

Gender Equality and Health: A review of the evidence

Report prepared for the Victorian Health Promotion Foundation

Dr Allison Milner

Dr Tania King

Gender and Women's Health Unit

Centre for Health Equity

School of Population and Global Health

University of Melbourne

Executive summary

Many countries have identified gender equality as an important economic and social developmental goal. The movement towards equality in political representation, education, income, and access to health services has resulted in changes to how everyday women and men work, cohabitate, and live. The purpose of this review was to assess the impact of gender equality on the health of both women and men in high income countries. The rationale for this review stems from VicHealth's updated 2016 Action Agenda, which recognises gender as a key lever to improve health.

Gender equality was measured in slightly different ways across the 53 studies included in the review. However, many studies recognised gender equality in employment (e.g., female labour force participation, pay equity), parliamentary representation, in the family (e.g., breadwinner and caring roles), and in access to services.

The results of this review suggest the effects of gender equality on health varied depending on the outcome studied, sphere of life (e.g., work and home), level and time period that the association was studied. However, while there were some mixed findings, we would argue that the evidence generally suggests that gender equality was good for the health of males and females. In saying this, it is necessary to acknowledge the dynamic nature of the relationship between gender equality and health. There is unlikely to be one linear path between a country's movement

toward gender equality and the health of its population. This fact reinforces the importance of further and in-depth investigation and evaluation of the effects of gender equality policies and practices on health outcomes.

The recommendations for VicHealth are to support policy models that seek to progress gender equality through:

- The promotion of equal breadwinning and caring role for males and females;
- Encourage labour force participation of women (e.g. females' engagement in the labour force including in positions of power in government and business), and;
- The provision of high quality health and social services, including affordable childcare.

At the same time, it is important to acknowledge the need for overall shifts in cultural gender norms for males and females. Thus, a multifaceted approach is required to ensure that gender equality benefits the health of all Australians. Alongside this, we strongly believe there is a need for more research assessing the progress of gender equality and its relationship to health. This is particularly necessary given the complexity of the relationship between gender equality and health.

Table of contents

Background and introduction.....	6
Gender, gender equity, gender equality and health	6
The Victorian Health Promotion Foundation’s interest in gender equality	7
Summary of review process	14
How was gender inequality measured?	19
What effect does gender equality have on health?	23
Workplace inequality and leave entitlements	23
Within countries analysis – gender equality measured within the family domain	26
Within countries - gender equality in politics, the economy, social services, and reproductive rights.....	29
Between countries, fertility rates, educational status of women, labour force status.....	30
Gender Inequality Index.....	32
As a whole, these studies suggest that gender equality measured at the country level was associated with an improvement in a range of health outcomes, including physical activity and smoking (see box above for specifics).	33
Gender Empowerment Measure.....	34
Global Gender index.....	35
Gender Development index (GDI)	36
Discussion relating to the systematic review	37
Main findings.....	37
Limitations.....	39

Relevance of the review to policy and practice	42
How have policy models of gender equality been described?	42
Which policy model will produce the best effects for health?	44
Considerations for Victoria and conclusion.....	46
References.....	49
Appendix	76

Background and introduction

Gender, gender equity, gender equality and health

According to the World Health Organization (WHO), gender refers to the socially constructed characteristics of women and men, such as norms, roles and relationships of (and between) groups of women and men. These vary from society to society and can be changed (WHO 2015).

The WHO recognizes gender as a key structural driver of inequalities in living conditions and, by extension, inequalities in health (CSDH 2008). 'Gender equity' acknowledges the different needs, preferences and interests of men and women, seeks to eliminate inequalities and discrimination, ensure equal opportunities. Gender equality, on the other hand, is the process of allocating resources, programs and decision making to ensure that both genders have the same opportunities.

The United Nations (UN) recognizes that addressing gender equity is crucial for social change (the third Millennium Development goal explicitly encourages a move towards greater equality of welfare resources, roles and lifestyles between women and men in countries around the world). However, achieving gender equality is still an ongoing process in many areas of the world. The Global Gender Gap Report in 144 countries shows that while there are closing gaps between men and women in health outcomes, persistent and large economic and political gaps remain (World Economic Forum 2017). These gaps in key aspects of life highlight the inequities that continue to exist between men and women. Inequities in access to resources such as

education, income, and political representation are recognized as having large impacts on the health of girls and women, particularly in low income countries (Sen and Östlin 2008). However, there is also some evidence that gender equality initiatives also play a role in the health of men and women in middle and high-income countries (Borrell, Palència et al. 2014).

The Victorian Health Promotion Foundation's interest in gender equality

The Victorian Health Promotion Foundation (VicHealth) aims to build and support a state in which all Victorians can enjoy improved health and wellbeing (VicHealth 2013). The 2016 Action Agenda defines five strategic imperatives through which the health of Victorians can be improved: promoting healthy eating, encouraging regular physical activity, preventing tobacco use, preventing harm from alcohol, and improving mental wellbeing. Furthermore, recognizing the need to act on the underlying determinants of health and equity, VicHealth has identified three key themes for action that will focus efforts to improve health and health equity in Victoria: gender, youth and community.

Within these themes, gender equality is seen as a critical determinant of health and wellbeing. VicHealth has commissioned this evidence review to examine the evidence and nature of associations between gender equality and population health. It is anticipated that the results of this review will inform policy and program development in this area.

The key research question that the review addressed was: Is gender equality, as measured by gender equality indicators, associated with better population health outcomes? Another important aspect of the study is its ability to inform practices, policies and interventions to address gender inequality. Hence, we also seek to examine the extent to which, policy interventions have been associated with improved population health outcomes.

Theoretical frameworks

There are a plethora of theories that could be used to explain the links between gender equality and health. The aim of this section is to provide an overview of those theories cited in the studies included in our systematic review. Because of this, the theories discussed below should in no means be considered as an exhaustive list of relevant materials. Rather, we include these theories in order to provide some context for the specific findings of the review. The foundation for many of these theories stem from a range of disciplines including gender studies, psychology, sociology, public health and economics. At a fundamental level, the theories recognise gender and gender equality as key social determinant of health.

The convergence hypothesis

This perspective argues that increasing levels of gender equality will result in a convergence of health outcomes by gender because of a convergence of welfare resources, roles and stress, and health behaviours between women and men (Backhans, Lundberg et al. 2007).

Role expansion and stress

Role expansion refers to the shift in women's role from being within the home domain to also encompass the public sphere. Female social roles are thus expanded. The role expansion hypothesis suggests that individuals with several life roles have health advantages compared to those with fewer roles (Thoits 1983). Somewhat

related to this, the 'multiple attachment hypothesis' posits that multiple roles imply multiple points of community attachment, which are likely to boost emotional and instrumental supports, and in doing so strengthen women's health (Lahelma, Arber et al. 2002). However, other theorists have argued that an increase in social roles will increase in role pressure, and may result in role conflict and ill-health (Goode 1960). This is discussed under the 'multiple burden hypothesis' below.

Reduction in protection/reduction-inequality/institutional adjustment hypotheses

The reduction-in-protection hypothesis argues that gender equality reduces the female advantage in overall health (e.g., women generally have longer life expectancy and lower rates of mortality than men). This is similar to the convergence hypothesis discussed above. In contrast, the reduction-inequality hypothesis argues that gender equality increases the advantage (e.g., female health is better off than male health), and the institutional adjustment hypothesis argues that gender equality initially reduces (female health becomes more similar to male health) and then increases advantage (female health is better than male health) (Pampel 2001). Essentially, this theory suggests that the relationship between gender equality and health changes over time as a society adjusts to the structural (e.g., policies, etc.) and cultural factors (e.g., norms about gender roles) that may accompany gender equality.

Relative resources hypothesis

The division of household labour has been conceptualised in terms of the relative resources hypothesis. According to this theory, the division of household labour

within a home is based on the power of each partner: this power is determined by possession of social resources, and is typically based on income. The spouse with the least power will typically undertake the more unpleasant tasks, or those with the least prestige (such as cleaning and childcare).

Doing gender hypothesis

Central to the 'doing gender' hypothesis is the fact that gendered expectations direct the ways that individuals construct gender through their daily lives (Velde, Huijts et al. 2013). According to this theory, in counter-normative situations, men and women default to stereotypical behaviors and roles (such as doing housework for women). This compensatory feminine or masculine behavior may be harmful to health. Research suggests that in societies in which males are typically the breadwinner, women who have greater economic power at an individual level are more likely to experience poorer health because they are over-burdened with multiple roles and role conflict (Velde, Huijts et al. 2013).

Multiple burden hypothesis

According to the multiple burden hypothesis, role conflict arises when there are competing obligations and demands stemming from multiple roles. Women in paid employment, with dependent children are likely to experience role conflict, with the resultant stress contributing to poorer health outcomes (Goode 1960, Lahelma, Arber et al. 2002).

Methodology

We conducted the search according to the PRISMA approach to systematic reviews (Liberati, Altman et al. 2009). Two reviewers screened articles independently.

Two search strategies were adopted for this systematic review of the literature: 1) computer search of databases, 2) review of reference lists of all articles retrieved. The systematic review utilised several databases – specifically PubMed, Global Health, PsycInfo, and Scopus. The search was performed in March 2017 with no restrictions placed on publication date, language or publication type. A list of the key words can be seen in Table A1 of the Appendix.

The key inclusion criterion was that the study must provide a measure of gender equity/inequity/equality/inequality as an exposure and a measure of health as an outcome. We were primarily interested in structural indicators of gender equality – as measured in developed indicators of the phenomena- rather than other possible dimensions and influences on gender equality such as norms and values. While we acknowledge that norms, values and attitudes are also important aspects of gender equality, they did not arise as measures of gender equality in this review.

Another inclusion criterion was that the study was conducted in high income countries, as these settings were deemed as most relevant to the Victoria context. Studies were excluded if they were of qualitative design, or were theoretical or

descriptive publications. Studies that had been conducted in low income or developing countries were excluded.

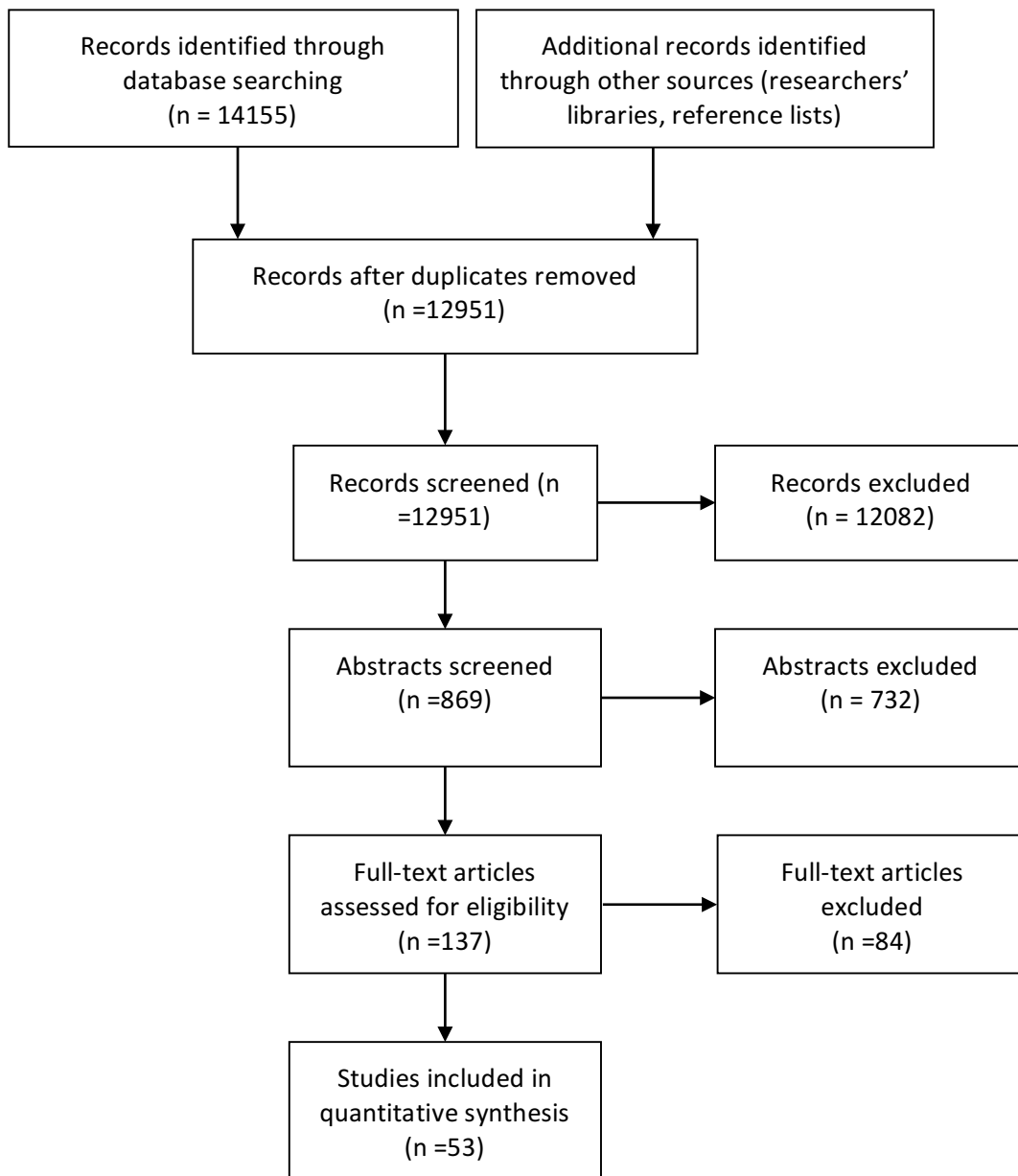
We were particularly interested in measures of gender equality that referenced both males and females, rather than measures that referred to females only. For this reason, studies that examined female only indicators (without other indicators being included) such as maternity leave or reproductive rights were excluded. We also preferred measures of gender equality that covered multiple dimensions, such as equality in the labour market, political sphere, and family domain rather than those that covered a single dimension.

