Screening Guidelines for Malignancy

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Identify patient population to be screened …

- **General population**
- **Cancer survivors**

- **Who** should be screened cancer ?
- **Which cancers** should be screened ?
- **Who (which clinician)** screens patients ?

Cancer Screening in the General Population

- **Important Factors**
  - Anticipated survival
  - Risk factors for developing cancer
    - *Genetic predisposition, exposures (i.e. tobacco), age*
  - Risks from cancer work-up
    - which may have been unnecessary; i.e. false +

Important Factors for Screening

- **General population**
  - Anticipated survival
  - Risk factors for developing cancer
    - *Genetic predisposition, exposures (i.e. tobacco), age*
  - Risks from cancer work-up

- **Cancer survivors**
  - All of the above, but more complicated …

Cancer Screening

- **General population**
  - Anticipated survival
  - Risk factors for developing cancer
    - *Genetic predisposition, exposures (i.e. tobacco), age*
  - Risks cancer work-up

- **Cancer survivors**
  - *Screen for recurrence of cancer*
  - *Screen for 2nd primary cancers*

Which cancers do we screen for in general population?

- **Breast cancer**
  - physical/self exam, mammography, US, MRI
- **Prostate cancer**
  - DRE, PSA
- **Lung cancer**
  - sputum, CXR, low dose CT
- **Colorectal cancer**
  - DRE, occult fecal blood, colonoscopy/sigmoidoscopy
- **Cervical and uterine cancer**
  - Pap smear
- **Gastric cancer**
  - upper endoscopy, contrast radiography

Which cancers do we screen for in general population?

- **Breast cancer**
  - physical/self exam, **mammography**, US, MRI
- **Prostate cancer**
  - **DRE, PSA**
- **Lung cancer**
  - ~~sputum~~, ~~CXR~~, **low dose CT**
- **Colorectal cancer**
  - **DRE, occult fecal blood, colonoscopy / sigmoidoscopy**
- **Cervical and uterine cancer**
  - **Pap smear**
- ***Gastric cancer*** *(in Japan)*
  - ***upper endoscopy****, contrast radiography*

Which cancers do we screen for in general population?

- **Testicular cancer**
  - physical/self exam
- **Thyroid cancer**
  - physical exam
- **Bladder cancer**
  - UA
- **Leukemia**
  - CBC
- **Liver cancer**
  - LFTs, AFP, US
- **Skin cancer**
  - physical/self exam


OVERLOAD!

Rely on the experts

But who ?

- **American College of Physicians**
  - breast, prostate, colorectal, cervical, endometrial, ovarian
- **CMS (Medicare/Medicaid) $**
- **American Academy of Family Physicians**
  - *compiles other society's screening recommendations*
- **American Medical Association (AMA)**
  - breast, cervical, colorectal, prostate, skin
- **American Cancer Society (ACS)**
  - breast, colorectal, cervical, endometrial, lung, prostate, testicular
- **US Preventive Services Task Force (USPSTF)**
  - bladder, breast, colorectal, gynecologic, lung, oral, ovarian, pancreatic, prostate, skin, testicular, thyroid
- **National Institutes of Health/National Cancer Institute (NIH/NCI) PDQ®**
  - bladder, breast, cervical, colorectal, endometrial, esophageal, liver, lung, neuroblastoma, oral cavity/oropharynx, ovarian, prostate, skin, stomach, testicular
- **National Comprehensive Cancer Network (NCCN)**
  - breast, colorectal, lung and prostate
- **Subspecialty Societies**
  - American Urological Association (AUA)
  - American Gastroenterologic Association (AGA)
  - American College of Obstetricians and Gynecologists (ACOG)
  - American College of Radiology (ACR)
  - American Geriatrics Society (AGS)
- **Published expert reviews**

But who ?

Subspecialty societies may have inherent biases

Don’t order the French fries …

or the chicken nuggets.

But who ?

- **American College of Physicians**
  breast, prostate, colorectal, cervical, endometrial, ovarian

  https://www.acponline.org/clinical_information/guidelines/guidance/

Colorectal cancer

Guidance Statement 1: ACP recommends that clinicians perform individualized assessment of risk for colorectal cancer in all adults.
Guidance Statement 2: ACP recommends that clinicians screen for colorectal cancer in average-risk adults starting at the age of 50 years and in high-risk adults starting at the age of 40 years or 10 years younger than the age at which the youngest affected relative was diagnosed with colorectal cancer.
Guidance Statement 3: ACP recommends using a stool-based test, flexible sigmoidoscopy, or optical colonoscopy as a screening test in patients who are at average risk. ACP recommends using optical colonoscopy as a screening test in patients who are at high risk. Clinicians should select the test based on the benefits and harms of the screening test, availability of the screening test, and patient preferences.
Guidance Statement 4: ACP recommends that clinicians stop screening for colorectal cancer in adults over the age of 75 years or in adults with a life expectancy of less than 10 years.

Qaseem A et al. Screening for Colorectal Cancer: A Guidance Statement From the American College of Physicians. Ann Intern Med. 2012;156:378-386.

Colorectal cancer

Guidance Statement 1: ACP recommends that clinicians perform **individualized assessment of risk** for colorectal cancer in all adults.

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Qaseem A et al. Screening for Colorectal Cancer: A Guidance Statement From the American College of Physicians. Ann Intern Med. 2012;156:378-386.

Colorectal cancer

Guidance Statement 1: **individualized assessment of risk**

Guidance Statement 2: screen **average-risk adults starting at age 50**
screen **high-risk adults starting at age 40, *or***
10 years younger than age which
youngest affected relative was diagnosed

Guidance Statement 3: **Clinicians should select the** [best] **test**

Guidance Statement 4: **stop screening in those >75 years,**
[or limited] life expectancy

Qaseem A et al. Screening for Colorectal Cancer: A Guidance Statement From the American College of Physicians. Ann Intern Med. 2012;156:378-386.

Colorectal cancer: 2015

Table 1. High- and Low-Value Screening Strategies for 5 Types of Cancer*

Cancer Type	Least Intensive Recommended Cancer Screening Strategies (High Value)	Cancer Screening Strategies That Are Not Recommended (Low Value)
Colorectal	Adults aged 50–75 y: Encourage 1 of the 4 following strategies: High-sensitivity FOBT or FIT (every year); sigmoidoscopy (every 5 y); combined high-sensitivity FOBT or FIT (every 3 y) plus sigmoidoscopy (every 5 y); or optical colonoscopy (every 10 y)	Adults aged <50 y or >75 y or adults of any age not in good health and with a life expectancy <10 y: Any screening Adults aged 50–74 y: Repeated colonoscopy more frequently than every 10 y or flexible sigmoidoscopy every 5 y if results of previous colonic examination were normal (i.e., without adenomatous polyps) Any age: Interval fecal testing in adults having 10-y screening colonoscopy or more frequently than biennially in adults having 5-y screening flexible sigmoidoscopy

CA-125 = cancer antigen 125; FIT = fecal immunofluorescence testing; FOBT = fecal occult blood testing; HPV = human papillomavirus; MRI = magnetic resonance imaging; PSA = prostate-specific antigen; TVUS = transvaginal ultrasonography.

Wilt TJ et al. Screening for Cancer: Advice for High-Value Care From the American College of Physicians. Ann Intern Med. 2015;162:718-725.

