



# OLLI at University of Illinois

Fall 2021 Semester  
Women and Medicine  
Session 8



# 21<sup>st</sup> Century & Beyond Women in Medical and Science Careers

November 1, 2021

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# My Cloudy Crystal Ball

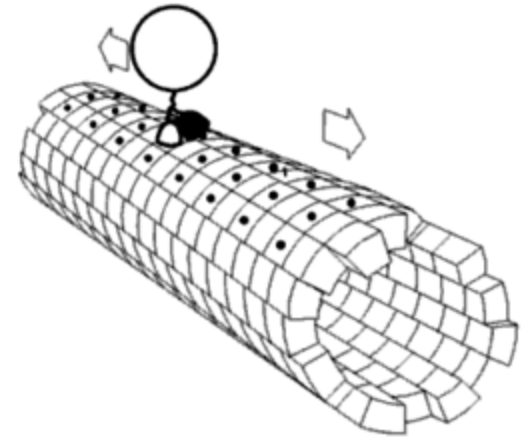
## Future Medical Technology

- Nanotechnology.
- Robotic surgery, close and long-distance.
- Genetic engineering.
- Virtual information recording & retrieving.
- Telemedicine and Telesurgery.
- 3-D Printing of organs and structures.
- Biomaterials science and tissue engineering.
- Micro multiple blood analyses.



# Nanotechnology

- The first useful applications of nanomachines may be in nanomedicine.
- Biological machines could be used to identify and destroy cancer cells.
- A potential application is the detection of toxic chemicals and their concentration in a site.





# Genetic Engineering



Manipulation of DNA by cutting or altering amino acid sequences, as with CRISPR.



# Virtual Information Recording and Retrieving



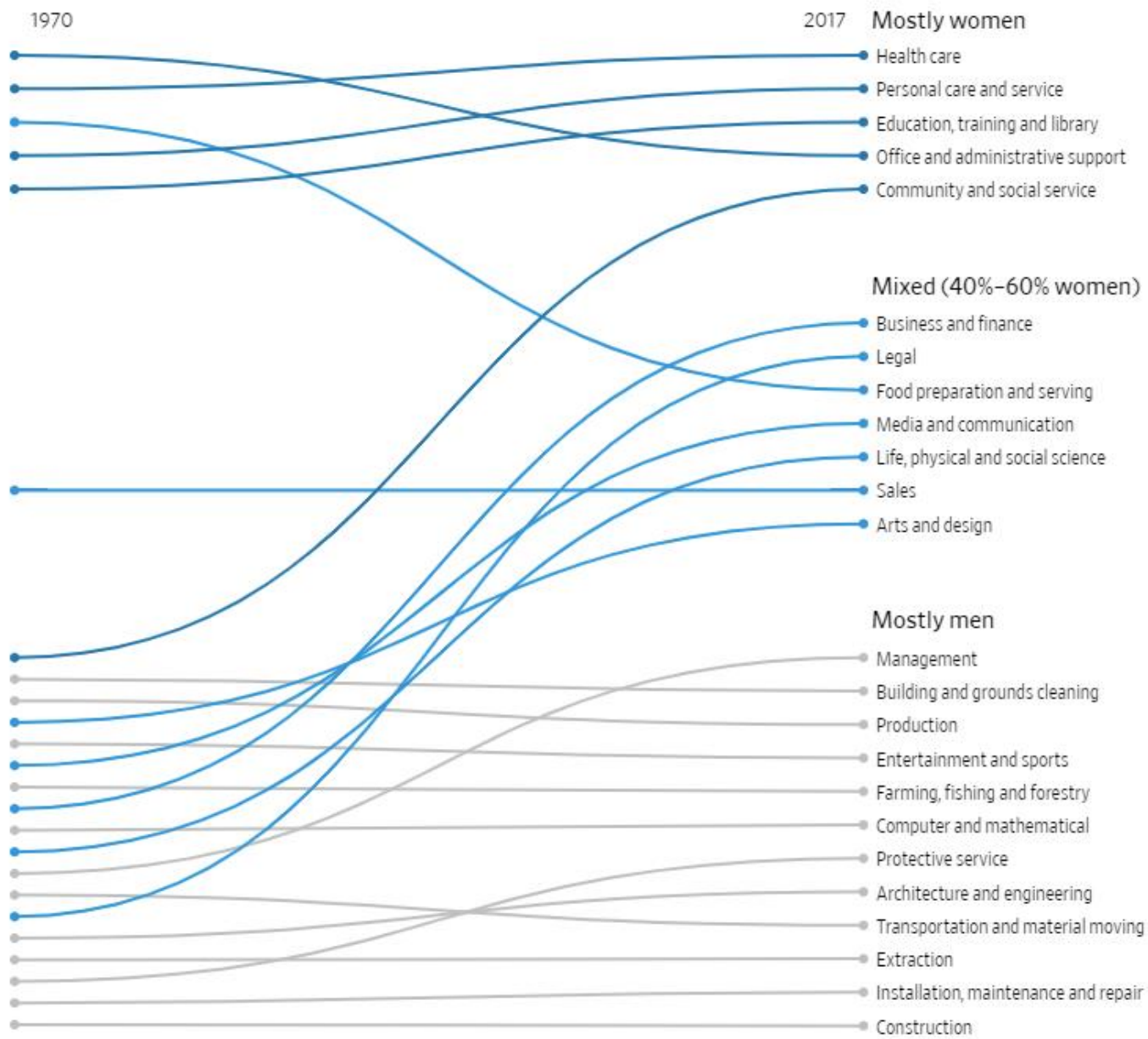


# Feminization of Professions

- Men predominated in the last 4 centuries, in science, medicine and other professions.
- In the 20<sup>th</sup> and 21<sup>st</sup> centuries, women are starting to outpace men in many fields of professional endeavor.
- Educational restrictions and discrimination have been lifted in many careers areas.



# Occupational groups ranked by percent of women



Wall Street Journal 2019





# Share of women in Job fields since 1970

- Women still dominate some traditionally female occupations such as health-care workers, teachers & admin support.
- Men occupy many of the same jobs they had back in 1970, such as truck drivers, construction workers and architects.
- Women make up more than 50% of jobs in white-collar fields, but research shows men still hold more of the **senior** roles.
- That division of labor can perpetuate a gender pay gap, since higher-paying positions tend to be held by men.



