Advances in Cancer Care
&
Importance of Survivorship in Long-Term Wellness

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DECLARATION OF INTERESTS

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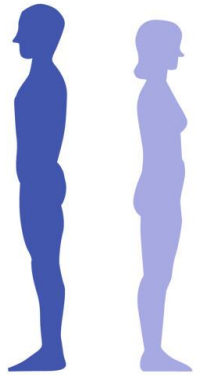
Review of current cancer statistics

Trends in cancer incidence and mortality

2025: 2 million cancers will be diagnosed in the US (5600 per day)

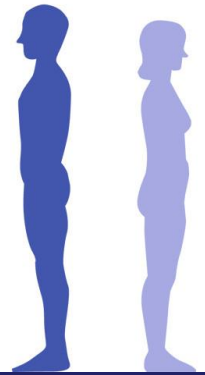
Estimated New Cases

Male			Female		
Prostate	313,780	30%	Breast	316,950	32%
Lung & bronchus	110,680	11%	Lung & bronchus	115,970	12%
Colon & rectum	82,460	8%	Colon & rectum	71,810	7%
Urinary bladder	65,080	6%	Uterine corpus	69,120	7%
Melanoma of the skin	60,550	6%	Melanoma of the skin	44,410	4%
Kidney & renal pelvis	52,410	5%	Non-Hodgkin lymphoma	35,210	4%
Non-Hodgkin lymphoma	45,140	4%	Pancreas	32,490	3%
Oral cavity & pharynx	42,500	4%	Thyroid	31,350	3%
Leukemia	38,720	4%	Kidney & renal pelvis	28,570	3%
Pancreas	34,950	3%	Leukemia	28,170	3%
All sites	**1,053,250**		**All sites**	**988,660**	



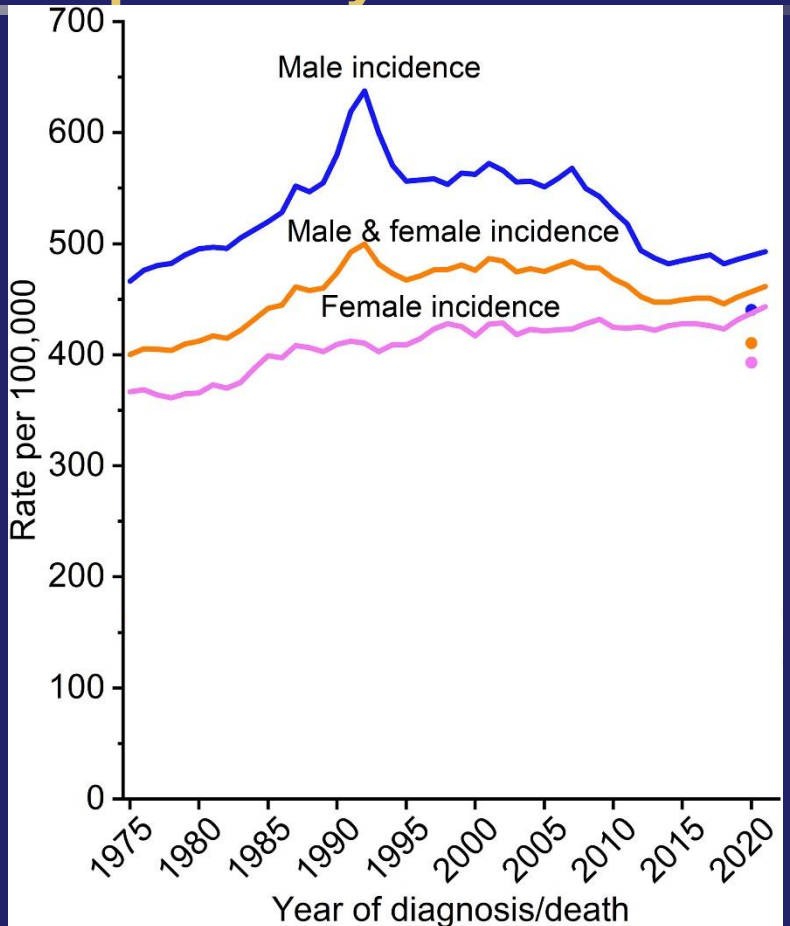
Estimated Deaths

Male			Female		
Lung & bronchus	64,190	20%	Lung & bronchus	60,540	21%
Prostate	35,770	11%	Breast	42,170	14%
Colon & rectum	28,900	9%	Pancreas	24,930	8%
Pancreas	27,050	8%	Colon & rectum	24,000	8%
Liver & intrahepatic bile duct	19,250	6%	Uterine corpus	13,860	5%
Leukemia	13,500	4%	Ovary	12,730	4%
Esophagus	12,940	4%	Liver & intrahepatic bile duct	10,840	4%
Urinary bladder	12,640	4%	Leukemia	10,040	3%
Non-Hodgkin lymphoma	11,060	3%	Non-Hodgkin lymphoma	8,330	3%
Brain & other nervous system	10,170	3%	Brain & other nervous system	8,160	3%
All sites	**323,900**		**All sites**	**294,220**	



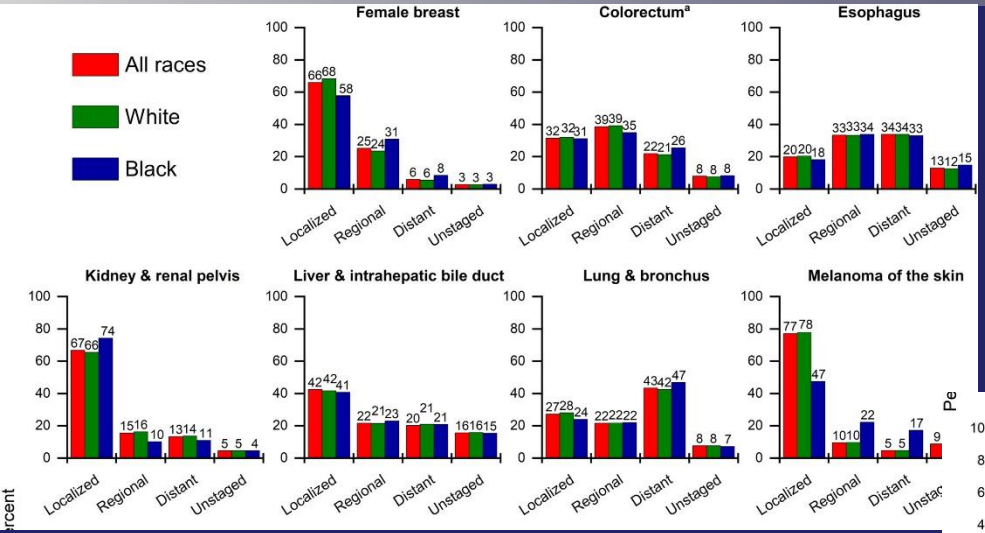
Siegel RL et al. https://doi.org/10.3322/caac.21871

