IBDC
International Breast Disease Centers

3rd International Congress of Breast Disease Centers 2013
7 & 8 February 2013 • PARIS
BREAST CENTERS : FOR BETTER CARE TO PATIENTS

Groupe Hospitalier Universitaire
SAINT-LOUIS
LARIBOISIÈRE
FERNAND-WIDAL

université
PARIS
DIDEROT
PARIS 7

Variations in Breast Cancer Incidence and Mortality

M. Espié

Centre des maladies du sein

Hôpital St LOUIS APHP

C M S

Incidence and deaths

- Breast cancer remains the most common malignancy worldwilde
- 1.6 million cases diagnosed annually
- 0.5 million deaths (WHO february 2011) of whom 68 000 were aged 15-49 years in developing countries
- There are pronounced variations in the trend in breast cancer mortality across regions and countries

M Forounzanfar Lancet 2011; 378: 1461-84

Incidence data

- In developed countries the disease accounts for one third of new female cancers
- In Western Europe the lifetime risk is one in eight
- The annual number of cases has doubled in the last three decades with a 65% increase in the age standardized rate from 75 cases per 100 000 in 1979 to 123.9 per 100 000 today

Incidence trends

- Half of breast cancers are diagnosed during the screening age bracket
- For example, the surge in incidence after the NHS Breast screening programme in UK was confined to the women of the initial screening age (50-64)
- Rates have now fallen slightly for this age group but increased for women aged 65-69 years with the age extension screening in the UK

Incidence trends

- Surveillance, Epidemiology and End Results (SEER) data in the US reveals a similar trend with significant increases in age specific incidence rates compared with baseline for screened women aged 40-80 years
- Incidence rates for invasive breast cancer for elderly women have not fallen below the baseline rate prior to introduction of mammographic screening

Incidence trends

- One interpretation of this patterns is that mammographic screening leads to potential overdiagnosis of occult non lethal invasive breast cancers (Jatoi I 2009)
- Some have attributed the rising incidence during the 1990s to increased usage of HRT (Waller M 2007)
- One quarter of women aged 45-69 years were taking exogenous hormones at the turn of the millennium but this halved dramatically after the publication of the WHI trial in 2002

Incidence trends

- This reduction in HRT usage corresponded with a transient decrease of 6.7% in breast cancer incidence for white American women aged 50-69 years which was not related to a reduction in uptake of screening (Ravdin 2007)
- However recent analysis of SEER data reveals this decline didn't persist (Desantis 2011)

Incidence trends

- Furthermore, breast cancer incidence rates were stable in some Nordic European countries despite a notable decline in use of HRT between 2002 and 2004 which was of similar magnitude to that observed in the USA
- There is some evidence for proportional discordance between decreases in breast cancer incidence and usage of HRT (Zahl PH 2007)

Incidence trends

- Decreases in ER positive disease began in 2000 and the timing of further reductions after 2002 suggests that HRT was stimulating latent cancers rather than inducing de novo cancers (Elfenbein GJ 2007)

