CERVICAL SCREENING PRESENTATIONS
FOR PROVIDERS OF MEDICAL PRACTITIONER EDUCATION IN QUEENSLAND
Section 1: Cervical Cancer – Background Information

- 1.1 Cervical Cancer Incidence and Mortality
- 1.2 The Aetiology of Cervical Cancer
1.1 Cervical Cancer Incidence and Mortality
● Lifetime probability to age 75 years of an Australian woman developing cervical cancer is 1 in 183
● Up to 90% of the most common form of cervical cancer (SCC) is preventable if all eligible women have regular two-yearly smears
Cervical Cancer:

- Squamous cell carcinoma 80-85%
- Adenocarcinoma 22.4%
- Others 3-5% e.g. clear cell adenocarcinoma (DES exposure)
• Incidence of adenocarcinoma essentially unchanged since 1990
• Adenocarcinoma arises from higher glandular epithelium and sheds cells much less readily
Queensland

In 2006

- 13\textsuperscript{th} most common cancer diagnosed in women
- 143 new cases of cervical cancer
- 60 deaths

Figure 7: Incidence trend for cervical cancer, Queensland, 1982-2003

In 2006
- 19th most common cause of cancer mortality in Australian women
- 734 new cases of cervical cancer
- 224 deaths
Figure 5.3: Age-standardised incidence rates of all cervical cancer (squamous, adenocarcinoma, adenosquamous and other cervical cancer), 1991-2004

Source: National Cancer Statistics Clearing House (AIHW).
• The age-standardized mortality rate from cervical cancer halved between 1991 and 2005 from 4.0 deaths per 100,000 women to 1.9 deaths per 100,000 women

• Mortality from cervical cancer increases with age. Highest mortality rate in 2003-2006 period was in women 85+ years (13.8 deaths per 100,000 women)
For Aboriginal and Torres Strait Islander women in Australia, the mortality rate is higher and was 9.9 per 100 000 for women aged 20-69 years in the period 2001-2004.
Mortality by Indigenous status

Number of deaths per 100,000 women

- Aboriginal and Torres Strait Islanders
- Other Australians

2002-2005

Note: Bars on graphs represent 95% confidence intervals.
Source: AIHW Mortality Database.

Figure 6.5: Age-standardised mortality rates for cervical cancer in women aged 20-69 years (Queensland, Western Australia, South Australia and Northern Territory), by Indigenous status, 2002-2005
Cervical cancer is 2nd most common cancer in women worldwide
493 000 new cases each year
275 000 women die annually
4 out of 5 new cases occur where screening programs are not established
The International Perspective
Age Standardised Rates (per 100,000) 2004

<table>
<thead>
<tr>
<th>Country</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
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<tbody>
<tr>
<td>NZ</td>
<td>10.00</td>
<td>3.2</td>
</tr>
<tr>
<td>UK</td>
<td>8.3</td>
<td>3.1</td>
</tr>
<tr>
<td>USA</td>
<td>7.7</td>
<td>2.3</td>
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<tr>
<td>Australia</td>
<td>6.9</td>
<td>1.7</td>
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<tr>
<td>Finland</td>
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<td>SE Asia</td>
<td>18.26</td>
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<td>Melanesia</td>
<td>43.81</td>
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<td>East Africa</td>
<td>44.32</td>
<td>24.24</td>
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</table>
Participation rate for Australian Cervical Screening By Age

- National target for participation 70%
- Latest available Australian rate (2005/06) 61.5%
- Qld participation rate (2006/07) 59.2%
  Qld had the second lowest participation rate after the Northern Territory (2005/06)
### Participation in cervical cancer screening over a two-year period by women aged 20–69 years in 13 rural and remote Indigenous communities compared with the rest of Queensland (March 1999-Feb 2001)

<table>
<thead>
<tr>
<th></th>
<th>Indigenous communities</th>
<th>Rest of Queensland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of women eligible for screening</td>
<td>7795</td>
<td>942 403</td>
</tr>
<tr>
<td>Number of women screened</td>
<td>3206</td>
<td>562 753</td>
</tr>
<tr>
<td>Age-standardised* biennial participation percentage† (95% CI)</td>
<td>41.5% (40.2%–42.7%)</td>
<td>59.1% (59.0%–59.2%)</td>
</tr>
<tr>
<td>Age-adjusted‡ risk ratio (95% CI)</td>
<td>0.70 (0.67–0.72)</td>
<td>1</td>
</tr>
</tbody>
</table>

* Directly age-standardised to the 1991 Australian standard population. † Biennial participation percentage = proportion of women undergoing screening over a two-year period. ‡ Age-adjusted using the Mantel–Haenszel technique.

Coory M et al. MJA 2002 177(10)
4: Age-standardised* biennial participation percentages† (with 95% CI) for 13 rural and remote Indigenous communities

* Directly age-standardised to the 1991 Australian standard population.† Biennial participation percentage = proportion of women undergoing cervical screening over a two-year period.

