Cancer of the Cervix

An Overview

Herschel W. Lawson, M.D.

June, 2006

Division of Cancer Prevention and Control
National Center for Chronic Disease Prevention and Health Promotion

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

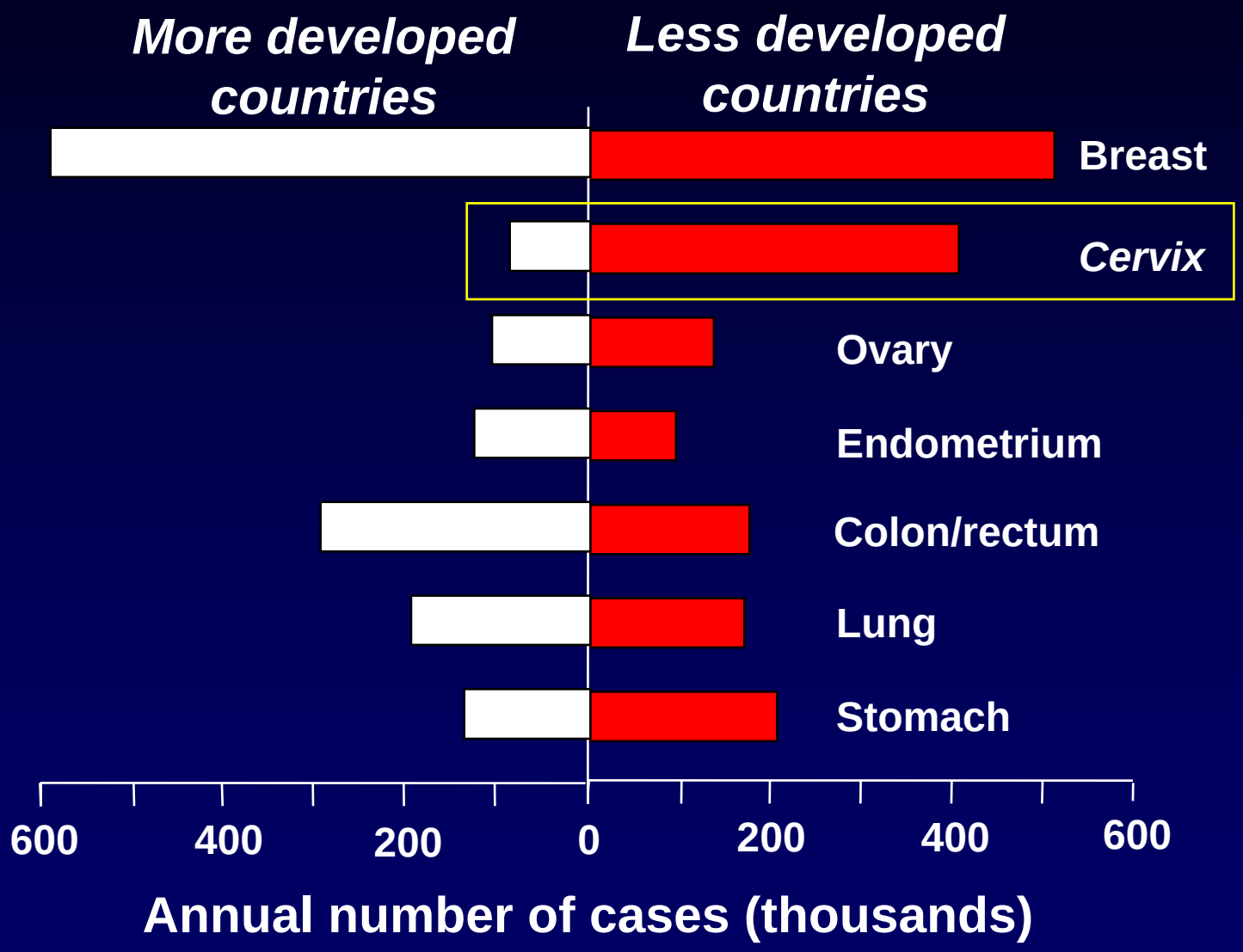
CDC
SAFER · HEALTHIER · PEOPLE™

Outline

- Surveillance
- Burden of Cervical Cancer
- Screening
- Diagnosis
- Costs

CDC
Centers for Disease Control and Prevention

The Most Common Cancers in Women

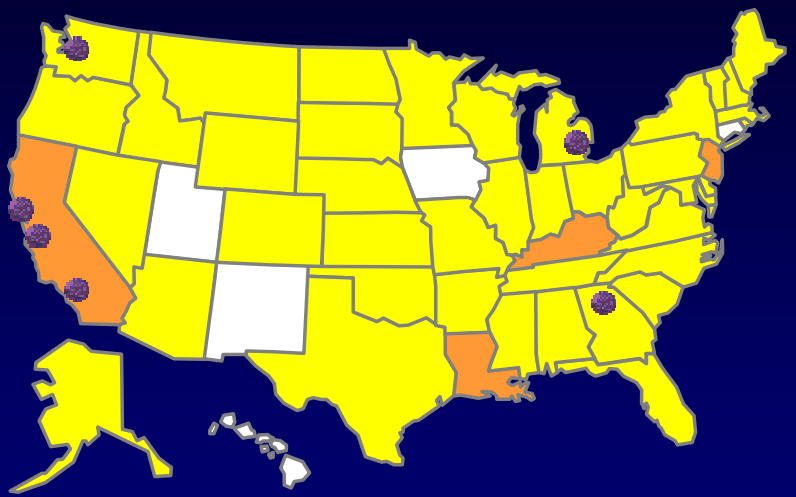


Adapted from Parkin et al, Eur J Cancer 37:S4, 2001

CDC
Centers for Disease Control and Prevention

Cervical Cancer Surveillance

National Program of Cancer Registries (NPCR) and Surveillance Epidemiology and End Results (SEER)



- SEER since 1973
- NPCR Since 1995
- 96% population coverage

SEER
NPCR
NPCR/SEER
SEER Metro

SURVEILLANCE EPIDEMIOLOGY END RESULTS

NPCR NATIONAL PROGRAM OF CANCER REGISTRIES

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Cervical Cancer Disease Burden in the U.S.

