

Life sciences

**Guides to
mainstreaming gender
in university teaching**

Medicine

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Xarxa Vives
d'universitats



THIS COLLECTION OF GUIDES IS PROMOTED BY THE GENDER EQUALITY WORKING GROUP OF THE XARXA VIVES D'UNIVERSITATS [VIVES NETWORK OF UNIVERSITIES]

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PRESENTATION

What is the gender perspective and what relevance does it have in teaching undergraduate and graduate programmes? When applied to a university setting, the gender perspective or gender mainstreaming is a comprehensive policy to promote gender equality and diversity in research, teaching and university management—all areas affected by different gender biases. As a cross-cutting strategy, it involves all policies taking into account the characteristics, needs and interests of both women and men, and distinguishing biological aspects (sex) from culturally and historically constructed social representations (norms, roles, stereotypes) of femininity and masculinity (gender) based on sexual difference.

The Xarxa Vives d'Universitats (XVU) (Vives Network of Universities) encourages a cohesive university community and reinforces the projection and the impact of academe in society by promoting the definition of common strategies, especially in the gender perspective scope of action. It should be highlighted that policies that do not take into account these different roles and diverse needs and are, therefore, gender-blind do not help to transform the unequal structure of gender relations. This also applies to university teaching, where we offer students a compendium of knowledge to understand the world and intervene in their future professional practice, providing sources of reference and academic authority and seeking to promote critical thinking.

Knowledge transfer in the classroom that is sensitive to sex and gender offers different benefits, both for teachers and for students. On the one hand, deepening the understanding of the needs and behaviours of the population as a whole avoids partial or biased interpretations—both theoretically and empirically—that occur when using man as a universal reference or when not taking into account the diversity of the female or male subject. In this way, incorporating gender perspective improves teaching quality and the social relevance of (re)produced knowledge, technologies and innovations.

On the other, providing students with new tools to identify stereotypes, social norms and gender roles helps to develop their critical thinking and skill acquisition that will enable them to avoid gender blindness in their future professional practice. Furthermore, the gender perspective allows teachers to pay attention to gender dynamics that occur in the learning environment and to adopt measures that ensure that the diversity of their students is addressed.

The document you are holding is the result of the biannual 2016-2017 work plan of the XVU Gender Equality Working Group, focused on gender perspective in university teaching and research. At an initial stage, the report entitled *La perspectiva de gènere en docència i recerca a les universitats de la Xarxa Vives: Situació actual i reptes de futur (2017)* [*Gender Perspective in Teaching and Research at Universities in the Vives Network: Current Status and Future Challenges*], coordinated by Tània Verge Mestre (Pompeu Fabra University) and Teresa Cabruja Ubach (University of Girona), found that the effective incorporation of gender perspective in university teaching remained a pending challenge, despite the regulatory framework in force at European, national and regional levels of the XVU.

One of the main challenges identified in this report in order to overcome the lack of gender sensitivity in curricula on undergraduate and postgraduate programmes was the need to train teachers in this skill. In this vein, it pointed out the need for educational resources that help teachers provide gender-sensitive learning.

At the second stage, these guidelines for university teaching with a gender perspective has been prepared, under the coordination of Teresa Cabruja Ubach (University of Girona), M. José Rodríguez Jaume (University of Alicante) and Tània Verge Mestre (Pompeu Fabra University). Altogether, eleven guides have been developed—with between one to four guides for each field of knowledge—by expert lecturers and professors from different universities in applying a gender perspective in their disciplines:

ARTS AND HUMANITIES:

HISTORY: Mónica Moreno Seco (Universitat d'Alacant)

ART HISTORY: M. Lluïsa Faxedas Brujats (Universitat de Girona)

PHILOLOGY AND LINGUISTICS: Montserrat Ribas Bisbal (Universitat Pompeu Fabra)

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ENGINEERING:

Computer Science: Paloma Moreda Pozo (Universitat d'Alacant).

Learning to incorporate the gender perspective in subjects merely implies a reflection on the different elements that constitute the teaching-learning process based on sex and gender as key analytical variables. In order to review your subjects from this perspective, the guidelines for university teaching with a gender perspective provide recommendations and instructions that cover all the following elements: objectives; learning outcomes; content; examples and language used; selected sources; teaching methods and evaluation, and management of the learning environment. After all, incorporating the principle of gender equality is not just a matter of social justice but also teaching quality.

Teresa Cabruja Ubach, M. José Rodríguez Jaume
and Tània Verge Mestre, coordinators

1. INTRODUCTION

Scientific evidence and experience – academic and professional – demonstrate that it is essential to incorporate a gender approach as a measure for improving the quality of university studies in health sciences. This guide contains proposals for mainstreaming the gender perspective in teaching undergraduate studies in medicine. Many of the thoughts and guidelines outlined here are applicable not only to degrees in health science and life science, but to any undergraduate studies.

Before presenting the specific guidelines for the implementation of the gender perspective in the degree in medicine (Section 4) there are two vital sections containing reflections and thoughts on the issue. In the first, professor Maria Teresa Ruiz sets out the incorrect assumptions, or gender biases, that have been identified in medical knowledge, clinical administration and health services (Section 2), while drawing attention to the general proposals that should be incorporated to counteract these gender biases in university teaching (Section 3). It is in this section that the following question is posed: what does it mean to be a gender-competent health professional? A key question that has been answered by a significant number of key universities that have endeavoured to incorporate the gender perspective into their teaching programmes.

In the section on proposals for introducing the gender perspective in the degrees of medicine (Section 4), we separate each of the elements around which we design the teaching-learning process corresponding to our subjects. Namely, general objectives, specific objectives, contents, evaluation, teaching methods and organisational modalities. This section, the result of a thorough study of degree courses and experiences of good practice in foreign universities, offers very useful tools, while placing the reader in the attitude of continual reflection that is essential to interrogating our teaching methods. Thus, we have chosen to present one complete case (cardiology) and three summarised cases (endocrinology, neurology and pneumology) to exemplify the proposal of contents with a gender perspective. The evaluation sections, and the organizational and teaching methods sections provide very useful tools in the areas of feminist and queer pedagogy.

The specific pedagogical teaching resources (Sections 5 and 7) and the indications for carrying out an undergraduate thesis or master's dissertation (Section 6) are rich in quality and quantity. These sections provide teaching staff with multiple options from which to construct their particular gender focus.

2. GENDER BLINDNESS AND ITS IMPLICATIONS

Gender bias (GB) or gender blindness in the field of health science – particularly in health research and care work – arises when *equality* between the sexes is assumed when there are genuine differences. These differences can be in exposure and response to health determinants; in the natural history of the disease – in the prodromes (initial phase) and during the course of the disease; in responses to different therapies and in prognosis; and when differences are assumed when there are none. This duality arises in a biomedical model that assumes *equality* for physical health problems, and *inequality* for those relating to emotional or self-perceived health.

Gender inequalities in health sciences are based on the following: 1, the social factors underlying the onset of the disease; 2, patient-physician relationships; and 3, behaviours triggered during the health-illness process. An approach that neglects any of these factors will generate a partial view that dismisses or misinterprets the risks to women's health and the way in which the disease manifests in women and how they report it.

