

Gender – and Sex Conscious Medicine



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Gender and Sex-Conscious Medicine

- **Same organs:**
 - Differences in physiology and pathophysiology
- **Same diseases:**
 - Differences in symptoms and intensity
 - Different prevalence and incidence
- **Same Treatment:**
 - Differences in efficiency
 - Differences in side effects



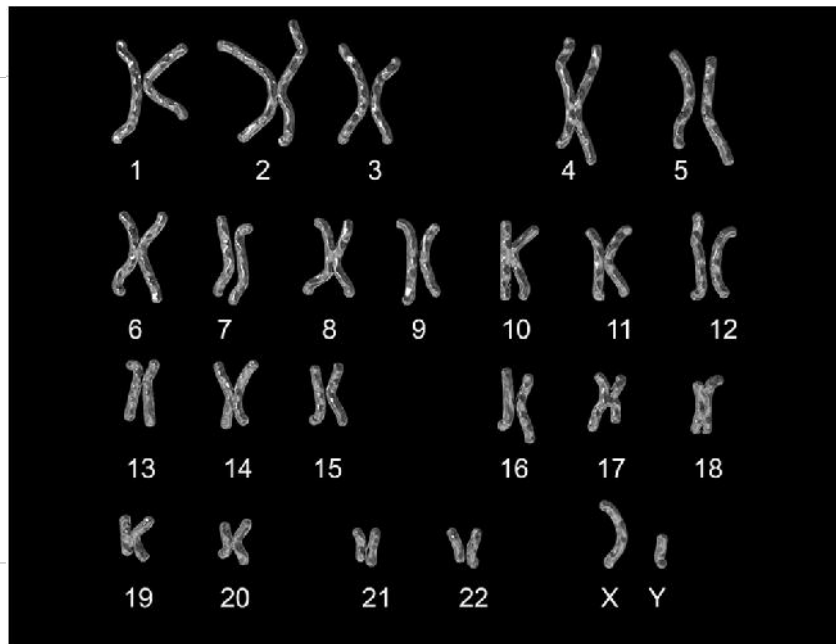
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Gender – and Sex Conscious Medicine

What is Sex? What is Gender?



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What is Gender ?



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Binary and Non- Binary Gender

Genderqueer

Bigender

Trigender

Transgender

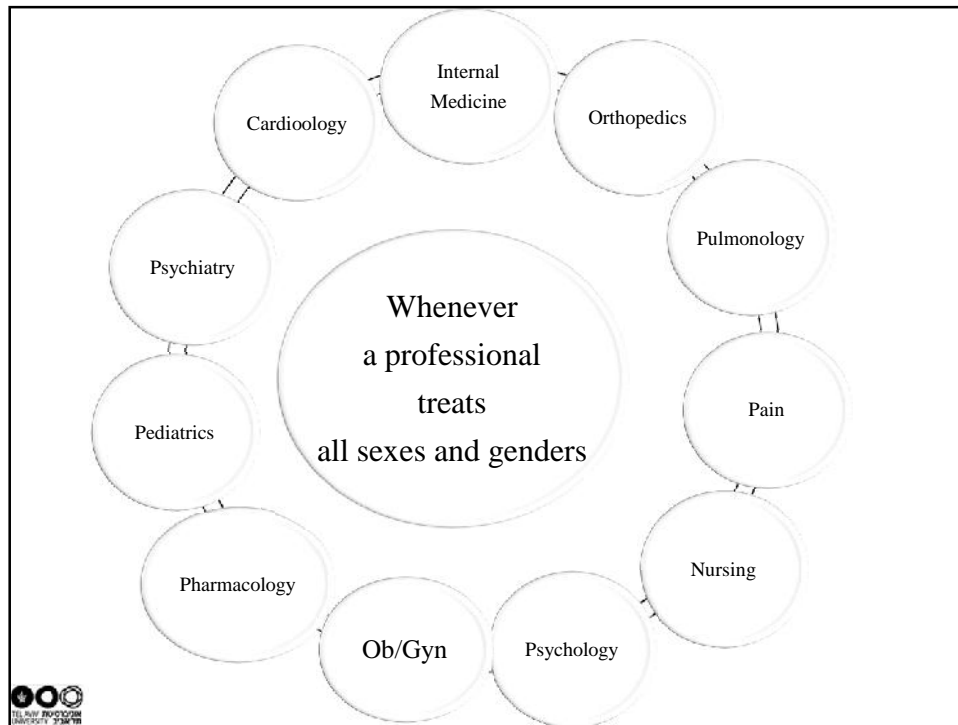
Pangender

Genderfluid

.....



