

# Women's health in NSW – a life course approach: a rapid review

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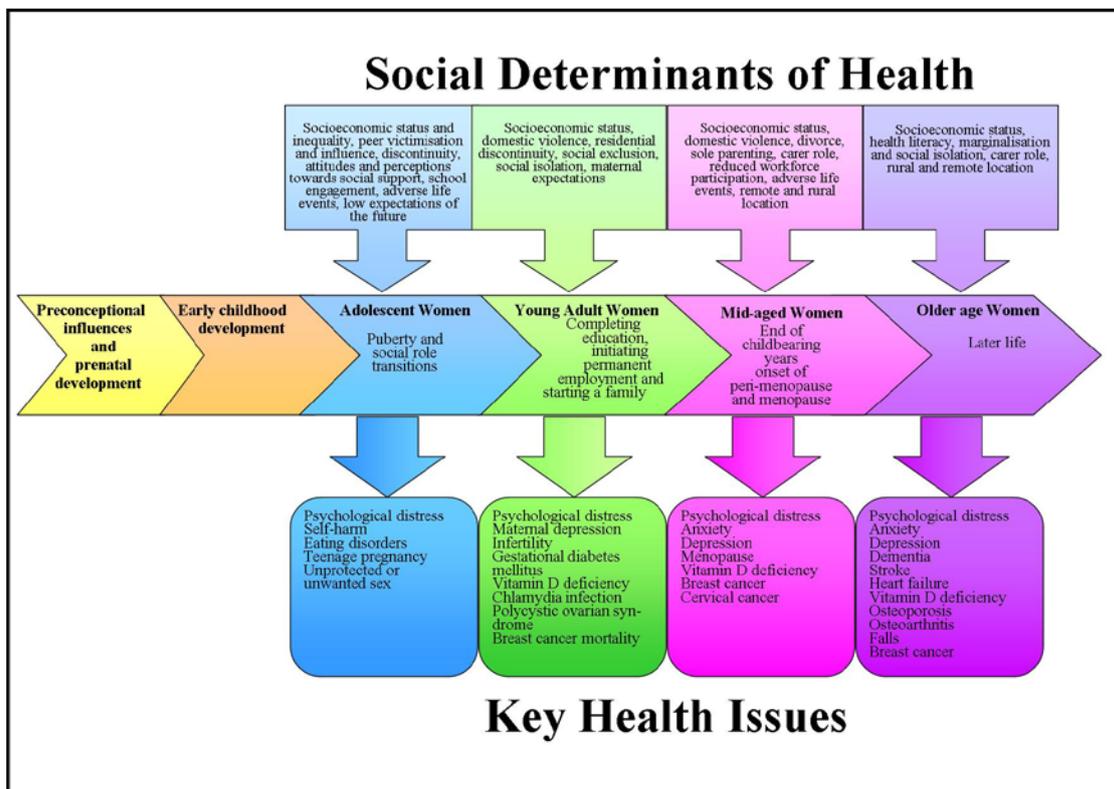
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# 1 EXECUTIVE SUMMARY

This report reviews the evidence on the key health issues affecting women in New South Wales (NSW) across the life course, and the social determinants which impact on the risk of developing these health issues. For the purposes of this review, the key health issues and social determinants were defined as either: a) unique to women or b) ones where there are considerable differences to men.

The overall findings of the review are presented in Figure 1. There is some consistency in the key health issues across all life stages for women and this reinforces the value of a life course approach in addressing health problems. Health issues which are seen across all life stages include mental health problems and gynaecological conditions. Indigenous women are at higher risk of some conditions such as self-harm, teenage pregnancy, perinatal mortality, chlamydia infection, cervical cancer and mental health conditions. Some migrant populations have a higher rate of preterm birth and are at greater risk of vitamin D deficiency.



**Figure 1: Overview of the social determinants of health across the life course for women and the key health issues identified for each life stage**

The review identified a number of social determinants which affect women's health for each life stage examined and a number of these factors were influential throughout the life course for women. These include:

- Socioeconomic status
- Isolation
- Interpersonal violence and victimisation.

The broad consistency in these social determinants when viewed from the life course perspective suggests that early intervention in younger life stages is important to prevent related health issues in later life.

## 2 Background and introduction

A life course approach investigates the effects of biological, social, and behavioural exposures during gestation, childhood, adolescence and adulthood on current and future health.<sup>1</sup> Taking a life course approach to women's health means understanding the links between health or health events through each life stage, for instance the relationship between mental health issues with current and future health. It emphasises the importance of targeting and timing of interventions, especially the need for early interventions to reduce the risk and severity of disease in later life.

Women tend to have frequent and regular interactions with health services in the course of managing their sexual and reproductive health. Adopting a life course framework for women's health has the potential to fit well with this pattern of healthcare utilisation, which provides opportunities for timely preventive healthcare.

This review focuses on key health issues in women's health. These are defined as either: a) unique to women or b) ones where there are considerable differences compared with men.<sup>1</sup>

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<sup>1</sup> A number of important conditions which contribute to the burden of disease for NSW women such as obesity, diabetes and cardiovascular disease are excluded unless they fulfil the above criteria.

### 3 Methods for searching and including evidence

Systematic data searching was undertaken to inform the contents of this report. Information sources were prioritised as evidence for NSW, and where this is not available, evidence from elsewhere in Australia or comparable OECD countries were used. The hierarchical order of evidence searched and included is as follows:

1. Health statistics data available through the NSW Ministry of Health
2. Reports and publications from other NSW surveys
3. Health statistics available through the Australian Institute of Health and Welfare
4. Reports and publications from other Australian national surveys
5. Reports and publications from national and local surveys from other OECD countries.

Supplementation of the available data from these surveys was achieved through searching peer-reviewed journal publications. A more detailed list of the state and national surveys targeted for this report and other details associated with the methods for searching and including evidence is provided in Appendix 1.

## 4 Adolescent women

Adolescence is a period of life between childhood and adulthood. For women, the beginning of adolescence is generally associated with the onset of puberty or menarche (averages 12–13 years) and ends with the transition to adulthood (usually 18–24 years).<sup>2</sup> The period of adolescence is characterised as much by emotional and psychological changes as it is by the physical and hormonal adjustments that occur.<sup>2</sup> As such it is unsurprising that the major health issues experienced by adolescent women relate to all four of these areas. This life stage is crucial to women's health across the life course as health and health behaviours in adolescence are strongly associated with health outcomes and behaviours in adult life.<sup>3</sup>

### *Major health issues faced by adolescent women*

#### Sexual health and pregnancy

Teenage pregnancy is an important concern in adolescent women's health, not only because of its immediate health effects but also its long term impact on the social and health outcomes of women and their children.<sup>4</sup>

- Whilst current evidence suggests overall teenage fertility rates are declining, pregnancy is still being reported in 18.5% of Indigenous adolescent women<sup>5</sup>
- There is an increasing prevalence of women in Year 10 and Year 12 who report having ever had sex (43% in 2008 compared with 33% in 2002), and an increase to 31% of all teenage girls having had sex without a condom with 26.5% having had sex with 3 or more partners<sup>6</sup>
- Whilst the proportion of teenage women who never used condoms is relatively low at 8%, a substantial number (45.8%) report only sometimes using condoms<sup>6</sup>
- Over one third of sexually active Year 10 and Year 12 women report experiencing unwanted sex. This is reported to be related to either excess alcohol consumption or pressure from their sexual partner.<sup>6</sup>

#### Mental health

Mental health refers to a broad range of health issues which affect mental and emotional wellbeing. Adolescent women are at greater risk of a number of mental health problems compared with men.