Coory M et al. MJA 2002 177(10)
Contributing factors to low Qld participation rates:

- Geography
- Rapidly growing population
- Shortage of medical services in rural and remote areas
- Fewer bulk-billing GPs
- International medical graduates with little training in cervical screening
- Proportion of Aboriginal and Torres Strait Islander women in Qld
Underscreened groups in Qld and nationally:

- Women > 50 years
- Women in rural and remote areas
- Women from Culturally and Linguistically Diverse (CALD) backgrounds
- Aboriginal and Torres Strait Islander women
Sources of current statistical data:

1.2 The Aetiology of Cervical Cancer
HPV and Cervical Cancer

- Overwhelming evidence that infection with HPV is necessary for the development of Cancer of the cervix
- Cervical cancer is the first solid tumour to be shown to be virally induced in essentially every case.
- > 99.7% of cervical cancers test positive for HPV
>100 known types – cutaneous/mucosotropic
>20 types infect the genital tract
HPV 6 and 11 (42,43,44) (genital warts, atypia and mild dysplasia)
HPV 16 and 18 (31,33,35,39,45,51,52,56,58,59,68) (high-grade ano-genital intra-epithelial dysplasia, invasive carcinoma)
HPV 16 responsible for >50% cancer in all studies
HPV and Cervical Cancer

- **Persisting** infection with high-risk HPV is necessary but NOT sufficient for cervical cancer

- Infection with high-risk HPV $\rightarrow$ lifetime risk of cervical cancer of 1/15 to 1/100
HPV - infection

- Common in early years of a woman’s sexual activity (almost always sexually transmitted)
  - peaks first 5 years after becoming sexually active
  - peak prevalence in early 20s
  - (<0.2% cervical cancer occurs in women <25 yrs)
  - > 50% chance of acquiring HPV after UPSIC
HPV- infection

- Acute lesion after 6 – 12 weeks: may be exhibited as LG lesion for high-risk HPV
- Median duration of infection ~ 8-10 months
- More than 95% of women who acquire a genital HPV infection clear the infection within 3 years
HPVs are dsDNA viruses.
Replicate in nuclei of epithelial cells, independent of host DNA.
Viral protein products:
- E4 – disrupts cytoplasmic keratin → koilocytosis
- E6, E7 – bind to host cell growth regulatory proteins
In some persistent infections, HPV genome inserts into the host genome i.e. integration

- Influenced by a no. of factors e.g. smoking, viral infections, random mutations

- E6, E7 proteins are overexpressed → less orderly cell proliferation → HGEA

- (HGEA also exists without integration; commonly within LGEA lesions early in infection process)
Biomarkers e.g. P16 (kinase) are over-expressed in cells after integration.

Identification of these → more accurate prediction of significant HGEA than primary HPV testing.
Low grade abnormalities are the result of a productive HPV infection.

High grade abnormalities are the result of integrated high risk subtypes of HPV.

70-90% of women have been exposed to HPV by the age of 40.

“The common cold of sexual activity”

Professor Ian Hammond
Figure 3.1 Natural history of HPV infection and cervical cancer precursors
Infections which persist for >3 years are unlikely to resolve spontaneously.

Risk factors for persistence: immunosuppression, smoking, long-term COC, age.

But HGEA can persist for life without progressing to cancer.
Factors influencing HSIL to Cancer

- **Age:** 10 year increase in age at CIN 3 diagnosis → RR of cervical cancer of 2.5 (National Women’s Hospital, N.Z.)

- **Size/extent of lesion –** larger lesions more likely to progress
Progression:

- LGL to HGL - average 88 mths
- LGL to cancer - at least a decade
Progression of LSIL to HSIL?

Women 16-30

Women 31-65

Risk of progression

Years since abnormal smear

High risk HPV _____

Low/no risk HPV - -

Slide courtesy of Dr James Nicklin

Figure 3.2  Frequency of histologic CIN 2 and CIN 3 per 100,000 screened women versus incidence of cervical cancer per 100,000 unscreened women
<table>
<thead>
<tr>
<th></th>
<th>Regress</th>
<th>Persist</th>
<th>Progression</th>
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</thead>
<tbody>
<tr>
<td>CIN 1</td>
<td>60%</td>
<td>39%</td>
<td>1% to invasive cancer</td>
</tr>
<tr>
<td>CIN 2</td>
<td>43%</td>
<td>35%</td>
<td>22% to CIN 3</td>
</tr>
<tr>
<td>CIN 3</td>
<td>32%</td>
<td>56%</td>
<td>12% to invasive Cancer</td>
</tr>
</tbody>
</table>

Slide courtesy of Professor Ian Frazer
Development of Cervical Cancer

Normal

HPV
5 weeks

LSIL
5 years

HSIL

20 years

Cancer

98%

Slide courtesy of Professor Ian Frazer