Women's Health VICTORIA

July 2016 Issue 10

healthy • empowered • equal

Women and Oral Health

Women's Health Issues Paper

ISSN: 1837-4417

About Women's Health Victoria

WHV is a statewide women's health promotion, information and advocacy service. We work collaboratively with women, health professionals, policy makers and community organisations to influence systems, policies and services to be more gender equitable to support better outcomes for women.

As a statewide body, WHV works with the nine regional and two other statewide services that make up the Women's Health Association of Victoria (WHAV).[1] The women's health services network offers a unique approach to women's health across the state by providing an infrastructure which focuses on gender equality, health promotion and improving women's health outcomes.

Women and Oral Health
(Women's Health Issues Paper No. 10)

Compiled by: Petra Begnell, Renata Anderson, Anna O'Halloran

Level 8, 255 Bourke Street
Melbourne Victoria 3000, Australia
(GPO Box 1160 Melbourne, 3001)
Telephone: 03 9664 9300
Facsimile 03 9663 7955
Email whv@whv.org.au
URL: http://www.whv.org.au

Published July 2016

ISSN: 1837-4417

This paper is also available at:
http://whv.org.au/publications-resources/issues-papers

[1] The three statewide services are *Women's Health Victoria*, the *Multicultural Centre for Women's Health* and the *Royal Women's Hospital*. The nine regional services are *Women's Health and Wellbeing Barwon South West*, *Women's Health Grampians*, *Women's Health Loddon Mallee*, *Women's Health Goulburn North East*, *Gippsland Women's Health Service*, *Women's Health West*, *Women's Health in the North*, *Women's Health East* and *Women's Health in the South East*.

Table of Contents

Executive summary

Oral health is necessary for good quality of life and encompasses more than just having healthy teeth. Without good oral health, everyday functions such as eating, speaking and socialising can be difficult. Sex and gender differences interact to influence oral health risk factors, indicators, conditions and ways of using health care. Oral health is also strongly influenced by other social determinants of health, in particular socio-economic status. This paper highlights the issues that women face with their oral health, in particular:

- Women have higher rates of decayed, filled or missing teeth due to tooth decay (dental caries)
- Women on average have more missing teeth than men and are more likely to be edentulate (have few or no natural teeth)
- Hormonal changes, especially during pregnancy, can lead to increased risk for various types of gum disease, and have been associated with adverse pregnancy outcomes such as low birth weight and preterm birth
- Women are more likely to experience dental erosion due to eating disorders
- Women may suffer from head, face and neck injuries and dental neglect arising from intimate partner violence
- Women are more likely than men to report experiencing financial barriers or hardship related to visiting a dentist and over a third of women report avoiding or delaying dental care due to cost.

More research is needed on sex-differentiated biomedical factors and the impact these have on women's oral health. For example, there is a lack of evidence to explain women's higher rates of tooth decay and tooth loss but lower rates of periodontal disease. There is also an opportunity to consider gender-related impacts on women's oral health, including those arising from gendered violence and eating disorders, as well as gendered eating and health-seeking behaviours.

Good oral health is important throughout the lifespan. The two major sex hormones in women – progesterone and oestrogen - have a strong effect on women's oral health. These hormones fluctuate throughout women's lives, especially at puberty, menstruation, pregnancy and menopause, exposing women to tooth decay, periodontal disease and tooth loss. Improving health literacy around the impacts of hormonal changes and fluctuations across the lifespan would improve oral health outcomes for women.

During pregnancy, hormones can change the blood supply to the gums and, when plaque is present, cause pregnancy gingivitis. For women who experience nausea and vomiting during pregnancy, there is increased risk of erosion of tooth surface enamel. Despite the impact of pregnancy on oral health, most women do not access dental care while pregnant. Studies have also found associations between poor oral health, particularly moderate to severe periodontitis, and adverse pregnancy outcomes such as preterm birth and low birth weight. Including dental care as an essential component of antenatal care would improve maternal health and has the potential to reduce adverse pregnancy outcomes.