# Share of women in Job fields since 1970

- The pay offered in an occupation affects its women proportionally due to employers' preference for men, and occupations with a greater share of women pay less than those with a lower share.
- This association is explained by:
  - *Devaluation*: By performing unrecognized, undervalued labor, women sustain the American Dream, a system which exists on their backs.
  - *Queuing*: Women enter jobs that *already* pay less, either because employers hire them last in the "labor queue" or because the things women value in a job are non-pecuniary.
- Models of occupations (U.S. Census 1950 – 2000) show much evidence for the *devaluation* view, but only scant evidence for the *queuing* view.



# Women in the Labor Force



## Football cheerleaders

- Sexist discrimination and exploitation
- Illegally low wages w/o benefits
- Almost -impossible standards of sexiness and appearance not applied to male-dominated jobs.



## Domestic workers

- Paid cash
- No benefits
- No employment security
- Ethnic & racial discrimination and exploitation
- High potential for sexual abuse.

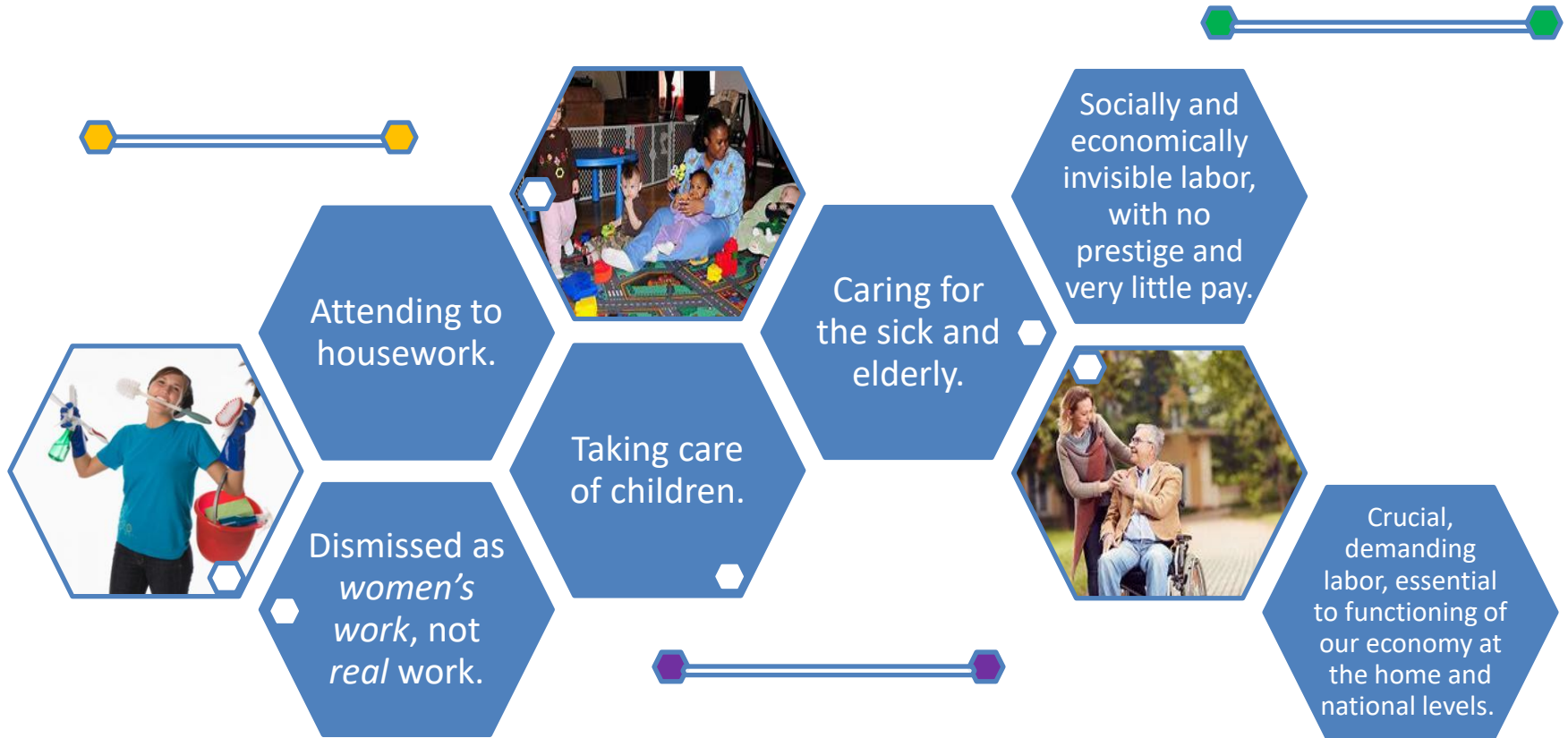


## Health home aides

- 72 % lost all of their clients at the beginning of April 2020
- As of September 2020, 36 % had no jobs, compared to 9 % before COVID.
- 74 % were not compensated by their employers for the loss of work.



# Domestic and Health Aides





# STEM

- **Science, Technology, Engineering and Mathematics** have remained mainly manly since the 18<sup>th</sup> century (Age of Enlightenment).
- The % of STEM PhDs earned by women in the US is about 42%, while the % of PhDs earned by women in all fields is about 52%.



# Scientists & Engineers (S&E)

43% of the US S&E workforce are women under 75 years old.

56% of the US S&E workforce are women under 29 years old.

Of scientists and engineers seeking employment 50% under 75 are women, and 49% under 29 are women.

About one in seven engineers are female.

Women are 28% of workers in S&E occupations, but not all women who are trained as S&E are employed as such.

Women hold 58% of S&E related occupations.

Women in STEM fields earn considerably less than men, even after controlling for education and age.

On average, men in STEM jobs earn \$36.34 per hour while women in STEM jobs earn \$31.11 per hour (2011).



# STEM

- A 1996 USA study suggested girls begin to lose self-confidence in middle school because they get to believe that men possess more intelligence in technological fields.
- Since men outperform women in spatial analysis, this incorrect conception prevails.
- Feminist scholars say that boys are more likely to gain spatial skills outside the classroom because they are culturally and socially encouraged to build and work with their hands.
- Research shows that girls can develop these same skills with the same form of training.



# Nikola Tesla

*“As generations ensue ... the average woman will be as well educated as the average man, and then better educated ... Women will ignore precedent and startle civilization in their progress.*

In science, women will assert first their equality and later their superiority”.





# STEAM



# STEM and STEAM

- Women have been enrolling in and graduating from college in growing numbers since the 1980s, and today have surpassed men in overall educational attainment — except in the STEM fields.
- Girls, as reported by the AAUW, walk away “at every step of the STEM ladder.
- Adding an “A” to STEM produces STEAM, building new rungs in the ladder to encourage girls and women to step into the STEM professions.
- The “A” is the Arts.



