



Medical physicists getting woke

The case for Equity, Diversity, and Inclusion

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MGH Physics Seminar

June 2, 2020

Relevant disclosures

- I am not an expert on any of this! All opinions are my own
- Member of the AAPM Women's Professional Subcommittee since 2014
 - In 2018, WPSC chair Laura Cervino proposed that the AAPM make championing equity a strategic goal



- + Board of Directors
- + Professional Council [Status]
- + Professional Services Committee [Status]
- + Women's Professional SC [Status]

- Gave an abbreviated version of this talk at WIMP 2020
- Seems appropriate to address this issue at this particular moment

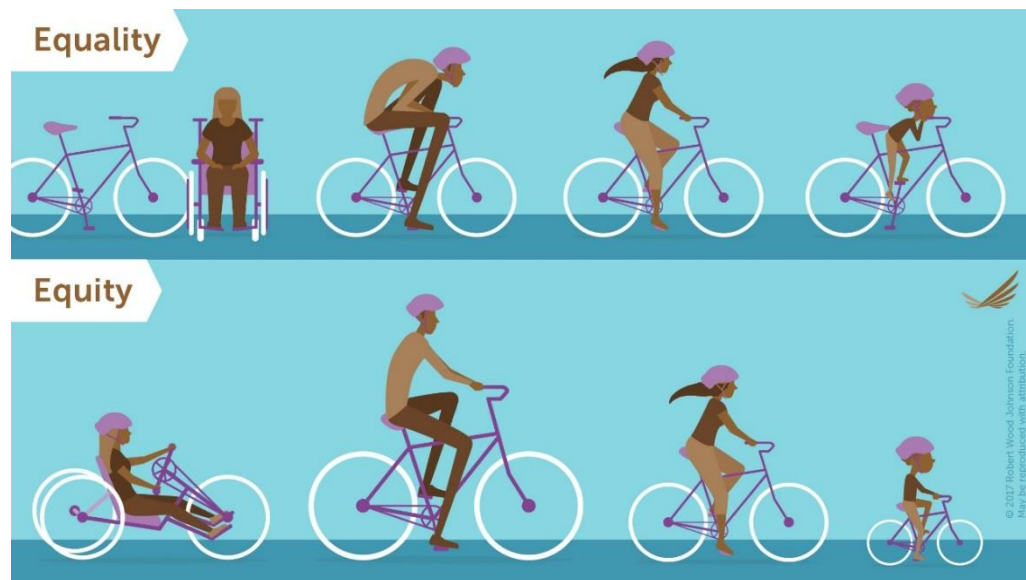
Initial motivation

- In 2018, AAPM Board of Directors approved a new 5 year Strategic Plan
- One of the goals: champion Equity, Diversity, and Inclusion (EDI) in the medical physics field
- Objectives include (see WPSC newsletter article by Laura Cervino, https://w3.aapm.org/newsletter/posts/2018/nov-dec/4306_18.php):
 - Evaluate EDI in current AAPM structure
 - Create and deliver professional and educational content that supports the importance of EDI
 - Ensure that EDI and AAPM's core mission remain aligned
- At this time, AAPM is still working on how to implement the first objective