Intimate partner violence is the leading contributor to preventable illness, disability and death in Victorian women aged 15 to 44 years, with one in three women experiencing violence from an intimate partner in their lifetime. Head, face and neck injuries have been identified

as the most common type of physical injury in women experiencing intimate partner violence. Women who have experienced violence also identify oral health as a significant issue; some of these women may have experienced dental neglect as a result of financial abuse. There is an opportunity to build the capacity of dental professionals to screen for and identify intimate partner violence, as well as to provide information on where to seek assistance.

Women are more affected by eating disorders than men; in fact, the strongest risk factor for eating disorders is being female. Common impacts of eating disorders on oral health include dental erosion, high rates of tooth decay, low salivary flow, swelling of the salivary glands, and periodontal disease. There is an opportunity for dental professionals to screen and refer to specialist services those who suffer from eating disorders.

Ageing and conditions disproportionately affecting older women, including dementia, osteoporosis and xerostomia (dry mouth) also have negative oral health impacts. Women over the age of 65 are also more likely to have no natural teeth than men in the same demographic.

Research confirms that socioeconomic status and cost of care affect rates of dental visits, pointing to a need for more affordable and accessible oral health care for both women and men. Women are more likely than men to report experiencing financial barriers or hardship related to visiting a dentist and over a third of women avoided or delayed dental care due to cost.

There is little, if any, gendered research on the oral health of Aboriginal and Torres Strait Islander women, rural women, culturally and linguistically diverse (CALD) and refugee women, and women with disabilities. These populations tend to have poorer oral health than the general population of Australian women and face barriers to dental care such as cost and poor health literacy.

There are many opportunities to improve the oral and general health of women. WHV recommends:

1. More research on the impact of sex and gender on oral health
2. That dental care be subsidised through Medicare to improve affordability and access
3. Efforts to improve health literacy around the effects of hormonal changes during pregnancy on oral health and the importance of maintaining good oral health during pregnancy
4. That all pregnant women be entitled to free or low fee dental care as part of antenatal care
5. Capacity-building for oral health professionals to identify indicators of family violence in patients, and how to respond to this, including referral to appropriate services
6. Capacity-building for oral health professionals to identify indicators of eating disorders in patients, and how to respond to this, including referral to appropriate services
7. Inclusion of oral health promotion messages and dental treatment as a routine component of eating disorder treatment
8. Efforts to improve health literacy regarding eligibility for public dental care (especially targeted at culturally and linguistically diverse communities) and improve service

accessibility in regional and rural Victoria through teledentistry and other alternative service models

9. Greater emphasis on oral health practices, including regular dental check-ups and tooth brushing, for older women (and men) in residential care.
10. More Aboriginal community-controlled and culturally safe oral health services for Aboriginal and Torres Strait Islander people and an increase in the Aboriginal and Torres Strait Islander oral health workforce to deliver these services
11. Efforts to improve oral health literacy for women in prison and provision of regular oral health check-ups and treatments
12. Gendered research on the oral health of women with a disability, Aboriginal and Torres Strait Islander women, CALD women and rural women.

Introduction

Oral health is necessary for a good quality of life and encompasses more than just having healthy teeth. Oral health is a prerequisite for general health and wellbeing, and poor oral health is associated with poor overall health (Victoria. Department of Health 2014). As stated in the *National Oral Health Plan 2015-2024*, a healthy mouth enables people to speak, eat and socialise without pain, discomfort or embarrassment (Ford and Farah 2013). 'Oral diseases are the most common of the chronic diseases and are important public health problems because of their prevalence, their impact on individuals and society, and the expense of their treatment' (Sheiham 2005). Appearance and speech are impaired by oral disease may inhibit opportunities for education, employment and social interactions (Victoria. Department of Health 2013).

Oral disease is a key marker of disadvantage, with greater levels experienced by people on low income, dependent older people, Aboriginal people, people in rural areas, people with disability, and immigrant groups from culturally and linguistically diverse backgrounds (particularly refugees) (Victoria. Department of Health and Human Services 2015).

Women's and men's oral health needs differ (Grover, More, Singh 2014). An increase in evidence and understanding of the sex-differentiated biomedical impact on oral health is providing a strong foundation for further research and dental practice that is tailored to the different needs of women and men (Doyal and Naidoo 2010). Sex and gender differences interact to influence oral health risk factors, indicators, determinants, conditions, and ways of using health care. In addition, certain groups of women (for example, pregnant women) are at increased risk of poor oral health outcomes.