# STEM and STEAM

- A combination of Art and Science may attract girls to STEM careers *and* help to rethink social stereotypes about science, engineering and computing as the exclusive domains of men.
- The inventive process connects ideas and thoughts that may seem to be unconnected.
- Integrating our artistic and inventive minds could be the perfect combination for STEM in the 21st century.



# STEM and STEAM

(Case of Hedy Lamarr)

- In the 1930s, before coming to the US and becoming a movie star, Hedy was married to Fritz Mandl, an Austrian arms dealer.
- At dinner parties, she was supposed to just “look pretty”, but instead, listened to scientists and military men from Germany and Spain who discussed research and investigations of “wire-guided” submarines and torpedos.
- After coming to the US to launch her movie career, she remained interested in science, and remembered the conversations from her European days.



# STEM and STEAM

(Case of Hedy Lamarr)

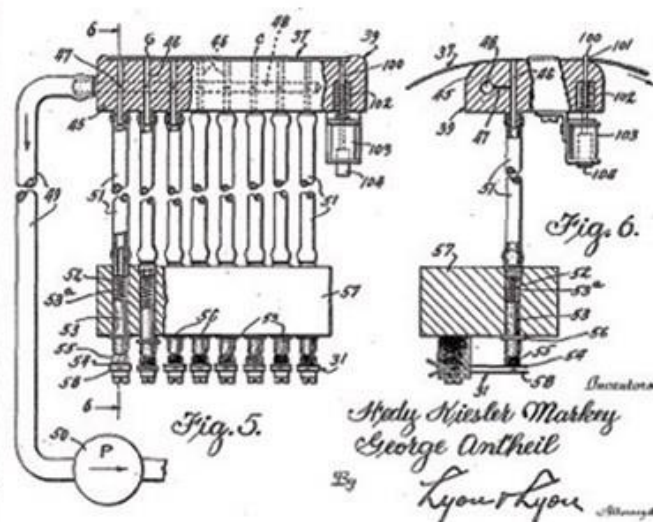
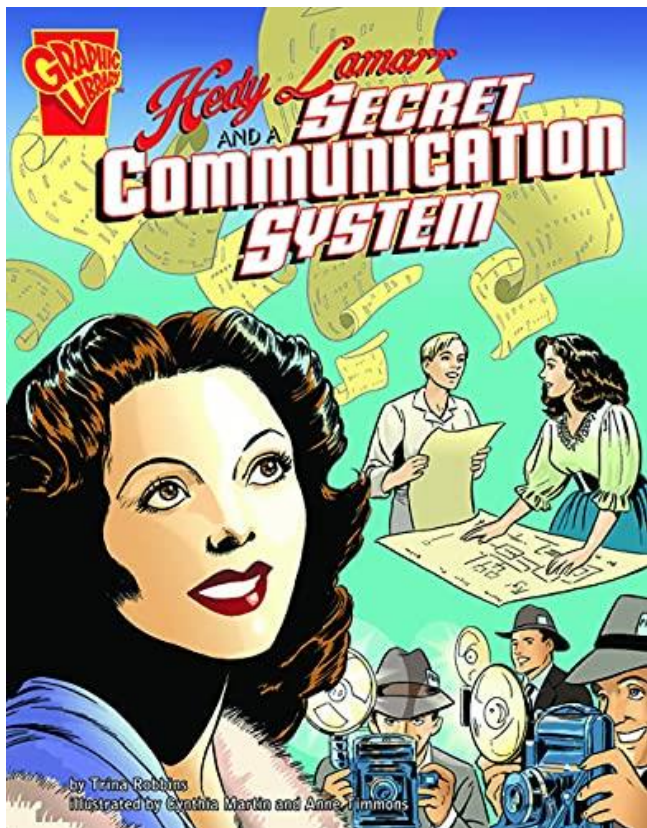
- She came up with an idea for a radio that “hopped frequencies,” to jam transmissions of Axis submarines launching torpedos at Allied transport ships.
- Together with George Antheil (pianist and composer) they invented and patented a radio system that saved lives of Allied soldiers and civilians during World War II.
- This spread-spectrum radio is the technology that made wireless phones, Bluetooth, WiFi, GPS systems, and many other devices possible.



# STEM and STEAM

(Case of Hedy Lamarr)

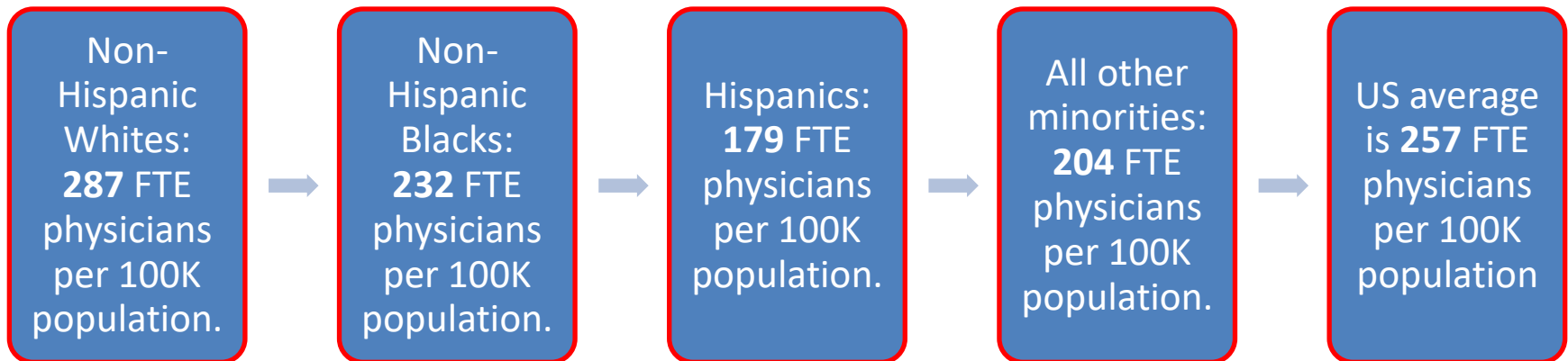
Lamarr and Antheil were posthumously inducted into the National Inventors Hall of Fame in 2014.



They received US Patent 2,292,387 in 1942, for a "Secret Communication System".