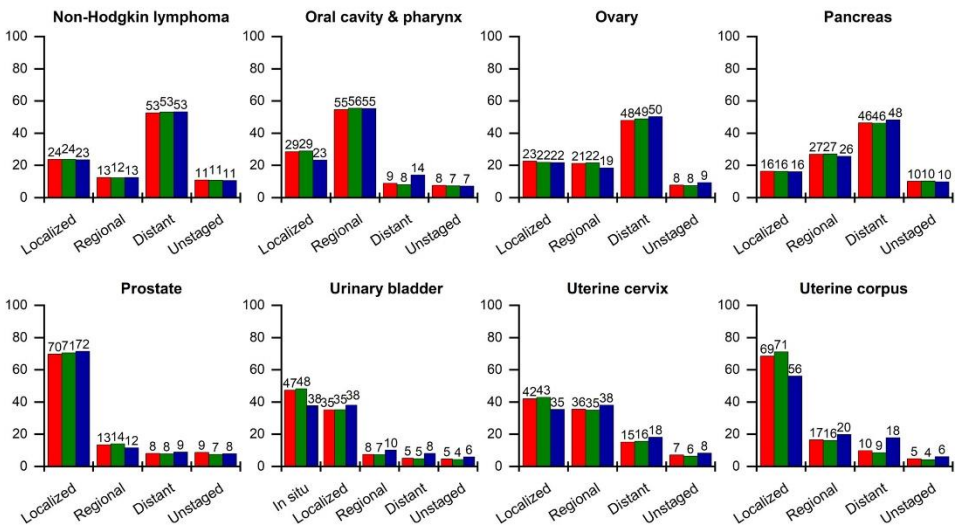
How many cancers have been diagnosed annually in the past 50 years in the US?



Siegel RL et al.
https://doi.org/10.3322/caac.21871

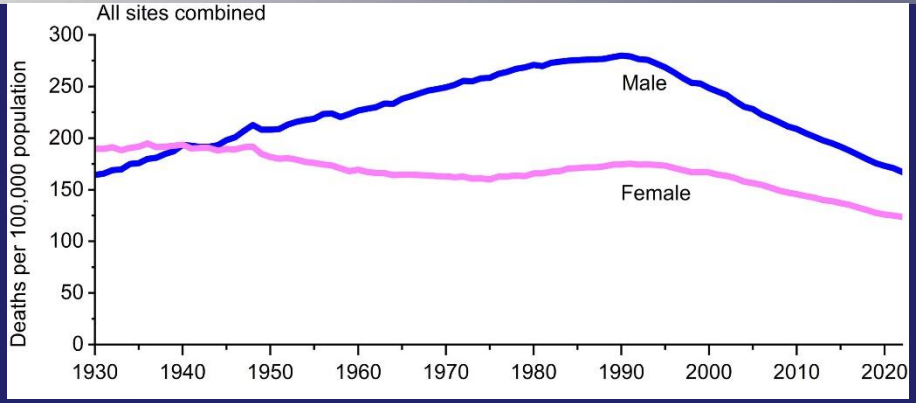
Most cancers are diagnosed at an early (local/regional) stage, meaning they have a higher chance of cure