Some consequences of gender bias in medical knowledge, clinical management and health services are incorrect assumptions like the following:

1. *There are no sex or gender-based differences in the experience of the disease.* Currently, most research and development of related therapies is dedicated to chronic, lethal diseases. A better balance and reorientation of specific research into certain diseases is needed in order to pay more attention to diseases that predominate in women. Similarly, men should also be included in research into non-lethal diseases.
2. *There are no sex or gender-based differences in the manifestations of diseases.* A higher proportion of women than men are diagnosed with “non-specific symptoms and signs” in health service records, medical records and death certificates. It is possible that accumulated medical knowledge stems from complaints, health problems and signs indicative of male-specific diseases. Female patients may suffer from diseases that are not identified at an early stage because standard (or male) diagnostic criteria are followed, or because of a set of atypical (non-male) complaints. A lack of treatment, or inadequate treatment, can lead to a worsening of the disease among women.

3. *Sex-related differences are behind the differential provision of health services and the differing outcomes of treatments.* Even though women use primary care more, data indicates that delays are shorter in men's healthcare and emergency services are more accessible to men. Women wait longer than men in emergency rooms before being checked. It is argued that these statistics can be explained by the fact that men suffer from more serious and complex diseases or that women are healthier, albeit with a worse perception of their health. However, recent studies show that when men and women use emergency services, their hospitalization rates are the same and that women admitted to hospital for cardiovascular disease have a higher rate of lethality than men.

3. GENERAL PROPOSALS FOR INCORPORATING THE GENDER PERSPECTIVE INTO TEACHING

In professional health practices, and in the editorial policies of many scientific journals, changes are taking place from a gender perspective. These must be incorporated into the curricula of health science degrees. What does it mean to be a gender-competent professional? This is a key question that has been asked by a significant number of international universities in their endeavours to incorporate a gender perspective into their curricula. Synthetically speaking, it means a professional who: 1, reads gender-sensitive literature in the field; 2, treats men and women competently based on appropriate scientific evidence; and 3, performs the corresponding advocacy function for the elimination of situations of vulnerability.

Although the concepts of sex and gender allude to different realities, they are frequently confused in health sciences and used interchangeably in scientific literature. Sex is a biological construct based on the two different chromosomal processes and on sets of biophysiological processes related to sexual beings. In the analysis to determine the differences between the two sexes it should be treated as a dichotomous variable. However, even though gender is related to sex, it is a continuous variable because it defines behavioural, psychological and cultural and political characteristics that are expressed in a continuum, with men and women being able to exhibit a range of different, even superimposed, results. Gender is defined as a sociocultural and political construction that determines the relationships between people, granting benefits and access to resources – such as health – to those positioned higher in the gender hierarchy (Connell, 2012).

With health problems, particularly chronic ones, it is advisable to consider that fragility (especially physical) in combination with the framework of femininity and masculinity, causes changes in symptomatic patients by forcing the creation of appropriate working conditions and family care. In a country in transition to a dual-income family model, men and women with chronic illnesses become people forced to restructure their life choices, to change the way they fulfil their productive and reproductive roles, identifying their limitations and renegotiating new roles within the family and at work.

In her book, *Science and Feminism*, Sandra Harding analyses three epistemological approaches (feminist theoretical currents) that are extremely useful for positioning students and professionals in accordance with their profession:

1. Feminist empiricism, which identifies sexism and androcentrism as social biases that are correctable through the application of methodological norms in scientific research. Its aim is to reform *bad science* (correct inaccuracies in empiricist epistemology).
2. The feminist standpoint which argues that men's dominant position in social life translates into partial knowledge, while women's social experience is the only starting point from which to uncover the androcentric foundation of science.
3. Feminist postmodernism, which discusses the most fundamental scientific assumptions, such as the generalization of research results.

Research on health determinants and gender as a crosscutting theme has shown in recent decades the need to understand and address the specific and varied subjectivities and needs of people, highlighting the need for interdisciplinary professional action. For this reason, recommendations for the incorporation of a gender perspective in Health Science degrees must be observed as crosscutting strategies for the different models of healthcare and the specific processes of intervention for each discipline.

Likewise, the incorporation of the gender perspective in health science degrees requires the revision of contents, learning outcomes, educational strategies and evaluation strategies in all subjects. This includes the basic subjects (anatomophysiology, pharmacology and applied pathologies), as well as the methodological, clinical, medical-surgical, psychosocial care and public or community health-related subjects. Based on the existing evidence, a degree that intends to be truly scientific must introduce the following in a timely manner: 1, sex-based differences; 2, making the relevance of gender roles visible; 3, incorporating the relational approach; and 4, interactions.

Finally, it is important to emphasize that in recent years, thanks to universities' development of the intersectional approach to policies and strategies for equality between the sexes, teaching and research in the health sciences have both been incorporating issues related to gender identity and expression. By gender identity we mean the psychological and social identity connected to the gender sense of each person.

In other words, the personal and profound living experience of being a man or a woman. For most people, gender identity corresponds to their biological sex (their genitals and hormonal systems); but for some people, their gender

identity is inconsistent with their biological sex. From the intersection between the spheres of biological and sociocultural-historical factors, people of *different sex-genders* are conceptualised: a conceptual and inclusive category to which lesbian, homosexual, bisexual, transgender, transsexual, intersex and asexual people would be assigned. Traditionally, the LGBTBI community has often been discriminated against in healthcare, as has been observed of people with a dysfunction, illness or disability.

4. PROPOSALS FOR INTRODUCING THE GENDER PERSPECTIVE IN MEDICINE

The incorporation of the gender perspective into undergraduate and postgraduate studies requires a review of course contents, as well as learning outcomes and evaluation in all subjects. It is what is known in teaching innovation as “gender mainstreaming in university teaching”.

4.1 Objectives of the subject/module

4.1.1 General objective for subjects in health sciences degrees

To provide a framework for the analysis of gender and human rights that can be incorporated into the provision of professional services (healthcare/assistance) that are adapted to the health needs of the people being cared for. This provision must be in accordance with the development of scientific knowledge, and in compliance with the quality and safety standards established by applicable legal and deontological regulations, so it has an impact on the improvement of the different areas of health.

4.1.2 Objective of the subjects related to clinical specialities

Providing information to students to enable them to analyse how the pathophysiological, clinical or therapeutic pattern of diseases in one sex is dominant in the diagnostic or therapeutic endeavour, making clinical care of subjects of the other sex more difficult.

4.1.3 Specific objectives

1. Demonstrate an understanding of the basic concepts of gender: gender power relations; gender roles; access and control; demonstrations of gender-based prejudice; gender identity; and gender equity and equality as one of the many social determinants of health.
2. Explain sexual and gender differences and their interactions in the normal development of men and women, health and disease (psychopathology and pathophysiology), to apply them to the prevention and management of health problems.

3. Communicate effectively with patients, showing awareness of the power difference between the physician and the patient, and the gender and cultural inequalities. This can be established, for example, through the use of language that minimises power imbalances, validates the experiences of those suffering and minimises gender stereotypes.
4. Perform a sex- and age-appropriate, culturally-sensitive physical examination.
5. Discuss the impact of gender-based social and cultural roles and beliefs on the health and healthcare of those with illnesses or health problems.
6. Discuss the impact of gender-based social and cultural roles and beliefs on the health and well-being of healthcare professionals.
7. Identify and assist victims of gender-based violence and sexual abuse.
8. Assess and advise patients on risk reduction relevant to sex and gender, including lifestyle changes and genetic testing.
9. Critically evaluate new information from a gender perspective: identify gender biases and gaps; and adopt good practices that incorporate knowledge of sex differences and gender inequalities in health and disease.
10. Demonstrate an understanding of the differing impact that healthcare systems have on men and women (the way they are organised and funded for example) in populations and individuals receiving medical attention.

4.1.4 Objective in the specific subject of gender and health

Analyse the basic concepts of the sex-gender system: the cultural construction of gender, the origin of gender inequalities and their impact on social construction; as well as the influence of gender on the health-disease process and on health inequalities.