First, define EDI

■ Equity ≠ Equality

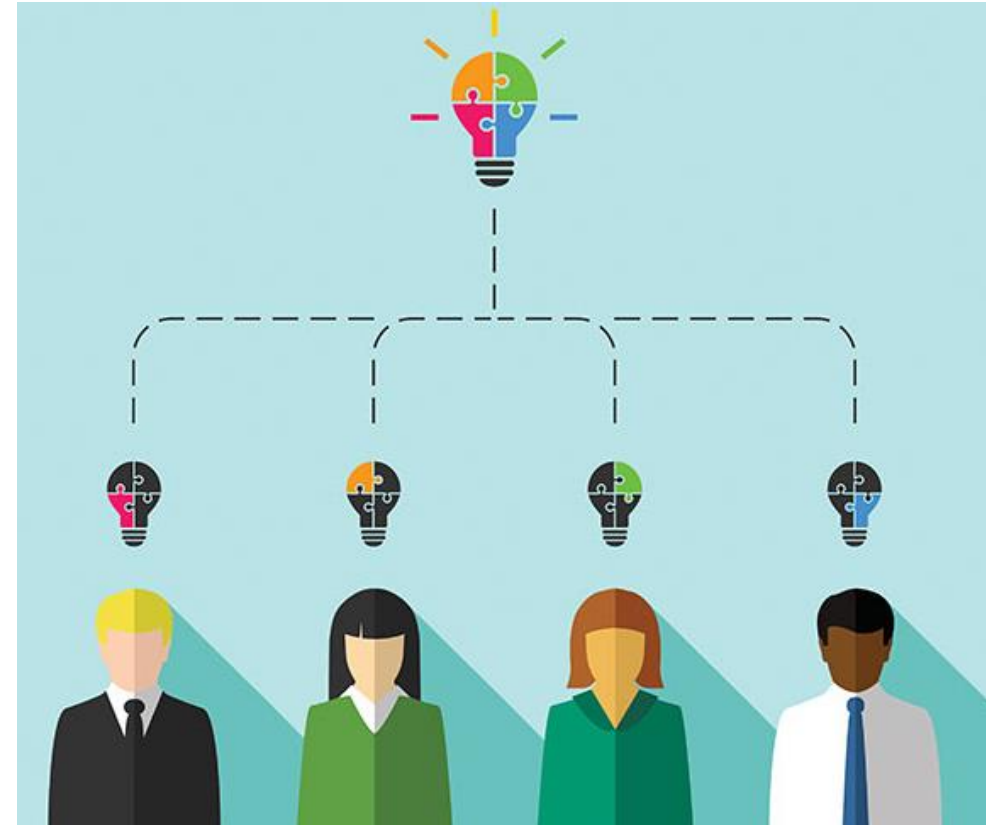
- Equality is giving everyone the same resource
- Equity is customizing the resource so everyone has the same access to opportunity
 - Note: this is quite challenging to provide when it comes to intangibles such as education, jobs
- Equity cannot exist if one group faces barriers that another does not



First, define EDI

■ Diversity

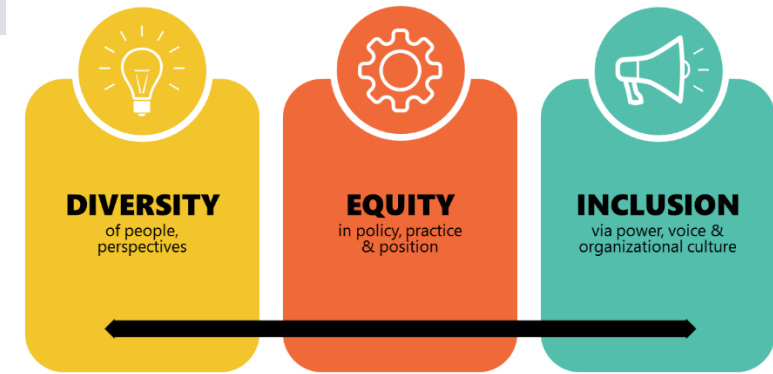
- Studies show diversity strengthens teams
 - Brings in new ideas and approaches, creativity
- Standardized criteria can unintentionally limit diversity of applicants (ex. SAT/ACT scores)
- Lack of diversity leads to oversights
 - Facial recognition software that doesn't recognize dark-skinned faces
 - Voice recognition software that doesn't recognize high-pitched voices
 - Health apps that don't allow customization by gender, race, or health condition



First, define EDI

■ Inclusion

- Having diversity alone isn't enough; the environment must support all individuals, valuing their skills and allowing them to contribute to the team
- All team members should feel they belong (not just be tolerated) and be comfortable expressing thoughts and ideas
- Potential benefits of an inclusive work culture:
 - Increased collaboration and cooperation between coworkers
 - Lower turnover rate because employees feel valued and heard
 - Increased commitment to institution and its success
 - Reduced perception of discrimination and inequality
 - Overall improved employee well-being and productivity



Is it necessary to promote EDI in AAPM?


