

ONCOLOGY FOR SCIENTISTS

Cancer Survivorship

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Chi-Chen Hong, PhD
Department of Cancer Prevention and Control
Email: Chi-Chen.Hong@Roswellpark.org
Tel: 845-7785

LIFE AFTER CANCER

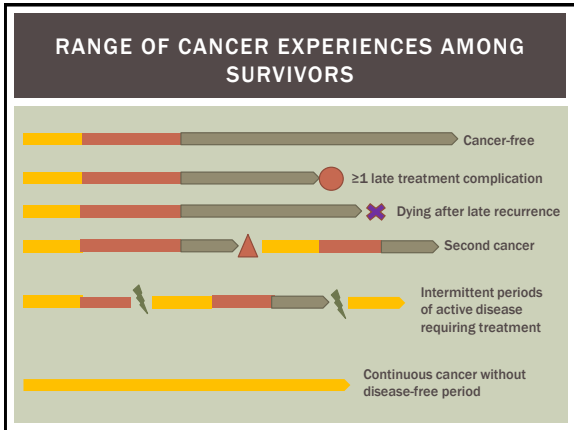
- Advances in the ways that cancer is diagnosed and treated have increased the number of people who live disease-free for long periods of time.
- More and more people are benefiting from the early detection of cancer and its successful treatment. These medical advances are improving both quality of life and length of survival.
- National data regarding life after cancer are limited and include survival rates by each stage at diagnosis, economic impact of cancer, cancer survivor's smoking status.

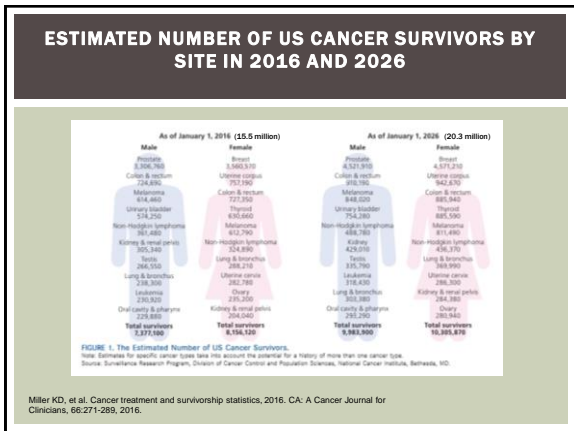
WHO ARE CANCER SURVIVORS?

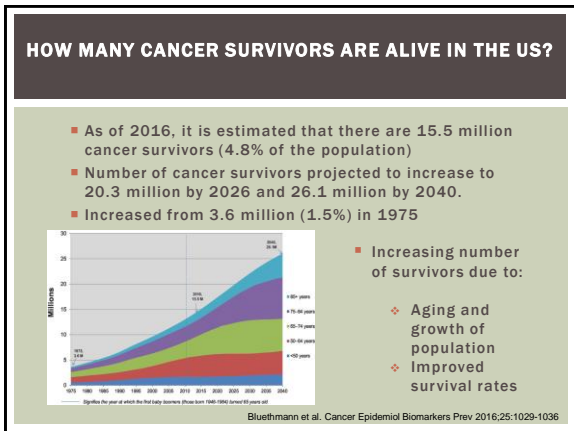
- Any person who has been diagnosed with cancer, from the time of diagnosis through the balance of life.
- Family members, friends, and caregivers also affected by the survivorship experience.
- In practice, concept of survivorship often associated with period after active treatment ends.

3 Distinct Phases of Cancer Survival

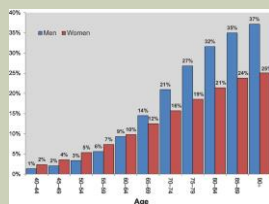








PERCENTAGE OF CANCER SURVIVORS IN THE U.S. POPULATION IN 2016

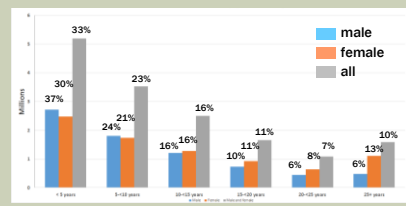


- Cancer prevalence similar in younger age groups.
- Prevalence higher among men in older age groups beginning at age 65.

Buethmann et al. Cancer Epidemiol Biomarkers Prev 2016;25:1029-1036

ESTIMATED NUMBER OF SURVIVORS IN THE U.S., BY YEARS SINCE DIAGNOSIS

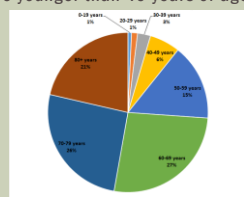
- Majority of cancer (67%) diagnosed 5 or more years ago.
- 17% diagnosed 20 or more years ago.



Source: Surveillance Research Program, Division of Cancer Control and Population Sciences, NCI
 Miller, K. D., Siegel, R. L., Lin, C. C., Mariotto, A. B., Kramer, J. L., Rowland, J. H., Stein, K. D., Alteri, R., and Jemal, A. (2016). Cancer treatment and survivorship statistics, 2016. CA: A Cancer Journal for Clinicians.