Incidence trends

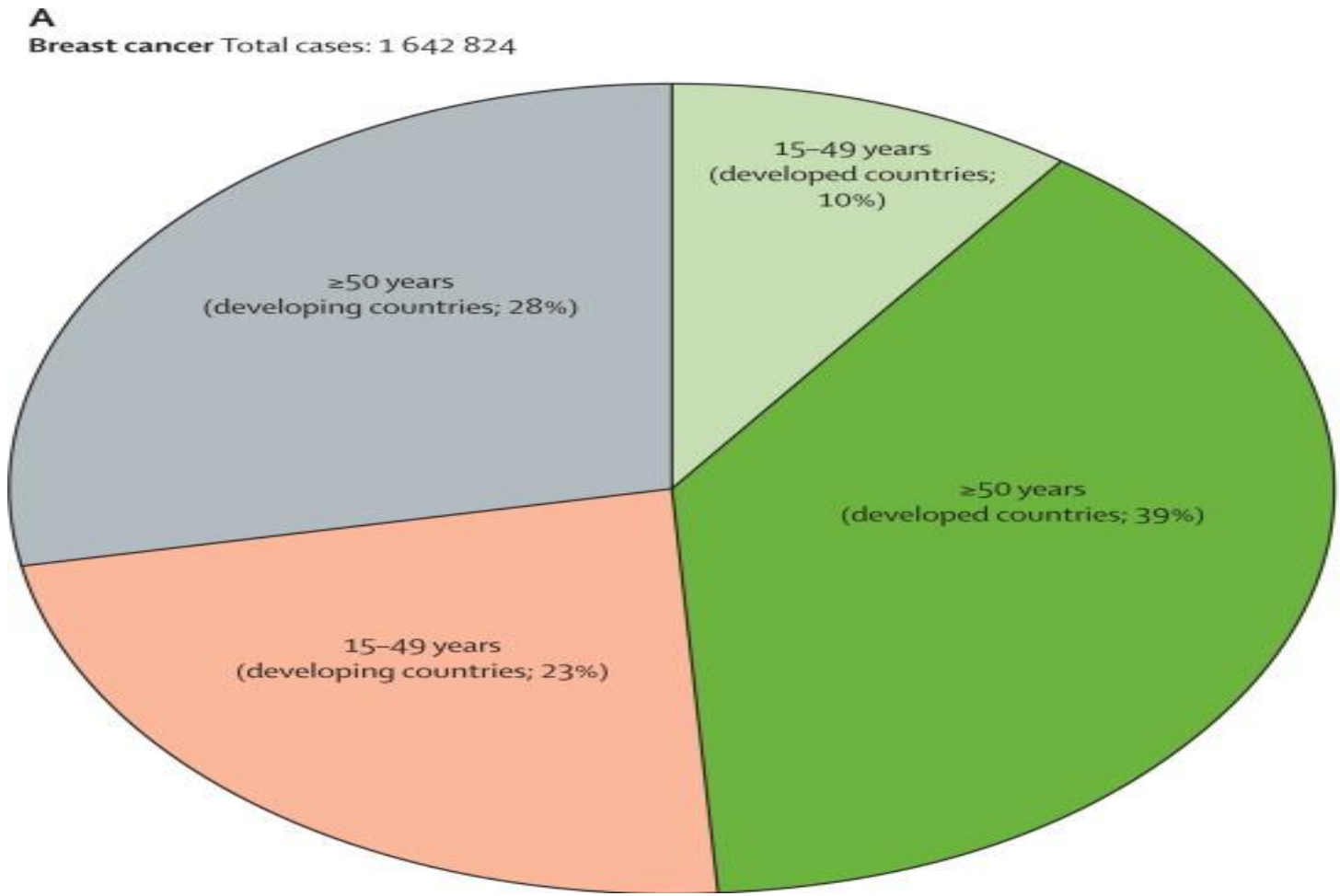
- Incidence rates are rising steadily in less affluent societies with contraction of an historical tenfold difference in breast cancer rates on income levels (Porter P 2008)
- The countries that had moderate (eastern Europe, south America, southern Africa and Asia) or low (sub Saharan Africa) incidence rates are now experiencing rapid rate increases which have more than doubled in Japan and are rising inexorably in China (Coleman MP 2008, Linos E 2008)

Incidence trends

- More than two thirds of cases of breast cancer in 2010 were in women aged 50 years and older most of which were in developed countries
- For women aged 15-49 twice as many breast cancers were recorded in developing countries as in developed countries

Forounzanfar M, Lancet 2011; 378:1461-1484

Breast cancer incidence



Forounzanfar M, Lancet 2011; 378:1461-1484

Incidence trends

- In developing countries in individuals aged 15-49 there were 367 000 cases of breast cancer
- There was an increase in the number of cases in all regions during the last three decades but this increase is more prominent in the Middle East, south Asia, southeast Asia and central Latin America
- In North America, Western Europe and southern Latin America the increase is lower than the global average
- Part of this recorded increase is because of population growth