Results

Summary of review process

Figure 1 describes the process of the review, including how the eventual number of studies was arrived at. In each of the listed databases, abstracts, titles and keywords were searched, and search terms included are detailed in Table 1 of the Appendix. Using these search terms, 14155 publications were included. After the removal of 1180 duplicates, two reviewers reviewed the titles of these publications, and excluded 12082 for failure to meet the following inclusion criteria: 1) must contain “gender equity/inequity/equality/inequality” in title; 2) must contain a measure of health in title. The full-text articles of the remaining publications were then extracted and examined by two reviewers. Studies were retained if they met all of the following criteria (as per the above): 1) provided a measures of gender equality that looked at the ratio or proportion of various social, economic, or political measures in males versus females; 2) examined gender equity/equality in relation to a health outcome; 3) were of quantitative design; 4) relevant to a Western context.

Figure 1: Flow diagram of study selection



Systematic review summary

A total of 53 publications were included in the systematic review. Table 1 provides some methodological and geographic characteristics of the studies. A more detailed description of the studies can be seen in Table 2 at the end of this report.

Table 1: Characteristics of studies included

Variable/Characteristic	No. of studies
<i>Geographic location</i>	
International	18
European countries	6
Sweden	15
USA	10
United Kingdom	1
Spain	3
<i>Gender Equality Indicator (exceeds 53 due to multiple measures)</i>	
Gender Inequality Indicator (GII)	12
Gender Empowerment measure (GEM)	6
Gender Development Index (GDI)	2
Gender Gap Index	4
Gender wage gap/Income inequality	3
Gender based economic discrimination	1
Parental leave	2
Organisational gender gap index	2
Women's status indicator (US state based measure)	7
Composite area level measure of (some, not necessarily all of following): political participation, employment, legal, reproductive rights	6
Gender equality within the home/compared to partner	11
<i>Health outcome(exceeds 53 due to multiple measures)</i>	
Mental health/Depression/Psychological distress	11
Alcohol	6
Smoking	2
Suicide/suicide ratio	3
Infant mortality/ Prenatal mortality/ Under-five mortality	1
Physical activity/inactivity	3
Human height	1
Self-rated health	8
Assault/Intimate partner violence/ adolescent dating violence	7
Sickness absences	4
Obesity/BMI	2
Healthy life years	1
CVD/CHD events or mortality	2
Contraception/child bearing intentions	3
Mortality/NCD mortality	1
Cancer	1
Life expectancy	4
<i>Population</i>	
Elderly 65 years+	1
Adults	43
Women	6
Child/infant	1
Single Mothers	1
Adolescents	1

We grouped studies into four main groups based on the measure of gender equality

(Table 2):

- work and employment related gender equality (group one);
- gender equality measured within the family domain (group two)
- gender equality in politics, the economy, and social services within countries (group three);
- gender equality in politics, the economy, and social services between countries (group four).

How was gender inequality measured?

Gender equality was measured in a range of ways across different study designs.

In the first group (work and employment related gender equality), a number of studies developed overall indicators of gender equality (Sörlin, Lindholm et al. 2011, Sörlin, Hman et al. 2012, Elwér, Harryson et al. 2013). For example, Elwér, Harryson et al. (2013) developed a five item scale of gender equality in a workplace, representing the ratio of male/female number of employees, salary (ratio of males/females), educational level of employees (ratio of males/females), and presence of parental leave (ratio of males/females) and temporary parental leave (ratio of males/females). Other studies examined the pay gap between men and women (Aizer 2010), while others examined parental leave, as defined as the length of time a male took in relation to a female (Norström, Lindberg et al. 2012, Johansson, Wennberg et al. 2014).

In the second group of studies (gender equality measured within the family domain), indices of gender equality reflected the extent to which males and females shared parental and breadwinner roles (Chandola, Kuper et al. 2004, Månsdotter, Lindholm et al. 2006, Backhans, Burström et al. 2009, Sörlin, Lindholm et al. 2011, Hammarström and Phillips 2012, Harryson, Novo et al. 2012, Månsdotter, Lundberg et al. 2012, Månsdotter, Nordenmark et al. 2012, Neyer, Lappegård et al. 2013, Eek and Axmon 2015). For example, Månsdotter, Lundberg et al. (2012) quantified the extent to which parents had equal responsibilities (both parents had between 40%

and 60% of income and caring roles), had “traditional” unequal roles (father had >60% of income and women had >60% caring roles), and “untraditional” unequal roles (mother’s had <40% caring and fathers <40% of income).

In the third group (within country measures), gender equality indices reflected politics, social/economic autonomy, and reproductive rights (Yllö 1983, Yllö 1984, Kawachi, Kennedy et al. 1999, Jun, Subramanian et al. 2003, Chen, Subramanian et al. 2005, Backhans, Lundberg et al. 2007, McLaughlin, Xuan et al. 2011, Roberts 2012, Wängnerud and Sundell 2012). For example, Backhans, Lundberg et al. (2007) used three dimensions and nine indicators of gender equality: political participation (proportion of women versus men in municipal councils and municipal executive committees); division of labour (temporary parental leave, proportion of part time workers in women and men); public sphere (proportion of men versus women of all people employed in female versus male dominated occupations; proportion of women versus men in managerial positions); and economic resources (average income and relative poverty in females and males).

The fourth group of studies looked at the effect of gender equality between countries and measured this through combined indicators comprising of measures such as the proportion of females achieving higher levels of education, the ratio of females to males in parliament, and measures of female participation in the labour force relative to men (Pampel 2001, Bentley and Kavanagh 2008, Tesch-Romer, Motel-Klingebiel et al. 2008, Clark and Peck 2012, Ricketts 2014, Chon 2016).

The remaining country level studies used the Gender Inequality Index (GII), Gender empowerment measure (GEM), the Gender Development Index (GDI) or the Global Gender Index (GGI). The Gender Inequality Index (GII) is an inequality index that was introduced in 2010 in the Human Development Report of produced by the United Nations Development programme (United Nations Development Programme 2010). The GII measures gender inequalities across three components of human development: reproductive health, empowerment and economic status. The GII superseded others, including the Gender empowerment measure (GEM) and the Gender Development (GDI).

Three indicators are used to produce GEM: proportion of seats held by women in national parliaments, percentage of women in economic decision making positions; income share (i.e. incomes of males vs. females). The Gender Development Index (GDI) emerged at the same time as GEM, and serves as the gender sensitive complement of the Human Development Index (HDI). While the HDI measures life expectancy, education (adult literacy, enrolment), and incomes, the GDI measures gender gaps in these dimensions. As such, the GDI cannot be used independently of the HDI.

Last, the World Economic Forum introduced the Global Gender Index in 2006 as a means of measuring and tracking gender disparities across a range of dimensions. The GGI comprises of 14 measures across 4 major subindexes or domains: economic participation and opportunity, education attainment, health and survival, political empowerment (World Economic Forum 2014).

What effect does gender equality have on health?

The following section provides a review of studies examining the relationship between gender equality and health. Because of the large number and diverse range of studies covered, we discuss these under the following headings:

- work and employment related gender equality (group one);
- gender equality measured within the family domain (group two)
- gender equality in politics, the economy, and social services within countries (group three);
- gender equality in politics, the economy, and social services between countries (group four).

Workplace inequality and leave entitlements

	Males Health	Females health
Gender equality higher (how many studies= 7)	<input type="checkbox"/> psychological distress <input checked="" type="checkbox"/> physical activity <input checked="" type="checkbox"/> lower sickness absence <input type="checkbox"/> depression and anxiety <input type="checkbox"/> sickness absence <input type="checkbox"/> self-rated health <input type="checkbox"/> outpatient services for mental health and drug register	<input checked="" type="checkbox"/> violence against women <input checked="" type="checkbox"/> psychological distress <input checked="" type="checkbox"/> depression and anxiety <input type="checkbox"/> physical activity <input checked="" type="checkbox"/> lower sickness absence <input type="checkbox"/> outpatient services for mental health and drug register <input checked="" type="checkbox"/> self-rated health

Notes: ✓ beneficial effects of gender equality ✗ detrimental effects of gender equality no effects of gender equality. Number of outcomes above might not sum to the total number of studies as studies might have examined the same outcome.

Reducing the wage gap was associated with lower depressive symptoms and a reduction in violence against women in two studies (Aizer 2010, Platt, Prins et al.

2016). A particularly interesting study by Platt, Prins et al. (2016) used a sample of men and women that were matched on education, occupation, age, and other factors related to wages. Among matched pairs of male and females where women reported greater income than the male, there was no significant difference in depression, and a substantially reduced disparity in anxiety. When female income was less than the matched male counterpart, odds of both depression and anxiety was significantly higher among women versus men. Aizer's (2010) study found that a reduction in the income gap was associated with a reduction in domestic violence across the USA.

There were three studies conducted at the workplace level (Sorlin, Ohman et al. 2011, Sörlin, Hman et al. 2012, Elwér, Harryson et al. 2013). Elwér, Harryson et al. (2013) found that, for women, the highest odds of psychological distress were found in traditionally gender unequal workplaces. The lowest overall occurrence of psychological distress was found on the most gender equal workplaces. Another study by Sörlin, Hman et al. (2012) found that women in companies with "completely equal" or "quite equal" scores on the Organizational Gender Gap Index had higher odds of reporting "good health" compared to women who perceived their company as "not equal". Although not statistically significant, the same trends were observed in men. However, Sorlin, Ohman et al. (2011) also found higher rates of sickness absence at gender equal companies.

There were also studies that examined workplace allowances such as parental leave as a form of gender equality (Norström, Lindberg et al. 2012, Johansson, Wennberg

et al. 2014). For example, a study by Johansson, Wennberg et al. (2014) studied the relationship between parental leave and physical activity, finding that longer parental leave was related to greater physical activity in fathers. There was no effect on parental leave for women.

Summary:

As a whole, this group of studies suggest that greater gender equality in the workplace was associated with better health. Although, it should be noted that a number of studies were not conclusive: this likely to be due to a number of methodological factors (e.g., lack of statistical power).

Within countries analysis – gender equality measured within the family

domain

	Males Health	Females health
Gender equality higher (how many studies= 9)	<ul style="list-style-type: none"> ✓ childbearing intentions ✓ Alcohol related inpatient care or mortality ☐ mortality ✗ anxiety symptoms ✓ sick leave ☐ CHD ✓ SRH ✓ lower psychological distress 	<ul style="list-style-type: none"> ✓ childbearing intentions ✗ Alcohol related inpatient care or mortality ✗ mortality ✗ sick leave ✓ CHD ✗ anxiety symptoms ☐ SRH ✓ stress, fatigue, physical symptoms ✓ lower depressive symptoms and psychological distress

Notes: ✓ beneficial effects of gender equality ✗ detrimental effects of gender equality ☐ no effects of gender equality. Number of outcomes above might not sum to the total number of studies as studies might have examined the same outcome. SRH= self-rated health; CHD= coronary heart disease.

