

MEN'S HEALTH RESEARCH VERSUS ANDROLOGY—DEFINING THE DIVISION AND CLOSING THE DIVIDE

Men's Health Research from the Perspective of Andrology

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ABSTRACT

Background and Objective

We explore here men's health research as practiced by health sociologists versus andrologists.

Material and Methods

We start by examining the occurrences of terms related to sex and gender in the literature of the two fields as a way to characterize and contrast their disciplinary differences. A sample of 30 terms that directly or indirectly related to sex and gender were searched in Google Scholar and the ratios of each term's appearance within the literature for the two disciplines was recorded. Chi-squared tests assessed the statistical differences between the usage of each term in the two fields.

Results

Of the terms we sampled, only "penis," "penile," "testicles," and "libido" did not differ significantly in their relative occurrence within either discipline's publications. Words and phrases linked to gender, such as masculine, masculinity, and manhood, were significantly more common in "men's health research" where gender is commonly construed as a social construct. We suggest, however, that the evidence for gender being purely a social construct is limited and neither necessary nor accepted as such within andrology. Andrology and men's health research, we argue, are different disciplines in terms of research methodologies and self-defined disciplinary borders. The presumption that gender is a social construct, though common within health sociology, is not implicit in andrology. Many problems in men's health that have been assumed to be the products of enculturation have in fact a biological basis. However, solutions to those problems are often outside the domain of biomedicine and are more amenable to social solutions. We suggest that men's health could be most effectively advanced if men's health researchers and andrologists understood what divides their disciplines and made more effort to bridge that divide.

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There is a divide between proponents of social versus biological factors that is nurture versus nature – as the primary determinants of men's health. Both health sociologists and biomedical researchers can muster evidence that the factors within their academic domain account for men's poor health outcomes and that more effort should be undertaken within their discipline to overcome that. We take it as a given that both health sociologists and biomedical researchers are genuinely committed to improving men's health. We also hold the view that the estrangement of these disciplines from each other impedes progress toward that goal.

Here we document the divide between the disciplines and the philosophical foundations that define each discipline's territories; such as exploring where they overlap and where they diverge. This is undertaken as a prelude to arguing for more integration to advance men's health. For the fields to complement each other, their commonalities as well as their methodological/epistemological differences need to be recognized.

Documenting the divide between the biomedical and health sociology approaches to men's health involves trying to parse out what have been the dominant themes *and* limitations in both disciplines. Documenting these disciplinary differences is a first step toward recognizing each discipline's strengths. We start with how those within biomedicine and sociology, who study men's health, define their discipline.

LABELING THE FIELDS AND MAPPING THE BORDERS FOR MEN'S HEALTH RESEARCH

In simple terms, anyone who investigates men's health is doing "men's health research". One can give a formal name to such an academic discipline. If the name is grounded in Greek, as is common for most academic fields, it would be called – and is indeed called – "andrology." That name comes from appending "-logy", a suffix denoting a science or body of knowledge, to the Greek word for man; that is "andros." Indeed, Wikipedia defines "andrology" as "the medical specialty that deals with male health."

To the casual observer, research in "andrology" and "men's health research" would seem synonymous, but they are not. The two disciplines reflect a classic "sex" versus "gender" (a nature vs. nurture) split following

the popular definitions given to these two terms. In the context of health research, "sex" is typically considered the "biological attributes of humans" and "gender" as their "socially constructed roles, behaviours, expressions and identities."¹⁻³ It is important to note though that these definitions are not universally accepted within both the natural and the social sciences.

According to Google Scholar, academic articles referencing "men's health research" that exclude the word "andrology" are over ninety times less common than articles solely linked to the word andrology. This suggested that "men's health research", when precisely labeled that way is a smaller field. Indeed, if one is simply counting papers, research in men's health outside of andrology is scant. A contributing factor in the limited number of papers found by Google Scholar is the use of quotation marks. This forced the search engine to find the exact word string within the quotes. Using the word string "men's health research" failed to pull up other word arrangements with essentially the same meaning, such as "research in men's health," which coincidentally yielded only 11 hits.

A difference here in quantity, however, does not necessarily reflect a substantial difference in quality; at least it is not obvious from the impact factors for journals in the two fields. The most established journal in "men's health" is the *American Journal of Men's Health* with a current impact factor of 2.14. In comparison, the impact factor for five journals in andrology for which recent impact factors can be found, range from 0.58 (*Andrology-Open Access*) to 2.43 (*Andrology*) with a mean of 2.22. That is above the impact factor for *American Journal of Men's Health*, but not by much.