Prostate cancer

Guidance Statement 1: ACP recommends that clinicians inform men between the age of 50 and 69 years about the limited potential benefits and substantial harms of screening for prostate cancer. ACP recommends that clinicians base the decision to screen for prostate cancer using the prostate-specific antigen test on the risk for prostate cancer, a discussion of the benefits and harms of screening, the patient's general health and life expectancy, and patient preferences. ACP recommends that clinicians should not screen for prostate cancer using the prostate-specific antigen test in patients who do not express a clear preference for screening.

Guidance Statement 2: ACP recommends that clinicians should not screen for prostate cancer using the prostate-specific antigen test in average-risk men under the age of 50 years, men over the age of 69 years, or men with a life expectancy of less than 10 to 15 years.

Qaseem A et al. Screening for Prostate Cancer: A Guidance Statement From the Clinical Guidelines Committee of the American College of Physicians. Ann Intern Med. 2013;158:761-769.

Prostate cancer

Guidance Statement 1: ACP recommends that clinicians **inform men** between the **age of 50 and 69** years **about the limited potential benefits and substantial harms of screening** for prostate cancer. ACP recommends that clinicians base the decision to screen for prostate cancer using the prostate-specific antigen test on the risk for prostate cancer, a discussion of the benefits and harms of screening, the patient's general health and life expectancy, and patient preferences. ACP recommends that clinicians should not screen for prostate cancer using the prostate-specific antigen test in patients who do not express a clear preference for screening.

Guidance Statement 2: ACP recommends that clinicians **should not screen** for prostate cancer using the prostate-specific antigen test in **average-risk men under the age of 50** years, men **over the age of 69** years, or men with a **life expectancy of less than 10 to 15 years**.

Qaseem A et al. Screening for Prostate Cancer: A Guidance Statement From the Clinical Guidelines Committee of the American College of Physicians. Ann Intern Med. 2013;158:761-769.

Prostate cancer

Guidance Statement 1: **inform men age 50-69 about limited potential benefits and substantial harms of screening**

Guidance Statement 2: **should not screen average-risk men under 50, over the age of 69, [or limited] life expectancy**

Qaseem A et al. Screening for Prostate Cancer: A Guidance Statement From the Clinical Guidelines Committee of the American College of Physicians. Ann Intern Med. 2013;158:761-769.

Prostate cancer: 2015

Table 1. High- and Low-Value Screening Strategies for 5 Types of Cancer*

Cancer Type	Least Intensive Recommended Cancer Screening Strategies (High Value)	Cancer Screening Strategies That Are Not Recommended (Low Value)
Prostate	Men aged 50–69 y: Discuss benefits and harms of screening with men who inquire about PSA-based screening and are in good health with a life expectancy >10 y at least once (or more as the patient requests), order screening only if the informed man expresses a clear preference for screening, and order PSA testing no more often than every 2–4 y	Men aged 50–69 y who have not had an informed discussion and have not expressed a clear preference for testing after the discussion: PSA testing Men aged <50 y or >69 y and men of any age who are not in good health and have a life expectancy <10 y: Any testing

CA-125 = cancer antigen 125; FIT = fecal immunofluorescence testing; FOBT = fecal occult blood testing; HPV = human papillomavirus; MRI = magnetic resonance imaging; PSA = prostate-specific antigen; TVUS = transvaginal ultrasonography.

Wilt TJ et al. Screening for Cancer: Advice for High-Value Care From the American College of Physicians. Ann Intern Med. 2015;162:718-725.

Breast and Gynecologic cancers: 2015

Table 1. High- and Low-Value Screening Strategies for 5 Types of Cancer*

Cancer Type	Least Intensive Recommended Cancer Screening Strategies (High Value)	Cancer Screening Strategies That Are Not Recommended (Low Value)
Breast	Women aged 40–49 y: Discuss benefits and harms with women in good health, and order screening with mammography every 2 y if a woman requests it Women aged 50–74 y in good health: Encourage mammography every 2 y	Women aged <40 y or ≥75 y and women of any age not in good health and with a life expectancy <10 y: Any screening Women of any age: Annual mammography, MRI, tomosynthesis, or regular systematic breast self-examination
Cervical	Women aged 21–29 y: Cytology testing every 3 y Women aged 30–65 y: Cytology testing every 3 y or cytology and HPV testing every 5 y	Women aged <21 y or >65 y with previous recent negative screening results: Any screening Women of any age without a cervix: Any screening Women aged 21–65 y: Cytology testing more frequently than every 3 y Women aged <30 y: HPV testing Women of any age: Pelvic examination
Ovarian	None	Women of any age: CA-125 screening, TVUS, or pelvic examination

CA-125 = cancer antigen 125; FIT = fecal immunofluorescence testing; FOBT = fecal occult blood testing; HPV = human papillomavirus; MRI = magnetic resonance imaging; PSA = prostate-specific antigen; TVUS = transvaginal ultrasonography.

Wilt TJ et al. Screening for Cancer: Advice for High-Value Care From the American College of Physicians. Ann Intern Med. 2015;162:718-725.

Lung Cancer

- **Lung cancer screening TO BE addressed by ACP**

- **USPSTF** screening recommendation based upon National lung screening trial (NLST)

