Gender differences in how scientists present the importance of their research

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Objectives To analyse whether men and women differ in how positively they frame their research findings and to analyse whether the positive framing of research is associated with higher downstream citations.

Design Retrospective observational study.

Data sources Titles and abstracts from 101 720 clinical research articles and approximately 6.2 million general life science articles indexed in PubMed and published between 2002 and 2017.

Main outcome measures For a set of 25 positive terms, we estimated the relative probability of positive framing of article titles and abstracts as a function of the gender composition of the first and last authors, adjusting for scientific journal, year of publication, journal impact, and scientific field.

Results Articles in which both the first and last authors were women used at least one of the 25 positive terms in 10.9% of titles or abstracts versus 12.2% for articles involving a male first or last author, corresponding to a 12.3% relative difference (95% CI 5.7% to 18.9%). Gender differences in positive presentation were greatest in high impact clinical journals (impact factor >10), in which women were 21.4% less likely to present research positively. Across all clinical journals, positive presentation was associated with 9.4% (6.6% to 12.2%) higher subsequent citations. In high impact clinical journals 13.0% (9.5% to 16.5%) higher citations. Results were similar when broadened to general life science articles published in journals indexed by PubMed.

Conclusions Clinical articles involving a male first or last author were more likely to present research findings positively in titles and abstracts compared with articles in which both the first and last authors were women, particularly in the highest impact journals. Positive presentation of research findings was associated with higher downstream citations.

Introduction

Women remain under-represented in academic medicine and the life sciences more broadly. One mechanism that may contribute to these gender gaps is differences in the extent to which women promote their research accomplishments relative to men. Identifying gender differences in how research is self presented is potentially important given that visible research productivity is central to career progress in the academic life sciences and medicine.

We studied gender differences in the self presentation of scientific research—as identified by authors’ use of terms such as “novel,” “unique,” etc, to describe their research in scientific titles and abstracts—among 101 720 clinical research articles published between 2002 and 2017 and indexed in PubMed. We examined how gender differences in positive presentation varied with journal impact and examined the external validity of our findings as sensitivity analyses are provided in the appendix on bmj.com.

WHAT IS ALREADY KNOWN ON THIS SUBJECT

- Women are under-represented on faculties of medicine and the life sciences and receive fewer citations than their male colleagues
- Identifying gender differences in how research is self presented is potentially important given that visible research productivity is central to career progress

WHAT THIS STUDY ADDS

- Articles in which the first and last authors were both women were, on average, 12.3% less likely to use positive terms to describe research findings compared with articles in which the first and/or last author was male
- The gender difference in positive presentation was greatest in high impact clinical journals, with women being 21.4% less likely to present research positively. Positive presentation was, on average, associated with 9.4% higher subsequent citations

Methods

Data sources First, we extracted information from the PubMed database. Second, we determined the probable gender of the authors through the Genderize database, an established approach that allows gender assignment for a large number of authors based on their first names. Third, we used information from the Journal Citation Report (Clarivate Analytics) to determine the impact factor of the publishing journals as well as the MeSH (Medical Subject Headings) library to categorise articles into fields of research.

Statistical analyses We used of a set of 25 words (see figure) that past research has identified as distinctively positive—such as “unprecedented” and “novel.” We estimated the probability that an article used one or more positive words in its title or abstract as a function of the gender composition of the first and last authors, using multivariable linear probability models. We categorised authorship of articles into two: articles with female first and last authors versus articles with a man as first and/or last author, which served as the baseline. We estimated the probability that an article used one or more positive words in its title or abstract as a function of this indicator variable for gender composition, adjusting for journal indicator variables (based on journal ISSN numbers), indicator variables for year of publication, number of authors and percentage of female authors in the author byline, and the extent of use of positive words in the article’s area of study (based on articles’ MeSH terms). Our approach effectively compared gender differences in the positive presentation of research between articles published within the same journal, year, and field of research.

Finally, using article citation data, we estimated the relation between the positive presentation of research findings and (logged) downstream citations received by articles, adjusting for the covariates described above. Details on these analyses as well as sensitivity analyses are provided in the appendix on bmj.com.
Results

Overall, 101 720 clinical research articles and 6 246 112 general life sciences articles, published between 2002 and 2017, were analysed.