The difference in the volume of literature in the two fields also reflected how long the two have been active disciplines. Academic andrology can be traced back to circa 1890, when the American Association of Genitourinary Surgeons was called for two years the American Association of Andrology and Syphilology (with a strong focus on venereal diseases). Andrology surged though between WWI and WWII with advances in endocrinology. The American Society of Andrology was formed in the mid-1930s, affirming andrology as an academic field.

Men's Health Research came of its own much later. It is only subsequent to the emergence of women's

health research – as a product of the feminist movement of the 1960-70s – that one sees a rise in men's health research as an autonomous academic field.

A subtle but significant disciplinary difference is that “men's health research” is about “men” whereas – andrology is about “males.” That men/male distinction is consistent with differentiating sex from gender as encouraged by granting agencies, such as the Canadian Institutes of Health Research (CIHR)'s Institute of Gender and Health, and The National Institutes of Health's Office of Research on Women's Health in the USA. Such agencies promote gender as separate from sex in the influences it can have on an individuals' health. Proponents of the language distinguishing sex from gender define “male” as a sex (i.e., biologically determined) and “man/men” as a gender (i.e., socially constructed). As such, the disciplines of “men's health research” and “andrology” are parked in the disparate worlds of sociology (nurture) and biology (nature).

The “men” versus “male” distinction in the definition of andrology is not quite so absolute. Out of 114 definitions for andrology on the Internet, 112 define it as the “specialty that deals with male health” but two define it as the “specialty that deals with men's health.” Males occur in all species with two sexes, whereas only one species has males that we identified as “men.” Thus, those who describe their discipline as the study of “men,” by definition, give their attention to one species (admitted one with profoundly complex sociality). Andrology in contrast does not make that restriction and entertains an interspecific comparative approach for insights into men's health.

Conversely the complexity and diversity of cultures – and thus enculturation – is generally understood as a property of relatively few animals and is largely restricted to our species. As such, sociologists, who study “men's health”, may give primacy to cultural influences on health, whereas those who study *male* health strive for generalities that are drawn from and cross taxa. Griffith succinctly presents the gender perspective when he states that, “Men's health research has primarily focused on the extent to which social and cultural factors shape men's health practices and health outcomes.”⁴

In this paper, we analyze some of the language that is used in men's health research versus andrology to

elucidate the differences between these two disciplines. We include comments on the divergent methodologies and disciplinary borders of the two fields and conclude with a plea for more effort to be made to bridge the disciplinary divide.

METHODS

We searched Google Scholar for peer-reviewed articles that included either “men's health research” or “andrology” paired with a selection of 30 terms associated with masculinity, male performance, male sociality, as well as other terms common to the health sociology literature. Noting the number of search results, we next recorded the ratio for the number of times the terms appeared within the collection of articles published in the field of “men's health research” versus “andrology.” Lastly, we compared the two ratios for the same search term paired within these different fields (Table 1).

A chi-squared test was used to analyze whether the difference between the ratios of each term when paired with either “men's health research” or “andrology” was statistically significant. This allowed us to both identify how common the term was in one field versus the other and how statistically significant the bias was for the term in one field than the other. P-value less than 0.05 was considered significant. No ethics review was sought nor required as data were only collected on the language used in previously published literature.

RESULTS

We identified via Google Scholar 198 articles in “men's health research” and 68,600 in “andrology” that had any of the selected search terms in Table 1. Articles that concurrently mention “andrology” and “men's health research” (N=31) were excluded from this tabulation.

In Table 1, the first column lists 30 terms that one might come across in either the sex or gender academic literature. The next two columns give the percentage for the number of papers listed in Google Scholar for either “men's health research” (N=198) or “andrology” (N=68,600) that also include the term in the first column.