- Two types of cervical cancer
  - Squamous cell carcinoma
  - Adenocarcinoma (20% of all invasive cases)

- 2002 – 12,085 new cervical cancer cases (NPCR)*
- 2002 – 3,952 cervical cancer deaths (NCHS)#

- 2006 Estimates (American Cancer Society)+
  - 9,710 new cervical cancer cases
  - 3,700 cervical cancer deaths

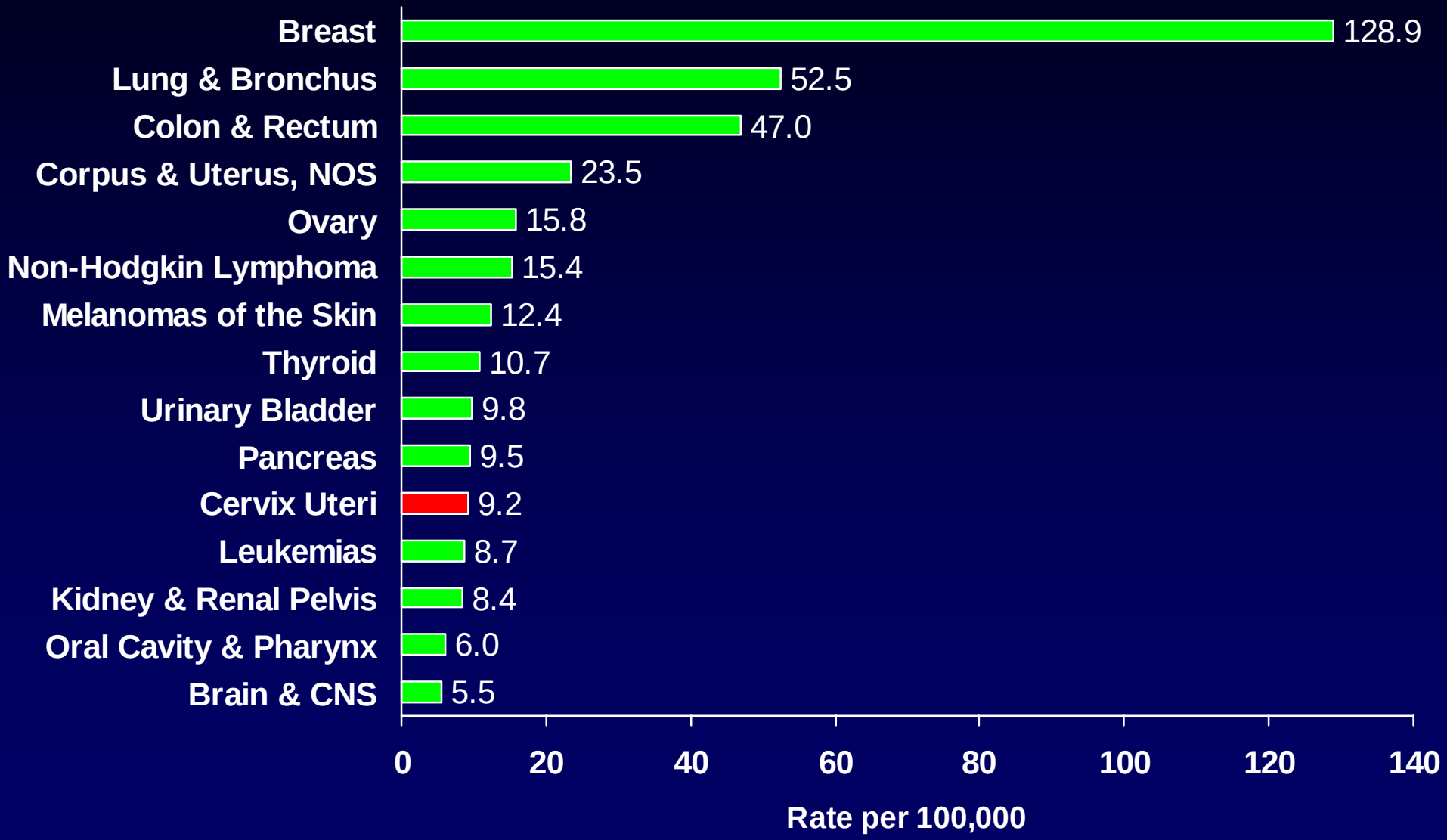
*U.S. count includes state cancer registries in the National Program of Cancer Registries that met certain data quality criteria for cancer incidence, and cover approximately 93% of the U.S. population.

#Mortality data are from the National Vital Statistics Surveillance System, NCHS, and cover 100% of the U.S. population (www.cdc.gov/nchs)

+Cancer Facts and Figures, 2006; American Cancer Society

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

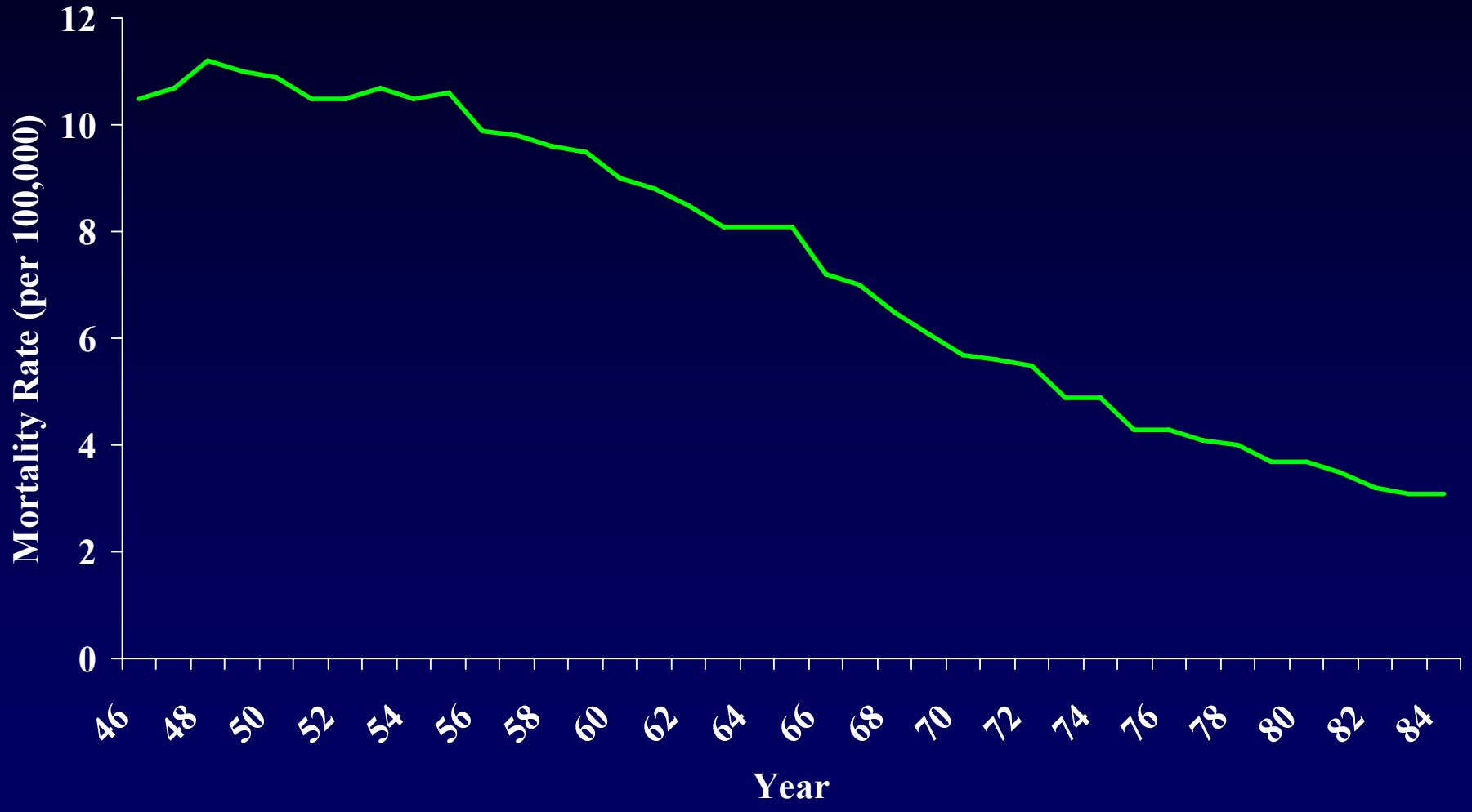
Age-Adjusted Invasive Cancer Incidence Rates, Among Women, U. S., 2000