The figure ranks individual positive words in descending order in terms of prevalence and compares the proportion of articles using each word in which the first and last authors were both women with the proportion of articles in which the first or last author was a man. For nine of the 10 most commonly used positive words, gender differences were statistically significant at the 5% level.

After multivariable adjustment, clinical research articles in which the first or last author was a man (10.9% v 12.2% of articles, corresponding to a 12.3% relative difference (95% CI 5.7% to 18.9%)). For broader life science research indexed in PubMed, positive modifiers were used to report research in 11.4% of articles where first and last authors were both women versus 11.5% of articles where first and/or last author was a man. A non-significant relative difference of 1% (−0.3% to 1.5%). However, the samples differed in the share of journals with an impact factor exceeding 10 (61% of articles in clinical journals v 5% of articles in the broader life sciences).

Gender differences in positive presentation were largest among articles published in journals with high impact factors, for both clinical and broader life science research and after multivariable adjustment. Among articles published in clinical journals with an impact factor >10, those that involved a male first and/or last author were significantly more likely to present research positively compared with articles where both first and last authors were women (absolute difference 12.9% v 10.7%, relative difference 21.4% (12.3% to 30.5%)). We observed a similar pattern for high impact journals for the broader set of life science articles indexed in PubMed (absolute difference 14.4% v 12.8%, relative difference 12.8% (8.2% to 17.4%)).

Positive presentation of research findings and subsequent article citations

After multivariable adjustment, the positive presentation of research findings was associated with greater downstream citations for both clinical research articles and for life sciences articles more broadly. Among clinical journals with an impact factor >10, positive presentation was associated with a 13.0% (95% CI 9.5% to 16.5%) increase in downstream citations, versus a non-significant 3.3% (−0.6% to 7.2%) increase in clinical journals with an impact factor ≤10. Among general life science articles, positive presentation of research findings was associated with a 12.0% (10.2% to 13.8%) relative increase in downstream citations for articles published in journals with an impact factor >10, versus a 5.7% (5.5% to 5.9%) increase in journals with an impact factor ≤10.

Discussion

In an analysis of titles and abstracts from over 100 000 clinical research articles and over six million articles in the life sciences, we found that articles in which the first and last authors were both women were less likely to use positive terms to describe research findings compared with articles in which the first and/or last author was a man. As this gender difference was most pronounced in the highest impact journals and was associated with higher downstream citations, the potential propensity of women to present equivalent work less positively than men may influence career progress and deserves further attention.
EDITORIAL

Gender differences in research reporting
If men are more positive, should they exercise restraint?

Disparities for women in medicine are well documented, and large gaps exist at high levels of leadership. A study by Lerchenmueller and colleagues suggests a potential mechanism driving lesser recognition of women’s accomplishments and reports striking gender differences in the positive framing of findings. When women served as both first and last authors, articles were less likely to include positive terms such as “novel,” “unique,” or “unprecedented.” Positive presentation of research findings was associated with higher rates of subsequent citations. Perhaps an obvious response to these findings is to encourage women to act more like men and be more positive; however, caution is warranted as this “fix the women” approach lacks an understanding of the evidence base on gender equity. We should instead use an approach aligned with experts in equity, diversity, and inclusion who favour fixing the systems that support various types of bias including implicit (unconscious), structural, and organisational.

Different standards
Lerchenmueller and colleagues cite “Publishing while female” by Hengel from the field of economics, which shows that editors opine more frequently on women’s writing and hold women to higher academic standards in peer review, including better writing. Hengel noted that tougher editorial standards and gender-biased peer review may lead people to mistakenly believe that certain behaviours (including less positive reporting of research findings) reflect the personal choices of women, thereby whitewashing discrimination.

In the Lerchenmueller study, gender disparities in framing were greatest in the highest impact journals. These journals tend to do more copyediting, often using aggressive strategies that fundamentally alter the language used in reporting findings. The robust body of literature on gender related (a) implicit (unconscious) bias and (b) disparities in publishing suggest we should consider the many ways that women are told by editors, reviewers, and copyeditors that their work is “not quite good enough” as drafted. Beyond journal walls, it is reasonable to consider the influence of powerful gendered norms for behaviour that society inculcates. Girls are socialised to act with modesty and take up little space, and this norm affects adult behaviours that can have meaningful consequences. Moreover, the paucity of female role models likely contributes to women experiencing more than their share of self doubt and may even lead some to develop “impostor syndrome” (which can affect all genders) and question their self worth.

