

## ***Breast Cancer & Breast Health***

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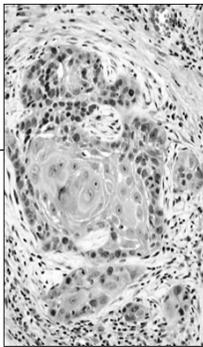
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**CANCER:**  
What is it?

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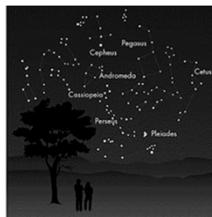
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What is Cancer?



- Constellation of diseases
- If untreated ⇨ serious illness & death
- Normal cell becomes abnormal

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<u>Normal Cells</u>	<u>Cancer Cells</u>
▪ Serve a purpose	▪ Serve no purpose
▪ Grow predictably	▪ Grow out-of-control
▪ Divide predictably	▪ Divide out-of-control
▪ Die when abnormal or worn out	▪ Fail to die even when abnormal
▪ "Stay home"	▪ "Leave home" (metastasize to other tissues or organs)

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**How does cancer begin?**

Cellular DNA damage

- DNA "drives" all cell activity
- Healthy DNA:
  - Normal cell activity
- Damaged DNA:
  - Abnormal cell activity
  - Cell grows & divides out of control




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**Gene mutations cause DNA damage**

Inherited gene mutations  
5-10% of cancers

- Born with the mutation
- Inherited from parent

Sporadic gene mutations  
90-95% of cancers

- Single cell mutation
- Carcinogen exposure
- Not born with/not inherited/not passed on
- Cell division error
- Familial tendencies

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Cancer is named...



According to where it begins

When cancer **spreads**, still named for the location where it **began**

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Are all cancers the same?

- No
- Behave differently
- Grow & respond differently
- Cancers in the same organ in different people can be very different (e.g., breast)

**Cancer treatment always targets *that* particular cancer**

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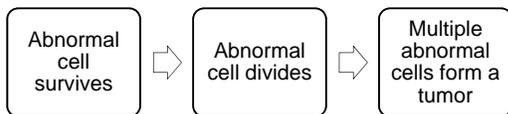
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How does cancer grow?



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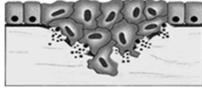
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### How does cancer spread?

#### Invasion

- Cells expand to nearby tissues



#### Metastasis

- Cells spread to other sites (blood stream, lymphatic system)
- New tumors develop away from primary site

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### Carcinogens

Agents that can cause cancer

- Known carcinogens:
  - Tobacco
  - Radon
  - Asbestos
  - Ultraviolet Rays
- Yet unknown carcinogens

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### Recognizing carcinogens for what they are...



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<http://www.youtube.com/watch?v=vLH7e724TjA&feature=related>  
<http://www.youtube.com/watch?v=HoWq0z07ZFs>

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Cancer is:

A **“clonal”** disease. It originates from one ancestral cell that, having acquired the capacity of limitless cell division & survival, gives rise to limitless descendants.

A **“clonally evolving”** disease - Every generation of cancer cells creates cells genetically different from its parents.

When chemotherapy or the immune system attacks cancer, mutant clones resist & grow.

This relentless cycle of mutation, selection, & overgrowth generates cells that more & more adapted to survival.

-- Siddhartha Mukherjee *The Emperor of All Maladies*

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How common is cancer?

One-third of women in the US will develop cancer during their lifetime

Half of men in the US will develop cancer during their lifetime

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**BREAST CANCER**  
What is it?



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Breast Cancer



Cancer that develops in the structures of the breast

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Structures of the female breast:

Each breast:

- 15-20 lobes, lobules & milk-producing glands
- Ducts
- Fat and fibrous tissue
- Lymph vessels connecting lymph nodes

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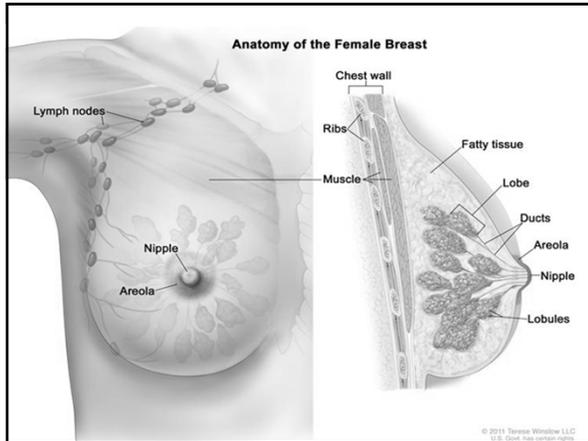
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### How common is Female Breast Cancer?

