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Learning from and overcoming gender disparities through research

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Human Sciences Research Council
Gender Summit, Cape Town
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science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA



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Objectives of the Summit

- Take a fresh look at gender issues in science knowledge making, in and for Africa;
- Formulate a gender policy charter for scientific research;
- Strengthen research collaborations with all stakeholders;
- Accelerate a shared responsibility of promoting gender sensitive science; and
- Promote research and innovation that impacts public policy.

The problem: Gender bias in Scientific research

- Gender inequalities and bias that frame males as the “norm” has influenced science, medicine, and technology.
- Research has historically and continues to use primarily male subjects, both animal and human, in science, technology, and engineering.



The consequences: Poor science

- Women, transgender and gender non-conforming people are often excluded from research and the innovations that result from that research.
- Poor science can lead to dangerous consequences – e.g. women are 1.5 times more likely to develop an adverse reaction to prescription drugs than men (Zopf et al., 2008).
- Limits scientific creativity, excellence, and benefits to society, and can be expensive – e.g. having to later withdraw drugs from national markets due to gender bias in drug development (Schieginger & Schraudner, 2011).

Gender bias across disciplines:

- Health & biomedical science
- Engineering & Technology
- Agriculture

Health & biomedical science: Clinical research

- There are significant differences in the ways that men and women experience many diseases due to a combination of biological, social and structural factors.
- In 1993, the US National Institutes of Health (NIH) implemented a requirement of including women in NIH-funded clinical research – however, in 2009, most studies (71%) reporting on randomized controlled trials enrolled less than 30% women (Geller et al., 2011).
- Scientists often neglect to disaggregate data by sex – in 2009, most studies (64%) reporting on RCTs did not report outcomes by sex (Geller et al., 2011).
- Pregnant women are also routinely excluded from the vast majority of clinical trials (Baylis, 2010).
- Clinical research typically requires conformation to the gender binary of “male” and “female” – excluding transgender populations (Baur et al., 2009).

Health & biomedical sciences: Preclinical research

- Preclinical research still primarily uses male animals – e.g. Neuroscience: 5.5 males to 1 female & Physiology: 3.7 males to 1 female (Zucker & Beery, 2011).
- The assumption that non-human female mammals are more variable than males is unscientific (Mogil & Chanda, 2005 cited in Zucker & Beery, 2011).
- The NIH only recently initiated a policy just last year to address this issue (NIH, 2014).
- Again, there is an issue in reporting: three quarters of studies (75%) found in immunology journals did not specify whether the animals used were male or female (Zucker & Beery, 2010).
- Stem cell research has neglected an analysis of differences between XX and XY cells (Wizemann et al., 2001) – sex analysis is revealing that clinical outcomes of stem cell transplantation can differ depending on the sex of donor cell used and the sex of the host (Csete, 2008).

Case study: Cardiovascular disease

- Traditionally believed to be a disease that affects primarily men, it was found that in fact more women than men die from cardiovascular disease each year in the U.S. and in many developed countries (American Heart Association, 2011).
- Heart attack symptoms can differ in males and females – men typically experience pain in the chest and left arm, whereas women can experience pain in the chest with nausea, vomiting, pain in the right arm and back, fatigue, cold sweat, and dizziness.
- Women are often misdiagnosed and improperly treated because the “normal” symptoms for heart attack were based on men (Mosca et al., 1997).