# Current Patterns of Health Care Service Use (2019)

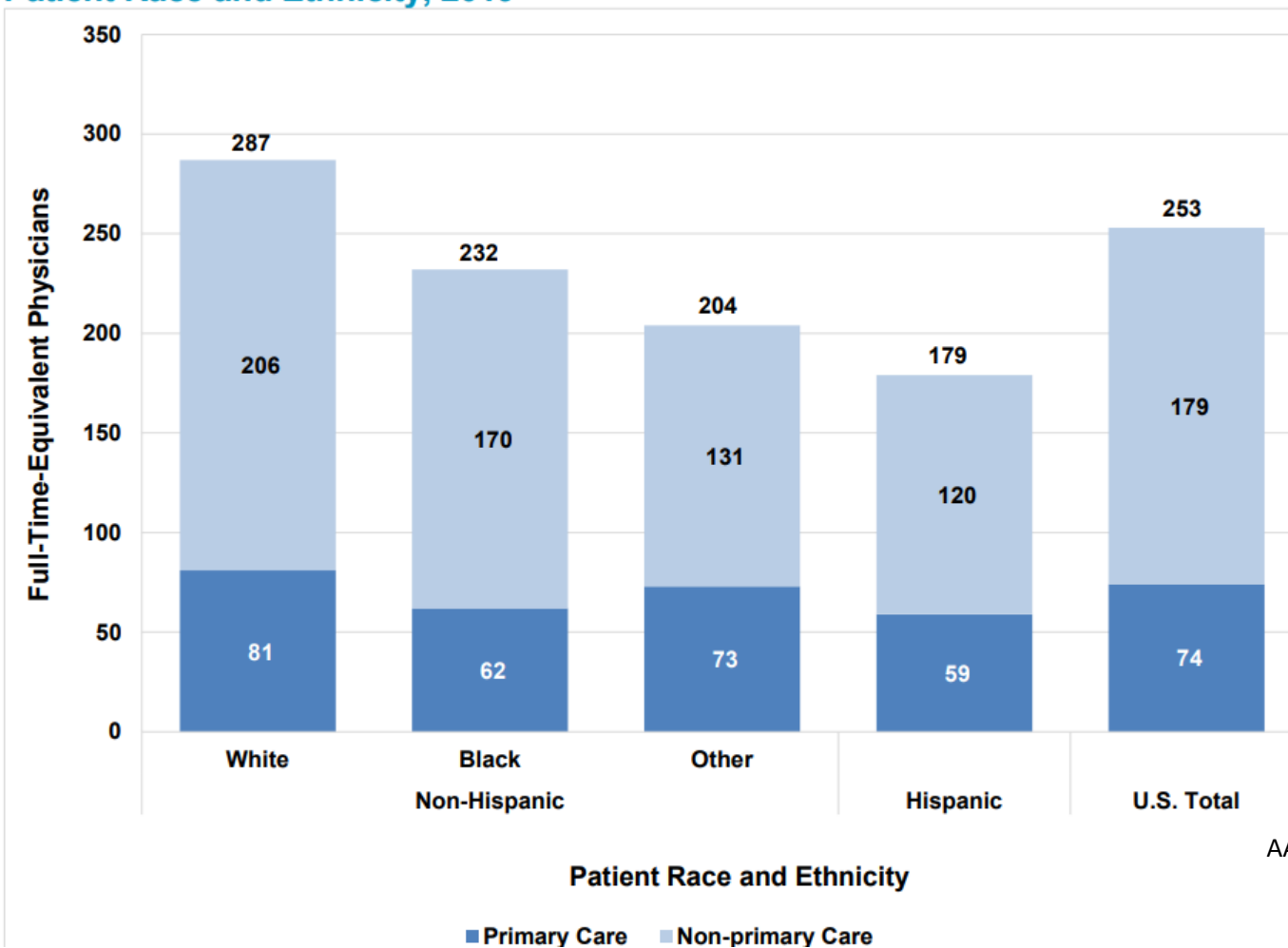


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# FTE Physicians by Race

**Exhibit 13: Current Use of FTE Physician Services per 100,000 Population by Patient Race and Ethnicity, 2019**



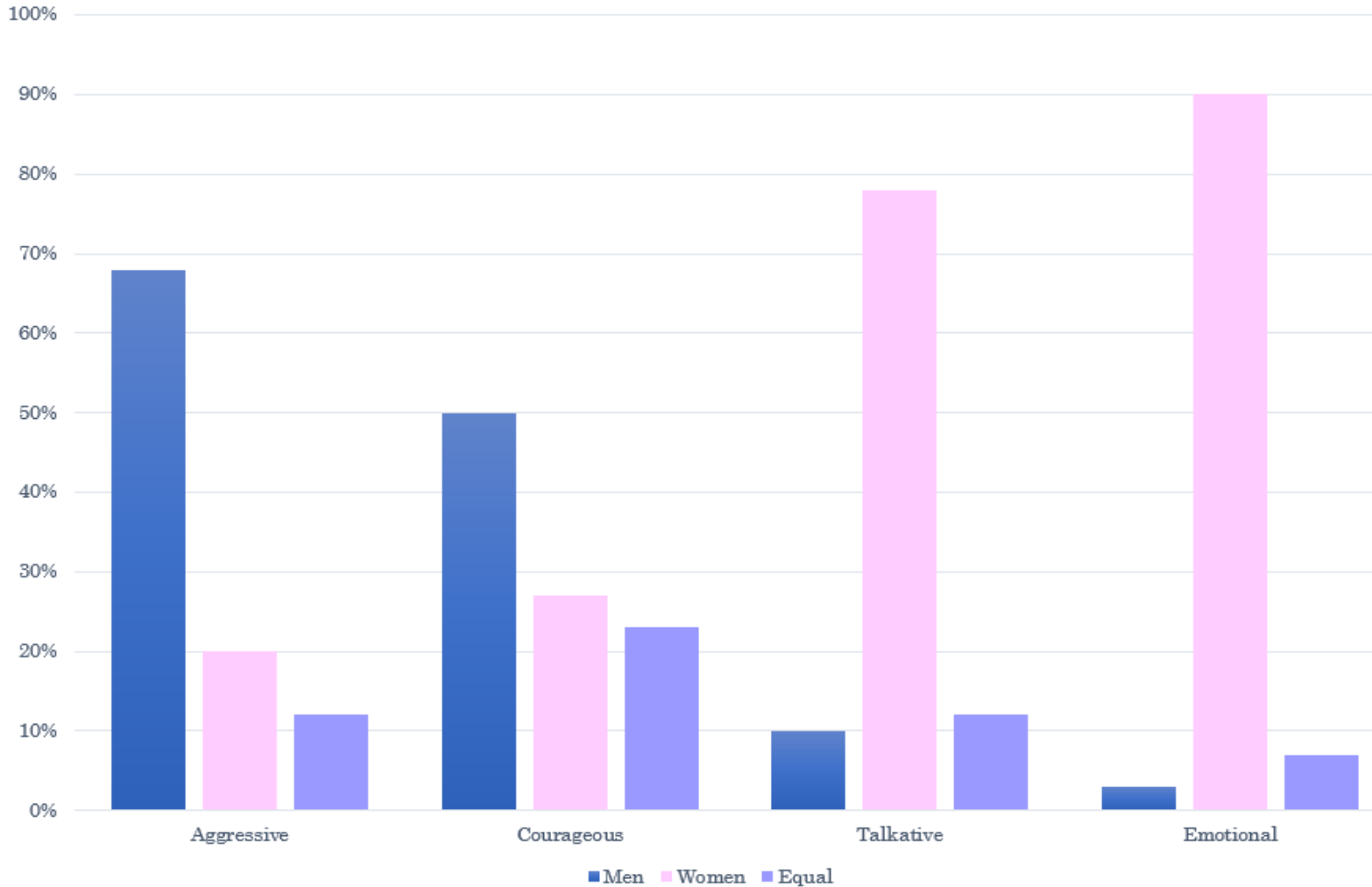
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# Traits Perceived as Most True (Men vs Women)