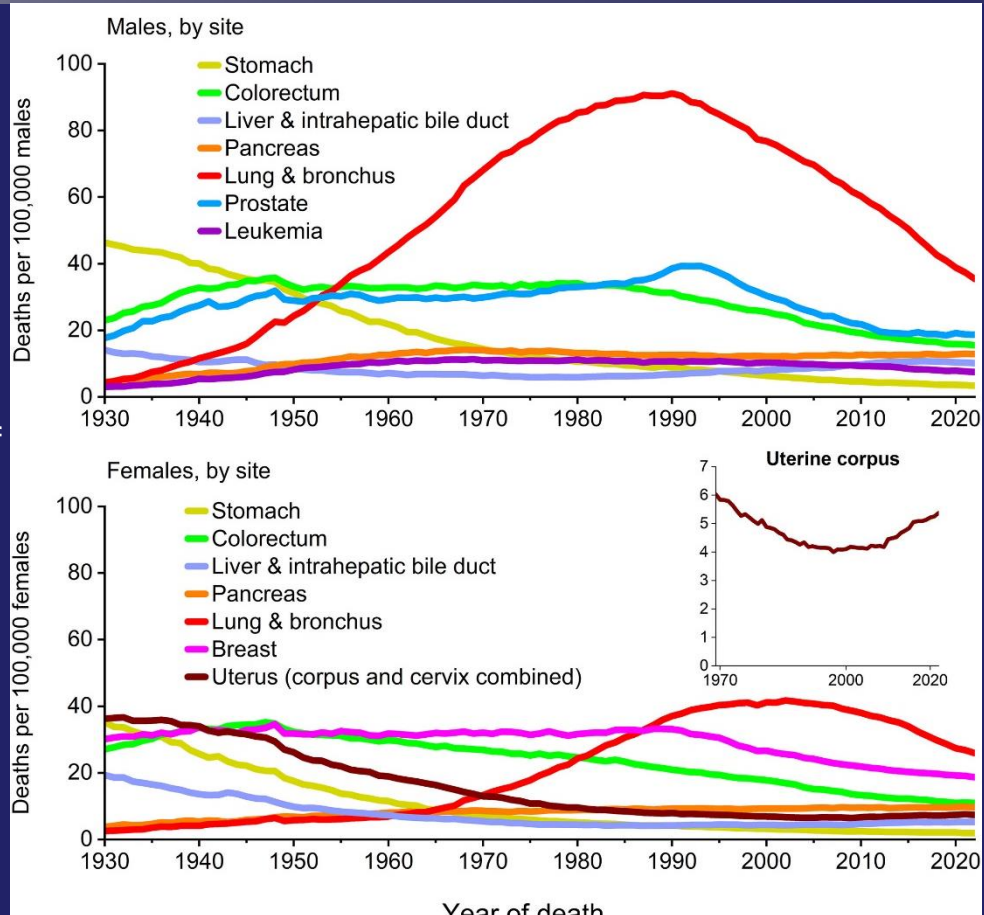


Siegel RL et al. https://doi.org/10.3322/caac.21871

Mortality is improving!
Especially in lung, colon, breast and prostate cancer



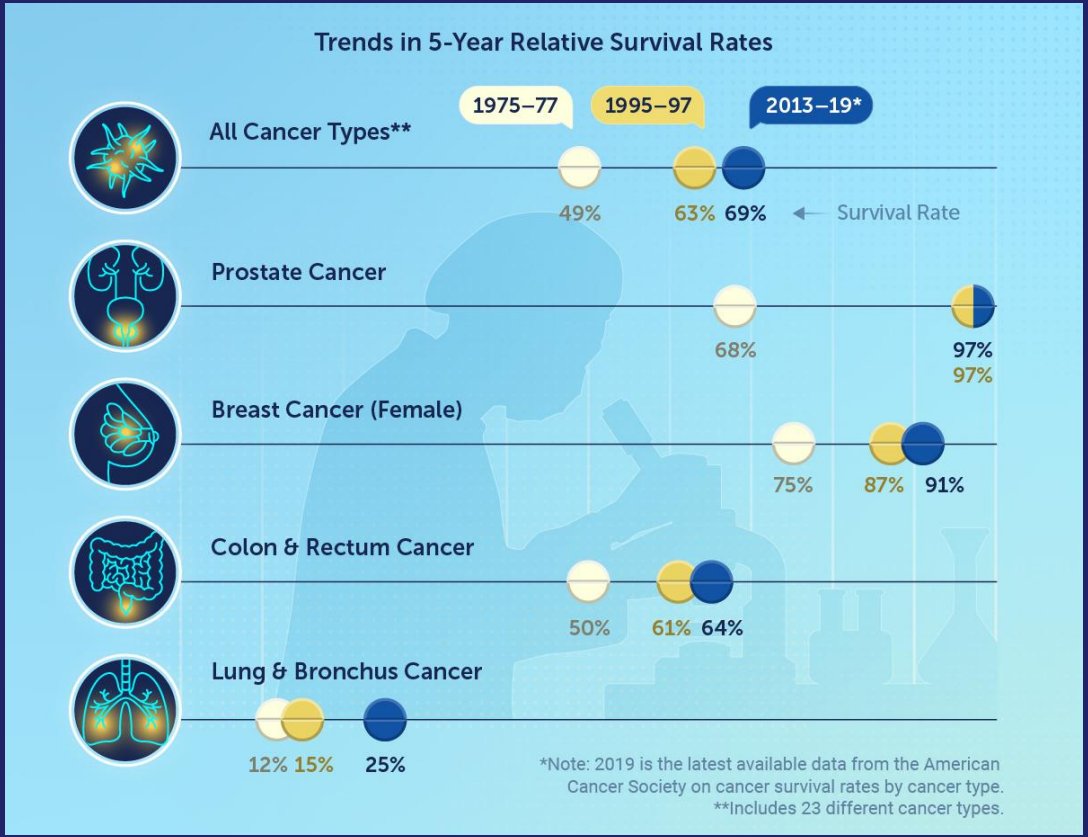
- Death rate rose (driven by males) during most of the 20th century due to smoking
- Since its peak in 1991 has dropped 34%
- Translates to 4.5 million fewer cancer deaths from 1991-2022 than if death rate remained at its peak.
- In the past ~decade, death rate dropped by 1.7% annually



Siegel RL et al. https://doi.org/10.3322/caac.21871

https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2025/2025-cancer-facts-and-figures-acs.pdf

Cancer Survival Improving



https://www.visualcapitalist.com/sp/charted-cancer-survival-rates-over-time/

Focus on Cancer Survival

- In recent years, the 5-year (relative) survival for all cancers combined is 69%
- Since the 1960s, 5-year survival increased from:
  - 39% to 70% for White people
  - 27% to 65% for Black people
- As a result, more than 18 million people in the US have a personal history of cancer

https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2025/2025-cancer-facts-and-figures-acs.pdf

Why is mortality improving?

Reasons for Improved Survival

- Better (and smarter) screening and early detection
  - Breast, cervical, colon cancer, prostate cancer
  - Lung cancer screening for high risk individuals
- Decrease in smoking!!
- Better treatment!!

Siegel RL et al. https://doi.org/10.3322/caac.21871

Improved Treatments

USC University of Southern California

Alexandra (Sandy) Levine, MD

Original Contributions

JAMA®
THE JOURNAL of the American Medical Association
Oct 11, 1985 Vol 254, No. 14

Retrovirus and Malignant Lymphoma in Homosexual Men

Alexandra M. Levine, MD; Parkash S. Gill, MD; Paul R. Meyer, MD; Ronald L. Burkes, MD; Ronald Ross, MD; Ruth D. Dwor

Rectal Lymphoma in Homosexual Men

Ronald L. Burkes, MD; Paul R. Meyer, MD; Parkash S. Gill, MD; John W. Parker, MD; Suraiya Rasheed, PhD; Alexandra M. Levine, MD

Arch Intern Med—Vol 146, May 1986

Evolving characteristics of AIDS-related lymphoma

blood®

Alexandra M. Levine, Lasika Seneviratne, Byron M. Espina, Amy Rock Wohl, Anil Tulpule, Bharat N. Nathwani, and Parkash S. Gill

Acquired Immunodeficiency Syndrome-Related Lymphoma

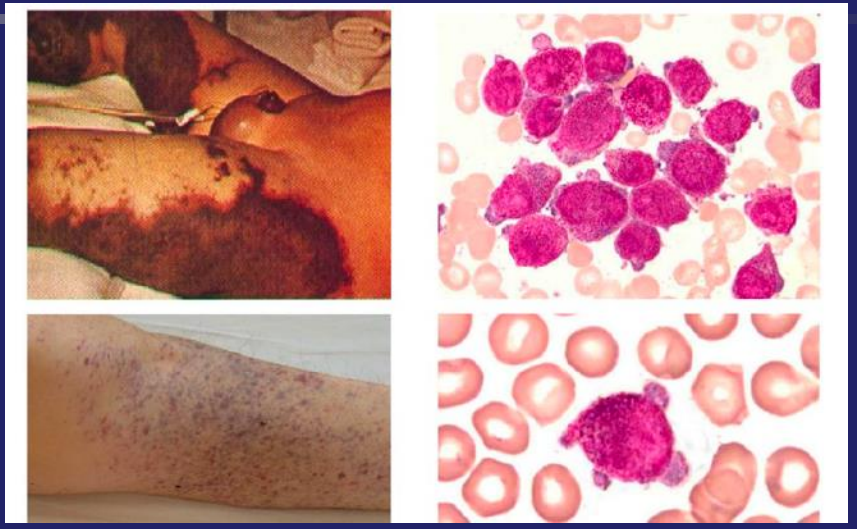
blood®

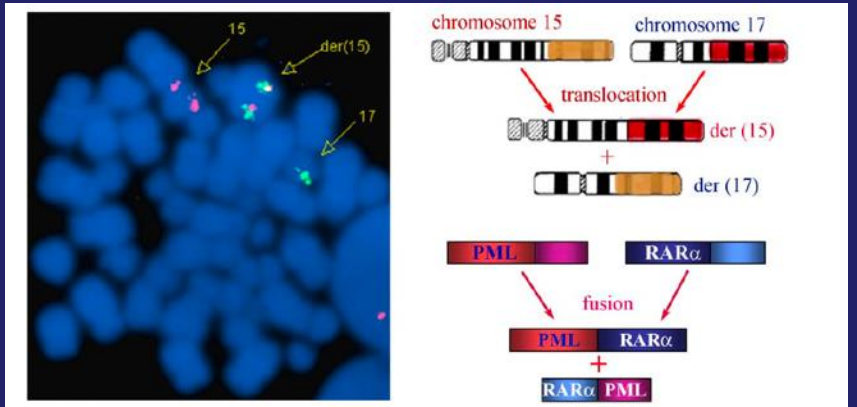
By Alexandra M. Levine

f Los Angeles. Significant emographic profile of pa- diagnosed ARL have oc- earliest time period (1982-1986), to 53/dL in the last time period from 1995 to 1998 ($P = .0006$). The pathologic spectrum of dis-