- Seems like things are moving in the right direction
 - Percentage of women in the field increasing over the past 30 years
 - Less tolerance/more recognition of discriminatory and unacceptable behaviors
 - Perception that attitudes have already changed, and now it just requires patience for the field to equalize naturally
- However, still far from equity, and further gains require more than time
 - Women report anecdotally (and sociology studies corroborate) that they are still undervalued, assigned more 'housekeeping' tasks, and face bias in the workplace
 - Rate of increase in women members is slowing: 20% in 2009, to 23% in 2019
 - Percentage of women in leadership roles doesn't track with senior women

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The state of gender diversity in medical physics

Elizabeth L. Covington , Jean M. Moran, Kelly C. Paradis

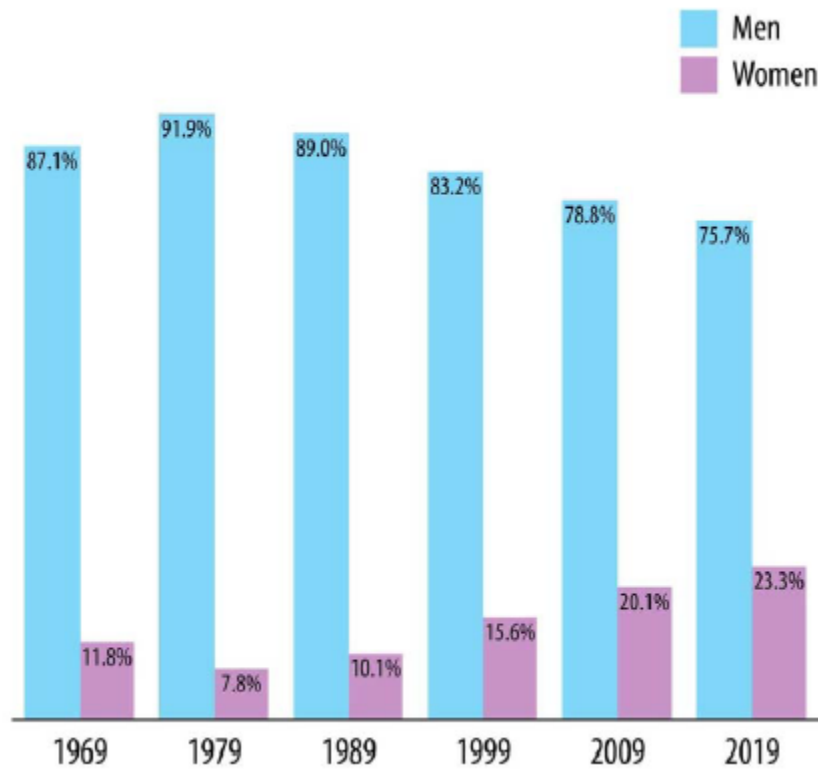
First published: 22 January 2020 | <https://doi.org/10.1002/mp.14035>

5 Conclusions

Gender representation in leadership positions in medical physics does not reflect the percentage of women working in the field. With the exceptions of the AAPM treasurer position and the John R. Cameron Young Investigator Symposium winners, the percentage of female medical physicists in leadership positions, AAPM fellows, executive committee members, Medical Physics board members, council chairs, and AAPM awardees, all are below the percentage of female medical physicists globally. While residency director positions are relatively well-aligned with the percentage of female medical physicists, clinical director positions and graduate program directors are much lower. This analysis is beneficial for those seeking champion diversity within both the AAPM and the international medical physics community.