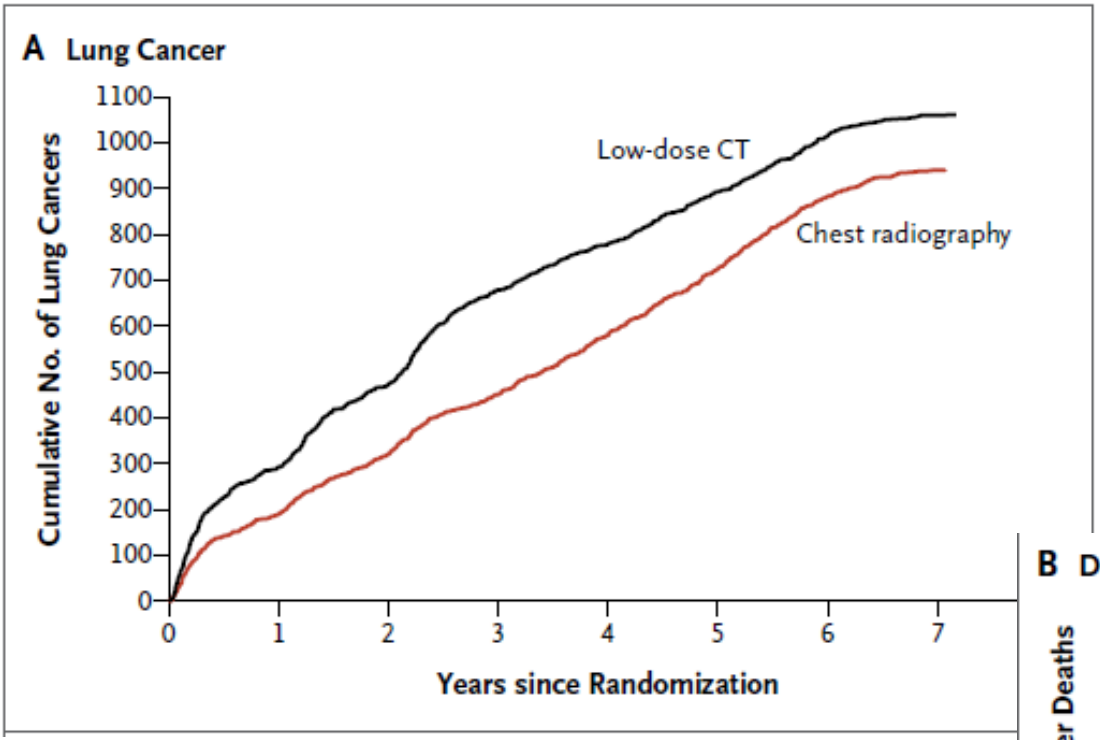
Lung Cancer

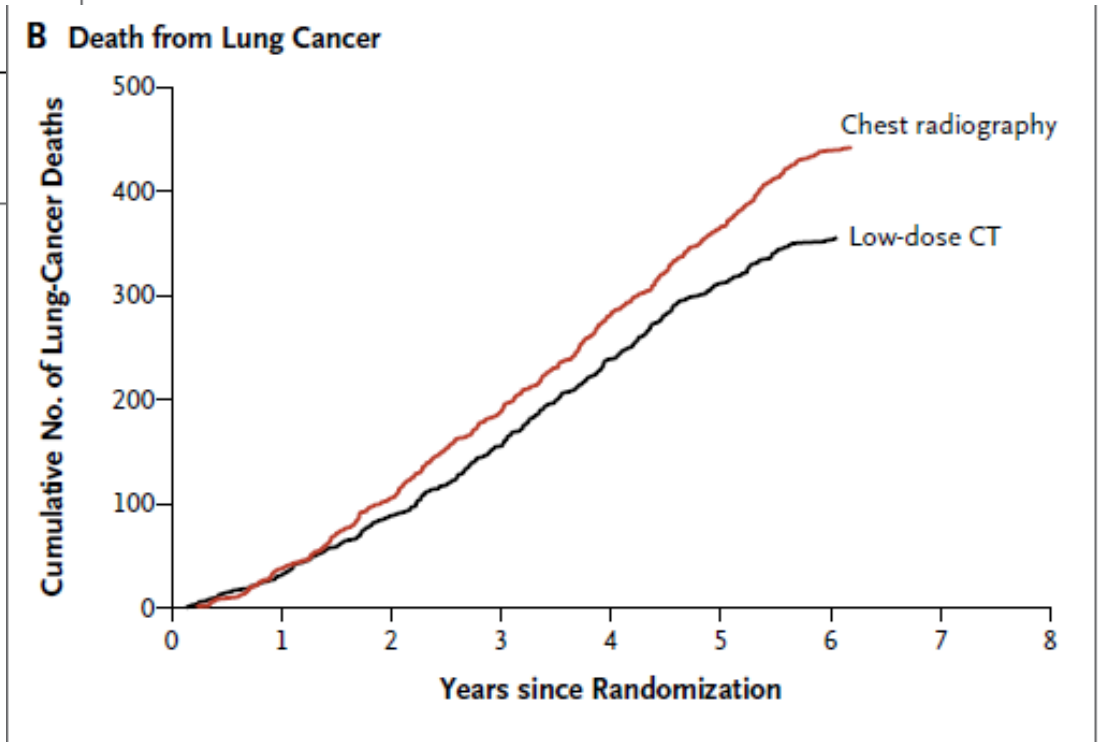
- **National Lung Screening Trial (NLST)**

  N Engl J Med. 2011 Aug 4;365(5):395-409.

  - **Randomized study of low-dose CT versus CXR x 3Y**
  - **High risk adults**
    - 55-74 yo
    - 30 pack-year history

Lung Cancer





20% **reduction in lung cancer deaths**

6.7% **reduction in death**

Screening in Cancer Survivors ??

Why do we care ?

- **Risk of recurrence of cancer**
  - depends on cancer type, stage, grade, histology, genomics ...

Screening for Recurrence

- Emerging screening guidelines …

Screening for Recurrence

- **National Comprehensive Cancer Network (NCCN)** Guidelines for *Treatment* of Cancer
  - Separate guidelines for specific cancers

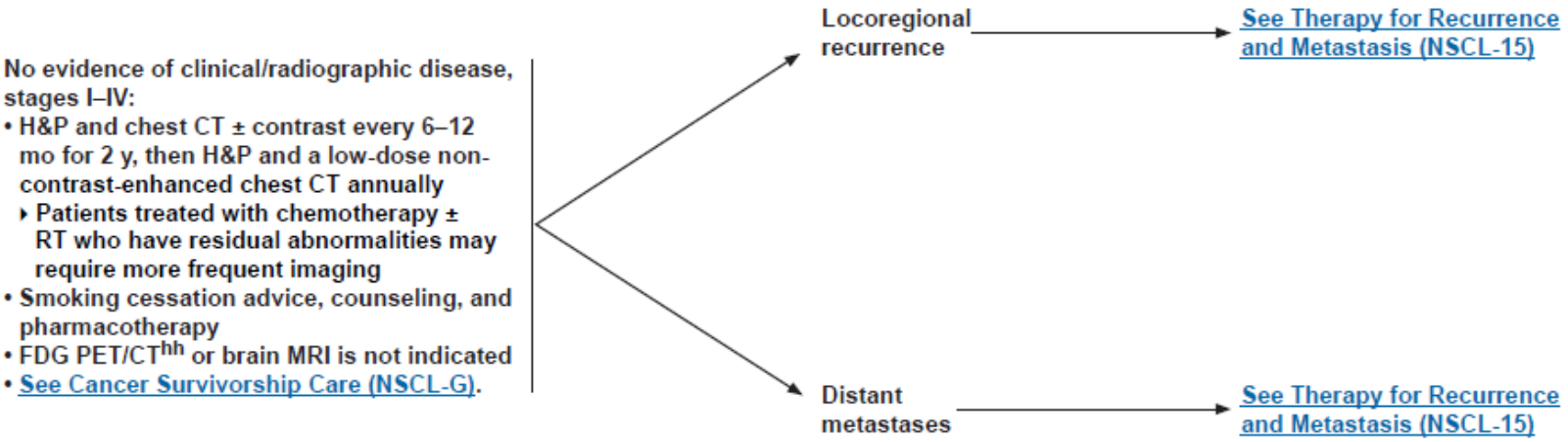
Screening for Recurrence

National Comprehensive Cancer Network®

NCCN Guidelines Version 3.2016
Non-Small Cell Lung Cancer

NCCN Guidelines Index
NSCLC Table of Contents
Discussion

SURVEILLANCE



[hh]FDG PET/CT is currently not warranted in the routine surveillance and follow-up of patients with NSCLC. However, many benign conditions (such as atelectasis, consolidation, and radiation fibrosis) are difficult to differentiate from neoplasm on standard CT imaging, and FDG PET/CT can be used to differentiate true malignancy in these settings. However, if FDG PET/CT is to be used as a problem-solving tool in patients after radiation therapy, histopathologic confirmation of recurrent disease is needed because areas previously treated with radiation therapy can remain FDG avid for up to 2 years.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Screening for Recurrence

National Comprehensive Cancer Network®

NCCN Guidelines Version 1.2016
Invasive Breast Cancer

NCCN Guidelines Index
Breast Cancer Table of Contents
Discussion

SURVEILLANCE/FOLLOW-UP

- History and physical exam 1–4 times per year as clinically appropriate for 5 y, then annually
- Periodic screening for changes in family history and referral to genetic counseling as necessary
- Educate, monitor, and refer for lymphedema management
- Mammography every 12 mo[oo]
- Routine imaging of reconstructed breast is not indicated
- In the absence of clinical signs and symptoms suggestive of recurrent disease, there is no indication for laboratory or imaging studies for metastases screening
- Women on tamoxifen: annual gynecologic assessment every 12 mo if uterus present
- Women on an aromatase inhibitor or who experience ovarian failure secondary to treatment should have monitoring of bone health with a bone mineral density determination at baseline and periodically thereafter[pp]
- Assess and encourage adherence to adjuvant endocrine therapy
- Evidence suggests that active lifestyle, healthy diet, limited alcohol intake, and achieving and maintaining an ideal body weight (20–25 BMI) may lead to optimal breast cancer outcomes
- See NCCN Guidelines for Survivorship

→ See Recurrent Disease (BINV-17)

[oo]Studies indicate that annual mammograms are the appropriate frequency for surveillance of breast cancer patients who have had breast-conserving surgery and radiation therapy with no clear advantage to shorter interval imaging. Patients should wait 6 to 12 months after the completion of radiation therapy to begin their annual mammogram surveillance. Suspicious findings on physical examination or surveillance imaging might warrant a shorter interval between mammograms.