Gallup Poll USA 2006



Kaitlyn J <https://commons.wikimedia.org/w/index.php?curid=68644374>



# Glass Ceiling

- Metaphorical invisible barrier that prevents a demographic (typically women) from rising beyond a certain level in a hierarchy.
- In the last twenty years, the women who have become more involved and pertinent in industries and organizations have rarely been in the executive ranks.
- Minority women in white-majority countries find the most difficulty because they are in 2 historically marginalized groups: women and people of color.



# Glass Ceiling

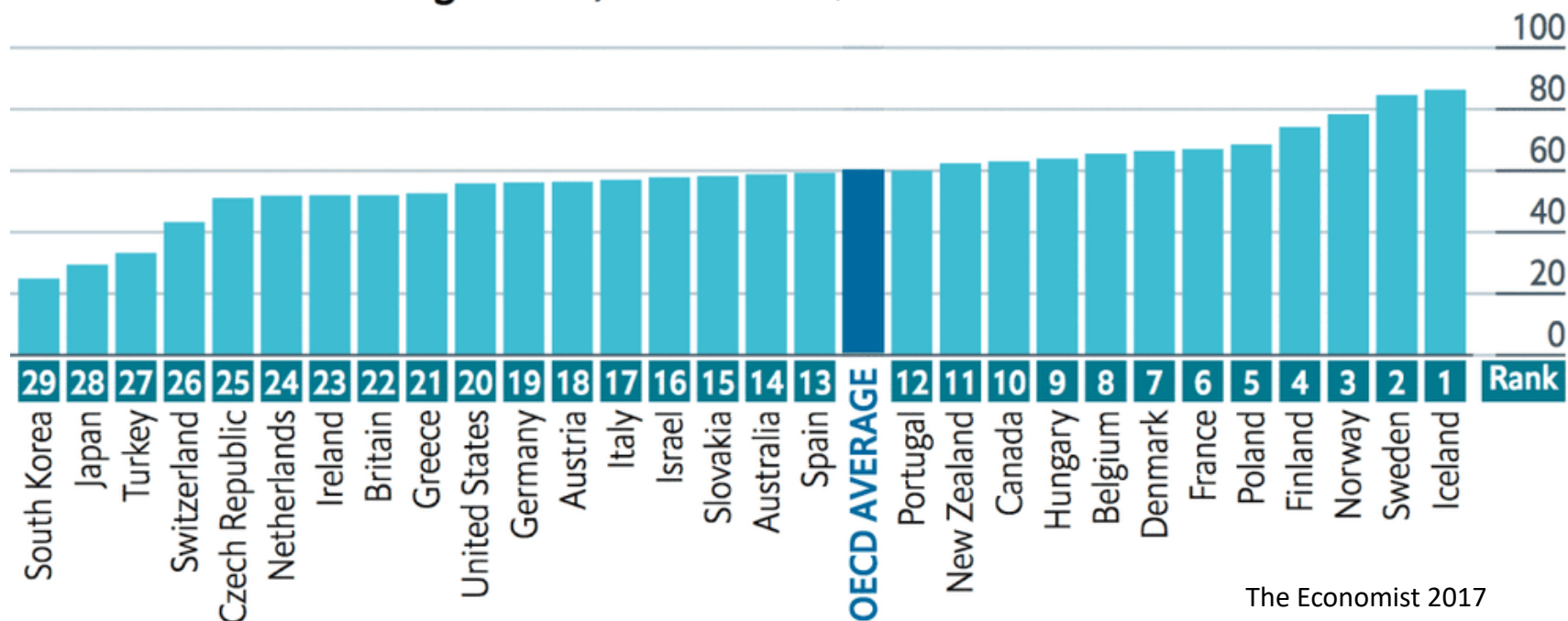
- Researchers found that glass ceilings correlate strongly with gender.
- Both white and minority women face a glass ceiling in the course of their careers.
- The researchers did not find evidence of a glass ceiling for African-American men.



# Glass Ceiling

## The glass-ceiling index

Environment for working women, 2016 or latest, 100=best





# Glass Ceiling

- The long trend of improving conditions for working women has flat-lined within the OECD (38 mostly rich countries).
- In 2005, 60% of women were in the labor force; in 2015, this ratio edged up slightly to 63% (80% for men both years).
- Old-boys' networks help men reach the top, but women's numbers in well-paid, high-status jobs is closer to a  $\frac{1}{3}$  than  $\frac{1}{2}$ .
- The gender wage gap (male minus female wages, divided by male wages) is still around 15% meaning that women as a group earn 85% of what men do.



# Glass Ceiling

- The obstacles that all East Asian Americans face in advancing their careers is referred to as the “bamboo ceiling”.
- The many barriers that refugees and asylum seekers face in their search for meaningful employment is referred to as a “canvas ceiling.”



# Glass Ceiling

US Federal Glass Ceiling Commission defines the glass ceiling as "the unseen, yet unbreachable barrier that keeps minorities and women from rising to the upper rungs of the corporate ladder, regardless of their qualifications or achievements."