Among this group, there were nine studies that examined gender equality within the family domain (Chandola, Kuper et al. 2004, Månsdotter, Lindholm et al. 2006, Backhans, Burström et al. 2009, Sörlin, Lindholm et al. 2011, Harryson, Novo et al. 2012, Månsdotter, Lundberg et al. 2012, Månsdotter, Nordenmark et al. 2012, Neyer, Lappegård et al. 2013, Eek and Axmon 2015).

There were a number of studies that suggested that gender equality within the family domain was associated with poorer health outcomes (Månsdotter, Lindholm et al. 2006, Backhans, Burström et al. 2009, Månsdotter, Lundberg et al. 2012,

Neyer, Lappegård et al. 2013). These studies classified gender equality by the extent to which males and females in coupled relationships participated in home and paid work. In greater detail, women in traditional roles (where women occupied most of the time in the home sphere, while their male partners spent a greater amount of time at work) appeared to have lower risk of alcohol related inpatient care or mortality (Månsdotter, Lundberg et al. 2012), overall mortality and sickness absence (Månsdotter, Lindholm et al. 2006), and lower sick leave (Backhans, Burström et al. 2009).

In contrast, other studies that specifically examined gender equality within the home find that equal relationships were associated with lower coronary heart disease (Chandola, Kuper et al. 2004), depressive symptoms (Hammarström and Phillips 2012, Harryson, Novo et al. 2012), perceived stress, fatigue, physical/psychosomatic symptoms, and work family conflict (Eek and Axmon 2015). This suggests that a more equal division of tasks in the home results in a range of positive outcome. One paper suggests that gender equality (e.g., gender balanced division of household work) was associated with higher childbearing intentions (Neyer, Lappegård et al. 2013), while one other found it was associated with better self-rated health (Sörlin, Lindholm et al. 2011).

Other studies examined a persons reported change in gender ideology (e.g., personally held thoughts) over time in relation to their parents gender orientation (Månsdotter, Nordenmark et al. 2012). Results suggest that for women and men, non-traditional gender ideology (e.g., believing that women could be the

breadwinner in a relationship) in adulthood was associated with decreased risk of anxiety symptoms. Further, those people who, at age 42, had departed from their traditional attitudes towards masculine (for men) and feminine (for women) roles (reported at age 30) reported no significant declines in mental health (Månsdotter, Nordenmark et al. 2012). Last, a parents' gendered life was not decisive for a person's own gendered life, and adulthood gender position ruled out the impact of childhood gender experience on self-reported mental ill-health (Månsdotter, Nordenmark et al. 2012).

Summary:

It appears that greater equality in household tasks is related to better health. However, it is important to take the dynamics of a person's relationship into account. Women who could be seen as the main income earners may also be taking on a substantial load of housework and childcare. Thus, poorer health among these women may reflect a lack of true equality in the division of household tasks, resulting in greater stress and poorer health.

Within countries - gender equality in politics, the economy, social services, and reproductive rights

	Males Health	Females health
Gender equality higher (how many studies= 7)	<ul style="list-style-type: none"> ✓ physical activity ✓ lower alcohol use ✗ sickness absence 	<ul style="list-style-type: none"> ✓ ✗ lower violence against women ✓ ✗ self-rated health ✓ post-traumatic stress disorder and depression ✓ lower alcohol use ✓ lower disability ✗ sickness absence ✓ lower mortality rates and physical limitations

Notes: ✓ beneficial effects of gender equality ✗ detrimental effects of gender equality □ no effects of gender equality. Number of outcomes above might not sum to the total number of studies as studies might have examined the same outcome.

There were seven studies that conducted within-country area investigations of the association between gender equality, measured in multiple domains, and health outcomes (Yllö 1983, Yllö 1984, Kawachi, Kennedy et al. 1999, Jun, Subramanian et al. 2003, Chen, Subramanian et al. 2005, Backhans, Lundberg et al. 2007, McLaughlin, Xuan et al. 2011, Roberts 2012, Wängnerud and Sundell 2012, Sanz-Barbero, Vives-Cases et al. 2015). The majority of studies at this level found that gender equality (measured as political participation, reproductive rights, socio-economic status) was associated with positive health outcomes, including lower reported intimate partner violence (Sanz-Barbero, Vives-Cases et al. 2015), self-rated poor health (Wängnerud and Sundell 2012), mood and anxiety disorders (Chen, Subramanian et al. 2005, McLaughlin, Xuan et al. 2011), alcohol consumption

(Roberts 2012), and female mortality rates (Kawachi, Kennedy et al. 1999). There was one study (Backhans, Lundberg et al. 2007) that found that higher gender equality was associated with higher levels of sickness absence and lower life expectancy. Two older studies (conducted in the early 1980s) examined state level equality in relation to intimate partner violence. High gender equality was negatively correlated with violence against women (Yllö 1983), but further research suggested that this was a complex relationship. Most particularly the research suggested that discordance or inconsistency between individual equality (balance of power within the relationship) and state level equality was predictive of greater levels of intimate partner violence (Yllö 1984).

Summary:

As a whole, the evidence from this group of studies suggests that gender equality was associated with better health outcomes.

Between countries, fertility rates, educational status of women, labour force status

Males Health	Females health
<p>Gender equality higher (how many studies= 8)</p>	<p>X life expectancy (compared to men) X mortality (compared to men) X suicide (compared to men) <input type="checkbox"/> female homicide <input checked="" type="checkbox"/> contraceptive use <input checked="" type="checkbox"/> SRH (compared to men) – cultural acceptance of gender equality critical.</p>

Notes: ✓ beneficial effects of gender equality ✗ detrimental effects of gender equality □ no effects of gender equality. Number of outcomes above might not sum to the total number of studies as studies might have examined the same outcome.

There were a number of cross-country studies that used multiple indicators of gender equality (fertility rates, ratio of females to males in the labour force, women in parliament, policies regarding families) and health outcomes (Pampel 2001, Bentley and Kavanagh 2008, Tesch-Romer, Motel-Klingebiel et al. 2008, Clark and Peck 2012, Ricketts 2014, Chon 2016). These generally produced mixed findings. Clark and Peck (2012) studied the relationship between various gender equality measures and life expectancy between 1985 and 2005. They find that the life expectancy in females decreases (while male life expectancy increases) as females begin to participate in “traditional male institutions”, such as formal schooling and paid employment, and begin to shift away from traditional female roles, as indicated by a decline in fertility. Another study by Chon (2016) seeks to examine the “backlash” hypothesis, which suggests that female homicide will increase as they question the gender order. In fact, the authors find no evidence of a significant increase in homicide in gender equality.

Summary:

The mixed findings in this group of studies are likely to reflect methodological differences. Compared to those mentioned earlier, a focus of these studies was the progress of gender equality over time. It should also be mentioned that the methodological quality of these studies was low.

Gender Inequality Index

	Males Health	Females health
Gender equality higher (how many studies= 10)	<ul style="list-style-type: none"> ✓ leisure time physical activity ✓ smoking ✓ infant mortality rates <input type="checkbox"/> SRH 	<ul style="list-style-type: none"> ✓ leisure time physical activity X smoking ✓ infant mortality rates <input type="checkbox"/> SRH ✓ reproductive health X ✓ lower violence X ✓ life expectancy ✓ obesity ✓ height ✓ smoking; alcohol consumption; life expectancy, cancer, BMI, blood pressure

Notes: ✓ beneficial effects of gender equality X detrimental effects of gender equality no effects of gender equality BMI=body mass index SRH=self-rated health

The GII was used by twelve studies (Bond, Roberts et al. 2010, Wells, Marphatia et al. 2012, Dahlin and Harkonen 2013, Hassanzadeh, Moradi et al. 2014, Kim and Kim 2014, Mark 2014, Brinda, Rajkumar et al. 2015, Gressard, Swahn et al. 2015, Balish, Deaner et al. 2016, Bilal, Beltran et al. 2016, Dereuddre, Van de Velde et al. 2016, Redding, Ruiz-Cantero et al. 2016) in relation to a range of health outcomes including obesity, leisure time physical activity, life expectancy and self-rated health.

Of relevance to VicHealth, gender equality was also found to have beneficial associations with obesity: higher levels of gender equality were associated with reduced female excess of obesity in a study comparing the prevalence of obesity in 68 countries (Wells, Marphatia et al. 2012). Also of relevance to VicHealth, a Spanish study examined the relationship between the gender smoking ratio (GSR) and

gender equality in Spain, as measured using the GII, over 50 years (Bilal, Beltran et al. 2016). A strong negative correlation was observed between gender inequality and the GSR over the 50 year study period: as gender equality increased, the female to male smoking ratio increased. The social patterning and chronology of adoption of cigarette smoking was apparent, with men and the highly educated the early adopters, and women and those of lower educational attainment later adopters, and later to cease smoking. The authors observed that sweeping social, economic and political changes had transformed the cultural and social climate of Spain in the last half century. They suggested that the tobacco industry had co-opted the message of liberation and emancipation that accompanied such social changes, and presented cigarette smoking as symbolic of gender equality and emancipation (Bilal, Beltran et al. 2016). Hassanzedeh and colleagues (2014) studied 123 countries and found negative association between gender inequality and: smoking; alcohol consumption; life expectancy, cancer, BMI, and blood pressure.

Summary:

As a whole, these studies suggest that gender equality measured at the country level was associated with an improvement in a range of health outcomes, including physical activity, but was also associated with an increase in other behaviours such as smoking and alcohol consumption.

Gender Empowerment Measure

	Males Health	Females health
Gender equality higher (how many studies= 10)	<input checked="" type="checkbox"/> lower depression <input checked="" type="checkbox"/> suicide <input type="checkbox"/> alcohol	<input checked="" type="checkbox"/> lower depression <input checked="" type="checkbox"/> hazardous drinking <input checked="" type="checkbox"/> suicide <input type="checkbox"/> alcohol

Notes: beneficial effects of gender equality detrimental effects of gender equality no effects of gender equality

The Gender Empowerment measure was used as a measure of gender equality in six studies (Mayer 2000, Shah 2008, Tesch-Romer, Motel-Klingebiel et al. 2008, Bond, Roberts et al. 2010, Velde, Huijts et al. 2013, Bosque-Prous, Espelt et al. 2015) that arose in the literature review.

In a study across 25 European countries, gender equality was positively associated with lower levels of depression among men and women, leading the authors to conclude that, in terms of depression, both genders benefit from higher levels of gender equality (Velde, Huijts et al. 2013). However, another study across 16 countries (also in Europe) found that greater gender equality was associated with reduced gender differences in hazardous drinking (i.e., there was a higher consumption of alcohol among women in countries of higher gender equality) (Bosque-Prous, Espelt et al. 2015). The fact that the association between hazardous drinking and GEM was stronger in women than men led the authors to suggest that improved social conditions for women may lead them to adopt risky behaviours that have typically been associated with males (Bosque-Prous, Espelt et al. 2015).

Summary:

There were mixed findings among the small number of studies using this measure.

Global Gender index

	Males Health	Females health
Gender equality higher (how many studies= 10)	<input checked="" type="checkbox"/> LPTI	<input type="checkbox"/> self-reported health <input type="checkbox"/> internal or external alcohol related problems <input checked="" type="checkbox"/> LPTI

Notes: beneficial effects of gender equality detrimental effects of gender equality no effects of gender equality LPTI= leisure time physical inactivity

Four studies examined health outcomes in relation to the GGI (Bond, Roberts et al. 2010, Grittner, Kuntsche et al. 2012, Van Tuyckom, Van de Velde et al. 2012, Witvliet, Arah et al. 2014), with null findings emerging for the study by Witvliet, Arah et al. (2014) and Grittner, Kuntsche et al. (2012). Another study by Van Tuyckom and colleagues (2012) found that greater gender equality was associated with a reduced gender gap in sedentary behaviour. However, these differences disappeared in countries with high gender equality. The study by Bond and colleagues (2010) used multiple measures of gender equality and is discussed elsewhere.

Summary:

There were mixed findings among the small number of studies using this measure.

Gender Development index (GDI)

	Males Health	Females health
Gender equality higher (how many studies= 10)	✓ depression	✓ depression

Notes: ✓ beneficial effects of gender equality ✗ detrimental effects of gender equality □ no effects of gender equality

Hopcroft and Bradley (2007) found that rates of depression were higher in countries with low gender equality, however the gender gap in depression was larger in countries with high gender equality. The authors interpreted the results as suggesting that the benefits of living in a country with high gender equality are greater for male mental health than for female mental health.

