Diet and Cancer: Prevention, Treatment and Survival
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Educational Series
Disclosure

All Faculty, CME Planning Committee Members, and the CME Office Reviewer have disclosed that they have no financial relationships with commercial interests that would constitute a conflict of interest concerning this CME activity.
**Estimated New Cancer Cases* in the US in 2014**

<table>
<thead>
<tr>
<th></th>
<th>Men 855,220</th>
<th>Women 810,320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>27%</td>
<td>29%</td>
</tr>
<tr>
<td>Lung &amp; bronchus</td>
<td>14%</td>
<td>13%</td>
</tr>
<tr>
<td>Colon &amp; rectum</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>Melanoma of skin</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Kidney &amp; renal pelvis</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Non-Hodgkin lymphoma</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Oral cavity &amp; pharynx</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Leukemia</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Liver &amp; intrahepatic bile duct</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>All other sites</td>
<td>20%</td>
<td>21%</td>
</tr>
</tbody>
</table>

*Excludes basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.*
*Age-adjusted to the 2000 US standard population.
Source: National Center for Health Statistics, Centers for Disease Control and Prevention, 2013.
Trends in Cancer Death Rates* Among Women, US, 1930-2010

*Age-adjusted to the 2000 US standard population.
Source: National Center for Health Statistics, Centers for Disease Control and Prevention, 2013.
Cancer Prevention
Nutrition and Physical Activity Cancer Prevention Guidelines, Cancer Risk, and Mortality in the Women's Health Initiative

_Cancer Prevention Research Research_, January, 2014

Cynthia A. Thomson, Marjorie L. McCullough, Betsy C. Wertheim, Rowan T. Chlebowski, Maria Elena Martinez, Marcia L. Stefanick, Thomas E. Rohan, JoAnn E. Manson, Hilary A. Tindle, Judith Ockene, Mara Z. Vitolins, Jean Wactawski-Wende, Gloria E. Sarto, Dorothy S. Lane, and Marian L. Neuhouser
Women’s Health Initiative

- Hormone Therapy: 27,347
- Diet Modification: 48,835
- Calcium/Vit D: 36,382
- Observational Study: 93,676
Compelling Question(s)…

• If a woman adheres to the American Cancer Society Guidelines for Cancer Prevention will she really experience a lower risk for cancer?
• Regardless of race/ethnicity?
• What about lower mortality?
Evidence to date...

• Iowa Women’s Study showed a 35% greater risk for cancer in women who did not adhere to AICR dietary guidelines (95% CI, 1.15-1.58) (Cerhan, CEBP, 2004)

• EPIC, 34,000+ males and females, 18% lower total cancer risk with adherence to AICR/WCRF diet/activity guidelines (Romaguera, AJCN, 2012)

• Cancer Prevention Study II in adults suggested a 30% lower cancer mortality in adults who reporting higher adherence to ACS Guidelines (McCullough, CEBP, 2011)
WHI ANALYTICAL CONSORT  93,676

12827 w/ cancer history or unknown cancer history

2956 w, death or cancer within 2 years of study enrollment

9868 with BMI < 18.5 or unknown or unreliable BMI history

5403 missing exposure data (diet, activity, etc)

473 missing health status data

6786 missing covariate data

Final analytical cohort 65838
<table>
<thead>
<tr>
<th>ACS recommend</th>
<th>Worst score (0)</th>
<th>Mid score (1)</th>
<th>Best score (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain a healthy weight throughout life</td>
<td>BMI at age 18y and enrollment of &gt;30</td>
<td>BMI at age 18 y and enrollment of &gt; 25-29.9 kg/m²</td>
<td>BMI at age 18y and enrollment of &lt; 25</td>
</tr>
<tr>
<td>Adopt a physically active lifestyle</td>
<td>&lt;8.75 MET-hr/week</td>
<td>8.75-17.5 MET-hr/week</td>
<td>&gt; 17.5 MET-hr/week</td>
</tr>
<tr>
<td>Consume a healthy diet with emphasis on plant sources</td>
<td>0-2 diet points</td>
<td>3-6 diet points</td>
<td>7-9 diet points</td>
</tr>
<tr>
<td>If you drink, limit consumption to &lt; 1 drink/day</td>
<td>&gt; 1 drink/day</td>
<td>&gt;0-≤ 1 drink/day*</td>
<td>Nondrinker at enrollment</td>
</tr>
</tbody>
</table>

