



Florida and the Cancer Moonshot

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Florida and the Cancer Moonshot

Overview



**Florida's
Cancer Problem**



**Lessons from
Cancer History**



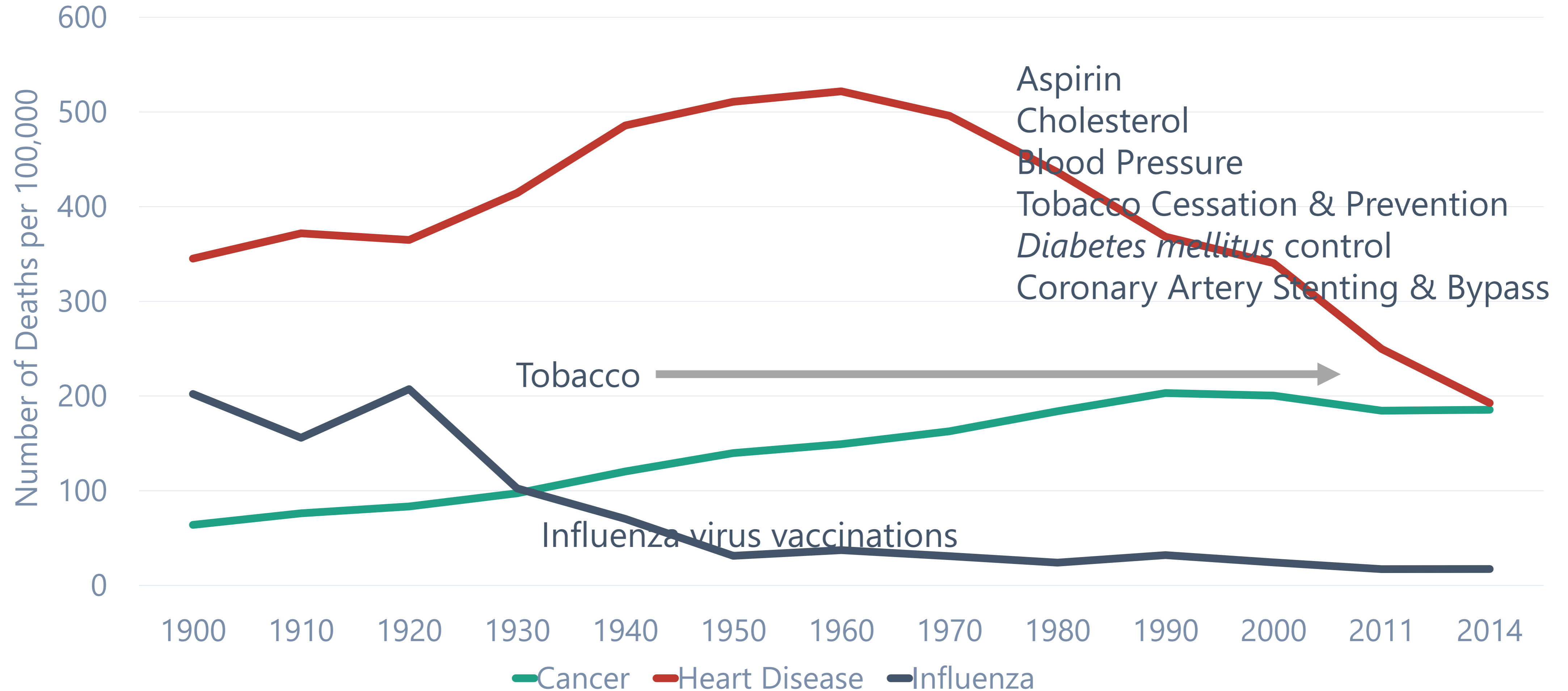
**National
Cancer Moonshot**



**Florida's
Cancer
Moonshots**

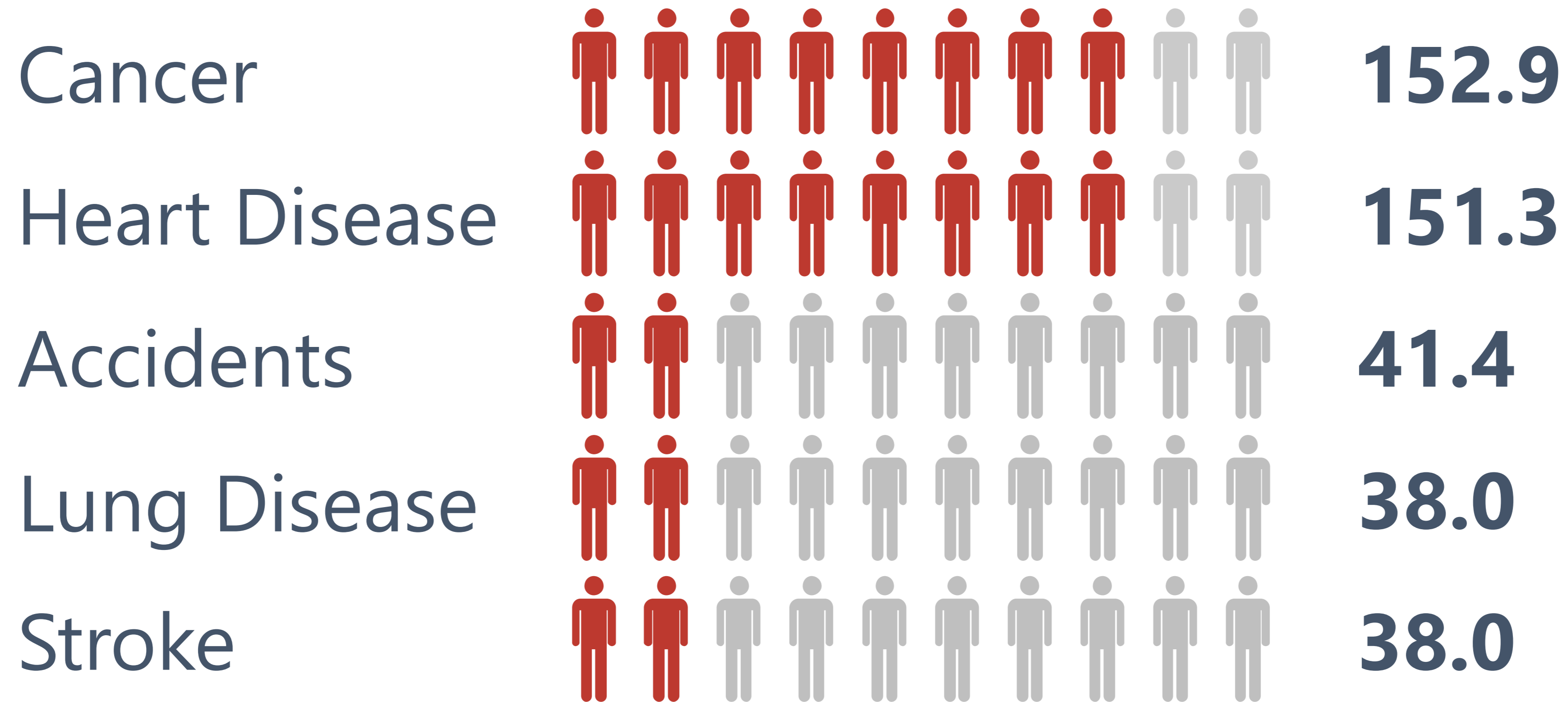
Leading Causes of Death in the U.S.

Data from National Vital Statistics Reports, CDC, US DHHS



Florida's Top 5 Causes of Deaths

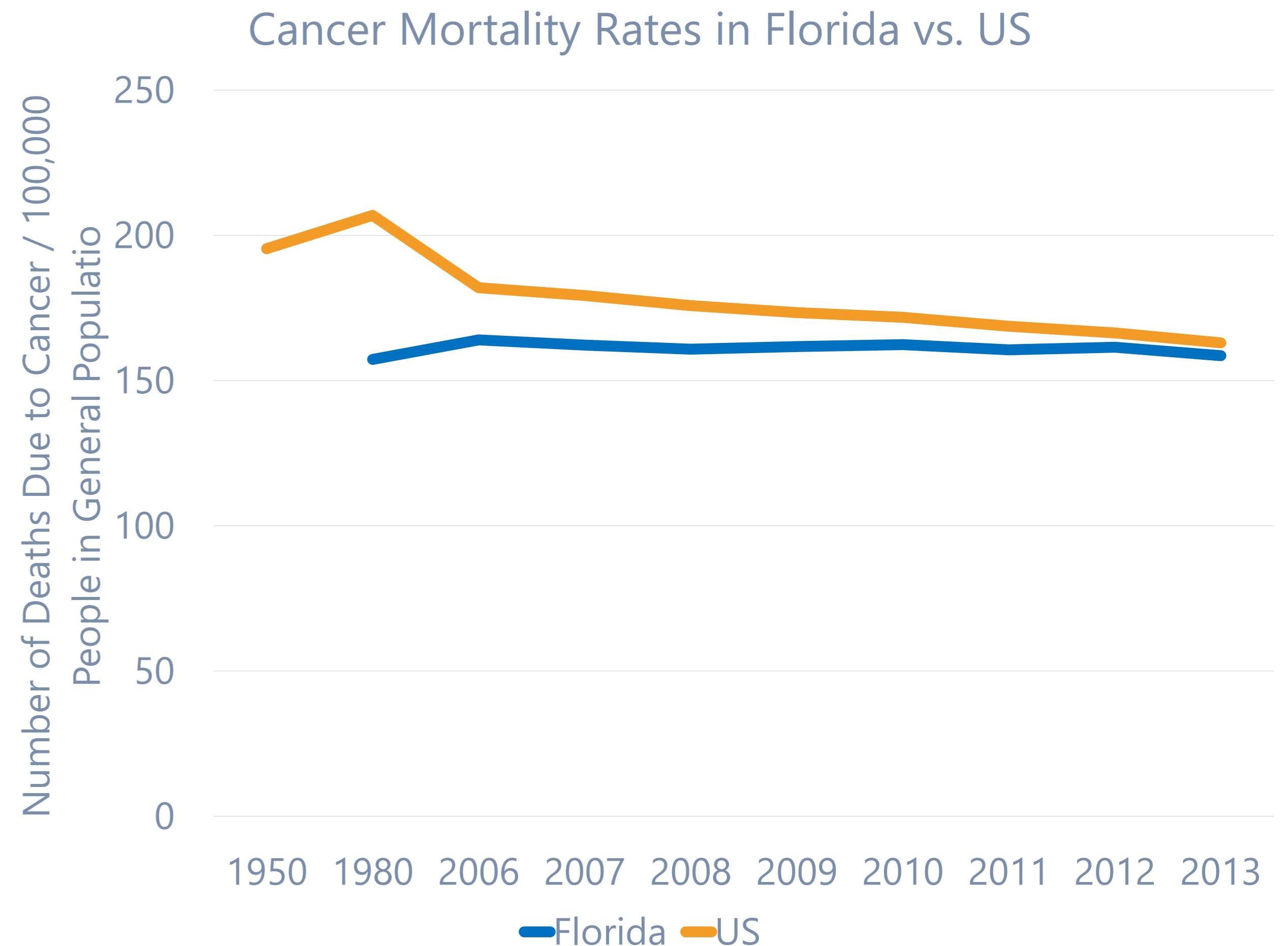
Stateline analysis of CDC data 2014, Number per 100,000 individuals