Oral health is influenced by a combination of biology, behaviour and social forces (Grover, More, Singh 2014). This Issues Paper investigates women's oral health from a sex (biological) and gender (social) perspective. It applies a 'gender lens' to indicators and determinants of women's oral health, and looks at issues associated with poor oral health in women. Finally, the oral health of at-risk and diverse population groups is examined, followed by a discussion of gaps in knowledge and research. The goal of this Issues Paper is to bring together available evidence and provide a starting point for discussion on ways to improve women's oral health outcomes.

Women's oral health status

The *2011-2012 Victorian Population Health Survey* found that most women feel positively about their oral health, with 19 per cent of women rating their oral health as 'excellent', 57 per cent 'good' or 'very good', 11.5 per cent 'fair', and 5 per cent rating their oral health as 'poor'. A higher proportion of women than men rated their oral health as 'excellent'. (Victoria. Department of Health 2014). There is a general trend for younger women to have better self-rated dental health than older women (Victoria. Department of Health 2014).

Despite reporting generally good oral health, many women live with the effects of poor oral health. Women are more at risk of certain oral health conditions that may have significant impacts on their quality of life. Dental problems cause more women than men to avoid eating certain foods (21.2 per cent compared with 13 per cent) and more women than men are

uncomfortable with the appearance of their teeth (28.5 per cent compared to 21.9 per cent) (Harford and Islam 2013).

Oral health indicators

The burden of oral disease comes from three main conditions: tooth decay, periodontal (gum) disease and oral cancer (Victoria. Department of Health 2013). Tooth decay and gum disease account for around 90 per cent of all tooth loss (Australian Health Ministers Advisory Council (AHMAC). Steering Committee for National Planning for Oral Health 2001).[2]

Tooth decay

The *Australian Institute of Health and Welfare* defines tooth decay, also known as dental caries, as 'bacterial disease that causes the demineralisation and decay of teeth and can involve inflammation of the central dental pulp' (Chrisopoulos and Harford 2013). Tooth decay is the most prevalent of all health conditions, and is more prevalent among women than men (Lukacs and Largaespada 2006), affecting an estimated 36 per cent of women globally (Marcenes, Kassebaum, Bernabé 2013). Australian women have a slightly higher average number of teeth that are decayed, filled or missing due to caries (13.29) compared to Australian men (12.42). However, *untreated* decay affects more men than women (28.2per cent of men compared to 22.7per cent of women) (AIHW 2016).

Periodontal (gum) disease

Periodontal disease is also known as gum disease. The two main types of periodontal disease are gingivitis, or inflammation of the gum tissue, and periodontitis, the inflammation of the deep tissues of the tooth socket (Chrisopoulos and Harford 2013).

Periodontitis is a progression of untreated gingivitis (Boggess and Edelstein 2006). It can lead to tooth and surrounding bone loss (George, Johnson, Blinkhorn 2010). Mild or severe periodontitis is reported to affect around a fifth of all Australian women and 26.8 per cent of men (AIHW 2016).

Gingivitis is the most prevalent oral condition associated with pregnancy, and occurs in 60 to 75 per cent of all pregnant women in the United States (American Dental Association Council on Access Prevention and Interprofessional Relations 2006, Russell 2013).

Tooth loss

Tooth loss is usually the result of a failure to prevent and treat oral disease (Harford and Islam 2013). Australian women, on average, have more missing teeth than men (5.4 compared with 4.8 teeth) and are more likely to be edentulate (lacking in natural teeth) – 4.9 per cent of women compared with 3.9 per cent men (AIHW 2016). Women over 65 years are more likely than younger women to be edentulate and lower household income is associated with higher numbers of missing teeth (AIHW 2016).