Lack of gender diversity in leadership positions

- Current percentage of AAPM female membership: 23.3%



Increasing percentage of women AAPM members slowed in past decade

Clinical Leadership Positions (2019)			
	Total #	Males	Females
USA	524	461 (88%)	63 (12%)
Canada	22	19 (86%)	3 (14%)
Other countries	128	105 (82%)	23 (18%)
TOTAL	674	585 (87%)	89 (13%)

CAMPEP Program Directors (2019)			
	Total #	Males	Females
Graduate Program	53	49 (93%)	4 (7%)
Residency - Imaging	28	22 (79%)	6 (21%)
Residency - Therapy	102	80 (78%)	22 (22%)
Residency (all)	130	102 (78%)	28 (22%)

AAPM Council Chairs (incl. historical)			
	Total #	Males	Females
Science Council	14	14 (100%)	0 (0%)
Education Council	13	13 (100%)	0 (0%)
Professional Council	13	13 (100%)	0 (0%)
Administrative	2	1 (50%)	1 (50%)

AAPM Executive Committee (incl. historical)			
	Total #	Males	Females
President	62	57 (92%)	5 (8%)
Secretary	19	16 (84%)	3 (16%)
Treasurer	16	9 (56%)	7 (44%)

AAPM attempts to start EDI conversation

- January 2019: AAPM president Cynthia McCollough starts a thread on “Appropriate questions for assessing diversity in the AAPM”
 - AAPM currently allows members to identify their gender as M/F, birth date, and ethnicity. Should we expand gender options and add identifiers such as sexual orientation, political or religious beliefs, disabilities, in order to assess equity?
- Responses stayed professional, but a range of concerns expressed:
 - AAPM should use anonymous surveys to gather statistics, not link to member bio
 - This is a political issue and AAPM shouldn't touch it
 - Demographics don't matter, all that matters is how good of a physicist you are
 - This will lead to categorizing people and discriminating against those who aren't in the right diversity category

Dr. McCollough's response on why collect data:

- Example of why data are valuable: Let's say we start by asking members to respond to questions about physical limitations. [...] If we work off of what we think that we know (e.g., I rarely, if ever, have seen a blind person at an AAPM meeting, so this isn't an issue), then we can draw false conclusions. Maybe there are quite a few members in some stage of partial or full vision loss, but because we've never offered any way to help them come to a meeting, they don't. Hence we reinforce our belief that we don't have any members who need assistance in this area when the truth is that our lack of knowledge (data) has resulted in a barrier to attendance for these members.

Using data to inform EDI initiatives

- Anecdotally, many women and minorities still report discrimination or not feeling welcome in meetings and other AAPM activities
 - Informally, WPSC hears complaints from women members, Diversity and Inclusion Subcommittee hears from minority members
 - Anecdotes are powerful but they cannot be used as an indicator of change
- AAPM's first objective was to evaluate the current state of EDI
 - Must have a baseline to evaluate and compare against any interventions
 - Baseline can also indicate areas where intervention may be needed
- But... strategic goal objectives didn't outline any intervention goals
 - Primary active objective was to “create content” promoting EDI

So what's the point of the AAPM initiative?

- **Would probably produce little measurable change in the near future**
 - Will not immediately increase numbers of women or minorities in leadership, or create more diverse and inclusive committees
 - But small steps can improve equity too, like providing childcare at the annual meeting to make it easier for more women to attend and network
 - And starting the conversation is an important step for the field
- **AAPM can lead by example of an inclusive culture for medical physicists**
 - Encourage members to promote EDI at their institutions
 - Even if only some members are inspired to change, could shorten the time for culture shift!

Why starting the conversation is important

- Many (recent!) published sociology studies show persistent gender bias
 - Identical resumes: ones with female name rated lower by hiring managers
 - Women need to achieve twice as much as men to be rated equally competent
 - Women punished/judged more harshly than men for making mistakes
- Also many identified contributors to the gender gap
 - Cultural stereotypes that women are not as good at math and science
 - Unfriendly environments discourage women from continuing in a field
 - Unconscious bias against women, based on perceptions of science as ‘male’
 - Implicit Associations Test (IAT): <https://implicit.harvard.edu> to take an IAT in multiple areas (race, gender, etc); while not definitive for an individual, aggregate shows trends

<https://www.wired.com/story/why-men-dont-believe-the-data-on-gender-bias-in-science/>