4.2 Contents of the subjects/modules

Epidemiological studies have systematically identified differences in the incidence and prevalence of disease in men and women. The relevance of incorporating the sex-gender system in the health sciences lies in the fact that in healthcare, sexual differences and gender biases play an important role in the pathophysiology and clinical picture. One of the most important consequences occurs in the differential diagnosis of diseases. Specifically, this happens when mistakenly confusing one

disease with another due to differences between men and women (for example, spondyloarthropathy is confused with osteoporosis or fibromyalgia in women, and with sprains in men). This can result in the development of complications and it can also influence the therapeutic prescription, which, in turn, affects life expectancy and quality of life. The same pathophysiological differences between the two sexes are also the basis for classifying diseases into three categories:

1. Diseases that can be experienced by both sexes but with different ages of onset, with symptoms at the start or during the course of the disease (infarction or spondyloarthropathies), or with different responses to treatment and prognosis in one sex with respect to the other.
2. Diseases of greater prevalence in one sex.
3. Diseases that are unique to one sex (those associated with reproduction).

The following are examples of pathologies that can be experienced by both sexes (Point 1, above):

4.3 Incorporation of the gender perspective into cardiology¹

Sex differences and gender inequalities play an important role in the manifestation and outcomes of cardiovascular disease. From a gender perspective, cardiology teaching should focus on the following:

1. Chronic ischemic heart disease.
2. Heart failure and its most common causes, such as hypertension and cardiomyopathies.
3. Acute coronary syndrome / myocardial infarction.
4. Risk factors, both traditional and new.
5. Special problems, such as cardiovascular diseases during pregnancy and arrhythmias.

4.3.1 Chronic ischemic heart disease

Sex differences and gender inequalities in coronary heart disease (CHD) have long been known. Women with CHD are approximately ten years older than men, and type II diabetes mellitus is a higher risk factor for women than for men. Genetic risk factors for CHD are also known about and differ for women and men.

¹ Complete case

The pathophysiology also differs according to sex. Men have more stenosis of the main trunk and multi-vessel disease. In contrast, women are more likely to have single-vessel disease, more microcirculation disorders, and more angina-like symptoms with normal CHD. This difference in the pathophysiology of the coronary artery (non-obstructive CHD) could be a reason for the different diagnostic and therapeutic approaches in men and women. For reasons not fully understood, exercise ECGs are often misleading in women. However, echo imaging, scintigraphy and magnetic resonance imaging strategies are of similar value in both sexes. Percutaneous coronary intervention is successful in both sexes, although it is more often accompanied by bleeding complications in women.

Women have a higher mortality rate after coronary artery bypass graft surgery. There is also evidence that women respond worse to early aggressive revascularization in cases of acute angina or acute coronary syndromes. The reasons for this are still under debate. Suggested explanations include advanced age and increased comorbidity in surgery, as well as women's narrower blood vessels.

Gender inequalities also exist in behaviour related to obtaining health, on the side of the patient; and in disease management by medical professionals. All of these circumstances lead to women with CHD being underdiagnosed or to diagnosis being delayed in women with acute and chronic coronary syndromes.

From a gender perspective, teaching should focus on the following:

1. Presenting the differences in the pathophysiology of ischemic heart disease in men and women.
2. Keeping microvascular disorders in mind and thinking about the “atypical” symptoms described by women.
3. Easily recognising the differences between men and women, and the gender inequalities in the clinical manifestations of ischemic heart disease.
4. Develop skills for diagnosis in women, including the use of imaging techniques and the assessing of the endothelial vasodilator function of the coronary artery.

Expected results. By the end of this course, students should be able to understand that:

1. CHDs are the leading cause of death for women in industrialised countries.

2. Significant risk factors for cardiovascular disease and myocardial infarction in women include diabetes mellitus, hypertension, renal dysfunction, obesity and depression.
3. Complication of pregnancy, such as preeclampsia, gestational diabetes or pregnancy-induced hypertension and systemic autoimmune diseases such as lupus erythematosus or rheumatoid arthritis are among the “new” risk factors that should be considered when assessing cardiovascular risk in women.
4. Women with acute coronary syndrome often have symptoms that are “atypical”. Shortness of breath and severe fatigue are often not perceived as early symptoms. Between 10% and 30% of patients show symptoms of angina without injury in coronary angiography as a cause of myocardial ischemia. Women with unstable angina pectoris symptoms form the largest group.
5. In stable patients, a stress test for a stress echocardiogram is preferable for diagnosis.
6. Due to the different pharmacokinetics in women, the following factors should be considered in determining the dose of a drug: weight, a wider distribution of fat-soluble substances, a different expression of CYP isoenzymes, shorter gastrointestinal transit time, and lower renal clearance.

4.3.2 Diseases due to heart failure (HF)

The number of patients with heart failure (HF) is constantly increasing. It is one of the leading diagnoses of hospital discharge in the world today, with important implications for the use of society’s resources and individual quality-of-life experiences. They represent a huge burden on healthcare costs. Cardiomyopathies are a rare, but particularly serious, cause of HF, leading to 50% of all transplants in the final stage of HF.

From a gender perspective, teaching should focus on showing the following:

1. The epidemiology of HF differs in women and men. Discussion of this should be encouraged.
2. The gender inequalities in diagnosis of HF by echocardiography, focusing on systolic versus diastolic blood pressure in women and men.

3. Gender differences in the pathophysiology of HF diseases, including the role of sex hormones such as oestrogen and androgens, and hormones with effects on Ca manipulation, mitochondrial metabolism and the production of free radicals.
4. Cardiomyopathies, a rare but particularly serious cause of HF, leading to 50% of all transplants in the final stage of HF in both sexes.
5. Pharmacotherapy and its adverse effects in both sexes.
6. Key words: heart failure with preserved ejection fraction (normal) or diastolic heart failure, cardiomyopathies.

Expected results. At the end of this course, students should be able to understand that:

1. Women with HF represent the largest group due to their higher numbers and their tendency to live longer.
2. Women more frequently experience HF with normal systolic function or diastolic HF, while men more often experience HF with reduced ejection fraction (systolic HF).
3. In general, sex-specific myocardial adaptations are characterized by concentric hypertrophy with ejection fraction maintained more frequently in women, and eccentric hypertrophy with dilated ventricle, systolic dysfunction, and decreased ejection fraction more frequently in men.
4. Sex hormones are involved in adaptive cascades of myocardial signalling under pressure and volume overload, which include, for example, calcium signalling, nitric oxide synthesis, and profibrotic mechanisms.
5. Women show more rapid regression of the LVH (left ventricle hypertrophy) and dimensions of the left ventricle than men in the early postoperative period, after aortic valve repair.
6. Cardiomyopathies occur with similar frequencies in men and women, the difference being approximately 1.5:1 or 2:1.
7. Tako-Tsubo cardiomyopathy affects women almost exclusively and is preceded by massive psychological stress.
8. Women with cardiomyopathy and systolic heart failure receive less invasive treatment, devices and organ transplants than men.

