

# Integrating a gender dimension in research

*an introduction to gender sensitive research*

Workshop scientific excellence and ‘sexy’ research

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# Structure of this presentation

- Clarification of concepts gender, sex and gender dimension
- The clinical relevance of sex and gender in life sciences
- An example

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# Gender dimension?

Research that pays attention to the role that gender and sex can play in every phase of the research process.

Research that has adopted a gender dimension we call **sex and gender sensitive**

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# Sex & gender

**Sex** refers to biological characteristics that distinguish females and males  
*dimorphic*

**Gender** refers to the social and cultural influences that lead to differences between men and women

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*Continuum*

# Sex differences in biomedical and health related research

- Females are more likely than males to recover language ability after suffering from a left-hemisphere stroke (Shaywitz et al. 1995)
- Asthma is more prevalent in boys in childhood, but more prevalent in women from puberty on (Wieringa et al., 2005)
- Women are at a 1.2 to 1.7-fold higher risk than men for all major types of lung cancer at every level of exposure to cigarette smoke (Wizemann & Pardue, 2001)
- Location of gastric cancer varies by sex (Wieringa et al, 2005)

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# Gender differences in biomedical and health related research

- Gender influences environmental factors
  - Development of eczema (Mohrenschlager et al., 2006)
  - Occupational hazards (Messing et al., 2006)
- In risk perception women and men: (Gustafson, 1998)
  - Express *different levels of concern* about same risks
  - Perceive *different* risks
  - Attribute different meanings to the same risks
- Impact of gender on perception and reporting of symptoms (Robertson, 2003)

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# Sex and gender: it's not one or the other

- Take both sex and gender into consideration (if relevant). Examples: (Krieger, 2003)
  - HIV/AIDS (sexually transmitted)
  - Hypospadias
- Not always easy to distinguish

(Wizemann & Pardue, 2001) :

- Bone mass development
- Melanoma

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# Clinical relevance of sex and gender sensitive research

Scientific evidence of sex and gender differences has shown that being female or male is an important variable that affects health and illness throughout the life span.

“As long as we can not read a patient’s DNA and the ultimate individualisation of health care is not reached, patients and doctors must continue to rely on the results of studies carefully designed and analysed by patient type – including sex – to obtain the clinical results that are useful and meaningful to the health of both women and men.” (Science, special issue on Women’s Health, 2005)

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# Clinical relevance of sex and gender sensitive research

(Wizemann & Pardue, 2001)

- Helps explain the differences in aetiology and prognosis of diseases as function of sex.
- Outcomes of diagnostic procedures and of preventive and treatment interventions can be modified by sex and/or gender.
- Differences in health outcomes may be caused by differences in perception between women and men.

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# Clinical relevance of sex and gender sensitive research

M/F differences and similarities:

- At the societal level.
- At the level of the whole organism.

(Wizemann & Pardue, 2001)

- Now, sex and gender in life sciences should be taken to the next level.

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# Taking life-science research to the next level

- “*Sex dependent biomarkers?* Should, in a quest for biomarkers for health and disease sex be included as a modifying criterion? While there has been much activity in the last few years in identification of the function of genes and their effect on treatment, research on the effects of sex as a modifier of gene function and response is under-investigated. The sequencing of the human genome allowed researchers to define the role of genetic polymorphisms and pharmacogenomics on development, course, and response to current treatments. However, **the role of confounding factors, including sex, on the function of genes and genetic polymorphisms in disease incidence, course, and response to treatment has been largely ignored.** (NIH, 2005)

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# The extended role of sex

- Look beyond reproductive system
- Influence of (sex) hormones
- Every cell has a sex!
- “*Every cell has a sex. Whether a cell contains an XX or an XY chromosome may have an impact on everything from regulation of gene expression in a cell line to the efficacy or toxicity of a pharmaceutical in living human.*” (Roerh, 2005)

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# **XX/XY** (Wizemann & Pardue, 2001)

- Genes on Y-chromosomes only expressed in males
- Women have two X chromosomes, resulting in X-inactivation
- Expression of some genes likely to be influenced by hormonal differences.
- Sex-biased gene expression on transcriptome level in somatic tissues (Isensee & Ruiz Noppinger, 2007)

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# Implications for pharmacodynamics

- **Sex in pharmacogenomics** (ORWH FY, 2004): :
  - Sex chromosomal differences.
  - Genetic, molecular and cellular bases for action of pharmacological agents that have different effects in women and men.
  - Susceptibility: the interaction of genetic polymorphisms with diet, drugs, or toxins on the architecture or development of reproductive or other organs
- **Control for other factors, such as m/f weight and body composition differences**
  - But be careful! Differences in body composition explain the differential effect of antipsychotics in men and women (Kaiser, 2005)

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# The relevance for your research from NuGO's technical annex:

‘humans’ ‘life style’ ‘sex’

‘optimal intake of bioactive components’

‘prevention’ ‘inter-individual differences’

‘dietary intervention strategies’

‘human gut health’ ‘genetic variation’

‘metabolic disorders’

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# Gender in research in NuGO

- Sex differences and gender effects are related to the central research topic of NuGO
- Ben van Ommen:  
**“The aim should be that no gender bias results from NuGO.”**

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# Examples of a gender dimension in NuGO

## as laid out in the Gender Action Plan

### SEX DIFFERENCES

- Different susceptibility of m/f to diet related diseases
- Different acute and chronic responses of m/f to nutrients
- M/f affected differently by gene polymorphisms

### GENDER DIFFERENCES

- Different motivation of m/f with regard to own and family's nutrition
- Different processing of nutrition information by m/f, attendance to different elements of dietary advice
- Different barriers for m/f affecting behavioural

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change

## Commitment to integrate a gender dimension in:

**The use of cells and  
animal models**



Give origin of materials, give  
sex disaggregated data

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## Commitment to integrate a gender dimension in:

**The use of cells and animal models**



Give origin of materials, give sex disaggregated data

**Selection of human volunteers**



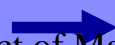
Give arguments for the composition of the research population, give sex disaggregated data

**Research and provision of information on nutrient effects**



Give sex disaggregated data, analyse gender differences

**Research and information on nutrient-gene interactions**



Give sex disaggregated data, analyse gender differences

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# Other reasons to conduct gender-sensitive research

- Criterion of *scientific quality* in FP6

“Risk factors, biological mechanisms, clinical manifestation, causes, consequences of disease and disorders may differ in men and women. In such cases, diagnosis, prevention, treatment, and management need to be adapted according to sex and gender. Consequences for not doing so impinge on the health of both women and men” (DG RTD, 2003)

- Attention to gender and sex issues is an *innovative enterprise*

- **Medical & social relevance**

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# Why a workshop?

- To promote gender equality
- To raise gender and sex awareness
- In addition to current curricula

An example:

The impact of sex and gender  
on analysing and interpreting  
violence statistics

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# The impact of sex and gender: an example

- **Original:** chapter on violence from a publication of the Finnish Office of Statistics (Heiskanen et al., 1991), investigating the statistical changes in violence between 1980 and 1988.
- **Adaptation:** chapter rewritten by Eichler (1997). It is constructed entirely with information found within the original chapter itself, but pays attention to gender as a significant variable.

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# The impact of sex and gender on data interpretation

**Original:** Heiskanen et al., 1991

- 1980: 1 out of 10 persons was the victim of a violent act or threats of violence.
- 1988: 1 out of 12.
- The victim was most likely a **single young man**.
- The relative number of persons who were victims of incidents that resulted in **restricted activity** has also fallen, but only slightly.

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# The impact of sex and gender on data interpretation

**Original:** Heiskanen et al., 1991

- Decrease was most accentuated among the **youngest men** and in the category of **street violence**.
- Exception: **work-related violence** experiences became more numerous. It has become more common among women (aged 20-44); the number of such experiences among men has fallen.
- The rate of **family violence** in 1988 remained rather close to the numbers measured in 1980.

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# The impact of sex and gender on data interpretation

Adaptation: Eichler, 1997

- Although men are slightly more likely to be victims of violence than women, this difference decreased:
  - 1980: 58% were men, 42% women
  - 1988: 53% were men, 47% women
- Typical male victim: street violence
- Typical female victim: family violence

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# The impact of sex and gender on data interpretation

Adaptation: Eichler, 1997

- Gender differences: gravity of consequences.
- Restricted activity (>1 day) following violence:

	<b>1980</b>	<b>1988</b>
<b>Male</b>	3.4%	2.7%
<b>Female</b>	3.6%	5.1%

à decreased

à increased

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# Differences?

	<b>Gender insensitive</b>	<b>Gender sensitive</b>
<b>Typical victim</b>	A young man	Male: street violence; female: family violence
<b>Likelihood of restricted activity of victim</b>	Slightly decreased	Decreased for men, increased for women
<b>Likelihood to experience violence in 1988, relative to 1980</b>	Young men less likely	Fewer incidents for both sexes, but proportion of female victims increased
<b>Work-related violence</b>	Increased	Decreased for men, increased for women
<b>Family violence</b>	Remained stable	Increased for both, but experienced by 2.3% of the men and 27.5% of the women.

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# To conclude

Sex and gender differences and/or the effects of gender are related to biomedical and health related research, and very relevant to genomics, nutrition and health.

Therefore, a challenge exists for NuGO researchers to include a sex and gender dimension in their research activities.

By doing so, the research will be innovative, of high quality and the health care and policies based on the results will be better and more effective.

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