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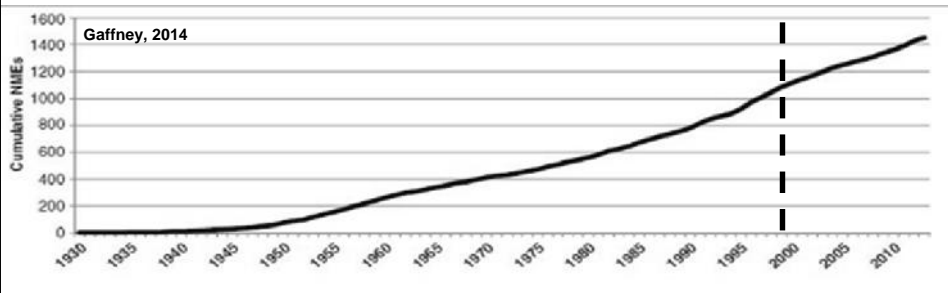


Unbelievable.....

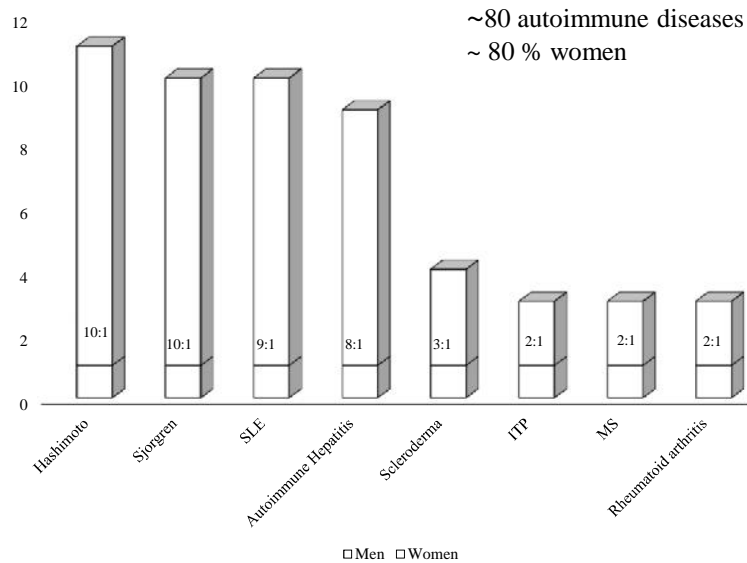
- **Most diseases and drugs studied in men**
- **Neglect of inter- sex and intra-individual variability (menstrual cycle)**



- ❖ FDA supervises 20.000 drugs
- ❖ Since 100 years ago: ~1.500 New Molecular Entities
 - ❖ From these: 66 % before year 2000
- ❖ Ergo: Most drugs never assessed in women



Autoimmune Diseases



Heart Attack



Receiving State of the Art Treatment

Lee, 2019

- **N~48.000 w ACS**
- **MI= > 99%ile of Troponin**
 - 16 ng/l Women
 - 34 ng/l Men
- **Sex-specific thresholds: 5x more women**
- **Despite this, women received less ttm:**
 - Dual anti-platelet therapy: 54% vs 67 %
 - Revascularization: 35% vs 57%



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More Women die annually from CVD than from all forms of Cancer combined		
Outcome Data: Israel 2018 ACSIS	Men (1.407)	Women (414) Age adjusted
7-day mortality	1.4 %	3.1 %
30-days	2.9 %	5.8 %
90-days	4.3 %	6.9 %
1 year	7.3 %	9.8 %
Maj.Adv.Cardiac Events Adj:Age, past MI, DM, HT	9.6 %	12.5%

Medications

Does One Size Fits All ????

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Pharmacodynamics

- **What the drug does to the body**
 - Mechanism of action
 - Effectiveness
 - Toxicity – side effects