9. Terminal HF is a disease of both sexes. However, only about 25% of all heart transplants are performed on women. The 20-year survival rate is similar in both sexes (26%), suggesting that there is no reason to prevent transplantation in women.
10. Drug treatment should be carefully monitored in women (e.g., in relation to the appropriate therapeutic dose, with long-term QT follow-up in ECG).
11. Sex-based disparities in pharmacokinetics are common. Some, but not all, will lead to clinically relevant differences in adverse effects and efficacy.
12. Digoxin treatment should lead to plasma levels below 0.8 ng per ml for both sexes. Impaired kidney function should be specifically considered in women treated with digitalis.
13. Sex differences in the pharmacokinetics of beta-blockers lead to increased drug exposure and greater adverse effects in women. Beta-blockers lead to similar survival benefits in cases of heart failure in women and men.
14. Sex-based differences in pharmacokinetics and in the effects of calcium channel blockers are minimal. In elderly people, clearance of orally administered amlodipine is quicker for women.
15. Adverse effects of ACE inhibitors, especially the typical dry cough, are more common in women than in men.
16. Adverse effects such as hyponatremia and hypokalaemia occur more frequently in women than in men taking diuretics. Both electrolyte disorders have the potential to cause severe arrhythmia.

4.3.3 Acute coronary syndrome (ACS) / myocardial infarction (MI)

Although MI is considered a male disease, it kills almost as many women as men. Most women who experience MI do so about 10 years later than men. But women's longer life expectancy means that the number of them who experience MI is almost equal the number of men.

It is now accepted that the incidence of MI is declining worldwide, except among young women. Women have a higher mortality rate after a first MI than men of the same age. This is also true for the increased mortality rate among younger women after coronary bypass surgery. The sexes differ in terms of MI triggers. Psychological stress is a more significant factor in women; while heavy exercise

is more significant in men. There are also differences between the sexes in the symptoms of MI. Women experience a greater variety of symptoms – called “atypical syndromes” – and more signs of vagal activation than men. In contrast, there is a much higher probability of sudden ischemic death in men. Women receive fewer diagnoses based on clinical practice guidelines and protocols, and less invasive treatment for MI than men. Social stress is the primary determinant of reinfarction after a first MI in women.

4.3.4 Cardiovascular risk factors – traditional and new

Women generally have longer life expectancy than men. Therefore, women make up a larger proportion of the elderly population, where the prevalence of CVD is higher. Alarming statistics for females between 35 and 44 show that mortality rates from coronary heart disease have increased among younger women. There is an ongoing debate about whether women have a worse prognosis after a myocardial infarction (MI) than men and why this should be. Are there any observed differences that can be explained by gender bias in the way the CHD is managed?

The observed delay in healthcare may also be due to women seeking care later, issues with identification and treatment by healthcare providers, differences in pathophysiology, more comorbidities, or the more advanced age of women (in comparison with men) at the moment of presentation.

From a gender perspective, teaching should focus on the following:

1. Repetition of the traditional risk factors of cardiovascular diseases (CVD).
2. Incorporation of new risk factors for CVD in women.
3. Study of the importance of hypertension, diabetes, complications of pregnancy, and rheumatic and autoimmune diseases.
4. Improvement in the knowledge of sociocultural influences.
5. Information on changes in lifestyle balance and prevention in order to improve individual health.
6. Determining risk stratification of CVD using risk assessment scores, while being aware of their limitations, and using other scores to stratify the risk to women of CVD in their daily lives.

A new approach is to understand the risk factors and to be open to new algorithms for classifying risk in women. Educational efforts are critical, as greater awareness

of individual cardiovascular risk factors has been associated with better health and lifestyles for women and their families.

4.4 Incorporation of the gender perspective in endocrinology²

Gender-sensitive medicine in the field of endocrinology and metabolism is expanding rapidly. From the perspective of sex/gender interaction, endocrinology is a central area of medicine. Sex differences and gender inequalities play an important role in the pathophysiology, clinical picture, development of complications and, in part, in the therapy of metabolic disorders that affect quality of life and life expectancy.

It is understandable that lifestyle related diseases, such as obesity and type 2 diabetes, should be of special interest when thinking about medicine from a gender perspective. Genes, sex-specific hormones and body fat distribution, combined with sex-related changes in adipocytokines – as well as environmental exposures and psychosocial factors – obviously contribute to disease progression. Furthermore, these diseases are associated with depression, cardiovascular disease, sexual dysfunction and gender-specific malignancies. Osteoporosis is a well-known problem in postmenopausal women, but it is also increasingly affecting young women and men who currently go undiagnosed. Men are even at increased risk of mortality after hip fractures; therefore, better detection and prevention strategies should be implemented in both sexes. This, in turn, involves a medical education in these diseases that shows the differences between the sexes and analyses the situation from a gender perspective.

Endocrinology studies are concerned with the secretion and effects of hormones, as well as the regulation of energy metabolism, the maintenance of body weight and the reproduction throughout the life cycle of men and women. There are differences in important endocrine systems, such as insulin metabolism, bone metabolism, the hypothalamic-pituitary-adrenal axis, thyroid hormones and the metabolism of adipocytes.

Subjects of interest from a gender perspective:

1. Insulin resistance and beta cell secretion.
2. Appetite and weight gain.
3. Bone structure and osteoporosis.

4.5 Incorporation of the gender perspective in Neurology²

Gender issues have so far played a minimal role in clinical research and practice, whether in the areas of disease and health or in the neuropsychiatric field. In almost every field of neuroscience there has been a generally implied assumption that there are few significant differences – if any – between male and female brain function. However, this is now being questioned. Sex and gender affect the incidence, prevalence and dynamics of the nervous system with its central, peripheral and/or autonomic part and the tissue with which actions are carried out, particularly the muscle.

Sex-based differences are being documented at all levels of neuroscience, from unique neurons in cell culture to processes at the level of systems measured by neuroimaging. Anatomically, there are differences in the density of neurons, the size of brain regions, the expression of cellular receptors, and neurotransmitter systems. Physiologically, there are differences in cerebral blood flow and cortical activation patterns. The most important pathologies from a sex/gender perspective include inflammatory (multiple sclerosis) and degenerative (Alzheimer's and Parkinson's) neurological diseases, as well as epilepsy, a functional state of greater vulnerability to seizures.

Stroke can be devastating to anybody. However, in social terms, women generally suffer more from strokes than men, largely due to their longer life expectancy and the higher risk of suffering a stroke with the advancement of age. Not only do women suffer more episodes of strokes overall, but those who survive have worse prospects for recovery, worse functional outcomes and a lower quality of life than men. Therefore, it is crucial that strategies for preventing strokes and providing greater access to treatment for women are improved. It is thought that many strokes can be prevented. There is an urgent need for greater awareness of risk factors that are more common in women – especially hypertension and atrial fibrillation – and better strategies for managing them.

Subjects of interest from a gender perspective:

1. Inflammatory neurological diseases.
2. Degenerative neurological diseases.
3. Epilepsy.
4. Cerebral effusion.

² Summary case

4.6 Incorporation of the gender perspective in pulmonology³

Lung diseases, such as chronic obstructive pulmonary disease (COPD) and lung cancer, reveal a highly unfavourable trend in the near future towards a global increase in morbidity and mortality. Epidemiological statistics predict that in 2020, COPD will rank third in the list of diseases with the highest incidence worldwide. Furthermore, lung cancer is the most common and aggressive form of solid tumour. A gender-sensitive analysis of survival strategies for lung disease is of interest to combat the burden of the disease in a more efficient way. Data relating to sex-based differences and gender inequalities in clinical management of lung disease is scarce but growing.

Subjects of interest from a gender perspective:

1. Allergic airway diseases – genetic predisposition is crucial.

The incidence of asthma has increased in male children in comparison with female children. However, this situation changes over time, since women appear to be affected more than men in young adulthood, while males are affected more again when they reach old age. Symptoms tend to be more severe in adolescents. In the elderly, there are significant differences between the sexes in terms of symptoms, the obstructive pattern and the underlying allergy potential.