ESTIMATED US CANCER PREVALENCE COUNTS, BY CURRENT AGE

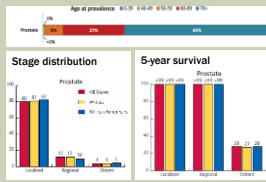
- 74% of survivors are currently 60 years of age and older.
- Almost half (47%) are age 70 years of age or older.
- Only 5% are younger than 40 years of age



American Cancer Society, Cancer Treatment & Survivorship Facts & Figures 2016-2017.
 Atlanta: American Cancer Society, 2016.
 Miller KD, et al. Cancer treatment and survivorship statistics, 2016. CA: A Cancer Journal for Clinicians. 66:271-289, 2016.

PROSTATE CANCER

- 3.3 M men living with a history of prostate cancer in US
- Median age at Dx is 66, and 64% are over age 70, <1% under age 50.
- Most men diagnosed by PSA screening, although expert groups conclude data is insufficient to recommend routine use of PSA.
- >90% of all prostate cancers are discovered in the local or regional stages for which the 5-yr mortality rate is 100%.
- 10 and 15 yr survival rate is 98% and 95%, respectively.

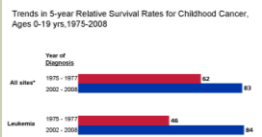
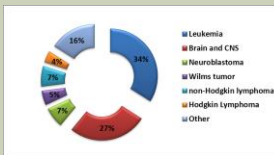


SPECIAL CONCERNS OF PROSTATE CANCER SURVIVORS

- Survivors treated with surgery or radiation therapy experience incontinence, erectile dysfunction, bowel complications.
- >95% of patients who undergo surgery or received radiation experience sexual dysfunction.
- 50% report urinary or bowel dysfunction,
- Patients receiving hormonal treatment may experience loss of libido, menopausal-like symptoms including hot flashes, night sweats, irritability, and osteoporosis.
- Over long-term, androgen deprivation therapy increases risk of diabetes, cardiovascular disease, obesity.

CANCERS IN CHILDREN

- 1% of all new cancers (birth to age 14)
- 2nd leading cause of death in children (accidents is 1st)
- 65,190 childhood cancer age 14 and younger, 47,180 survivors aged 15 to 19 in US
- 5-year survival rate has improved over past 30 yrs due to new and improved treatments,



SPECIAL CONCERNS OF CHILDHOOD CANCER SURVIVORS

- Children may experience treatment-related side effects many years after diagnosis.
- Aggressive treatments used during 1970s and 80s, and even some newer treatments, result in a number of late effects, including risk of second cancers, organ dysfunction, reduced growth and development, decreased fertility, cognitive impairments, early death.
- 50% of childhood cancer survivors develop a severe or life-threatening chronic health condition by age 50.
- Most common second cancers are breast, brain/CNS, bone, thyroid soft tissue, melanoma, acute myeloid leukemia.
- Important to monitor childhood cancer survivors for long-term and late effects as well as emotional and psychosocial concerns.

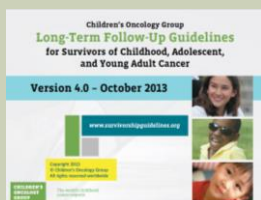


SPECIAL CONCERNS OF CHILDHOOD CANCER SURVIVORS

- Radiation to brain or spine can slow growth. If "at risk" for being short, healthcare provider can recommend tests and treatments.
- Survivors treated with chest radiation or anthracyclines might have heart problems. More likely at higher doses and if treatment occurred before heart finished growing.
- Radiation and some anticancer drugs affect sexual development and reproduction. Risk of delayed puberty, infertility, early menopause.
- Adolescents and young adults face additional challenges related to insurance coverage.
- Medicaid covers cancer treatment for pediatric cancer patients meeting income criteria, but more general coverage lapses at age 18 or 21 depending on state of residence.

LONG-TERM FOLLOWUP GUIDELINES FOR CHILDHOOD CANCER SURVIVORS

- Followup guidelines for management of late-effects developed by The Children's Oncology Group, a NCI-supported clinical trials group that cares for >90% of US children and adolescents with cancer.



Survivorshipguidelines.org

COMMON EFFECTS OF CANCER AND ITS TREATMENT

- Management of cancer and treatment-related symptoms is an important aspect of cancer care, affecting QOL, functional status, and completion of treatment.
- Most common side-effects:
 - ❖ Pain
 - ❖ Fatigue
 - ❖ Emotional distress
 - ❖ Bone density loss (osteopenia/osteoporosis)
 - ❖ Cardiotoxicity
 - ❖ Cognitive Deficits

PAIN

Pain (ACS Cancer Facts & Figures 2007)


- One of most common symptoms associated with cancer and one of most important factors reducing QOL
- Associated with depression and poor functioning.
- Can interfere with normal activities, diminish enjoyment of everyday pleasures, prevent relaxation and sleep, increase anxiety, stress, and fatigue.
- Can cause people to withdraw and reduce contact with friends and family.
- Recent meta-analysis estimated prevalence of pain to be:
 - ❖ 59% undergoing active treatment
 - ❖ 33% after treatment
 - ❖ 64% with advanced/metastatic/terminal disease