What is the appropriate response to these findings? We must fix the systems that support gender disparities. Although detailing solutions to eradicate gender inequity more generally is beyond the scope of this editorial, we espouse a scientific and data-driven approach and refer readers to a vast body of research, largely led by women, which consists of many studies that are novel, seminal, and ground-breaking. Summary reports of these studies help to synthesise and disseminate the literature on interventions to promote equity in medicine. Intentional efforts are needed to fairly acknowledge women’s contributions.

Eradicating implicit bias
Journal editors must address gender equity within their organisations and develop training and procedures focused on eradicating implicit bias, as undeniably manuscripts are altered by journal processes from submission to publication. Future research should investigate whether women who initially proposed more positive framing were subjected to greater scrutiny and guided to alter language in the system of single-blinded peer review that characterises most medical journals’ processes, and which might itself be reconsidered, with alternatives including the fully open system used by The BMJ.

Scientific integrity and the public interest should be assessed with regard to positive framing terms. For example, in this issue of The BMJ, an article by Bero and colleagues on the subject of spin may lead to the conclusion that, rather than encouraging women to frame their research findings more positively, interventions should be deployed to help men exercise more restraint. It may be useful for editors to work together to establish common standards and more transparent, shared expectations on the strength of evidence required to support the use of certain terms when framing findings.

Producers of scientific literature should be mindful when selecting citations of the biases that can be introduced throughout the research and publication process; producers and consumers alike must be vigilant in evaluating the quality of the analyses and data presented to us by colleagues. We must all work to counteract bias in order to optimally advance science.

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The SSSPIN study—spin in studies of spin
Lisa Bero, Kellia Chiu, Quinn Grundy

Objectives To identify and calculate the prevalence of spin in studies of spin.

Design Meta-research analysis (research on research).

Setting 35 studies of spin in the scientific literature.

Main outcome measures Spin, categorised as: reporting practices that distort the presentation and interpretation of results, creating misleading conclusions; discordance between results and their interpretation, with presentation of favourable conclusions that are not supported by the data or results; attribution of causality when study design does not support it; and over-interpretation or inappropriate extrapolation of results.

Results Five (16%) of 35 spin studies contained spin categorised as reporting practices that distort the presentation and interpretation of results (n=2) or categorised as over-interpretation or inappropriate extrapolation of results (n=3).

Conclusion Spin occurs in research on spin. Although researchers on this topic should be sensitive to spinning their findings, our study does not undermine the need for rigorous interventions to reduce spin across various research fields.

Conclusion with spin Our hypothesis that spin will be less prevalent in spin studies than in studies on other topics has been proven. Spin scholars are less likely to spin their conclusions than other researchers, and they should receive substantial resources to launch and test interventions to reduce spin and research waste in reporting.

WHAT IS ALREADY KNOWN ON THIS TOPIC
- Spin scholars—PhD prepared researchers or biomedical researchers—conduct meta-research to study the nature and extent of spin in the scientific literature
- Spin in the scientific literature is defined in various ways that include practices distorting the interpretation of results and misleading readers to view the results as more favourable than they really are; spin occurs across different scientific disciplines and study designs
- A systematic review of spin studies found that the median prevalence of spin was 56% in trials, compared with 26% in systematic reviews

WHAT THIS STUDY ADDS
- Spin occurs in studies of spin
- Spin scholars appear to be more cautious about spinning their findings than other researchers

Introduction
Scholars on spin studies (doctorate prepared or biomedical researchers) conduct meta-research to study the nature and extent of spin in the scientific literature. Spin scholars use various observational study designs to examine spin. A systematic review of studies of spin in the scientific literature found that the nature and prevalence of spin varied by the study designs included in the spin studies.

Spin has been defined in various ways, ranging from misleading conclusions to conclusions being more favourable than the results, inappropriate attribution of causality, and over-reaching extrapolation of results. This variability in definitions and subjectivity in coding spin provides an opportunity for spin scholars to come to different conclusions about the nature and prevalence of spin. Thus, there is a risk that studies of spin will be spun.

We expect that spin scholars will be hyperaware and super vigilant about detecting spin in their own studies. On the other hand, they could have a tendency to produce conclusions that favour support for further research on spin and interventions to reduce spin. We hypothesise that spin will be less prevalent in spin studies than studies on other topics when matching by study design.