The fourth column gives the ratio of those percentages in rank order from the smallest to largest. The

TABLE 1 Ratio of Terms in the Fields of Men's Health Research versus Andrology

Term	Ratio in Men's Health Research	Ratio in Andrology Research	Ratio of % in Men's Health Research Compared to Andrology Research	P Value
Testes	0.03	0.31	0.08	<0.00001
Androgens	0.04	0.17	0.24	<0.00001
Testosterone	0.17	0.38	0.45	<0.00001
Androgen	0.16	0.30	0.54	<0.00001
Testicles	0.04	0.05	0.73	<0.3838
Penile	0.12	0.15	0.79	<0.2178
Penis	0.14	0.13	1.11	<0.5419
Libido	0.10	0.08	1.14	<0.5487
Sex	0.65	0.44	1.47	<0.00001
Sex Drive	0.02	0.01	1.83	<0.00001
Aggressive	0.15	0.08	1.96	<0.0001
Partners	0.43	0.20	2.17	<0.00001
Social	0.88	0.26	3.33	<0.00001
Feminized	0.03	0.01	4.50	
Wives	0.15	0.02	6.22	<0.00001
Gender	0.80	0.13	6.33	<0.00001
Wife	0.23	0.03	6.58	<0.00001
Genitals	0.02	0.00	8.15	
Aggression	0.16	0.02	8.46	<0.00001
Masculine	0.45	0.03	15.32	<0.00001
Pathologize	0.01	0.00	21.65	
Masculinity	0.57	0.02	29.66	<0.00001
Manhood	0.24	0.00	56.54	<0.00001
Breadwinner	0.05	0.00	57.74	<0.00001
Self-reliant	0.04	0.00	74.91	<0.00001
Gender Norms	0.12	0.00	83.01	<0.00001
Stoic	0.06	0.00	86.62	<0.00001
Masculinities	0.44	0.00	115.93	<0.00001
Gender Norm	0.01	0.00	138.59	
Stoicism	0.16	0.00	244.10	<0.00001

smaller numbers at the top of the column are terms that appear more often in andrology than in the men's health literature. A ratio of 1 indicated that the term is equally likely to appear in the "andrology" and "men's health research" literature. The larger ratios at the bottom conversely indicate the terms that appear most commonly in papers on "men's health research" and least often in "andrology."

This ranking helps to identify the areas where the fields of "men's health research" and "andrology" overlap the least and demonstrates the wide divide between the disciplines with many terms two to three orders of magnitude more common in one field than another. The last column gives the significance levels when the original ratios in the second and third columns are compared with a Chi square test. For some of the terms no p value is provided. This is because the term in the papers referencing either "men's health research" or "andrology" was too rare for a valid Chi square tests.

The data help to reveal the large language and topical differences between the biomedical (= andrology) and the sociological (= men's health research) disciplines in the study of sex and gender.

Few of the terms that we selected for this exploration are common to both fields. The term, which most closely approached comparable levels of usage in the two disciplines, was "penis." In addition, three other terms "penile," "testicles," and "libido" did not differ significantly in how common they were in the literature for one versus the other disciplines.

As one might expect, words and phrases linked to socialization, social roles, and gender—such as "masculinities", "gender norm" and "stoicism"—are more than 100× more commonly paired with "men's health research" than with "andrology" (bottom of Table 1). Conversely, words linked to bodily parts, other than the penis, and to hormones—and understood to be products of biology—are all more commonly associated with the word andrology. These terms are "testes," "testosterone," "androgen," and "androgens" which are 2 to 10× more common in the andrology literature than in the "men's health research" literature (top of Table 1).

Some of the differences in language for the two fields are impressive. So, for example, the word

"partners" is more than twice as likely to appear in articles mentioning "men's health research" than in one mentioning andrology. The word "masculinity" itself pairs with "men's health research" almost 30× more often than it pairs with "andrology." A paper mentioning testosterone is almost three times more likely to be paired with "andrology" than with "men's health research". These particular examples of differences between the two disciplines are all highly significant statistically (all $p < .001$, Chi-squared tests).

We can add to these data contrasting the terminology and topics of interest between the two disciplines one large methodological distinction. Qualitative research is common within sociology. We thus searched on the word "qualitative" – as in qualitative methods – and found that it appeared in more than half (54%) of the articles in "men's health research," but in less than 10% of the papers in andrology, with the difference significant at $p < 0.0001$.

DISCUSSION

As seen from a biomedical perspective (and vernacular English) "men's health research" would seem at first glance to fit within andrology. However, many researchers within men's health research would contest the idea that men's health research can or should be subsumed within andrology. Our analysis of language linked to "men's health research" indicates that that field stands as a separate academic discipline with men's health research aligned with the social sciences.