PAIN

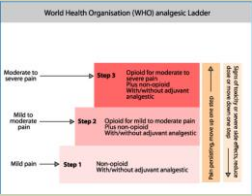
- Both surgery and radiation can cause nerve damage, resulting in chronic pain.
- Chemotherapy drugs, especially vincristine and taxanes, can damage sensory nerve cells, causing peripheral neuropathy. Extent of damage is dose-dependent and may take months or years to resolve.
- Regardless of stage of disease or recovery, ~ 80% of cancer-associated pain can be relieved by proper treatment.
- Often undertreated (minorities, age 70 or older, female). Serious problem in developed countries. Even more serious in developing countries.

PAIN

- Clinical guidelines from WHO and NCCN recommend that doctors ask about pain and other symptoms throughout course of treatment and continuing care (eg. Wong-Baker FACES Pain Rating Scale)



- Pharmacologic treatment of cancer pain provided by WHO's Three-Step Analgesic Ladder



PAIN

Use of Complementary Methods to help Control Pain

- Cognitive and behavioral techniques to divert attention from pain, improve pain tolerance.
- Acupuncture
- Mind-body imaging techniques (hypnosis, progressive muscle relaxation)
- Therapeutic massage
- Physical activity



Issues with Reimbursement

- Lack of health insurance plays significant role in which pain is treated (47 million Americans have no health insurance).
- Depending on health insurance, some have full access to adequate pain management while others do not.
- Problems are worse for the most vulnerable populations – low SES, and racial and ethnic minorities, who have been shown to have a greater degree of pain and suffering from cancer than other Americans.

FATIGUE

- One of the most common side-effect of cancer treatment; reported in one third of cancer patients.
- Reported by 80-90% of those receiving chemotherapy or radiation.
- Different from feeling tired after a long day and does not get better with rest or sleep.



- For many patients, chronic fatigue persists long after treatment has ended. At least 3 studies suggest that persistent fatigue is present in 17 to 26% of cancer survivors.
- Fatigue in cancer patients is underdiagnosed, underreported, and undertreated.
- Seldom occurs by itself. Commonly associated with sleep disturbance, emotional distress (depression, anxiety), or pain.

FATIGUE

- Cause is multifactorial.
 - ❖ Anemia
 - ❖ Depression
 - ❖ Chronic inflammatory processes with elevated cytokines
 - ❖ Alterations in muscular energy systems
- Meta-analyses show that exercise, especially moderate-intensity resistance exercise, reduces cancer-related fatigue.
- Some evidence for the efficacy of psychological interventions or psychostimulants.

CANCER-RELATED DISTRESS

- Defined as a multifactorial unpleasant emotional experience of a psychosocial nature that may interfere with the ability to cope effectively with cancer and its treatment.
- Complex response to effects of pain, fatigue, and/or other stressors associated with cancer diagnosis and treatment.
- Difficult to identify because of overlap with other symptoms (eg. Fatigue, changes in appetite, sleep disruption).
- Recent meta-analysis found 30 to 40% of cancer patients with diagnosable mood disorder, though this is thought to be an underestimate.
- Early detection and treatment of distress can improve treatment adherence and patient-provider communication and decrease the risk of severe depression or anxiety.

CANCER-RELATED DISTRESS

- 2008 IOM report supported work of the National Comprehensive Cancer Network (NCCN) guidelines for Distress Management.
- Recommends routine screening for distress and has developed a measurement tool called the Distress Thermometer.
- Those with moderate to severe distress often referred to supportive services (mental health, social work, counseling).

BRIEF SCREENING TOOL AND PROBLEM LIST

COGNITIVE DEFICITS

Memory and Thinking Problems

- Chemobrain in up to 75% of cancer patients receiving chemotherapy.
- Can negatively impact cognitive function, including problems with attention, concentration, memory, comprehension, mental speed processing, and reasoning.
- Can be debilitating and persist for months to years.
- Long-term survivors of breast, lung, and ovarian cancers and lymphoma may have cognitive and neurological complications caused by systemic therapy.
- Study of brain dysfunction is complicated by chemo-related fatigue, depression, and anxiety which also contributes to poor cognitive performance.
- Risk of cognitive impairment from chemo increases with advanced age, lower pretreatment IQ, and the apolipoprotein E genotype, which is associated with Alzheimer disease.



FEAR OF CANCER RECURRENCE

- Among chief concerns of post-treatment cancer survivors and may persist long after treatment ends, even among survivors who are considered to be cancer free or in remission.
- ACS Studies of Cancer Survivors indicate that ~60% of 1-year cancer survivors reported moderate to severe concerns about disease recurrence.
- Fear of recurrence is elevated among survivors and caregivers who find less meaning in the cancer experience and who experience more concomitant family stressors.