Pharmacokinetics

- **What the body does to the drug**
L.A.D.M.E



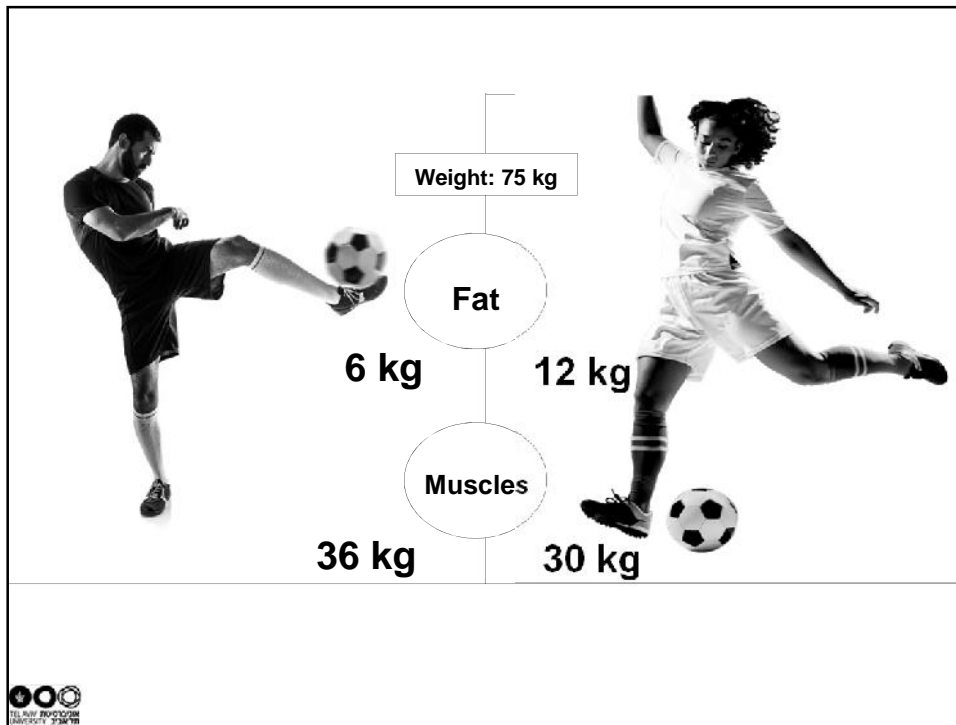
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Pharmacokinetics - LADME

- **L**iberation: Physico-chemical characteristics
- **A**bsorption: Environment > peristaltic, skin
- **D**istribution: Muscle /water/fat, carriers
- **M**etabolism: Phase I and phase II reactions in liver
- **E**limination: Organs, transporters



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Clearance of Drugs

- | | |
|---------------------|-----------------|
| ➤ Higher in MEN | Higher in WOMEN |
| ➤ Ciprofloxacin | ➤ Prednisone |
| ➤ Oncological drugs | |
| ➤ Aspirin | |
| ➤ Paracetamol | |

Side Effects (SE)

Twice more common in women

- **Physical and mental burden**
- **Affect compliance**
- **SE cause 7 % of hospitalizations in US**
 - **5% of these lead to mortality**
- **NO to: “You have to live with it”**
- **NO to: “ Side effects mean that the drug is effective”**



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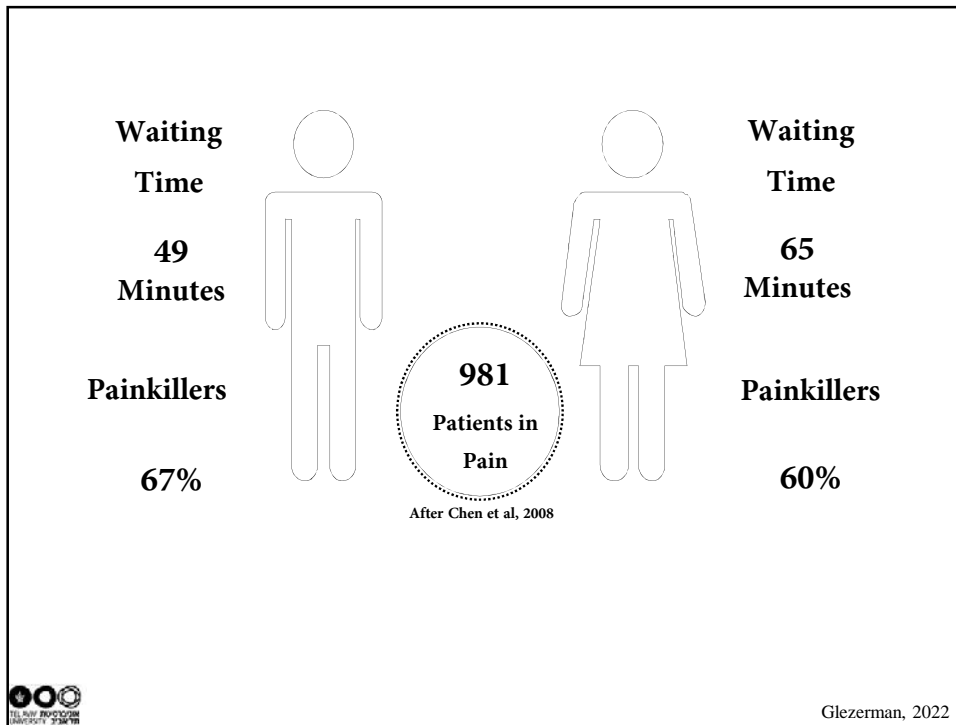
Diseases Associated with Chronic Pain	
<p>Male prevalence</p> <ul style="list-style-type: none"> Migraine without aura Cluster headache Post-traumatic headache SUNCT syndrome Raeder's paratrigeminal syndrome Pancoast tumor Thromboangitis obliterans Brachial plexus avulsion Pancreatic disease Duodenal ulcer Abdominal migraine Lateral femoral cutaneous neuropathy Post-herpetic neuralgia Hemophilic arthropathy Ankylosing spondylitis 	<p>Female prevalence</p> <ul style="list-style-type: none"> Migraine headache with aura Chronic tension headache Post-dural puncture headache Hemicrania continua Cervicogenic headache Tic douloureux Temporomandibular joint disorder Occipital neuralgia Periapical periodontitis & abscess Atypical odontalgia Burning tongue Carotidynia Chronic paroxysmal hemicrania Temporal arteritis Carpal tunnel syndrome Raynaud's disease Chilblains Causalgia Reflex sympathetic dystrophy Hemicrania continua Chronic venous insufficiency Fibromyalgia syndrome Esophagitis Reflux esophagitis with peptic ulcer Slipping rib syndrome Twelfth rib syndrome Gallbladder disease Post-cholecystectomy syndrome Irritable bowel syndrome Interstitial cystitis Acute intermittent porphyria Proctalgia fugax Chronic constipation Pyridiformis syndrome Peroneal muscular atrophy Multiple sclerosis Rheumatoid arthritis Pain of psychological origin