Acute Promyelocytic Leukemia

- Aggressive leukemia characterized by a mistake in the DNA during cell division where two genes (PML and retinoic acid receptor, RAR) become fused together
- Rapid course, severe bleeding
- All efforts until 1970s were chemo based which targets cells that are rapidly proliferating
- These cells characterized by inability to mature and die in a natural way (the cells became immortal)





Acute Promyelocytic Leukemia

- When studying how to manage APL, Chinese scientists in Shanghai (Zhen-yi Wang, et al) reflected on a famous analect of Confucius:
  - *If you govern the people with laws and control them by punishment, they will avoid crime, but have no personal sense of shame. If you govern them by means of virtue and control them with propriety, they will gain their own sense of shame, and thus correct themselves.*
- Translating into a philosophy of managing this cancer, they sought to educate the cancer cells (coaxing them to differentiate) rather than killing them
- Tested a form of vitamin A (all trans retinoic acid) that showed promise in the laboratory

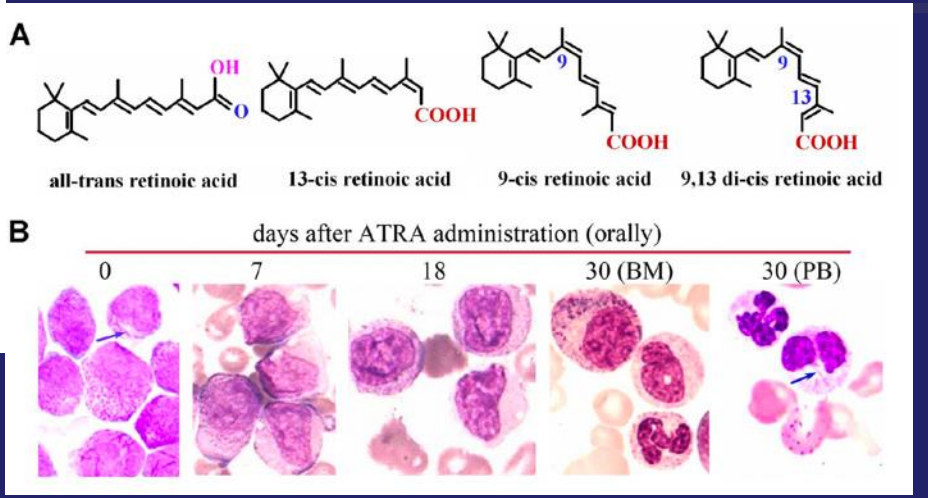
blood®

Volume 72, Issue 2, 1 August 1988, Pages 567-572

ARTICLES

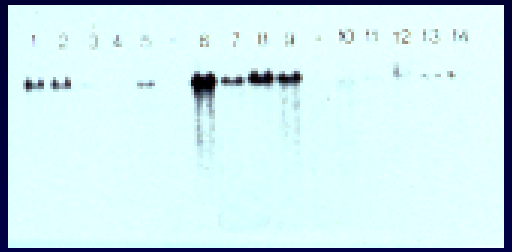
Use of All-Trans Retinoic Acid in the Treatment of Acute Promyelocytic Leukemia

Huang Meng-er, Ye Yu-chen, Chen Shu-rong, Chai Jin-ren, Lu Jia-Xiang, Zhoa Lin, Gu Long-jun, Wang Zhen-yi



- 5 year old girl in Shanghai in 1985
- Dying after chemotherapy failed her. In critical condition with fever, hemorrhaging from skin and mucosa, blood infection
- Parents ready to place her on hospice
- Agreed to try ATRA.
- After 1 week of oral ATRA, fever resolved
- After 3 weeks, no detectable leukemia
- As of age 26, healthy and fully functional

Human Epidermal Growth Factor-2 (HER2)