RISK OF RECURRENCE AND SUBSEQUENT CANCERS

Figure 15. Observed-to-expected (O/E) Ratios for Subsequent Cancers by Primary Type, Age 15, 1976-2012

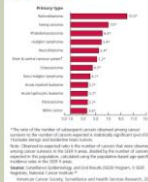
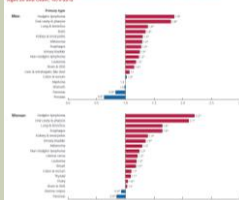


Figure 16. Observed-to-expected (O/E) Ratios for Subsequent Cancers by Primary Type and Sex, Age 15 and Older, 1976-2012



- Recurrence rates depend on tumor characteristics, stage of disease and treatments received.
- Ratios of observed-to-expected number of cancers used to describe risk for subsequent cancer. Expected based on cancer occurrence in general population.
- Risk higher among individuals with childhood cancer.
- Small increased risk in adults, but higher for those with Hodgkin lymphoma and tobacco-related cancers (oral cavity, lung, kidney, bladder).

E.g. Female survivors of Hodgkin lymphoma treated with radiation to chest at particularly increased risk of developing breast cancer.

American Cancer Society. Cancer Treatment & Survivorship Facts & Figures 2016-2017. Atlanta: American Cancer Society; 2016.

HEART DAMAGE

- Chemotherapy drugs, particularly anthracyclines, can cause heart damage, which may increase risk of heart failure over time.
- Risk of heart disease increases in proportion to the amount of radiation received to chest and persists for at least 20 years.
- Risk and severity can be reduced through healthy lifestyle modifications (e.g. smoking cessation, healthy diet, exercise)

INFERTILITY

- Can result from surgery, radiation therapy, or chemotherapy in men and women.
- Pelvic radiation among women associated with miscarriage, preterm labor, low birthweight infants.
- Options for fertility preservation include freezing and banking sperm, eggs, or embryos.
- There is a rapid loss of ovarian reserve in premenopausal women treated with chemotherapy, therefore consultation to a fertility specialist should occur prior to treatment.

CANCER DISPARITIES AND BARRIERS TO TREATMENT

- Quality cancer care can significantly increase survival and quality of care during and after treatment.
- Disparities in cancer treatment and outcomes persist for medically underserved populations, including racial and ethnic minorities, uninsured or underinsured groups, rural populations, elderly.
- Structural Barriers
 - Inadequate health insurance
 - Out of pocket costs even with insurance
 - Complexities of health care system
 - Treatment facility hours and operation
 - Appointment wait times
 - Access to transportation

CANCER DISPARITIES AND BARRIERS TO TREATMENT

- Physician factors
 - Attitudes and beliefs
 - Preferences
 - Implicit or explicit biases influencing treatment delivery and recommendation
- Patient factors
 - Attitudes and beliefs about specific treatments
 - Life circumstances and competing demands
 - Health literacy
 - Perceptions about health care system

IOM'S QUALITY OF LIFE MODEL




- QoL may decline considerably during active treatment and remain low for a short period of time afterwards.
- According to National Health Interview Survey – 25% of cancer survivors report a decreased QoL due to physical problems; ~10% report decreased QoL due to emotional problems
- Among long-term cancer survivors (5 years or more), emotional well-being is comparable to those with no history of cancer, but they report poorer physical well-being.
- Individuals who undergo more invasive and aggressive treatments report lower functioning and QoL over long term.

QUALITY OF LIFE IN LONG-TERM SURVIVORSHIP


- Racial and ethnic minorities, and those of lower SES report lower QoL.
- Younger age associated with poorer emotional functioning.
- Older age associated with poorer physical function.
- Many have a fear of recurrence and subsequent primary cancers.
- QoL issues include concerns of caregivers, who provide emotional and physical support to survivors and who frequently report unmet psychosocial and medical needs.


REPORTS RECOMMENDING CANCER SURVIVORSHIP DATA COLLECTION/SURVEILLANCE

- **National Action Plan for Cancer Survivorship (2004)**
 - ❖ Identified surveillance and applied research as major areas of public health focus for cancer survivorship.
 - ❖ Recommended development of infrastructure for comprehensive database on cancer survivorship
 - ❖ Recommended improved coordination among administrators of existing databases and the addition of variables of indicators to collect supplementary information on cancer survivors.




- **President's Cancer Panel Report (2004)**
- **Institute of Medicine Report (2006)**
 - ❖ Emphasized the importance of surveillance in monitoring cancer treatment and factors associated with the ongoing health concerns of cancer survivors







CDC BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

- Established in 1984
- Largest continuously conducted telephone health survey in the world
- >400,000 interviews annually
- 50 states, District of Columbia, Puerto Rico, Virgin Islands, Guam
- Collects information on health-related risk behaviors, chronic health conditions, and use of preventive services





BRFSS CORE TOPICS (2007)

<ul style="list-style-type: none"> • Demographics • Health Status • Health Care Access • Healthy Days • Life Satisfaction • Emotional Support • Disability • Tobacco Use • Oral Health 	<ul style="list-style-type: none"> • Alcohol Consumption • Exercise • Immunization • HIV/AIDS • Diabetes • Asthma • Cardiovascular Disease • Emerging Issues • Veteran's Status 	<ul style="list-style-type: none"> • Hypertension Awareness • Cholesterol Awareness • Arthritis Burden • Physical Activity • Fruits and Vegetables
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CDC BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM 2009 AND 2010 CANCER PREVALENCE QUESTIONNAIRE



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

Core Questions

1. Have you ever been told by a doctor, nurse, or other health care professional that you had cancer?
2. *[If yes]* At what age were you told that you had cancer?
3. How many different types of cancer have you had?
4. *[If one]* What type of cancer was it?
[Or if more than one] With your most recent diagnosis of cancer, what type of cancer was it?