Modified for breast cancer for < 1 drink/d for best score
ACS Scoring: consume a healthy diet with emphasis on plant sources

- Eat 5 or more servings of a variety of vegetables and fruits daily
- Choose whole grains in preference to refined (processed)
- Limit consumption of processed and red meats
Higher Scores were associated with...

- Older age in years
- Higher education
- Lower BMI at age 18 and at study enrollment
- Multivitamin use (no association with cancer risk in WHI)
- Non-smoking status
- Family history of cancer

82% reported weight gain after age 18 y
Findings: Cancer Risk

- Higher score (more adherent) as compared to lower score (less adherent) with lifestyle behaviors:
  - 17% lower risk for any cancer (HR-0.83; 0.75-0.82)
  - 22% lower risk for breast cancer (HR- 0.78;0.67-0.92)
  - 52% lower risk for colorectal cancer (HR-0.48; 0.32-0.73)
  - 27% lower risk for endometrial cancer (HR-0.73; 0.49-1.09)
  - No association with ovarian, lung
What about Mortality?

- Death from any cause:
  - 27% lower risk (HR-0.73; 0.68-0.78)
- Cancer-related death (HR-0.80; 0.71-0.90)
  - 20% lower risk
- Death from breast cancer
  - 33% lower risk (HR-0.67; 0.43-1.03)
- Death from colorectal cancer
  - 61% lower risk (HR-0.39; 0.24-0.63)
Race/Ethnic Differences

- Hispanics 47% lower cancer risk; blacks 33% lower risk with higher ACS score as compared to 12% in NHW
  - Despite having lower cancer rates
- All-cause mortality: Hispanics 44%; blacks 39% lower risk; 27% in NHW
- No significant association with cancer-specific mortality by race/ethnicity
Individual score components had limited association with cancer risk and mortality

- Breast cancer incidence lower with alcohol avoidance, BMI < 25 kg/m²
- Colorectal cancer incidence lower with BMI < 25 and > physical activity
- PA was inversely associated with all-cause mortality
Some Vegetables May be Better than Others

- Green leafy
- Cruciferous
- High carotenoid
- Allium
Eat a Variety of Grains
Limit Alcohol

- Low nutrient calories
- Concentrated calories
- Commonly consumed with less healthy foods
- May contribute to folate insufficiency; increase risk?
- Binge drinking > risk than small amounts in a single day (3 x/week)
Don’t Forget the Spices

- Onion and garlic
- Wasabi and horseradish
- Turmeric
- Oregano
- Citrus zest
- Capsaicin /chili peppers
- Rosemary
Eat Food, Not Supplements

- Food is complex matrix of compounds that likely provide a more optimal exposure for risk reduction
- Generally the supplement trials for cancer prevention have failed
- Dietary supplements should *supplement* healthy diet
- Those that are commonly required to meet requirements:
  - Calcium in women
  - Folic acid in fertile women
  - Vitamin D in at-risk individuals
  - Omega 3 fatty acids
Cancer Survival

Total Number of Cancer Deaths Averted from 1991 to 2010 in Men and 1992 to 2010 in Women

The blue line represents the actual number of cancer deaths recorded in each year, and the red line represents the number of cancer deaths that would have been expected if cancer death rates had remained at their peak.
## Five-year Relative Cancer Survival Rates (%) by Race, 2003-2009