2. COPD and female smokers.

Chronic obstructive pulmonary disease is a serious problem in women and men. Its relevance from a gender perspective is based on the increasing prevalence of smoking in women and their greater sensitivity to tobacco toxicity. Due to these differences, pharmacological treatment and women's responses to drugs is also of interest from this perspective.

2. Lung cancer: women at risk!

Lung cancer is currently one of the most common solid tumours. Its prevalence in women is increasing and, due to changes in lifestyle and smoking habits, it will soon reach the level of men. It appears that a higher sensitivity to some tobacco toxins and cigarette smoking puts women at a greater risk of lung cancer than men. Globally, there are a great deal of anti-smoking campaigns and material, but rarely from a gender perspective.

3. Sleep disorders

³ Summary case

While women have a higher level of objective sleep efficiency than men, paradoxically, they report sleep problems more frequently. It is not clear whether these differences are real or an issue of measurement. Some sleep disorders, such as insomnia, restless legs syndrome (RLS), and hypersomnolence, are more common in women, while others, such as REM sleep behaviour disorder and breathing problems, are more common in men. Sex-based differences can be observed in prevalence, pathophysiology, clinical presentation and response to treatment.

Table 1. Basic concepts of application in preclinical, clinical and public health subjects

Basic or preclinical subjects (anatomophysiology, pharmacology and applied pathologies)
<ul style="list-style-type: none">• Anatomical-physiological differences, avoiding the androcentric position• Sex-gender differentiation and sex-gender interactions in general pathology• Sex as a factor of variability in drug reactions• Contraceptive therapy and infertility• Toxicity of drug use in pregnancy• Sex-based differences and sex-gender interactions in eating disorders and mental health issues• Sex-based differences and sex-gender interactions in contraception, sexuality, human sexual response problems, STDs and sexual identity

**Clinical subjects (medical-surgical, psychosocial care,
and public and community health)**

Sex-based differences and sex-gender interactions of specific pathologies:

- Identification of sex-based differences and sex-gender interaction in the manifestations (signs-symptoms) of diseases
- Assessment of illness/diseases: medical history, clinical examination procedures, additional tests
- Diagnostic criteria by sex and sex-gender interactions
- Use of standard diagnostic and therapeutic protocols
- Diagnostic decision-making that takes gender stereotypes into account
- Use of available information (e.g. clinical trials) and development of critical thinking for clinical decision making
- Diagnostic/therapeutic and care-based decision-making based on appearance and behaviour
- Care plan adapted to sex-based differences and sex-gender interactions
- Attention to gender violence
- Public and community health:
 - Gender-sensitive individual and community planning and intervention programmes
 - Sex/gender differences in health indicators, incidence, prevalence and causality
 - Evaluation of health interventions

4.7 Evaluation of subjects

A review of the experiences of international universities in their efforts to incorporate and assess the gender perspective in their courses suggest the following:

1. Include gender in 10% of exam questions.
2. Consider the gender biases that are unconsciously introduced in the formulation of the question when assertions (or denials) relating to health problems are generalised (from the onset of symptoms, through the course of the evolved health problem or disease, to prognosis and differential diagnosis). Also, check when assertions (or denials) are made regarding the causes and impact of risk factors, as these may differentiate according to sex and gender. Finally, review possible answers when alluding to health outcomes or interventions (including drug therapy).

The most appropriate way to address this problem is to ensure that the wording of each question is based on the scientific evidence for each sex.

1. Similarly, answers should take into account the sex-based differences in the concepts outlined in the previous point. To illustrate these proposals, here are some examples taken from the subject of public health:
 - Conceptual questions should include answers that make health strategies aimed at women visible.
Example: Which of the following is related to secondary prevention?
Work in health planning services in a programme that aims to:
 - a) reduce the risks of maltreatment of the elderly.
 - b) increase the number of hours of physical exercise for people with disabilities.
 - c) inform the population of the relevance of gender equality to their health.
 - d) increase the participation rate of women in mammography programmes.
 - e) increase the insertion activities of children with a chronic illness.

- Or answers should be included that make the sexes separate and visible.
Example: The increasing life expectancy over the last 20 years:
 - a) is higher in low-resource countries.
 - b) is higher in developed countries.
 - c) is higher in women in high-income countries.
 - d) is higher in men in low-income countries.
 - e) is generally higher in men living in middle-income countries.
- 2. Include questions with a gender perspective but not about sex-based differences.

Example: Regarding determinants of gender inequalities in health. Middle and upper-class women are more likely to prioritise exercise and a balanced diet. Which of the following is the most correct response to this fact?
 - a) It is causing greater inequalities between classes.
 - b) It is only the result of an early benefit for these women of population interventions.
 - d) It is because a higher proportion of these women benefit from health interventions.
 - e) It does not increase inequalities because people from more vulnerable social classes imitate these women.
 - f) It is due to a matter of social selection.
- 3. In addition to the assessment of theoretical lessons by means of multiple-choice tests, open questions can be used, especially when evaluating case studies.
- 4. Learning assessment forums can also be used to provide students with the opportunity to interact and learn from each other through participation.

4.8 Organisational modalities of teaching dynamics

The following actions have proved useful in health sciences:

1. Incorporating sex-gender concepts during the first years of the degree.

2. Including, in a cross-cutting way, sex-based differences and the gender perspective in clinical subjects, regardless of the potential existence of compulsory or optional subjects.
3. Providing information on sex-based differences and gender inequalities in health. Theory classes are a necessary way of obtaining scientific information. In addition, there is a wide selection of scientific literature regarding gender bias in research into the health-disease duality. This bias generates a series of consequences, including gender bias in scientific outreach, policy making and – even more seriously – healthcare itself. This information barely transcends the educational system. It is therefore essential to address sex and gender-based differences. For this reason, the classical organization of subjects into theoretical classes (master classes) is still necessary.
4. Promoting participatory activities among students, encouraging them to understand, reflect on and interpret the learning content and objectives. These include issues such as: the sex/gender intersection with other areas of health inequality; the recognition and empowerment of historically discriminated-against groups; and students' awareness of gender stereotypes and the intersection of these with other social categories (social class, age, ethnicity, etc.).

4.9 Teaching methods

1. Individual tasks for increasing personal awareness: exercises in discriminating concepts, searching for audiovisual material, applying content to familiar situations, analysing videos, cases and professional practices.
2. A motivating feature of practical classes is to share experiences and discuss innovations and applications related to gender in the clinical-health and population field. Here are some examples:
 - Scientific literature review workshop to be carried out at a later date:
 - a) Critical analysis of professional practices (identify gender biases).
 - b) Identify the effectiveness (good practices, equity and efficiency) of gender innovations.
 - Critical reading seminars.

- Seminar on sex differences/gender inequalities in professional practice based on the sex of the medical professionals.
 - Case study seminars. Develop between three and five simple case studies in which the relevance of gender is convincing. It is more useful if student volunteers write these, after researching documents and scientific literature.
 - Workshop for the preparation of checklists, diagnostic/therapeutic protocols according to sex and from a gender perspective.
3. Field studies can also focus on case studies that are based on scientific evidence.

5. TEACHING RESOURCES

Table 2, below, displays information on the experiences of different institutions in incorporating the gender approach into health science degrees, educational strategies and teaching tools.