<https://hbswk.hbs.edu/item/women-receive-harsher-punishment-at-work-than-men>

Consequences of bias on women's careers

- Results of a systemic devaluation of women's work in science:
 - Shorter, less praise-filled letters of recommendation (“hard worker” not “gifted”)
 - Lower citation rates of women's work
 - Fewer research grants, awards, and invitations to speak at conferences
- ‘Diversity hire’ perception and backlash
 - When a woman or person of color is chosen for a position or award, negative perception that they didn't deserve it and were selected to meet a ‘quota’
- “Mountains are molehills, piled one on top of the other”
 - Being left behind on one project, promotion, or invitation after another adds up
 - Cumulative effect: women less likely to achieve senior leadership roles

Can't we just not discriminate?

- Everyone has these unconscious biases which are difficult to overcome
 - Social conditioning of both men and women promotes specific biases
 - Cognitive dissonance: resistance to new information that conflicts with self-image
 - Ex: when asked to rate studies based on a summary of results, men rated as lower-quality those studies that demonstrated gender bias against women in STEM
 - Scientists view themselves as objective and resist evidence they have unconscious bias
- Implicit expectation that women should conform to male-dominated culture
 - Rather than change culture to be welcoming to women, expect women to:
 - Learn to negotiate like a man, speak up like a man, self-promote like a man
 - Actually a catch-22, because women who behave like men are viewed unfavorably for violating gender stereotypes/norms

<https://www.pnas.org/content/112/43/13201>

<https://www.aauw.org/app/uploads/2020/03/why-so-few-research.pdf>

How does promoting EDI help?

- When people are actively aware of systemic bias, instinct is to counteract
 - Study in France: more women recommended for promotion if faculty educated on unconscious bias before making recommendations. The following year, no repeat education was performed, and promotion of women returned to normal level
 - Just being aware of EDI can actually help promote it... but only if you make it part of your culture (work or personal)
- EDI initiatives require awareness and changing the culture
 - Cannot happen overnight, requires commitment from leaders and entire team
 - To overcome unconscious bias on how best to change the culture, recommend getting outside advice

<https://www.vox.com/future-perfect/2019/8/28/20833505/women-science-unconscious-gender-implicit-bias-study>

<https://www.nature.com/articles/s41562-019-0686-3.epdf>

Medical physicists getting woke

- Being “woke” means being aware of social justice issues and working to improve them
- Everyone contributes to creating an inclusive environment
 - We all carry biases and it requires constant awareness to counteract them
- EDI can be improved in medical physics but it requires active engagement
 - Unconscious bias still exists and particularly impacts women and minorities in subtle ways that prevent their careers from advancing at the same rate as men
 - Male allies particularly needed to promote women who may be undervalued
- Is there anything specific you can do to be an ally?
 - Many resources online, ones listed here are just a few suggestions

Counteracting unconscious bias

- **Mandatory bias training really doesn't work**
 - Can actually have the opposite effect due to resentment over feeling forced
- **Having one or a few women around also doesn't work**
 - Studies show you need a critical mass (> 20%) of female leadership to change the climate for women; probably similar for minorities
- **Awareness: look at your colleagues and evaluate your institutional EDI**
 - Get to know people, ask about their experiences. Is your group diverse and inclusive, does everyone feels valued and comfortable speaking up?
 - Is everyone doing work they enjoy? Is service work equitably distributed?
 - Check your biases: don't expect everyone to act and react as you do

Resources to learn more

- Books related to how we think and why it's so hard to change:
 - “Blink” by Malcolm Gladwell, on how our brains make snap decisions
 - “Thinking, Fast and Slow” by Daniel Kahneman
- Videos if you're not the reading type:
 - https://www.ted.com/talks/sara_sanford_how_to_design_gender_bias_out_of_your_workplace TEDx talk by Sara Sanford (13 mins), 2018
 - https://www.ted.com/talks/rocio_lorenzo_how_diversity_makes_teams_more_innovative TED talk by Rocio Lorenzo (11 mins), 2017
 - https://www.ted.com/talks/verna_myers_how_to_overcome_our_biases_walk_boldly_toward_them?language=en TEDx talk by Verna Myers (17 mins), 2017
- Search for articles, check twitter for great resources being posted now