United States Cancer Statistics: 2000 Incidence; NPCR

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

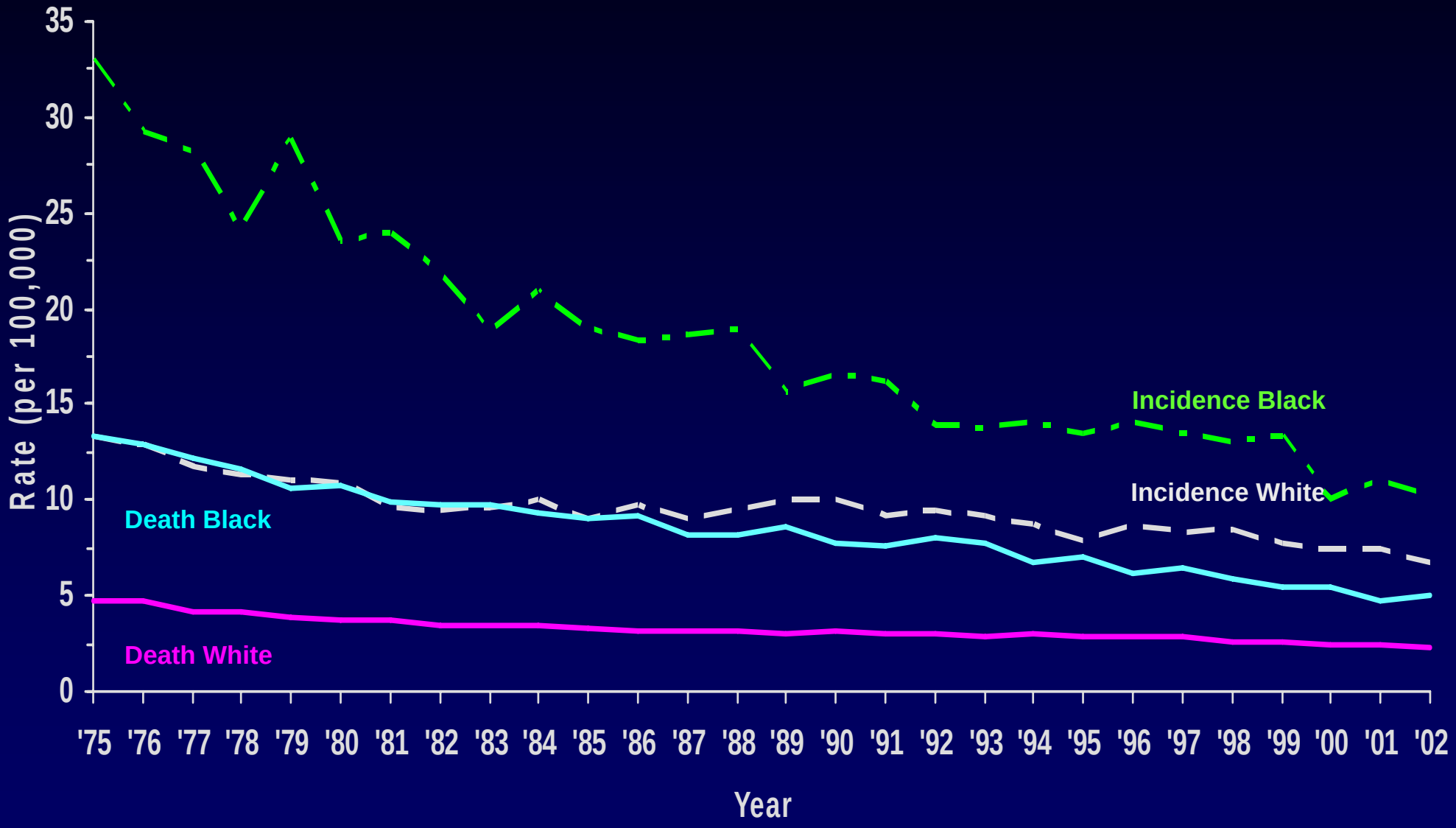
Cervical Cancer Mortality Rates, U.S., 1946-1984



Source: Program for Improving Clinical Pap Smear Programs and Management, Office of Population Affairs, DHHS, 1987.