<table>
<thead>
<tr>
<th>Site</th>
<th>White</th>
<th>Black</th>
<th>Absolute Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Sites</td>
<td>67</td>
<td>59</td>
<td>8</td>
</tr>
<tr>
<td>Breast (female)</td>
<td>90</td>
<td>79</td>
<td>11</td>
</tr>
<tr>
<td>Colon</td>
<td>65</td>
<td>56</td>
<td>9</td>
</tr>
<tr>
<td>Esophagus</td>
<td>18</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Leukemia</td>
<td>56</td>
<td>50</td>
<td>6</td>
</tr>
<tr>
<td>Non-Hodgkin lymphoma</td>
<td>70</td>
<td>62</td>
<td>8</td>
</tr>
<tr>
<td>Oral cavity &amp; pharynx</td>
<td>64</td>
<td>43</td>
<td>21</td>
</tr>
<tr>
<td>Prostate</td>
<td>100*</td>
<td>97</td>
<td>3</td>
</tr>
<tr>
<td>Rectum</td>
<td>67</td>
<td>61</td>
<td>6</td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>78</td>
<td>65</td>
<td>13</td>
</tr>
<tr>
<td>Uterine cervix</td>
<td>69</td>
<td>59</td>
<td>10</td>
</tr>
<tr>
<td>Uterine corpus</td>
<td>84</td>
<td>61</td>
<td>23</td>
</tr>
</tbody>
</table>

5-year relative survival rates based on patients diagnosed in the SEER 18 areas from 2003 to 2009, all followed through 2010.

*99.5%

Source: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2013.
Estimated number of cancer survivors, by cancer site
ACS Diet & Physical Activity Survivorship Guidelines

- Maintain a healthy weight throughout lifespan
  - Avoid periods of weight gain
  - If overweight or obese, achieve a healthy body weight
- Adopt a physically active lifestyle
  - 45 to 60 minutes of intentional activity
- Consume a healthy diet with emphasis on plant sources
  - Balance energy intake with output
  - 5 or more servings of vegetables and fruit
  - Whole grains
  - Avoid processed meats  

ACS, Rock CL, et al., 2012
Women who enrolled in the study were randomly assigned to one of two healthy cancer prevention diets.

**WHEL Diet**

Healthy cancer prevention diet

**NCI-Based Diet**

Healthy cancer prevention diet
Change in Serum Hormones Versus Change in Fiber Intake

<table>
<thead>
<tr>
<th>Fiber Change at 1 Year</th>
<th>Estrone</th>
<th>Total Estradiol</th>
<th>Bioavailable Estradiol</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;8g/1000 kcal/day</td>
<td>-12</td>
<td>-29</td>
<td>-12</td>
</tr>
<tr>
<td>&gt;8g/1000 kcal/day</td>
<td>-57</td>
<td>-117</td>
<td>-32</td>
</tr>
</tbody>
</table>

Cox Proportional Hazards Model: Breast Cancer Endpoint

<table>
<thead>
<tr>
<th>Variable</th>
<th>HR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I (Reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage II</td>
<td>2.77</td>
<td>(1.89, 4.06)</td>
</tr>
<tr>
<td>Stage IIIA</td>
<td>5.31</td>
<td>(3.01, 9.34)</td>
</tr>
<tr>
<td>No tamoxifen (Reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any tamoxifen</td>
<td>0.69</td>
<td>(0.49, 0.97)</td>
</tr>
<tr>
<td>Plasma carotenoids Q1 (Reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carotenoids Q2</td>
<td>0.68</td>
<td>(0.45, 1.01)</td>
</tr>
<tr>
<td>Carotenoids Q3</td>
<td>0.69</td>
<td>(0.45, 1.04)</td>
</tr>
<tr>
<td>Carotenoids Q4</td>
<td>0.57</td>
<td>(0.37, 0.88)</td>
</tr>
</tbody>
</table>

Higher carotenoids (vegetables/fruit) associated with a 43% lower risk for breast cancer recurrence

* Controlled for age at diagnosis, clinical center, plasma cholesterol, BMI, tumor hormone receptor status, and adjuvant chemotherapy.
Carrot Juice Study