- 73% of NSW women aged 12–17 years experience unhappiness, sadness or depression, whilst 79% report feelings of nervousness, stress or pressure and 15% describe high psychological distress<sup>7</sup>
- 352 per 100,000 adolescent women were hospitalised in 2008 for intentional self-harm.<sup>7</sup> This rate is increased more than two-fold for Indigenous adolescent women (733 per 100,000)<sup>7</sup>
- 5–10% of adolescents experience an eating disorder and 80–90% of those cases are women<sup>8</sup>
- 16% of adolescent women perceive themselves as too fat even when their body mass index (BMI) is calculated as underweight or healthy weight.<sup>7</sup>

## Lifestyle behaviours

Adolescent women are engaging in a number of lifestyle behaviours which impacts on their health.

- Only 10.5% of adolescent women are exercising adequately based upon recommended levels<sup>7</sup>
- A low number of adolescent women use protective clothing (16.7%) and hats (14.8%) for sun protection<sup>7</sup>
- The level of overall alcohol consumption does not differ between adolescent men and women but a greater proportion of women consume champagne, premixed spirits and liqueurs.<sup>7</sup>

## Social determinants of health issues for adolescent women

Health in adolescence is viewed from the perspective of life course epidemiology as the outcome of interactions between antenatal and early childhood development accompanied by changes in biology and social roles and shaped by social determinants which impact on uptake of health-related behaviours.<sup>9</sup> This highlights the importance of not only addressing adolescent issues directly but also considering preconception and early childhood as contributing to health outcomes in adolescence.

- Teenage pregnancy is associated with poor material circumstances, unhappy childhood, dislike of school and low expectations for the future<sup>6,10</sup>
- Adolescent women who have higher levels of social support from friends but a lower level of support from family are more likely to engage in unsafe sex,<sup>11</sup> whilst contraception use is more likely for adolescents when rates of contraception use are higher in their peers<sup>12</sup>
- Condom use is more common in women who have condom negotiation skills and hold more positive attitudes towards condom use<sup>13</sup>
- The development of depression in adolescent women has been linked with discontinuity in life generally (such as frequent changes in school, residence and guardianship) alongside specific factors such as recent residential relocation and low parental education<sup>14,15</sup>
- Women who do not consider health professionals or psychologists as able to support women with eating disorders may be less likely to seek treatment for eating disorders or to seek inappropriate treatment<sup>16,17</sup>
- Adolescent women who have spent more time viewing 'thin-ideal' media content are more likely to hold a negative body image<sup>18</sup>
- In Indigenous populations the social factors influencing mental illness are even more complex. These encompass a mix of adverse life events such as trauma, poverty, ill health, violence and racism in conjunction with systemic social and justice issues which combine to contribute to substantial psychological distress<sup>19</sup>
- There is also some evidence that the discontinuity identified as important for non-Indigenous adolescent women may be more pronounced as an influencing social factor for Indigenous populations.<sup>19</sup>

A number of potential social determinants have been linked with adolescent mental health although not specifically for women.

- Bullying or peer victimisation increases the likelihood of detrimental health behaviours such as unsafe sex and depression<sup>9</sup>
- In line with the life course approach, bullying behaviour may have occurred during childhood<sup>20</sup> or adolescence<sup>21</sup> and have impacts later in life
- Low levels of perceived parental care may contribute to poor adolescent mental health.<sup>22</sup>

## 5 Young adult women

Young adulthood is a life stage which is defined by a change in social and personal roles such as completing education, starting work and starting a family.<sup>23</sup> It is also a stage where important life decisions about advanced education, entering the workforce, establishing long term relationships including marriage and parenting are made.<sup>23</sup> In the context of the increasing age of first pregnancy for Australian women<sup>24</sup>, this life stage may extend up to 35–45 years for some women. These decisions not only affect health and social factors for young adult women directly but they also impact on health status and behaviours later in life.

### *Major health issues faced by young adult women*

#### **Sexual and reproductive health**

As young adulthood is typified by establishing long term relationships and starting a family, health issues for young adult women include a range of factors associated with sexual and reproductive health.

#### ***Pregnancy, birth and postnatal health***

- Fertility rates are declining for 20–29 year old women in NSW but increasing significantly for women 30 years and over<sup>24</sup>
- One-quarter of women over 35 years who give birth are doing so for the first time<sup>24</sup>
- It is estimated that infertility may affect approximately 15% of couples<sup>25</sup> and in line with this the use of Assisted Reproductive Technology (ART) is increasing for women aged 35–44 years<sup>25</sup>
- ART use is also increasing for younger women (25–34 years) although still significantly less than for women 35–44 years<sup>25</sup>
- Women in the latter stages of young adulthood (35 years and older) are more commonly birthing via caesarean delivery in NSW<sup>24</sup> as well as having a higher incidence of gestational diabetes mellitus (GDM) compared with younger adult women<sup>26</sup>
- Women with GDM are more likely to have premature births compared with mothers without GDM (21.5 vs. 8.6%)<sup>26</sup>
- A pre-existing diagnosis with type 1 or type 2 diabetes mellitus is linked with greater risks of preterm (20–31 weeks) birth, caesarean delivery, longer antenatal and postnatal hospital stays, stillbirth and low birth-weight babies<sup>26</sup>
- Maternal depression (both antenatal and postnatal) affects an estimated 15% of young adult women<sup>27</sup>
- 47.9% of Indigenous women smoke during pregnancy<sup>28</sup> and there is a substantially higher rate of perinatal mortality for Indigenous women in NSW when compared with the general population (13.4 vs. 8.0 per 1,000 births)<sup>29</sup>
- Migrant populations such as women from the Philippines, India, Fiji and Bangladesh have a comparably higher rate of preterm birth<sup>30</sup>
- Vitamin D deficiency has been identified as a significant issue for pregnant women with one in four pregnant women in NSW categorised with suboptimal vitamin D levels with 38% of those women being Caucasian.<sup>31</sup>

### ***Sexually transmitted infections and gynaecological conditions***

- Notifications of chlamydia in NSW are much higher for women compared with men and the current rate, which has shown a steady increase since 2002, is 317.9 per 100,000<sup>32</sup>
- These rates are substantially greater in Indigenous women although not as high as the rates for Indigenous men<sup>33</sup>
- Endometriosis occurs in 1.6% of young adult women in NSW<sup>34</sup>
- Polycystic ovarian syndrome (PCOS) is estimated to occur in between 5 and 10% of young adult women.<sup>35</sup>

### ***Cancer and cancer screening***

- There is an overall trend towards lower rates of new cases of cervical cancer in NSW since 1987 with the current rate at 8.4 per 100,000<sup>36</sup>
- Whilst the overall incidence of breast cancer diagnosis is higher in mid-aged and older women, the mortality rates of younger women who are diagnosed with breast cancer are higher than for older women.<sup>37</sup>

## **Mental health**

Young adult women in NSW have greater rates of high or very high psychological distress compared with men (12.2–12.5 vs. 8.6–10.0%).<sup>38</sup> Mental health issues in women also affect successive generations, as women with psychotic illness are more likely than men with psychotic illness to have children and many of these women have dependent children living with them.<sup>39</sup>

## ***Social determinants of health issues for young adult women***

Due to the diversity of health issues, a number of social factors are determinants of poor health for young adult women. The health issues associated with childbearing such as infertility and pregnancy complications are impacted by a complex array of factors.