Table 2. Incorporation of the gender approach in health science degrees. Educational strategies, teaching tools and institutions

Assessing the incorporation of a gender focus and the design of teaching guides: sensitivity, objectives, competencies and learning outcomes	
“Guidelines for assessing gender sensitivity in the medical curriculum.” (Canada). Zelek B (1997) in Yut-Lin W (2009)	Provides a guide for assessing gender sensitivity in content, language and the teaching-learning process.
“Women’s healthcare objectives and goals and gender issues.” (USA). Phillips SP. (2002) in Yut-Lin W (2009)	Goals and objectives, and how to verify that they have been achieved. Includes specific pathological entities, and a gender-focused analysis of scientific evidence, attitudes and capabilities.
“Objectives for assessing the successful implementation of gender issues in medical curricula.” (Netherlands). Verdonk P (2008)	Objectives that indicate a successful implementation of gender issues in the medical curriculum.
Nursing teacher training: “Norm Aware Caring.” Tenglein I <i>et al.</i> (2017)	Course for improving the skills of nursing teachers in identifying and questioning the dominant social norms that impact on encounters with patients.

Teaching techniques, materials and evaluation	
eGender platform (Germany): http:// egender.charite.de	Online learning and knowledge exchange platform on sex and gender-based differences and communication skills for facilitating decision making by health professionals. Requires (free) registration and offers a variety of independent training modules.
Resources for curriculum development with a sex-gender perspective (USA). Miller VM (2016)	Textbooks and articles describing experimental methodological designs for incorporating the gender perspective into health science degrees.
Educational resources (USA) with links to websites. Miller VM (2013)	Textbooks, web resources for research and education, and for lifelong learning courses, professional organisations and scientific journals.
“Feminist learning strategies in health professions education.” Michela NJ (2014)	Cooperative learning, case studies, small groups.
“Teaching strategies from a feminist approach to nursing.” Lamont I (2014)	Learning interpersonal skills and application in the first year of the degree.
Professional institutions with accessible resources for research and education	
The Sex and Gender Medical Education Summit (USA): http:// www.sgbmeducati- onsummit.org	Access to documents from the 2015 summit on sex and gender in medical and health education (The Sex and Gender Medical Education Summit). Events, presentations, posters and other materials, including the figure of the agent of change.

<p>The Sex and Gender Women's Health Collaborative (USA): www.sgwahc.org "Every cell has a sex, and all bodies are influenced by gender."</p>	<p>Focused on sex-gender competence in healthcare for women. Provides sex and gender-sensitive materials for inclusion into education and clinical practice.</p>
<p>The Gender Awakening Tool (Canada): http://www.cwhn.ca/en/node/43342</p>	<p>Resources for the inclusion of a gender perspective into research. Cases showing the benefits of including sex and gender in healthcare, strategies and guides for including sex and gender in research (basic, experimental, systematic reviews, good research practices and a checklist for each step of the research process).</p>
<p>Sex and Gender in Systematic Reviews: Planning Tool (USA): http://methods.cochrane.org/equity/sex-and-gender-analysis</p>	
<p>Gender Toolkit in EU Funded Research (European Union): https://publications.europa.eu/es/publication-detail/-/publication/c17a4eba-49ab40f1-bb7b-bb6faaf8dec8</p>	
<p>The Centre for Gender Medicine (CfGM) in the Karolinska Institutet (Sweden): http://ki.se/en/research/centre-for-gender-medicine</p>	<p>First European institution with online courses in health and disease from a gender perspective.</p>
<p>Institute of Gender and Health (IGH) of Canadian Institutes of Health Research (Canada): http://www.cihr-irsc.gc.ca/e/48641.html</p>	<p>Institute supported by the Canadian government. Access to funding requests for research, seminars, videos and online training modules.</p>

<p>Online Continuing Medical Education and Certificate Program in Sex and Gender Specific Health: http://www.laurabushinstitute.org/cme/default.aspx</p> <p>From the Texas Tech University Health Sciences Center (USA)</p>	<p>Certification programme for graduates of medicine, nursing, pharmacy and other health sciences.</p>
<p>Sex and gender specific health https://www.sexandgenderhealth.org/</p> <p>From the Texas Tech University Health Sciences Center (USA)</p>	<p>Interprofessional repository and meeting place for discussions on the contribution of sex and gender to personalised healthcare.</p>
<p>Gender innovations Stanford University https://genderedinnovations.stanford.edu</p>	<p>Applying the gender approach to scientific research and innovation, health sciences and other disciplines.</p>

6. TEACHING HOW TO CARRY OUT GENDER-SENSITIVE RESEARCH

Mainstreaming a gender perspective (GP) into research implies making it visible in all sections of a research project, from the title to all the products derived from the research, such as publications and, especially, the original articles. This should include systematic reviews and meta-analysis. To achieve this, consideration must be given to whether the gender perspective is relevant and, if so, how to incorporate it into the project method. Fortunately, there are multiple guides on the webpages of research centres and institutes – from Spain and around the world – about women and gender. One of these is the *Guía práctica para la inclusión de la perspectiva de género en los contenidos de la investigación* (*Practical guide for the inclusion of the gender perspective in the contents of research*) by a collective of authors from a range of professional fields in Spain. It can be found on the website of the MINECO Women and Science Unit (<http://www.idi.mineco.gob.es/portal/site/micinn/menuitem.26172fcf4eb029fa6ec7da6901432ea0/?vg-nextoid=e218c5aa16493210vgnvcm1000001d04140arcd>).

With regard to relevance, the previous sections have outlined how to assess this according to illness type. It is important that research is carried out by those who are specialized in the relevant area of knowledge. This is because the application of the gender perspective in research is usually adopted from gender systems, which are a collection of socioeconomic and political structures that maintain the traditional male and female roles, and everything that is classically attributed to men and women. These systems indicate how a society structures gender relations and how it transmits them to all areas of social life in a comprehensive social dynamic that gives priority to, and reinforces, certain results.

Gender systems establish three dimensions from which gender is characterised: as the basis of normative values (gender social identity); as a component of personal identity; and as an organizing principle of the social structure (social position of women and men).

Gender social identity is constituted from the social patterns associated with apparent, corporeal and visible characteristics projected onto social groups, specifically women and men. It responds to what is considered feminine and masculine in a society. Gender as a component of individual identity refers to the sense that people have of themselves versus social identity, which is the categorisations of people made by others. Gender can also be understood as

the organising principle of the social structure by which the activities of women and men in a society are segregated according to their sex.

The sexual division of labour should be understood not only as a method of task redistribution but as an indicator (and product) of the social inequalities between the sexes. In this dimension we can include studies on the position of women and men in societies and their access to, and distribution of, resources. This includes analyses that consider gender as a criterion for social stratification, in areas such as reproductive work (care and domestic) and paid work, double shifts or the segregation of the labour market. There are three scenarios which reveal sex-based division of tasks, and which can serve as a way to observe the effect of the sexual division of labour: personal/domestic/family or private life, professional/working or public life; and the interaction of both these lives. All three scenarios have implications for time distribution and work overload.

Read:

HARDING, Susan (1987). *Feminism and Methodology: Social Science Issues*. Bloomington: Indiana University Press.

HARDING, Susan (1991). *Whose Science, Whose Knowledge?* Ithaca: Cornell University Press.

BRAIDOTTI, Rosi. "The uses and abuses of the sex/gender distinction in European feminist practices." In: GRIFFIN, Gabriele and BRAIDOTTI, Rosi, eds., *Thinking Differently. A Reader in European Women's Studies*. London: Zed Book; 2002.

Ruiz Cantero, María Teresa; Papí Gálvez, Natalia; Cabrera Ruiz, Virginia; Ruiz Martínez, Ana; Álvarez-Dardet Díaz, Carlos, *Los sistemas de género y/en la Encuesta Nacional de Salud*. Gac Sanit 2006; 20: 427-34.

