

Women and Children' Health

Introduction

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Three topics:

1. Basic concepts

Health and Public Health

The Principles of Public Health

2. Why we focus on Women and Children' Health?

3. DOHaD: Developmental Origins of Health and Disease



Assignment:

Please describe one or more health determinant(s) that you are interested in.

Deadline: the day before final exam

E-mail address: cnzhangbo_smu@126.com (only for collecting assignments)

To be continued...

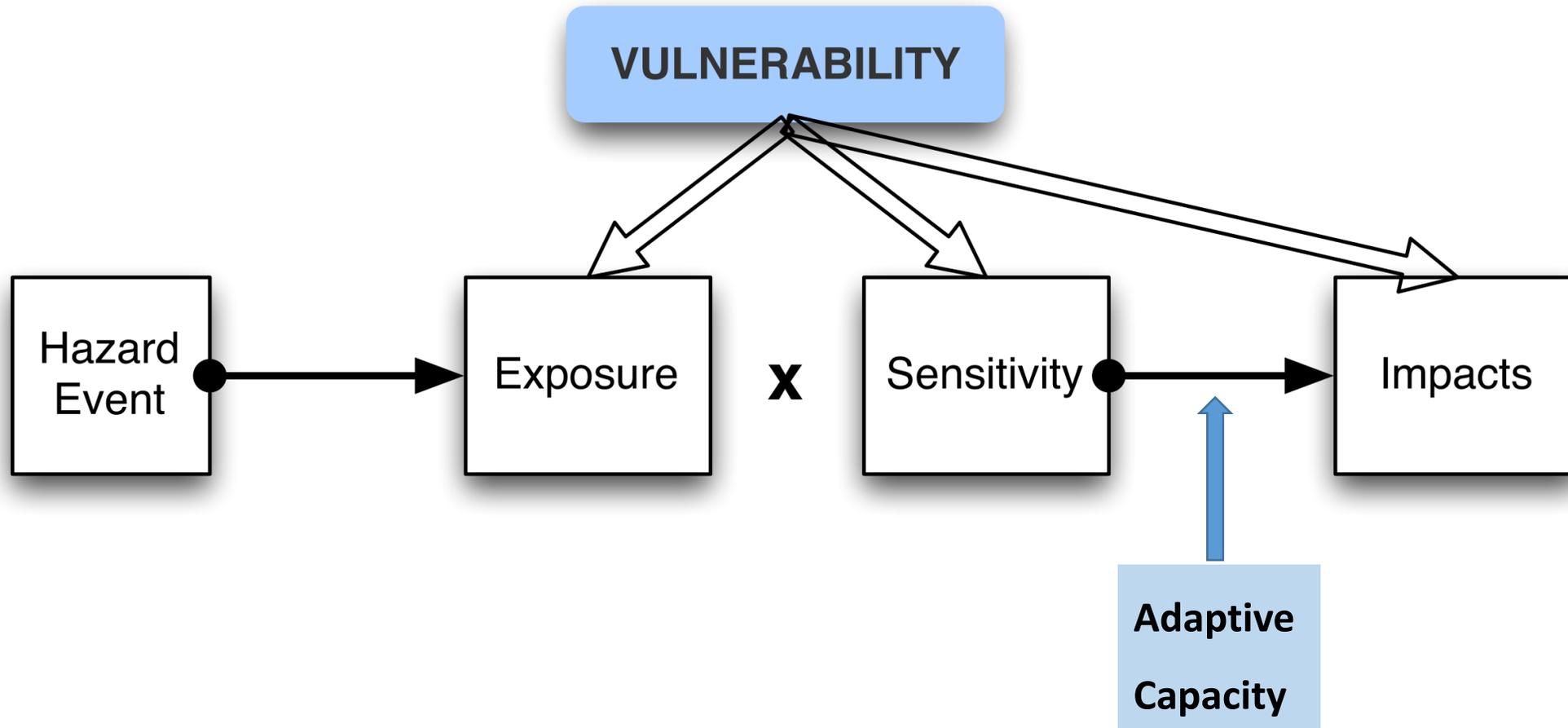
Thank you!