**1 of 8** women in U.S. will develop breast cancer in her lifetime

**12%** lifetime risk

**192,000** diagnosed/year in U.S.

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### Female vs. Male Breast Cancer

**100 x** more common in women than in men

**Women:**

- Growth-promoting hormones

**Men:**

- May not know risk
- May not pay attention
- May ignore

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## Male Breast Cancer

Mark Goldstein

- Diagnosed in 1988
- October 2011, Kearney was his 215<sup>th</sup> SGK race
- 2,000 men dx/year in U.S.  
(192,000 women dx/year in U.S)



*"Men should not die from breast cancer out of ignorance."*

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*Changing as it does during adolescence, menstrual cycles, nursing, and menopause, the breast may be the most dynamic organ in the human body.*

National Cancer Institute

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## RECOGNIZING

The Risks



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Risk factors for breast cancer:

Three categories (ACS) of causes

- Risk factors you cannot change
- Lifestyle-related factors
- Factors with uncertain, controversial, or unproven effect on breast cancer risk

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Risk factors you cannot change:

- Gender
- Aging
- Genetic risk factors
- Family history of breast cancer
- Personal history of breast cancer
- Race and ethnicity
- Dense breast tissue
- Certain benign breast conditions
- Lobular carcinoma in situ
- Menstrual periods
- Previous chest radiation

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Gender



Being a woman

- 100 x more common in women than men
- Largely due to female hormones:
  - Estrogen
  - Progesterone

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**Age**



- ↑ age = ↑ risk
- 2 out of 3 breast cancers found after age 55

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**Genetic factors**

5-10% breast cancer due to inherited gene mutations

- BRCA genes prevent abnormal cell growth
- Mutations to BRCA1 & BRCA2 most common mutations for breast cancer  
(Ashkenazi Jews originally from Eastern Europe)
- Many other, rare gene mutations exist

These mutations are *inherited* from a parent and may necessitate different surveillance

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**Family Health History**



Higher risk if:

- Mother, father, sister, brother or daughter had breast cancer  
Especially if diagnosed before age 50
- Other relatives had breast or ovarian cancer on mother or father's side

But... 85% of women who get breast cancer have *no* family history

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### Personal Health History



Higher risk with personal history of:

- Breast cancer in one breast
  - 3-4 x risk of developing new breast cancer
  - not recurrence – in same or other breast
- Certain abnormal cells (atypical hyperplasia)
- Lobular carcinoma in situ (LCIS)
- Ductal carcinoma in situ (DCIS)

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### Race & Ethnicity



- Overall, white women more likely to develop breast cancer than
  - African American, Hispanic/Latina,
  - Asian/Pacific Islander, American
  - Indian/Alaska Native
- African American women more likely to die of breast cancer

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### Breast density



Breasts have:

- Glandular tissue = dense tissue
- Fatty tissue = not dense

Women with denser tissue have higher risk of breast cancer

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### Certain benign breast conditions

Some benign conditions increase risk of breast cancer:

- Fibrocystic disease
- Calcifications
- Mastitis
- Lipoma
- Fibroadenoma
- Atypical ductal hyperplasia

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### Lobular Carcinoma in Situ

LCIS increases risk of breast cancer

- LCIS looks like cancer cells growing in the lobules
- Cells do not grow through the lobule walls
- Cells don't become cancer if not treated

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### Menstrual history



Slightly increased risk if:

- ✓ Started menstruation before age 12
- ✓ Menopause after age 55

May be due to longer lifetime exposure to estrogen and progesterone

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### Radiation therapy to chest