[pp]The use of estrogen, progesterone, or selective estrogen receptor modulators to treat osteoporosis or osteopenia in women with breast cancer is discouraged. The use of a bisphosphonate or denosumab is acceptable to maintain or to improve bone mineral density. Optimal duration of either therapy has not been established. Duration beyond 3 y is not known. Factors to consider for duration of anti-osteoporosis therapy include bone mineral density, response to therapy, and risk factors for continued bone loss or fracture. Women treated with a bisphosphonate or denosumab should undergo a dental examination with preventive dentistry prior to the initiation of therapy, and should take supplemental calcium and vitamin D.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Screening for Recurrence

- **American Cancer Society (ACS)**
  - Colorectal Cancer Survivorship Care Guidelines
    El-Shami et al. CA: A Cancer Journal for Clinicians. 2015;65:427–455
  - Prostate Cancer Survivorship Care Guidelines
    Skolarus et al. CA: A Cancer Journal for Clinicians. 2014;64:225–249
- **American Society of Clinical Oncology (ASCO)**
  - Breast Cancer Follow-up Guidelines
    Khatcheressian et al. J Clin Oncol. 2013; 31(7):961-5
  - Colorectal Cancer Surveillance Guidelines
    Meyerhardt JA et al. J Clin Oncol. 2013;31(35):4465-70
- **Society for Gynecologic Oncology**
  - Gynecologic cancers
    Salani R et al. Am J Obstet Gynecol. 2011;204(6):466-78

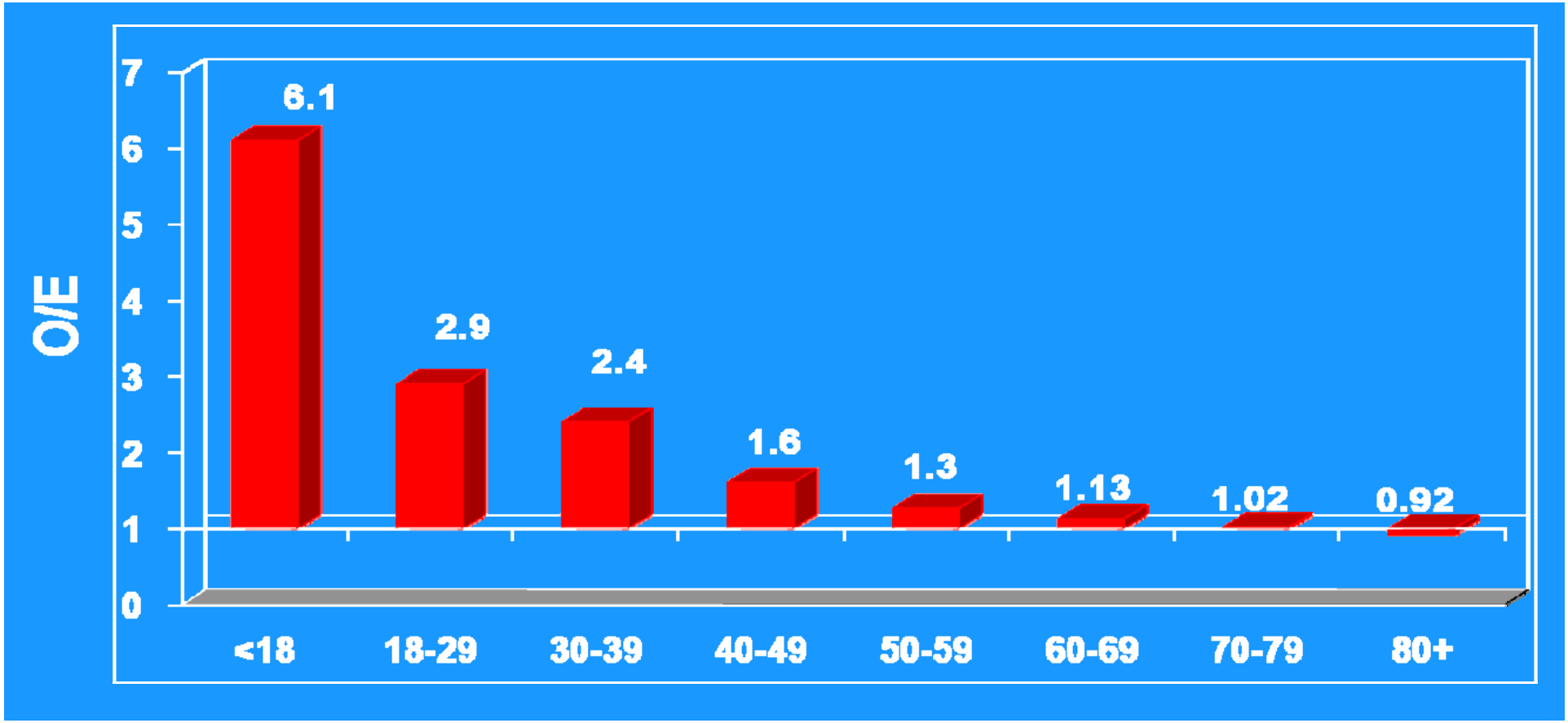
Why do we care ?

- **Risk of recurrence**
  - depends on cancer type, stage, grade, histology, genomics …

- **Risk of 2nd cancer …**

Why do we care ?

- **Many cancer survivors experience increased risk of 2nd cancers**



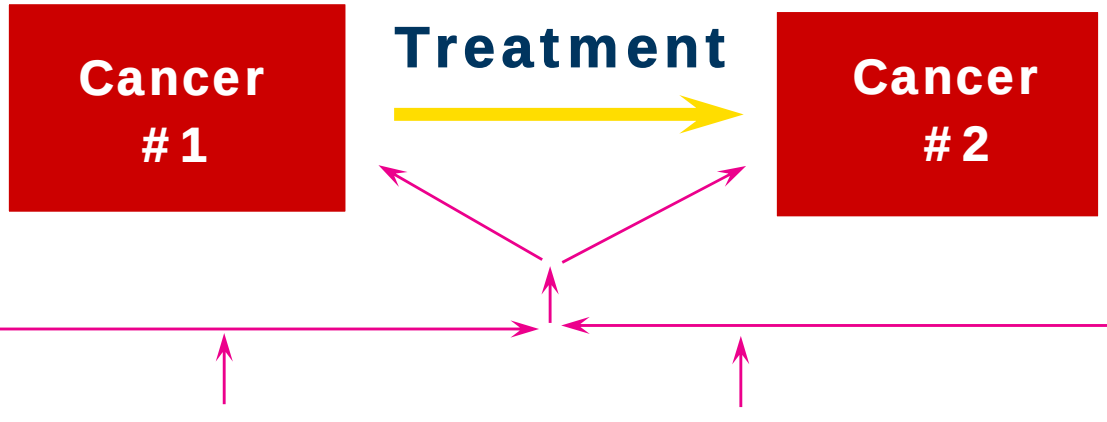
* P < 0.05

Age at 1st Cancer Diagnosis

Why 2nd malignancies ?