Cancer Deaths in Florida

Data from FCDS and SEER

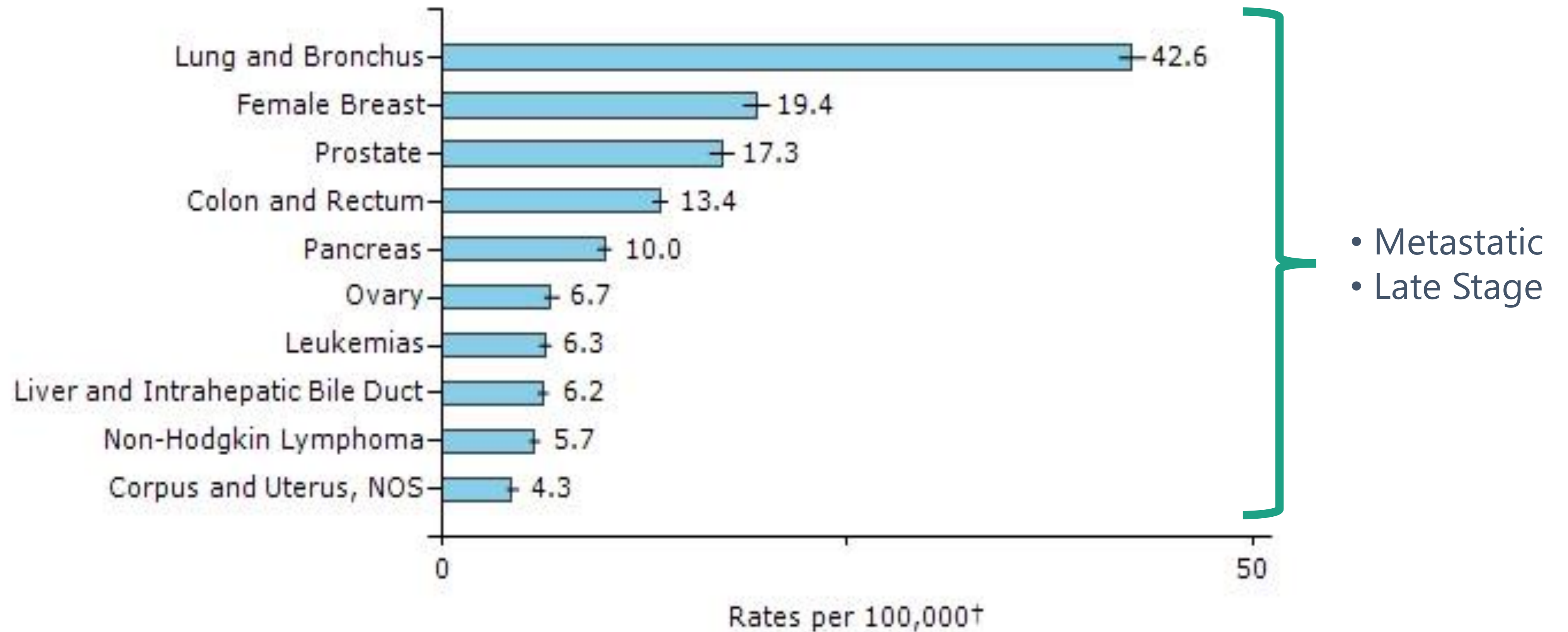
- 12.5% **decline** since 1950s
- Reasons for fewer deaths:
 1. Tobacco **cessation & prevention**
 2. Better **cancer screening** for breast, cervix, prostate
 3. Improved **diet & sanitation** reducing stomach cancer
 4. Avoid **estrogen + progesterone** in post-menopausal women
 5. Better **treatment for limited stage** cancers



Cancer Deaths in Florida

Data from CDC 1999–2013 Incidence and Mortality Web-based Report

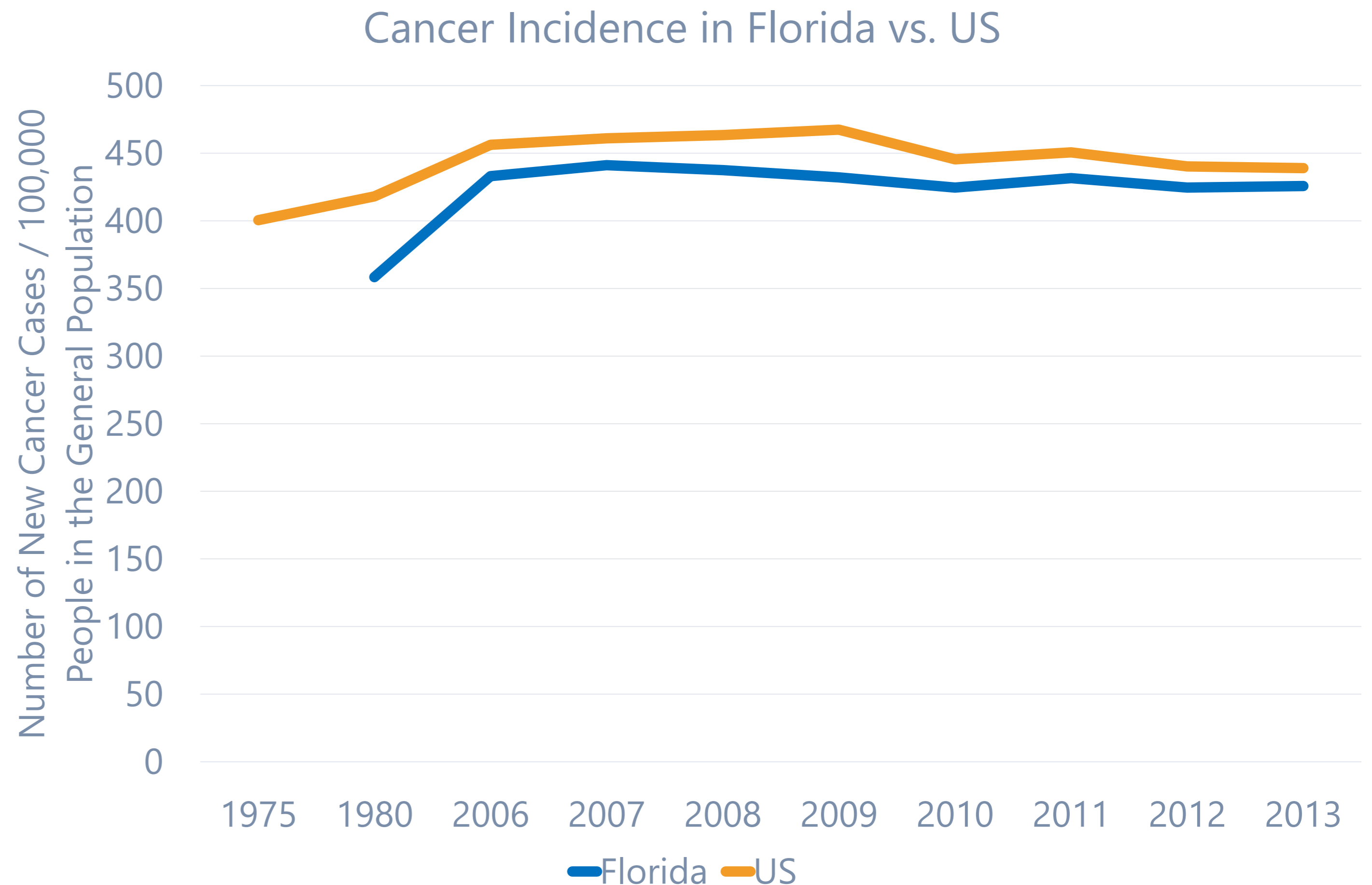
Top 10 Cancer Sites: 2013, Male and Female, Florida—All Races