HEALTH RISKS IN THE UNITED STATES
 BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM

2009 & 2010 BRFSS QUESTIONNAIRE OPTIONAL SURVIVORSHIP MODULE

- States may choose to ask 10 questions added as an optional module
- Source of questions
 - ❖ 1992 National Health Interview Survey Cancer Survivorship Supplement
 - ❖ State CCC programs, CDC staff
- Allowed state-level assessment of survivorship issues related to cancer treatment, pain, and access to care
 - ❖ 2009: 4 states participated (Connecticut, North Carolina, Vermont, Virginia)
 - ❖ 2010: 10 states participated (Alaska, Connecticut, Guam, Indiana, Massachusetts, Missouri, New Mexico, Ohio, South Dakota, Wisconsin)

2009 & 2010 BRFSS QUESTIONNAIRE OPTIONAL SURVIVORSHIP MODULE

1. Previously you said that you had been told by your doctor that you had cancer. I will now ask you about your experiences with cancer. Are you currently receiving treatment for cancer? By treatment, we mean surgery, radiation therapy, chemotherapy, or chemotherapy pills.
2. What type of doctor provides the majority of your health care? (cancer surgeon, family practitioner, etc)
3. Did any doctor, nurse, or other health professional EVER give you a written summary of all the cancer treatments that you received?
4. Have you EVER received instructions from a doctor, nurse, or other health professional about where you should return or who you should see for routine cancer check-ups after completing treatment for cancer?

2009 & 2010 BRFS QUESTIONNAIRE OPTIONAL SURVIVORSHIP MODULE

5. Were these instructions written down or printed on paper for you?
6. With your most recent diagnosis of cancer, did you have health insurance that paid for all or part of your cancer treatment? (Note: "Health insurance" also includes Medicare, Medicaid, or other types of state health programs.)
7. Were you EVER denied health insurance or life insurance coverage because of your cancer?
8. Did you participate in a clinical trial as part of your cancer treatment?
9. Do you currently have physical pain caused by your cancer or cancer treatment?
10. Is your pain currently under control?

CANCER SURVIVORSHIP CLINICAL PRACTICE GUIDELINES

Cancer Survivorship Clinical Practice Guidelines

National Comprehensive Cancer Network	American Society of Clinical Oncology	American Cancer Society Survivorship Care Guidelines for Primary Care Providers
<ul style="list-style-type: none"> • By Topic: • Anxiety and depression • Cognitive function • Exercise • Fatigue • Immunizations and infections • Pain • Sexual function (female/male) • Sleep disorders 	<ul style="list-style-type: none"> • By Topic: • Neuropathy • Fatigue • Anxiety and depression • Fertility preservation • Breast cancer survivorship care guideline (ACS/ASCO) 	<ul style="list-style-type: none"> • By Topic: • Holistic • Surveillance • Screening • Long-term and late effects • Health promotion • Breast (ACS/ASCO), colorectal, head and neck and prostate currently available

NCCN SURVIVORSHIP GUIDELINES 2015

- General Survivorship Principles**
- Definition of Survivorship & Standards for Survivorship Care
 - Screening for Second Cancers
 - Assessment by Health Care Provider at Regular Intervals
 - Survivorship Baseline Assessment
 - Survivorship Resources for Health Care Professional and Patients

- Late Effects/Long-term Psychosocial and Physical Problems**
- Antitumor-Induced Cardiac Toxicity
 - Anxiety and Depression
 - Cognitive Function
 - Fatigue
 - Pain
 - Sexual Function
 - Sleep Disorders


Preventive Health


- Exercise (and avoid inactivity)
- Diet
- Alcohol intake
- Smoking Cessation
- Sun Safety
- Immunizations
- Anthropometrics (weight, height, body composition)
- Followup with primary care physician regularly



REGAINING AND IMPROVING HEALTH THROUGH HEALTHY BEHAVIORS

- Healthy behaviors can improve survivor function and QoL
- Development of lifestyle guidelines for cancer survivors



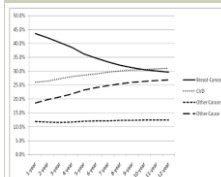
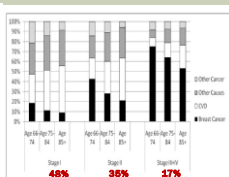


- Cancer recurrence
- Developing new cancer
- Heart disease

GUIDELINES ON NUTRITION AND PHYSICAL ACTIVITY INFLUENCED BY RISK FACTORS FOR CARDIOVASCULAR DISEASE

Cardiovascular disease competes with breast cancer as the leading cause of death of breast cancer survivors

Especially for early stage breast cancer survivors!