Significantly higher risk if:

- Radiation to chest wall between ages 10-40  
Hodgkin disease, non-Hodgkin lymphoma
- The younger the age, the  higher the risk

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### DES Exposure Diethylstilbestrol



Slightly increased risk

- Given 1940s – 1960s to pregnant women to lower  
chanced of miscarriage
- Women whose mothers took DES during pregnancy  
may also have slightly higher risk

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### Lifestyle-related risk factors that can be influenced or controlled

- Having children
- Birth control
- Hormone therapy after menopause
- Breastfeeding
- Alcohol
- Being overweight or obese
- Physical activity

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## Having children

Slightly increased breast cancer risk if:

- No children
- First child after age 30

Slightly reduced risk if:

- Many pregnancies
- Becoming pregnant at young age



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## Birth control



Increased risk:

- Oral and injectable contraceptives
- Risk may be slight and may revert back to normal once stopped, depending upon the drug

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## Breastfeeding



- May slightly lower risk
- Difficult to study
- Benefit may be tied to fewer menstrual cycles

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### Hormone therapy after menopause



- Different types exist
- Some types increase risk
- Make decision with your doctor after weighing risks and benefits

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### Alcohol Use



The more alcohol a woman drinks...



...the greater the risk

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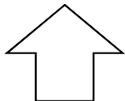
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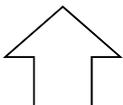
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### Weight



Being overweight or obese after menopause...



...increases risk

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## Weight



- Complex connection
- Estrogen produced mostly by:
  - Ovaries before menopause
  - Fat after menopause
- More fat tissue after menopause = higher risk
- Higher risk when
  - Weight gained in adulthood vs. childhood
  - Excess fat in waist vs. hips and thighs

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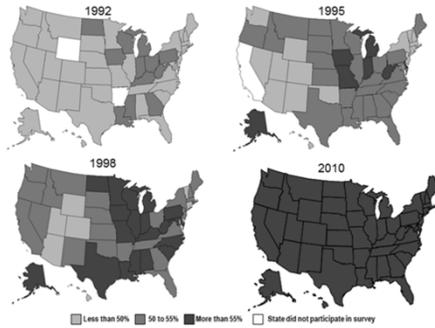
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Trends in Overweight\* Prevalence (%), Adults 18 and Older, US, 1992-2010



\*Body mass index of 25.0 kg/m<sup>2</sup> or greater. Source: Behavioral Risk Factor Surveillance System, CD-ROM 1992-2010, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2011.

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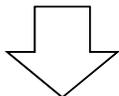
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## Activity



Physical activity...



...lowers risk

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Factors with uncertain, controversial, or unproven effects:

- Diet and vitamin intake
- Antiperspirants
- Bras
- Induced abortion
- Breast implants
- Chemicals in the environment
- Tobacco smoke
- Night work



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Diet and vitamin intake

- Research results are conflicting
- No clear link to risks
- But...calories and fat intake influence weight !!



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Antiperspirants



- Rumors suggest chemicals are absorbed and lead to breast cancer
- Little evidence to support rumor
- Large study found no increase in breast cancer with underarm products or shaved underarms

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### Bras



- Rumors suggest bras cause breast cancer by obstructing lymph flow
- No scientific or clinic basis for rumor

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### Abortions

- Strong data that neither induced or spontaneous abortions (miscarriages) have an overall effect on risk

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### Breast implants



- Several studies provide data that implants do not increase risk
- Implants may cause scar tissue
- Harder to see breast tissue using standard mammography
- May be linked to rare type of lymphoma – too few cases to draw conclusions

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### Chemicals in the environment

- Research being conducted
- Compounds with estrogen-like properties are of interest
  - Plastics, certain cosmetics and personal care products, pesticides



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### Tobacco smoke



- Studies in recent years have found smoking might increase risk
- Limited evidence that smoking causes breast cancer
- Evidence on secondhand smoke and breast cancer is controversial

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### Night work



- Several studies suggest that women who work at night might have increased risk
- Research continues

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BUT, after reviewing all these risk factors...