Forounzanfar M, Lancet 2011; 378:1461-1484

Incidence trends

- Cumulative probabilities for breast cancer range from 2% in Niger, Bengladesh, Guatemala, Democratic Republic of the Congo to more than 13% in Denmark, Belgium or Israel
- Cumulative incidence is very high in North America, Western Europe and Australia (more than 10% cumulative probability)
- Some countries from sub-Saharan Africa and south Asia show a cumulative risk of less than 3% (Sri Lanka, Nepal, Malawi, Namibia, Benin, Burkina Faso, Chad, Niger)

Forounzanfar M, Lancet 2011; 378:1461-1484

Mortality

- Breast cancer mortality rates have declined significantly in industrialized countries since 1990 reversing a long-term trend of stable or increased death rates
- These falls in mortality have been attributed to earlier detection through screening and use of adjuvant systemic therapies (Berry DA 2005)
- Improved outcomes have increased prevalence rates, this has implications for survivorship

Mortality

- A retrospective trend analysis found variable changes in mortality among 30 European countries between 1989 and 2006:

➢ The greatest mortality reductions were associated with participation in national screening, assimilation of new treatments and multidisciplinary teamwork with development of specialized breast clinics (Autier 2010)

Mortality

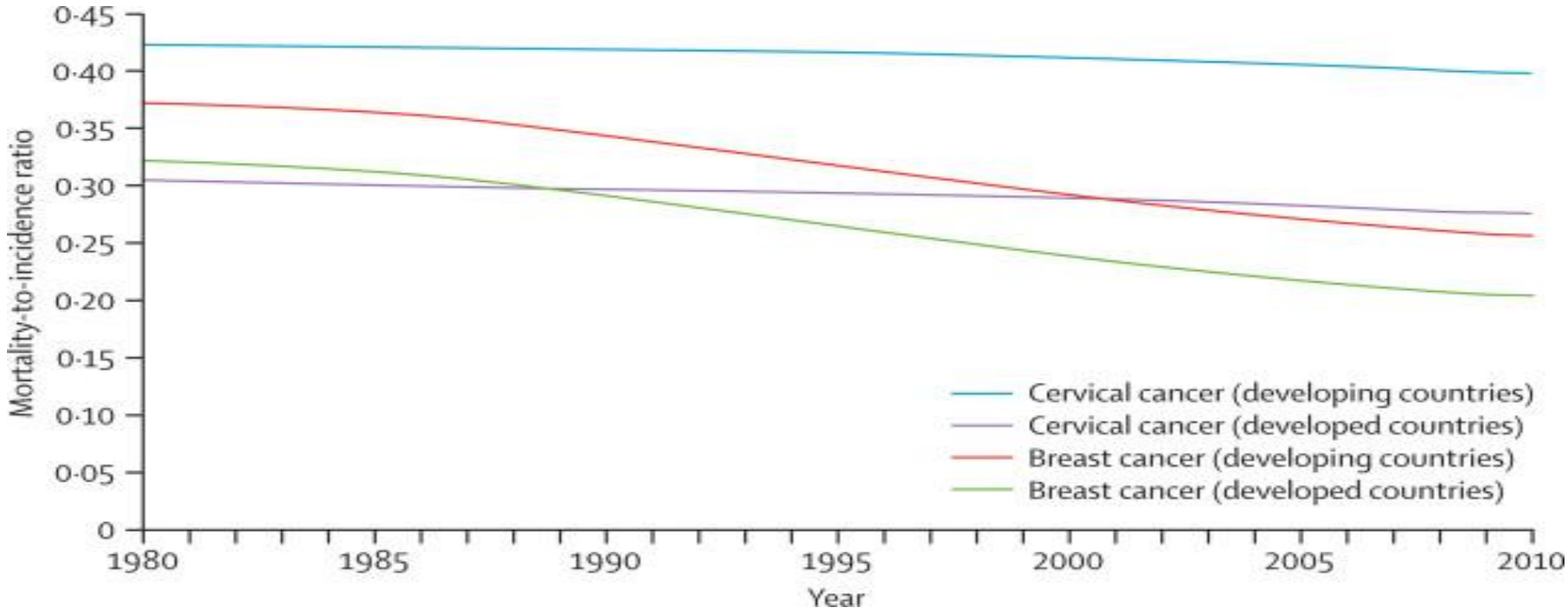
- The global number of deaths from breast cancer has increased from 250 000 in 1980 to 425 000 in 2010, an annual increase of 1.8%
- 69% of all breast cancer deaths occur in developing countries, where 5 year survival rates are below 40% (Coleman MP 2008)
- In 2010 the countries with the lowest risk of mortality of breast cancer were Mongolia, Saudi Arabia, Gambia, Bangladesh (≈ 0.2%)
- Denmark, Uruguay, Lebanon and Argentina had some of the highest risk (≈ 3.3 %)