- For women planning to conceive, current health problems may be a barrier to pregnancy alongside financial considerations and career ambitions<sup>40</sup>
- Advanced maternal age and cigarette smoking increases the risk of GDM<sup>41</sup> as may maternal vitamin D deficiency and insufficiency<sup>42</sup> which is associated with sun exposure and sun avoidance behaviour<sup>43</sup>
- Socioeconomic status impacts on childbearing women's BMI in part due to mothers from low socioeconomic backgrounds perceiving limitations to their ability to make time for healthy eating and exercise amongst family commitments<sup>44</sup>
- Socioeconomic status also impacts on young adult women's lifestyle and health behaviours<sup>45</sup> which influences their risk of key health conditions
  - A range of behavioural factors increase the risk of chlamydia infection in young women including younger age, having two or more partners in the last 12 months, and having unprotected sex with three more partners<sup>46</sup>
  - There is a greater chance of developing endometriosis for women who smoke, consume alcohol, drink coffee, are overweight, and are eating a diet rich in saturated fats<sup>47</sup>

- Poor dietary and exercise habits may also contribute to the development or severity of the PCOS<sup>48</sup> as weight gain and obesity exacerbate the features of this condition<sup>49</sup>
- Increased uptake of cervical screening is argued to be the best health behaviour to prevent against cervical cancer<sup>50</sup> alongside the Human Papilloma Virus vaccination program for adolescent women<sup>51</sup>
- Over half (55.1%) of young women in NSW take up biennial cervical cancer screening. This rate has remained steady since 2003<sup>52</sup>
- Women who are obese, reliant on welfare, current smokers, report childhood sexual abuse, and experience anxiety symptoms are less likely to participate in cervical screening<sup>53</sup>
- The increased risk for cervical cancer reported for Indigenous women is suggested to be linked to structural, social or individual barriers to screening, but details of the possible barriers have not been identified.<sup>54</sup>

### ***Social influences on mental health issues for young women are multifaceted***

- Maternal depressive symptoms are linked with the mother's social exclusion or isolation and unmet maternal expectations as well as infant behaviour<sup>55,56</sup>
- The severity of the symptoms of antenatal or postnatal depression for young adult women are associated with difficult financial situations, living in the suburb for one year or less, unplanned pregnancy, not breastfeeding and poor self-rated health<sup>57</sup>
- A significant risk factor for depression<sup>58,59</sup> and a social influence which is reported more frequently by women than men is domestic violence
  - One in six adult women has experienced actual or threatened physical or sexual violence perpetrated by a partner<sup>60</sup>
  - This domestic violence is linked with a higher incidence of homelessness, with 50% of women escaping from domestic violence being turned away from emergency shelter due to lack of space<sup>60</sup>
  - A large number of these women have children and are either Indigenous or overseas born<sup>60</sup>
  - The health effects of women's exposure to domestic violence and the adverse effects on their children includes unwanted and unplanned pregnancies, low birthweight babies, higher rates of abortion and sexually transmitted infections (including HIV infection) and the murder of both mother and child.<sup>60</sup>

## 6 Mid-age women

Mid-age for women occurs beyond young adulthood. This period is characterised by the end of the childbearing years (average 40–45 years) and the onset of menopause, prior to the onset of old age (around 65 years). Major health concerns for this age group are related to reproductive health and hormonal changes, mental health and the early effects of detrimental life-style habits and ageing.

### *Major health issues faced by mid-aged women*

#### Reproductive health

The time of transition toward menopause can be highly symptomatic and challenging for many women. Menopause is defined as the absence of menstruation for at least 12 months and generally occurs between 45 and 55 years with the average age being 51 years.<sup>61</sup>

- Menopausal symptoms such as hot flushes, night sweats, and sleeping difficulties can considerably impact on women's lives<sup>27</sup>
- Female reproductive cancers are a significant health issue in this age group with breast cancer being the leading cause of burden of disease in the 45 to 64 age group<sup>62</sup>
- 4,376 new cases of breast cancer and 248 cases of cervical cancer were diagnosed in NSW in 2008<sup>62</sup>
- The median age of diagnosis of breast cancer is 60 years and 53 years for cervical cancer<sup>62</sup>
- Screening remains the most important means of early detection<sup>63,64</sup> and in 2006, 76.2% of women aged 50 to 69 years had a mammogram for the detection of breast cancer within the previous 2 years<sup>65</sup>
- 78.9% of women aged 40 to 54 years were screened for cervical cancer<sup>65</sup>
- Aboriginal and Torres Strait Islander women had more than double the rate of cervical cancer in 2009–2010<sup>66</sup>, and a mortality rate of more than 5 times that for non-Indigenous women<sup>67</sup>
- Data on cervical screening participation rates of Indigenous women are not available, however there is evidence that screening rates are lower than for non-Indigenous women<sup>66</sup>
- While Indigenous women appear to have lower rates of breast cancer, they have twice the risk of death from breast cancer as non-Indigenous women<sup>68</sup>
- Indigenous women are less likely to participate in screening and more likely to be diagnosed with a more advanced breast cancer.<sup>68</sup>

#### Mental health

Women experience higher rates of psychological distress compared with males in this age-group.<sup>69</sup>

- 13.2% of women aged 45 to 54 years reported high or very high psychological distress compared to 11% of men<sup>69</sup>

- Anxiety and depression are the leading causes of burden of disease for women up to the age of 65 years, with women experiencing more than twice the burden of males (10% vs. 4.8%)<sup>70</sup>
- The highest suicide rate for women in 2008 was in the 45 to 54 year age group<sup>71</sup>
- Higher rates of mental health conditions are reported for mid-aged Indigenous women compared with non-Indigenous women including higher rates of related hospitalisation and mortality.

## *Social determinants of health issues for mid-aged women*

There are many social factors that affect mid-age women's mental health status.

- Women in this life stage are more likely to suffer from economic hardship and financial insecurity as a result of declining health, divorce, sole parenting and reduced workforce participation<sup>27,72</sup>
- Women from lower socioeconomic backgrounds are less likely to engage in physical activity and healthy eating and less likely to develop extensive social networks<sup>27</sup>
- Women from lower socioeconomic backgrounds are also more likely to have higher rates of tobacco smoking and obesity<sup>27</sup>
- Violence against women significantly impacts on the mental health status of mid-age women<sup>27</sup>
- Women who have been the victims of domestic violence have been shown to participate less in screening for breast and cervical cancers<sup>27</sup>
- Domestic violence or intimate partner violence is known to be a problem for women across all ages and 8% of women aged 40–49 years report domestic violence to the NSW police<sup>73</sup>
- Women living in rural and remote locations in Australia have consistently been found to have poorer outcomes after the diagnosis of breast cancer than their urban counterparts<sup>74,75</sup>
- Women in remote locations and women with low socioeconomic status are much more likely to be diagnosed with advanced breast cancer.<sup>76</sup> This may be due to delayed diagnosis related to geographical remoteness, inadequate transport and health workforce shortages<sup>74</sup>
- Indigenous women are subject to additional health risks due to higher levels of drinking and smoking, along with increased levels of partner and community violence<sup>73,77</sup>
- Women in this life stage commonly engage in unpaid work as a carer with 25% of mid-aged women currently caring for an ill, frail or disabled person<sup>78</sup>
- Caring is significantly correlated with depression in the carer<sup>78</sup>
- Women carers are less likely to be in paid employment and are more likely to reduce employment<sup>78</sup>, leading to concerns about financial security in retirement.