- Objective: to determine if intake of 8 ounces fresh carrot juice daily significantly increases total carotenoid levels to levels previously associated with reduced risk for recurrent disease
- Design: Randomized, 3 week feeding trial
- 68 overweight breast cancer survivors
Protective concentration of carotenoids achieved in 3 weeks
Ovarian cancer diagnoses; successful first line treatment ± consolidation
≥ 6 week to ≤ 4 months
Post-treatment

Stratify:
1. Consolidation therapy
2. Cancer stage

RANDOMIZE

1:1

LIFESTYLE INTERVENTION

20% total energy as dietary fat, > 6 colorful vegetable & fruit servings + 4000 additional steps daily

24 month Follow-up Progression-free survival

COMPARISON
General Health Education

ARIZONA TELEMEDICINE PROGRAM
### Healthy Eating Index and Ovarian Cancer Survival

<table>
<thead>
<tr>
<th>HEI score</th>
<th>n deaths (%)</th>
<th>All-cause mortality HR (95% CI)*</th>
<th>Ovarian cancer-specific mortality HR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEI total score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertile 1 (≤ 66.0)</td>
<td>130 (61.3)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Tertile 2</td>
<td>110 (51.9)</td>
<td>0.71 (0.54–0.92)</td>
<td>0.68 (0.51–0.91)</td>
</tr>
<tr>
<td>Tertile 3 (≥ 74.3)</td>
<td>114 (53.8)</td>
<td>0.73 (0.55–0.97)</td>
<td>0.75 (0.55–1.01)</td>
</tr>
<tr>
<td>P trend</td>
<td></td>
<td>0.028</td>
<td>0.054</td>
</tr>
</tbody>
</table>
HEI and Lower Mortality after Ovarian Cancer by WC, Diabetes and Physical Activity
Obesity and Cancer

• Obesity associated with:
  • Post-menopausal breast, endometrial/uterine, pancreatic, colorectal, gallbladder, esophageal and ovarian cancers

• Prognosis?
  • Inconsistent
  • Dependent on co-morbidity
  • Overweight/obesity may increase survival in those likely to experience repeat treatment of recurrent disease (ovarian)
Medical Complications of Obesity

**Pulmonary disease**
- abnormal function
- obstructive sleep apnea
- hypoventilation syndrome

**Nonalcoholic fatty liver disease**
- steatosis
- steatohepatitis
- cirrhosis

**Gallbladder disease**

**Gynecologic abnormalities**
- abnormal menses
- infertility
- polycystic ovarian syndrome

**Osteoarthritis**

**Gout**

**Cancer**
- breast, uterus, cervix
- colon, esophagus, pancreas
- kidney, prostate

**Phlebitis**
- venous stasis

**Coronary heart disease**

**Diabetes**

**Dyslipidemia**

**Hypertension**

**Idiopathic intracranial hypertension**

**Stroke**

**Cataracts**

**Severe pancreatitis**

**Slide source:** www.obesityonline.org
Weight Loss Corrects Metabolic Disturbance in Cancer Survivors

Also demonstrated significant improvements in CRP, lipids, insulin and glucose

Thomson CA, J Women’s Health, 2009
Obesity and Chronic Inflammation

Metabolic
Nutrients
Adipocyte
Originates from and orchestrated by the metabolic cell

Moderate
JNK
IKK
PKR
TNF-α
IL-1β
CCL2
Metabolic signals engage inflammatory pathways that mediate a modest, low-level induction of inflammatory cytokines

Modified milieu
JNK
IKK
PKR
TNF-α
IL-1β
CCL2
Macrophage
T cell
Mast cell
Reconstruction of the metabolic tissue milieu including immune cell infiltration results in proinflammatory changes in the tissue environment

Maintained
JNK
IKK
PKR
TNF-α
IL-1β
CCL2
Inflammatory state is chronic and unresolved

Gregor MF, Hotamisligil GS. 2011.
Annu. Rev. Immunol. 29:415–45
# Obesity-Associated Biomarkers of Cancer Risk and Recurrence