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

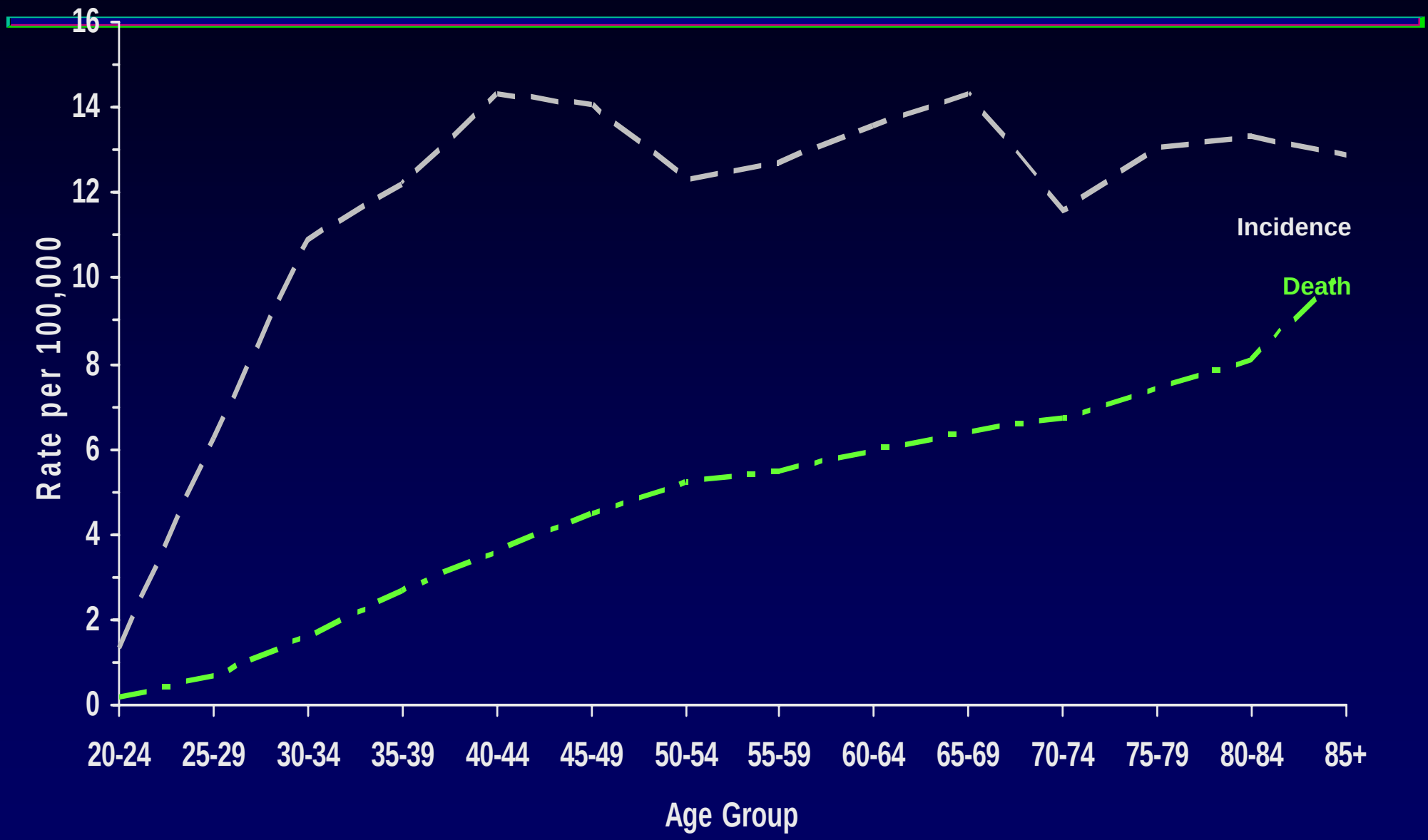
Invasive Cervical Cancer Incidence and Mortality Rates,* by Race, SEER in US, 1975-2002



*Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.
Source: SEER Cancer Statistics Review, 1975-2002

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

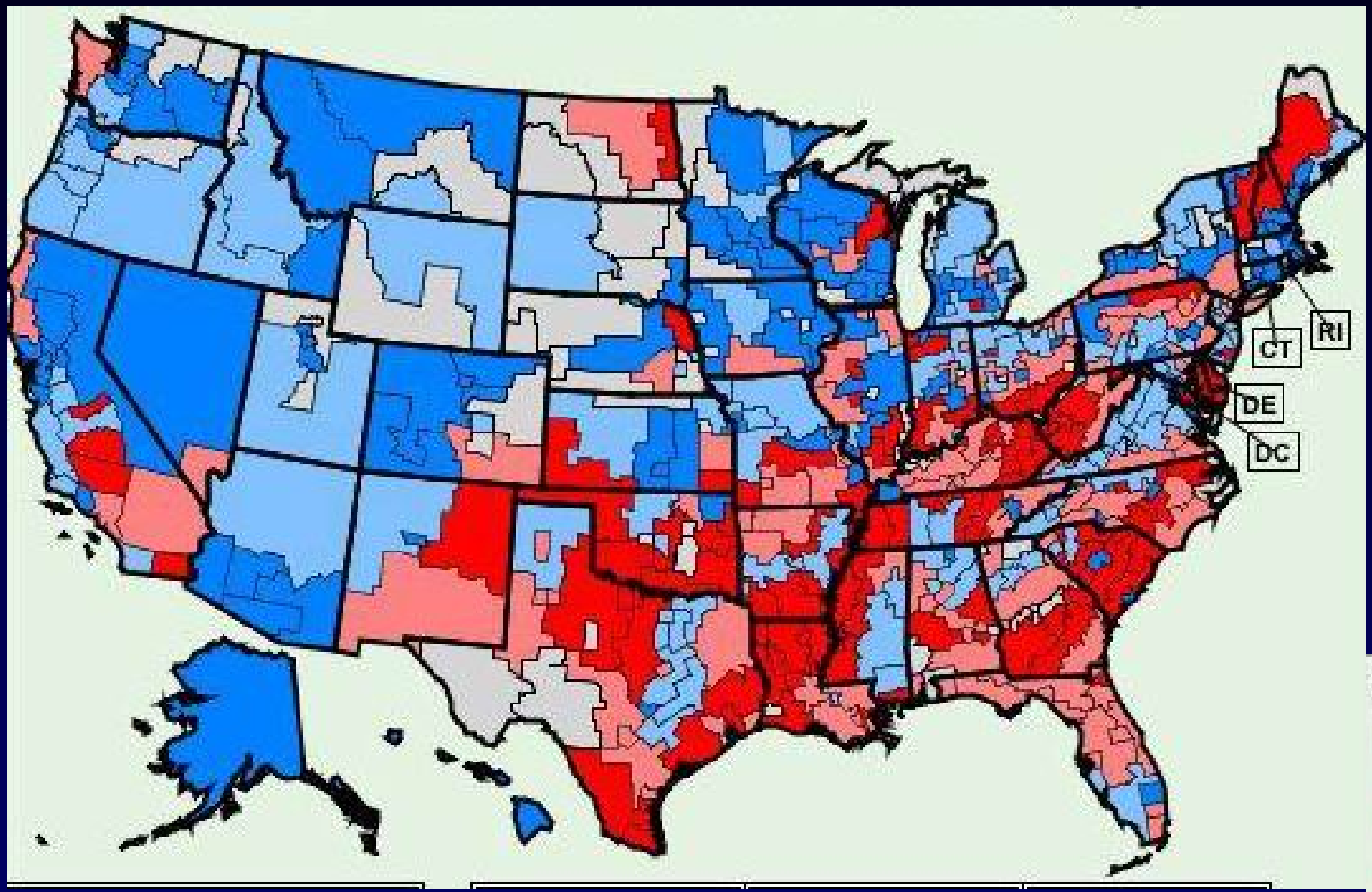
Invasive Cervical Cancer Incidence and Mortality Rates,* by Age Group, SEER in U.S., 1998-2002