2. Why we focus on Women and Children' Health?

- Social vulnerability/Health disparity/Health inequality
- Priority populations of healthcare
- Gender difference in health and disease
- Children Are Not Little Adults!

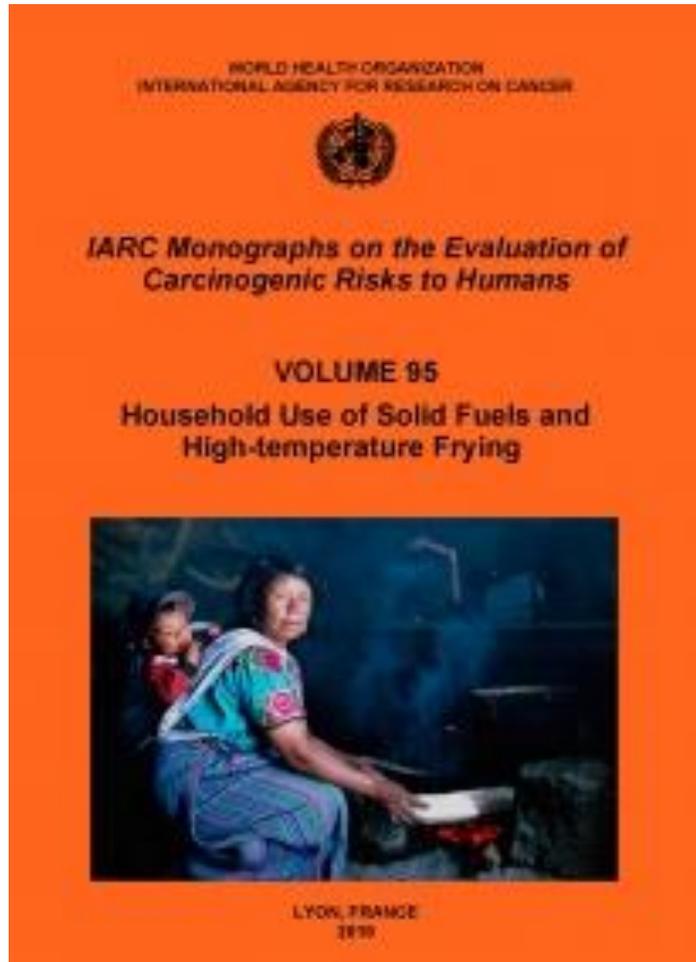




Risk-Hazard (RH) model (diagram after Turner et al., 2003), showing the impact of a hazard as a function of exposure and sensitivity. The chain sequence begins with the hazard, and the concept of vulnerability is noted implicitly as represented by white arrows.



High incidence of lung cancer in Asia females: Solid Fuel Use May Be a Risk Factor for Mortality and Disease



Indoor emissions from household combustion of coal are carcinogenic to humans (Group 1).

Indoor emissions from household combustion of biomass fuel (primarily wood) are probably carcinogenic to humans (Group 2A).