Cancer Incidence in Florida

Data from FCDS and SEER

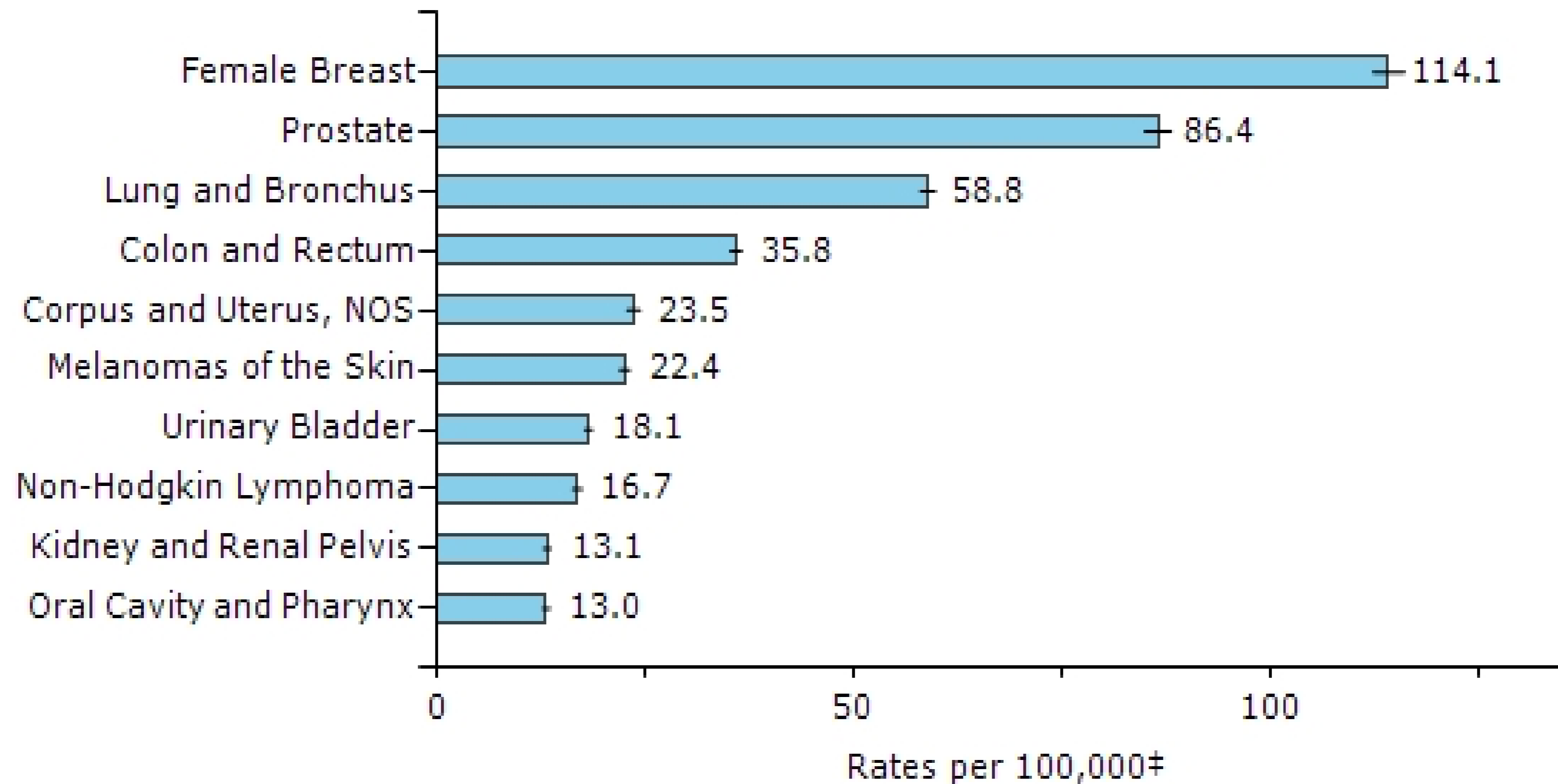
- 10% **increase** since 1970s
 - Longer life-span
 - Increased cancer screening
 - Diet & exercise
 - Pregnancy & breast-feeding
- **110,000** cancer cases per year reported to FCDS
- **+ 20,000** cases per year in outpatient clinics
 - Prostate cancer
 - Skin cancers
 - Blood/Lymph Node cancers
- 1.3 Million Floridians with **History of Cancer**



Cancer Incidence in Florida

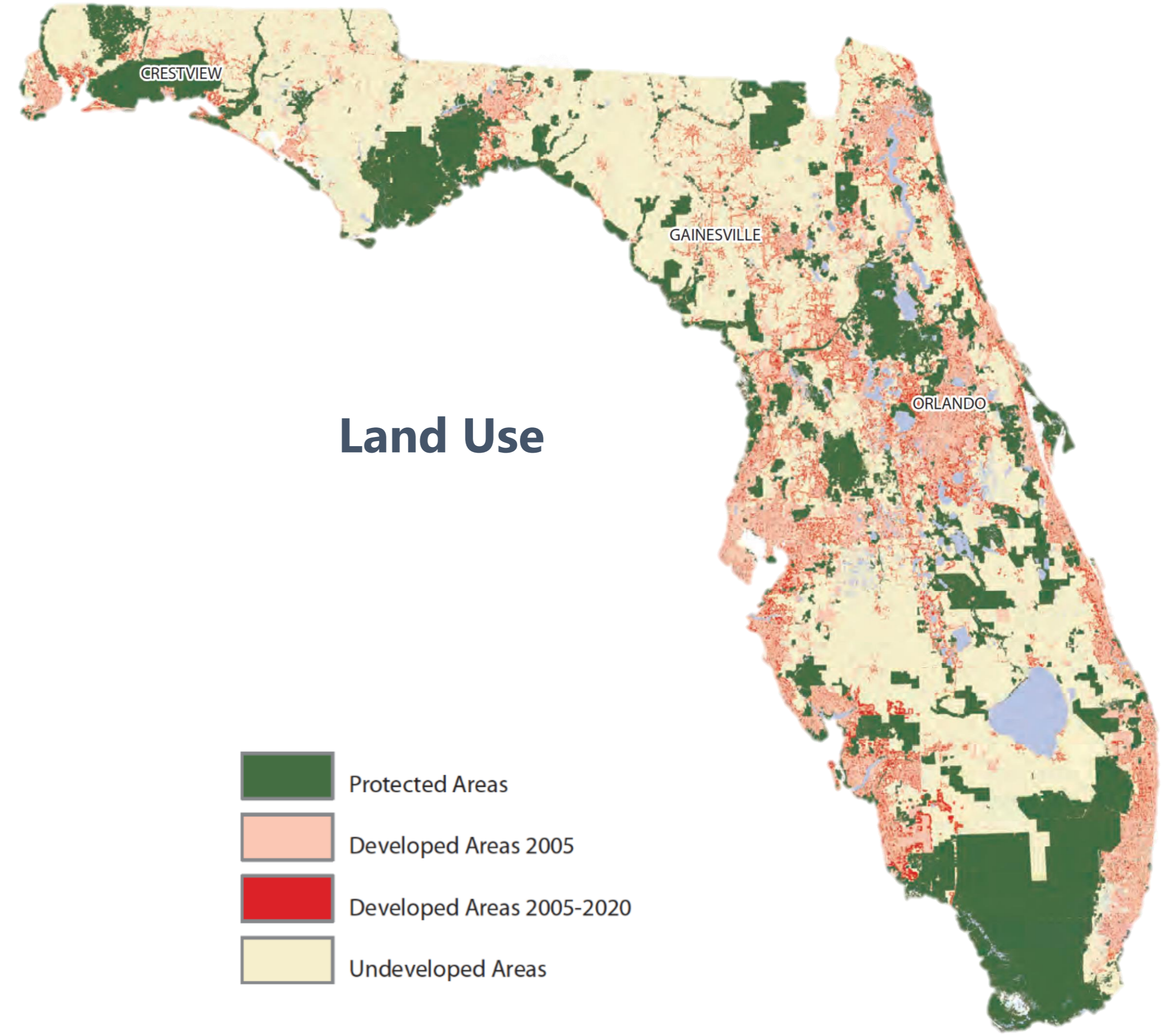
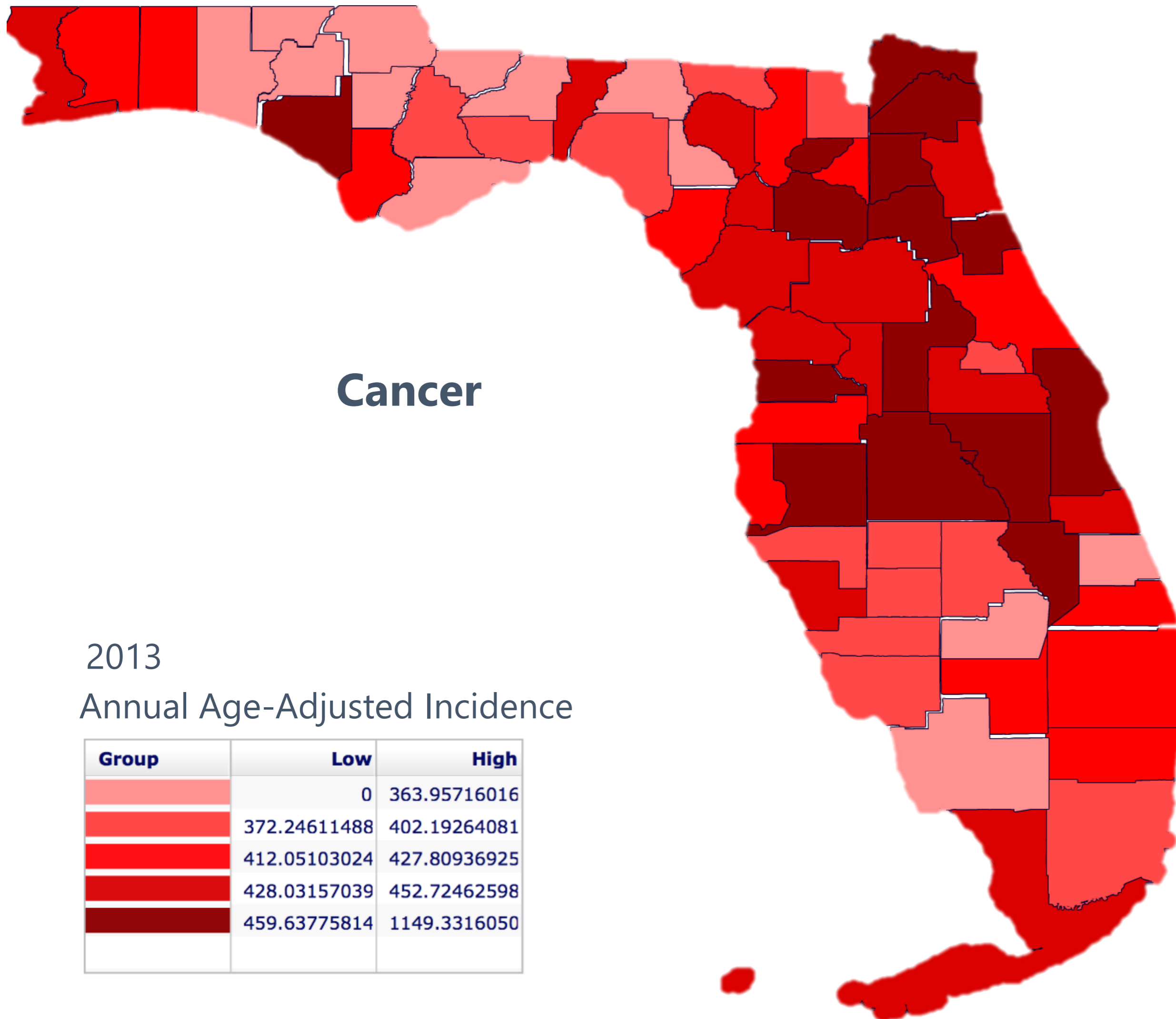
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Top 10 Cancer Sites: 2013, Male and Female, Florida—All Races