Ex: Reference letters

- Look for gender bias in letters you receive
 - And check for it in those you write!
- Also applies to performance reviews

Adjectives to avoid: Adjectives to include:

caring
compassionate
hard-working
conscientious
dependable
diligent
dedicated
tactful
interpersonal
warm
helpful

successful
excellent
accomplished
outstanding
skilled
knowledgeable
insightful
resourceful
confident
ambitious
independent
intellectual

Avoiding gender bias in reference writing

Got a great student? Planning to write a super letter of reference?
Don't fall into these common traps based on unconscious gender bias.

Mention research & publications

Letters of reference for men are 4x more likely to mention publications and twice as likely to have multiple references to research. Make sure you put these critical accomplishments in every letter!

Don't stop now!

On average, letters for men are 16% longer than letters for women and letters for women are 2.5x as likely to make a minimal assurance ('she can do the job') rather than a ringing endorsement ('she is the best for the job').

Emphasize accomplishments, not effort

Letters for reference for men are more likely to emphasize accomplishments ('his research', 'his skills', or 'his career') while letters for women are 50% more likely to include 'grindstone' adjectives that describe effort. 'Hard-working' associates with effort, but not ability.

We all share bias

It is important to remember that unconscious gender bias isn't a male problem. Research shows that women are just as susceptible to these common pitfalls as men. This is a problem for all of us - let's solve it together!

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Commission on the Status of Women

Research from Trix, F & Psenka, C. Exploring the color of glass: Letters of recommendation for female and male medical faculty. *Discourse & Society*, 2003; and Madera, JM, Hebl, MR, & Martin, RC. Gender and letters of Recommendation for Academia: Agentive and Communal Differences. *Journal of Applied Psychology*, 2009.



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Keep it professional

Letters of reference for women are 7x more likely to mention personal life - something that is almost always irrelevant for the application.

Also make sure you use formal titles and surnames for both men and women.

Stay away from stereotypes

Although they describe positive traits, adjectives like 'caring', 'compassionate', and 'helpful' are used more frequently in letters for women and can evoke gender stereotypes which can hurt a candidate. And be careful not to invoke these stereotypes directly ('she is not emotional').

Be careful raising doubt

We all want to write honest letters, but negative or irrelevant comments, such as 'challenging personality' or 'I have confidence that she will become better than average' are twice as common in letters for female applicants. Don't add doubt unless it is strictly necessary!

Adjectives to avoid: Adjectives to include:

caring	successful
compassionate	excellent
hard-working	accomplished
conscientious	outstanding
dependable	skilled
diligent	knowledgeable
dedicated	insightful
tactful	resourceful
interpersonal	confident
warm	ambitious
helpful	independent
	intellectual

Follow us at: www.facebook.com/uacsw

For an electronic copy of this graphic, see:
www.csw.arizona.edu/LORbias

Impact of pandemic on equity

- In most relationships, women provide majority of childcare
 - During pandemic, this means “working from home” while providing schooling, meals, and attention to children who would normally be otherwise provided for
 - Even worse, their spouses don’t seem to recognize how much extra work they are doing:

The New York Times | <https://nyti.ms/3dpAAs>

Nearly Half of Men Say They Do Most of the Home Schooling. 3 Percent of Women Agree.

A survey suggests that pandemic-era domestic work isn’t being divided more equitably than before the lockdown.

- Women also on average shoulder more teaching responsibilities so the sudden shift to online learning further negatively impacted their workload
- As a result, female academics have seen their productivity drop steeply
 - Downstream consequences: fewer publications, fewer grants, less promotion

<https://www.bwfund.org/feature-women-science-part-three>, <https://www.nature.com/articles/d41586-020-01294-9>

<https://www.theguardian.com/education/2020/may/12/womens-research-plummets-during-lockdown-but-articles-from-men-increase>