## 7 Older women

The definition of older age is generally considered to be beyond 65 years of age, with those aged 84 years and over described as *very old*. The Australian Bureau of Statistics predicts that by 2056, 25% of all Australians will be aged over 65 years; an increase from 13% in 2007.<sup>29,79</sup> Women tend to live longer than men; consequently they experience significantly more disability, primarily due to dementia and musculoskeletal disease.<sup>71</sup>

### Major health issues faced by older women

#### Cardiovascular/neurovascular

Cardiovascular diseases including stroke contribute to around 60% of all female deaths, with older women being 10% more likely than men to suffer from cardiovascular diseases.<sup>79,80</sup>

- In 2010, 61% of the recorded deaths from cerebrovascular disease were female<sup>29,79</sup>
- Heart failure, predominantly a condition of older people, is the eighth leading cause of death for women; it is more common among women than men due largely to their greater longevity<sup>29</sup>
- It is estimated that 25% of women aged 75 years and older have dementia, as compared to 17% of men<sup>71</sup>, with predictions of a 320% increase in the incidence of dementia in NSW by 2050<sup>81</sup>
- Dementia and Alzheimer's disease were the third ranked cause of death for women compared to sixth for men in 2010<sup>29</sup>
- Dementia and Alzheimer's disease are ranked as the fifth contributor to the burden of disease in women<sup>79</sup>, and are the leading cause of disability amongst older people in Australia<sup>82</sup>
- Alzheimer's disease is the most common cause of dementia and accounts for between 50 and 70% of cases.<sup>71</sup>

#### Mental health

Results from the Australian National Mental Health and Wellbeing survey showed that more older women than men suffered from depression or anxiety, which was shown to be associated with significant disability.<sup>83</sup> In 2010, 7.5% of women aged 65–74 years reported high or very high psychological distress compared to 5.7% of men in this age category.<sup>69</sup>

#### Musculoskeletal conditions

The prevalence of osteoarthritis is higher in women than men and increases with age.<sup>84</sup>

- 63% of women aged 77–85 years have been diagnosed with arthritis<sup>85</sup>
- Osteoarthritis has a considerable effect on an older woman's quality of life due to pain and limited mobility which in turn has an impact on self-care and ability to socialise with others<sup>85</sup>
- Limited mobility also increases the likelihood of a fall and, inversely, fear of falling decreases mobility<sup>86</sup>

- Women are at greater risk of developing osteoporosis after menopause due to accelerated bone-loss as a result of decreased circulating oestrogen<sup>87</sup>
- Often the diagnosis of osteoporosis occurs following a fall that has resulted in a fracture<sup>87</sup>
- Vitamin D deficiency is relatively common for women in this age group<sup>88</sup>, and leads to poor calcium uptake and bone mineralisation, increasing the risk of fractures<sup>89,90 91</sup>
- Duration of hospital stay after injury is also longer for women than men in this age group, reflecting higher rates of hip replacement in women.<sup>91</sup>

## Cancer

Breast cancer is a leading cause of cancer death in older women.

- In 2008, 69% of breast cancers in women were diagnosed between the ages of 40 and 69 with 25% being diagnosed at 70 years or older<sup>92</sup>
- The rate of breast cancer diagnosis declines after the age of 69, however this is believed to be due to reduced participation in screening, rather than an age related decrease<sup>92</sup>
- Mortality rates for women with breast cancer increase with age with the sharpest increase for women over 80 years.<sup>92</sup>

## *Social determinants of health issues for older women*

Women are living longer<sup>71</sup> and this is an important factor in the development of cardiovascular disease, musculoskeletal problems and dementia.

- They are generally more likely than younger women to suffer from obesity, have lower levels of adequate exercise and poorer economic status<sup>71</sup>
- Women of this age group have also been shown to have poor health literacy which may affect all aspects of their health<sup>71</sup>
- Older women are more likely to be widowed, live alone or in residential care, experience financial insecurity, suffer from chronic illness, have multiple disabilities and utilise health services than men<sup>71</sup>
- Women over 65 years are also likely to be caring for another person because of that person's illness or disability (usually a partner but sometimes a parent or older sibling)<sup>93</sup>
- Older women may feel marginalised or invisible within the community<sup>71</sup>
- Elder abuse is a significant health issue for Australian women in this age group with 2–3% of women in their early 70s experiencing physical abuse and 3–8% suffering psychological abuse<sup>94</sup>
- Older people in residential care, those with mobility issues, and geriatric patients admitted to hospital tend to have very low vitamin D levels<sup>90</sup>; this has particularly been shown to be the case in women<sup>88</sup>
- There also appear to be socioeconomic factors at play in the development of musculoskeletal disorders, as women with less formal education and lower financial status have higher rates of arthritis<sup>71,95</sup>
- Women from regional and remote areas are significantly more likely to develop arthritis<sup>71</sup> and women with arthritis commonly report suffering from other chronic health care conditions including depression and anxiety<sup>85</sup>

- Obesity is a crucial factor in the development of osteoarthritis<sup>71,96</sup> and rates of obesity are greater among those with a lower socioeconomic status and living in a remote location<sup>97,98</sup>
- The risk factors associated with breast cancer development in older women are similar to those in mid-age women and include being of higher socioeconomic status, living in urban areas<sup>92</sup>, higher alcohol consumption, inadequate exercise and obesity after menopause<sup>99,100</sup>
- Indigenous women have lower rates of breast cancer development, but also lower levels of screening.<sup>92</sup>

## 8 Global trends for sub-populations of women

Whilst this report presents a review of the social determinants affecting health issues which affect women across specific life stages it is important to highlight specific concerns for women within sub-populations. Where appropriate within the scope of the review, health issues for Indigenous women, ethnic women, and women living in rural and remote areas have been presented within each life stage. However, for each of these sub-populations there are global trends and underpinning social factors which influence their risk of developing health problems and transcend age-related constructs.

- Indigenous women experience poorer health across most health domains and substantially shorter life expectancy (by 9.7 years) compared with non-Indigenous women<sup>101</sup>
- Women living in rural/remote areas have poorer health than their urban counterparts including higher rates of asthma, arthritis, diabetes, hypertension, and some preventable cancers<sup>27</sup>
- Genetic predispositions to some health problems are more common in women from ethnic backgrounds, and this may be exacerbated by the adoption of Western diets and lifestyles when living in Australia<sup>27</sup>
- Lower levels of English proficiency may impact on the ability for some ethnic women to access health-related knowledge and health services<sup>27</sup>
- Lesbian and bisexual women may encounter health inequalities due to experiences of heterosexism, homophobia, and discrimination.<sup>27</sup>

## 9 Conclusion

The findings of this review identify consistency in many of the key health issues affecting women's health throughout their life. It also highlights the value in the life course approach as the conditions (e.g. depression, self-harm) within each broad category (e.g. mental health) develop into more chronic and complex conditions over the course of a woman's life. Likewise, a number of the social determinants which influence the likelihood of women being diagnosed with one of the identified key health issues are similar across the different life stages. With this in mind and in light of the life course approach which guides this review, the need to intervene and address these key health issues early in a woman's life is clearly highlighted.