- **Potential risk factors:**
  - Genetic susceptibility
  - Environmental exposure
  - Field cancerization
    - i.e. smoking → lung, head/neck & bladder cancers
  - Treatment for 1st cancer
    - radiation, chemotherapy
  - Age at diagnosis/treatment
  - Age at time of screening

Subsequent Malignancies: *Etiologic Factors*



Lifestyle *

- Tobacco
- Alcohol
- Diet
- Other

Environment

- Contaminants
- Occupation
- Viruses
- Other

Host factors

- Age and gender
- Genetics
- Immune function
- Hormonal, other

Interactions and other influences

- Gene-environment
- Gene-gene

*** population-based data suggests Lifestyle accounts for 35% of total excess risk**

Slide modified from Dr. Constine who modified from Travis LB. Acta Oncologica 2002; 323-33

How do they fare after 2nd cancer ?

- **These 2nd cancers *may* be more lethal (vs. *de novo* cancers)**

Example …

- Breast cancer (BC) after Hodgkin lymphoma (HL)
- Increased risk
  - i.e. 25 yo woman with HL s/p 40 Gy thoracic RT
    – 1 in 3 risk by age 55
  - Travis LB et al. J Natl Cancer Inst 97:1428-1437, 2005

Question ...

- Do HL survivors have worse prognosis after BC diagnosis ?

  - Milano MT et al. J Clin Oncol. 2010;28(34):5088-96

Methods

- From Surveillance, Epidemiology, End Results (SEER 9) population-based registry
  - **298** HL survivors who developed BC: **HL-BC group**
    - among **9,946** women with HL
  - **405,223** women with first or only BC: **BC-1 group**
- Patients grouped by BC stage
  - Localized
  - Regional
  - Distant

Breast Cancer Stage

	localized BC	regional BC	distant BC
HL-BC	63%	30%	7%
BC-1	60%	34%	6%

Breast Cancer Stage

	localized BC	regional/distant BC
HL-BC	63%	37%
BC-1	60%	40%

Breast Cancer Stage and Latency

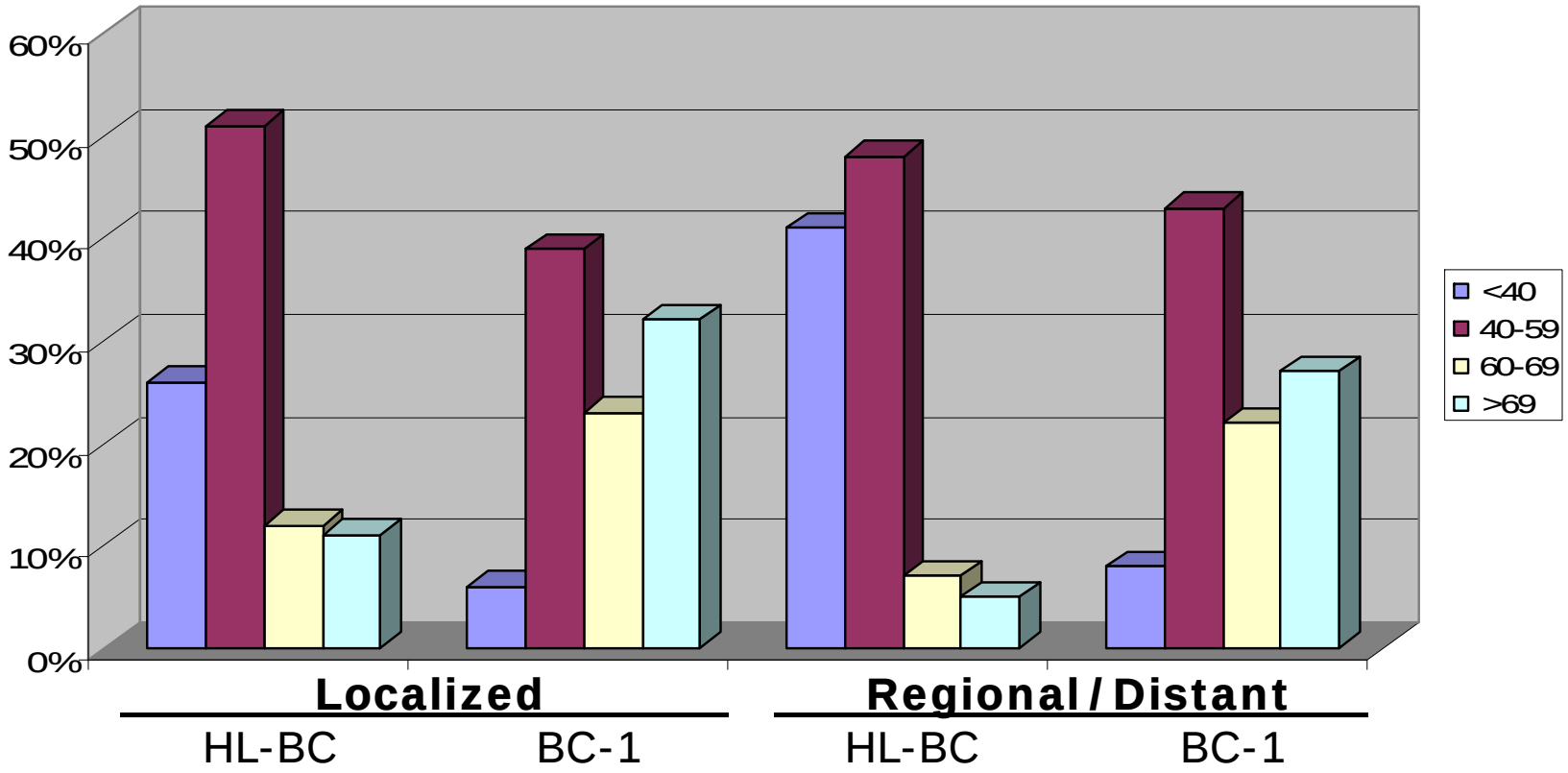
	localized BC	regional/distant BC
HL-BC	63%	37%
BC-1	60%	40%