Case study: HIV

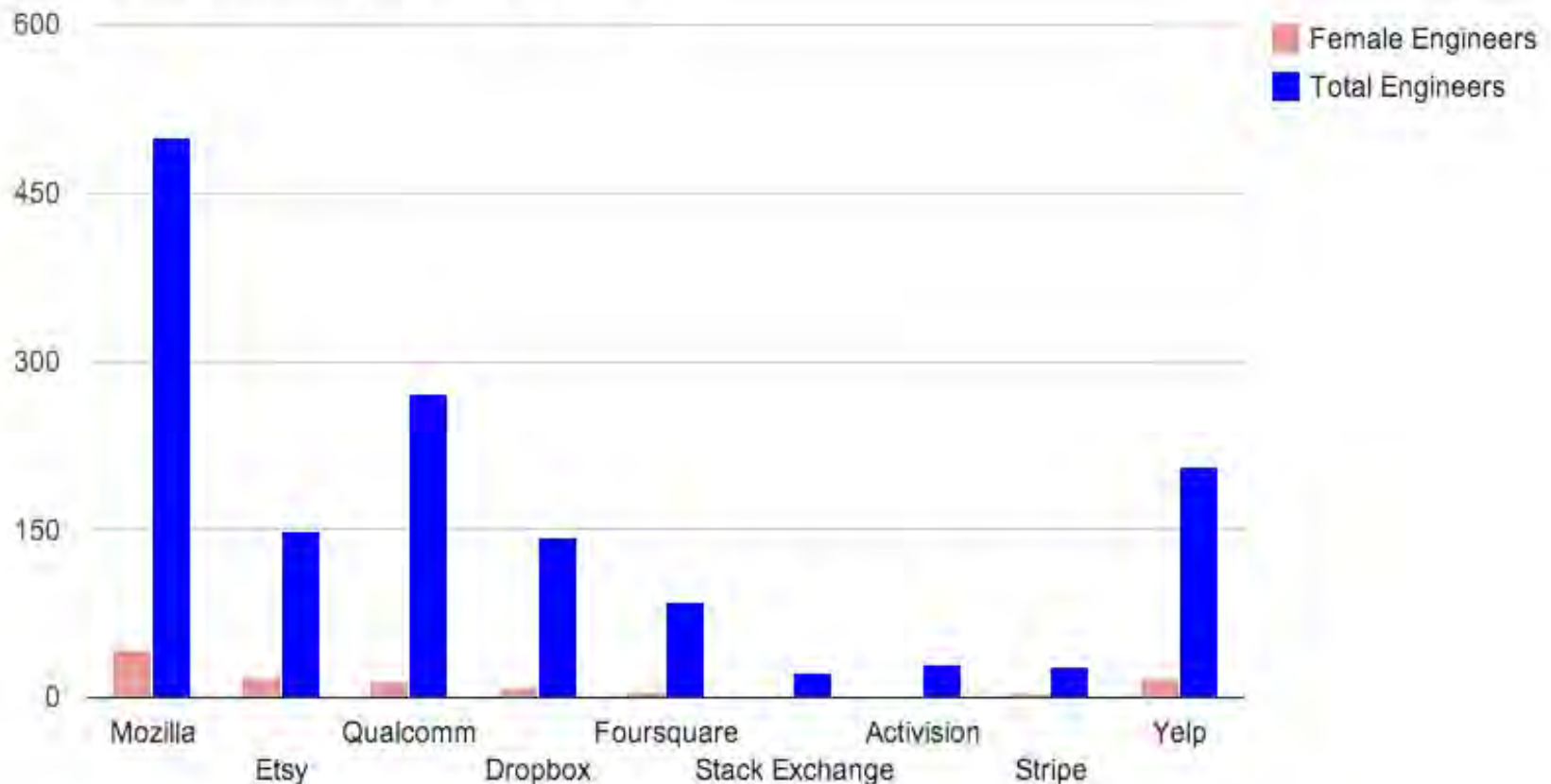
- Women are disproportionately affected by HIV in sub-Saharan Africa and in other parts of the world.
- Biological factors increase women's risk of infection through vaginal and anal sex and social factors such as violence and gender inequality heighten their risk of infection
- Disease progression appears to be different for men and women – women living with HIV progress at a lower viral load than men
- Being female was associated with toxicities of cancer treatment (Chansky, et al 2005) .
- These differences do not usually translate into different clinical management (Heidari et al., 2011).
- Women are underrepresented in clinical trails and gender analysis of data is often absent

Engineering & Technology

- In engineering and technology design, men are often taken as the norm – many devices are adapted to women retrospectively, if at all.
- Computer technologies are primarily developed for an audience of men and boys – e.g. sexist computer games.
- It is no surprise because men are the ones designing this technology.

Gender Gap in Top Tech Companies

Female Engineers vs. Total Engineers



[LISA EADICCO](#)

Case Study: Seatbelts



- Pregnant crash test dummies were not invented until 1996 and are still rarely used in automobile testing.
- The 3-point automobile seatbelt does not fit pregnant women properly.
- A different design, such as a four-point seatbelt without a lap belt, might be better (Duma et al. 2006).
- If gender analysis had been used from the beginning, engineers would not have excluded pregnant women from automobile seatbelt design.

(Schiebinger & Schraudner, 2011)