*Source: SEER Cancer Statistics Review, 1975-2002

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Age-adjusted Cervical Cancer Mortality Rates by State Economic Areas*, All Women, U.S., 1995-1999



Rates per 100,000 person-years, 1995-1999

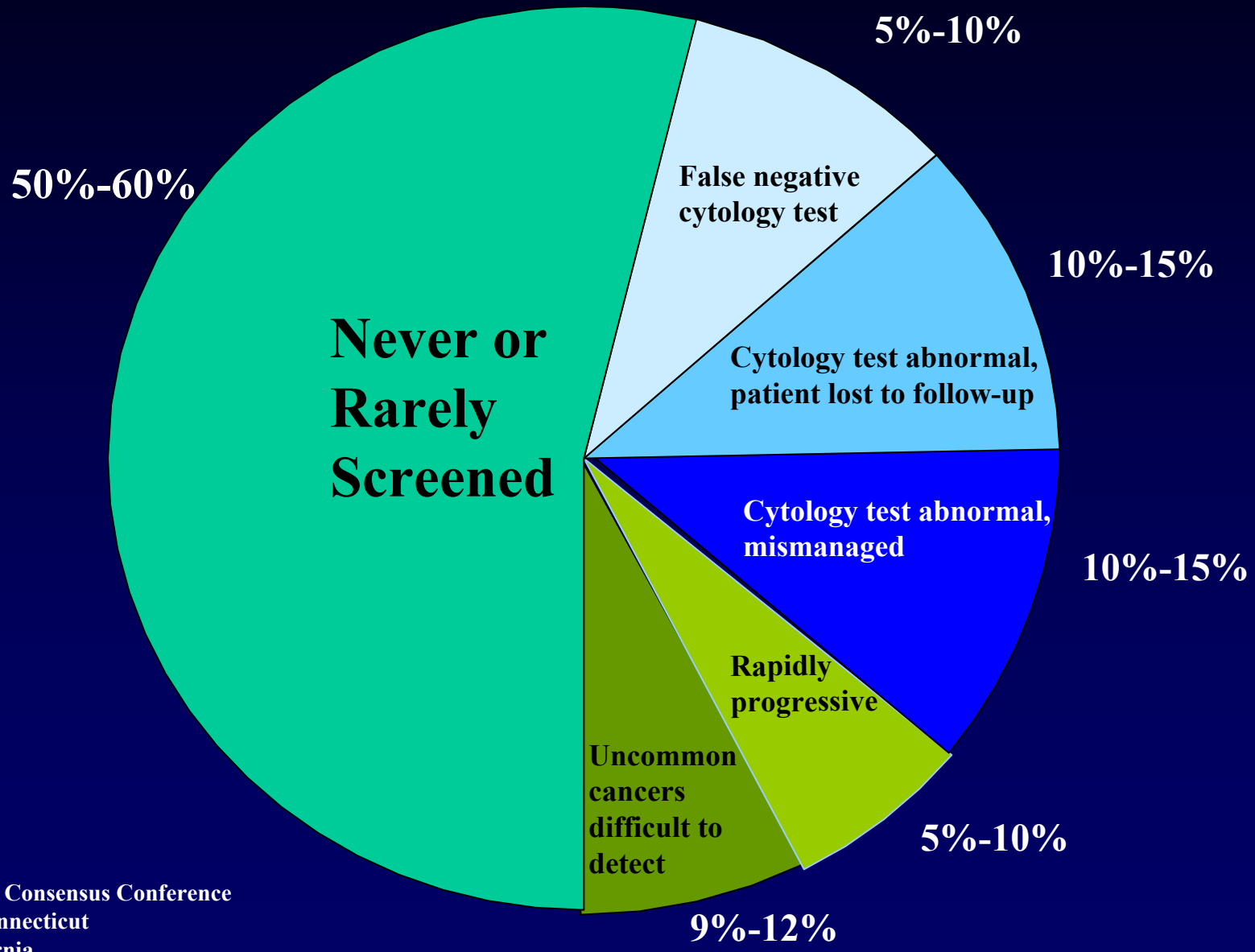
- 3.93-6.76
- 3.21-3.93
- 2.53-3.21
- 0.90-2.53
- Sparse

Source: Grauman D., NCI; http://www3.cancer.gov/atlasplus/

*State Economic Area: One or more socio-economically similar counties within a state

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Factors Contributing to Cervical Cancer