We can expand upon our quantitative data documenting methodological and focal distinctions between the two disciplines. Here our data are anecdotal and derived from the hundreds of peer-reviewed papers we have reviewed related to sex, gender, and men/males health, plus the conferences that we have attended over decades. It is our impression that those doing "men's health research" outside of andrology are more likely than those within andrology to: (1) describe their research as exploratory rather than hypothesis-testing, and (2) be more person-centred in documenting participant-reported outcomes rather than strictly physiological data, if a problem is being described or an intervention and treatment is being evaluated.

In sum, the biomedical and sociologist communities invested in studying and improving men's health

differ in both their focus and the methodologies they use for information acquisition and translation. Yet, as outlined below, both disciplines have substantive contributions they can make to men's health. We suggest that meaningful collaboration is predicated on those on each side of the divide acknowledging their fundamental epistemology and ontology differences.

THE VIEW FROM BOTH SIDES OF THE DIVIDE

As with many discussions around sex and gender, nature vs. nurture, those who study men's health from either a sociological or biomedical perspective have methodological and territorial conflicts that may impede collaboration. The barriers though are not identical nor symmetrical when seen from either side and are worth recognizing as a prerequisite to overcome them.

The Social Science Critique of Biomedicine

A clear, consistent and concise criticism leveled by men's health researchers at those in biomedicine is that they too often ignore social factors – including cultural, economic, political, and institutional factors – that influence health.^{5,6} The data in Table 1 supports that criticism. Indeed, men's health research emerged as an autonomous field to fill in the void.

The Biomedical View of the Men's Health Research

The criticism from the other side is neither so explicitly nor singularly focused on territoriality. Biomedicine strives to be “evidence-based” and what is recognized as “evidence” by those in biomedicine often excludes the qualitative findings common to men's health research. The gold standard for evidence in biomedicine is the randomized control trial with the best studies prospective and longitudinal. Practical and ethical factors make studies of that sort rarely possible within health sociology.

One issue relates to different perceptions about empiricism and the generalities that can be drawn from data acquired from other species. Many features of humans that are labeled “roles, behaviours, expressions and identities” may very well “be socially constructed” and fit with the definition of gender given above. However, as seen from the perspective

of biomedical researchers, just because a human character or trait could be socially constructed, doesn't mean it is. In practice, it may be easier to document biological influences on, or correlated with, human characteristics than to document whether the same feature is truly or fully socially constructed...and to what extent it is influenced more by social than biological factors. Thus, researchers in biomedicine may be prone to dismiss claims that a masculine feature is an enculturated gender display when data establishing the characteristic as truly socially constructed have not been acquired within an empirical experimental framework.

Furthermore, biomedical ways to document biological correlates to human behaviours, social roles, and performance are many. Genes can be sequenced. Hormonal titers can be measured. As a result of variation in gene expression and/or hormonal status, various populations provide ways of demonstrating biological correlates to human behavioural traits. Compared to health sociologists, andrologists have more to work with—from historical accounts of the effects of castration on behaviour to the CRISPR/Cas system for editing genomes. Biomedicine is rich with quasi-natural experiments involving endocrinological manipulations that suggest hormonal correlates to, if not direct causal influences on, behaviour. These include male-to-female transsexuals on cross-sex hormones, prostate cancer patients on androgen-deprivation therapy, and body builders on anabolic steroids. All of these have helped us understand the ways that gonadal hormones and other biological factors influence men's health.

Furthermore, indirect markers of earlier exposure to testosterone have been linked to later expression of many masculine traits. The best documented marker is the 2D: 4D digit ratio.^{7,8} Against this background, andrologists, as experimentalists, have been hesitant to accept male behaviour as social constructs in the absence of explicit developmental data. Without such data documenting enculturation, those in biomedicine may be prone to dismiss discussion of gender norms for violating what they perceive to be sociologists' own definition of how genders come to be.

In contrast the ability to document that a stereotypically male feature has some biological basis is

increasingly easy...at least for studies with non-human species. Drawing generalities though from such models (most commonly rodents) is clearly more accepted by those working in andrology than in men's health research. That is implicit in the definitions of the two disciplines as give above.