Case study: Condoms

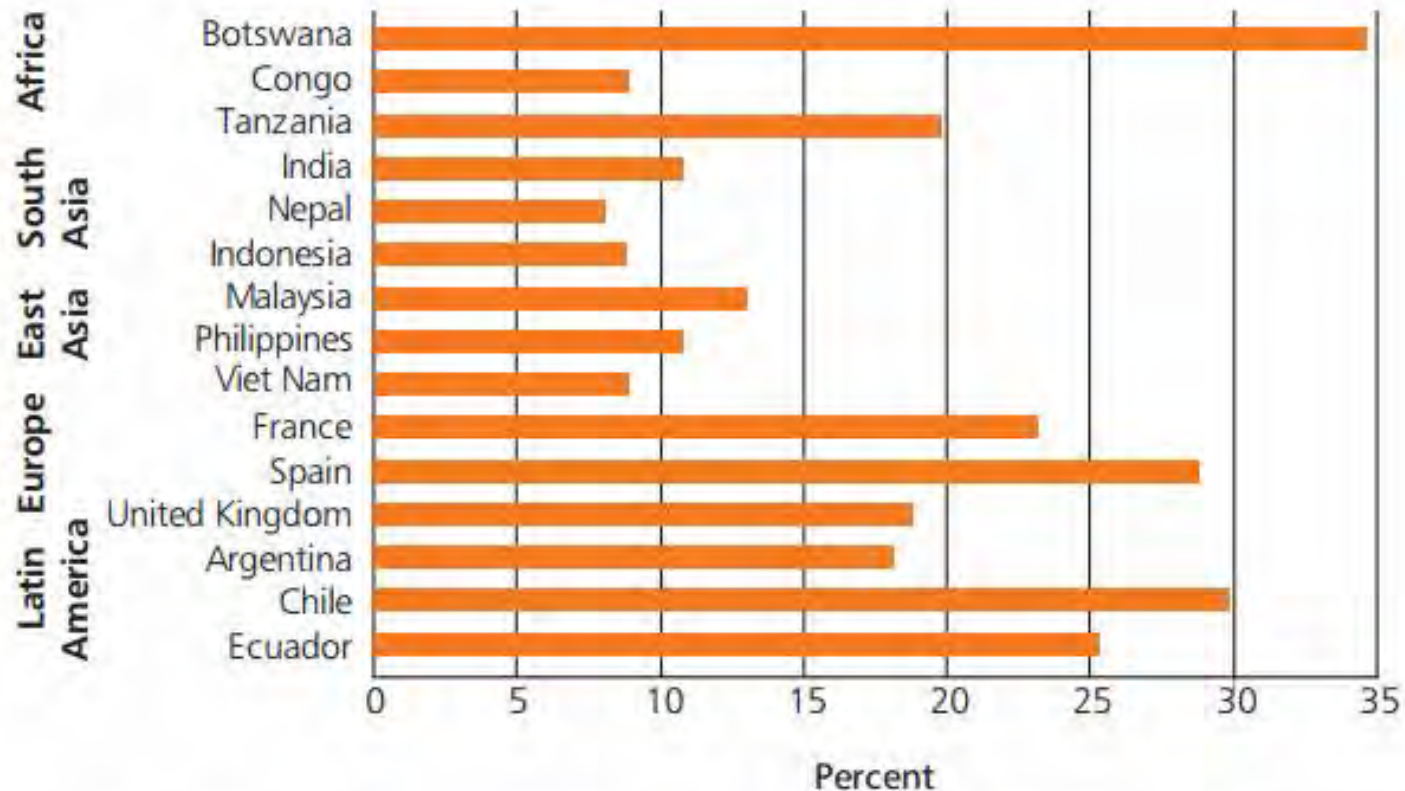
- The main prevention device continues to be the male condom
- Compared to the male condom being used since the mid-19th century, the female condom was developed only in 1993.
- Poor uptake – just 1 female condom is used for every 200 male condoms worldwide, and
- Poor distribution – only 35 million FC were available for distribution compared to 6-9 billion male condoms (NAM Female condoms, 2015).



Agriculture

- Dependence on women in agriculture is growing – men in much greater extent than women have been moving to non-farm jobs (Agarwal, 2011).
- Women contribute 60-70% of the total labour needed to bring food to the table in developing countries (Doss, 2010).
- Gender inequalities and male bias disadvantage women farmers' access to technical information, credit, extension services, critical inputs such as fertilizers and water, and marketing (World Bank, 2009; FAO, 2011).
- This is changing – for example, the Bill and Melinda Gates Foundation has committed to including gender analysis in their agricultural grants (Gates Foundation).

Case Study: Percentage of ownership of Land by Women, 2012



Source: Food and Agriculture Organization of the United Nations, Gender and Land Rights Database. <http://www.fao.org/gender/landrights/topic-selection/en/>

(FAO, 2013)

The solution: Increase efforts to incorporate gender analysis in research

- Gender analysis is needed in all phases of research – from funding decisions, project conceptualization and objective setting, to methodologies and ethics, to data collection and analysis, and to making recommendations based on results.
- Must be coupled with fixing the number of women in Science, and fixing white male domination of institutions and universities. For example, to date only:
 - 2 of 199 winners of the Physics Nobel were women.
 - 4 of 169 winners of the Chemistry Nobel were women.
 - 11 of 207 winners of the Medicine Nobel were women.

Recommendations:

- Strictly enforced measures are needed from institutions, funders, and journal editors.
- Institutions must require researchers to control for sex and gender.
- Funders should implement policies that require a gender dimension in research, and refuse to consider grant proposals that do not properly acknowledge or justify the sex of cells, animals, or human participants.
- Journal editors should require that authors who use only male or only female cells, animals, or human participants should state this in the title of their paper.

(Zucker & Beery, 2010)

The result: Innovation and Creativity

- Including gender analysis in research promotes not only good science and critical rigour, but offers new perspectives, challenges and questions for researchers.
- The Gender Summit encourages gender analysis in all research, for quality science and exciting innovations that are beneficial for all.



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Quality Research and Innovation through Equality

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