Latency from HL to BC

median	15.2 years	15.2 years
range	0.6-33.3 years	0.3-32.0 years

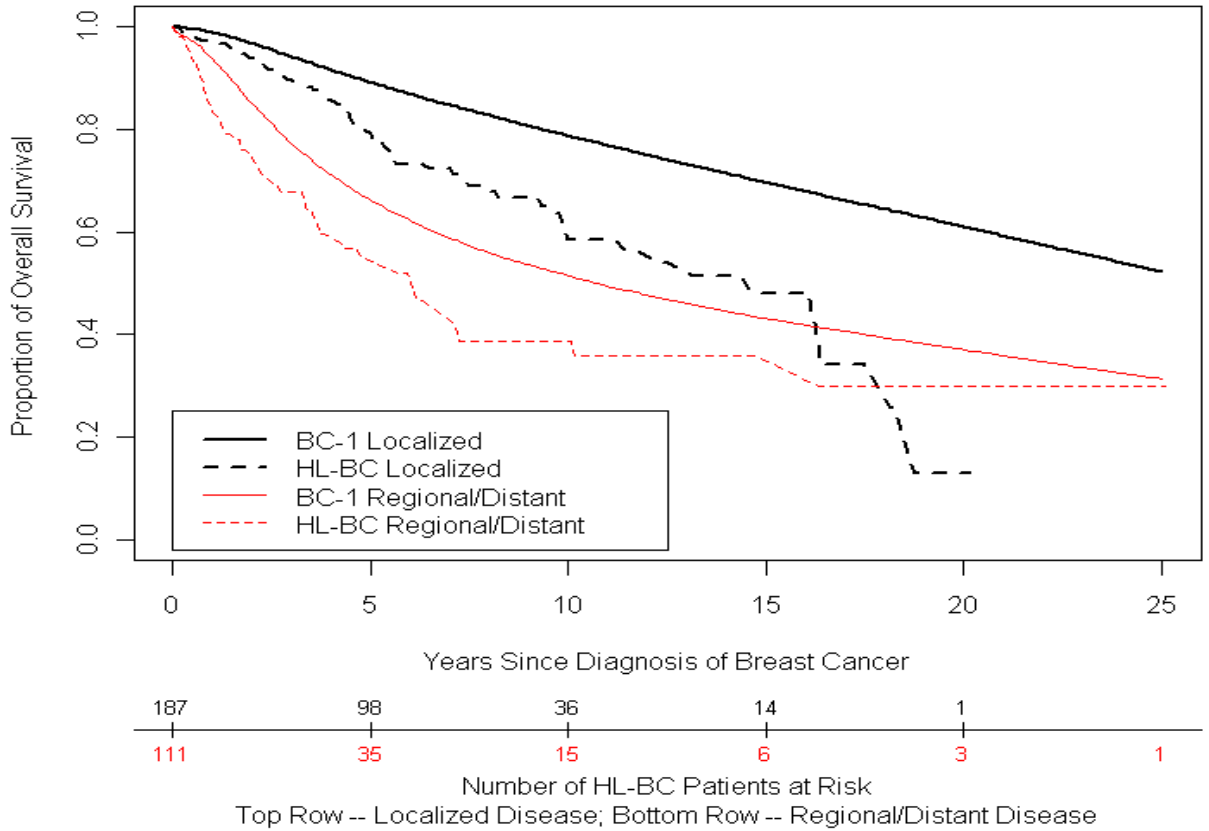
Age @ breast cancer diagnosis

- HL-BC patients younger ($p<0.0001$) than BC-1 patients
  - median age: 45 and 61 respectively



Age-adjusted overall survival

	Localized BC		Regional / Distant BC	
	HL-BC	BC-1 *	HL-BC	BC-1 *
Total	187 (63%)	241,128 (60%)	111 (37%)	164,095 (40%)
5-year OS	77%	89%	55%	66%
10-year OS	59%	79%	38%	51%
15-year OS	48%	69%	33%	43%
Cox model: multivariate §	**p<0.0001**		**p<0.0001**	
HR (95% CI)	**2.82 (2.17 - 3.67)**		**2.22 (1.68-2.93)**	

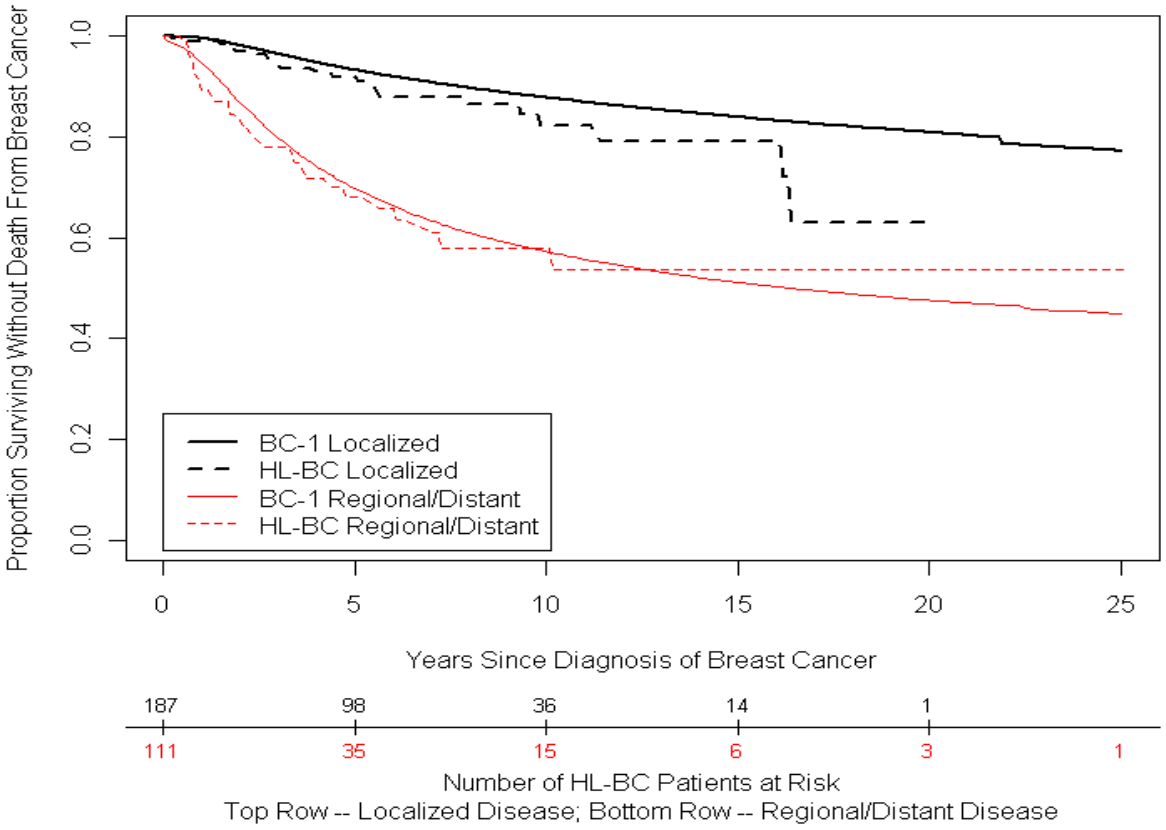


* age-adjusted OS

§ Cox model adjusted for:
- age at BC diagnosis
- calendar year of BC diagnosis
- ER status, PR status,
- radiotherapy for BC
- sociodemographic status
- race

Age-adjusted breast cancer cause specific survival

	Localized BC		Regional / Distant BC	
	HL-BC	BC-1 *	HL-BC	BC-1 *
Total	187 (63%)	241,128 (60%)	111 (37%)	164,095 (40%)
5-year OS	91%	93%	68%	70%
10-year OS	82%	88%	58%	57%
Cox model: multivariate	**p=0.002**		p=0.15	
HR (95% CI)	**2.01 (1.31 - 3.08)**		1.31 (0.91 – 1.89)	