To demonstrate that a masculine trait is truly and purely socially constructed is unavoidably more difficult within a research paradigm that avoids (or is at least more cautious about) extrapolating from non-humans to humans. The certainty of social constructionist claims can also be eroded, if biological data were not concurrently collected and controlled for. Given our species' altricial nature and protracted pre-pubertal growth, rigorous prospective data that would prove that enculturation alone led to specific male "roles, behaviours, expressions and identities" would need to be collected over years to decades. If the data were acquired within an experimental protocol with a manipulative intervention, challenges could be raised about the ethics of the study.

Granted, there have been quasi-experiments with children deprived of social contact that demonstrate how massive and long-lasting social influences can be on one's health.⁹⁻¹¹ But that negative impact is on both sexes and is not specific to males. Studies that have attempted to parse out social versus hormonal developmental influences on males invariably fail to show solely biological or cultural causation.

What this boils down to is that it is easier to affirm (or reject, with a null hypothesis within an experimental framework) the extent to which biology determines aspect of men's lives than it is to prove that the same aspects are socially constructed...*if one accepts extrapolating from other species to humans.* Faced with this situation, biologist and sociologists have reacted quite differently. Many sociologists have often accepted that a trait is an expression of gender *if it could be socially constructed.* Those doing biomedical research have been more likely to accept that a trait is an expression of sex, *if it is backed up by controlled experimental data even if those data are from other species.*

One fall out of presumed social constructionism is that researchers in men's health, who dichotomize gender and sex as social (nurture) versus biological (nature), are at risk of being summarily ignored by

those in biomedicine. Conversely, sociologists have been criticized for uncompromized rejection of biology.¹² Indeed, in tit for tat fashion, both sides of the divide, we believe, have shown limited tolerance for the results drawn from the methodologies of the other side.

There is also the problem of territoriality alluded to above. The rationale for the disciplinary divide becomes weak given the growing recognition that testosterone is a "social hormone."¹³ As Table 1 indicates "androgens" currently lie outside the domain of "men's health research". "*Testosterone remains outside the pale of disciplinary sociology...*" wrote Mazur, who was both a trained sociologist and one of the fathers of the field of social endocrinology.¹⁴

It is debatable whether andrology or men's health research has been more prone to round the wagons and erect self-imposed boundaries. At the moment it appears to us that andrology has been somewhat less likely to consider masculine gender norms as outside its territory than health sociologist have been to engage with social endocrinology. Research within andrology has for example documented many gender typical behaviours that are seeded, primed, or otherwise influenced by biological factors...most notably hormones. The evidence is extensive that androgens contribute to both male gender presentation and health.¹⁵⁻¹⁸

The reciprocal though also is true; such as social factors influence hormonal titers.¹⁹ Whole disciplines, such as psychoneuroendocrinology, have come into existence that explore how hormones lead to not just sexual characteristics and sex specific displays, but to features that health sociologists have labeled as detrimental male gender expressions such as in risk-taking and reactive aggression.^{18,20}

That, however, has only increased the divide between the parent disciplines. If anything, it has provoked a territorial conflict where those, who do men's health research versus those within andrology and related fields, have attempted to show the pertinence of their discipline to men's health while giving limited attention to the other's discipline. It is hard to imagine the disciplines conjoining when one avoids mention of androgens and the other gives little ground to data about sex and gender not acquired via controlled experimental protocols.

The disassociation of men's health research from the sociological versus the biomedicine perspective is further evident in the databases where journals in the two fields are listed. Most notably, although PubMed strives to list all credible journals in health, the major journal in health sociology, the *Sociology of Health & Illness*, has been in existence since 1979 but only acquired PubMed listed in the last year. Three strongly sociological and well-established journals related to health sociology, *Sex Roles*, the *International Journal of Men's Health*, and the *International Journal of Sexual Health*, are still not included there. No one benefits from this isolationism.

A CLASSIC CASE AS SEEN FROM THE SOCIOLOGICAL VERSUS THE BIOLOGICAL PERSPECTIVE

To illustrate the divergent disciplinary views, we need look no further than the basic fact that men on average in the industrial world do not live as long as women. Data going back centuries in several European countries show that a substantial difference in life expectancy between men and women has been consistently present.^{21,22} Women live longer and this has been shown to be true for 176 countries and geopolitical units out of 178 in Unstats.un.org.²³