Based on 63,566 women aged 66 or older diagnosed with BrCa followed for median of 9 years


Patil et al., Breast Cancer Research 2011, 13:R64
Iqbal et al., JAMA 2015; 313: 165-173

1. GET TO AND STAY AT A HEALTHY WEIGHT

- Increased risk of postmenopausal breast, colon, endometrium, esophageal, kidney, and pancreatic cancer.
- Obesity increases risk of cancer recurrence
- Decreased survival rates among breast, prostate, and colon cancer survivors.
- Risk factor for developing other cancers, heart disease, osteoporosis.




WEIGHT GAIN AMONG BREAST CANCER SURVIVORS



Weight Gain after Breast Cancer
Meta-analysis of 12 studies of >23,000 women

Weight Gain	All Cause Mortality	Breast Cancer
≥ 5 % compared with maintainers	↑23%	↑17%
≥ 10% compared with maintainers		

8 lbs in 160 lb woman

Will Losing Weight after Breast Cancer Help?

ER+ Women's Intervention Nutrition (WINS) Study
↓15% Nutrition (WINS) Study
Intervention: Reduced fat intake (N=975)(6 lb weight loss)
Control: N=1462

↓24% in new BrCa events

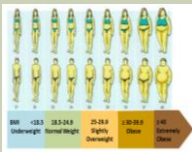
ER- ↓42% fewer recurrences or contralateral BrCa

Playdon et al., J Natl Cancer Inst 2015 Sept 30; 107(12)

DEFINITION OF OVERWEIGHT/OBESITY

Body Mass Index

- ▶ An estimate of body fat.
- ▶ Higher your BMI, the higher your risk for certain cancers, heart disease, type 2 diabetes, high blood pressure.



BMI = (Weight in Kg) / (Height in m²)

% BF Defining Obesity:
Men: ≥ 25%
Women: ≥ 35%

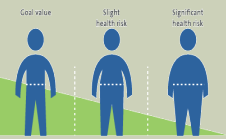
Goal

- Be as lean as possible without becoming underweight.
- **Aim to be a healthy BMI (18.5 - 24.9)**

HEALTHY WAIST CIRCUMFERENCE

- ▶ If most of **fat is around your waist rather than your hips**, individual at up to 50% higher risk of dying from any cancer.
- ▶ The **larger the waist circumference, the higher the risk of death**, regardless if the person is overweight or not.
- ▶ The association appears **strongest for those of normal weight – especially women.**

Waist Circumference (inches)



	Goal value	Slight health risk	Significant health risk
Men	<37	37-40	>40
Women	<31.5	31.5-35	>35

No risk of illness due to overweight | Avoid weight gain or lose weight | Should lose weight and seek help from health professional

WAIST TO HIP RATIO SURVIVAL

Nurse's Health Study of 44 636 women followed for 16 years

WC goal: ≤ 35 Inches
WHR goal: ≤ 0.85

Cullin Zhang et al. Circulation. 2008;117:1658-1667

2. BE PHYSICALLY ACTIVE!!

- ▶ Reduce risk of breast, colon, endometrial, and prostate cancer.
- ▶ >20 studies show lower risk of cancer recurrence and improved overall survival.
- ▶ Many studies show that being physically active improves quality of life among cancer survivors.
- ▶ Lower risk of other health problems such as heart disease, high blood pressure, diabetes, and osteoporosis.

Breast Cancer

- Lower risk of recurrence
- Lower risk of breast cancer deaths (50-63%)
- Lower risk of dying from all causes (24-67%)

Colon Cancer

- Lower risk of recurrence
- Lower risk of colon cancer deaths

BENEFITS TO CANCER SURVIVOR

- ▶ Helps prevent treatment-related weight gain
- ▶ Keep and improve physical abilities
- ▶ Improve balance and reduce risk of falls
- ▶ Reduces risk of osteoporosis
- ▶ Keep muscles from wasting away
- ▶ Reduces cancer-related fatigue (tiredness), depression, anxiety
- ▶ Improves quality of life
- ▶ Improving cancer-specific survival and all cause survival
- ▶ Lowers risk of heart disease

HOW MUCH ACTIVITY NEEDED?

- American Cancer Society Guidelines and American College of Sports Medicine encourage survivors to exercise for at least **150 minutes per week of moderate and/or vigorous activities.**



- 30 minutes 5 days/week ?
- Include strength training exercises at least 2 days per week.

EXERCISE INTENSITY



Light Activity

- Casual walking
- Light bicycling
- Light yard/house work

Moderate Activity

- Brisk walking
- Low impact aerobics
- Housework that involves scrubbing
- Swimming

Vigorous Activity

- Jogging/running
- High impact/step aerobics
- Competitive sports

WHY IS IT SO IMPORTANT TO KEEP MOVING?