- Most women with risks never develop cancer
- Many who develop breast cancer have no apparent risk factors - other than being a woman and growing older
- When a woman with risk factors develops breast cancer, hard to know just how much those factors contributed to her disease

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## SIGNS & SYMPTOMS



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Early signs & symptoms of breast cancer

Usually none

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### Signs & symptoms as breast cancer grows

- Lump or thickening – breast or underarm
- Change in size or shape of breast
- Dimpling or puckering in skin
- Inverted nipple
- Discharge from nipple – especially if bloody
- Scaly, red, or swollen skin on breast

*Tell health provider about any change from normal*

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### PREVENTION STRATEGIES & LIFESTYLE CHOICES

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that make a difference

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### Lower your risk by changing the risk factors that can be changed

- Weight
- Exercise
- Alcohol
- Avoid or limit hormone replacement



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### Know if you are at increased risk

Do you have:

- Strong family history of breast cancer?
- Known genetic mutation in family?
- Personal health risks?

Women at average risk – 1 in 8

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### Breast Cancer Risk Assessment Tool



- National Cancer Institute (NCI)
- Estimates risk of invasive breast cancer
- Designed for health care professionals
- Not all-inclusive for all risks (radiation)

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### If higher than average risk, talk to your doctor about...

- Genetic testing for BRCA gene mutations
- Breast cancer chemoprevention
  - Tamoxifen, Raloxifene, Aromatase inhibitors (block effects of estrogen on breast tissue)
- Preventive surgery for high risk women
  - Prophylactic mastectomy
  - Prophylactic ovary removal

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# CURRENT SCREENING RECOMMENDATIONS

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## Screening texts and exams

Goal:  
Find before symptoms begin

Screening does not prevent disease, it finds it at an early stage



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## Screening texts and exams

Breast cancers found during screening exams more likely to be:

- Small
- Still confined to the breast

Breast cancers found because they're felt more likely to:

- Be larger
- Have spread beyond the breast

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### Why screening is important



The size of a breast cancer and how far it has spread are important factors in predicting the prognosis (outlook)

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### Screening recommendations for women with AVERAGE lifetime risk:

▪ **Mammogram**

✓ Screening mammogram every year after age 40 as long as in good health

▪ Clinical Breast Exam by health professional

▪ Breast Awareness

▪ Breast self exam (optional)

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### Mammogram

X-ray of the breast

- Analog – x-ray plate
- Digital – computer image

Screening mammogram:

- ✓ No symptoms exist
- ✓ Too small to be felt

Diagnostic mammogram:

- ✓ Problem recognized
- ✓ Change on a screening mammogram



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Screening recommendations for women with AVERAGE lifetime risk:

- Mammogram
- **Clinical Breast Exam by health professional**
  - ✓ Every 3 years ages 20-40
  - ✓ Every year after age 40
- Breast Awareness
- Breast self exam (optional)

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Screening recommendations for women with AVERAGE lifetime risk:

- Mammogram
- Clinical Breast Exam by health professional
- **Breast Awareness**
  - ✓ Know how your breasts normally look & feel
  - ✓ Notify health care provider of changes
- Breast self exam (optional)

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Screening recommendations for women with AVERAGE lifetime risk:

- Mammogram
- Clinical Breast Exam by health professional
- Breast Awareness
- **Breast self exam (optional)**
  - ✓ Begin in 20s
  - ✓ Know benefits and limitations
  - ✓ Report breast changes to health professional

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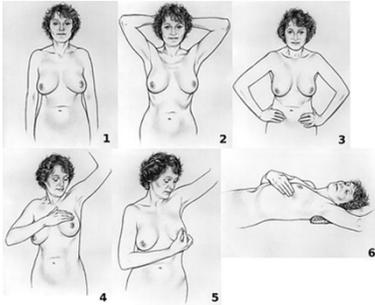
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### Breast Awareness & Self Exam



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### Women at MODERATELY increased risk:

- Lifetime risk of 15% to 20% via assessment tool
- Personal history of breast cancer or other conditions: DCIS, LCIS
- Extremely dense breasts or unevenly dense breasts

#### Screening Recommendations:

Talk with doctor about the benefits and limitations of adding MRI screening to yearly mammogram