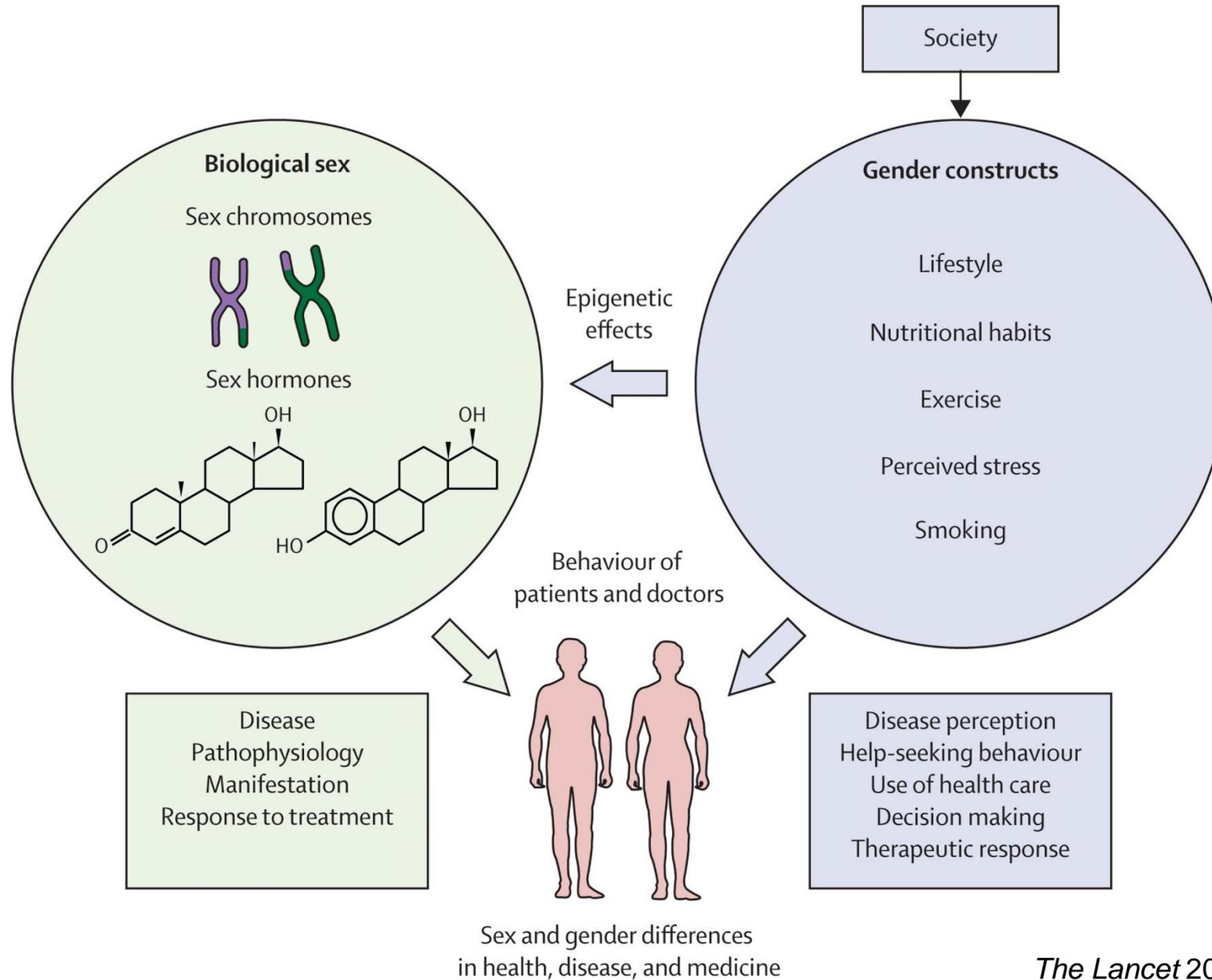


Data from the 2009–2010 National Adult Tobacco Survey indicated that a majority of U.S. adults think workplaces and restaurants should be smokefree, and half think bars, casinos, and clubs should be smokefree.

U.S. Adults	Believe Workplaces Should Be Smokefree	Believe Restaurants Should Be Smokefree	Believe Bars/Casinos/Clubs Should Be Smokefree
All Adults	81.6%	74.9%	50.0%
Never Smokers	89.0%	82.9%	60.0%
Former Smokers	82.1%	76.6%	51.9%
Current Smokers	59.4%	49.9%	19.2%