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin</td>
<td>Growth-promotion/ cell division, anti-apoptotic</td>
</tr>
<tr>
<td>IGF-1 and IGF-BP-1</td>
<td>Increased cell migration, prolonged elevated insulin, potentiates growth factors</td>
</tr>
<tr>
<td>C-reactive protein (CRP)</td>
<td>Inflammation, may correlate with estradiol</td>
</tr>
<tr>
<td>Interleukin 6</td>
<td>Inflammation, growth and differentiation of malignant cells</td>
</tr>
<tr>
<td>Tumor necrosis factor alpha</td>
<td>Inflammation, associated with insulin resistance</td>
</tr>
<tr>
<td>Serum amyloid A (SAA)</td>
<td>Low-grade chronic inflammation; assoc with reduced survival in breast cancer</td>
</tr>
</tbody>
</table>
## Obesity-associated Co-Morbidities and Breast Cancer Survival

**Women’s Healthy Eating and Living Study**

<table>
<thead>
<tr>
<th>Disease</th>
<th>HR BrCancer</th>
<th>HR Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVD</td>
<td>1.11 (0.74-1.67)</td>
<td>1.13 (0.69-1.86)</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td><strong>2.06 (1.25-3.41)</strong></td>
<td><strong>2.50 (1.42-4.39)</strong></td>
</tr>
<tr>
<td>HTN</td>
<td>1.04 (0.78-1.39)</td>
<td>1.23 (0.88-1.72)</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>0.74 (0.43-1.26)</td>
<td>0.37 (0.15-0.90)</td>
</tr>
</tbody>
</table>

> 3 co-morbidities | 2.09 (1.32-3.29)
Interventions for Weight Control
Post-Diagnosis

• No evidence of survival benefit demonstrated to date
  • Trials underway: ENERGY, LEAN, etc.
• Weight loss diets will “correct” metabolic and inflammatory abnormalities
  • Trials with: RD counseling, Weight Watchers, Curves, etc
  • May reduce risk co-morbidities associated with poorer prognosis
• Diet-induced weight loss reduces lean mass and bone;
  • Physical activity, including strength training, should be considered in weight loss plans
  • Must address whole person
Promoting Healthy Weight in Survivors

- Read labels
- Write down what you eat
- Weigh regularly
- Walk daily
- Set goals
- Work with others
- Control portions
- Make healthy food choices
Self-monitoring

- Daily weight
- Food diary
- Step counter (pedometer)
  - >10,000/day
- Fat grams
  - 40-50 gms/d
  - Vegetables 5 or more serving/day
  - Fruit 2 serving/day

http://www.choosemyplate.gov
Lifestyle Targets for Health in Survivors

Surgery/Chemotherapy/Radiation/Hormone therapies

↓ Hormones and activity

↓ Muscle Mass

↓ Metabolic Rate

↓ Energy Needs

Fatigue

Menopause/hormone suppressive therapy

↓ Weight Gain, Reduced physical function, Co-morbidity

Lifestyle Interventions
diet, physical activity, weight, sleep, etc.

Reversal or Primary prevention
Improved QOL, Survival

Poor Sleep

Reduced QOL, Increased Mortality
Role of Healthcare Providers

- ACS Guidelines, 2011
  - Promote weight control
  - Plant-rich diet
  - Physical activity > 30 minutes daily
  - Limit alcohol
  - Avoid energy-dense foods; sweetened beverages
- Lifestyle modification counseling and support
- Tailored to individual patient, prognosis and time-course of disease
IOM Report, 2012

• Committee charged with examining the nonfatal burden of chronic disease and the implications for population-based public health action

• Examples: arthritis, dementia, mental illness, diabetes, neurological conditions, chronic lung disease

• Advised to focus less on common high mortality diseases
## Is Cancer a Chronic Illness?