Summary:

There were beneficial effects of gender equality on health.

Discussion relating to the systematic review

Main findings

The results of this review suggest the effects of gender equality on health varied depending on the outcome studied, sphere of life (e.g., work and home), level and time period that the association was studied. While there were some mixed findings (as discussed below), we would argue that the evidence generally suggests that gender equality was good for the health of males and females.

Gender equality in the workplace was generally related to better mental health and overall self-rated health, particularly for women. In this context, gender equality referred to reducing gender-based discrimination in the workplace, ensuring an equal representation of males and females at work, and providing equal access to pay and parental leave. Results from area level studies (examining gender equality within a country in different states or regions) also suggested that gender equality was good for health. In these studies, gender equality was measured in a variety of ways, including political participation, labour force participation, and reproductive rights. Similarly, between country studies (examining a countries overall level of gender equality) suggested that gender equality was good for health. However, a number of these studies also highlighted the likelihood of a convergence in life expectancy for women and men.

Another group of studies examined gender equality within the home. These suggested that women and men who take on untraditional roles (e.g., women who

are the main breadwinner, men who are the main carers) had worse health than those who take on traditional roles. Women in particular had higher levels of alcohol use and worse mental health. However, there was also some evidence that the context in which men and women lived and work mattered. Backhans et al (2009) study of “pioneers” and “laggards” examined the extent to which people’s roles at home and at work mirrored the norms of what was occurring in their municipality. Findings suggested that fathers who had an equal relationship had better health when they were in congruence with the overall level of gender equality. For women, being a “pioneer” (being in a couple that was more equal than your municipality) conferred the worst health benefits, but results were similar for all “equal” groups. Being “equal” in the public sphere was thus generally bad for health regardless of the level of gender equality in a person’s municipality.

To some extent, these findings may reflect the potentially damaging effects of altering the gender status quo within the personal realm of the family, e.g., the ‘doing gender’ hypothesis (Velde, Huijts et al. 2013). At the same time, this could reflect the effect of women’s ‘double burden’ of paid and unpaid work, where women have to contend with competing obligations and demands stemming from multiple roles, and suffer poorer health because of this (Goode, 1960).

Area-level studies conducted within countries (i.e., where the unit of study was municipalities or states) generally found that gender equality was associated with better self-rated health, mental health, and lower mortality, alcohol use and disability. By and large, these studies were conducted in Sweden (which is one of the

most gender equal countries in the world) or the United States of America. These studies highlighted the importance of wider structural reform to women's rights in political and economic realms, and the power that this has to flow through to improve the overall health of a population.

At a country level, studies suggested that gender equality had a mixed effect on health. There was evidence that male and female health outcomes converged over time (Clark and Peck 2012). This lends some support to the convergence or the reduction-in-protection hypothesis, which suggests that that increasing levels of gender equality may result in a convergence of health outcomes by gender, chiefly because of a convergence of welfare resources, roles and stress, and health behaviours between women and men (Backhans, Lundberg et al. 2007).

Limitations

There are several limitations of this review and the studies we included within it. Firstly, many of the health outcome measures we studied were obtained from self-reported measures, which are likely to be subject to reporting bias, particularly if reporting on sensitive behaviour such as mental health. Further, many of the items (both outcome and exposure) were derived from single-item measures that are unlikely to capture more nuanced elements of behaviour. It was noted that in the case of division of household duties, for instance, a single item may fail to account for broader division of household responsibilities (Eek and Axmon 2015). In many studies, there was limited or no control for confounding variables, which may have

biased estimates and in some studies there was insufficient data on some components of gender inequality measures, and the means of handling this was sometimes inadequate. Another limitation was the fact that many of the studies reported here were cross-sectional and ecological. There are several limitations associated with such designs. As with all cross-sectional studies, it is not possible to make causal inference, and indeed in some cases reverse causation cannot be ruled out. It is not implausible, for example that clustering of unhealthy women leads to reduced labour force participation in some areas.

The ecological nature of many of the publications reviewed here raises the issue of the ecological fallacy. The ecological fallacy can occur when inferences are made at the individual level based on data aggregated at a group level (Diez Roux 2002, Macintyre and Ellaway 2003). The associations between two variables measured at the group level, may differ from associations between two equivalent variables at an individual level: the ecological fallacy arises when the associations are assumed to be the same. For example, it may be that at a country level, increased gender equality is associated with better population health. To assume that at an individual level, high gender equality is associated with good health is to commit the ecological fallacy.

It is also likely that there is some lag between exposure to gender inequality and health outcomes. While it is possible that within a country or state context, gender equality at different time points is likely to be highly correlated, the fact that many studies measured gender equality and the health outcome at the same time needs

to be noted as a limitation. It is also worth noting that different outcomes may be more sensitive to shifts in the social context than others, so more careful consideration of temporality is needed.

While not necessarily a limitation, it is worth noting that several studies included in this review were conducted in Europe, roughly around the time of the 2008 economic recession, when there were significant shifts in labour force participation, as well as economic austerity measures (with likely changes in gender equality policies), which are likely to have altered the social milieu, and attitudes to gender equality, in many countries.

Another important limitation is the fact that many studies focused on female health outcomes only, and therefore neglected to assess the impact of gender equality on male health. This methodological limitation has effects that flow through to policy. For example, a criticism that has been made of “gender mainstreaming” is that commentary and investigation often conflates “gender” with “women”, and that gender mainstreaming neglects a focus on men (Saunders and Peerson 2013). It is also worth considering that gender mainstreaming does not necessarily translate to better health outcomes for women either.

Relevance of the review to policy and practice

As we have discussed above, the review suggests that gender equality may have important flow through effects to health. The following section seeks to provide recommendations on: a) how policy and practice regarding gender equality may benefit health; b), how to assess evidence by which policy and practice regarding gender equality, may impact health.

First and foremost, we have to acknowledge that while a number of policies have been implemented at various levels with the aim of addressing the effects of gender inequality on health, there are few studies that have evaluated the success of these policies (Backhans, Burström et al. 2012, Borrell, Palència et al. 2014).

Further, key researchers in the area argue that it is critical to assess the overall policy climate of gender equality at a country level, rather than looking at policies individually (Muntaner, Borrell et al. 2010). This is because assessment of individual policies fails to take into account how different social, economic and welfare policies intersect with one another. Hence, in this section, we will discuss overall policy regimes and approaches to gender equality at a country level, rather than specifically examining individual policies.

How have policy models of gender equality been described?

One group of researchers have conducted a number of reviews of gender policies in relation to country regime type (Palència, De Moortel et al. 2017). These researches

used a classification developed by Korpi, who grouped European countries according to the characteristics of their labour force participation policies (Korpi 2010).

- *Dual-earner/dual-carer* regimes are typified by Nordic countries, which have policies to support women and men's employment and caring responsibilities.
- *Traditional* countries are characterised by policies that support the traditional family model (women as caregivers and men as breadwinners), and include most continental and north western European countries.
- *Market-oriented countries* are those characterised by little or no policy support for households, and are mostly Anglo-Saxon countries.

Others have expanded the list to include:

- *Traditional southern* countries: characterised by southern European countries with lower female labour force participation and a lack of policy support to families, leading to reliance on unpaid work, and;
- *Contradictory* countries are mainly former socialist countries where there is both support for dual-earner families, mingled with attempts to retain gendered division of domestic labour.

Another study classified countries into policy regime types/clusters based on Sainsbury's typology(Sainsbury 1999). These are:

- *Male breadwinner* regimes are typified by an ideology of male ascendancy, largely based on a division of labour that is highly gendered. There is typically favouring of the sole breadwinner through allowances and tax credits.

- *Earned-carer* regimes are characterised by an ideology that supports equal rights between men and women, and shared roles and responsibilities (Sainsbury 1999), through generous parental leave, high social service, separate taxation and high pension universality.

Backhans et al., expanded this typology, and created two further classifications:

- *Universal citizen* which are characterised by reasonably generous and inclusive means-tested benefits, separate taxation and high pension universality (Backhans, Burström et al. 2012).
- The *compensatory breadwinner* is typified by separate taxation, and compensatory measures in the pension systems (Backhans, Burström et al. 2012).

Which policy model will produce the best effects for health?

From the evidence we review above, it is clear that the impact of gender equality on health is complex and will change over time and the location. However, on the basis of the evidence above we suggest that policies that support the dual-earner/ dual-carer model are likely to result in better health outcomes (specifically, mental health and self-rated health). Supporting this conclusion, an evaluation of different policy regimes in relation to health outcomes revealed that policies that supported female labour force participation and reduced care burdens were associated with reduced gender gaps in terms of health (Palència, De Moortel et al. 2017). This was enacted through increased public services such as childcare, provision of economic support

for families, as well as entitlements for fathers (such as paternity leave) (Palència, De Moortel et al. 2017). This also aligns with a review of the topic by Borrell, Palència et al. (2014), who conducted a comprehensive review of policies and their associations with gender equality. These researchers also concluded that the “dual-earner policy model” of Scandinavian welfare states involves policies to support women’s participation in the workforce, and policies to encourage more equitable sharing of responsibilities for unpaid work, are associated with better health for women (Borrell, Palència et al. 2014).

Considerations for Victoria and conclusion

As we argue above, strategies to support the dual earner/dual carer model may have a number of population level health benefits. Thus, policies that support gender equality through:

- Promotion of the equal caring role of males and females through parental leave, and flexible working arrangements;
- Encouraging labour force participation of women (e.g. females engagement in the labour force including in positions of power in government and business), and;
- High quality universal health and social services, including affordable childcare;

are recommended as likely to have the best population health outcomes.

The 2015 Victorian Gender Equality Strategy aligns with our recommendations for policy outlined above. Specifically, this sets out six settings for state-wide action on gender equality, including in education and training, work, and leadership roles (Victorian Government 2015).

In stating our endorsement of this strategy however, we would also offer some caveats. The results of our review suggest that the relationship between gender equality and health is not linear, nor does it guarantee universally better health outcomes. While, overall, we believe the bulk of the evidence is in favour of gender equality, there were a number of circumstances where there may be increases in

poor health behaviours such as smoking or alcohol use. To some extent, these results may reflect the differences in progression of gender equality in different spheres of life and over time. For example, an increase in female parliamentarians does not necessarily mean that traditional gender roles in the home (where females take on the bulk of home and child work) will be immediately altered in favour of more equal responsibilities between males and females. Further, gender equality implemented at a policy level does not necessarily flow to influence cultural norms about how women and men operate in a variety of life arenas. In our review, the studies that measured gender equality in a number of different domains, including in the home, in the workplace, and in politics provide the most complete measure of gender equality. We would suggest that similar measurement approaches are undertaken in Australian research to assess gender equality and its effects on health. On this point, we would argue that action for gender equality needs to occur at multiple levels in society, including at work, in the home, and in the community. Policy alone is not enough. Furthermore, any interventions must acknowledge the broader social context in which they are to be delivered, as well as the ways that the social context can interact with gender equality to sometimes produce paradoxical results.

Changes towards gender equality will take time, however, implementing supportive policy for gender equality is a critical building block from which societal and individual change can occur. As a final recommendation, we would suggest the need for policy orientated research to understand the health impacts of gender equality on the Victorian population over time. It is worthwhile considering that the

experience and meaning of gender equality (and its relationship with health) is likely to vary depending on a range of socio-economic, cultural and geographic factors. Thus, we suggest that there needs to be a range of further studies conducting aimed at assessing gender equality and health across a range of different contexts within Australia.