# Glass Escalator

- When men join fields previously dominated by women (like nursing, teaching, social work and even ballet), men are promoted and given more opportunities than women.
- Men are often pushed toward administrative tracks where they benefit from unofficial mentoring by other men in leadership positions.
- Also, those making promotion decisions are often male.





# The Glass Escalator

(K-12 Education)

Gender	Teachers	Principals	Superintendents
Men	24%	49%	76%
Women	76%	51%	24%
Median Salary (2013)	\$53,725	\$94,179	\$142,523



It is as if the men were taking escalators and the women were taking the stairs.



- Gender segregation among occupations in the United States is lessening to a small degree.
- In 2011 there were 12 FORTUNE 500 companies headed by women (down from 15 in 2010).
- U.S. Census: for 2010, for every 100 unmarried women there are 88 unmarried men.



# Women in Surgery



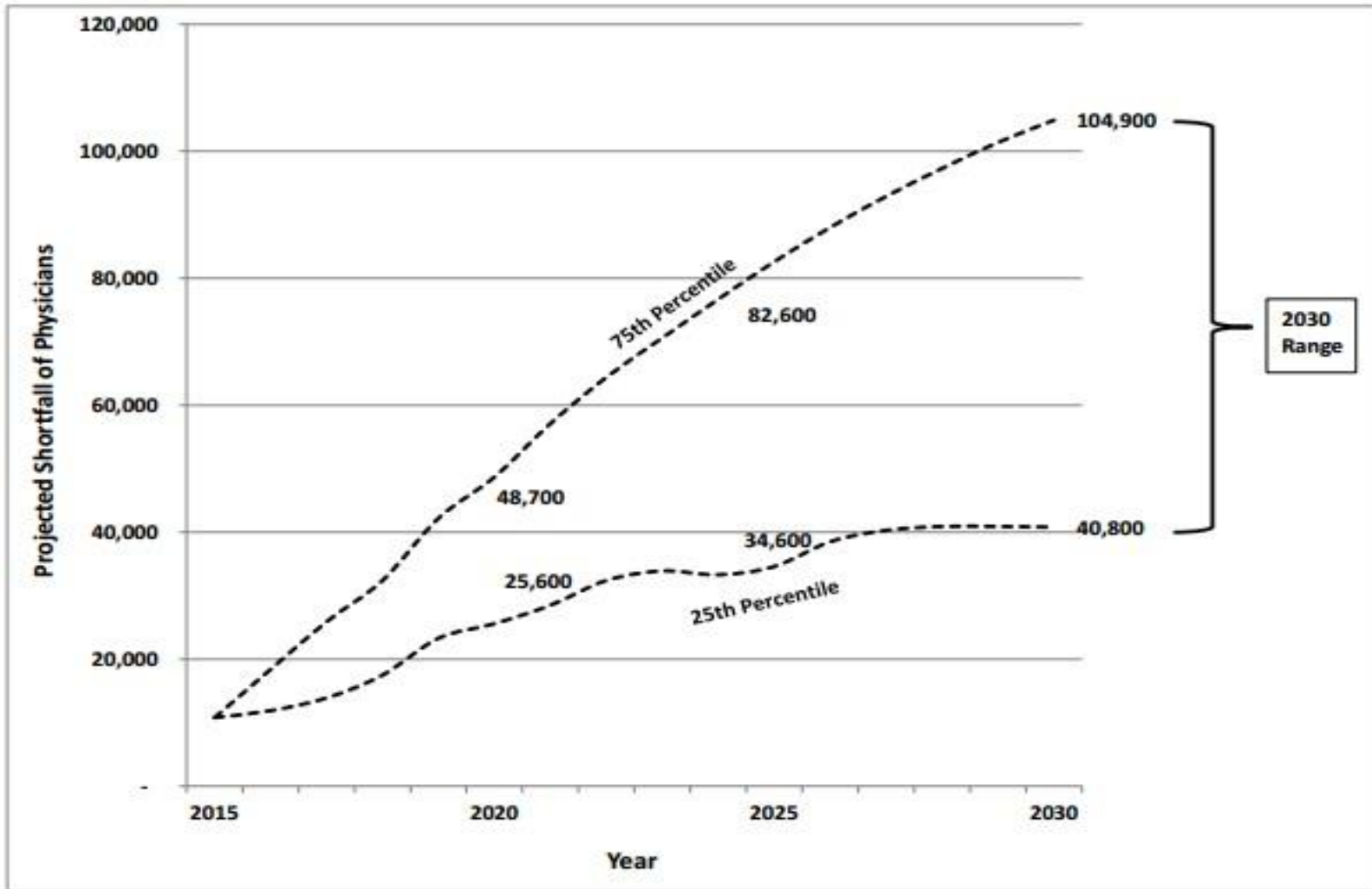


# Physician Demand & Supply

- Under most scenarios, the total projected *demand for physicians exceeds* the total projected supply.
- Projections show that total demand for physicians will continue to grow faster than supply, leading to a shortage of 37,800 to 124,000 physicians by 2034.



# Projected US Physician Shortage (2015-2030)





# FEB. 3 NATIONAL WOMEN PHYSICIANS DAY



“Celebrating Today and Paving the Way for Tomorrow”

Women are now  $\frac{1}{2}$  of new medical school students and a larger number of practicing MD's.