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### Women at HIGH risk (2% of population):

- Known *BRCA1* or *BRCA2* gene mutation
- First-degree relative with a *BRCA1* or *BRCA2* gene mutation, but no genetic testing themselves
- Lifetime risk of > 20% via assessment tool
- Radiation therapy to chest - ages of 10 - 30 years
- Self or first-degree relative with syndrome linked to breast cancer

#### Screening recommendations:

- MRI and a mammogram every year

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**Make the move from  
AWARENESS to ACTION...**

- Statistical indifference
- Information apathy
- Siren Fatigue



"You can present the material, but you can't make me care."  
-- Bill Watterson

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**Credible Resources:**

American Cancer Society  
Centers for Disease Control  
Oncology Nurse Community  
Susan G. Komen for the Cure  
Nebraska Department of Health & Human Services Cancer Registry

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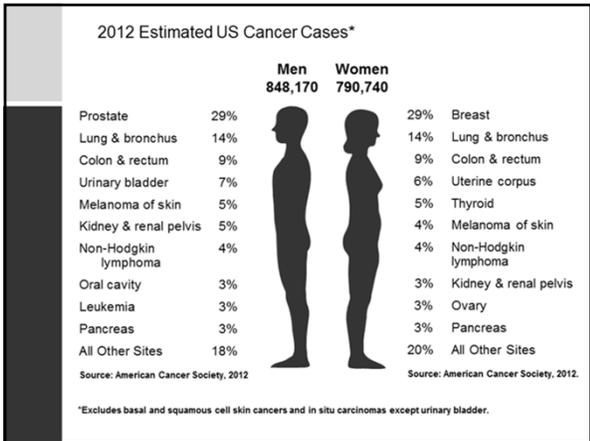
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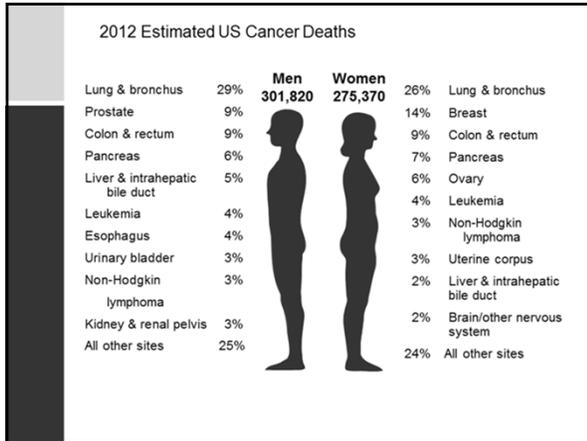
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### The Lifetime Probability of Developing Cancer for Men, 2006-2008\*

Site	Risk
All sites <sup>†</sup>	1 in 2
Prostate	1 in 6
Lung and bronchus	1 in 13
Colon and rectum	1 in 19
Urinary bladder <sup>‡</sup>	1 in 26
Melanoma <sup>§</sup>	1 in 36
Non-Hodgkin lymphoma	1 in 43
Kidney	1 in 51
Leukemia	1 in 64
Oral cavity	1 in 69
Stomach	1 in 91

\* For those free of cancer at beginning of age interval.  
<sup>†</sup> All Sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.  
<sup>‡</sup> Includes invasive and in situ cancer cases.  
<sup>§</sup> Statistic for white men.  
 Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.0.0 Statistical Research and Applications Branch, NCI, 2011.

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### The Lifetime Probability of Developing Cancer for Women, 2006-2008\*

Site	Risk
All sites <sup>†</sup>	1 in 3
Breast	1 in 8
Lung & bronchus	1 in 16
Colon & rectum	1 in 20
Uterine corpus	1 in 38
Non-Hodgkin lymphoma	1 in 51
Urinary bladder <sup>‡</sup>	1 in 87
Melanoma <sup>§</sup>	1 in 55
Ovary	1 in 71
Pancreas	1 in 69
Uterine cervix	1 in 147

\* For those free of cancer at beginning of age interval.  
<sup>†</sup> All Sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.  
<sup>‡</sup> Includes invasive and in situ cancer cases.  
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