References

- Aizer, A. (2010). "The Gender Wage Gap and Domestic Violence." Am Econ Rev **100**(4): 1847-1859.
- Backhans, M., B. Burström, A. P. de Leon and S. Marklund (2012). "Is gender policy related to the gender gap in external cause and circulatory disease mortality? A mixed effects model of 22 OECD countries 1973–2008." BMC Public Health **12**(1): 969.
- Backhans, M. C., B. Burström, L. Lindholm and A. Månsdotter (2009). "Pioneers and laggards - Is the effect of gender equality on health dependent on context?" Social Science and Medicine **68**(8): 1388-1395.
- Backhans, M. C., M. Lundberg and A. Mansdotter (2007). "Does increased gender equality lead to a convergence of health outcomes for men and women? A study of Swedish municipalities." Social Science & Medicine **64**(9): 1892-1903.
- Balish, S. M., R. O. Deaner, S. Rathwell, D. Rainham and C. Blanchard (2016). "Gender equality predicts leisure-time physical activity: Benefits for both sexes across 34 countries." Cogent Psychology **3**(1).
- Bentley, R. and A. M. Kavanagh (2008). "Gender equity and women's contraception use." Australian Journal of Social Issues **43**(1): 65-80.
- Bilal, U., P. Beltran, E. Fernandez, A. Navas-Acien, F. Bolumar and M. Franco (2016). "Gender equality and smoking: a theory-driven approach to smoking gender differences in Spain." Tob Control **25**(3): 295-300.
- Bond, J. C., S. C. Roberts, T. K. Greenfield, R. Korcha, Y. Ye and M. B. Nayak (2010). "Gender differences in public and private drinking contexts: a multi-level GENACIS analysis." Int J Environ Res Public Health **7**(5): 2136-2160.
- Borrell, C., L. Palència, C. Muntaner, M. Urquía, D. Malmusi and P. O'Campo (2014). "Influence of macrosocial policies on women's health and gender inequalities in health." Epidemiologic Reviews **36**(1): 31-48.
- Bosque-Prous, M., A. Espelt, C. Borrell, M. Bartroli, A. M. Guitart, J. R. Villalbí and M. T. Brugal (2015). "Gender differences in hazardous drinking among middle-aged in Europe: the role of social context and women's empowerment." European Journal of Public Health **25**(4): 698-705.
- Brinda, E. M., A. P. Rajkumar and U. Enemark (2015). "Association between gender inequality index and child mortality rates: a cross-national study of 138 countries." BMC Public Health **15**(97): (9 February 2015).
- Chandola, T., H. Kuper, A. Singh-Manoux, M. Bartley and M. Marmot (2004). "The effect of control at home on CHD events in the Whitehall II study: Gender differences in psychosocial domestic pathways to social inequalities in CHD." Soc Sci Med **58**(8): 1501-1509.
- Chen, Y. Y., S. V. Subramanian, D. Acevedo-Garcia and I. Kawachi (2005). "Women's status and depressive symptoms: a multilevel analysis." Social Science & Medicine **60**(1): 49-60.
- Chon, D. S. (2016). "A spurious relationship of gender equality with female homicide victimization: A cross-national analysis." Crime & Delinquency **62**(3): 397-419.
- Clark, R. and B. M. Peck (2012). "Examining the Gender Gap in Life Expectancy: A Cross-National Analysis, 1980-2005." Social Science Quarterly **93**(3): 820-837.

CSDH (2008). Closing the gap in a generation: Health equity through action on the social determinants of health. Final report of the commission on social determinants of health. Geneva, World Health Organization.

Dahlin, J. and J. Harkonen (2013). "Cross-national differences in the gender gap in subjective health in Europe: Does country-level gender equality matter?" Social Science & Medicine **98**: 24-28.

Dereuddre, R., S. Van de Velde and P. Bracke (2016). "Gender inequality and the 'East-West' divide in contraception: An analysis at the individual, the couple, and the country level." Social Science & Medicine **161**: 1-12.

Diez Roux, A. V. (2002). "A glossary for multilevel analysis." Journal of Epidemiology and Community Health **56**(8): 588(587).

Eek, F. and A. Axmon (2015). "Gender inequality at home is associated with poorer health for women." Scand J Public Health **43**(2): 176-182.

Elwér, S., L. Harryson, M. Bolin and A. Hammarström (2013). "Patterns of Gender Equality at Workplaces and Psychological Distress." PLoS ONE **8**(1).

Goode, W. J. (1960). "A theory of role strain." American Sociological Review **25**: 483-496.

Gressard, L. A., M. H. Swahn and A. T. Tharp (2015). "A first look at gender inequality as a societal risk factor for dating violence." American Journal of Preventive Medicine **49**(3): 448-457.

Grittner, U., S. Kuntsche, K. Graham and K. Bloomfield (2012). "Social inequalities and gender differences in the experience of alcohol-related problems." Alcohol and Alcoholism **47**(5): 597-605.

Hammarström, A. and S. P. Phillips (2012). "Gender inequity needs to be regarded as a social determinant of depressive symptoms: Results from the Northern Swedish cohort." Scandinavian Journal of Social Medicine **40**(8): 746-752.

Harryson, L., M. Novo and A. Hammarstrom (2012). "Is gender inequality in the domestic sphere associated with psychological distress among women and men? Results from the Northern Swedish Cohort." J Epidemiol Community Health **66**(3): 271-276.

Hassanzadeh, J., N. Moradi, N. Esmailnasab, S. Rezaeian, P. Bagheri and V. Armanmehr (2014). "The correlation between gender inequalities and their health related factors in world countries: a global cross-sectional study." Epidemiology Research International **2014**.

Johansson, K., P. Wennberg and A. Hammarström (2014). "Parental leave and increased physical activity of fathers and mothers-results from the Northern Swedish Cohort." European Journal of Public Health **24**(6): 934-939.

Jun, H.-J., S. Subramanian, S. Gortmaker and I. Kawachi (2003). "A multilevel analysis of women's status and self-rated health in the United States." J Am Med Womens Assoc (1972) **59**(3): 172-180.

Kawachi, I., B. P. Kennedy, V. Gupta and D. Prothrow-Stith (1999). "Women's status and the health of women and men: a view from the States." Soc Sci Med **48**(1): 21-32.

Kim, J. I. and G. Kim (2014). "Labor force participation and secondary education of gender inequality index (GII) associated with healthy life expectancy (HLE) at birth." Int J Equity Health **13**: 106.

Korpi, W. (2010). "Class and gender inequalities in different types of welfare states: The Social Citizenship Indicator Program (SCIP)." International Journal of Social Welfare **19**(SUPPL. 1): S14-S24.

Lahelma, E., S. Arber, K. Kivelä and E. Roos (2002). "Multiple roles and health among British and Finnish women: the influence of socioeconomic circumstances." Social Science & Medicine **54**(5): 727-740.

Liberati, A., D. G. Altman, J. Tetzlaff, C. Mulrow, P. C. Gøtzsche, J. P. A. Ioannidis, M. Clarke, P. J. Devereaux, J. Kleijnen and D. Moher (2009). "The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration." BMJ **339**.

Macintyre, S. and A. Ellaway (2003). Neighbourhoods and Health: An Overview. I. Kawachi and L. F. Berkman. New York, Oxford University Press: 20-42.

Månsdotter, A., L. Lindholm, M. Lundberg, A. Winkvist and A. Öhman (2006). "Parental share in public and domestic spheres: A population study on gender equality, death, and sickness." Journal of Epidemiology and Community Health **60**(7): 616-620.

Månsdotter, A., M. Lundberg and L. Lindholm (2012). "How does gender equality progress link to alcohol care and death? A registry study of the Swedish parental cohort of 1988/1989." Journal of Public Health Policy **33**(1): 105-118.

Månsdotter, A., M. Nordenmark and A. Hammarström (2012). "The importance of childhood and adulthood aspects of gendered life for adult mental ill-health symptoms – a 27-year follow-up of the Northern Swedish Cohort." BMC Public Health **12**(1): 493.

Mark, Q. J. (2014). "Global variance in female population height: the influence of education, income, human development, life expectancy, mortality and gender inequality in 96 nations." Journal of Biosocial Science **46**(1): 107-121.

Mayer, P. (2000). "Development, gender equality, and suicide rates." Psychological Reports **87**(2): 367-372.

McLaughlin, K. A., Z. Xuan, S. V. Subramanian and K. C. Koenen (2011). "State-level women's status and psychiatric disorders among US women." Social Psychiatry and Psychiatric Epidemiology **46**(11): 1161-1171.

Muntaner, C., C. Borrell, A. Espelt, M. Rodríguez-Sanz, M. I. Pasarín, J. Benach and V. Navarro (2010). "Politics or policies vs politics and policies: a comment on Lundberg." International journal of epidemiology **39**(5): 1396-1397.

Neyer, G., T. Lappegård and D. Vignoli (2013). "Gender equality and fertility: which equality matters?" European Journal of Population **29**(3): 245-272.

Norström, L., L. Lindberg and A. Månsdotter (2012). "Could gender equality in parental leave harm off-springs' mental health? a registry study of the Swedish parental/child cohort of 1988/89." International Journal for Equity in Health **11**(1).

Palència, L., D. De Moortel, L. Artazcoz, M. Salvador-Piedrafita, V. Puig-Barrachina, E. Hagqvist, G. Pérez, M. E. Ruiz, S. Trujillo-Alemán, C. Vanroelen, D. Malmusi and C. Borrell (2017). "Gender Policies and Gender Inequalities in Health in Europe: Results of the SOPHIE Project." International Journal of Health Services **47**(1): 61-82.

Pampel, F. C. (2001). "Gender equality and the sex differential in mortality from accidents in high income nations." Population Research and Policy Review **20**(5): 397-421.

Platt, J. M., S. J. Prins, L. M. Bates and K. M. Keyes (2016). "Unequal depression for equal work? How the wage gap explains gendered disparities in mood disorders." Social Science & Medicine **149**: 1-8.

Redding, E. M., M. T. Ruiz-Cantero, J. Fernandez-Saez and M. Guijarro-Garvi (2016). "Gender inequality and violence against women in Spain, 2006-2014: towards a civilized society." Gac Sanit **26**(16): 30192-30193.

Ricketts, C. F. (2014). "Re-Examining the Gender Gap in Life Expectancy: a Cross Country Analysis." International Journal of Humanities and Social Science **4**(10): 38-51.

Roberts, S. C. M. (2012). "Macro-level gender equality and alcohol consumption: a multi-level analysis across U.S. States." Social Science & Medicine **75**(1): 60-68.

Sainsbury, D. (1999). Gender and welfare state regimes, Oxford University Press.

Sanz-Barbero, B., C. Vives-Cases, L. Otero-García, C. Muntaner, J. Torrubiano-Domínguez and P. O'Campo (2015). "Intimate partner violence among women in Spain: the impact of regional-level male unemployment and income inequality." European Journal of Public Health **25**(6): 1105-1111.

Saunders, M. H. and A. Peerson (2013). "Gender equity in health policy: response to Keleher." Aust N Z J Public Health **37**(5): 491-492.

Sen, G. and P. Östlin (2008). "Gender inequity in health: why it exists and how we can change it." Global Public Health **3**(sup1): 1-12.

Shah, A. (2008). "Association of suicide rates for elderly age bands with gender equality." Psychol Rep **102**(3): 887-892.

Sörlin, A., A. Hman, N. Ng and L. Lindholm (2012). "Can the impact of gender equality on health be measured? a cross-sectional study comparing measures based on register data with individual survey-based data." BMC Public Health **12**(1).

Sörlin, A., L. Lindholm, N. Ng and A. Öhman (2011). "Gender equality in couples and self-rated health - A survey study evaluating measurements of gender equality and its impact on health." International Journal for Equity in Health **10**: 37-37.

Sorlin, A., A. Ohman and L. Lindholm (2011). "Sickness absence in gender-equal companies a register study at organizational level." BMC Public Health **11**(548): (11 July 2011).

Tesch-Romer, C., A. Motel-Klingebiel and M. J. Tomasik (2008). "Gender differences in subjective well-being: Comparing societies with respect to gender equality." Social Indicators Research **85**(2): 329-349.

Thoits, P. A. (1983). "Multiple identities and psychological wellbeing." American Sociological Review **48**: 174-187.

United Nations Development Programme (2010). Human Development Report 2010. New York, USA, United Nations.

Van Tuyckom, C., S. Van de Velde and P. Bracke (2012). "Does country-context matter? A cross-national analysis of gender and leisure time physical inactivity in Europe." The European Journal of Public Health: cks009.

Velde, S. v. d., T. Huijts, P. Bracke and C. Bambra (2013). "Macro-level gender equality and depression in men and women in Europe." Sociology of Health and Illness **35**(5): 682-698.

VicHealth (2013). VicHealth Action Agenda. Melbourne, Victorian Health Promotion Foundation.

Victorian Government (2015). "SAFE AND STRONG A VICTORIAN GENDER EQUALITY STRATEGY."

http://www.vic.gov.au/system/user_files/Documents/women/161108_Victorian_Gender_Equality_Strategy_ONLINE.pdf.

Wängnerud, L. and A. Sundell (2012). "Do politics matter? Women in Swedish local elected assemblies 1970–2010 and gender equality in outcomes." European Political Science Review **4**(1): 97-120.

Wells, J. C. K., A. A. Marphatia, T. J. Cole and D. McCoy (2012). "Associations of economic and gender inequality with global obesity prevalence: understanding the female excess." Social Science & Medicine **75**(3): 482-490.