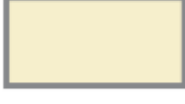
Cancer Incidence in Florida

Data from FCDS



2013
Annual Age-Adjusted Incidence

Group	Low	High
	0	363.95716016
	372.24611488	402.19264081
	412.05103024	427.80936925
	428.03157039	452.72462598
	459.63775814	1149.3316050

-  Protected Areas
-  Developed Areas 2005
-  Developed Areas 2005-2020
-  Undeveloped Areas

Florida's Cancer Problem

- **Common:**

44 Floridians will be **diagnosed with cancer** during this presentation.

- **Lethal:**

11 Floridians will **die of cancer** during this presentation.

Lessons from the Past

Wars, Rocket Launches on Cancer

1910s

American Society for the Control of Cancer

1940s

Mary Lasker transforms American Cancer Society and promotes War on Cancer

1962

Drug Efficacy Amendment to FDA Act.

1971

National Cancer Act: \$1 Billion for cancer research



Surgery

Bilroth, Handley and Halsted

Screening

Pap smear
1923

Chemotherapy

Nitrogen mustard
chemotherapy for
lymphomas

Thalidomide

Europe: thousands of
children born with birth
defects as a result of
taking thalidomide for
morning sickness during
pregnancy

Screening

Mammography
1960s

CT Scan

Replaced exploratory
surgery and quantified
tumor response

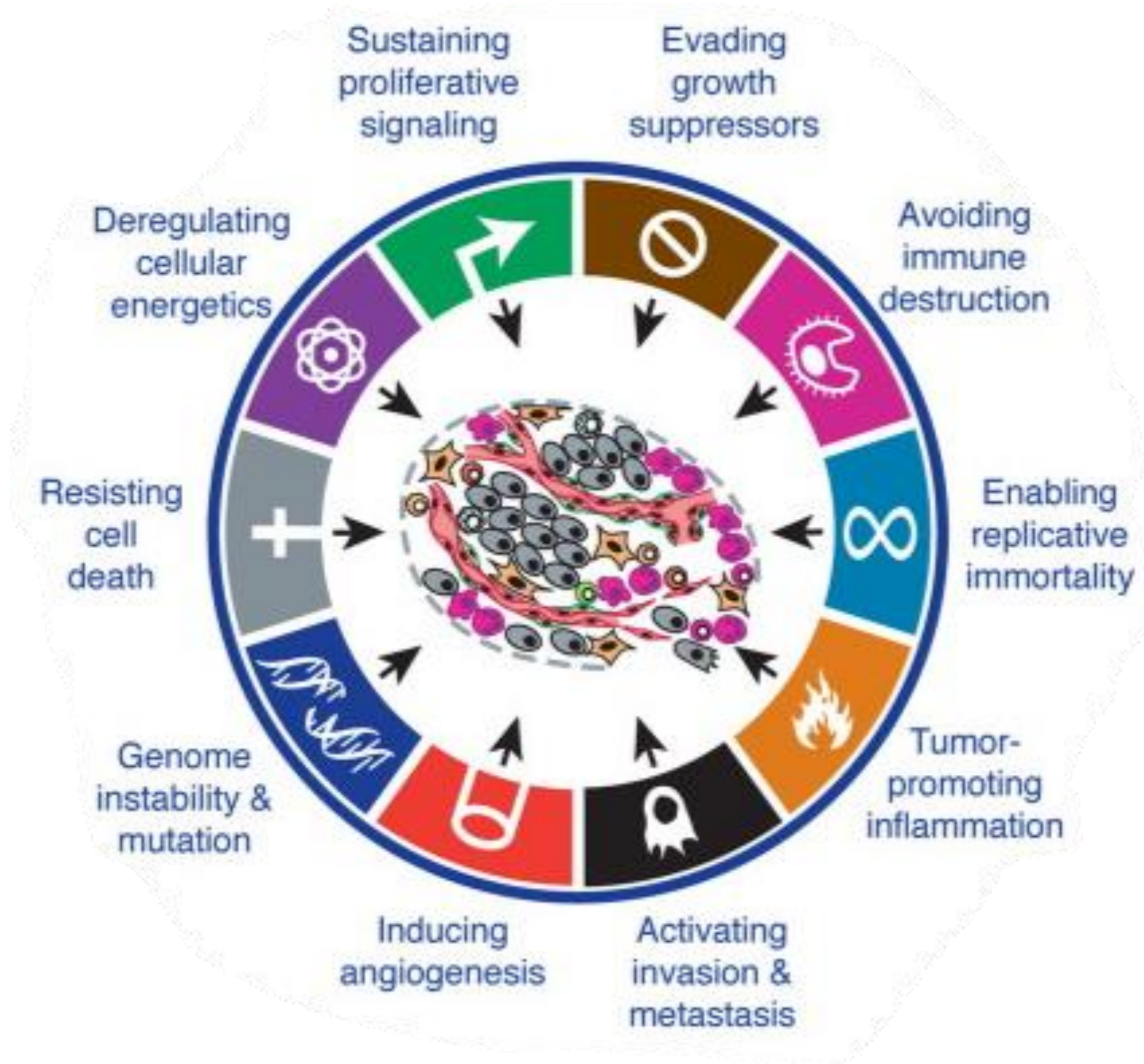
Radiation Therapy

Roentgen, Ewing

Immune Therapy

Coley's toxins

10 Hallmarks of Cancer



Lessons from the Past

Wars, Rocket Launches on Cancer

1983

PCR invented

1986

PSA test

1990 - 2003

Human Genome Project

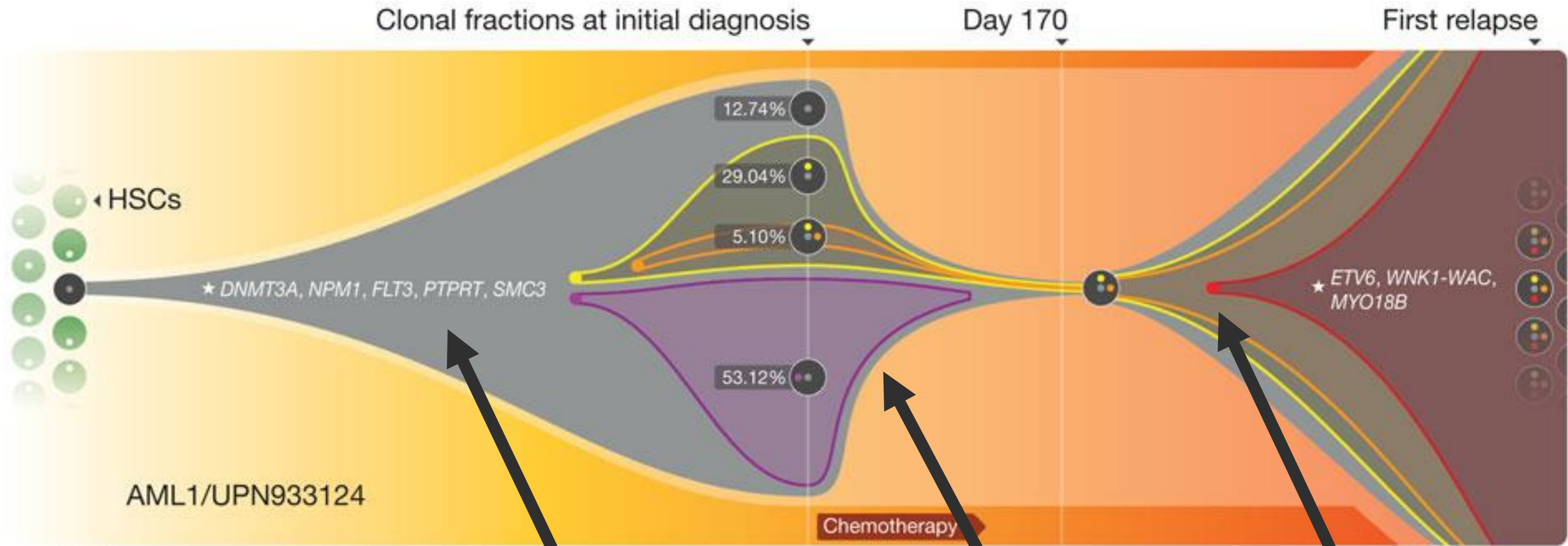
- Department of Energy & NIH
- International effort
- \$3 billion over 13 years