Methods
We conducted a systematic search for spin in the main text of 35 studies examining the nature and prevalence of spin that were included in our previously published methodological systematic review. The 35 studies included in this review investigated spin in clinical trials, observational studies, and systematic reviews on a variety of topics including pharmaceuticals, obesity, rheumatology, and oncology. The median prevalence of spin was 56% in trials, compared with 26% in systematic reviews.

Identification and prevalence of spin
All authors independently categorised instances of spin and reached consensus. We categorised instances of spin into the four categories derived from our systematic review:

- Reporting practices that distort the presentation and interpretation of results, creating misleading conclusions
- Discordance between results and their interpretation, with presentation of favourable conclusions that are not supported by the data or results
- Attribution of causality when study design does not support this
- Over-interpretation or inappropriate extrapolation of results.

We compared the prevalence of spin detected in the 35 spin studies with the prevalence of spin reported in the meta-research studies included in our systematic review. The meta-research studies of spin examined spin in various bodies of evidence, across a range of biomedical fields of research. When possible, we conducted subgroup analyses by the study designs used to examine spin (review, cross sectional, case study, and retrospective cohort designs).
Prevalence of spin in spin studies versus studies of similar design but on different topics

<table>
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<tr>
<th>Study design</th>
<th>Proportion of studies with spin</th>
<th>Studies on other topics*</th>
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<tbody>
<tr>
<td>Reviews</td>
<td>19.0 (9.5 to 41.9); N=21</td>
<td>26.3 (24.2-28.4); N=2 spin studies including 219 reviews</td>
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<tr>
<td>Cross sectional</td>
<td>14.3 (0.4 to 57.9); N=7</td>
<td>85.6 (85.6-85.6); N=1 spin study including 167 observational studies</td>
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*Data from Chiu et al. Other topics included drug studies, obesity and nutrition, surgical studies, psychological treatments, quality improvement interventions, diagnostic tests, or unrestricted studies across fields such as oncology, obesity or rheumatology.†Data for observational studies which include cross sectional studies.

Discussion

Principal findings
We found that spin occurs in studies of spin, but at a lower proportion than in studies on other topics. Our findings suggest that even spin scholars are not immune to the multiple pressures that contribute to spin, which are believed to be associated with publication bias, confirmation bias, conflicts of interest, pressures from funders, academic incentives, and placating peer reviewers and editors.

Spin manifesting as inappropriate extrapolation of results occurred in studies that examined spin in studies of observational design. Such studies are commonly used to answer public health questions assessing potential harms, for example, from tobacco or chemical exposures. Observational studies are also used to assess the effects of exposures to which people cannot or should not be randomised, such as living near a toxic waste dump or adhering to a lifelong diet. While inappropriate causal statements or a lack of evidence from randomised controlled trials was considered spin in the context of these observational study designs, not all conclusions from observational studies should be labelled as spin, otherwise it could undermine public health research that necessarily relies on these studies to provide evidence for practice and policy.

Strengths and limitations
A strength of our study was that in the reflexivity methods section we sought to make explicit our disciplinary, theoretical, and personal perspectives in order to account for their influence on the research. Our study had limitations. We compared the prevalence of spin in spin studies with historical data on spin prevalence calculated in our previous systematic review. However, recent studies of spin suggest that the prevalence of spin has remained stable over the past two years.

Conclusion
Our findings suggest that spin occurs in research on spin. Although researchers on this topic should be sensitive to spinning their findings, our study does not undermine the need for rigorous interventions to reduce spin across various research fields.

Conclusion with spin
Our hypothesis that spin will be less prevalent in spin studies than studies on other topics has been proven. Spin doctors are less likely to spin their conclusions than other researchers. They should receive substantial resources to launch and test interventions to reduce spin and research waste in reporting.

Reflexivity
Meta-research and methodological systematic reviews involve interpretation and multiple judgements. Thus, understanding how the researchers have inevitably influenced the research process is important. The reflexivity section reports how our preconceptions, personal beliefs and values, assumptions, and theoretical and disciplinary positions shape our research on spin.

Firstly, we are members of the community we study; all the authors consider themselves spin scholars who have published a systematic review of spin studies and have made presentations on the topic of spin. Thus, we are motivated to offer this constructive critique in the hopes that it works towards a more robust science.