[2] Most recent data, as referenced in the AIHW's *Oral health and dental care in Australia: Key facts and figures trends 2014.*

Oral cancers

Oral cancer (encompassing lip, oral cavity, and pharyngeal cancers) is the sixth most common cancer in men and eleventh most common cancer in women in Victoria (Thursfield, Giles and Farrugia 2014). In 2013, oral cancer accounted for 1.8 per cent of newly diagnosed cancer in Victorian women and 3.3 per cent of new diagnoses in Victorian men (Thursfield, Giles and Farrugia 2014). The median age of oral cancer diagnosis in Victorian women is between 65 and 69 years, and the 5-year survival rate for oral cancer in Victorian women is relatively high – 76 per cent for salivary gland cancer, 61 per cent for cancer of the oral cavity, and 58 per cent for the pharynx (Thursfield, Giles and Farrugia 2014). Despite the incidence of oral cancer in women being low, it has increased over time and international studies show the incidence of oral cancer in women has increased compared to men. In the United States, the male to female ratio for oral cancer was 6:1 in the 1950s, but this has decreased to 2:1 in the US (Zavras, Shanmugam, Shetty 2013) and 3:1 in the majority of developed nations (Kruse, Bredell and Grätz 2011). In addition, while the incidence of some types of cancer (such as cervical cancer) is falling, the incidence of oral cancer is not. For example, the incidence rate of oral and pharyngeal cancer (OPCs) in non-Hispanic white women in the United States has overtaken that of cervical cancer (Zavras, Shanmugam, Shetty 2013).

Alcohol and tobacco consumption have been identified as the predominant causes of oral cancer (Zavras, Shanmugam, Shetty 2013). Though the impact of tobacco as a risk factor for oral cancer in women is established, the effect of alcohol on the development of oral cancer in women is still unclear (Zavras, Shanmugam, Shetty 2013) (Takács, Koppány, Mihályi 2011). Women have been underrepresented in the clinical research on the links between alcohol and oral cancer, and only a handful of studies have investigated the biological pathways that connect alcohol consumption and the development of oral cancer in women (Zavras, Shanmugam, Shetty 2013).

There are a number of other risk factors for oral cancer. For example, a possible link has been observed between salivary gland cancer and the BRCA-positive gene mutations that can be responsible for women's breast and ovarian cancers (Shen, Teknos, Toland 2014).

Human papillomavirus (HPV) is known to be the predominant cause of cervical cancer, and in recent years, HPV has also been identified as a risk factor for oral cancer – specifically the oral cavity, oropharynx and tonsil (Cogliano, Baan, Straif 2011, Zavras, Shanmugam, Shetty 2013). A study of oropharyngeal squamous cell carcinoma samples found that 72 per cent tested positive for HPV, with HPV 16 and 18 – the strains most associated with cervical cancers – found in nearly two thirds of these positive samples (Steinau, Hariri, Gillison 2014). HPV has been identified as the predominant cause of oral pharyngeal cancers in developed nations (D'Souza and Dempsey 2011). Studies of the prevalence of oral HPV-16 infection in the US indicate that it is nearly three times higher in men than women. Women with cervical HPV infection are 5 times more likely to have oral HPV infection than those without cervical infection (Steinau, Hariri, Gillison 2014). Sexual activity is hypothesised as the route of oral HPV infection (Gillison, Chaturvedi and Lowy 2008), and there are consistent calls for further investigation into HPV-associated oral cancer (Zavras, Shanmugam, Shetty 2013). Women with a history of cervical cancer have been found to have an increased risk of developing oropharyngeal cancer, compared to other women (Dost, Ford and Farah 2013).

Vaccines to prevent genital HPV infection cover HPV 16 and 18, and so in theory there is potential for current HPV vaccines to prevent a significant proportion of HPV-associated oropharyngeal cancer (Chaturvedi 2010). Research has begun into the effects of the available HPV vaccines on the prevention of oral cancer, with great potential for prevention and reduction in the incidence of oropharyngeal cancer (Gillison, Chaturvedi and Lowy 2008, Hocking, Stein, Conway 2011).

Sex differences and oral health

Sex differences refer to the biological differences between women and men. This section explores the ways that female biology affects genetics, hormones and saliva and impacts on oral health status.

Genetics

Although research on a genetic link to tooth decay is still developing, recent scientific studies imply that there is a connection between two sex-linked genes, Amelogenin X and Amelogenin Y, and women's predisposition to higher rates of dental caries (Russell, Gordon, Lukacs 2013).