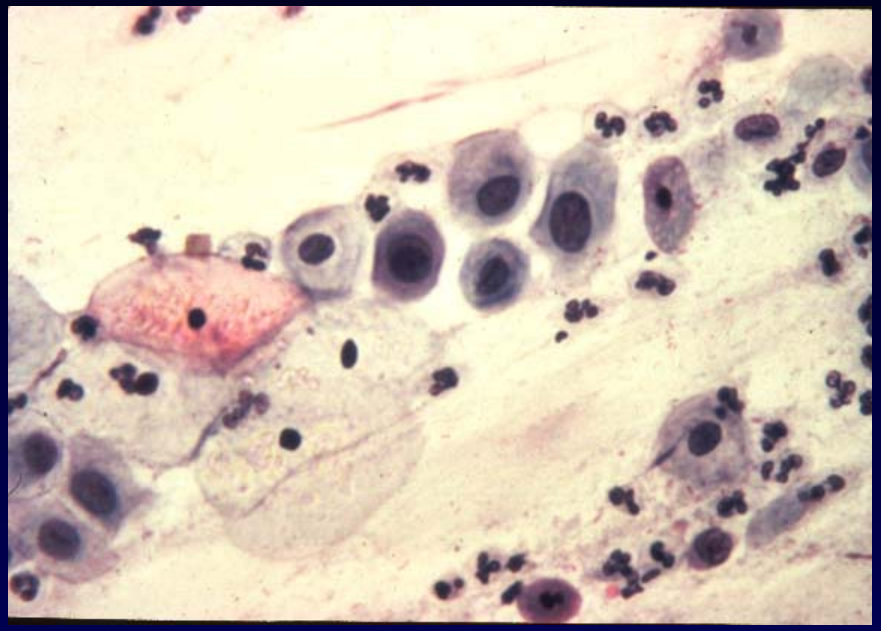


Sources:NIH Consensus Conference
Janerich, Connecticut
Sung, California

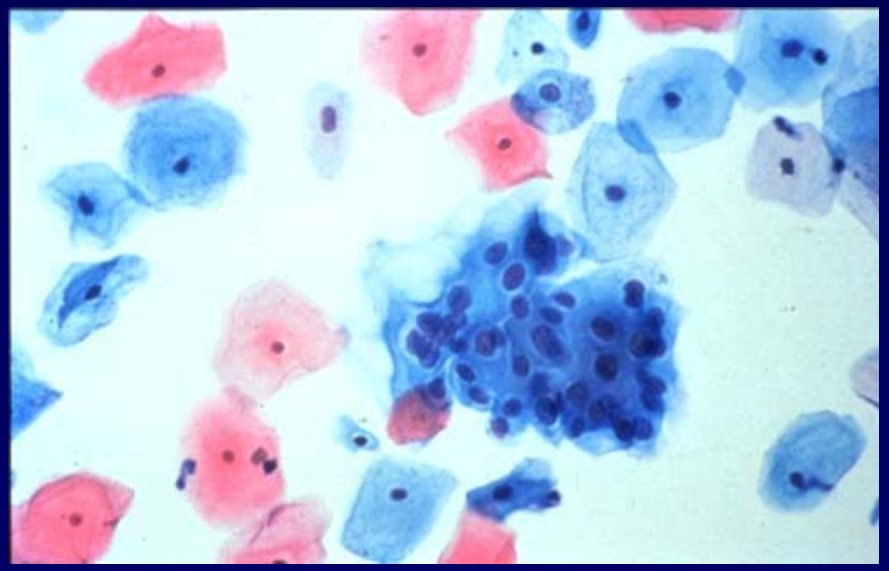
CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Cervical Cancer Screening Methods

- **Conventional Cytology**
  - Sensitivity: 51–88%
  - Specificity: 95–98%



- **Liquid-based Cytology**
  - Sensitivity: 61-95%
  - Specificity: 78-82%



Source: Meyers et al., 2000; Nanda, et al., 2000; Belinson, et al., 2001

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Abnormal Pap Test Results (Bethesda 2001)

Squamous Cell

- Atypical squamous cells of undetermined significance (ASC-US)
- Atypical squamous cells cannot exclude high grade squamous intraepithelial lesion (ASC-H)
- Low grade squamous intraepithelial lesion (LSIL)
- HSIL
- Squamous Cell Cancer

Glandular Cell

- Atypical glandular cells (AGC)
- Adenocarcinoma in situ (AIS)
- Adenocarcinoma

CDC
Centers for Disease Control and Prevention

Cervical Cancer Screening Recommendations

	USPSTF 2003	ACS 2002	ACOG 2003
Age to start	Age 21 or within 3 yrs of sexual activity	Age 21 or within 3 yrs of sexual activity	Age 21 or within 3 yrs of sexual activity
Interval			
<30 yr	Conv: at least every 3 yrs	Conv: 1 yr LBC: 2 yr	1 yr
≥ 30 yr		2-3 yrs	2-3 yrs

USPSTF – U.S. Preventive Services Task Force
ACS – American Cancer Society
ACOG – American College of Obstetricians and Gynecologists
Conv – Conventional Cervical Cytology
LBC – Liquid-based Cytology

CDC
Centers for Disease Control and Prevention

Prevalence of Cervical Cancer Screening, National Health Interview Survey, United States, 2000

Group	% Pap test past 3 years
All women	82%
Insured	
yes	85%
no	62%
Country of birth	
US born	83%
Foreign born in U.S. <10 yrs	61%
Race/Ethnicity	
Hispanic	77%
Non-Hispanic White	83%
Non – Hispanic Black	84%
Asian	71%

Swan J, Breen N, Coates RJ, Rimer BK, Lee NC. Progress in cancer screening practices in the United States: results from the 2000 National Health Interview Survey. Cancer. 2003;97:1528-40.

CDC
Centers for Disease Control and Prevention

HPV Test – Hybrid Capture 2 (HC2)

- A nucleic acid solution hybridization assay with signal amplification that uses long synthetic RNA probes complementary to the DNA sequence of the 13 high risk HPV types.
- Easy to perform in clinical practice and amenable to automation
- The only system approved by FDA

CDC
Centers for Disease Control and Prevention

FDA Approved Use of HPV Test

- **Triage:**

  Hybrid Capture II high risk panel (HC2) for ASC-US Pap test results

- **Primary screening:**

  HC2 as adjunct to Pap test in women 30 years of age and older. If both tests are negative, next cervical cancer screening should not occur for at least 3 years.