**Multi-Modality
Treatments**

**Bone Marrow
Transplantation**

Cancer Evolution



Cancers are: **Multi-Genetic** **Multi-Clonal** **Evolving**

Lessons from the Past

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PCR invented

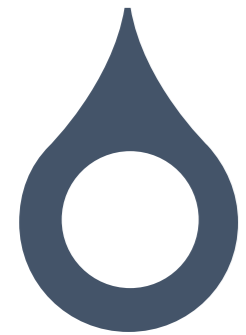
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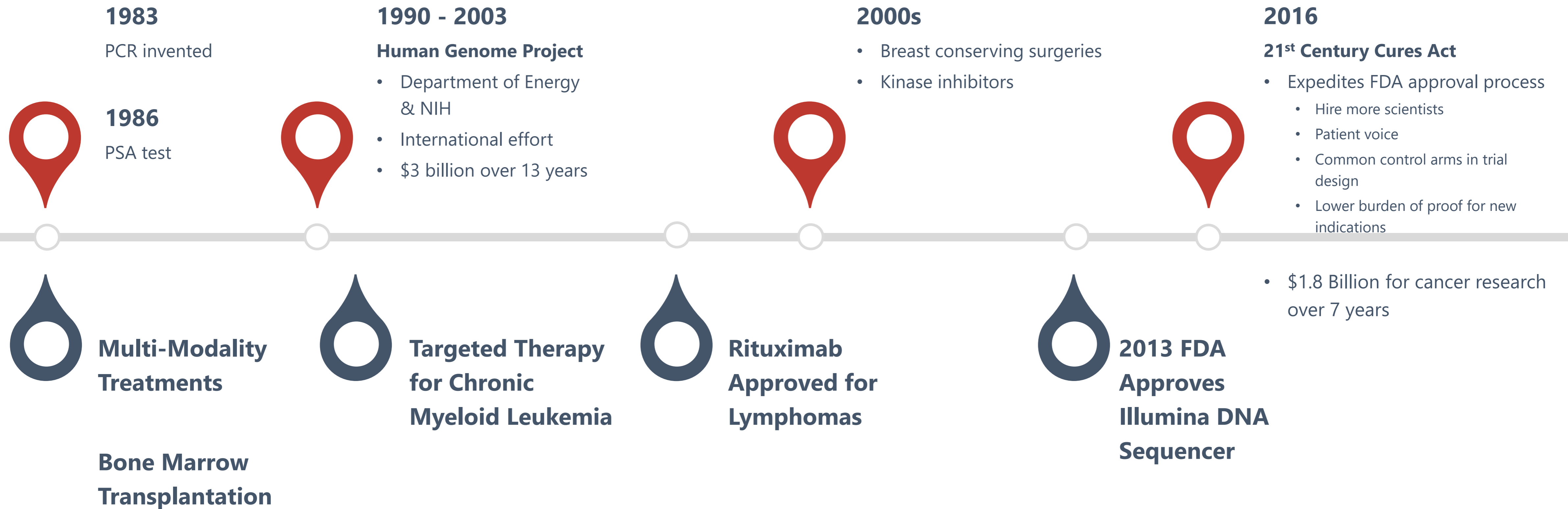


**Multi-Modality
Treatments**

**Bone Marrow
Transplantation**

Lessons from the Past

Wars, Rocket Launches on Cancer



National Cancer Moonshot

Accelerate cancer research to **prevent** more cancers, **detect** cancer earlier, and **treat** more patients.

- 1 Patients to donate cancer information
- 2 Immunotherapy network
- 3 Cancer resistance
- 4 National system to share patient cancer information
- 5 Pediatric cancer
- 6 Side effects of cancer treatment
- 7 Prevention and Early Detection of Cancer
- 8 Mine past patient data to predict future patient outcomes
- 9 Cancer evolution in 3-D
- 10 New cancer technologies

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Chimeric Antigen Receptor T Cell Therapy

CAR-T or Adoptive Cell Transfer

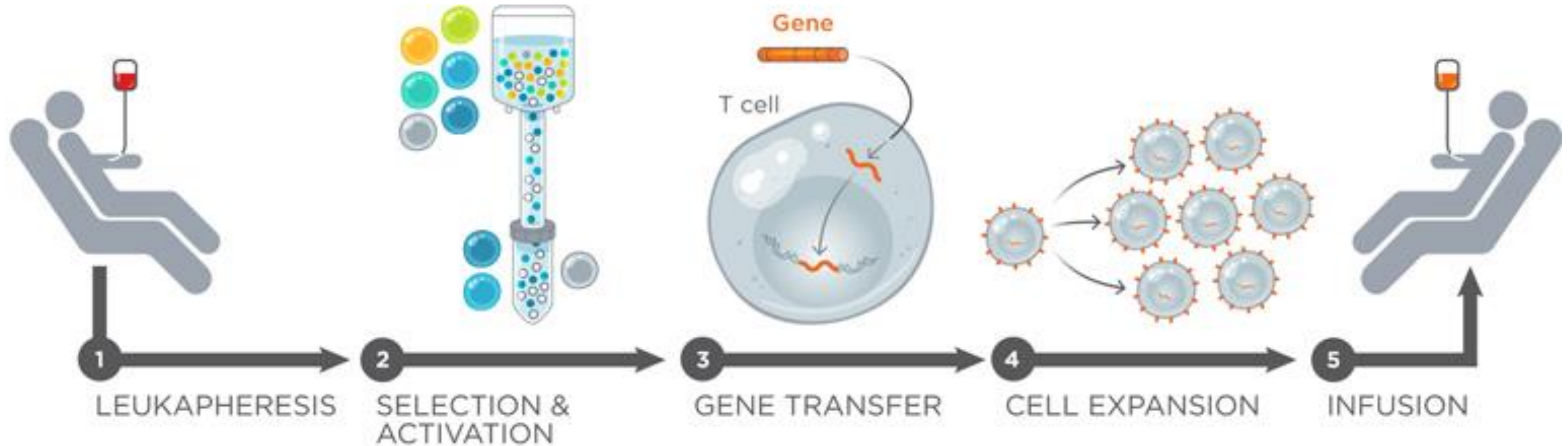


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Chimeric Antigen Receptor T Cell Therapy

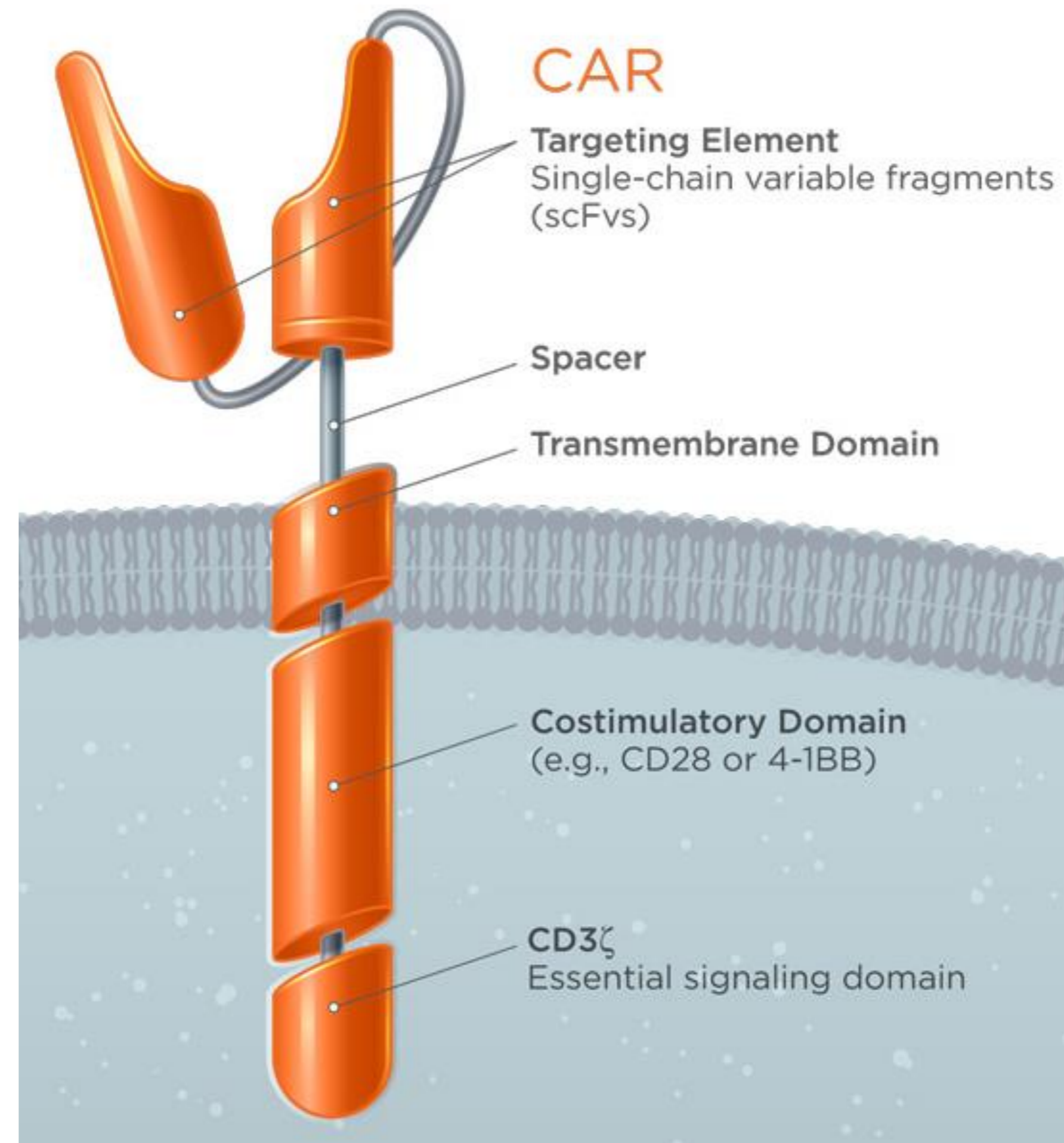
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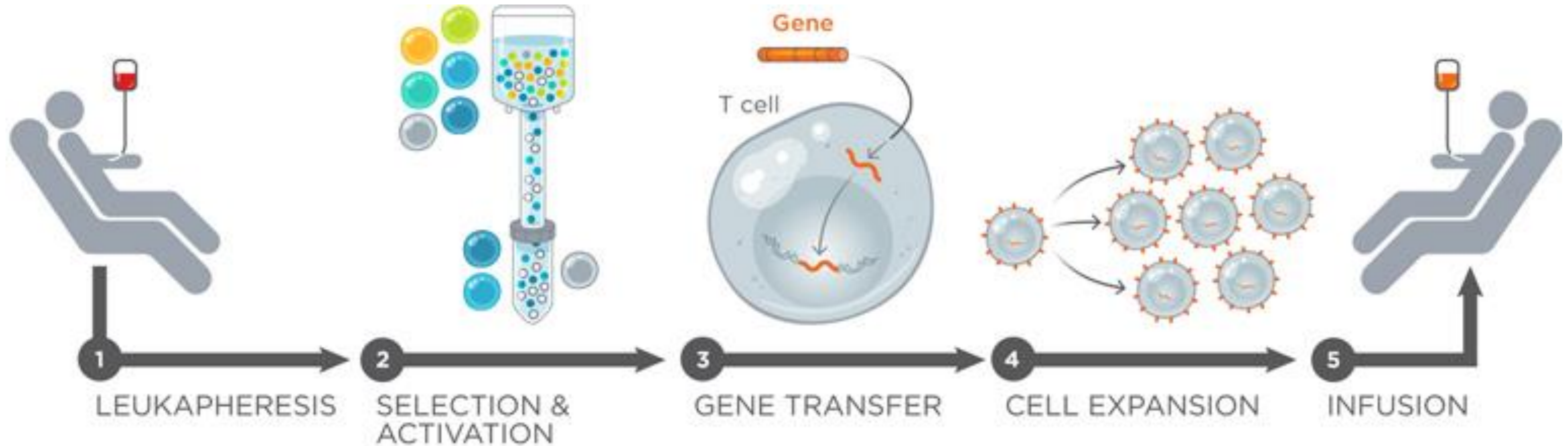
Antibody
|
|
|
|
|
T Cell Receptor