## 10 Appendix 1: Details on methods for evidence search and inclusion

### *Hierarchical order of evidence*

Details on the hierarchical order of evidence searched and included for this report are as follows:

1. *Health statistics data available through the NSW Ministry of Health* – statistical information available through NSW Health was accessed and all relevant data were included where appropriate
2. *Reports and publications from other NSW surveys* – additional data were used from surveys of NSW populations
3. *Health Statistics available through the Australian Institute of Health and Welfare* – Australia's Health 2012 report was accessed and used to identify key national surveys reporting on prevalence of health conditions
4. *Reports and publications from other Australian national surveys* – Any available national surveys were accessed to fill gaps in NSW prevalence data
5. *Reports and publications from national and local surveys from other OECD countries* – where Australian data were not available international data were used. Where possible nationally-representative data were used, but if none were available then results from smaller studies were included. These smaller studies were only used to identify the social determinants of key health issues when other data were not available.

### *Search methods for additional peer-reviewed publications*

Publication searches for social determinants were undertaken through searching databases including PubMed and Google Scholar. Search terms used included 'social determinants', 'social', 'NSW', 'Australia', 'women' and other terms relevant to the key health issue (e.g. 'endometriosis' or 'breast cancer') and the life stage (e.g. 'teenage' or 'menopause'). Hand searching of citation lists was used to identify additional research.

### *Bibliography of resources accessed for NSW and Australian data*

A range of resources were accessed to identify prevalence of health issues for the target populations which reported on NSW and Australian national survey data including:

- BEACH study: [www.sydney.edu.au/medicine/fmrc/beach/index.php](http://www.sydney.edu.au/medicine/fmrc/beach/index.php)
- Department of Families, Housing, Community Services and Indigenous Affairs: [www.fahcsia.gov.au/our-responsibilities/women/publications-articles](http://www.fahcsia.gov.au/our-responsibilities/women/publications-articles)
- Department of Health and Ageing: [www.health.gov.au/internet/main/publishing.nsf/Content/Publications+Statistics+&+Resource+s-1](http://www.health.gov.au/internet/main/publishing.nsf/Content/Publications+Statistics+&+Resource+s-1)

- Medical Journal of Australia Women’s Health edition: [www.mja.com.au/journal/2003/178/12](http://www.mja.com.au/journal/2003/178/12)
- Aboriginal Health and Medical Research Council: [www.ahmrc.org.au/index.php?option=com\\_docman&Itemid=45](http://www.ahmrc.org.au/index.php?option=com_docman&Itemid=45)
- Telethon Institute for Child Health Research: [www.childhealthresearch.org.au/our-research/projects-index/c/child-and-adolescent-component-of-the-national-survey-of-mental-health-and-wellbeing.aspx](http://www.childhealthresearch.org.au/our-research/projects-index/c/child-and-adolescent-component-of-the-national-survey-of-mental-health-and-wellbeing.aspx)
- 2010 National Drug Strategy Household Survey Report: [www.aihw.gov.au/publication-detail/?id=32212254712](http://www.aihw.gov.au/publication-detail/?id=32212254712)
- Drugs in Australia 2010 – tobacco, alcohol and other drugs: [www.aihw.gov.au/publication-detail/?id=10737420497](http://www.aihw.gov.au/publication-detail/?id=10737420497)
- National Survey of Secondary Students and Sexual health: [www.latrobe.edu.au/arcshs/downloads/arcshs-research-publications/secondary-students-and-sexual-health-2008.pdf](http://www.latrobe.edu.au/arcshs/downloads/arcshs-research-publications/secondary-students-and-sexual-health-2008.pdf)
- Cancer in Adolescents and Young Adults in Australia: [www.aihw.gov.au/publication-detail/?id=10737420603&tab=2](http://www.aihw.gov.au/publication-detail/?id=10737420603&tab=2)
- Cancer in Australia: in brief 2012 [www.aihw.gov.au/publication-detail/?id=60129542358](http://www.aihw.gov.au/publication-detail/?id=60129542358)
- National Survey of Mental Health and Wellbeing: [www.health.gov.au/internet/main/publishing.nsf/content/mental-pubs-m-mhaust2](http://www.health.gov.au/internet/main/publishing.nsf/content/mental-pubs-m-mhaust2)
- National Survey of Psychotic Illness: [www.health.gov.au/internet/main/publishing.nsf/content/353E10EE88736E02CA2579500005C211/\\$File/psyexe.pdf](http://www.health.gov.au/internet/main/publishing.nsf/content/353E10EE88736E02CA2579500005C211/$File/psyexe.pdf)
- National Mental Health Report: [www.health.gov.au/internet/main/publishing.nsf/content/mental-pubs-n-report10](http://www.health.gov.au/internet/main/publishing.nsf/content/mental-pubs-n-report10)
- Diabetes in pregnancy: [www.aihw.gov.au/publication-detail/?id=6442472448](http://www.aihw.gov.au/publication-detail/?id=6442472448)
- Prevalence of Type 1 diabetes in Australian Children: [www.aihw.gov.au/publication-detail/?id=10737419239](http://www.aihw.gov.au/publication-detail/?id=10737419239)
- Arthritis and Musculoskeletal Conditions: [www.aihw.gov.au/arthritis-and-musculoskeletal-conditions-publications/](http://www.aihw.gov.au/arthritis-and-musculoskeletal-conditions-publications/)
- Oral Health and Dental Care in Australia: [www.aihw.gov.au/publication-detail/?id=10737420710](http://www.aihw.gov.au/publication-detail/?id=10737420710)
- Jean Hailes: [www.jeanhailes.org.au](http://www.jeanhailes.org.au)
- National Women’s Health Policy 2010: [www.health.gov.au/internet/main/publishing.nsf/content/A3D713CE1DCD64E5CA257457001D4ED0/\\$File/NWHP\\_access\\_final.pdf](http://www.health.gov.au/internet/main/publishing.nsf/content/A3D713CE1DCD64E5CA257457001D4ED0/$File/NWHP_access_final.pdf)
- NSW School Student Behaviour Survey: [www0.health.nsw.gov.au/resources/publichealth/surveys/hss\\_08.pdf](http://www0.health.nsw.gov.au/resources/publichealth/surveys/hss_08.pdf)

Not all of these resources are included in the reference list as some did not describe health issues which fit within the scope of this report.