CDC
Centers for Disease Control and Prevention

Organization Recommendations for HPV DNA Use in Cervical Cancer Screening

	USPSTF	ACS	ACOG	ASCCP
ASC-US triage	Insufficient Evidence	Not addressed	Recommended	Recommended
Primary screening with Pap test	Not addressed	Option	Recommended	Recommended

USPSTF – U.S. Preventive Services Task Force

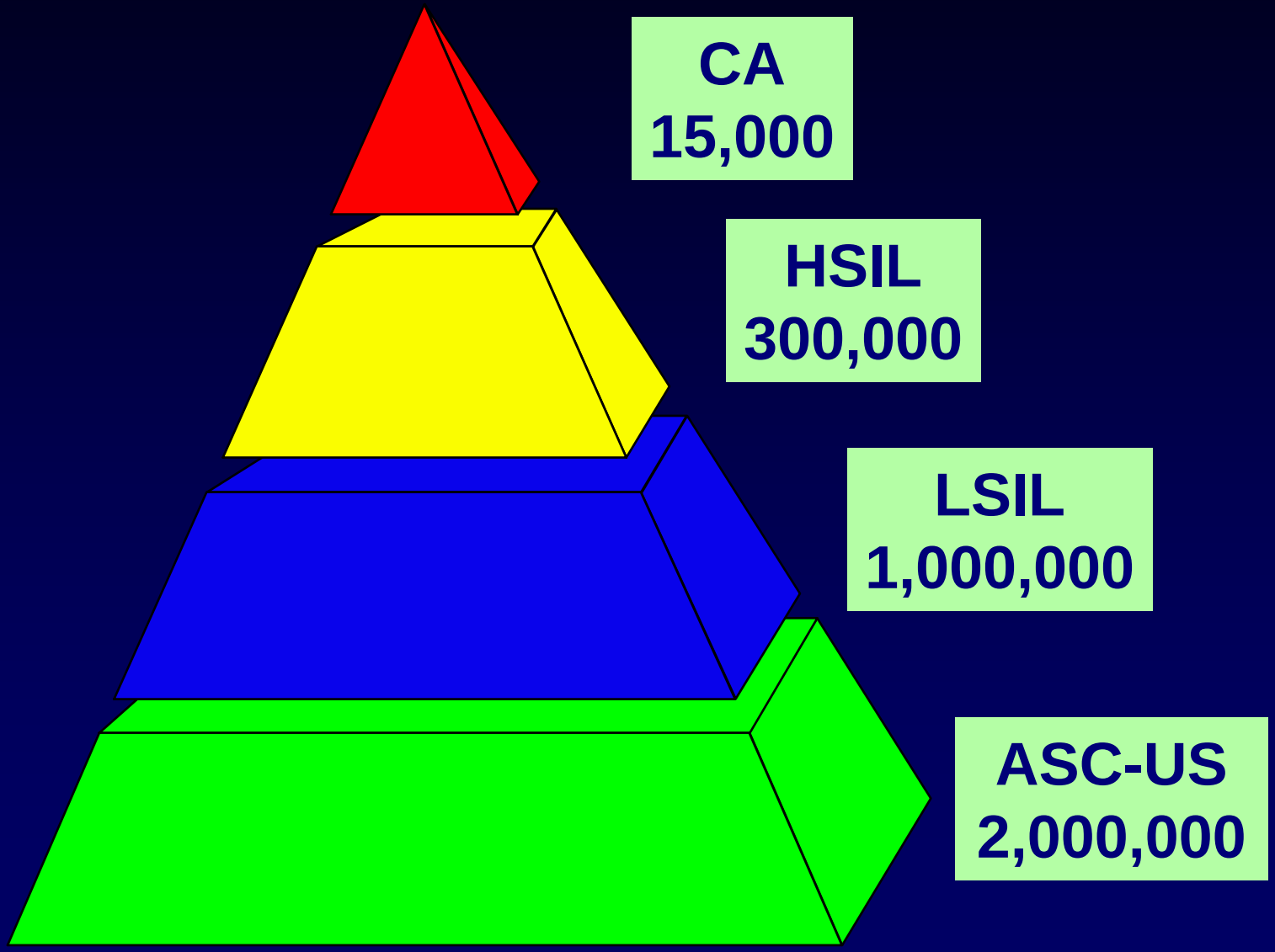
ACS – American Cancer Society

ACOG – American College of Obstetricians and Gynecologists

ASCCP – American Society of Colposcopy and Cytopathology

CDC
Centers for Disease Control and Prevention

Estimated Annual Abnormal Pap Tests, U.S.



Modified from Hildesheim, A., National Cancer Institute

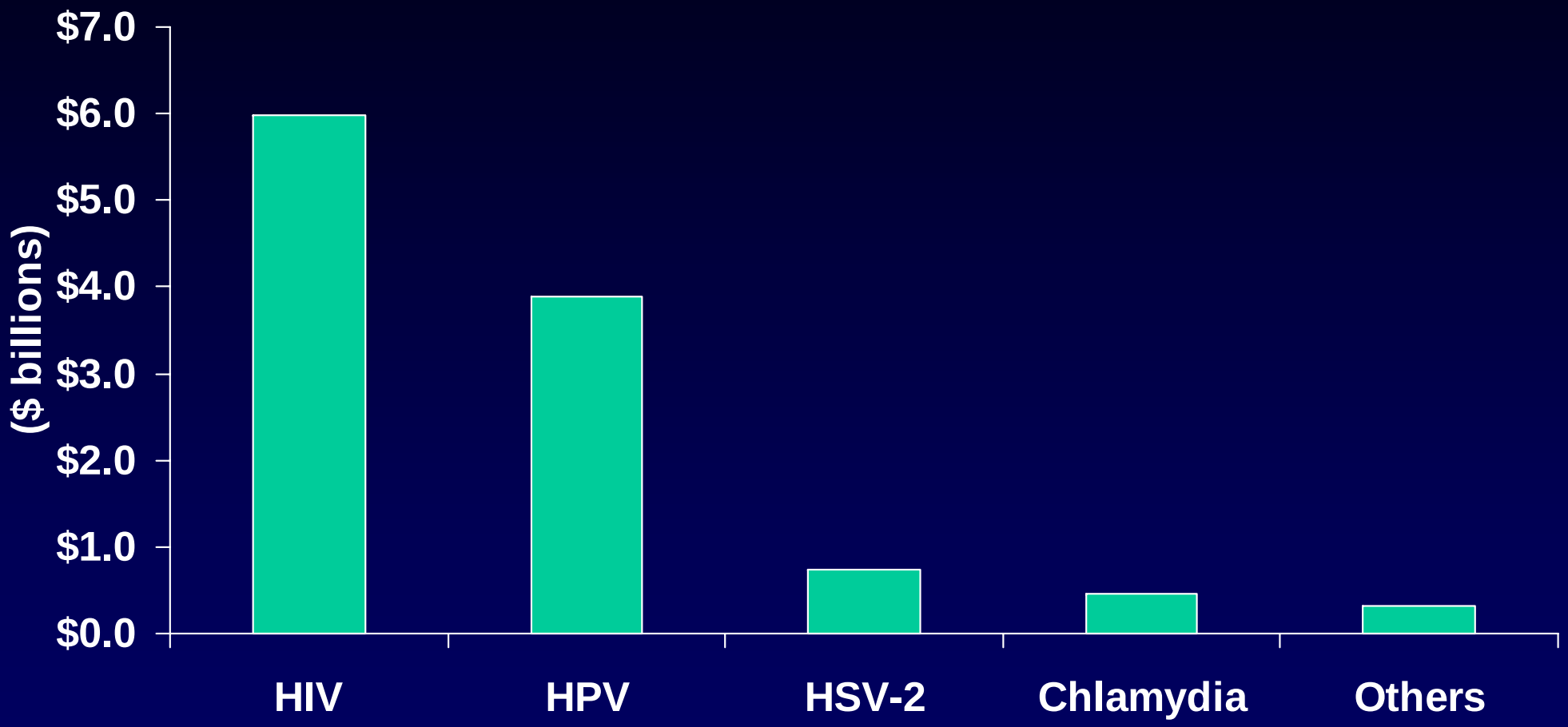
CDC
Centers for Disease Control and Prevention

