Breast Cancer: Breast cancer is thought to be many different types of cancer.

Breast Cancer Cells: Cells that line the milk ducts and cover the lobular organs that make milk are common sites where breast cancer develops.

Breast reconstruction: A surgeon uses the body’s own tissue or manmade materials to create a new breast.

Breast implants: Saline or silicone filled sacs inside rubber-like shells that are surgically inserted behind the breast tissue to enlarge the breast (one method of breast reconstruction).

Breast self-exam (BSE): Checking your breasts (looking and feeling) monthly, for changes or lumps

Chemoprevention: The use of medicines, drugs and/or dietary substances to delay the progression of cancer or to stop it from coming back (recurring). Chemoprevention is targeted to the *type* of breast cancer.

Chemotherapy: Treatment with prescribed drugs that kill cancer cells. Chemotherapy is often used with surgery and radiation to treat cancer when it has spread, when it comes back, or to prevent further spread. Chemotherapy side effects (most are temporary) may include nausea, vomiting, loss of appetite and fatigue.

Clinical breast examination A doctor or nurse physically inspects and the breasts (by feeling) for changes

Complementary and alternative medicine (CAM): Forms of treatment that are used in addition to (complementary), or in the place of (alternative), standard medical treatments. CAM’s may include dietary supplements, mega dose vitamins and herbal preparations, special teas, acupuncture, massage therapy, spiritual healing and meditation.

Cyst: A fluid filled sac that can feel like a breast lump and is usually not cancerous.

DCIS: Also called intraductal carcinoma, a non-invasive, pre-cancerous condition in which abnormal cells are found in the lining of the breast duct but have not spread outside the milk duct.

Doctors carefully “monitor” DCIS patients and provide treatment to prevent cancer progression.

Estrogen Receptor: A protein normally found in mammary cells. Estrogen attaches to these receptors and exerts their biological function. Some breast cancers need “positive” estrogen receptors to grow, therefore they are treated medically with “anti-estrogen” hormone therapy that “blocks” the tumor’s growth.

Fibroadenoma: Benign (non-cancerous) tumor of the breast, common in young women.

Fibrocystic changes: Breast tissue that is normally lumpy, not considered cancerous.

Hyperplasia: When cells in an organ are growing faster than normal.

Gynecologist: Physician who specializes in the reproductive health of women, including breast exams

Informed consent: The process of explaining a course of treatment, along with the risks, benefits, and possible alternatives. It is a legal document showing that a patient understands and agrees to treatment.

Inhibitor: A drug that slows or blocks biological, chemical, or enzymatic action, used in cancer treatments.

Irradiation: The use of high-energy radiation to kill cancer cells (directed by a Radiation Oncologist).

Locally advanced cancer: A cancer that has spread to other parts of the breast and nearby lymph nodes.



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Lumpectomy: The removal of a cancerous breast lump along with some of the surrounding normal tissue.

Mammogram: A low-dose X ray that gives a detailed picture of breast tissue and some cancers.

Digitized mammogram-A mammogram that is recorded in computer code instead of on X-ray film.

Micro-calcifications are deposits of calcium in the breast that show up as white specks on a mammogram that *may be* an early sign of breast cancer. A **radiologist** interprets these results.

Mastectomy: The surgical removal of the breast, which may be followed by “reconstructive” surgery.

Oncologist: A medical doctor who specializes in cancer diagnosis and treatment.

Radiation oncologist: A medical doctor - radiologist who diagnoses and treats cancer patients.

Pathology: The scientific study of the nature of disease and its causes, progression and effects.

Vocabulary References - Zero Breast Cancer Adolescent Education Project

Adapted or Reproduced for Educational Purposes from the following scientific information sources:

Breast Cancer Questions & Answers for Young Women (Vogel, C.; Twenty-First Century Books, 2001

Breast Health and Cancer Detection (Aronson, V., Need to Know Library, Rosen Publishing Group, Inc.,2000)

Cancer and the Environment, What You Need to Know, What You Can Do (U.S. Dept Health & Human Services)

National Institutes of Health, National Cancer Institute, National Institute of Environmental Health Sciences, 2003)

“Cancer Facts,” National Cancer Institute, (2005)

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“Medical & Scientific Glossary” Developed by the Cincinnati Breast Cancer and the Environment Research Center (BCERC) University of Cincinnati Children’s Hospital Medical Center (2005); NIH Grant #ES/CA 012770-02



Personal Action Plan - Breast Cancer

Complete the following questions to identify how you can make a change in your life now and in the future to try and reduce the risk of breast cancer, and which information you learned today that you will share with family/friends. Do not write your name (Confidential) (Please use a black or dark blue pen. If form is a duplicate, return one copy to your teacher)

SCHOOL/COMMUNITY <----- OTHER PEOPLE INDIVIDUAL

What is one change that you will make for your personal health?

What is one factor related to breast cancer that you will do something about?

I will take which information from this lesson and share it with

Information:

Share with:

What I learned most about breast cancer is:

Name at least one thing you will do to reduce breast cancer risk:

Name at least one thing you will do about environmental factors:

Name at least one thing you will do for prevention:

About you: I am: Male Female My grade level is: 9 10 11 12



Evaluation Survey

Please mark the box that corresponds with your answer – only ONE box per line (no in-between marks).

| Part I: CONTENT | Strongly Agree | Agree | Disagree | Strongly Disagree |
|--|----------------|-------|----------|-------------------|
| The presentation made me more aware of the risk factors for Breast Cancer. | | | | |
| The presentation made me more aware of suspected environmental factors and breast cancer. | | | | |
| I feel confident that I can do at least one action that may help to reduce the risk of breast cancer. | | | | |
| Increasing physical activity and avoiding exposures like second-hand tobacco smoke will reduce my risk for developing breast cancer. | | | | |
| I plan on sharing the information I learned with my family and friends. | | | | |

| Part II: PRESENTATION QUALITY | Strongly Agree | Agree | Disagree | Strongly Disagree |
|--|----------------|-------|----------|-------------------|
| Peer educators were knowledgeable and clear. | | | | |
| Peer educators encouraged participation. | | | | |
| The handouts were useful. | | | | |

Overall, how would you rate the presentation?

- Excellent Good Fair Poor

How did the presentation change your thoughts about Breast Cancer?

What was the most important thing you learned from this presentation?

Would you be interested in having additional information or help on the issue of breast cancer?

- Yes* No Not Sure* *Please print your Name _____ [confidential]

(Please check your grade level below)

About You: I am: Male Female. My Grade Level is: 9 10 11 12

Thanks!



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