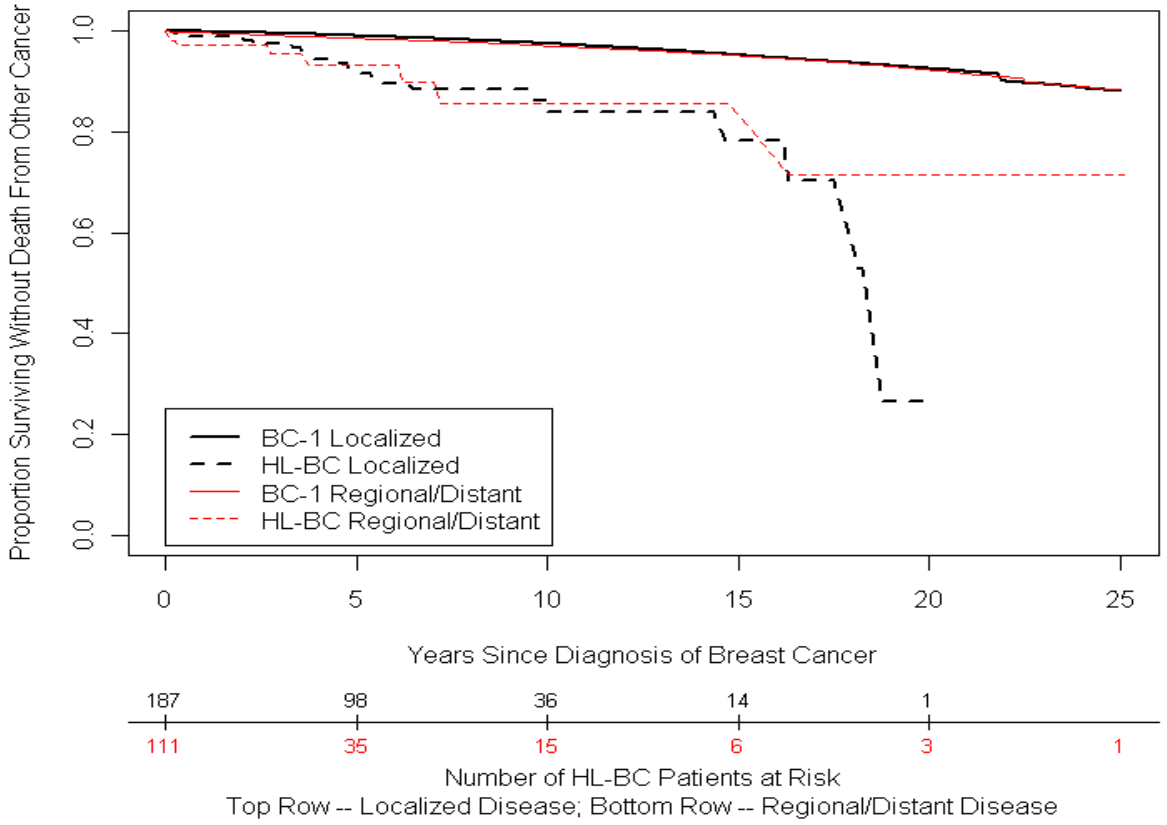


* age-adjusted OS

§ Cox model adjusted for:
- age at BC diagnosis
- calendar year of BC diagnosis
- ER status, PR status,
- radiotherapy for BC
- sociodemographic status
- race

Age-adjusted other cancer cause specific survival

	Localized BC		Regional / Distant BC	
	HL-BC	BC-1 *	HL-BC	BC-1 *
Total	187 (63%)	241,128 (60%)	111 (37%)	164,095 (40%)
5-year other cancer CSS	92%	99%	93%	99%
10-year other cancer CSS	84%	97%	86%	97%
Cox model: multivariate HR (95% CI)	**p<0.0001 7.03 (4.53 – 10.91)**		**p<0.0001 6.87 (3.43 – 13.75)**	



* age-adjusted OS

§ Cox model adjusted for:
- age at BC diagnosis
- calendar year of BC diagnosis
- ER status, PR status,
- radiotherapy for BC
- sociodemographic status
- race

Age-adjusted heart disease cause specific survival

	Localized BC		Regional/Distant BC	
	HL-BC	BC-1 *	HL-BC	BC-1 *
Total	187 (63%)	241,128 (60%)	111 (37%)	164,095 (40%)
5-year heart disease CSS	96%	99%	97%	99%
10-year heart disease CSS	93%	96%	92%	97%
Cox model: multivariate	**p=0.04**		**p=0.02**	
HR (95% CI)	**2.22 (1.06 - 4.65)**		**4.28 (1.38-13.27)**	

* age-adjusted heart disease CSS

Another question ...

- NSCLC after HL ?
  - 3-20 fold increased risk after HL
  - Is survival worse ?

Milano MT et al. Cancer. 2011 Dec 15;117(24):5538-47

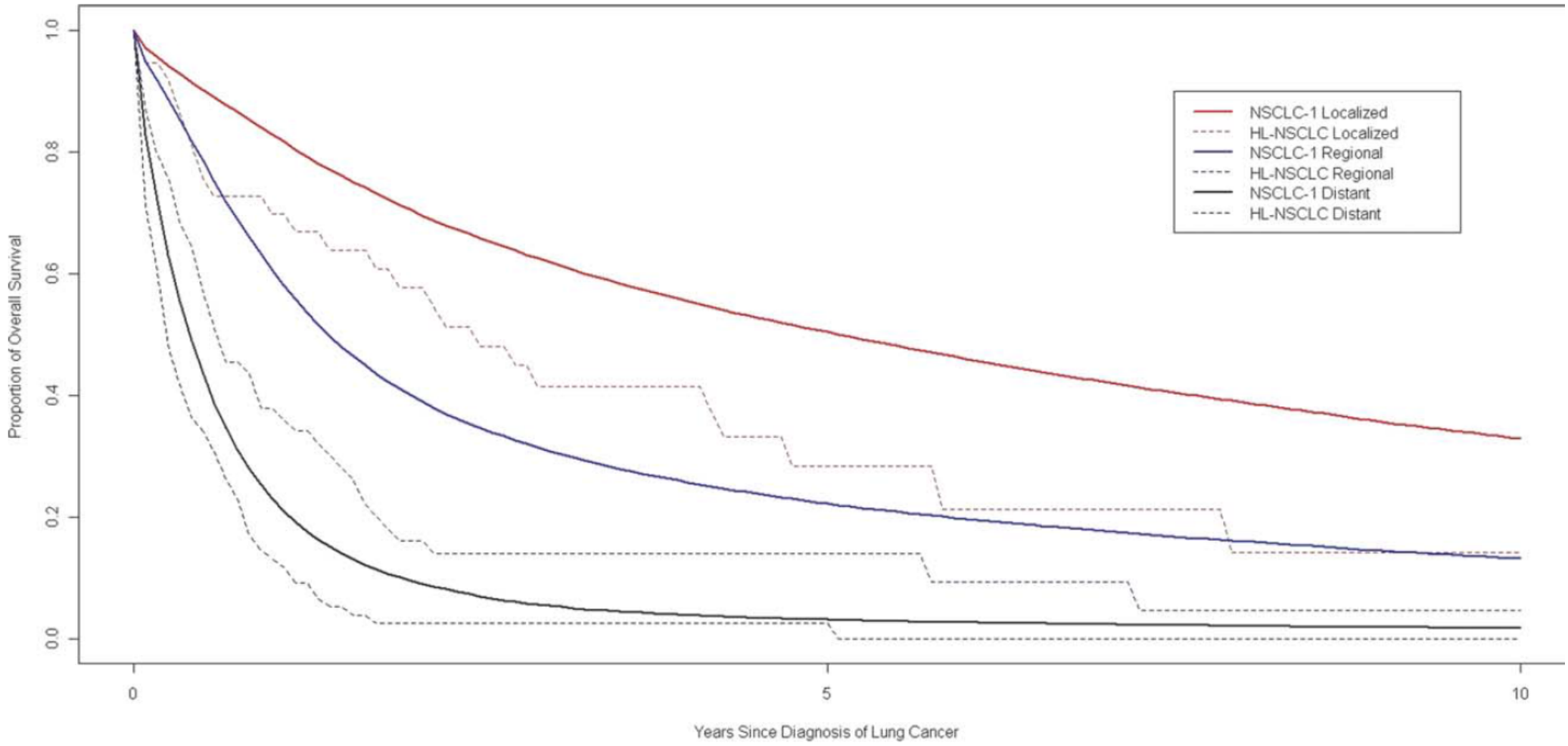
Methods

- From Surveillance, Epidemiology, End Results (SEER 13) population-based registry
  - **187** HL survivors who developed NSCLC: **HL-NSCLC group**
    - among **22,648** HL survivors
  - **178,431** patients with first or only NSCLC: **NSCLC-1 group**
- Patients grouped by stage:
  - Localized
  - Regional
  - Distant