## 11 References

1. Mishra GD, Cooper R, Kuh D. A life course approach to reproductive health: theory and methods. *Maturitas* 2010;65(2):92–97.
2. American Psychological Association. *Developing adolescents: a reference for professionals*. Washington, DC: American Psychological Association, 2002.
3. Viner RM, Ozer EM, Denny S, Marmot M, Resnick M et al. Adolescence and the social determinants of health. *Lancet* 2012;379(9826):1641–1652.
4. Jutte DP, Roos NP, Brownell MD, Briggs G, MacWilliam L et al. The ripples of adolescent motherhood: social, educational, and medical outcomes for children of teen and prior teen mothers. *Acad Pediatr* 2010;10(5):293–301.
5. NSW Health. Total births by mother's Aboriginality and maternal age. [Internet] 2012 [cited 27 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/atsi\\_bthage](http://www.healthstats.nsw.gov.au/Indicator/atsi_bthage)
6. Smith A, Agius M, Mitchell A, Barrett C, Pitts M. *Secondary students and sexual health 2008: results of the 4th national survey of Australian secondary students, HIV/AIDS and sexual health*. Melbourne: Australian Research Centre in Sex, Health and Society (ARCHSHS), 2009.
7. Centre for Epidemiology and Research. *New South Wales school students health behaviours survey: 2008 Report*. In: NSW Department of Health, Sydney, 2009.
8. Telethon Institute for Child Health Research. *Eating disorders*. [Internet] 2013 [cited 7 February 2013]. Available from: [childhealthresearch.org.au/our-research/projects-index/e/eating-disorders.aspx](http://childhealthresearch.org.au/our-research/projects-index/e/eating-disorders.aspx)
9. Sawyer SM, Afifi RA, Bearinger LH, Blakemore SJ, Dick B et al. Adolescence: a foundation for future health. *Lancet* 2012;379(9826):1630–1640.
10. Harden A, Brunton G, Fletcher A, Oakley A. Teenage pregnancy and social disadvantage: systematic review integrating controlled trials and qualitative studies. *BMJ* 2009;339:b4254.
11. Kalina O, Geckova AM, Klein D, Jarcuska P, Orosova O et al. Psychosocial factors associated with sexual behaviour in early adolescence. *Eur J Contracept Reprod Health Care* 2011;16(4):298–306.
12. Ali MM, Amialchuk A, Dwyer DS. Social network effects in contraceptive behavior among adolescents. *J Dev Behav Pediatr* 2011;32(8):563–571.
13. Gakumo CA, Moneyham LD, Enah CC, Childs GD. The moderating effect of sexual pressure on young urban women's condom use. *Res Nurs Health* 2012;35(1):4–14.
14. Kaltiala-Heino R, Rimpelä M, Rantanen P, Laippala P. Adolescent depression: the role of discontinuities in life course and social support. *J Affect Disord* 2001;64(2–3):155–166.
15. Fröjd S, Marttunen M, Pelkonen M, von der Pahlen B, Kaltiala-Heino R. Perceived financial difficulties and maladjustment outcomes in adolescence. *Eur J Public Health* 2006;16(5):542–548.
16. Mond JM, Hay P, Rodgers B, Owen C. Mental health literacy and eating disorders: what do women with bulimic eating disorders think and know about bulimia nervosa and its treatment? *J Ment Health* 2008;17(6):565–575.
17. Mond JM, Marks P, Hay PJ, Rodgers B, Kelly C et al. Mental health literacy and eating-disordered behavior: beliefs of adolescent girls concerning the treatment of and treatment-seeking for bulimia nervosa. *J Youth Adolesc* 2007;36(6):753–762.

18. Bissell K, Hays H. Exploring the influence of mediated beauty: examining individual and social factors in white and black adolescent girls' appearance evaluations. *Howard Journal of Communications* 2010;21(4):385–411.
19. Heath F, Bor W, Thompson J, Cox L. Diversity, disruption, continuity: parenting and social and emotional wellbeing amongst Aboriginal peoples and Torres Strait Islanders. *Aust NZ J Fam Ther* 2011;32(4):300–313.
20. Zwierzyńska K, Wolke D, Lereya TS. Peer victimization in childhood and internalizing problems in adolescence: a prospective longitudinal study. *J Abnorm Child Psychol* 2013;41(2):309–323.
21. A review of research on bullying and peer victimization in school: an ecological system analysis. *Aggress Violent Behav* 2012;17(4):311–322.
22. Rigby K, Slee PT, Martin G. Implications of inadequate parental bonding and peer victimization for adolescent mental health. *J Adolesc* 2007;30(5):801–812.
23. Jessor R, Donovan JE, Costa FM. *Beyond Adolescence: Problem Behaviour and Young Adult Development*. New York: Cambridge University Press, 1994.
24. Li Z, Zeki R, Hilder L, Sullivan EA. *Australia's Mothers and Babies 2010*. Perinatal Statistics series no. 27. Cat. no. PER 57. Canberra: Australian Institute of Health and Welfare, 2012.
25. Newman P, Morrell S, Black M, Munot S, Estoesta J et al. *Reproductive and sexual Health in New South Wales and Australia: Differentials, trends and assessment of data sources*. Sydney: Family Planning NSW, 2011.
26. Australian Institute of Health and Welfare. *Diabetes in pregnancy: its impact on Australian women and their babies*. Diabetes series no. 14. Cat. no. CVD 52. Canberra: Australian Institute of Health and Welfare, 2010.
27. Department of Health and Ageing. *Developing a Women's Health Policy for Australia – Setting the Scene*. Canberra: Commonwealth of Australia, 2008.
28. NSW Government. *Smoking at all during pregnancy by Aboriginality*. [Internet] 2012 [cited 17 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/atsi\\_smomum](http://www.healthstats.nsw.gov.au/Indicator/atsi_smomum)
29. NSW Government. *Perinatal mortality by mother's Aboriginality*. [Internet] 2011 [cited 12 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/atsi\\_peridth](http://www.healthstats.nsw.gov.au/Indicator/atsi_peridth)
30. NSW Government. *Preterm births by COB*. [Internet] 2012 [cited 12 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/cob\\_prem\\_cob](http://www.healthstats.nsw.gov.au/Indicator/cob_prem_cob)
31. Perampalam S, Ganda K, Chow K-A, Opie N, Hickman PE et al. Vitamin D status and its predictive factors in pregnancy in 2 Australian populations. *A N Z J Obstet Gynaecol* 2011; 51(4):353–359.
32. NSW Government. *Chlamydia notifications by month and sex, NSW 2002 to 2011*. [Internet] 2012 [cited 7 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/com\\_chlamnot](http://www.healthstats.nsw.gov.au/Indicator/com_chlamnot)
33. Lewis D, Newton DC, Guy RJ, Ali H, Chen MY et al. The prevalence of *Chlamydia trachomatis* infection in Australia: a systematic review and meta-analysis. *BMC Infect Dis* 2012;12(1):113.
34. Hadfield RM, Lain SJ, Raynes-Greenow CH, Morris JM, Roberts CL. Is there an association between endometriosis and the risk of pre-eclampsia? A population based study. *Human Reprod* 2009;24(9):2348–2352.
35. Norman RJ, Wu R, Stankiewicz MT. 4: Polycystic ovary syndrome. *Med J Aust* 2004;180(3):132–138.
36. NSW Government. *Cervical trends in new cases and deaths*. [Internet] 2012 [cited 17 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/can\\_cervcdth](http://www.healthstats.nsw.gov.au/Indicator/can_cervcdth)
37. Beadle GF, McCarthy NJ, Baade PD. Effect of age at diagnosis of breast cancer on the patterns and risk of mortality from all causes: a population-based study in Australia. *Asia Pac J Clin Oncol* 2013;9(2):129–138.

