### INTRODUCTION

Exclusion of individuals on the basis of sex and gender in health research has led to lack of knowledge of biological sex differences, and the presence of gender bias in research design and health delivery. In an effort to address this, research funding agencies such as CIHR, SHRF, and the Heart & Stroke Foundation, now require researchers to integrate sex and gender considerations into their projects. We present this resource to help you think about how you can approach this, and why it is important.

### DEFINITIONS & CONCEPTS

**SEX** = BIOLOGICAL, i.e. genes, hormones, anatomy is NOT binary; exists on a spectrum

**INTERSEX** = variations in sex characteristics that do not fit boxes of ‘male’ and ‘female’

Consider chromosomal variation - each leads to several possible variations in genes, hormones, sex organs, and z’ sex characteristics:

<table>
<thead>
<tr>
<th>46XX</th>
<th>46XX + SRY</th>
<th>45X</th>
<th>45X/46XY</th>
<th>47XXY</th>
<th>46XY + SRY</th>
</tr>
</thead>
</table>

Could sex differences and/or variations in sex characteristics play a role in mechanism, pathway, intervention, outcome, etc.? ...

**GENDER** = PSYCHO-SOCIAL, i.e. behaviours, expressions is fluid and multidimensional

Consider these 4 dimensions of gender:

- ROLES
- IDENTITIES
- RELATIONS
- INSTITUTIONS

#### WHERE ARE THE BIASES, AND WHY?

**WOMEN: ALWAYS POTENTIALLY PREGNANT**

- hormones “too complicated”, therefore excluded
- result: missing/inaccurate knowledge in several areas

**LGBTQ2S+: DISCRIMINATION & PRIVACY ISSUES**

- exclusion in research and reluctance to participate
- result: missing/inaccurate knowledge in several areas

**INDIGENOUS: DISCRIMINATORY, UNETHICAL TX**

- colonization effects on gender roles
- ignorance of Indigenous research methods
- result: major disparities in health

**MEN: STANDARD, DEFAULT BODY**

- some disparities in “female diseases”
- i.e. osteoporosis, breast cancer, mental health disorders

### BASIC SCIENCE CONSIDERATIONS:

**CELLS**

- all have a sex. Know and indicate the sex origin of cell lines, and try to balance primary cells between sexes when possible.

**ANIMALS**

- have a sex but not gender. However, consider how sex interacts with context, i.e. strain, age, temperament, behaviour, and environment. Watch for human biases misinterpreting different behaviors between the sexes as ‘wrong’. Another way to include sex in your work is to consider stress responses, behaviour, etc. of your animals based on sex of the handler.

### GUIDING QUESTIONS

- Have sex differences been established in your field?
- Have dimensions of gender been examined?
- Have LGBTQ2S+ individuals been included?
- Has context, age, ethnicity, etc., been considered?
- Who is absent? What don’t we know about?
- Is S/G of the researcher/animal handler/interviewer a factor?
- Are data collection tools sensitive and appropriate?
- Is recruitment strategy appropriate?
- Is KT plan appropriate?

### WHY SHOULD YOU CARE?

**Integrating sex and gender considerations...**

- Improves rigour and reproducibility of research
- Better serves the public taxpayers who fund research
- Broadens the applicability of research
- Addresses ethical principles of research, including respect for persons and doing no harm
- It’s the right thing to do!

### CONSIDER THE CONSEQUENCES

- Women 47%> likely to be prescribed inappropriate medications
- Drugs pulled off the market b/c harmful/fatal in women
- Men 3x more likely to die of suicide
- SK First Nation girls’ suicide rate 26x > than non-FN girls
- 2/3 heart disease research focuses on men
- Women 50%< likely to survive cardiac arrest, and < likely to be resuscitated by bystanders
- Indigenous women and women from South Asian, Chinese, and Afro-Caribbean decent have higher rates of heart disease and poorer outcomes vs. white women
- Feminine gender, independent of female sex, is associated with higher risk of recurrence of cardiovascular events
- 50-75% of girls and women with ADHD go undiagnosed due to differing of symptoms from boys and men
- Genome data sets are 80% Euro decent, <1% Indigenous
- Genetic studies often omit X chromosome
- 90% of LGBT youth have reservations about reporting sexual orientation to their clinicians, which has been associated with inadequate screening for communicable diseases

### LEARN MORE

CoM researchers can contact erin.prosser-loose@usask.ca for further resources and assistance, and for info on the CoM Sex and Gender Champion group, the Sex and Gender Trainee Group, and the Sex, Gender, & Diversity email list.