WHO (2015). "Media Centre: Gender. Fact sheet N°403." <http://www.who.int/mediacentre/factsheets/fs403/en/>;

Witvliet, M. I., O. A. Arah, K. Stronks and A. E. Kunst (2014). "A global study on lone mothers: Exploring the associations of self-assessed general health with motherhood types and gender inequality in 32 countries." Women's Health Issues **24**(2): e177-e185.

World Economic Forum (2014). The Global Gender Gap 2014. Switzerland, World Economic Forum.

World Economic Forum (2017). "The Global Gender Gap Report 2016." <http://reports.weforum.org/global-gender-gap-report-2016/>.

Yllö, K. (1983). "Sexual equality and violence against wives in American states." Journal of Comparative Family Studies: 67-86.

Yllö, K. (1984). "The status of women, marital equality, and violence against wives: A contextual analysis." Journal of Family Issues **5**(3): 307-320.

Table 2. Detailed description of the studies included in the review

Author	Population/setting	Participants	Objectives	Study design	Outcome	Exposures: Gender equality indicators	Confounders/covariates	Main results
Work and employment related gender equality								
Aizer, 2010	Population and administrative data: Administrative data on female hospitalisation for assault in California. County level data on wages from Bureau of Economic Analysis annual survey of employers.	Working population of California, n=? 15 million women.	Examine associations between gender wage gap and domestic violence.	Longitudinal using non-linked administrative data (1990-2003)	Female hospitalisation due to assault.	Gender wage gap.	Race Unemployment rate Non-intimate homicides Incarceration number Student population Immigration rate Gender Non assault injuries	Reduction in the wage gap explains 9% of reduction in violence against women.
Elwer et al., 2013	Swedish cohort started from last year of high school (1983), followed up with surveys and linked to health insurance and labour market statistics datasets	Northern Swedish Cohort n=715, Participants were employed males and females	<ul style="list-style-type: none"> To understand the patterns of gender equality and mental health Gender equality is multidimensional 	Linked cohort design (1983 to 2007)	Psychological distress (men and women)	5 item scale representing gender equality in a workplace, representing ratio of male/female: <ul style="list-style-type: none"> Number of employees Salary Educational level Parental leave Temporary parental leave 	Previous psychological distress Socio-economic position Occupational classification Proportion of employees younger than 38 years	Patterns of gender inequality in workplaces were related to women's but not men's psychological distress. In workplaces that were unequal and traditional regarding gender, women's mental health suffers more than men's.
Platt et al., (2016)	US nationally representative survey	22,581 adults (30-65 years)	To understand the relationship between the wage gap and mental health	Cross-sectional survey	Past year and lifetime major depressive and anxiety disorders (men and women)	Individual income between men and women (propensity score matched approach)	Propensity score included: age, age entered the workforce, educational attainment, whether born in the US, occupation, full or part time working, industry, employer type, marital status, number of children at home	When female income was lower than those of a matched male counterpart (adjusting for propensity score), odds of depression and anxiety elevated among women. When female income exceeded or was the same as matched counterpart, the odds of depression and anxiety was non-significant, but still

								elevated.
Johansson et al., 2014	North Swedish Cohort	Parents in the cohort, n=584	To understand relationship between parental leave and physical activity	Linked cohort design (1983 to 2007)	Change in physical activity from age 21 to 42 (decreased, stable, increased) (men and women)	Parental leave in women and men.	SES based on occupation, year of birth of the child	No relationship between length of parental leave and physical activity at age 42 for women. For men, longer parental leave related to greater physical activity.
Norstrom et al., 2012	Population of Sweden	Parents and children (50589 boys and 48524 girls)	To explore gender equality in childcare and mental ill-health among children	Linked administrative dataset (Social Insurance agency dataset, linked to outpatient and drug register) original study	Outpatient services for mental health and drug register (anxiety and depression) (men and women)	Parental leave – categorised into five categories- ranging from traditionally unequal (mother 80% of the leave) to very untraditionally unequal (father 80% of the leave)	Total number of days of leave, year of birth, having another child, born outside Sweden, educational level, institutional care of parents in a mental health facility.	No significant results. Compared to those who shared parental leave equally, higher odds of depression among girls who had traditional parental roles. Males had lower odds of depression and anxiety in all other parental role groups (very traditional, rather traditional, untraditional) compared to parents that had equal parental leave.
Sorlin et al., 2011	Population of Sweden	123 companies, 53,204 working males and females	To understand whether gender equality reduces the number of days of sick leave at the company level	Linked administrative dataset, cross-sectional dataset	Sickness absence (2 to 4 days – “days off sick”; 15 days and over “days on sickness benefit”) (men and women)	Organisational Gender Gap Index (OGGI)-ratio at organisational level: <ul style="list-style-type: none"> • male/female employee ratio • percentage of fulltime employees • educational level • monthly income • days on parental leave • days on temporal leave. 	Age, education, income, full/part time, and sector	Compared to gender unequal companies, there were higher odds of sickness absence among those employed in organisations that were equal. The differences were greater for men rather than women.
Sorlin et al., 2012	Population of Sweden	Two sectors: section 1=11,471 people in 46 companies; sector 2=32,151	To understand the association between gender equality at work and self-rated health.	Linked administrative dataset, cross-sectional dataset	Self-reported health (men and women)	Organisational Gender Gap Index (OGGI)-ratio at organisational level: <ul style="list-style-type: none"> • male/female 	Age, education level, income, employment level, type of company based on the gender equality index	Women in gender equal companies reported significantly better self-rated health than those worked in unequal

		individuals in 77 companies				<ul style="list-style-type: none"> • employee ratio, • percentage of fulltime employees, • educational level, • monthly income, • days on parental leave, • days on temporal leave. 		organisations. No associations for men.
Within countries analysis – gender equality measured within the family domain								
Neyer et al., 2012	Multi-country (Bulgaria, France, Germany, Georgia, Norway, Romania, Russia, Hungary, Italy, Netherlands)	First waves of Generations and Gender Surveys	To understand the link between gender equality and childbearing intentions	Cross-country survey	Child bearing intentions of women and men	<ul style="list-style-type: none"> • Employment status, • precarious employment, • working arrangement, • Housework division, childcare division, 	Age, education, marital status, employment status. Partners activity status, country	Women and men had higher childbearing intentions in more equal couples
Mansdotter et al., 2012	Sweden	All fathers and mothers who had their first child in 1988 or 1989, linked to national health datasets.	How gender equality during (income and caring roles) in early parenthood relates to subsequent alcohol-related inpatient and/or mortality	Cohort, country level linkage of datasets. Gender equality measured (1988-1991), alcohol related inpatient care or mortality (1992-2006)	Alcohol related inpatient care or mortality (men and women)	<p>Three categories of gender equality:</p> <ul style="list-style-type: none"> • Equality – both parents had between 40% and 60% of indicators below • Traditional inequality (father had >60% of income and women had >60% caring roles) • Untraditional inequality (mother's had <40% caring and fathers <40% of income) <p>Data included</p> <ul style="list-style-type: none"> • Income data • Occupational position • Parental leave data • Temporary childcare data 	Age, birth outside Sweden, income 1990-1991, education 1990, married/cohabiting 1990, other children, alcohol related care two years before and during measurement of gender equality.	Overall, traditional women run lower risk, whereas traditional men and untraditional women (those opposing the traditional division of parenthood responsibilities) run higher risk of alcohol harm than gender-equal counterparts.

Mansdotter et al., 2006	Sweden	All Swedish couples (98240 people) who had first child in 1978	To understand the relationship between gender equality and health	Cohort, country level linkage of datasets.	Overall mortality and sickness absence	Five categories of gender equality: <ul style="list-style-type: none"> • Pronounced traditional • Moderate traditional • Equal • Moderate untraditional • Pronounced untraditional Income data Occupational position Parental leave data Temporary childcare data	Age, socioeconomic position, income, country of birth	Equality in income and occupation was associated with increased odds of mortality for women. No effects for men. For females, being traditional associated with lower sickness risks.
Backhans et al., 2009	279 Swedish municipalities	37,423 men and 37,616 women in 279 Swedish municipalities, who had their first child in 1978.	Does the context impacts on the association between gender equality and health	Registered data – all Swedish couples (N=49120) first child in 1978, followed up until the year 1999.	Compensated days from sickness insurance during 1986-1999.	Gender equality at individual/couple levels: five categories: <ul style="list-style-type: none"> • Pronounced traditional- fathers >80%, mothers <20% • Moderately traditional – father 60-80%, mother 20-40% • Equal – either parent 40-60% • Moderately traditional – father 20-40%, mother 60-80% • Pronounced untraditional- father <20%, mother 80% Gender equality at individual/couple levels: <ul style="list-style-type: none"> • Political participation • Economic resources • Occupational sex segregation 	Area level: total employment rate, and the proportion of the population with mandatory education. Individual level: type of work, Swedish or foreign born.	Among men: those who are equal in an equal municipality have lower levels of sick leave, while those who are less equal than their municipality. In the public spheres, those more equal than the municipalities fare better than average. Mothers who are traditional in their roles in public spheres had high levels of sick leave, reverse true for those who are equal. Traditional mothers in traditional municipalities have the lowest levels of sick leave and pioneers had the highest.

						<ul style="list-style-type: none"> • Caring work • Interaction between couple and area level 		
Mansdotter et al, 2012	Sweden	Participants in Northern Swedish cohort study. At 26 year follow-up, n=481 women and 526 men)	Examine associations between childhood and adulthood gendered life on mental health	Cohort study	Mental ill health (depressive symptoms, anxiety symptoms)	Gendered life: traditional or non-traditional in childhood (parents gendered life), adulthood at age 30 (gender ideology and attitude to childcare), adulthood age 42 partnership equality and attitude to childcare)	Self-reported anxiety and depression at age 16, perceived childhood class at age 16, divorced or dead parents at age 16, educational level at age 30, married/cohabiting at age 30, number of children at age 30.	1. Gender equality in adulthood associated with good self-reported mental health regardless of childhood (parents gendered life) Reduced depressive symptoms at age 42 in men who regard childcare as female role

Chandola et al, 2004	United Kingdom	Data from phases 3-5 of Whitehall II study, n=7470	<ul style="list-style-type: none"> Investigate the meaning of control at home, Examine the effect of control at home on incident CHD events <p>Ascertain the extent to which control at home explains social inequalities in CHD events</p>	Cohort study of civil servants	Fatal CHD Non-fatal myocardial infarction	Control at home	Civil service grade, Household financial problems Demand overload Power within household	1. Low control at home predicts CHD among women but not men
Sorlin et al, 2011	Sweden	1400 participants drawn from prior register survey of 1.1 million people working in 8000 companies in Sweden	Analyse association between gender equality in partner relationship and self-reported health	Cross-sectional	SRH	Self reported gender equality index measured across three domains (1. education, income, full/part time employment; 2. Sharing of responsibilities and time; 3. Sharing of parental leave following birth of child and temporary leave for sickness of child) for respondent and partner Self-perceived gender equality index	Age Education Occupational grade Income	<ol style="list-style-type: none"> No significant association between self-reported gender equality index and SRH For men, significant association between perception of gender equality in partner relationship and good SRH For women there were similar associations but these were non-significant Men perceived greater gender equality than they reported <p>Women perceived less equality than they reported</p>

Eek and Axmon, 2015	Sweden	837 women living in relationship and working at least 50% of full time. Participants were drawn from an original survey among parents whose youngest child was 2 years old	Investigate whether unequal distribution of responsibilities in home is related to health outcomes in women	Cross-sectional	Subjective global stress (PSS) Physical/psychosomatic symptoms (13 common health complaints) General physical and mental self-rated health Work related fatigue Satisfaction with general life and work situations Work stress Work engagement Work to family conflict Family to work conflict Leisure time activities	Division of household duties	Employment status (full/part time) Educational level	Women in relationships who perceived greater inequality in distribution of household responsibilities had significantly higher self-perceived stress, fatigue, physical and psycho-somatic symptoms and work family conflicts compared to women living in more equal relationships.
Hammerstrom et al, 2012	Sweden	Participants in Northern Swedish cohort study who were cohabiting or married at 26 year follow-up, n=390 women and 383 men)	Analyse importance of gender relations for	Cohort study	Depressive symptoms at age 42	Perceptions of gender inequity in partner relationship Household responsibilities Socioeconomic status Financial strain	Prior depressive symptoms	1. Depressive symptoms were significantly associated with financial strain Among women, depressive symptoms were significantly associated with perceived gender inequity