38. NSW Government. High or very high psychological distress by age and sex, persons aged 16 years and over, NSW 2011. [Internet] 2012 [cited 17 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/men\\_distr\\_age](http://www.healthstats.nsw.gov.au/Indicator/men_distr_age)
39. Morgan VA, Waterreus A, Jablensky A, Mackinnon A, McGrath JJ et al. People living with psychotic illness 2010: report on the second Australian national survey. Canberra: Commonwealth of Australia, 2011.
40. Holton S, Rowe H, Fisher J. Women's health and their childbearing expectations and outcomes: a population-based survey from Victoria, Australia. *Womens Health Issues* 2011;21(5):366–373.
41. Solomon C, Willett WC, Carey VJ, Rich-Edwards J, Hunter DJ et al. A prospective study of pregravid determinants of gestational diabetes mellitus. *JAMA* 1997;278(13):1078–1083.
42. Poel YHM, Hummel P, Lips P, Stam F, van der Ploeg T et al. Vitamin D and gestational diabetes: a systematic review and meta-analysis. *Eur J Intern Med* 2012;23(5):465–469.
43. van der Mei IA, Ponsonby A-L, Engelsen O, Pasco JA, McGrath JJ et al. The high prevalence of vitamin D insufficiency across Australian populations is only partly explained by season and latitude. *Environ Health Perspect* 2007;115(8):1132.
44. MacFarlane A, Abbott G, Crawford D, Ball K. Personal, social and environmental correlates of healthy weight status amongst mothers from socioeconomically disadvantaged neighborhoods: findings from the READI study. *Int J Behav Nutr Phys Act* 2010;7(1):23.
45. Mishra GD, Ball K, Dobson AJ, Byles JE. Do socioeconomic gradients in women's health widen over time and with age? *Soc Sci Med* 2004;58(9):1585–1595.
46. Walker J, Fairley CK, Bradshaw CS, Tabrizi SN, Chen MY et al. The difference in determinants of Chlamydia trachomatis and Mycoplasma genitalium in a sample of young Australian women. *BMC Infect Dis* 2011;11(1):35.
47. Parazzini F, Vercellini P, Pelucchi C. Endometriosis: Epidemiology, and Etiological Factors. In: Giudice LC, Evers JLH, Healy DL, eds. *Endometriosis: Science and Practice*. Oxford, UK: Wiley-Blackwell, 2012.
48. Carmina E. Genetic and environmental aspect of polycystic ovary syndrome. *J Endocrinol Invest* 2003;26(11):1151–1159.
49. Moran LJ, Lombard CB, Lim S, Noakes M, Teede HJ. Polycystic ovary syndrome and weight management. *Womens Health* 2010;6(2):271–83.
50. Scarinci IC, Garcia FAR, Kobetz E, Partridge EE, Brandt HM et al. Cervical cancer prevention. *Cancer* 2010; 116(11):2531–2542.
51. Quinn E, Donovan B, Sheppard VK. The early impact of the National HPV Vaccination program. *NSW Public Health Bull* 2012;23(9-10):208.
52. NSW Government. Cervical cancer biennial screening rates. [Internet] 2012 [cited 17 February 2013]. Available from: [www.healthstats.nsw.gov.au/Indicator/can\\_cervscr](http://www.healthstats.nsw.gov.au/Indicator/can_cervscr)
53. Olesen SC, Butterworth P, Jacomb P, Tait RJ. Personal factors influence use of cervical cancer screening services: epidemiological survey and linked administrative data address the limitations of previous research. *BMC Health Serv Res* 2012;12(1):34.
54. Vasilevska M, Ross SA, Gesink D, Fisman DN. Relative risk of cervical cancer in indigenous women in Australia, Canada, New Zealand, and the United States: a systematic review and meta-analysis. *J Public Health Policy* 2012;33(2):148–164.
55. Eastwood J, Jalaludin B, Kemp L, Phung H, Barnett B et al. Social exclusion, infant behavior, social isolation, and maternal expectations independently predict maternal depressive symptoms. *Brain Behav* 2013;3(1):14–23.
56. Eastwood JG, Jalaludin BB, Kemp LA, Phung HN, Barnett BE. Relationship of postnatal depressive symptoms to infant temperament, maternal expectations, social support and other potential risk

- factors: findings from a large Australian cross-sectional study. *BMC Pregnancy Childbirth* 2012;12(1):148.
57. Eastwood JG, Phung H, Barnett B. Postnatal depression and socio-demographic risk: factors associated with Edinburgh Depression Scale scores in a metropolitan area of New South Wales, Aus N Z J Psychiatry 2011;45(12):1040–1046.
  58. Faisal-Cury A, Menezes P, d'Oliveira A, Schraiber L, Lopes C. Temporal relationship between intimate partner violence and postpartum depression in a sample of low income women. *Matern Child Health J* 2012:1–7.
  59. Selic P, Pesjak K, Kersnik J. The prevalence of exposure to domestic violence and the factors associated with co-occurrence of psychological and physical violence exposure: a sample from primary care patients. *BMC Public Health* 2011;11(1):621.
  60. Tually S, Faulkner D, Cutler C, Slatter M. Women, domestic and family violence and homelessness: a synthesis report. Perth: Flinders Institute for Housing, Urban and Regional Research, 2008.
  61. Utian WH. The International Menopause Society menopause-related terminology. *Climacteric* 1999;2:284–286.
  62. Tracey E, Kerr T, Dobrovic A, Currow D. Cancer in NSW: Incidence and mortality report 2008. [Internet] 2010 [cited 17 February 2013] Available from: [www.cancerinstitute.org.au/media/32413/cim\\_2008\\_full.pdf](http://www.cancerinstitute.org.au/media/32413/cim_2008_full.pdf)
  63. Roder D, Houssami N, Farshid G, Gill G, Luke C et al. Population screening and intensity of screening are associated with reduced breast cancer mortality: evidence of efficacy of mammography screening in Australia. *Breast Cancer Res Treat* 2008;108(3):409–416.
  64. Yang B, Morrell S, Zuo Y, Roder D, Tracey E et al. A case-control study of the protective benefit of cervical screening against invasive cervical cancer in NSW women. *Cancer Causes Control* 2008;19(6):569–576.
  65. NSW Government. Cancer screening: breast and cervical. [Internet] 2007 [cited 11 February 2013]. Available from: [www0.health.nsw.gov.au/PublicHealth/surveys/hsa/06/toc/2\\_beh\\_03\\_cancer\\_breast\\_cervical.asp](http://www0.health.nsw.gov.au/PublicHealth/surveys/hsa/06/toc/2_beh_03_cancer_breast_cervical.asp)
  66. Australian Institute of Health and Welfare. Cervical screening in Australia 2009–2010. [Internet] 2012 [cited 17 February 2013]. Available from: [apo.org.au/research/cervical-screening-australia-2009-2010](http://apo.org.au/research/cervical-screening-australia-2009-2010)
  67. Shannon GD, Franco OH, Powles J, Leng Y, Pashayan N. Cervical cancer in Indigenous women: the case of Australia. *Maturitas* 2011;70(3):234–245.
  68. Roder D, Webster F, Zorbas H, Sinclair S. Breast screening and breast cancer survival in Aboriginal and Torres Strait Islander women of Australia. *Asian Pac J Cancer Prev* 2012;13(1):147–155.
  69. Centre for Epidemiology and Research, NSW Department of Health. New South Wales Population Health Survey 2010 (HOIST). [Internet] 2010 [cited 12 February 2013]. Available from: [www0.health.nsw.gov.au/PublicHealth/surveys/hsa/10pub/i\\_k10/i\\_k10\\_bar.asp](http://www0.health.nsw.gov.au/PublicHealth/surveys/hsa/10pub/i_k10/i_k10_bar.asp)
  70. Department of Families, Housing, Community Services and Indigenous Affairs. Women in Australia 2009. [Internet] 2009 [cited 11 February 2013]. Available from: [www.fahcsia.gov.au/our-responsibilities/women/publications-articles/general/women-in-australia/women-in-australia-2009](http://www.fahcsia.gov.au/our-responsibilities/women/publications-articles/general/women-in-australia/women-in-australia-2009)
  71. Department of Health and Ageing. National women's health policy 2010. Canberra: Department of Health and Ageing, 2010.
  72. Pit SW, Byles J. The association of health and employment in mature women: a longitudinal study. *J Womens Health (Larchmt)* 2012;21(3):273–280.
  73. Gretch K, Burgess M. Crime and Justice statistics: trends and patterns in domestic violence assaults: 2001 to 2010. [Internet] 2011 [cited 17 February 2013]. Available from: [www.sheriff.nsw.gov.au/lawlink/bocsar/ll\\_bocsar.nsf/vwFiles/BB61.pdf/\\$file/BB61.pdf](http://www.sheriff.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/BB61.pdf/$file/BB61.pdf)