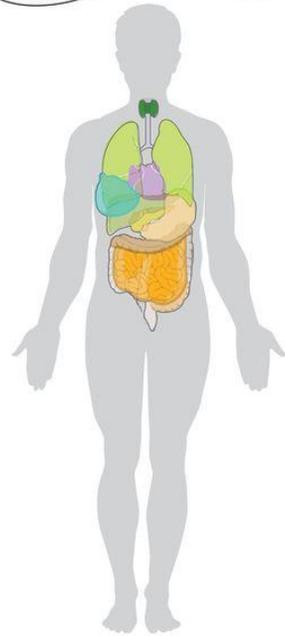
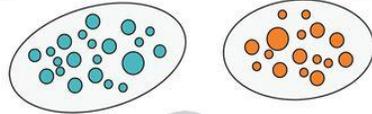


Sex and gender: modifiers of health, disease, and medicine



Sex affects gene expression and its genetic regulation across tissues.

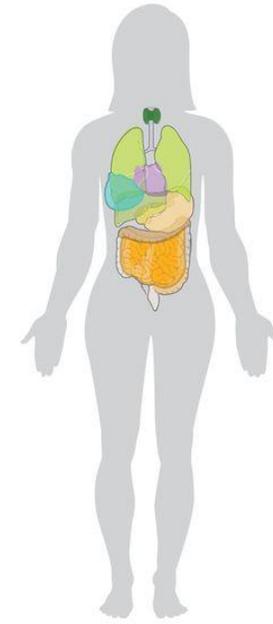
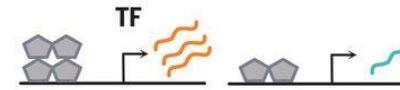
Sex biases in biological processes and pathways



Male

Sex-biased eQTL mediation by cellular abundances

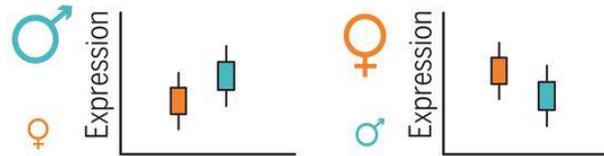
Sex biases in transcriptional regulation



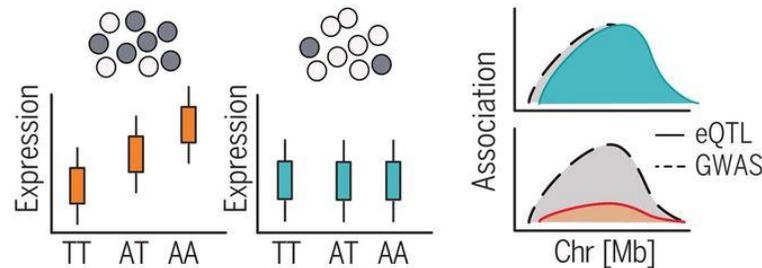
Female

Sex biases in gene-trait association

Sex-biased gene expression



Sex-biased eQTLs



Meritxell Oliva et al. *Science* 2020;369:eaba3066



➤ **Children Are Not Little Adults!**

1) Unique Activity Patterns + Behavior

- Children crawl and play close to the ground making them more likely to come into contact with dirt and dust, which can include toxicants.
- Children often put their hands, toys, and other items into their mouths.

2) Physiology

Children eat, breathe, and drink more relative to their body mass than adults do.

Children's natural defenses are less developed.

More permeable blood-brain barrier.

Less effective filtration in nasal passages.

Highly permeable skin.

Lower levels of circulation of plasma proteins.

Digestive system, metabolic pathways, renal clearances, and vital organs are still developing.



➤ **Children Are Not Little Adults!**

3) Windows of Susceptibility

- The timing of exposure to chemicals or other insults is critical in determining the consequences to children's health.
- Because of the differing windows of susceptibility, the same dose of a chemical during different periods of development can have very different consequences. For example, fetal loss or birth defects are most likely to occur as a result of exposures to chemicals during the embryonic period, when organs are beginning to differentiate.
- Even after the basic structure of an organ has been established, disruption of processes such as growth and cell migration can have lifelong consequences on the function of key organ systems.
- Due to the complexity and speed of development during the prenatal period, organ system development is particularly susceptible to adverse effects resulting from environmental exposures