Harryson et al, 2012	Sweden	Participants in Northern Swedish cohort study who were cohabiting at 26 year follow-up, n=372 women and 352 men)	Examine associations between gender inequality in household is associated with psychological distress for men and women	Cohort study	Psychological distress	Gender inequality within household (measured as perceptions of gender inequality, time spent on household chores, time spent on household work, responsibility for domestic work and childcare).	Psychological distress at age 21 Time in paid work Socioeconomic position Number of children	<ol style="list-style-type: none"> 1. Perceived gender inequality in couple relationship was significantly associated with psychological distress for men and women 2. For women, being solely responsible for domestic work was significantly associated with greater psychological distress 3. For men, having responsibility for less than half domestic work was significantly associated with greater psychological distress
----------------------	--------	--	---	--------------	------------------------	--	---	--

Within countries - gender equality in politics, the economy, social services, and reproductive rights								
Sanz-Barbero et al., 2015	Spain	7898 adult women	To understand the role of contextual level unemployment and gender based income inequality on IPV	Cross-country survey	IPV (women)	Gender based economic discrimination (GDP per capita minus index of income separately for women and men)	Individual level variables (age, citizenship, social class, education, mothers exposure to IPV) and regional level variables (male long term unemployment, Gini coefficient of income inequality)	Women residing in areas with high gender-based income discrimination had lower IPV compared to those in areas with low gender-based income discrimination.
Wangnerud et al., 2012	Swedish local elected assemblies	238 municipalities	To understand the effect of female councillors (1985-2010) on poor health	Longitudinal pooled ecological analysis, 1970-2010	Poor health (women)	<ul style="list-style-type: none"> Female councillors (%) Left-green parties (%) Female voter turnout Public employee Female education 	Average municipal population, geographical area in square kilometres, average percentage of women and men with tertiary education.	In municipalities where female turnout was high in relation to women, women had better health.
McLaughlin et al., 2011	United States	National probability sample of US adults (n=34,653), data from the National Epidemiological Survey on Alcohol and Related Conditions	To what extent is state level women's status related to psychiatric disorders in women and gender differences in psychopathology	Cross-sectional survey	12-month mood and anxiety disorders (women)	Women's status at the state levels: <ul style="list-style-type: none"> Political participation Employment earnings Social/economic autonomy Reproductive rights 	Age, race/ethnicity, marital status, educational attainment, household income, occupation.	The prevalence of major depression and PTSD was lower in states where women have reproductive rights. Other variables of state level women's right variables were unrelated to depression and anxiety.
Roberts et al., 2012	United States	Survey data from the 2005 Behavioural Risk Surveillance System	To understand the relationship between state-level gender equality and alcohol consumption	Cross-sectional survey	Alcohol consumption including past 30 day drinker status, drinking frequency, binge drinking, volume, risky drinking (men and women)	State level: <ul style="list-style-type: none"> gender socioeconomic status reproductive rights policies relating to violence against women women's political participation 	State level controls- income inequality, religion. Individual controls – age, race, income, marital status, education, employment status.	All gender equality indicators were positively associated with women's and men's drinker status. Findings do not support the hypothesis that high gender equality on women's status is associated with higher alcohol consumption. In fact, higher gender equality was associated

								with less alcohol consumption.
Chen et al., 2005	Fifty American states	7789 women in a 1991 longitudinal follow up study (participants were a nationally representative random sample of women who gave birth to live babies in 1988)	To assess the relationship between state level women's status variables and individual depressive symptoms	Follow up study of participants of a nationally representative sample	Symptoms of depression (CES-D) (women)	Composite indicators measuring: <ul style="list-style-type: none"> • Women's political participation • Economic autonomy • Employment and earnings and Reproductive rights. 	Age, race, family income, educational attainment, employment status, marital status, income distribution at the state level, GINI coefficient.	Women residing in states with high scores on index had lower depression than those who scored lower on the index. Women in states with higher scores on economic autonomy had lower depression. Women in states with high reproductive rights had lower depression.
Backhans et al, 2007	Population statistics from 289 Swedish municipalities	n=289 Swedish municipalities	To test the hypothesis that greater gender equality is associated with better health outcomes	Cross-sectional study of population data	Life expectancy Number compensated days per insured person for sickness absence and disability (men and women)	<ul style="list-style-type: none"> • Political participation: proportion of women vs men in municipal councils and executive committees • Temporary parental leave • Proportion of part time workers • Proportion of men and women in health care and social services • Proportion of men and women in manufacturing • Proportion of men and women in managerial positions • Average income Relative poverty 	Municipality finances Local labour market Local tax rate Robin Hood tax Total employment rate Proportion of population with any post-secondary education Age structure Proportion students	Gender equality associated with higher levels of sickness and disability for men and women. Gender equality associated with lower life expectancy.
Kawachi et al, 1999	USA	Age-standardised cause-specific mortality from	Examine associations between the status of women and women and	Ecological and cross sectional	Total female and male mortality rates Female cause specific	State level status of women assessed by four composite indices	State specific: Poverty rates Income distribution	Higher political participation by women correlated with lower

		50 US states	men's health status		death rates Mean days of activity limitations reported by women in the previous month	that measured: political participation economic autonomy employment and earnings reproductive rights	GINI coefficients Household size Median household income	female mortality rates and lower activity limitations Smaller wage gap associated with lower female mortality rates and lower activity limitations Indices of women's status were correlated with male mortality rates Associations between indices of women's status and female mortality rates persisted after adjustment for income inequality, poverty rates and median household income.
Jun et al, 2004	USA	Women in BRFS study in USA N=87848	Examine associations between self-rated health and women's status	Ecological and cross sectional	Self-rated health	State level status of women assessed by four composite indices that measured: political participation economic autonomy employment and earnings reproductive rights	State specific: GINI coefficients Median household income	Low status for women (as measured on political participation, economic autonomy) was associated with higher likelihood of reporting poor health.
Yllo, 1983	USA	Individuals cohabiting in 30 US states	Investigate association between women's status and IPV	Ecological and cross sectional	Proportion of couples who reported that husband had used violence against wife	Dimensions of Status of Women's index: economic, educational and political, legal.		Borderline significance for negative relationship between high legal status for women and IPV.
Yllo, 1984	USA	Individuals cohabiting in 30 US states	Investigate whether sexual inequality is associated with the relationship between marital inequality and IPV	Cross sectional	Proportion of couples who reported that husband had used violence against wife	Dimensions of Status of Women's index: economic, educational and political, legal.		Higher levels of IPV in couples where husband dominates decision making residing in states in which there is high status for women. Also higher levels of IPV in couples with dominant wife, residing in states with low status for women (low gender equity)

Between countries, fertility rates, educational status of women, labour force status								
Clark et al., 2012	Cross-country study	(1) Europe and the West (2) Latin America and Caribbean (3) Central and Sub-Saharan (4) North Africa and the Middle East (5) East Asia and the Pacific (6) Eastern Europe and Central Asia. 139 countries	Predictors of the gender gap in life expectancy across large cross-national sample	Cross-country panel study (Time 1985, 1990, 1995, 2000, 2005)	Gender differences in life expectancy Gender ratio in life expectancy	Women's status: • Fertility rate • Labour force ratio - female • Parliament ratio - female	GDP per capita Gini coefficient Year World region World Development Indicator	As females begin to participate in traditional male institutions, such as formal schooling and paid employment, and begin to shift away from traditional female roles, as indicated by a decline in fertility, this increase in women's status uniformly serves to increase female mortality. There needs to be greater studies into the long term mortality effects of gender equity.
Soo Chon 2013	Cross-country country	124 countries	To examine the role of women's educational and relative social status on the female homicide rate	Cross-country panel study, 2002 and 2004	• Female homicide victimization rate • Female-to-overall homicide victimisation ratio.	Absolute gender equality - index • Female educational status • Female income • Female economic activity Relative gender equality • Ratio of female's combined gross enrolment to that of males • Female political empowerment - % of females in national parliament • Female economic activity as a % of the male activity.	GDP per capita Gini coefficient of income inequality. Ethnic heterogeneity index % of the female population among the total national population % of female population aged 20 to 34 years Human Development Index Low, medium and high Human Development Index	Non-significant relationship between gender equality and female homicide victimisation rate. Criticises previous studies and finds that the relationship between both absolute and relative gender equity with female homicide rate may be spurious as they did not control important confounders.
Bentley et al., 2008	Within country analysis of postcode districts (United Kingdom) and Cross-	18 countries that participated in the Fertility and Family surveys	To examine whether women's labour force participation and political representation	Within country study of postcode districts, and between countries analysis.	Contraception use in the NSSAL Contraception use In the Fertility and	Individual variables in the NSSAL: Age, marital status, number of children,	Age, relationship status, indicator of employment status.	Gender equity may be an important determinant of contraceptive use. In the FFS contraceptive use was

	country study	conducted by the United Nations in the 1990s Also an analysis of postcode (646) areas in the United Kingdom (National Survey of Sexual Attitudes and Lifestyles- NSSAL)	in parliament was associated with contraception use.	Both cross-sectional panels.	Family Service (FFS)	ethnicity, religion, attendance at religious services, education, employment status and household social class, indicators of sexual activity, fertility status, and desire for children. Area level variables in the NSSAL: percentage of women who were employed on a part time or fulltime basis.		lower in countries where labour force participation was highest.
Ricketts 2014	Cross-country studies	World Development Indicators, 99 countries, 1995 to 2010	To understand the effects of increased female labour force participation on the life expectancy gender gap	Between countries studies (n=99), 1995 to 2010	Ratio: Life expectancy for females/ Life expectancy for males	Labour force participation (% of the female population ages 15 and older is that is economically active)	Age, population density, rural population growth, urban population growth, urban population %, low income, lower middle, upper middle, high income non-OECD, high income OECD, year, education, food production, consumer price index, GDP growth, GDP per capita, capital formation, inflation	Female labour force participation rate is significantly related to gap in life expectancy (e.g., a 1% increase in female labour force participants rate is association with a decrease in the life expectancy gender gap of 0.03%). This suggests that the labour force participation rates of women approach those of men, women's life expectancy is also expected to approach those of men, and vice versa.
Pampel 2001	High income countries	18 high income countries, 1955 to 1994	To investigate the "reduction in protection" argument predicts that the female advantage in accident mortality will reduce over time, and the indicators of gender	Cross-country panel study, 1955 to 1994	Number of deaths from accidents and suicide per 100,000 population of specified age and sex group	Female status in legal, family, political, occupation and education status.	Time, divorce, marriage, fertility	The reversal in the downward trends in the female advantage in both suicide mortality - favour institutional adjustment hypothesis (female advantage will first decline, but then increase,

			equality will reduce the female advantage.					and that indicators will reduce the female advantage at low levels of gender equality, but increase the female advantage at higher levels).
Tesch-Romer et al, 2008	57 countries (WVS) 5 countries (OASIS)	Two comparative datasets: World Values Survey & OASIS project (25 years and older living in private households)	Examine whether societal gender inequality is related to gender differences in subjective wellbeing		Subjective health rating (WVS)	Gender equality norms (WVS) Gender empowerment measure (GEM)	General life satisfaction(WVS) Welfare regime type	Relationship between societal gender equality and SWB varies according to countries culture of gender equality: if the majority of society reject gender inequality on the labour market, gender differences in SWB decrease with increasing equality for both genders on the labour market; in countries where gender inequality on the labour market is widely accepted, the gender differences in SWB increase with higher equality of women on the labour market.
UN gender equity index: GII								
Balish et al, 2016	36 countries	48154 adults from 36 countries, all participants in ISSP	<ul style="list-style-type: none"> To understand whether gender equality is related to LTPA, and explore extent to which this is gender specific. 	Cross-sectional design	LTPA operationalised as number of times engaged in physical activity: 1/week or more vs less than 1/week (males and females)	Gender Inequality Index (GII)	Individual: Age, level of education Country-level: GDP; % Muslim	Increased gender equality significantly associated with higher LTPA for both male and females.
Bilal et al, 2015	Spain	Spanish adults aged 16+ years from nationally representative data sources: National Institute of Statistics (GII); national	<ul style="list-style-type: none"> Examine associations between gender inequality and smoking prevalence by gender, education and birth cohort over the period of 1960-2010 	Ecological	Smoking prevalence (male and female)	Gender Inequality Index (GII)		As gender inequality decreased over time, the ratio of female to male smoking increased.