Hormones

The two major sex hormones in women – progesterone and oestrogen - have a strong effect on women's oral health (American Dental Association Council on Access Prevention and Interprofessional Relations 2006). These hormones fluctuate throughout women's lives, especially at puberty, menstruation, pregnancy and menopause (Grover, More, Singh 2014), exposing women to tooth decay, periodontal disease and tooth loss.

Progesterone, which is produced in the ovaries from puberty to menopause, increases significantly during pregnancy, and is linked to poorer oral health outcomes in women. It makes the gums more sensitive to irritation and inflammation, also known as gingivitis (Zitzmann, Schilling, Weiger 2007). The effects of pregnancy on oral health are discussed in more detail later in this paper. High levels of progesterone from contraceptive medications have also been linked to poorer oral health, however modern contraceptives use much lower doses of sex hormones, and so the effects of current contraceptives on salivary makeup and flow are minimal (Otomo‐Corgel 2013).

Oestrogen is any of a group of steroid hormones that promote the development and maintenance of female characteristics of the body (Oxford University Press (ed.) 2015). Oestrogen receptors are present in the oral mucosa, and changes in oestrogen levels have been shown to have a direct impact on women's oral health (Grover, More, Singh 2014). Rates of dental caries have been shown to increase as oestrogen levels increase, potentially pre-disposing women to the higher rates of dental caries consistently seen in global population health surveys. By contrast, male sex hormones do not have a corresponding impact on men's oral health. No relationship has been found between androgens (male sex hormones) and rates of dental caries (Lukacs and Largaespada 2006).

Oestrogen is present in high levels during puberty, menstruation, and especially pregnancy, when women's oestrogen levels are higher than at any other time (Lukacs and Largaespada 2006). Hormonal changes during pregnancy can lead to increased risk for various types of

gum disease. Decreased oestrogen levels during menopause affect salivary composition and flow, which is associated with xerostomia or 'dry mouth', painful mouth, and burning mouth syndrome (Grover, More, Singh 2014).

Saliva

Saliva protects the oral cavity by shielding and washing the gums and teeth. It also has antimicrobial and re-mineralising properties (Ferraro and Vieira 2010). There are differences in the form and function of salivary glands of women and men that expose women to poorer oral health outcomes. Women's salivary glands are generally smaller than those of men (Zitzmann, Schilling, Weiger 2007). Women's salivary flow rate is lower, and the composition of saliva differs between women and men (Lukacs and Largaespada 2006). A reduced salivary flow rate can lead to oral dryness (xerostomia). This condition is more common in women than men and is associated with lower oestrogen levels often seen during menopause (Grover, More, Singh 2014, Zitzmann, Schilling, Weiger 2007). Lower salivary flow rates lead to a higher risk of dental caries (Ferraro and Vieira 2010) as well as oral candidiasis, dental plaque and gingivitis, which can lead to periodontitis (Grover, More, Singh 2014).

Gender and oral health

Gender refers to the different social and cultural roles, attitudes, behaviours, expectations, and constraints attributed to or associated with a particular biological sex (male or female). This includes the social constructs of masculinity and femininity, and how various attributes and cultural norms are assigned to men or women.

Limited research evidence is available on the impact of gender on oral health. Women's oral health is predominantly studied in relation to hormonal changes and reproduction, which ignores the complexity of women's lives and the influences of gender (Martinez-Mier and Zandona 2013). There is a particular lack of evidence on the links between gender and dental health (Martinez-Mier and Zandona 2013). Despite this, some evidence is emerging that gender impacts on women's oral health risk exposure, health service visiting behaviour and access to services. These are explored below.

Exposure to risk factors

Behavioural and social risk factors interact to expose women to poor oral health outcomes. Two significant risk behaviours for poor oral health in both women and men are smoking and oral hygiene. Numerous studies have found that women's dental hygiene is generally better than men's – they are more likely to report brushing their teeth more than once a day (Bertea, Staehelin, Dratva 2007). Even though women generally take better care of their oral health, there are still disparities in oral health outcomes. It seems that good dental hygiene is not enough to ensure good oral health – women are experiencing other obstacles to good oral health that are not being overcome. High sugar consumption and unhealthy diet is also a key cause of tooth decay (NHMRC 2013).