Regarding the method, it is important to draw attention to the influence on the research of the theoretical strand to be employed. The method consists of two phases: design and analysis. The influence of the theoretical strand on the incorporation of the gender perspective in the design is as follows:

1. Feminist empiricism seeks to apply the empirical method in research design, calculating the sample number of men and women in the studies in proportion to the prevalence of the disease in each sex and the percentage of women and men exposed to risk factors. The method should also be applied to women and men who consume drugs in clinical trials or who receive an intervention in order to promote their health in community

intervention trials. For analysis it is important to stratify subjects according to sex in such a way that results are provided for men and women, specific enough to allow a meta-analysis to be carried out.

2. The feminist standpoint is that the androcentric perspective of science lacks the viewpoint of women, and that this results in a partial view of reality. In other words, the perspective of male scientists is privileged, and there is a lack of knowledge regarding the situation of women. Hypotheses about, and solutions to, health problems are put forward when there is little or no knowledge about said health problems, due to a lack of perspectives from the women who suffer from them. For example, less is known about risks in the reproductive (informal) sector than about the paid (formal) sector. It is partly due to this that one of the criteria established for the incorporation of the gender perspective into research is gender parity in research teams.
3. Postmodern feminism uses various theories such as phenomenology, psychoanalysis, and so on, to emphasize the fragmented nature of reality. From this perspective it is not possible to generalize the results. For example, the reality of a non-Caucasian woman with limited resources and a disability is not the same as that of a Caucasian man of high social class.

Below you can find links to a relevant article that was first published in the journal *Gaceta Sanitaria*, as well as the “Guide to incorporating a gender perspective into health research” from the Andalusian School of Public Health:

ARIÑO, María Dolores *et al.* “The Gender Perspective Can Be Assessed in Research Projects.” *Gaceta Sanitaria* 2011; 25: 146-50. Available at: http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0213-91112011000200011

GARCÍA CALVENTE, María del Mar *et al.* *Guide to Incorporating a Gender Perspective into Health Research*. Andalusian School of Public Health. Granada 2013. Available at: <http://www.easp.es/project/guia-para-incorporar-la-perspectiva-de-genero-a-la-investigacion-en-salud/>

Below is an adapted version of the Gendered Innovations project’s gender perspective research checklist: http://genderedinnovations.stanford.edu/methods/health_med_checklist.html

6.1 Health and medicine research checklist

This list is intended as an aid for researchers, writers, grant writers, project directors and evaluators, and funding organizations pertaining to health and medicine. The list presents key steps for incorporating sex and gender analyses into health and biomedical research. It compliments – and should be read in conjunction with – the methodology described in “Designing Health & Biomedical Research”. <http://genderedinnovations.stanford.edu/methods/health.html>

Important resources when considering research design include: Oertelt-Pri-gione, Sabine *et al.*, *Sex and Gender aspects in clinical Medicine*; Schenck-Gustafsson *et al.*, *Handbook of Clinical Gender Medicine*; and Vera, *Sex and Gender Differences in Pharmacology*. Additional Resources: U.S. National Institutes of Health online course: *The Science of Sex and Gender in Human Health*; the European Curriculum in Gender Medicine online course.

Step 1: Determining Relevance. See “Rethinking Research Priorities and Outcomes”: <http://genderedinnovations.stanford.edu/methods/priorities.html>

- Understand the analytical distinctions between “sex” and “gender”.
- Sex is likely relevant when a study involves human subjects, animals, tissues, or cells. Gender is likely relevant for humans and, in some instances, animals. See “Animal Research”, Next Steps #4:
<http://genderedinnovations.stanford.edu/case-studies/animals.html#-tabs-2>
- Sex and gender are also likely of relevance when the project develops or modifies health policies.
- Sex and gender must be investigated before they can be ruled out. See “Not Considering Sex Difference as a Problem”. http://genderedinnovations.stanford.edu/terms/not_considering.html
Not all sex or gender differences are significant. See “Overemphasizing Sex Differences as a Problem”.
<http://genderedinnovations.stanford.edu/terms/overemphasizing.html>
- Gender reduces less easily than sex to independent variables that can be included in a statistical analysis, but its explanatory power can be enormous. See “Analysing Gender”. <http://genderedinnovations.stanford.edu/methods/gender.html>

Step 2: Literature Search

Perform a literature and database search with adequate terms for *sex and gender*. MeSH (Medical Subject Headings) – the U.S. National Library of Medicine controlled-vocabulary thesaurus used for indexing articles for PubMed – does not distinguish consistently between sex and gender (in large part because authors do not). Hence, researchers need to develop search strategies to identify the full range of previously documented sex and gender differences.

- Several studies suggest combining the name of a condition or biomedical research topic with standardized MeSH terms, such as “*sex factors*” and “*sex characteristics*”, or text words, such as “*gender differences*” and “*sex differences*”. A number of complex search terms have been developed that yield better results than “sex” or “gender” alone (Oertelt-Prigione *et al.*, 2010; Moerman *et al.*, 2008).
- In basic life sciences research, search terms related to the female/male distinction, such as sex steroid hormones, gonadal hormones, sex chromosomes, oestrogens, and androgens or steroid receptors may be required.
- A database has been established that includes a survey of sex and gender related references in major clinical disciplines and biomedical basic research. See <http://bioinformatics.charite.de/gender/> (This website has two login prompts. At the first prompt, enter User: “gender” and Password “ppgm”. At the second prompt, enter User: “guest” and Password: “guest”). In basic life sciences research, it may also be helpful to use search terms related to the female/male distinction, such as sex hormones or reproductive biology.
- Researchers have created a search engine tool which can help identify sex-and-gender-related research in the U.S. National Library of Medicine’s PubMed database (Jenkins *et al.*, 2012).

Step 3: Establishing Research Questions and Hypotheses. See “Formulating Research Questions”:

<http://genderedinnovations.stanford.edu/methods/questions.html>

- Using the results of steps 1 and 2, consider how the current project will include methods of sex and gender analysis. See “Rethinking Concepts and

Theories” http://genderedinnovations.stanford.edu/methods/rethinking_concepts_theories.html

- Study design should allow for gathering of sex-disaggregated data.
- Study populations can be configured in different ways depending on the types of questions to be asked:

Studies which include both sexes:

1. Study population should reflect the composition of the group of patients likely to be treated with the therapy under investigation.
2. Women and men should be matched for traits such as age, race/ethnicity, socioeconomic status, body composition, etc.; if not possible, these variables should be measured and controlled for.
3. Analysing factors intersecting with sex and gender is critical to avoid overlooking sex differences and to avoid overemphasizing sex.

Women-only studies:

1. For studying single-sex diseases, such as ovarian cancer.
2. To close research gaps when a disease that affects both sexes (such as heart disease) has been understudied in women.
3. To analyse differences (such as reproductive status, age, etc.) among women.

Men-only studies:

1. For studying single-sex diseases, such as prostate cancer.
2. For closing research gaps when a disease which affects both sexes (such as osteoporosis) has been understudied in men.
3. For analysing differences among men.