Starting with this observation, those within the sociologist camp have explored the disparity in male/female longevity in terms of social cause.²⁴ A common observation often raised by health sociologists to account for this disparity is that men use healthcare services less than women.²⁵⁻²⁷ Many papers have described stoicism (see Table 1) as a male "gender norm," implying that it is a product of enculturation, which then can account for poorer survival for males compared to females of our species. The idea is that men are raised/enculturated to act stoic and as a result they don't go to see doctors until it is too late.²⁶ All that is plausible, and indeed this line of reasoning has led to much efforts to encourage men to engage more often and earlier in screening for illness and disease, when healthcare of a preventive or curative nature can be provided.²⁸

However, plausibility is not the same as proof. In that regard, it is rather fascinating to see how the same observations about the disparity in survivorship

for males and females has been assessed by those in biomedicine. They have, for example, noted that the survival advantage for females over males isn't just true for humans, but is true for almost all mammals.^{29,30} This has been correlated with differences in sex chromosomes. A survival advantage is provided to the sex that is homogametic for the sex chromosomes.^{31,32} That is the female for mammals. In birds the opposite is true and there the males typically live longer than the females.^{33,34}

As for stoicism as a masculine gender norm, there is evidence that males cross-culturally – even in societies with little modern medical care – go to healthcare providers less often than women.²⁶ It has been noted for a century that women are, in fact sicker than men for most serious diseases, even though they live longer.²⁵⁻²⁷ Thus women may go to doctors more often than men do, not because they are more attentive and diligent about their healthcare, but because they are truly sicker.

Furthermore, testosterone influences men's sense of their own vulnerability and thus invincibility.^{18,20,35} Male risk-taking behaviour is influenced by biological factors, as clearly shown by research on testosterone and risk.³⁶⁻³⁸ Testosterone levels can be correlated with increase risks of injury and early death for males.^{39,40} Overall there are data suggesting that stoicism in males is itself influenced by testosterone titers.

Thus, there are two very different perspectives on why men die younger than women depending on whether one presumes the disparity is one of socialization or grounded in biology. The social perspective is epitomized by Griffith⁴; and others before him, (but not without some challenges), who declared that "Men's health disparities are differences in health outcomes that are determined by cultural, environmental, and economic factors associated with socially defined identities and group memberships." The biomedical perspective is demonstrated, not by any particular definition, but by the large volume of data supporting biological influences on sex differences in longevity...and the growth of new subdisciplines within biology that explore those factors. Psychoneuroendocrinology is a good example. The first paper using that term appeared in PubMed in 1975; since then over 4550 papers have been published referencing the discipline and/or its findings.

“SEX VS. GENDER” OR “SEX + GENDER”?

There are additional problems with making a sex/gender, nature/nurture, biological versus social constructionist distinction when applied to men's health. Although major organizations, like CIHR's Institute of Gender and Health, push for a clear distinction between sex (as biological) and gender (as socially constructed), neither the history of hormones nor newer data from social endocrinology support the dichotomy.

In truth, the sex/gender dichotomy is not built upon developmental data, but is itself a social construct. This is testified to by the fact that many languages do not distinguish sex from gender. French is one of them and it is worth noting that in bilingual Canada the CIHR's "Institute of Gender and Health" (IGHR) is alternatively called the "Institut de la Santé des Femmes et des Hommes", which literally translates as "Institute of Women's and Men's Health."

In the CIHR's Institute of Gender and Health's 2017 *Strategic Plan* a full page is given to distinguishing gender from sex, inferring that the distinction is scientifically, and implicitly socially, important. That is followed on the next page by 15 examples of what is implied from the Institute's own name as examples of the influence of gender on health. However, at least 12 of the examples fit the institute's definition of sex rather than gender differences. What does stand out though is that strategies for reducing the differences in all 15 cases fall in the sociological realm. Simply stated, the predominated causes of the gender + sex difference are largely biological. The most obvious solutions – where there are obvious solutions—are first and foremost sociological.

CLOSING THE DIVIDE: IMPLICATIONS TO INTERVENTION

Whereas developmental data affirm that biological factors contribute to male gender displays, this is *not* grounds for discounting the importance of social factors in influencing men's health. Where the social perspective on gender comes into play and may have the most to offer men's health is in the area of intervention. It has been shown repeatedly that health problems for men are difficult to overcome with a purely biomedical armamentarium. The sociologists

can justly claim that problems, which may have a hormonal basis (i.e., grounded in biology), are rarely amenable in any ethical way to simple endocrinology intervention. So, for example, it is uncontested that high levels of testosterone contribute to adolescent males undertake risky activities that account for a high rate of injury and premature death.^{20,41–43} Few, however, would consider it ethical in a free society to tinker directly with a teenager's testosterone titer.