<table>
<thead>
<tr>
<th>Stage</th>
<th>Chronicity</th>
<th>Symptoms</th>
<th>Functional impairment</th>
<th>Self-management burden</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>Chronic with episodic flares</td>
<td>Minimal between flares</td>
<td>Low</td>
<td>Variable</td>
<td>Asthma, mild arthritis</td>
</tr>
<tr>
<td></td>
<td>Chronic</td>
<td>Mild</td>
<td>Low</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chronic</td>
<td>Mild</td>
<td>Low</td>
<td>High</td>
<td>Complicated diabetes</td>
</tr>
<tr>
<td>Moderate</td>
<td>Chronic, episodic flares</td>
<td>Mild btw flares, mod-severe during flares</td>
<td>Moderate</td>
<td>Moderate</td>
<td>COPD, depression, migraine</td>
</tr>
<tr>
<td></td>
<td>Chronic, quiescent</td>
<td>None-moderate</td>
<td>Low</td>
<td>Low</td>
<td>Early breast cancer</td>
</tr>
<tr>
<td></td>
<td>Chronic, stable</td>
<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
<td>Complicated diabetes</td>
</tr>
<tr>
<td></td>
<td>Chronic progressive</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Severe OA, hearing impairment</td>
</tr>
</tbody>
</table>
Prospective Surveillance

Oncology / Primary care clinic prospective surveillance of clinical morbidities

Pt needs referral

Evaluation by RD, PT, OT, exercise physiologist, or rehab MD

Pt needs/receives treatment

Pt doesn’t need referral

Pt doesn’t need treatment

Referred to cancer survivorship lifestyle program

Patient education & progress in supervised setting on individual basis, according to treatment response

New sx develop requiring eval

Graduate to community based program
Chronic Disease Self-Management

- Developed by Stanford University:
  - Small groups, 2.5 hour weekly workshops for 6 weeks

1. Techniques to deal with problems such as frustration, fatigue, pain and isolation
2. Appropriate exercise for maintaining and improving strength, flexibility, and endurance
3. Nutrition
4. Appropriate use of medications
5. Communicating effectively with family, friends, and health professionals
6. Decision making
7. How to evaluate new treatments
Self-management for Cancer Survivors

- Online program for cancer survivors - Cancer: Thriving and Surviving
  - 6 week, asynchronous online workshop, approximately 25 participants each
  - Emphasizes self-efficacy, and self-tailoring
  - Facilitated by two trained cancer survivors
  - Participants expected to log in 2x/week, total of 2-3 hours/week
  - Self-management content, bulletin board discussions, interactive self-management tools
  - Previous studies showed benefits
    - Macmillan Cancer Support: increases in strenuous aerobic exercise and improvements in fatigue, illness intrusiveness, depression, impact of events, insomnia, stress, sleep problems, and QOL
    - RCT by U of Hawaii and Stanford University – changes in insomnia, aerobic exercise, other exercise, and communication with physician

- ACS conducting a pilot of Cancer: Thriving and Surviving
  - Assessing feasibility of offering through ACS volunteer structure, also affects on cost (care utilization, employment, absenteeism)
  - Comparing to wait list control group in 600 post treatment cancer survivors
Resources: Diet and Cancer

• Academy of Nutrition and Dietetics – Oncology Dietetics Practice group: www.oncologynutrition.org
• American Cancer Society Guide: www.cancer.org
• American Institute for Cancer research: www.AICR.org
• Center for Disease Control and Prevention http://www.cdc.gov/cancer/survivorship/
• Marian M and Roberts S. Clinical Nutrition for Oncology Patients, Jones & Bartlett, 2010
• The University of Arizona College of Nursing’s Community Cancer Connections Projects www.linkin.nursing.arizona.edu
Summary

• Cancer is preventable with healthy diet; best when combined with physical activity and weight control
• Cancer treatment is associated with significant health problems/concerns, both short and long-term
  • Dietary interventions during treatment are limited but suggest improved health outcomes with protein supplementation
• People survive cancer, but that does not alleviate the need for medical nutrition therapy