B lymphocyte
|
|
|
|
|
T lymphocyte

Chimeric Antigen Receptor T Cell Therapy

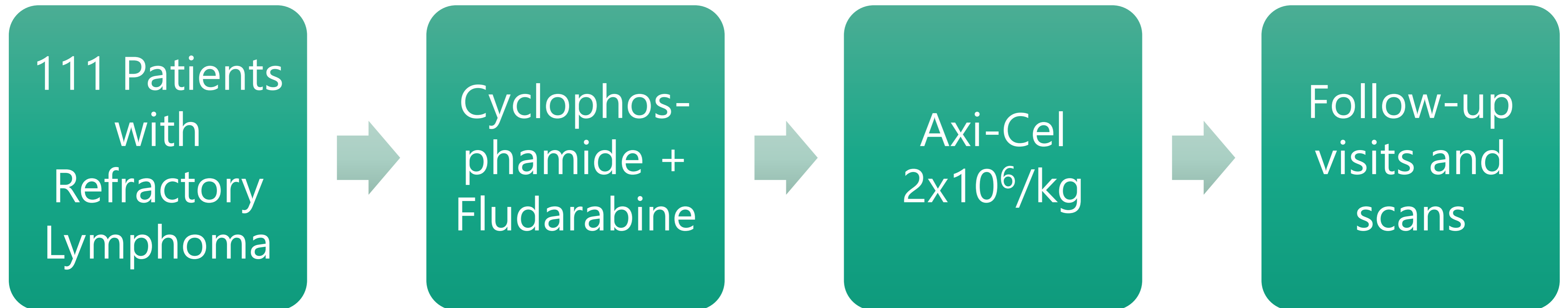
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Chimeric Antigen Receptor T Cell Therapy

CAR-T or Adoptive Cell Transfer

ZUMA-1: A phase 2 multi-center study evaluating anti-CD19 chimeric antigen receptor (CAR) T cells in patients with refractory aggressive non-Hodgkin lymphoma (NHL)



Chimeric Antigen Receptor T Cell Therapy

CAR-T or Adoptive Cell Transfer

ZUMA-1: A phase 2 multi-center study evaluating anti-CD19 chimeric antigen receptor (CAR) T cells in patients with refractory aggressive non-Hodgkin lymphoma (NHL)

Lymphoma Type	N	Overall Response	Complete Remission
Diffuse Large Cell B Cell	73	68%	33%
Primary Mediastinal, Transformed Follicular	20	80%	55%
Total	93	71%	38%

Current Standard

26% OR

8% CR

Chimeric Antigen Receptor T Cell Therapy

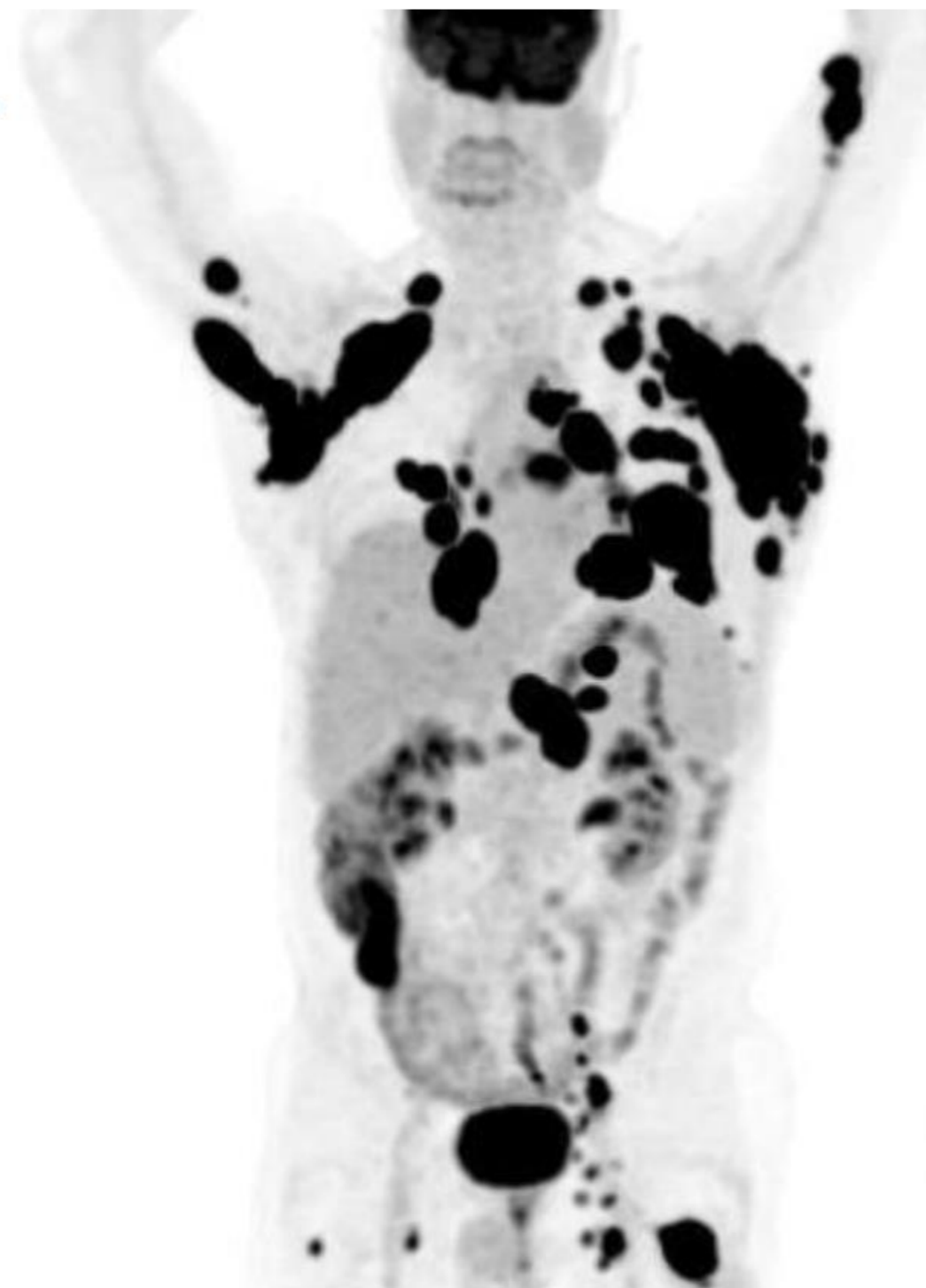
CAR-T or Adoptive Cell Transfer

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Baseline

Day 90

- 62-yo M with DLBCL
- Prior therapies
 - R-CHOP
 - R-GDP
 - R-ICE
 - R-lenalidomide
- No response to last 3 lines of therapy



Computational Biology to Predict Treatment Response

Next Generation Sequencing + Big Data + Informatics



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Computational Biology to Predict Treatment Response