Pain // Greenspan et al, 2007

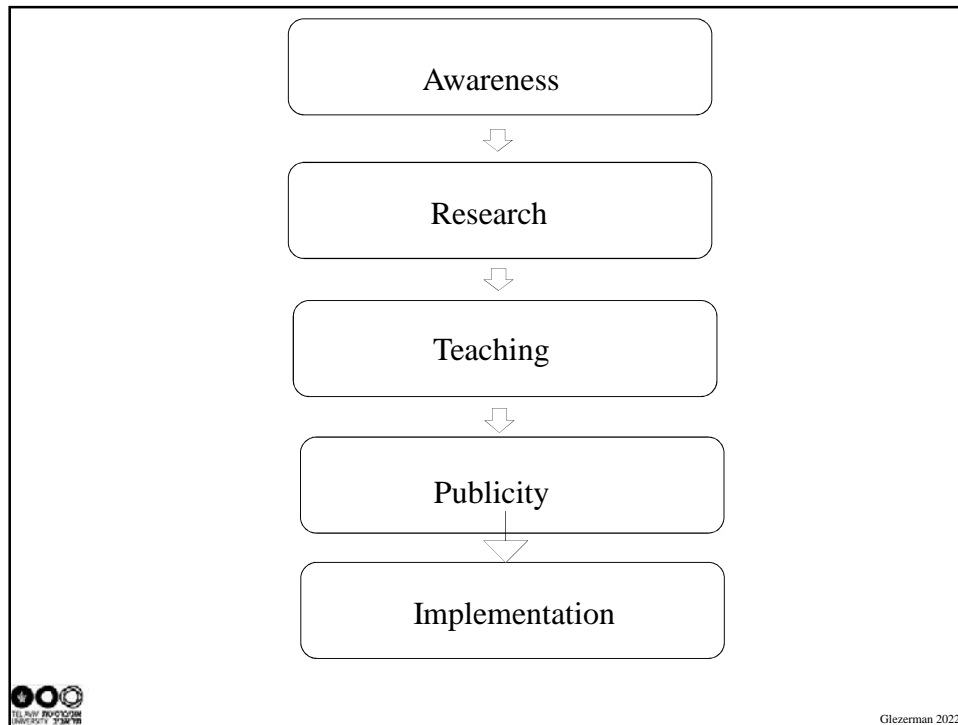
Women:...

- ... different threshold for pain
- ... experience pain differently
- ... fear pain more
- ... communicate pain differently


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How to Promote Gender- and Sex Conscious Medicine?



Teaching (Universities and everywhere)

- **Core curriculum**
- **Workshops**
- **Inter-and Intradisciplinary teaching**
- **Graduate studies**
 - (physicians, nurses, psychologists etc)
- **Postgraduate studies**
- **Integration in board exams**

Sex and Gender Analysis Policies of Peer-Reviewed Journals

Scientific Journals With Policies on sex- and Gender Specific Reporting

- Physiology
- Circulation
- Endocrinology
- Lancet
- Nature
- Science
- Plos Medicine
- Plos Biology
- Surgery
- Am J Cardiology
- Physiological Genomics
- J Nat Cancer Institute
- ... and 22 more....



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Gender and Sex-Conscious Medicine

Change of Paradigms

Re-Thinking Physiology and Pathophysiology

Re- Doing Research

Re-Writing Textbooks



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