If we take the classic example given above for the disparity in the longevity between males and females, virtually all the fluctuations documented in differences between male and female longevity can be accounted for by social factors. The prevalence of smoking for males and females is, in fact, a recognized contributor to shifts in that ratio.⁴⁴ Regardless of how toxic cigarettes are, nicotine is addictive and it is largely social influences that start people smoking.^{45,46} Similarly, it is social interventions that have been effective in helping people stop smoking.^{47,48} Virtually all health problems for men have been shown to be socially influenced, profoundly so, even when there is little or no evidence that they were originally social constructs. Here are some examples:

1. Sexual transmitted diseases are biological. Getting men to use condoms prophylactically or to take pre-exposure prophylaxis with antiretroviral medicines is a social problem.
2. Prostate cancer can be treated and cured if detected early. Getting men to get a PSA test to screen for prostate cancer in a timely fashion is a social problem.
3. Helmets prevent traumatic brain injuries in a variety of sports. Getting men to wear helmets is a social problem.

All such examples arise from the fact that we are an obligatory social species. As such, we are greatly influenced by others in the choices we make to care for our health. This reality leads to the major irony of a sex (biological) /gender (social constructionist) divide. Although gender, according to the definition given in the Introduction of this paper, is supposed to be the product of external environmental influences, it is increasingly clear that biology contributes directly and substantially to gender presentation. Yet

modifying behaviours in ways that improve men's health is often outside of the effective and ethically acceptable reach of biomedicine. From that perspective, the greatest advances in men's health are likely to come from research that bridges the disciplinary divide. This requires recognizing the contributions that both health sociology and andrology can offer to understanding the causes of men's poor health and ways to overcome them.

This brings us back to the siloing that separates sex from gender in men's health research. Given the interplay between biological and social factors influencing men's health, we consider it counter-productive to accept this divide as immutable. It is a forced lexicographic dichotomy not derived from primal observations of the natural world and adhering to it, we believe, does little to advance men's health.

One barrier to collaboration that can be lower immediately relates to the dictum that masculine traits and gender norms are in fact social constructs. Broader and more liberal definitions of gender are possible.¹² We favour definitions that neither requires nor presume a specific developmental pathway. Here is one such definition:

“Gender...may or may not depend upon biological traits. More specifically, it is a concept that describes how societies determine and manage sex categories; the cultural meanings attached to men and women's roles; and how individuals understand their identities... Gender involves social norms, attitudes and activities that society deems more appropriate for one sex over another.”⁴⁹

In a more abbreviated form, “gender refers to the constellation of mental and behavioural traits that differ between the sexes.”⁵⁰

These definitions of gender free men's health research from self-enforced social constructionism and open the way for the field to more readily interdigitate with biomedicine. This can lead to more rigorous and refined way to implement and evaluate interventions to improve men's health without the constraints of arbitrary, exclusionary, and isolating definitions of gender and sex. Both andrology and health sociology in general should benefit from being freed from having to guard academic territories that are both hard to nor necessary to defend.

CONCLUSIONS

The disciplines of men's health research and andrology approach problems in men's health in fundamentally different ways. Andrology is grounded in experimentation and not allegiant to a strict sex vs. gender divide. Andrology is not focused solely on humans nor presumes that factors influencing men's socially roles, behaviours, expressions, and identities are outside its disciplinary domain. Men's health research, in contrast, has tended to define its academic territory more narrowly and adhere more firmly to a sex versus gender divide. Researchers in that field are more likely to perceive of gender norms as social constructs...in contrast to sex, which it sees as biologically based and outside its disciplinary domain. Men's health research is less committed to proving that gender norms are in fact socially constructed which makes it implicitly, if not explicitly, less empirical. However, it is more engaged in promoting social changes for the benefit of men. It is thus less grounded in experimentation, but more pragmatic in its goals. Its strength is not so much in finding the ultimate cause of problems as in implementing solutions. Clearly health sociology under the label of “men's health research” can contribute enormously to improving men's health. The autonomous fields of men's health research and andrology can do the most to improve men's health if they converge on common goals rather than adhere to borders that isolated the disciplines.

DECLARATIONS OF INTEREST

None

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