The authors bring different methodological perspectives to the study of spin. LB is primarily a quantitative researcher, QG had training in advanced qualitative methods, and KC is a doctoral student receiving training in quantitative and qualitative methods. The result of this combination of perspectives is that we treat spin as a social and political construct. Whether interpretation becomes defined as spin will depend on the context and on time and place. For example, in another scientific era, spin might not be considered a problem or might be defined differently. LB has thought about the concept of spin for decades in the context of her research on bias, conflicts of interest, and peer review in biomedicine and public health. LB is also an avid knitter, but does not spin her own wool, and thus, values the contributions of spinners in other contexts.

Results

Identification of spin
Five (14%) of the 35 spin studies contained spin. Two of the spin studies were reviews of studies of quality improvement interventions or psychological treatments. These reviews contained instances of spin that we categorised as discordance between results and their interpretation, with presentation of favourable conclusions that are not supported by the data or results. In these two spin studies, authors reported statistically non-significant results as a trend to suggest that their primary outcome, the presence of spin, was related to the study design or to authors’ non-financial conflicts of interest.

Three meta-research spin studies (two reviews and one cross sectional study) contained instances of spin that we categorised as over-interpretation or inappropriate extrapolation of results. One spin study classified any observational study that made inappropriate causal statements or to authors’ non-financial conflicts of interest. Two meta-research spin studies (two reviews and one cross sectional study) contained instances of spin that we categorised as over-interpretation or inappropriate extrapolation of results. One spin study classified any observational study that made inappropriate causal statements or...
Can academic satire still exist in the age of science denying “fake news?”

As a medical student Kenneth A Myers published a satirical research paper for the Canadian Medical Association Journal. It’s been cited 11 times—and not for the reasons it was written.

Nine years ago, I published an article in the holiday review issue of the Canadian Medical Association Journal (CMAJ) entitled “Cigarette smoking: an underused tool in high performance endurance training.”

I was a medical student at the time, and the article was meant to illustrate the potential perils of non-systematic review articles. I attempted to take a light hearted approach, cherry picking articles and taking findings out of context, in order to make what I thought was a ridiculous argument. At the time I was mildly concerned that some people might take the article seriously; the abstract was clear, however, that this was not a sincere thesis, and clearly explained the underlying message of the paper. In fact, “SATIRE” was even written in large font at the top of the first page.

Initially, the paper was well received, and I was pleased to hear from several of my colleagues that they had found it entertaining. In subsequent years, however, I began to get notifications through Google Scholar of citations of the paper. To date, it has been cited 11 times and now even factors into my automatically calculated h-index. My hope was that the paper was being cited for its cautionary scholarly message; in fact, “SATIRE” was even written in large font at the top of the first page.

Inappropriate citations
Of the remaining nine publications, it was cited inappropriately in eight; I was unable to locate one of the references. In some cases, the context of the citation suggested the authors had read the paper (or at least the title) but failed to understand that the thesis was not serious. In other cases, however, authors had cited the paper in support of statements that were either against cigarette smoking for endurance athletes (the opposite of the proposed thesis) or not related to endurance sports at all.

Sadly, this experience sheds light on two unfortunate aspects of present day academia and, in an ironic manner, further emphasises the original paper’s message. First, although we now have the capability to search for articles on any subject in seconds, it’s clear that when writing papers, some authors fail even to skim the abstract of the paper they are citing. Do academic writers feel that reading the title of a work is sufficient, and do they feel that they need not investigate further if a study has sufficient methodological rigour, or is logically sound? Second, does this suggest that when authors do read a manuscript, in some cases they may lack the critical reading skills or even time to determine if the paper is serious or not?

The potential for this was emphasised by Manarin and colleagues, describing the experience of asking first year undergraduates to evaluate my CMAJ article critically. Despite providing students with the original article, labelled “satire” with explanatory abstract, they reported that “many students read the article without challenging its conclusion.” Others became emotional because they disagreed with the conclusion, but were unable to articulate why the article was flawed, let alone recognise the actual message.

We now live in an era of “fake news,” when universally agreed upon, objective truths seem rare and science is often under attack. The defence of academics should be that in peer reviewed journals, all material has been subject to rigorous review before publication. Thus, journals should be a last fortress of trust in a world where people struggle to find reliable, unbiased sources of information. In order for academia to maintain this already fractured reputation, however, all involved must strive to be better in all aspects of our work.