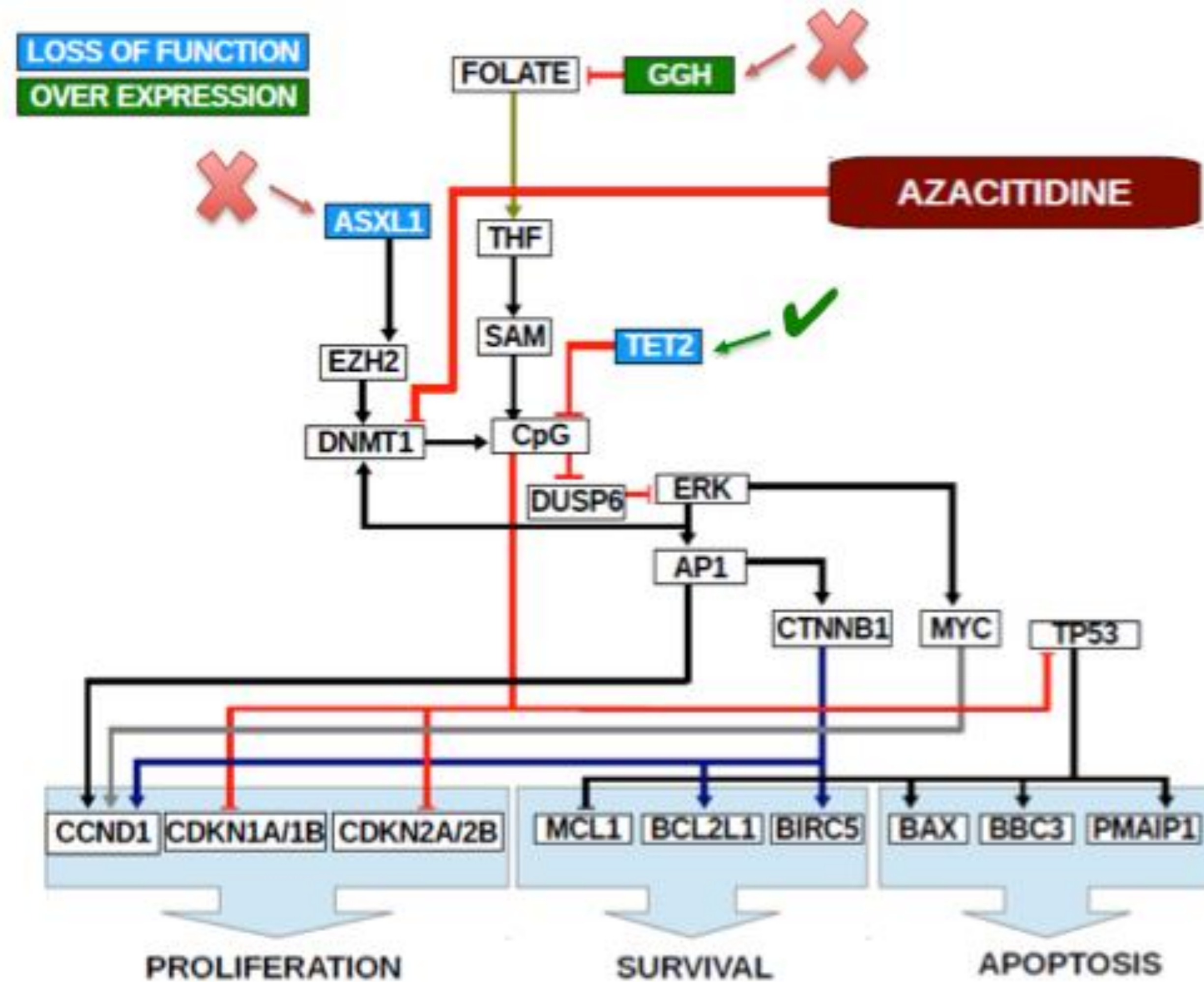
Next Generation Sequencing + Big Data + Informatics

Myelodysplastic Syndromes

	LENALIDOMIDE	HMA_s	LENALIDOMIDE + AZA
Study	Mallo, et al. 2013 <i>British Journal of Haematology</i>	Bejar, et al. 2014 <i>Blood</i>	Sekeres, et al. 2012 <i>Blood</i>
Sample size	52 Patients	213 Patients	36 Patients
Clinical Responders	80%	46%	80%

Computational Biology to Predict Treatment Response

Next Generation Sequencing + Big Data + Informatics



Computational Biology to Predict Treatment Response

Next Generation Sequencing + Big Data + Informatics















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Sample size	52 Patients	213 Patients	36 Patients
Clinical Responders	80%	46%	80%
Computer Prediction Accuracy	80%	80%	100%
P-value	0.03586	0.02564	0.022

Florida Cancer Control & Research Advisory Council

<http://www.ccrab.org>, [Section 1004.435, Florida Statutes](#)

1. Advise the Florida Board of Governors, Florida Surgeon General, and Florida Legislature with respect to cancer control and research in Florida.
2. Florida Cancer Plan
3. Florida Research Plan
4. Cancer Center of Excellence Awards

 Christopher Cogle, MD Chair, University of Florida Senate President's Appointee	 Clement Gwede, Ph.D., MPH, RN, FAAN, Vice Chair Moffitt Cancer Center			
 Celeste Philip, MD, MPH Florida's Surgeon General	 Jessica Bahari-Kashani, MD Florida Medical Association	 Robert Cassell, MD, Ph.D. Association of Community Cancer Centers, Florida Society of Clinical Oncology	 Asher Chanan-Kahn, MD Florida Hospital Association	
 Marti Coley Eubanks, Director Government Relations Nemours Children Hospital	 Lawrence Hochman, DO, FACRO Florida Cancer Affiliates-Tampa Florida Osteopathic Medical Association	 TBD Speaker Pro-Tempore House Speaker's Appointee	 Duane Mitchell, MD, Ph.D. University of Florida Appointee	 Theresa Morrison, Ph.D., CNS-BC Florida Nurses Association
 Amy Smith, MD Arnold Palmer Hospital for Children Governor's Appointee	 TBD Senate President's Appointee	 Megan Wessel, MPH American Cancer Society	 Mohammad Jahanzeb, MD, FACP Sylvester Comprehensive Cancer Center University of Miami	

Florida Cancer Plan

2015 – 2020

Faces of Cancer	Best Defense is Great Offense	Improving Patient Outcomes	Beyond Cancer Diagnosis	Destination for Research & Care
Expand FCDS case capture	Reduce tobacco use	Health equity and access	Cancer survivorship	Invest in biomedical research
Data repository of outcomes	Promote healthy lifestyles (obesity, HPV vaccine, UV, radon)	Quality cancer care	Quality of life	Biomedical workforce pipeline (K-12 & beyond)
Data repository of screening, laboratory and molecular data	Increase cancer screenings	Clinical trials	End of life care	Telehealth

Florida's Cancer Priorities

Florida Cancer Plan 2015-2020

01

**Funding for
the Biomedical
Research
Programs (King
& Coley)**

02

**HPV
vaccination to
prevent
cervical cancer
and head &
neck cancer**

03

**Tobacco
Prevention and
Cessation**

04

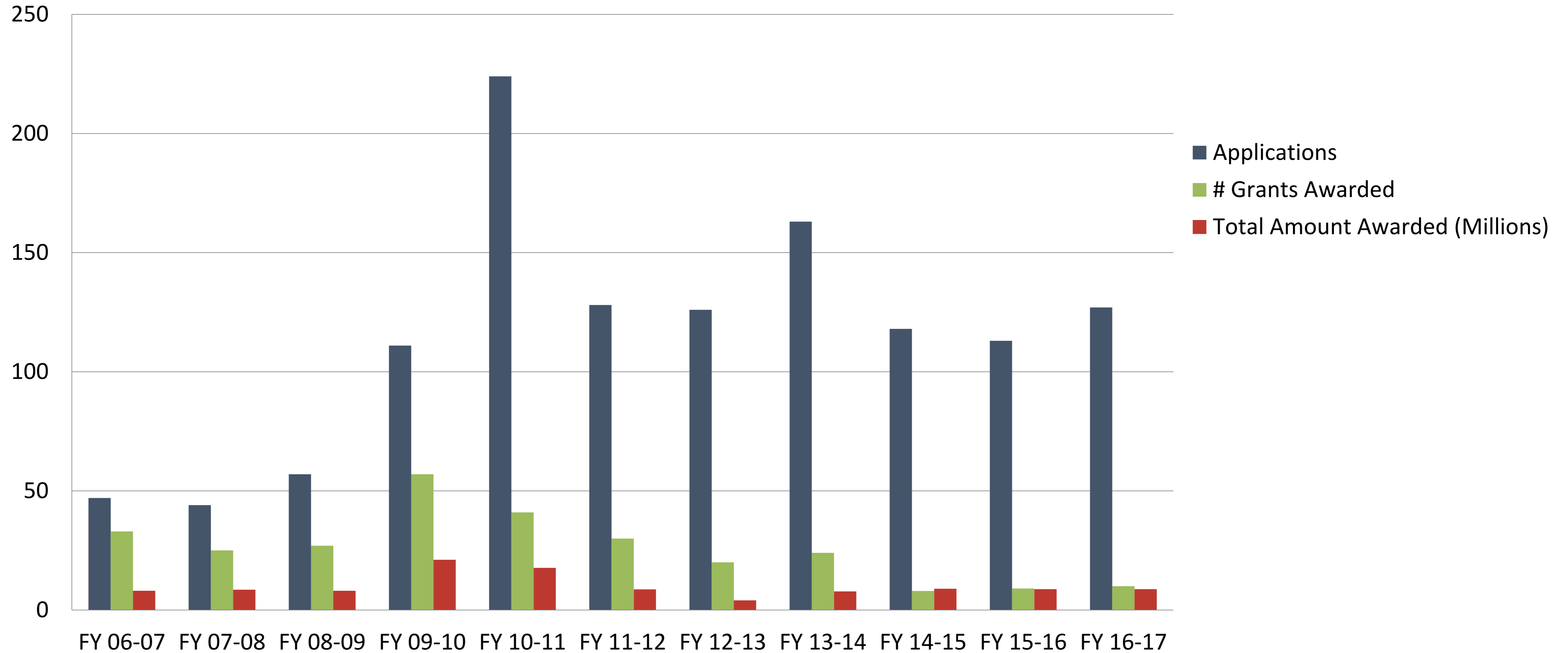
**Access to
cancer care for
uninsured and
underinsured**