***HER2* Oncogene Amplification**

Breast Cancer

HER-2 Oncoprotein Overexpression

Shortened Survival

Dennis Slamon, MD, PhD

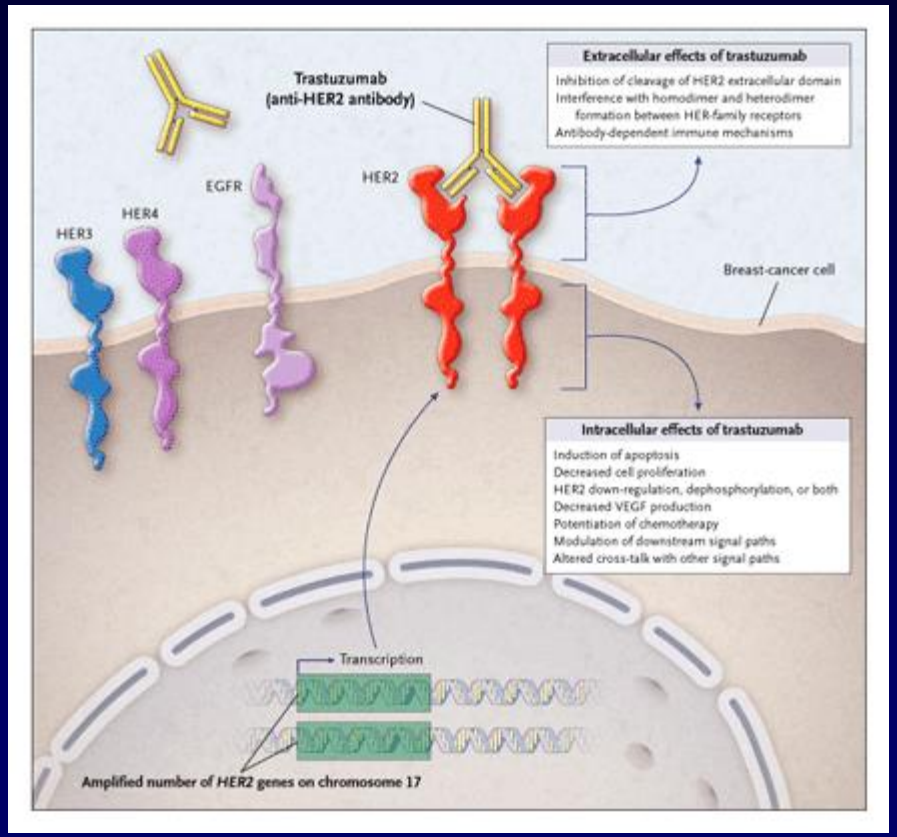
Axel Ullrich, PhD

Median Survival from First Diagnosis

HER-2 overexpressing	3 yrs
HER-2 normal	6 - 7 yrs

Slamon et al, *Science* 1987, *Science* 1989

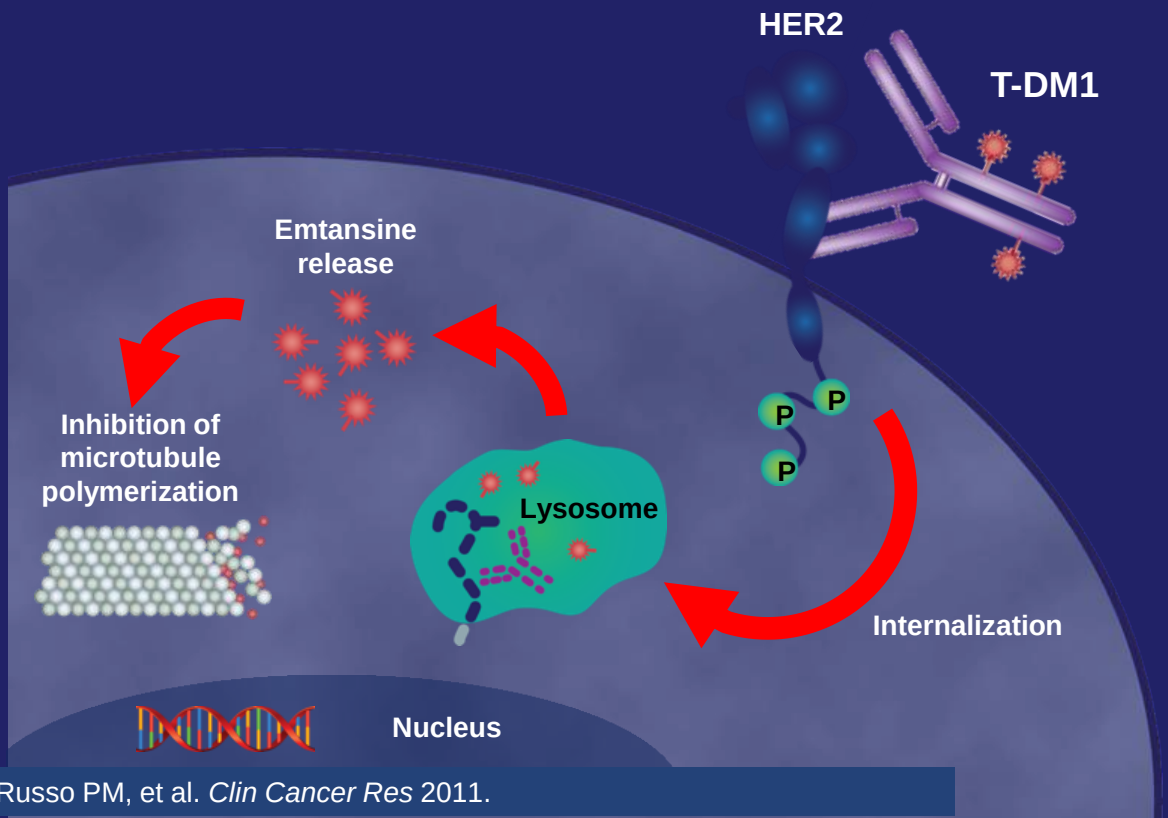
Second Approval of Monoclonal Antibody to Target Cancer: Trastuzumab (1998)



Median OS (95% CI) (months) by year of diagnosis of MBC	
2008	39.1 (36.2-46.5)
2009	42.1 (38.2-50.8)
2010	39.4 (35.9-45.4)
2011	41.1 (35.5-48.3)
2012	50.8 (45.0-55.5)
2013	58.0 (52.0-68.4)
2014	NR (50.6-NR)
2015	NR (55.7-NR)
2016	NR (NR-NR)

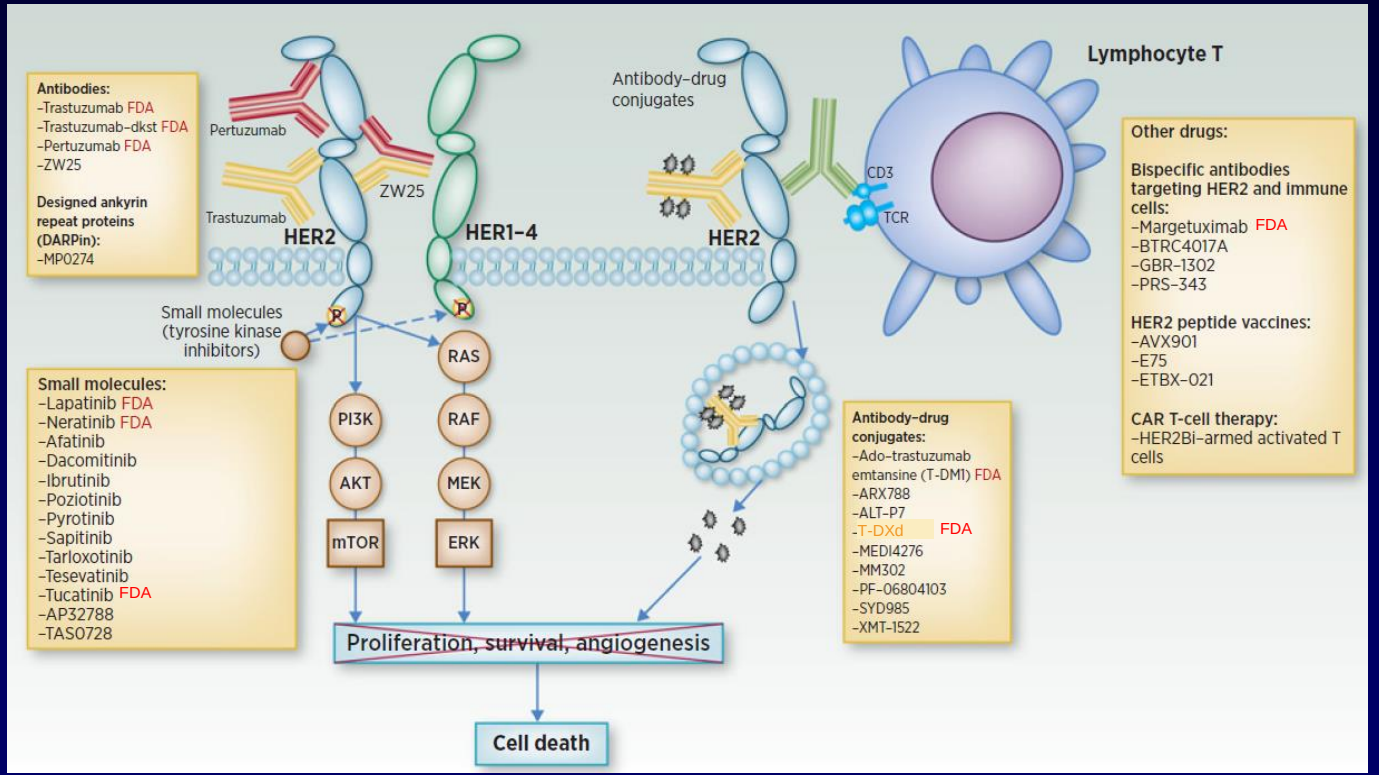
Burstein H. *N Engl J Med.* 2005;353(16):1652-1654.

