R. Mackenzie et al.: Plenty of moustaches but not enough women: cross sectional study of medical leaders

INTRODUCTION	WHAT IS THE RESEARCH QUESTION?
Medicine, a historically male dominated discipline, has undergone considerable change in sex representation in recent decades. In 1960, women accounted for only 9% of medical students in the United States, but for the past 15 years, almost 50% of medical students have been women. The proportion of women in academic medicine, however, remains low and drops with increasing academic rank: 38% of full time faculty, 21% of full professors, and 16% of deans are women. This is a problem not only because of the strong ethical argument for equality but also for practical reasons: in business having more women leaders has been linked with better performance. For example, one study found that top firms experience positive returns on the date that female directors are announced, and another found that the Fortune 500 companies (the 500 largest US corporations by total revenue) with the highest representation of women in senior management experience significantly higher returns on equity.	What is the proportion of men and women in academic medicine at this moment? Why is this a problem?
We want to increase the representation of women in academic medical leadership by drawing attention to sex disparities. We compared the proportion of women in leadership positions with the proportion of individuals with moustaches. We chose to study moustaches as the comparator because they are rare (<15% of men from the most recent measures available), and we wanted to learn if women were even rarer. Our hypothesis was that fewer women lead academic medical departments in the US than individuals with moustaches.	What is the aim of our study? What was our hypothesis?
METHODS	**WHAT DID WE DO?**
Setting and participants This was a cross sectional study of the leaders of academic medical departments in the US. We used publicly available data (http://report.nih.gov/award) to identify the top 50 schools of medicine in the US funded by the National Institutes of Health (NIH) in 2014 (table 1⇓). We used clinical specialties defined by NIH: anesthesia, dermatology, emergency medicine, family medicine, general surgery, internal medicine, neurology, neurosurgery, obstetrics and gynecology, ophthalmology, orthopedics, otolaryngology, pathology, pediatrics, plastic surgery, physical medicine and rehabilitation, psychiatry, radiology, radiation oncology, and urology.	Who were the participants? What data did we use? What were the defined specialties?
We used institutional websites to identify the leader (such as chair, chief) of each specialty. Departmental structures vary between institutions, and regardless of structure (such as department, division), we identified the highest ranking leader in each specialty, which we refer to as a "department leader." For example, urology could be a department or a division of the department of surgery; in either case we included the highest ranking leader of urology. When institutions comprised multiple hospitals with more than one equally ranked leader in a specialty (n=2), we included all equally ranked leaders. Figure 1⇓ shows the search and inclusion strategy.	How did we identify the leader of each specialty?
For each department leader we determined the URL of their institutional website and identified medical specialty, institution, name, and sex. To be included, leaders had to have a photo available on the webpage so we could check the presence and type of facial hair. Two authors (MRW, KTN) reviewed and collected data between 21 September 2015 and 3 October 2015. Both raters reviewed a subset of individuals (n=50), and the assessment of inter-rater reliability showed perfect agreement (κ=1).	How did we check presence and type of hair?
Definition of moustache Figure 2⇓ shows the categories of facial hair. We defined a moustache as the visible presence of hair on the upper cutaneous lip and included both stand alone moustaches (for example, Copstash Standard, Pencil, Handlebar, Dali, Supermario) as well as moustaches in combination with other facial hair (for example, Van Dyke, Balbo, The Zappa). Department leaders with facial hairstyles that did not include hair on the upper lip (for example, Mutton Chops, Chin Curtain) were considered not to have a moustache. We evaluated each leader for the presence of facial hair regardless of sex.	How did we define the moustache?