05

**Screening to
Detect Early
Cancers: breast,
cervical, colon,
prostate, lung**

Florida Bankhead Coley Research Program

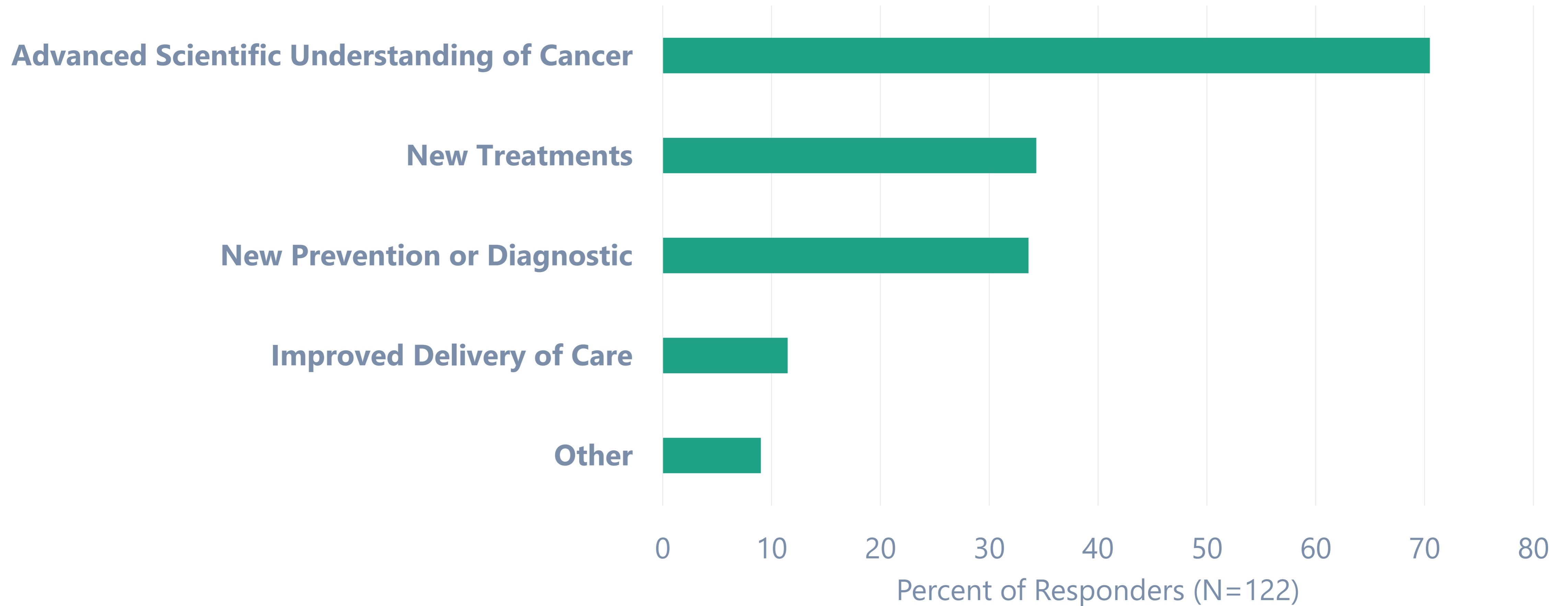
State Funding for Cancer Research, [Section 381.922, Florida Statutes](#)



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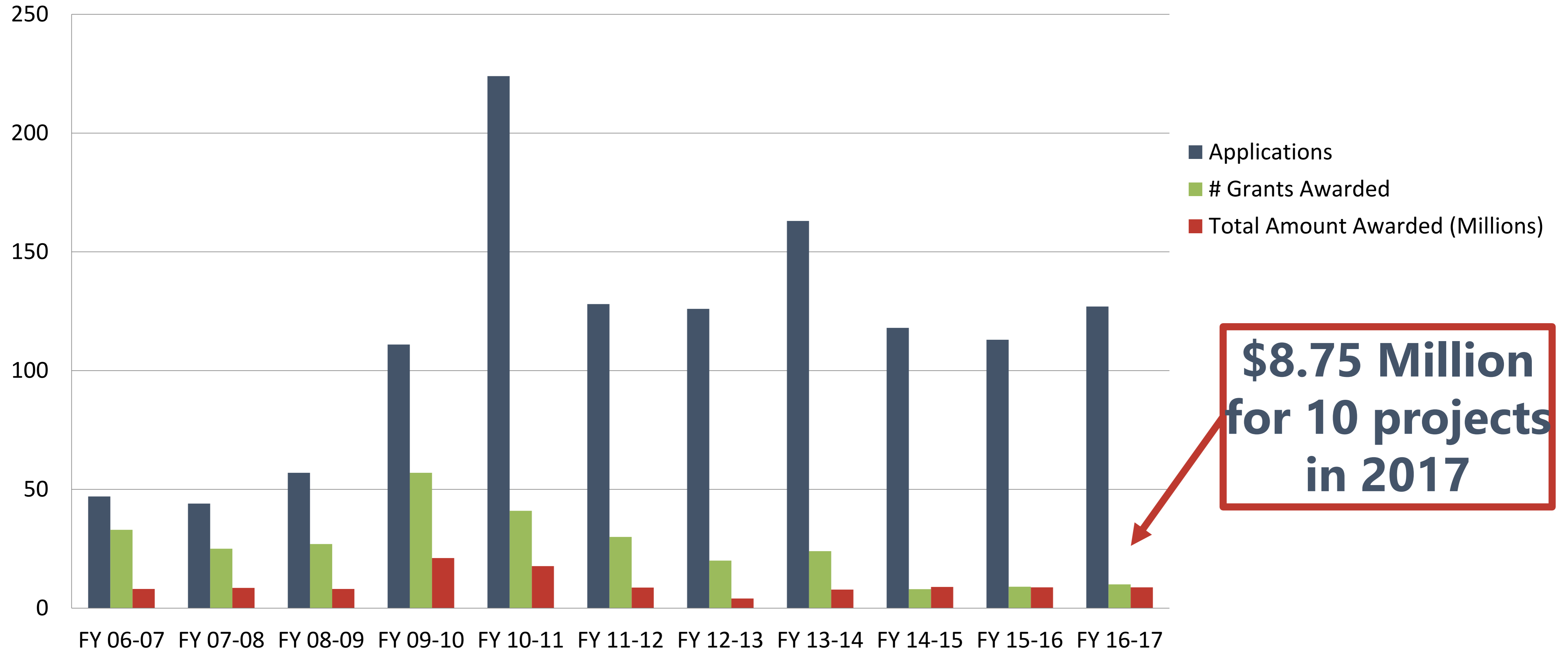
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Return on Investment from Cancer Research Grants



Florida Bankhead Coley Research Program

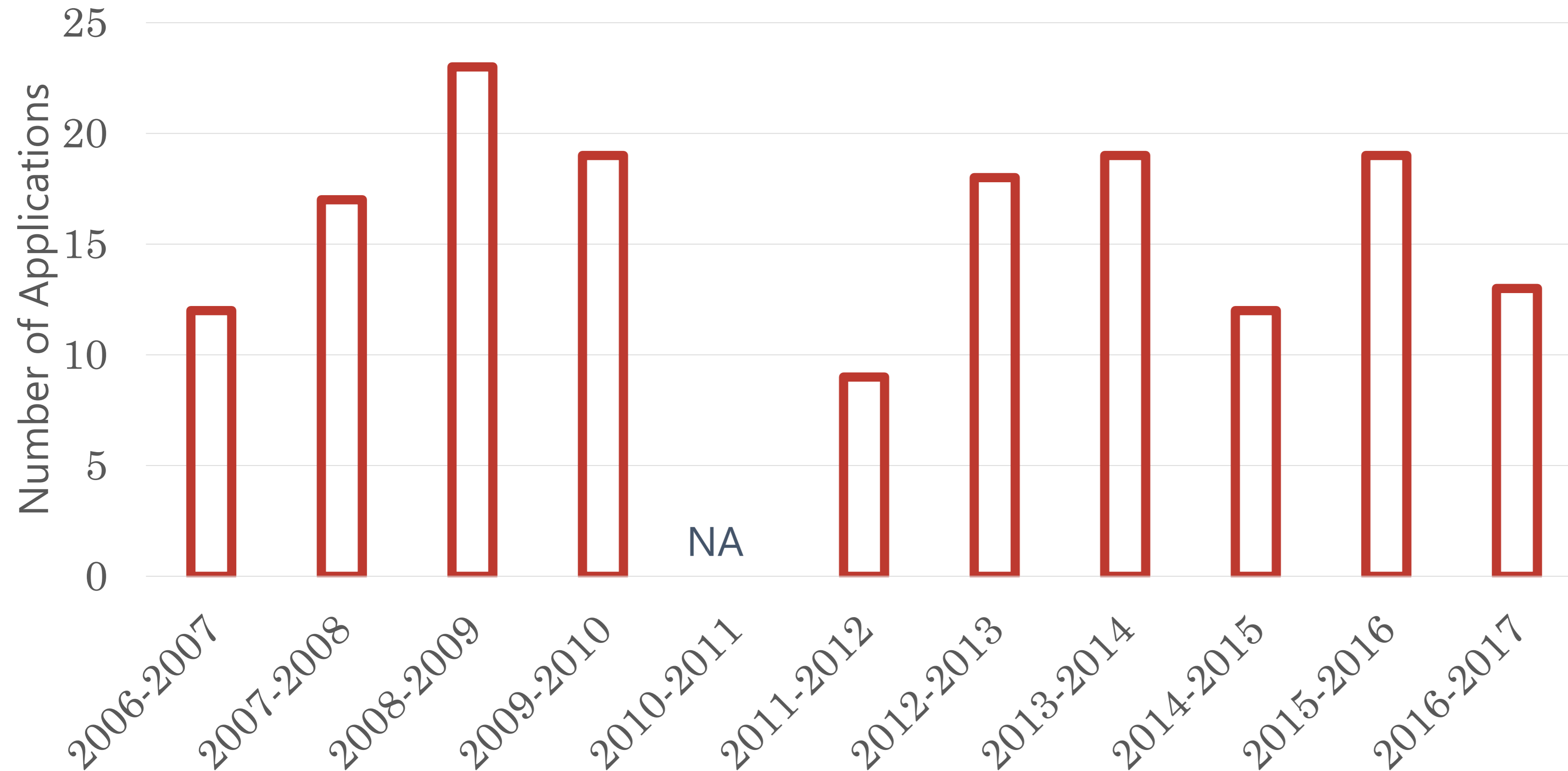
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Florida Bankhead Coley Research Program

State Funding for Cancer Research, [Section 381.922, Florida Statutes](#)

Unfunded Florida Cancer Research Proposals with **No or Negligible Weaknesses**



**+ \$20 million
per year**

Florida and the Cancer Moonshot

Summary

Florida's Cancer Problem



- Common
- Lethal

Lessons from Cancer History



- Moon landing already accomplished
- Large investment and collaborations

National Cancer Moonshot



- More moonshots possible
- Federal funding minimal & uncertain

Florida's Cancer Moonshots



- Cancer pioneers in Florida
- Increased state funding is justified

Thank You



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