Perhaps the solution is for academia to adopt some convention based on a winking face emoji

Humorous, yet thought provoking
So, what does this mean for satire in academia? I still believe that papers written in this manner can make important points, and I hope this is not the death knell for this style of writing. There have been many humorous yet thought provoking papers, and I would not want to see such efforts cease. Perhaps the solution is for academia to adopt some convention based on Poe’s Law, the internet maxim that a winking face emoji or other such symbol is necessary to clarify if a given statement is intended to be serious or only in jest. While I would find it heartbreaking to see a 😬 at the end of a journal article title, this would surely be more clearly understood by people who are primarily used to reading online media.

It seems clear that some such change is necessary; the experience with my CMAJ manuscript has opened my eyes to the perils of such works. While my paper may have unwittingly led some athletes to take up cigarette smoking, the consequences would be considerably more dire if large numbers of people were to misinterpret the 2018 BMJ article, describing the positive results of a randomised controlled trial of parachutes to prevent death and major trauma in people jumping from aircraft.

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Calling “Dr Trump”

The US president has been making medical pronouncements since long before he took up residence at the White House. The tradition continued this year, reports Joanne Silberner

Doctors have seen lots of encroachments on their areas of expertise—TV doctors, fictional characters, the patient with a stack of printouts from Dr Internet. But perhaps the oddest wannabe is someone with no relevant credentials at all: US president Donald Trump. Here’s a sample of his thoughts on various health matters.

On vaccination
He’s swung from being an antivaxxer to promoting vaccination. In March 2014 he tweeted: “Healthy young child goes to doctor, gets pumped with massive shot of many vaccines, doesn’t feel good and changes—AUTISM. Many such cases!”

Six months later he tweeted a revised position, but one that still went against recommendations. “I’m not against vaccinations for your children, I’m against them in 1 massive dose. Spread them out over a period of time & autism will drop!” And finally, in April 2019, in the midst of a measles outbreak in the US: “They have to get their shots. The vaccinations are so important.”

Physician, heal thyself
Trump also feels qualified to write medical reports. In December 2015 he dictated the results of his own physical exam to his physician, who printed it out and signed it. Among the report’s conclusions were that his blood pressure and laboratory results were “astonishingly excellent.” Trump, whose girth is unmissable, has a well known penchant for fast foods and uses a motorised cart for his one form of exercise—golf. He wrote, over his doctor’s signature, that he would be “the healthiest individual ever elected to the presidency.”

The letter is no longer on Trump’s website but the full text is on the Independent website.

On healthcare reform
He’s got easy fixes for the notoriously complicated US health system. In October 2016, just before he was elected president, he said about healthcare reform, “It’s going to be so easy.”

In a July 2017 interview with the New York Times, he said, “I know a lot about healthcare.” He also said this about healthcare reform: “I want to either get it done, or not get it done.”

Later in the interview, while trying to describe pre-existing conditions, he illustrated his lack of understanding of the US healthcare system. “Because you are basically saying from the moment the insurance, you’re 21 years old, you start working and you’re paying $12 (£9) a year for insurance, and by the time you’re 70, you get a nice plan.”

Finding a 21 year old American paying $12 a year for health insurance is extremely unlikely.

On mental health
In June 2019 at a veterans’ convention the president said that he had “really read quite a bit” about the controversial and expensive new antidepressant drug esketamine (Spravato). Trump said the drug could lead to an “incredible” drop in suicide among veterans.

Despite Trump’s show of support for the drug, the US Veterans Administration has approved it for use only after patients have failed to respond to two other antidepressants, and only with the approval of a supervisor.

On curing AIDS and cancer
At a campaign rally last August, Trump had this to say: “We will be ending the AIDS epidemic shortly in America, and curing childhood cancer very shortly.” That statement may be confusing to people who have survived childhood cancers that are already curable, at least in high income countries. And on ending the AIDS epidemic —let’s hope he’s right.

Does it matter?
Should we stick to obtaining medical and public health advice from robust evidence and appropriately qualified professionals? Do doctors need to worry about health information and advice from a political leader?

Yes, to both, says Martin McKee, professor of European public health at the London School of Hygiene and Tropical Medicine.

While Trump’s confidence in his own health puts only himself at risk, his layman’s advice could place others at risk if they follow it.