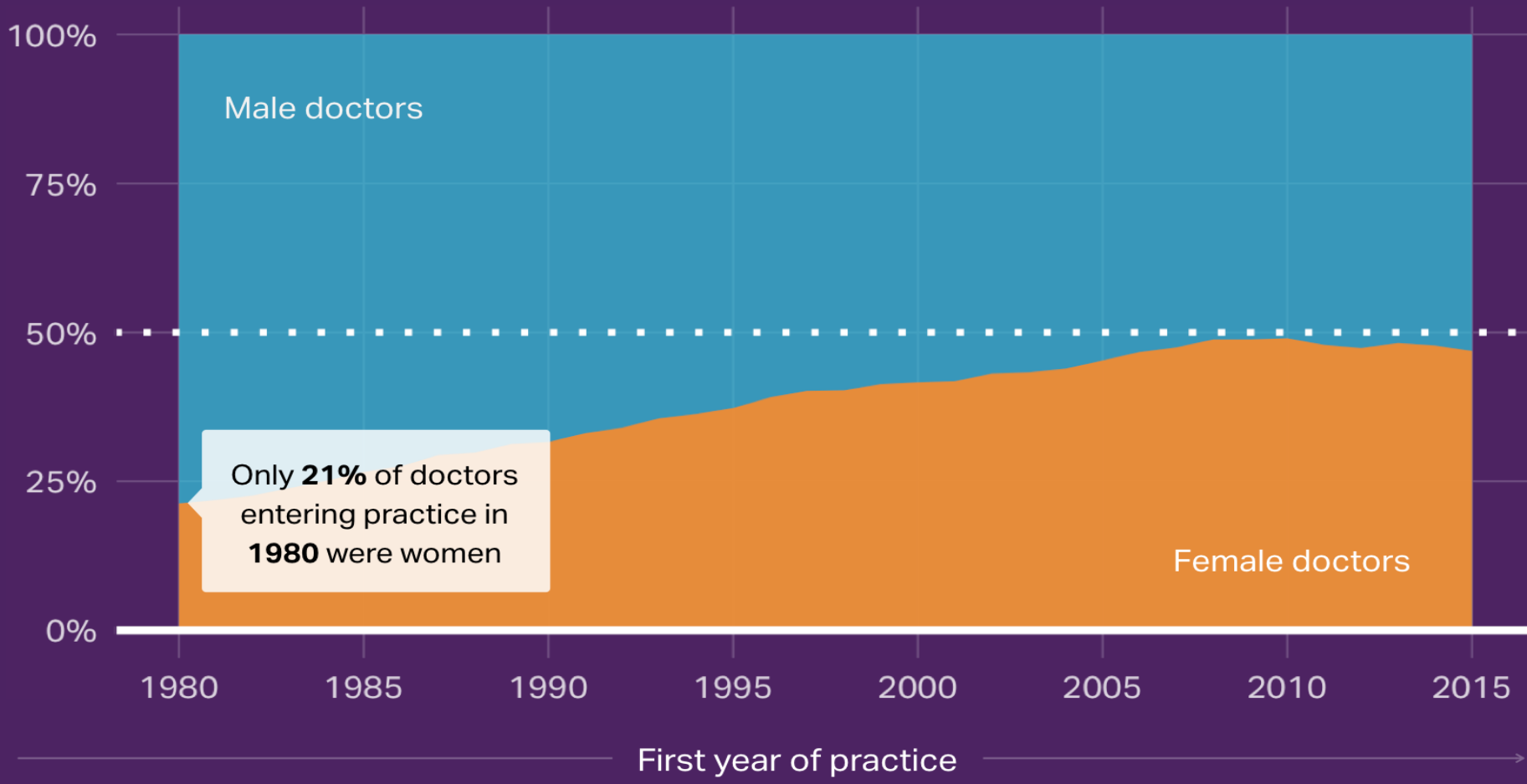


# Women in Medicine

- Women MD's report that they are less satisfied with their careers and that, given a choice, they would not have become physicians.
- They have to cope with more work-related stressors and less control of their work environments
- Recognizing gender-related differences can help design strategies to improve physician well-being and to identify, treat, and prevent burnout.



## Gender breakdown of doctors across all specialties, by first year of practice







## Women physicians differ from male counterparts:

May lack role models.

Face challenges of dual-career couples.

Forced to accept having only a few years for childbearing.

Face large disparity in salaries.

Receive less promotions to leadership positions.

Confront both conscious and unconscious biases.

Experience higher rates of sexual harassment.



# Physician Burnout

- It is not clear if burnout is actually more common among women, or if gender-based differences in its expression make it easier to identify among women.
- Surveys have found that the prevalence of burnout may be as much as **20 to 60 %** higher among women physicians than among men physicians.
- A 2017 survey of 15,000 physicians from 29 specialties found that burnout was self-reported by **48 %** of women physicians and **38 %** of men physicians.



# Physician Burnout

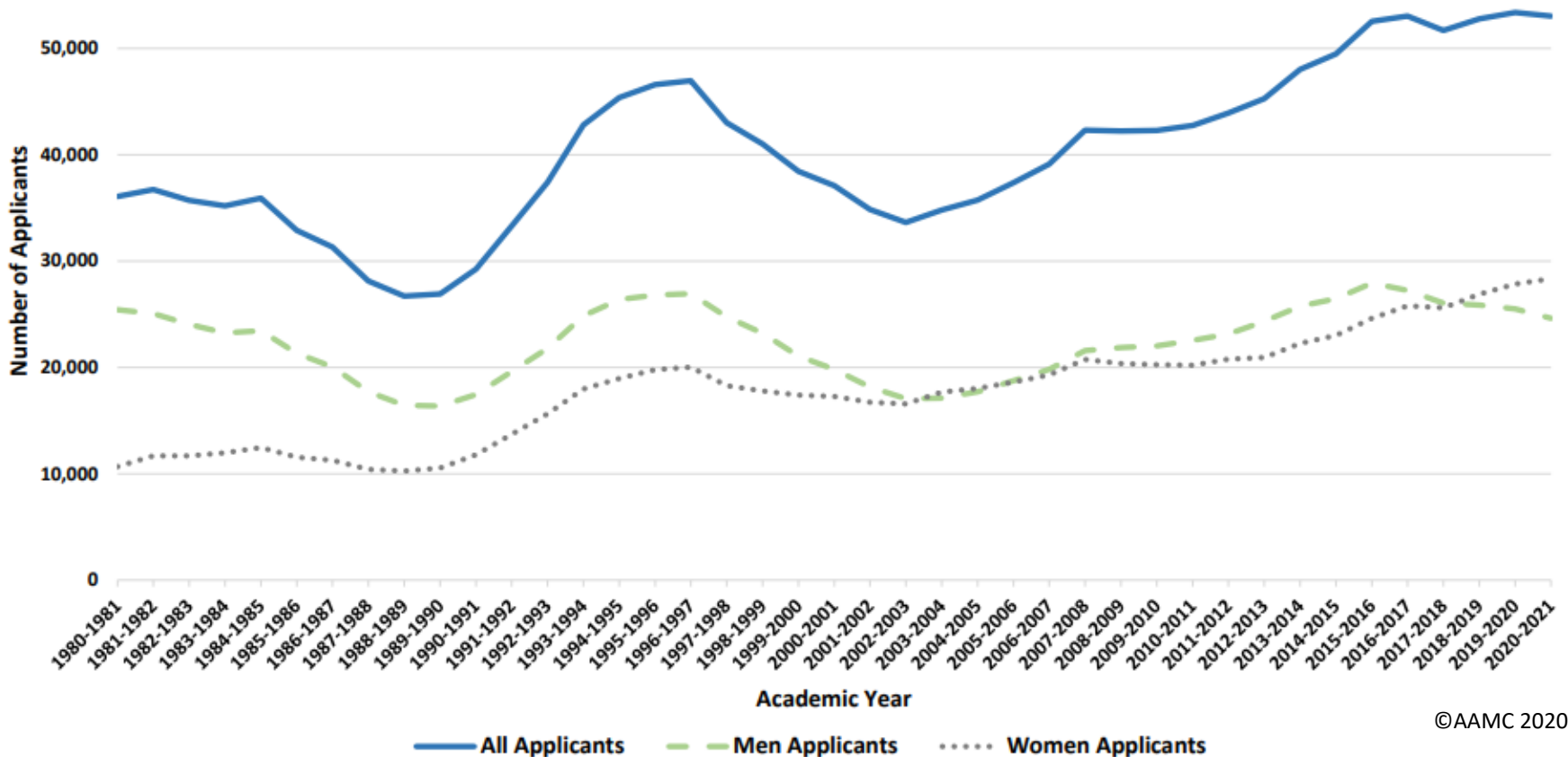
- Specialty-specific studies have found that women are more likely to exhibit burnout symptoms than are men.
- A large national sample of internal medicine residents found that women MD's were more likely than men MD's to report being burned out and dissatisfied with work-life integration.