Step 4: Establishing Research Methods and Planning Data Analysis. See “Designing Health & Biomedical Research”: <http://genderedinnovations.stanford.edu/methods/health.html>

- Research instruments (questionnaires, surveys, or protocols, etc.) should be developed for both women and men or females and males. See “Rethinking Standards and Reference Models”. <http://genderedinnovations.stanford.edu/methods/standards.html>

- Data can be analysed in many different ways. Clarify whether sex needs to be controlled for, or whether the study is investigating the effects of sex on outcomes.
- A study that includes both women and men must use statistical tests to determine the confidence with which similarities or differences can be asserted.
- Consider the following questions in data analysis:
 1. Does the treatment have a favourable balance of benefits and risks in a mixed-sex population overall?
 2. Is the treatment effective and safe enough to be indicated in both women and men?
 3. Are there sex differences in effect – i.e., is the treatment more effective or safer in one sex?
 4. Do differences between women’s and men’s existing treatment options make the proposed treatment more important for one sex?
- If the study population is matched for age, reproductive status, ethnicity, etc., is the study sufficiently powered for subgroup analysis? Can the efficacy and safety of the treatment be evaluated in specific subpopulations? If so, are these subpopulations defined consistently enough to ensure evidence-based clinical practice?

Step 5: Interpreting Data through Concepts and Theoretical Models

- Analyse all concepts and theoretical models for unfounded assumptions. See “Rethinking Concepts and Theories” http://genderedinnovations.stanford.edu/methods/rethinking_concepts_theories.html
- Studies should take care not to:
 - Assume that findings in one sex apply to the other.
 - Create a non-representative norm, such as assuming a male norm for a disease that affects both sexes or a technology used by both women and men. See “Rethinking Standards and Reference Models”. <http://genderedinnovations.stanford.edu/methods/standards.html>
 - Pathologize normal biological processes, such as pregnancy or menopause.
 - Interpret results in a sex- or gender-blind manner.

Step 6: Reporting Findings. See “Analysing Sex”: <http://genderedinnovations.stanford.edu/methods/sex.html>

- Report the sex of research subjects and materials.
- Report null findings. Researchers should report when sex differences (main or interaction effects) are not detected in their analyses to reduce publication bias and enable meta-analysis.
- Check that sex or gender are properly visualised in the tables, figures and conclusions (see “Rethinking Language and Visual Representations” <http://genderedinnovations.stanford.edu/methods/language.html>)
- Check that sex and gender related findings are presented correctly in the title, abstract, and keywords.

Step 7: Establishing Conclusions and Making Recommendations

- Where significant sex differences and gender effects emerge, what follow-up research is necessary?
- Do results have specific implications for women and men patients? Do these differences have implications for clinical practice or future research?
- How can results showing significant sex or gender differences be translated into preventive, diagnostic, and therapeutic practices to improve patient outcomes?

7. PEDAGOGICAL RESOURCES

- eGender platform (Germany): <http://egender.charite.de>
- The Sex and Gender Medical Education Summit (USA): <http://www.sgbmeducationsummit.org>
- The Sex and Gender Women's Health Collaborative (USA): www.sgwhc.org
"Every cell has a sex, and all bodies are influenced by gender".
- The Gender Awakening Tool (Canada): <http://www.cwhn.ca/en/node/43342>
- Sex and Gender in Systematic Reviews: Planning Tool (USA): <http://methods.cochrane.org/equity/sex-and-gender-analysis>
- Toolkit Gender in EU Funded Research (European Union): <https://op.europa.eu/en/publication-detail/-/publication/c17a4eba-49ab-40f1-bb7b-bb6faaf8dec8>
- The Center for Gender Medicine (CfGM) in the Karolinska Institutet (Sweden): <http://ki.se/en/research/centre-for-gender-medicine>
- Institute of Gender and Health (IGH), Canadian Institutes of Health Research (Canada): <http://www.cih-irsc.gc.ca/e/48641.html>
- Gendered innovations: http://ec.europa.eu/research/swafs/gendered-innovations/index_en.cfm

8. FURTHER INFORMATION

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OERTELT-PRIGIONE, Sabine; PAROL, Roza; KROHN, Stephan; PREISSNER, Robert; REGITZ-ZAGROSEK, Vera (2010). “Analysis of Sex and Gender-Specific Research Reveals a Common Increase in Publications and Marked Differences between Disciplines.” *BioMed Central Medicine*, 8: 70-80.

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There are also norms for incorporating a gender perspective into scientific publications. See: <http://genderedinnovations.stanford.edu/sex-and-gender-analysis-policies-peer-reviewed-journals.html>. Highly recommended is “Sex and Gender Equity in Research: rationale for the SAGER guidelines and recommended use”, published by Shirin Heidari *et al.*, in *Research Integrity and Peer Review* (2016) 1:2.

In Spain, the magazine *Gaceta Sanitaria* took a step forward on this subject by publishing an editorial entitled “Gender Inequalities in Science: Gaceta Sanitaria Takes a Step Forward” *Gac Sanit.* 2015; 29:161-3, the following recommendations:

Recommendations for incorporating sex and gender into scientific publication	
Section	Recommendation
Authorship	The full name of each author must be included in order to know the sex of the authors.
Terminology and language	Use correct terminology without confusing the terms “sex” (which refers to biological differences), and “gender” (which refers to social inequalities). Use non-sexist language.
Title and summary	If only one sex population is included, it is necessary to specify this in the title and the summary.
Introduction	A reflection on the sex differences or gender inequalities expected to be found should be included (if appropriate). If the study focuses on one sex, this choice should be justified.
Methods	Explain how sex/gender was taken into account in the design of the study. Ensure that there is a large enough sample of both men and women, and make known lost cases by sex. If the study analyses data for both sexes together, it is important to justify the reason for doing so. Gender-stratified analysis should be performed, whichever the patterns of association of predictive variables with dependents differentiated by sex.

Results	<p>Results stratified by sex (if applicable) should be displayed.</p> <p>In evaluations, the results for men and women should be analysed separately to facilitate meta-analysis.</p> <p>Interactions to determine sex differences or gender inequalities should be considered.</p>
Discussion	<p>The implications of the analysis of comparison between the sexes or genders should be discussed.</p> <p>If this analysis cannot be done, comment on the limitations.</p>

Here are some articles, regarding integrating the gender perspective into research, which provided information included in this document:

BLASCO-BLASCO, María del Mar; RUIZ-CANTERO, María Teresa and cols. (2017).

“Sex and Gender Interactions in the Lives of Patients with Spondyloarthritis in Spain: A Quantitative-qualitative Study.” *J. Rheumatol*; 44: 1429-35.

JOVANÍ, Vega; BLASCO-BLASCO, María del Mar; RUIZ-CANTERO, María Teresa and cols. (2017). “Understanding How the Diagnostic Delay of Spondyloarthritis Differs Between Women and Men: A Systematic Review and Metaanalysis.” *J. Rheumatol*; 44: 174-83.

HERRERA Y CAIRO, Lucero Aida; CASTRO-VASQUEZ, María del Carmen and RUIZ-CANTERO, María Teresa (2016). “Análisis con perspectiva de género sobre percepción y prácticas en enfermedad coronaria en mujeres del Norte de México.” *Salut Pub Mex*; 58: 428-36.

GARCÍA-CALVENTE, María del Mar; RUIZ-CANTERO, María Teresa and cols. (2015).

“Desigualdades de género en la investigación en salud pública y epidemiología en España (2007-2014).” *Gac Sanit.*; 29: 404-1.

SÁNCHEZ DE MADARIAGA, Inés and RUIZ-CANTERO, María Teresa (2014).

“Oportunidad de integración en la perspectiva de género en investigación e innovación en salud en Europa: red COST genderSTE.” *Gac Sanit.*; 28: 401-4.

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In health sciences, although the concepts of sex and gender refer to different realities, they are often confused. In addition, some consequences of gender biases in medical knowledge, clinical management and health services respond to incorrect assumptions.

The Guide of Medicine to mainstreaming gender in university teaching offers proposals, examples of good practices, teaching resources and consultation tools that will allow to incorporate a gender approach in university studies in health sciences and to train gender competent professionals in this discipline.



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