NSCLC Stage

	localized BC	regional BC	distant BC
HL-NSCLC	20%	29%	51%
NSCLC-1	20%	30%	50%

Overall survival



Overall survival

Disease Stage	HL-NSCLC	NSCLC-1	Age-Adjusted OS: NSCLC-1	HL-NSCLC vs NSCLC-1: HR (95% CI) [*P*][a]
Localized				
No. of patients	38	35,657	35,657	
OS rate, %				
1 y	70	78	83	
2 y	58	64	70	
5 y	28	43	50	
Median survival, mo	28.2	44.3	61.0	
P[b]	NA	.12	<.0001	1.60 (1.08-2.37) [.018]
Regional				
No. of patients:	54	52,825	52,825	
OS rate, %				
6 mo	57	74	78	
1 y	38	56	61	
2 y	16	36	40	
Median survival	7.2	14.6	16.8	
P[b]	NA	.001	.001	1.67 (1.26-2.22) [.0004]
Distant				
No. of patients	95	89,949	89,949	
OS rate, %				
6 mo	34	38	43	
1 y	13	20	23	
2 y	3	8	9	
Median survival, mo	2.9	3.9	4.8	
P[b]	NA	.040	<.0001	1.31 (1.06-1.61) [.013]

Overall survival

Disease Stage	HL-NSCLC	NSCLC-1	Age-Adjusted OS: NSCLC-1	HL-NSCLC vs NSCLC-1: HR (95% CI) [*P*][a]
Localized				
No. of patients	38	35,657	35,657	
OS rate, %				
1 y	70	78	83	
2 y	58	64	70	
5 y	28	43	50	
Median survival, mo	28.2	44.3	61.0	
P[b]	NA	.12	<.0001	1.60 (1.08-2.37) [.018]
Regional				
No. of patients:	54	52,825	52,825	
OS rate, %				
6 mo	57	74	78	
1 y	38	56	61	
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Implications/Future Directions

- HL survivors should be
  - screened for BC and NSCLC
  - counseled on preventive measures
    - smoking cessation
    - healthy life-style modifications.

- HL survivors should be monitored for:
    - late cardiac complications
    - additional malignancies

- Future research should be directed at:
  - examining underlying cancer biology and etiology of treatment-induced cancers,
  - investigating inherent and treatment-induced genetic susceptibility of HL survivors.

What about Cancer Survivors …

- **What 2nd cancers do we screen for ?**
- **Who screens them (oncologists, PCP) ??**

What about Cancer Survivors …

- **What 2nd cancers do we screen for ?**
  - **It depends**

What about Cancer Survivors …

- **What 2nd cancers do we screen for ?**
  - **It depends**
    - Initial cancer
    - Age at initial diagnosis
    - Age now
    - Anticipated survival

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*at a **minimum** we should follow 'consensus' guidelines for general population*

What about Cancer Survivors …

- **What 2nd cancers do we screen for ?**
  - **It depends**
    - Initial cancer
    - Age at initial diagnosis
    - Age now
    - Anticipated survival

We need evidence-based consensus guidelines (i.e. from large societies) for cancer survivors

What about Cancer Survivors …

NCCN National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2015
Survivorship

NCCN Guidelines Index
Survivorship Table of Contents
Discussion

SCREENING FOR SECOND CANCERS

- Subsequent malignant neoplasms may occur in survivors, due to genetic susceptibilities (ex, cancer syndromes), shared etiologic exposures (ex, smoking, environmental exposures) and mutagenic effects of cancer treatment.
- The overall cancer rate in survivors is higher than in the general population.
- Treatment-related subsequent primary cancers vary with the type and intensity of anticancer treatment and are associated in particular with radiation and specific chemotherapeutic agents.
- Screening for second primary cancers should be a shared responsibility between primary and oncology care physicians (See the NCCN Guidelines for Detection, Prevention, and Risk Reduction Table of Contents).

What about Cancer Survivors …

National Comprehensive Cancer Network®

NCCN Guidelines Version 1.2015
Breast Cancer Screening and Diagnosis

For women **aged 25 years and older** who have received prior thoracic irradiation, the NCCN panel recommends encouraging breast awareness, counseling on risk, and an **annual CBE [clinical breast exam] starting 8-10 years after the radiation therapy.**

What about Cancer Survivors …

National Comprehensive Cancer Network®

NCCN Guidelines Version 2.2015
Hodgkin Lymphoma

NCCN Guidelines Index
Hodgkin Table of Contents
Discussion

FOLLOW-UP AFTER COMPLETION OF TREATMENT AND MONITORING FOR LATE EFFECTS

Follow-up and Monitoring After 5 Years[ff,gg]

- Interim H&P: Annually
  - Annual blood pressure, aggressive management of cardiovascular risk factors
  - Pneumococcal, meningococcal, and H-flu revaccination after 5–7 y, if patient treated with splenic RT or previous splenectomy (according to current CDC recommendations)
  - Annual influenza vaccine
- Cardiovascular symptoms may emerge at a young age.
  - Consider stress test/echocardiogram at 10-y intervals after treatment is completed.
  - Consider carotid ultrasound at 10-y intervals if neck irradiation.
- Laboratory studies:
  - CBC, platelets, chemistry profile annually
  - TSH at least annually if RT to neck
  - Biannual lipids
- Consider low-dose chest CT for patients at increased risk for lung cancer or those who smoke >30 packs/year.[hh]
- Annual breast screening: Initiate 8–10 y post-therapy, or at age 40, whichever comes first, if chest or axillary radiation. The NCCN Hodgkin Lymphoma Guidelines Panel recommends breast MRI in addition to mammography for women who received irradiation to the chest between ages 10–30 y, which is consistent with the American Cancer Society (ACS) Guidelines. Consider referral to a breast specialist.
- Colonoscopy every 10 years for patients age ≥50, if high risk begins at age 40, which is consistent with ACS Guidelines.
- Counseling: Reproduction, health habits, psychosocial, cardiovascular, breast self-exam, and skin cancer risk.
- Treatment summary and consideration of transfer to PCP.
- Consider a referral to a survivorship clinic.

What about Cancer Survivors …

- **Breast cancer screening after radiotherapy for HL in the UK**
  - Launched 2003
  - Screen♀ s/p supradiaphragmatic RT at:
    - 8+ years after RT, and
    - age 25+ (*whichever is later*)
  - Program seems to be catching BC at an earlier stage

Howell SJ et al. Br J Cancer. 2009 Aug 18;101(4):582-8.

What about Cancer Survivors …

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What about Cancer Survivors …

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Thank you!

“Jack Rabbit” – wooden roller coaster Seabreeze Amusement Park

Oldest continuing operating roller coaster in US (since 1920)