The oral health impacts of smoking are well established and include oral cancer, periodontal (gum) disease, halitosis (bad breath), and oral mucosal diseases (Petersen 2003). Around 10.6 per cent of Victorian women (Australia. Department of Health 2016) and 39% of

Aboriginal and Torres Strait Islander women are current smokers (ABS 2013). Research shows that smokers are less likely to see a dentist than non-smokers (Sibbritt, Byles and Tavener 2010).

A number of social risk factors are associated with poor oral health in both women and men. In Victoria, those reporting poor oral health were significantly more likely to have not progressed beyond primary school education; not be in paid work; have a household income of less than $40,000 per year; report high or very high levels of psychological distress; not be physically active; a current smoker, report their health as being fair or poor; and be underweight (Victoria. Department of Health 2014). Low socio-economic status is associated with poor access to dental services and preventative treatment and linked to higher consumption of sugar, tobacco and alcohol, contributing to poor oral health for women and men (Australian Health Ministers' Advisory Council. Oral Health Monitoring Group 2015).

There are also social factors associated with being a woman that provoke stress responses and affect women's biological ability to fight disease. These include single parenting, economic disadvantage, intimate partner violence, eating disorders, living longer lives, and higher use of medications (Shah 2003).

The role of women in society is reported to be a risk factor for dental caries (Ferraro and Vieira 2010). The division of labour, which traditionally sees women take on the bulk of household tasks, is said to influence women's oral health (Lukacs 2011). This refers to the traditional responsibility of women for food preparation, with access to food throughout the day, rather than just at mealtimes (Lukacs and Largaespada 2006). The more frequently foods containing added sugars are consumed, the greater the risk of caries, since frequent consumption does not allow remineralisation of the teeth (Balakrishnan, Simmonds and Tagg 2000). The acidity of sweetened drinks also contributes to dental erosion, a major factor in dental decay (American Academy of Pediatrics. Committee on School Health 2004), however Australian men consume more of these drinks than women (ABS 2014). The expectation of women to put the needs and wellbeing of others first may also be having a detrimental effect on women's oral health (Kandiyoti 1998).

Women are particularly exposed to living in poverty because of gender inequalities in income and wealth (Doyal and Naidoo 2010). Women's poverty and economic inequality has been called a 'significant risk to their oral health' (Doyal and Naidoo 2010). One US study has found a relationship between older women's financial hardship and self-reported oral health. Specifically, when older women report three or more financial hardships, they are more likely to report poor self-rated oral health than older women with no financial hardship. The same study found no relationship between the number of financial hardships and self-rated oral health for older men (Chi and Tucker-Seeley 2013). This implies that women experiencing multiple financial challenges may have the poorest self-rated oral health of all groups. Further research is needed to understand the ways in which gender and a lack of economic resources interact with oral health outcomes (Chi and Tucker-Seeley 2013).

Women experience depression at higher rates than men and are almost twice as likely to be prescribed antidepressants (ABS 2008) (ABS 2016). Common side effects of antidepressants include burning mouth and xerostomia (Zitzmann, Schilling, Weiger 2007).

Visiting behaviour and access to services

Women are more likely than men to seek medical assistance from a general practitioner (Victoria. Department of Health 2014), and this trend extends to dental visits. Women in Victoria are more likely than men to have visited a dentist in the previous 12 months (60.6 per cent of women compared with 52.9 per cent of men) (Victoria. Department of Health 2014), and this pattern is mirrored in national statistics (Harford and Islam 2013).

The primary means of accessing dental care in Australia is via the private system (Mejia, Jamieson, Ha 2014), which has been described as unfair due to the cost of dental treatment for the individual (Armfield, Mejia and Jamieson 2013). This system has created inequalities in dental visiting behaviours, which exacerbates inequalities in oral health outcomes (Armfield, Mejia and Jamieson 2013, Ford, Cramb and Farah 2014).

Women are more likely than men (42.5 per cent compared to 33 per cent) to report experiencing financial barriers or hardship related to visiting a dentist (Harford and Islam 2013). The *National Dental Telephone Interview Survey* found that 35.3 per cent of women avoided or delayed dental care because of the cost (compared to 26.9 per cent of men); 22 per cent said that cost had prevented them from accessing recommended treatment; and 12.7 per cent felt that dental visits in the previous 12 months were a large financial burden (Harford and Islam 2013).