- Increasingly clear that sedentary time is associated with increased risk of dying after considering the benefits of moderate-vigorous exercise.



- Among breast cancer survivors, those in the top tertile of television time have a ~2-fold increased risk of dying compared to those in the bottom third.
- After adjusting for time exercising their risk of death was still 70% higher.


Using 2007-2010 NHANES data, cancer survivors exercised more than those without cancer BUT are more likely to be sedentary!

LIVESTRONG AT THE YMCA



LIVESTRONG AT THE YMCA

- Research-based 12-week physical activity and well-being program for adult cancer survivors.
- Free to cancer survivors
- Participants work with Y staff trained in supportive cancer care to achieve goals such as:
 - Building muscle mass and strength
 - Increase flexibility and strength
 - Reduce side effects of treatment
 - Improve quality-of-life




3. EAT A VARIETY OF HEALTHY FOODS, WITH MORE FOODS FROM PLANT SOURCES

- ▶ Higher vegetable and fruit intake associated with reduced cancer risk
- ▶ Food choices may affect risk of recurrence and survival among survivors.
- ▶ Most studies in breast cancer, some for colon and prostate cancer survivors.

- Like cancer prevention, looks like it's the overall dietary pattern that is important for cancer survivorship.
- It's not one food, or even a whole group of foods that makes a difference.

It's the combination of many different nutrients – working together- that offers the best protection



BEST PROTECTION COMES FROM A DIET THAT IS:

- ▶ *High in fruits, vegetables and whole grains.
- ▶ Includes more fish and poultry instead of red and processed meats.
- ▶ Includes non-fat and low-fat instead of full-fat dairy products.
- ▶ Includes nuts and olive oils instead of less healthy sources of fat, such as butter or saturated fats found in many processed snack foods.




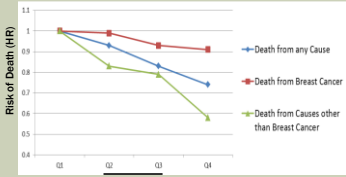
- **Prudent diet:** high in fruit and vegetables, poultry and fish.
- **Western diet:** high in meat, fat, refined grains, dessert.
- **Higher intake of western dietary pattern associated with almost 3 times greater risk of colon cancer recurrence.**



Diet Quality and Breast Cancer Survival

- ▶ High in fruits, vegetables and whole grains
- ▶ Associated with 26% reduction in overall mortality.

2,317 postmenopausal women in Women's Health Initiative study diagnosed with BrCa

Diet Quality	Death from any Cause (RR)	Death from Breast Cancer (RR)	Death from Causes other than Breast Cancer (RR)
Poor	1.00	1.00	1.00
Mixed	~0.92	~0.95	~0.82
Better	~0.74	~0.85	~0.58

Diet Quality: Healthy Eating Index-2005

George et al., Cancer Epidemiol Biomarkers Prev 23: 575-83, 2014.

FOOD AND CANCER

- Review what we have learned from research studies

RED MEAT, PROCESSED MEAT, AND CANCER MORTALITY

Study followed ~37,700 men in Health Professionals Followup Study for 22 years and ~83,600 women in Nurse's Health study

1 daily serving of unprocessed red meat

- overall mortality: ↑13%
- CVD mortality: ↑18%
- Cancer mortality: ↑10%

1 daily serving of processed meat (one hot dog, 2 slices of bacon)

- overall mortality: ↑20%
- CVD mortality: ↑24%
- Cancer mortality: ↑16%

- Compelling evidence that red meat increases colorectal cancer risk (>15 studies).
- Processed meat raises the risk of colorectal cancer twice as much as red meat.
- 3.5 oz of red meat per day increases colorectal cancer risk by 47%
- 3.5 oz of processed meat increased colorectal cancer risk by 36%

EAT 2½ CUPS OR MORE OF VEGETABLES AND FRUITS EACH DAY

- Include vegetables and fruits at every meal, and eat them for snacks.
- Eat a variety of vegetables and fruits each day.
- Choose whole fruits and vegetables, and 100% juice.
- Limit use of creamy sauces, dressings, and dips with fruit and vegetables.



CHOOSE MORE WHOLE-GRAIN FOODS

- Choose whole-grain foods such as whole-grain breads, pasta, and cereals (such as barley, oats, quinoa)
- Brown rice over white rice
- Breads, cereals and pasta made from whole grains
- Limit refined carbohydrate foods, such as pastries, candy, other high-sugar foods

Examples of one serving of whole-grains:



CHOOSE HEALTHIER FATS

Unhealthy ↑
↓ Healthier

Saturated

- From animals
- Increased breast and prostate cancer mortality and overall mortality.



Dietary Fats

Trans Fats

- Mostly in processed foods.
- Increased breast and prostate risk and cancer mortality and overall mortality.



Polyunsaturated

- Plant-based oils.
- Omega-3 fatty acids found in fatty fish especially beneficial.
- Lower overall mortality among breast and prostate cancer survivors.



Monounsaturated

- Olive oil, avocados, nuts
- Lower risk of BRCs and of recurrence.