Evaluation of an Abnormal Pap Test

- Repeat cytology
- HPV DNA test
- Vaginal and cervical inspection
- Colposcopy with directed biopsy
- Endocervical curettage
- Bimanual pelvic examination

CDC
Centers for Disease Control and Prevention

Estimated Annual Direct Medical Cost of Specific Sexually Transmitted Infections, U.S., 2000

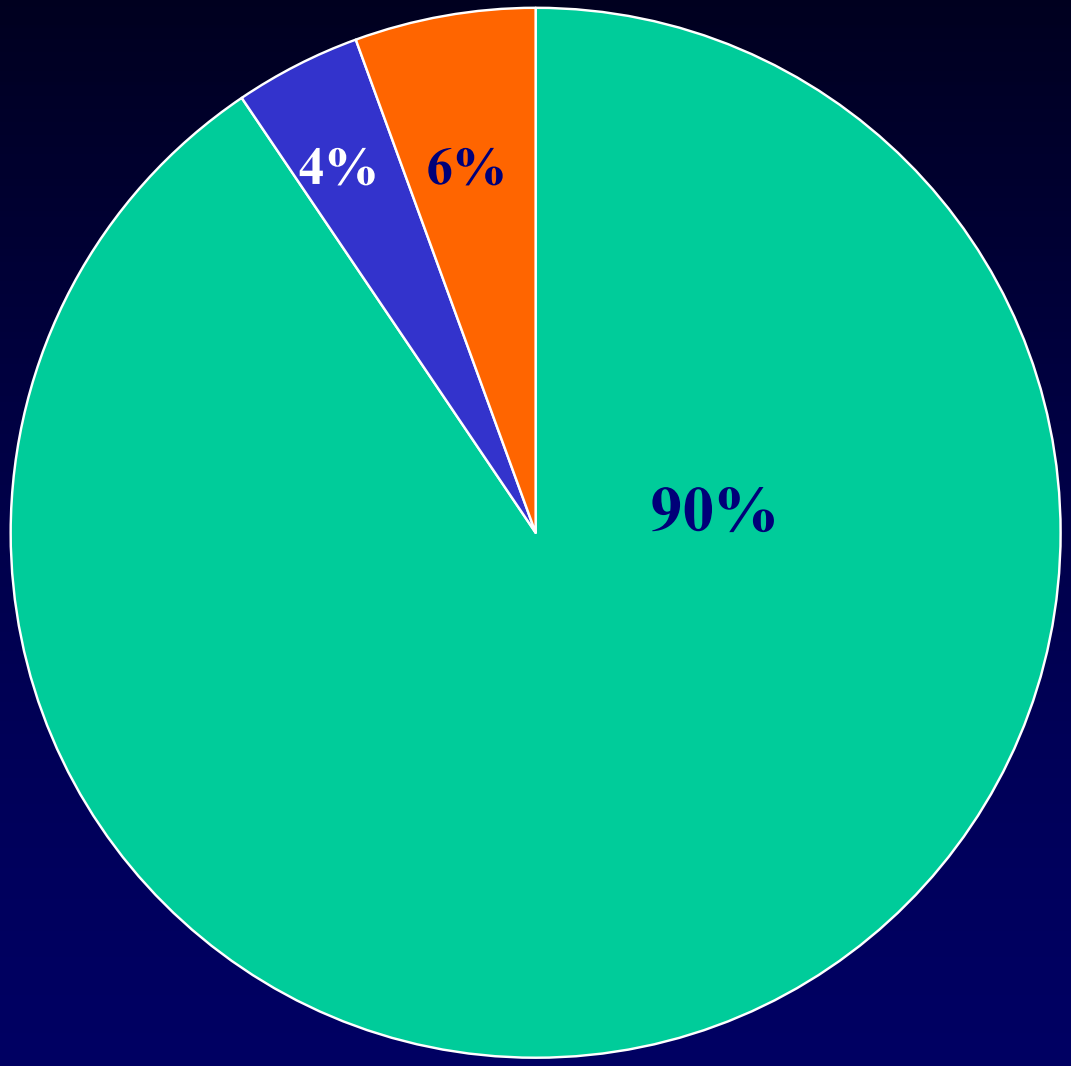


Based on estimated incidence rates in 2000, in 2000 $US

Modified from Chesson et al. Perspectives on Sexual and Reproductive Health 2004, 36(1): 11-19
Weinstock et al. Perspectives on Sexual and Reproductive Health 2004, 36(1): 6-10.

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Components of Total Cost Burden of HPV, U.S., 2000



Modified from Chesson et al. Perspectives on Sexual and Reproductive Health 2004, 36(1): 11-19)

CDC
Centers for Disease Control and Prevention

Summary

- Cervix Ca is the 11th most common cancer in U.S. women; occurs mainly among rarely or never screened
- 9,710 new cancer cases and 3,700 cancer deaths estimated in 2006
- There are racial and socioeconomic disparities in cervical cancer incidence and mortality rates
- Cervical cancer screening has resulted in a 75% decrease in cervical cancer incidence in the U.S.
- Survival is high among women detected with early stage disease
- Cost of screening and managing results of abnormal Pap tests is in excess of $4 billion per year

CDC
Centers for Disease Control and Prevention

Acknowledgement

- Mona Saraiya, MD
- Lauri Markowitz, MD
- Eileen Dunne, MD
- Beth Unger, MD, PhD

CDC
Centers for Disease Control and Prevention

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

CDC
SAFER · HEALTHIER · PEOPLE™