		Parliament historical sources (GII); National Health Interview Survey (Smoking prevalence)						
Brinda et al, 2015	138 countries: 27 low income; 38 low-middle income; 30 upper middle income; 43 high income countries	Population statistics from 138 countries, obtained from WHO statistical information system	<ul style="list-style-type: none"> Examine associations between gender inequality and child mortality 	Ecological	<ul style="list-style-type: none"> Infant mortality; Neonatal mortality; Under-5 mortality; Female under-5 mortality; Rural under-5 mortality; Under-5 mortality due to AIDS/HIV; Under-5 mortality due to diarrhoea 	Gender Inequality Index (GII)	Per capita GDP Economic inequality index (Gini co-efficient); Immunisation coverage	Greater gender inequality significantly associated with higher neonatal, infant and under-5 child mortality rates. These associations persisted after adjusting for economic and health service variables.
Dahlin & Harkonen, 2013	28 European countries	191104 participants in 5 waves (109 country years) of European Social Survey data	<ul style="list-style-type: none"> Assess relationship between gender gap in subjective health across 28 European countries Ascertain whether gender gaps and cross-national differences are explained by demographic and socioeconomic differences; Examine whether national level gender equality is related to gender gaps in subjective health 	Ecological	SRH; LLI (male and female)	Gender; Gender Inequality Index (GII) fitted as interaction term;	Individual: Age, age-squared, respondent education, partner's education, occupational status, whether occupation missing, employment status, children, "tight with money", calendar year Country level: income inequality (Gini); Gender Inequality Index (GII); overall social development (HDI)	<ol style="list-style-type: none"> Cross-national variation in gender gaps in health Countries with greatest gender gap in health are in Eastern and Southern Europe (worse for women); in other countries there is little or no difference Gender inequality not associated with gender gaps in health Higher levels of human development was associated with reduced gender gaps in SRH (but not LLI)
Dereuddre et al, 2016	Data from 17 European countries	N=31632 women aged 18-49 who had a male partner at the	<ul style="list-style-type: none"> Assess whether gender inequality is associated with greater use of no or 	Cross-sectional ecological	Contraception type (female)	Women's individual socioeconomic position (education attainment and	Individual: Age, age-squared, partner status; parity; Urbanity (proxy for	<ol style="list-style-type: none"> Positive association between women's individual SEP and use of modern reversible

		time. Data drawn from the GGS and DHS surveys.	traditional differences in contraceptive use are associated with differences in women's status at individual level, and gender inequality at couple and country level			employment status); Women's relative socioeconomic position (compared to partner); Gender Inequality Index (GII)	supply of modern contraceptives) Country level: income inequality (Gini)	contraceptives 2. Negative association between women's individual SEP and female sterilization. 3. Equality of occupation relative to partner associated with higher use of modern reversible contraception 4. Greater country level gender equality associated with greater likelihood of using modern reversible female methods, but not sterilisation 5. Central and Eastern European countries have higher prevalence of no contraception or traditional and modern reversible male contraception appeared to be explained by country level gender equality indices.
Redding et al, 2017	Spain	Population statistics from 17 Autonomous Communities (AC) from 2006-2014	<ul style="list-style-type: none"> Examine associations between gender inequality and IPV over the period of 2006-2014 	Ecological NOTE: correlation	<ul style="list-style-type: none"> Reported IPV cases; IPV mortality (female) 	Gender Inequality Index (GII) and its components		<ol style="list-style-type: none"> Greater gender inequality in 2006 associated with higher IPV mortality and higher IPV reports. In 2014 Risk of IPV declined between 2006 and 2014. In 2014, IPV mortality was lowest in areas with greater gender

								inequality.
Gressard et al, 2015	USA	US State representative data	<ul style="list-style-type: none"> Examine associations between GII and physical and sexual ADV 	Ecological	Physical and sexual ADV (female)	Gender Inequality Index (GII)		GII significantly associated with state prevalence of female physical ADV, but not female sexual ADV.
Kim & Kim, 2014	148 countries	Population data from 148 countries obtained from WHO	<ul style="list-style-type: none"> Estimate associated between PLSE & LFPR components of GII and HLE 	Ecological NOTE: correlation	HLE (male and female)	PLSE & LFPR components of Gender Inequality Index (GII)		Gender inequality in the attainment of secondary education and labour force participation (female disadvantage) is associated with reduced healthy life expectancy at birth.
Mark, 2013	96 nations	Population data from United Nations	<ul style="list-style-type: none"> Examine associations between female height and gender inequality 	Ecological	Human height (female)	Gender Inequality Index (GII) Human development index (HDI)	Years of Education, Life-expectancy, per capita income, maternal mortality, maternal death, education ratio (females to males, 25 years and older that have attained a secondary education), ratio of female to male seats held in a lower or single house, or an upper house or senate), Childhood mortality rate	Gender inequality is most significant factor contributing to population height.
Wells et al, 2012	68 countries	Data from Obesity Task Force website	<ul style="list-style-type: none"> Examine gender gap in obesity prevalence Test whether economic influence, and economic and gender inequality are associated with between country differences in gender gaps in obesity prevalence 	Ecological	Obesity prevalence (2011)	Gender Inequality Index (GII) (2005) GINI (2004) Per capita GDP (2004)	Geographic latitude (estimated as midpoint of country); total fertility rate; age	<ul style="list-style-type: none"> Greater prevalence of obesity in women. Association between obesity prevalence and GDP (attenuating at higher GDP) Greater female excess in obesity greater in countries with greater gender inequality.
Hassanzadeh et al, 2014	123 countries	Countries in the United Nations Development Programme (with	<ul style="list-style-type: none"> Examine gender inequalities in health in relation to prevalence of 	Ecological	Prevalence of smoking, Blood pressure Alcohol consumption, NCD mortality	Gender Inequality Index (GII)		<ul style="list-style-type: none"> Negative association between gender inequality and: smoking; alcohol

		adequate data)	smoking, blood pressure, alcohol consumption, cancer death rate, BMI		BMI Cancer Life expectancy			consumption; life expectancy, cancer, BMI, blood pressure • Positive association between gender inequality and NCD mortality
World economic forum: GGI								
Witvliet et al, 2014	32 countries (low income to high income but mainly low income)	Women aged 18-50 in 32 countries, n=57182 participating in the World Health Survey	<ul style="list-style-type: none"> • Compare the general health of single mothers with that of other women • Examine whether associations between health and gender inequality is stronger among single mothers than other women 	Cross-sectional survey and ecological data	Self- assessed general health	Global Gender Gap Index	Motherhood status and partnership status Individual covariates: age, occupational status, educational attainment Country level: GDP	Country gender inequality is not related to relative health of lone mothers
Grittner et al, 2012	25 countries worldwide: mix of regions	42655 individuals participating in GENACIS project, aged 25-69	<ul style="list-style-type: none"> • Examine influence of country-level characteristics and individual socio-economic status on individual alcohol related consequences/harm 		Alcohol related consequences experienced by individual (internal) e.g. guilt/remorse; unable to remember night before; failing to do what was normally expected; unable to stop drinking once started; needing drink in morning to get going after heavy drinking Consequences experienced beyond individual (external), e.g. effect on finances, effect on marriage, children, getting into fight.	Individual SES: highest educational level	Type of alcohol consumption (moderate, heavy, monthly, both heavy and monthly). Country level covariates: purchasing power parity, measure of gross national income per capita, GINI coefficient; Gender Gap Index	<ol style="list-style-type: none"> 1. Lower educated men and women more likely to report alcohol related problems (internal and external problems) than higher educated men. 2. Lower educated women more likely to report external alcohol related problems <p>There were no significant associations between Gender Gap Index and either internal or external alcohol related problems</p>
Van Tuyckom et al, 2012	27 European countries	Participants in 2005 Eurobarometer survey	<ul style="list-style-type: none"> • Examine gender differences in leisure time physical inactivity (LTPI) 	Cross-sectional survey and ecological data	Leisure time physical inactivity (LTPI)	Gender Gap Index	Age Marital status Educational attainment Urbanisation	3. Greater gender equality associated with reduced gender gap in LTPI differences

		N=25745	<ul style="list-style-type: none"> • Examine compositional effects of individual-level factors on cross national differences • Examine relationships between gender inequality and gender disparities 				Employment	– difference disappeared in countries with high gender equality.
UN gender equity index: GEM								
Van de Velde et al, 2012	25 countries in Europe	Participants in European Social survey, 2006-2007 (n=39891) aged 18-75 years	<ul style="list-style-type: none"> • Examine associations between gender equality and depression among men and women. 	Cross-sectional survey and ecological data	Depression	Gender empowerment measure (GEM)	GINI Gender Age Age squared Employment status Educational level Household income Marital status Cohabitation status Presence of children aged under 12 years	<ol style="list-style-type: none"> 1. Higher gender equality is associated with lower levels of depression among men and women 2. Among some subgroups, some dimensions of gender equality are associated with a reduced gender difference in rates of depression
Bosque-Prous et al, 2015	16 European countries	N=26017 adults aged 50-64 years in SHARE project, 2010-2012	<ul style="list-style-type: none"> • Examine gender differences in hazardous drinking and assess associations with contextual factors including gender empowerment 	Cross-sectional design	Hazardous drinking levels	Gender; Standardised gender empowerment (GEM) (examined as a covariate)	Individual: educational level, age, migration status, employment status, self perceived health Country level: standardised GDP; Standardised gender empowerment (GEM); Standardised unemployment rate; Standardised degree of alcohol advertising restrictions; Other standardised alcohol control policies Drinking patterns score for 12005; Percentage immigrants	3. Greater gender equality associated with lower gender differences in hazardous drinking, with higher levels of alcohol consumption among women underpinning this.

Mayer, 2000	26 (GEM) & 37 (HDI) countries	1996 WHO data for 26 countries	• Examine associations between suicide rates and gender equality	Ecological	Age-standardised suicide rates (per 100000)	Gender empowerment measure (GEM) Human development index (HDI)	GDP index, Education index, gender-related development index and life-expectancy index	4. Gender equality, as measured by the gender-related development index was positively associated with suicide rates for both men and women, but particularly for women
Shah, 2008	55 & 65 countries worldwide	Data obtained from WHO for years 1991-2003	• Examine associations between gender equality and male to female sex ratio of suicide rates		Male to female ratio for suicide rates in age 65-74 years, and 75 years +	Gender empowerment measure (GEM) Gender related development index (GDI)		5. Gender inequality, as measured by GEM and GDI was not significantly correlated with male to female sex ratio of suicide rates in either age group.
Bond et al, 2010	22 countries worldwide	2006-2007 survey data from GENACIS project Age: 18-75 years	• Examine associations between country level equality and drinking, and compare sex differences across different settings	Cross sectional and ecological	Frequency of drinking in public settings and frequency of drinking in private settings in past 12 months	Gender empowerment measure (GEM) Gender Inequality Index (GII) GGI education GGI political participation	<i>Individual</i> Age Gender Marital status <i>Country level</i> GDP	6. Men drink more than women in each setting 7. In adjusted models neither measure predicts gender differences but in unadjusted models greater reproductive autonomy and less violence against women associated with smaller differences in drinking in public settings.
Gender Development index (GDI)								
Hopcroft and Bradley, 2007	29 countries worldwide	1990 survey data from World Values Survey	• Examine sex differences in depression	Ecological and cross sectional	Depression	Gender related development index (GDI)	<i>Individual</i> Sex Age Self-rated health Socioeconomic status Marital status Psychological status <i>Country level</i> Percent Muslim	Rates of depression are higher in low gender equity countries Gender gap in depression larger in countries with high gender equity

Notes: US: United States; SES: Socio-economic status; ; LTPA: leisure time physical activity; ; LTPI: leisure time physical inactivity; ISSP: International Social Survey Programme; GDP: gross domestic product; SHARE: Survey of Health, Ageing and Retirement in Europe; WHO: World Health Organisation; SRH: Self-rated health; LLI: Limiting long-standing illness; HDI: human development index; GGS: generations and gender survey; DHS: demographic health survey; IPV: inter-partner violence; ADV: adolescent dating violence; HLE: healthy life expectancy; PLSE: Population at least secondary education; LFPR: labour force participation rate; PSS: perceived stress scale

Appendix

Table A1: Search terms.

Search iteration	Gender equality/ equity	Health outcome	Design
1	"gender equality", "gender equity", "women"	"morbidity", "mortality", "health behaviours", "mental health"	ecological, panel study, longitudinal design, observational, cohort
2	"gender equality", "gender equity", "gender inequality", "gender inequity" "women"	"health"	