LIMIT ALCOHOL

- Alcohol consumption increases risk of breast, head and neck, esophageal, breast, colorectal, and liver cancer.
- Even small amounts of drinking increases the risk of developing cancer, and increases with the amount of alcohol consumed.
- Men ≤ 2 drinks per day; women ≤ 1 drink per day



Alcohol and Breast Cancer Survival

- A few studies to date
- Half link alcohol to worse outcomes
- Half show no harm or benefit.

SMOKING CESSATION

- From 2003 to 2012, 35% of young cancer survivors ages 18 to 44 continue to smoke compared to 23% in the general population.
- Even up to 9 years post diagnosis, 10% of survivors still smoke.
- Smoking can interfere with cancer treatment
- Increases risk for 12 different cancer types, heart disease, and many other chronic health conditions.
- Cessation efforts most successful soon after diagnosis.

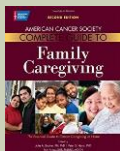
Roswell Park Just Breathe Program

- Free cessation program
- Individualized quit plans
- Behavioral counseling
- Cessation support
- Assistance to accessing pharmacotherapy



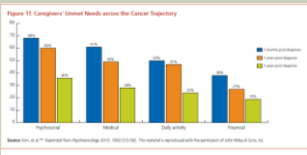
CONCERNS OF CAREGIVERS AND FAMILIES

- 7% of general population is a family caregiver of a loved one with cancer.
- 4 million caregivers for adult cancer patients (spouse, children, more likely to be women)
- Responsibilities
 - Information gathering to advise treatment decisions
 - Attending to treatment side-effects
 - Coordinating medical care
 - Managing financial issues
 - Providing emotional support
- More than one year after dx, caregivers spend an average of 8 hours per day providing care, with highest time costs for lung cancer patients.



CONCERNS OF CAREGIVERS AND FAMILIES

- Caregivers can feel unprepared and overwhelmed.
- Can result in deterioration of mental and physical health and QoL, including feelings of social isolation.
- Stressed caregivers more likely to develop heart disease, arthritis, chronic back pain.
- Social support teaching effective coping skills can help to maintain, protect, or improve health among caregivers.



- Psychosocial: ability to help cancer survivor deal with emotional distress and find meaning in cancer experience.
- Medical needs: obtaining information about cancer, its treatment, side effects, providing care for survivor.
- Issues with caregiver's daily life include ability to balance personal care with caregiving.

NATIONAL CANCER SURVIVORSHIP RESOURCE CENTER

- A collaboration between the ACS, the George Washington University Cancer Institute, the Centers for Disease Control and Prevention, funded by Centers for Disease Control and Prevention. (www.cancer.org/survivorshipcenter)
- Goal is to shape future of posttreatment cancer survivorship care and to improve QoL of cancer survivors.
- Tools for cancer survivors and caregivers
 - Life after treatment guide
- Tools for health care professionals
 - Adult Posttreatment Cancer Survivorship Care Guidelines
 - Guide for Delivering Survivorship Care
 - Cancer Survivorship E-learning Series for Primary Care Providers
 - Smartphone App to house content from breast, colorectal, head and neck, and prostate cancer survivorship care guidelines.
- Tool for cancer advocates and policy makers
 - Cancer Survivorship: A policy Landscape Analysis – a white paper designed to educate policy makers on survivorship issues and describe priority areas for improving survivorship care.

NCI OFFICE OF CANCER SURVIVORSHIP (1996)

Julia Rowland, Director of the Office of Cancer Survivorship, discusses history and impact of the Imperatives document, progress in cancer survivorship in last 20 years, and current challenges.

1. A History of the Imperatives Document (1995)

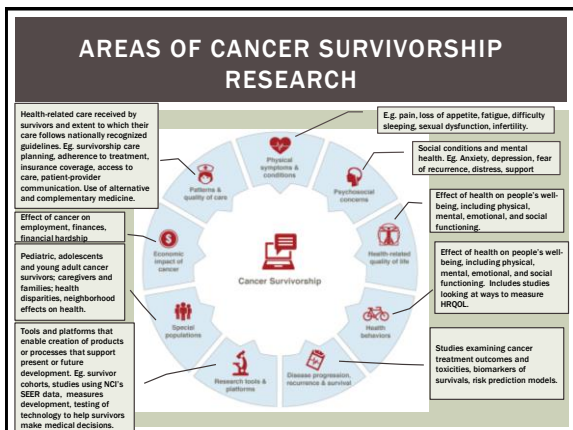
<https://www.youtube.com/watch?v=pPuyo13iKY4>

2. How focusing on survivorship has changed cancer care

<https://www.youtube.com/watch?v=bDFkhqB6EQA>

3. Survivorship Moving Forward, New Challenges

https://www.youtube.com/watch?v=UZaE0qI_gFg



ONCOLOGY FOR SCIENTISTS

Contact Information

Chi-Chen Hong, PhD
 Department of Cancer Prevention and Control
 Email: Chi-Chen.Hong@Roswellpark.org
 Tel: 845-7785
