Cancer of the Cervix
An Overview

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

◆ Surveillance
◆ Burden of Cervical Cancer
◆ Screening
◆ Diagnosis
◆ Costs
The Most Common Cancers in Women

- **Breast**
- **Cervix**
- **Ovary**
- **Endometrium**

**Annual number of cases (thousands)**

- More developed countries:
  - Breast
  - Ovary
  - Endometrium
  - Colon/rectum
- Less developed countries:
  - Breast
  - Cervix
  - Ovary
  - Endometrium
  - Colon/rectum
  - Lung
  - Stomach

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

Map showing coverage areas for SEER, NPCR, NPCR/SEER, and SEER Metro.
Two types of cervical cancer
  • Squamous cell carcinoma
  • Adenocarcinoma (20% of all invasive cases)

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  • Squamous cell carcinoma
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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
Age-Adjusted Invasive Cancer Incidence Rates, Among Women, U. S., 2000

United States Cancer Statistics: 2000 Incidence; NPCR

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.

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


Source: Grauman D., NCI; http://www3.cancer.gov/atlasplus/
*State Economic Area: One or more socio-economically similar counties within a state
Factors Contributing to Cervical Cancer

- Never or Rarely Screened: 50%-60%
- Cytology test abnormal, mismanaged: 10%-15%
- Cytology test abnormal, patient lost to follow-up: 5%-10%
- False negative cytology test: 5%-10%
- Uncommon cancers difficult to detect: 9%-12%

Sources: NIH Consensus Conference
Janerich, Connecticut
Sung, California
Cervical Cancer Screening Methods

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

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

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
## Cervical Cancer Screening Recommendations

<table>
<thead>
<tr>
<th></th>
<th>USPSTF 2003</th>
<th>ACS 2002</th>
<th>ACOG 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age to start</strong></td>
<td>Age 21 or within 3 yrs of sexual activity</td>
<td>Age 21 or within 3 yrs of sexual activity</td>
<td>Age 21 or within 3 yrs of sexual activity</td>
</tr>
<tr>
<td><strong>Interval</strong></td>
<td>Conv: at least every 3 yrs</td>
<td>Conv: 1 yr</td>
<td>1 yr</td>
</tr>
<tr>
<td>&lt; 30 yr</td>
<td></td>
<td>LBC: 2 yr</td>
<td>2-3 yrs</td>
</tr>
<tr>
<td>≥ 30 yr</td>
<td></td>
<td>2-3 yrs</td>
<td></td>
</tr>
</tbody>
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**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
## Prevalence of Cervical Cancer Screening, National Health Interview Survey, United States, 2000

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

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
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.
### Organization Recommendations for HPV DNA Use in Cervical Cancer Screening

<table>
<thead>
<tr>
<th></th>
<th>USPSTF</th>
<th>ACS</th>
<th>ACOG</th>
<th>ASCCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASC-US triage</td>
<td>Insufficient Evidence</td>
<td>Not addressed</td>
<td>Recommended</td>
<td>Recommended</td>
</tr>
<tr>
<td>Primary screening with Pap test</td>
<td>Not addressed</td>
<td>Option</td>
<td>Recommended</td>
<td>Recommended</td>
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**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
Estimated Annual Abnormal Pap Tests, U.S.

- HSIL: 300,000
- LSIL: 1,000,000
- ASC-US: 2,000,000

Modified from Hildesheim, A., National Cancer Institute
Evaluation of an Abnormal Pap Test

- Repeat cytology
- HPV DNA test
- Vaginal and cervical inspection
- Colposcopy with directed biopsy
- Endocervical curettage
- Bimanual pelvic examination
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
Components of Total Cost Burden of HPV, U.S., 2000

- Abnormal cervical cytology and treatment of neoplasia: 90%
- Cervical cancer: 6%
- Anogenital warts: 4%

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

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