Statistical analysis and moustache index Our data represent a multinomial distribution with three mutually exclusive groups of leaders: women, men with moustaches, and men without moustaches. We used multinomial logistic regression analysis to compare the proportion of women with the proportion of moustachioed department leaders across institutions and specialties: the moustache index. Tests were considered significant if the two sided P value was <0.05. Analyses were performed with Stata version 12.0 (StataCorp, College Station, TX).	How did we analyze our data?
RESULTS	**WHAT DID WE FIND?**
There were 1018 department leaders who met inclusion criteria. Two (0.2%) did not have a photo available and were excluded. We found that women accounted for 13% (137/1018) of department leaders at the top 50 NIH funded medical schools in the US. Moustachioed individuals were all men and accounted for 19% (190/1018) of department leaders.	What were the main results?
Figure 3⇓ shows the proportion of female department leaders by institution, which ranged from 0% (0/20) to 26% (5/19). Only seven institutions had more than 20% female department leaders. It also shows the proportion of female department leaders by medical specialty, which ranged from 0% (0/53) to 36% (19/53). Only five specialties had more than 20% female department leaders: obstetrics and gynecology (36%; 19/53), pediatrics (31%; 16/52), dermatology (23%; 12/53), family medicine (21%; 9/43), and emergency medicine (21%; 11/53).	What was the proportion of female department leaders by institution?
Figure 4⇓ shows the proportion of moustachioed department leaders by institution, which ranged from 0% (0/20) to 37% (7/19). Nineteen institutions had more than 20% moustachioed department leaders. It also shows the proportion of moustachioed department leaders by medical specialty, which ranged from 2% (1/53) to 31% (17/54). Ten specialties had more than 20% moustachioed department leaders, with the thickest moustache density in psychiatry (31%; 17/54), pathology (30%; 16/53), and anesthesiology (26%; 14/53). Two specialties had fewer than 10% moustaches (general surgery (2%; 1/53) and plastic surgery (4%; 2/52)).	What was the proportion of moustachioed department leaders by institution?
The overall moustache index, derived from multinomial logistic regression analyses, of all academic medical departments studied was 0.72 (95% confidence interval 0.58 to 0.90; P=0.004). Figure 5⇓ shows the moustache index across institutions and specialties. Six out of 20 specialties had moustache indices >1, indicating that there were more women than moustaches: pediatrics (1.33), dermatology (1.50), physical medicine and rehabilitation (1.50), obstetrics and gynecology (1.90), plastic surgery (2.0), and general surgery (3.0). Table 1⇓ and appendix 1 show individual institution and specialty level data used in the calculation of the moustache index.	What was the overall moustache index?
DISCUSSION	**HOW DO WE VALUE OUR FINDINGS?**
Discussion Individuals with moustaches outnumber women as department leaders in the US. Pediatrics, family medicine, obstetrics and gynecology, and dermatology have the highest proportions of women leaders and the highest moustache indices. General surgery and plastic surgery also have high moustache indices, but this was driven by the absence of moustaches rather than the number of women.	What is the main result / the answer to the research question?
Our study builds on a recent analysis of over 90 000 academic physicians, which showed that women were less likely to be full professors even after adjustment for age and research productivity. We believe that every department and institution should strive for a moustache index ≥1. There are two ways to achieve this goal: by increasing the number of women or by asking leaders to shave their moustaches. In addition to being discriminatory, the latter choice could have detrimental effects on workplace satisfaction and emotional wellbeing of moustachioed individuals. Deans are left with one option: to hire, retain, and promote more women.	How do we evaluate this result? What should be our aim for the future? How do we achieve this goal?

Sex discrepancies in leadership are distressingly common across specialties. Many employers have taken steps to reduce these gaps by adopting policies against discrimination and sexual harassment, by introducing family friendly benefits, and by offering paid parental leave, which have been shown to considerably improve outcomes in the female labor force. In medical academia, department leaders are familiar with the potentially effective strategies of mentoring, paid leave for childbearing (especially maternity leave), and tenure clock extensions, which allow new parents more time to meet requirements for promotion.	What actions have been taken till now to close the gap between men and women in medical leadership??
Recent evidence from psychology, sociology, and economics, however, suggests that two additional strategies might be necessary to close the gap. Firstly, define hiring criteria in advance of evaluating candidates. Without clearly defined criteria, evaluators unconsciously redefine what they are seeking to match the attributes of male candidates. As a result, women, and especially mothers, tend to be evaluated more negatively than men with the same professional characteristics. Secondly, increase temporal flexibility in job structures. In many occupations, the ideal worker is one who works long hours each week over many decades. Women experience considerable penalties in status and pay for taking even a short time off to care for children. This penalty differs by specialty: it is lowest in specialties like pharmacy, in which organizational innovations allow workers to easily substitute for one another. In medicine, innovations such as creating larger practices to enable teamwork, computerized medical records, and shift work could also reduce sex inequality by reducing the premium for long hours and uninterrupted employment. Further strategies that increase control over work schedules could promote retention and advancement of women: having control over total hours and when you work is a predictor of career satisfaction, work-life balance, and low burnout. Accordingly, women physicians in “controllable lifestyle” specialties, such as dermatology and anesthesiology, tend to enjoy high levels of satisfaction.	What additional strategies may be necessary ?
Limitations To highlight the paucity of women in academic medical leadership, we wanted to choose a rare but easily identifiable comparator unrelated to promotion and achievement: the moustache. Facial hair, however, has been shown to enhance perceptions of maturity, responsibility, dominance, strength, and self confidence. In addition, men who put on fake beards rate themselves as more masculine. If moustaches are linked to success, this could bias our moustache indices. Additionally, the prevalence of moustaches among physicians is unknown. We were not able to control for age, and, given that leaders are older and moustache popularity has decreased over time, our results might be confounded by age. Similarly, we were unable to account for the impact of ethnicity in our analysis. Misclassification of moustaches is another potential limitation, and our data are only as accurate as the institutional websites: photos might be out of date, especially for senior staff who might strive to look younger. Also, we could not confirm that moustaches in photos were real, although two authors are trained in dermatology and skilled at examining hair growth. Finally, our sample was limited to clinical departments in NIH funded US medical schools, which could limit its generalizability.	What are limitations of this study?
Conclusion We conclude that there are more moustachioed individuals than women leading US academic medical departments. Two evidence based solutions that could be applied to improve this are the predefining of hiring criteria and innovations that allow women flexibility in scheduling their working days and years. We hope that these solutions will help increase moustache indices across all specialties by raising the number of women leaders while maintaining sufficient facial hair in our workplaces.	What is the overall conclusion of this study? What solutions can be proposed?