Mortality to Incidence Ratio

- Although pronounced differences exist between developed and developing countries in the MI ratios for both regions have decreased substantially since the mid-1980s
- This decrease coincides with the introduction of treatments (hormonotherapy, chemotherapy) and the wider use of screening

Mortality to Incidence Ratios

- The breast cancer MI ratio increases from less than 0.2 in women younger than 50 years in developed countries to more than 0.35 in women aged 70 years in developing countries



Forounzanfar M, Lancet 2011; 378:1461-1484

Genetic factors

- Genetic alterations within a cell that form the basis for malignant transformation can either be inherited or acquired
- Carcinogenesis is a multistage process with sequential acquisition of gene mutations, it remains unknown whether serial accumulation are mandatory or whether mutations must occur in a special order
- The incidence of many common cancers increases with age suggesting that continuous exposure to low levels of environmental or endogenous carcinogens may have a cumulative effect

Genetic factors

- The incidence of breast cancer doubles every ten years up to menopause and its characteristic hormone dependency can interact directly with environmental and genetic factors to determine the incidence and progression of the disease
- Although, in western countries, more than 80% of breast cancers occur in women aged over 50 years, the breast is the second site for primary cancer in individuals under 35 years of age in whom genetic factors predominate etiologically

Genetic factors

- Most cancers display epigenetic phenomena which permit changes in gene expression without DNA sequence alterations and act as translators between environment and genome at the interface between the genotype and the phenotype
- These epigenetic processes provide effector mechanisms for environmental risk factors, such as hypermethylation, which can selectively silence BRCA1 and other tumor suppressor genes alleles (Esteller M 2007)

Environment and Lifestyle

- The high incidence rates of breast cancer within industrialized nations have been attributed to lifestyle factors which now have relevance to increasing rates among countries with emerging economies
- These include reproductive behavior, dietary habits, physical inactivity, pollution …

Conclusion

- Worldwide, the incidence of breast cancer has increased at an annual rate of 3.1% and mortality rate at an annual rate of 1.8%
- Increases in the absolute number of cases and deaths are driven by the interaction of three distinct reasons:
  - Rising population numbers in women at age risk
  - Population ageing
  - Changes in age-specific incidence and deaths rate

Conclusion

- The trend in MI ratios shows the effects of screening and treatments over the time
- Screening can increase the diagnosis and potentially the overdiagnosis of some cancers that would not lead the person to death, thus lowering MI ratios
- Progress in treatments will also lower the MI ratio
- MI ratios can remain constant when incidence and mortality rates are changing in the same direction

Conclusion

- Female breast cancer is common in all regions of the world
- It is the most common of female cancer in the vast majority of countries irrespective of level of developement
- The global control of breast cancer through early detection, primary prevention, and treatments improvement is a high priority
- Breast diseases Units will offer the best tools to adress this worrying problem

THANK YOU VERY MUCH FOR YOUR ATTENTION