Trastuzumab Emtansine (T-DM1): Mechanism of Action of An Antibody Drug Conjugate



Adapted from LoRusso PM, et al. *Clin Cancer Res* 2011.

Flash Forward: We Have an Expanding Armamentarium of Agents for HER2+ Breast Cancer



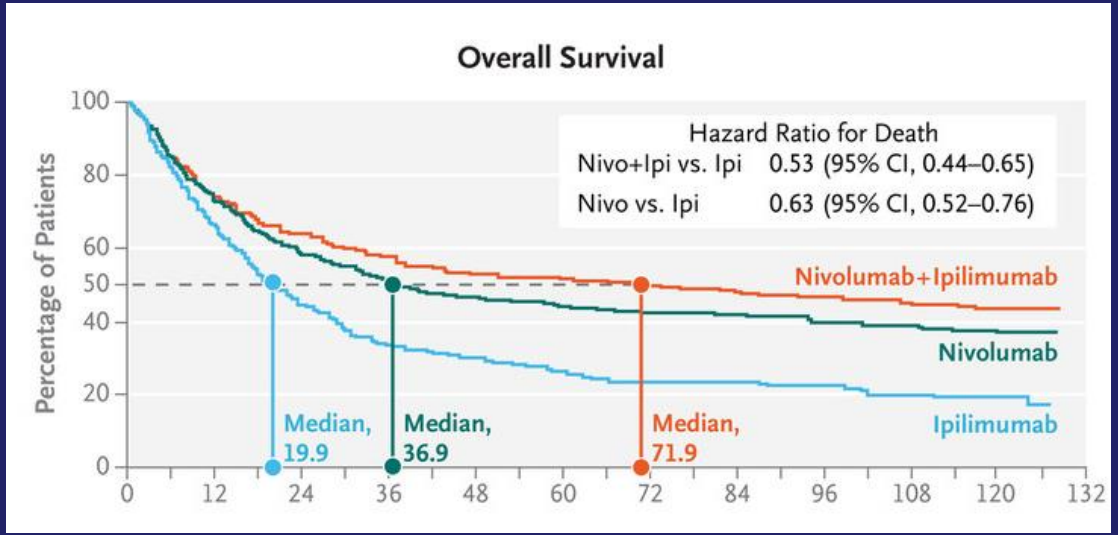
PI3K = phosphoinositide-3 kinase; AKT = a serine/threonine kinase; mTOR = mammalian target of rapamycin.

Meric-Bernstam F, et al. *Clin Cancer Res.* 2019;25:2033-2041.

Long term survivorship after cancer has spread is becoming an increasingly common reality

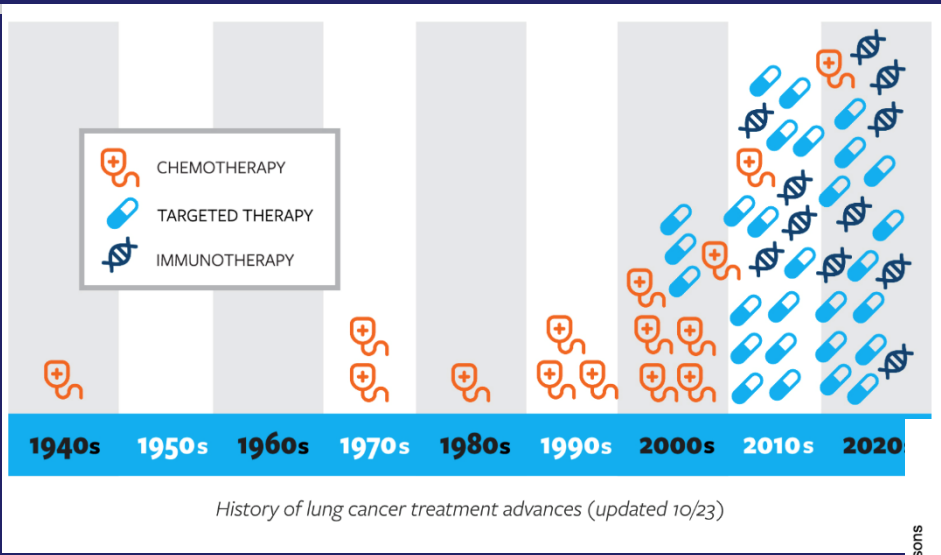
Jimmy Carter diagnosed at age of 90 with metastatic melanoma to the brain. Lived to 100 thanks to immune therapy (longest living president in history)

- Prior to introduction of immune therapy, median survival for metastatic melanoma was 6-9 months (Knight A et al. Cancers 2023)

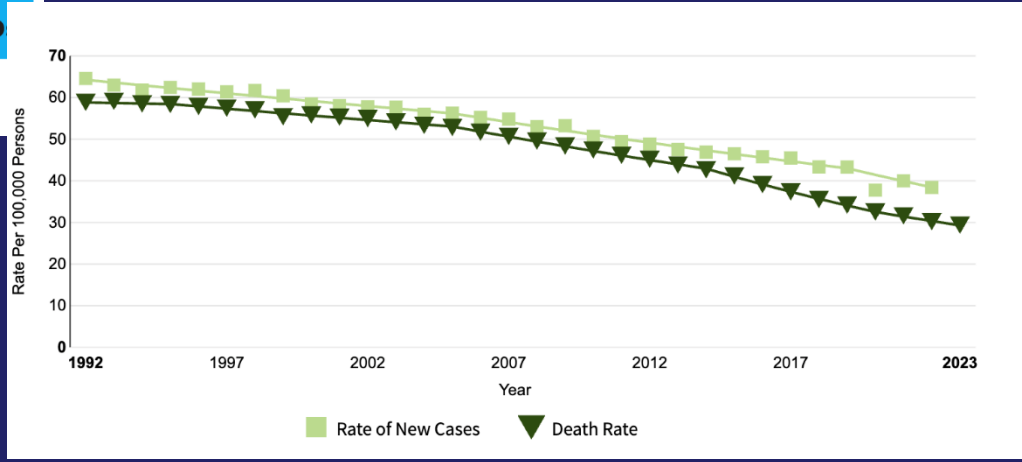


https://pubmed.ncbi.nlm.nih.gov/39282897/

As New Therapies Become Available, Survival For Lung Cancer Increases



History of lung cancer treatment advances (updated 10/23)



https://seer.cancer.gov/statfacts/html/lungb.html

https://www.lungcancerresearchfoundation.org/research/why-research/treatment-advances/