- The culture of medicine must change to eliminate conscious and unconscious biases, gender discrimination, and sexual harassment.
- Health care institutions should prioritize the physical and mental health of all physicians, with specific tactics employed for women physicians.



# Applicants to US Medical Schools by Gender and Academic Year (1980-2020)



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# Gender Discrimination

- Authors speculate about why women cannot achieve the same academic, occupational or economic goals as their male peers.
- They associate this with:
  - Women's traditional cultural roles.
  - The archaic belief that women do not have the physical or mental capacity to carry the workload and associated stress.
  - The fear of losses due to maternity.
  - Women are not good negotiators for themselves.
  - Women are less prone to look for positions of power because of personal situations or insecurities.



# Gender Discrimination

- Studies show that patients often fare better under the care of female doctors.
- Female heart attack patients are more likely to survive when cared for by female rather than male emergency department physicians.



# Women in Medicine **BY THE NUMBERS**

In 2012, women were:

**48.3%** of all U.S. medical graduates

**45.4%** of all residents and fellows in the U.S.

**34.3%** of all US physicians and surgeons

**38.5%** of female physicians were  
women of color.







## 10 Specialities with more than 5,000 female physicians



Internal  
Medicine



Pediatrics



Family  
Medicine



Ob/Gyn



Psychiatry



Anesthesiology



Emergency  
Medicine



Pathology



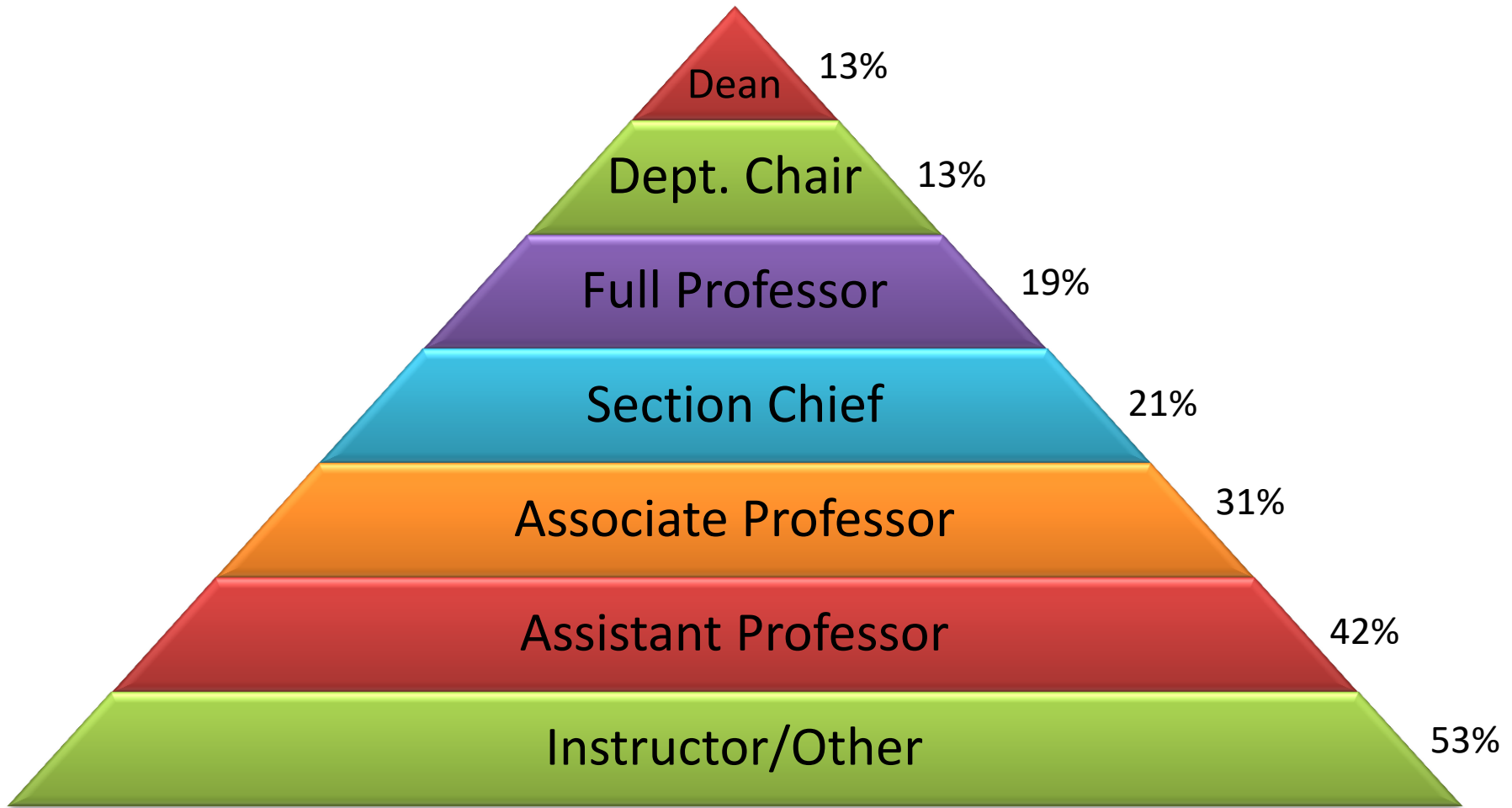
General  
Surgery



Radiology



# Percentage of Women in Medical School Faculty Positions





# Recap of the Course