74. Grimison P, Phillips F, Butow P, White K, Yip D et al. Are visiting oncologists enough? A qualitative study of the needs of Australian rural and regional cancer patients, carers and health professionals. *Asia Pac J Clin Oncol*, 2012.
75. Butow PN, Phillips F, Schweder J, White K, Underhill C et al. Psychosocial well-being and supportive care needs of cancer patients living in urban and rural/regional areas: a systematic review. *Support Care Cancer* 2012;20(1):1–22.
76. Baade PD, Turrell G, Aitken JF. Geographic remoteness, area-level socio-economic disadvantage and advanced breast cancer: a cross-sectional, multilevel study. *J Epidemiol Community Health* 2011;65(11):1037–1043.
77. Guest CS, O'Dea K, Carlin JB, Larkins RG. Smoking in Aborigines and persons of European descent in southeastern Australia: prevalence and associations with food habits, body fat distribution and other cardiovascular risk factors. *Aust J Public Health* 1992;16(4):397–402.
78. Changes in caring roles and employment in mid-life: findings from the Australian Longitudinal Study on Women's Health (ALSWH). [Internet] 2007 [cited 14 February 2013]. Available from: [www.health.gov.au/internet/publications/publishing.nsf/Content/ageing-publicat-caring-midlife.htm](http://www.health.gov.au/internet/publications/publishing.nsf/Content/ageing-publicat-caring-midlife.htm)
79. Australian Bureau of Statistics. Leading causes of death by gender. [Internet] 2012 [cited 11 February 2013]. Available from: [www.abs.gov.au/ausstats/abs@.nsf/Products/BBC4B00DFF0E942ACA2579C6000F6B15?opendocument](http://www.abs.gov.au/ausstats/abs@.nsf/Products/BBC4B00DFF0E942ACA2579C6000F6B15?opendocument)
80. Australian Institute of Health and Welfare. Australia's health 2008. [Internet] 2009 [cited 17 February 2013]. Available from: [www.aihw.gov.au/publication-detail/?id=6442468102](http://www.aihw.gov.au/publication-detail/?id=6442468102)
81. Access Economics. Projections of dementia prevalence and incidence in NSW: 2009–2050. [Internet] 2009 [cited 15 February 2013]. Available from: [www0.health.nsw.gov.au/pubs/2009/pdf/adhc\\_dementia\\_projections.pdf](http://www0.health.nsw.gov.au/pubs/2009/pdf/adhc_dementia_projections.pdf)
82. Australian Bureau of Statistics. Australian social trends: using statistics to paint a picture of Australian Society. [Internet] 2012 [cited 15 February 2013]. Available from: [www.ausstats.abs.gov.au/ausstats/subscriber.nsf/LookupAttach/4102.0Publication11.12.121/\\$File/41020\\_ASTDec2012.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/LookupAttach/4102.0Publication11.12.121/$File/41020_ASTDec2012.pdf)
83. Trollor JN, Anderson TM, Sachdev PS, Brodaty H, Andrews G. Prevalence of mental disorders in the elderly: the Australian National Mental Health and Well-Being Survey. *Am J Geriatr Psychiatry* 2007;15(6):455–466.
84. Australian Institute of Health and Welfare. A picture of osteoarthritis. [Internet] 2007 [cited 15 February 2013]. Available at: [www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442459825](http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442459825)
85. Parkinson L, Gibson R, Robinson I, Byles J. Older women and arthritis: tracking impact over time. *Australas J Ageing* 2010;29(4):155–160.
86. Boltz M, Resnick B, Capezuti E, Shuluk J. Activity restriction vs. self-direction: hospitalised older adults' response to fear of falling. *Int J Older People Nurs* 2013 Jan 7:doi: 10.1111/opn.12015.
87. Australian Institute of Health and Welfare. A snapshot of osteoarthritis in Australia 2010. Arthritis series no. 13. Cat. no. PHE 126. Canberra: AIHW, 2010.
88. Nowson CA, McGrath JJ, Ebeling PR, Haikerwal A, Daly RM et al. Vitamin D and health in adults in Australia and New Zealand: a position statement. *Med J Aust* 2012;196(11):686–687.
89. Lips P. Vitamin D physiology. *Prog Biophys Mol Biol* 2006;92(1):4–8.
90. Lips P, Hosking D, Lippuner K, Norquist JM, Wehren L et al. The prevalence of vitamin D inadequacy amongst women with osteoporosis: an international epidemiological investigation. *J Intern Med* 2006;260(3):245–254.

91. Australian Institute of Health and Welfare. Australia's Health 2012. [Internet] 2012 [cited 14 February 2013]. Available from:  
[www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737422169](http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737422169):
92. Australian Institute of Health and Welfare. Breast cancer in Australia: an overview. [Internet] 2012 [cited 11 February 2013]. Available from:  
[www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737423006](http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737423006)
93. Australian Bureau of Statistics. 4102.0 – Australian social trends, Dec 2012: Older carers. [Internet] 2012 [cited 26 February 2013]. Available from:  
[www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features40Dec+2012](http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features40Dec+2012)
94. Schofield M, Reynolds R, Mishra G, Powers J, Dobson A. Screening for vulnerability to abuse among older women: Women's Health Australia study. *Journal of Appl Gerontol* 2002;21(1):24–39.
95. Brennan S, Henry M, Kotowicz M, Nicholson G, Zhang Y et al. Incident hip fracture and social disadvantage in an Australian population aged 50 years or greater. *Bone* 2011;48(3):607–610.
96. Ackerman IN, Osborne RH. Obesity and increased burden of hip and knee joint disease in Australia: results from a national survey. *BMC Musculoskelet Disord* 2012;13(1):254.
97. Laatikainen T, Janus E, Kilkinen A, Heistaro S, Tideman P et al. Chronic disease risk factors in rural Australia: results from the Greater Green Triangle Risk Factor Surveys. *Asia Pac J Public Health* 2009;21(1):51–62.
98. Brennan SL, Henry MJ, Nicholson GC, Kotowicz MA, Pasco JA. Socioeconomic status and risk factors for obesity and metabolic disorders in a population-based sample of adult females. *Prev Med* 2009;49(2):165–171.
99. Cancer Australia. Report to the nation: breast cancer 2012. [Internet] 2012 [cited 13 February 2013]. Available from:  
[canceraustralia.gov.au/sites/default/files/publications/ca\\_report\\_to\\_the\\_nation\\_breast\\_cancer\\_2012\\_d15\\_508de9ff41cae.pdf](http://canceraustralia.gov.au/sites/default/files/publications/ca_report_to_the_nation_breast_cancer_2012_d15_508de9ff41cae.pdf)
100. Sweeney C, Blair CK, Anderson KE, Lazovich D, Folsom AR. Risk factors for breast cancer in elderly women. *Am J Epidemiol* 2004;160(9):868–875.
101. Australian Bureau of Statistics. 4125.0 – Gender indicators, Australia, Jan 2012. [Internet] 2012 [cited 1 March 2013]. Available from:  
<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by+Subject/4125.0~Jan+2012~Main+Features~Life+expectancy~3110>