Survivorship

The What and The Why

Survivorship

- **Survivorship begins with a cancer diagnosis of <u>any stage</u>**
- **Some survivors are living with known active cancer, others are living cancer free**
- **Life after a cancer diagnosis is forever different, requiring those affected to find a ”new normal”**

https://www.cancer.gov/about-cancer/coping/survivorship

Late Effects of Cancer Treatment

- Bone loss
- Gastrointestinal problems
- Brain/cognitive effects
- Sexual side effects
- Thyroid dysfunction
- Early menopause
- Fertility effects
- Eye and hearing problems
- Neuropathy
- Heart problems
- Lung problems
- Lymphedema
- Dental issues
- Skin/hair changes
- New cancers
- Post traumatic stress

https://www.cancer.gov/about-cancer/coping/survivorship

Common Experiences of Survivors

- Fear, anxiety about recurrence or worsening of disease
- Emotional distress during and after active therapy
- Feeling untethered after active therapy ends
- Cancer = Loss of Control

Survivorship Care Can Help Patients Regain Sense of Control

- **Follow Up/Survivorship Care Plan (SCP)**
  - **Summary of treatment with recommendations for cancer care**
  - **Including what symptoms to report**
  - **Tests/surveillance needed**
  - **Long-term consequences of treatment**
  - **Support group referral**
  - **Measures to reduce risk of recurrence**
- **SCP in isolation have not been shown to improve outcomes, possibly because the plan is not implemented**

https://www.cancer.gov/about-cancer/coping/survivorship

Survivorship Team Comprised of Many Individuals (different for all patients)

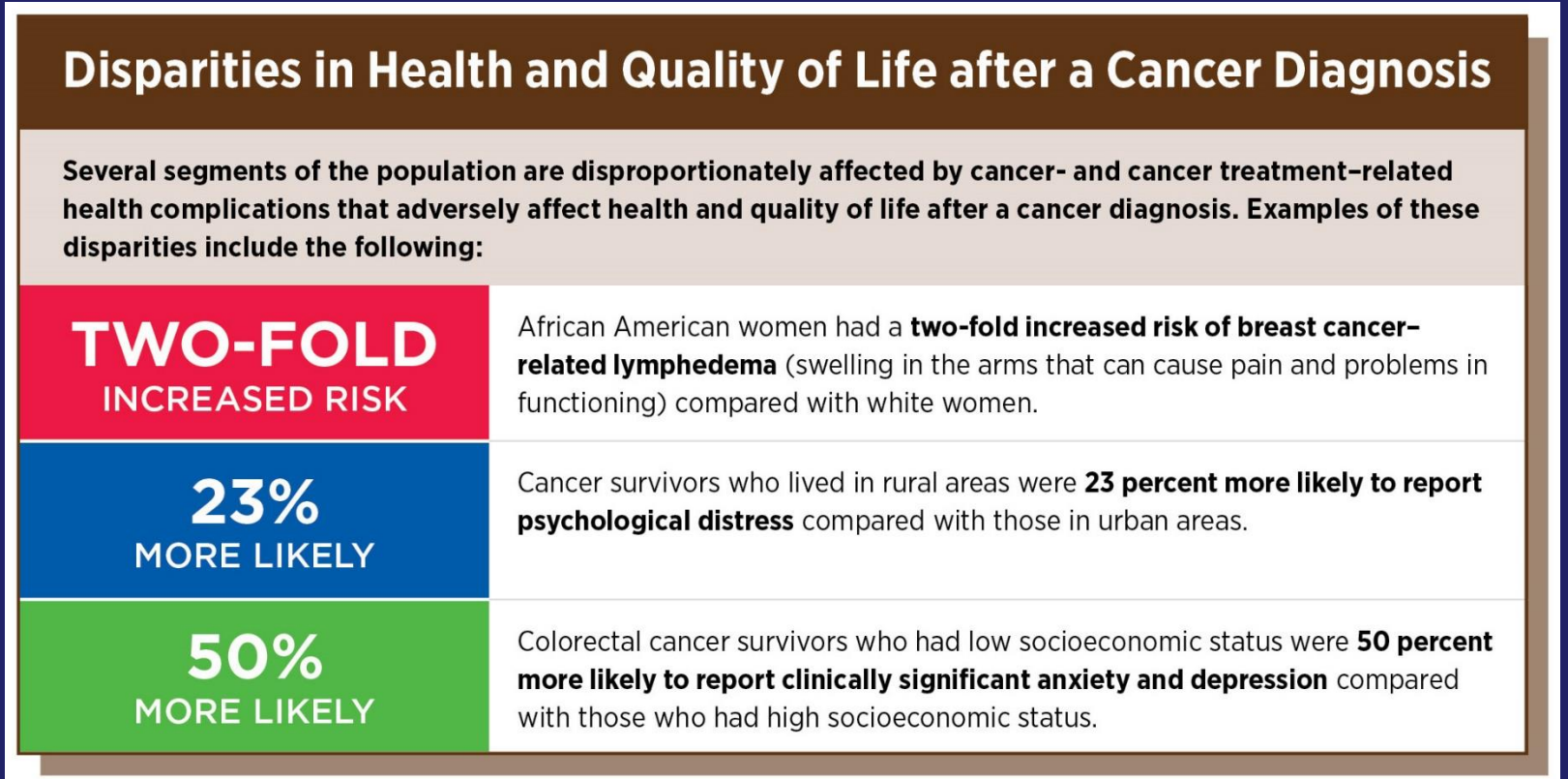
- Primary care provider
- Subspecialists
- Nurses/APPs
- Social worker, psychologist, mental health professionals
- Physical therapist
- Nutritionist
- Palliative care
- Spiritual care

What is the best model for survivorship??

This is not well defined!

Many ways to do this…

Disparities in Survivorship



American Association for Cancer Research (AACR) Cancer Disparities Progress Report 2020

Regaining Control

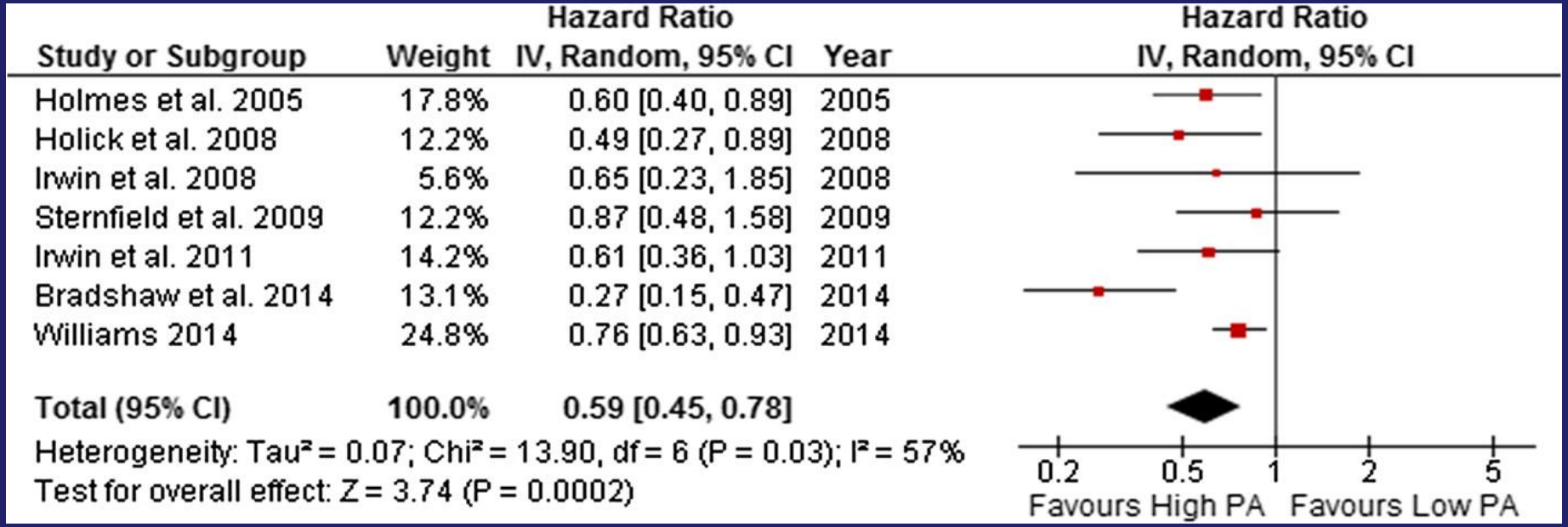
What can cancer survivors do to help their outcomes?

ACS/ACSM Survivor Recommendations:

- Maintain a healthy weight
  - Attempt weight loss if overweight or obese
- **Activity**
  - **>30 minutes of moderate to vigorous activity 5+days/week**
  - **Strength training or resistance training 2x/week**
- Consume a healthy diet
  - >5/day servings of fruits and vegetables
  - limited ingestion of processed foods and red meats.
- Limit alcohol ≤ 1/day for women and ≤ 2/day for men
- Quit smoking
- **Stay up to date with screenings and vaccination with primary care provider**
- Use sunscreen

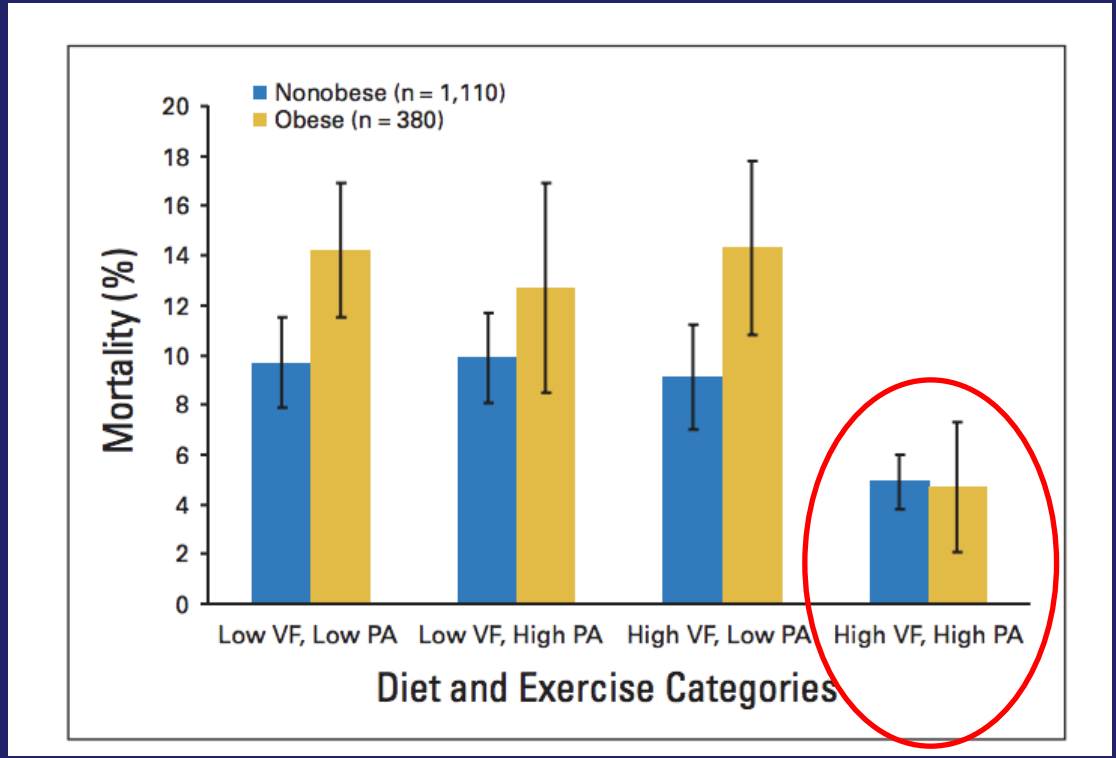
Slide Courtesy of Rachel Yung, MD

Physical Activity Reduces Risk of Breast Cancer-Specific Death



Lahart; *Acta Oncologica* **2015,** 54, 635-654.

Good Diet and Physical Activity: lowers mortality in breast cancer survivors, regardless of obesity



Pierce, JCO, 2007

What does activity look like?

Slide Courtesy of Rachel Yung, MD

Benefits of activity:

- Fun
- Gives us energy
- Improves mood & sleep
- Counteracts side effects
- Helps Weight management
- Decreases risk of
  - Breast cancer recurrence
  - Heart disease
  - Diabetes

Slide Courtesy of Rachel Yung, MD

Questions & Discussion