Dental Health Services Victoria provides subsidised healthcare to Health Care Card and Pensioner Concession Card holders (capped at $108 for general dental and $326 for a course of specialist dental care) and free general dental for those who are homeless or at risk of homelessness, refugees and asylum seekers, and Aboriginal and Torres Strait Islander people.[3] Despite this, 37.9 per cent of people eligible for public dental care report cost as a barrier to visiting the dentist (AIHW 2016). The high costs of private dental care are also a barrier for those ineligible for public dental care, with almost 30 per cent reporting avoiding dental care due to costs(AIHW 2016). Women are more likely to report a lot of difficulty in paying a $200 dental bill than men (33.7 per cent compared to 22.9 per cent) (AIHW 2016). Though oral health is a significant health issue, unlike general medical services, which are government-subsidised at around 70 per cent, dental care is only subsidised at 27.6 per cent (AIHW 2014) (VCOSS 2015). Those who are not eligible for public dental care, but cannot afford private care, slip through the cracks of the Australian dental system (Ford, Cramb and Farah 2014, Mejia, Jamieson, Ha 2014).

Australian findings also suggest that women are more likely to see a dentist if they live in a city, are married or in a defacto relationship; have a high level of education; find it easy to live on their income; or have private health insurance (Sibbritt, Byles and Tavener 2010). Of women needing treatment who did not see a dentist, half cited inability to afford dental care as the reason for not seeking treatment (Sibbritt, Byles and Tavener 2010).

Research confirms that socioeconomic status and cost of care are affecting rates of dental visits (Anikeeva, Brennan and Teusner 2013). One study found that the cost of treatment is a significant barrier to older women seeking dental care (Sibbritt, Byles and Tavener 2010). It has been hypothesised that women are prioritising areas other than health care when making purchasing decisions (Jatrana 2012).

[3] See section on *'Policy context'* for more detail regarding public dental healthcare in Victoria

Issues associated with poor oral health

Oral disease is a prevalent chronic disease and shares common risk factors with a number of chronic conditions such as heart disease, cancer and stroke (Victoria. Department of Health 2011). Chronic periodontitis has an adverse effect on the control of blood sugar and the incidence of diabetes complications. Poor oral health is associated with poor diet, aspiration pneumonia and infective endocarditis. Gum disease is associated with rheumatoid arthritis, adverse pregnancy outcomes and coronary heart disease, although causation has not been proved (Victoria. Department of Health 2011).

Cardiovascular disease

There is a growing body of research on the relationship between cardiovascular disease and periodontal disease. However, there is uncertainty as to the strength of this relationship and its direction, specifically, whether periodontal disease contributes to cardiovascular disease or vice versa (Pussinen and Könönen 2016). This is compounded by the fact that the two conditions share many risk factors including smoking, increasing age and diabetes (Lockhart, Bolger, Papapanou 2012). Very little research exists on the relationship between cardiovascular disease and oral disease in women. One study found an association between tooth loss and cardiovascular disease in women (Buhlin, Gustafsson, Ahnve 2005), but another found no association (Desvarieux, Schwahn, Völzke 2004). These conflicting results highlight the need for more research in this area.

Intimate partner violence

It is well established that intimate partner violence has significant physical, mental, social and financial impacts on women. Intimate partner violence is the leading contributor to preventable illness, disability and death in Victorian women aged 15 to 44 years (Victorian Health Promotion Foundation (VicHealth) 2004), with one in three women experiencing violence from an intimate partner in their lifetime (Cox 2015).

While the negative impacts of intimate partner violence on overall health have been extensively reported, the impacts on oral health have received less attention. A number of major international studies and reviews have not incorporated the oral health impacts of intimate partner violence (Campbell 2002, Ellsberg, Jansen, Heise 2008, World Health Organization 2013).

It is difficult to quantify the oral health impact of intimate partner violence due to a paucity of research, together with methodological issues in the research that exists. There is anecdotal and theoretical evidence to indicate women experiencing intimate partner violence suffer negative oral health impacts. Some of this evidence is discussed below.

The literature identifies head, face and neck injuries as the most common type of physical injury in women experiencing intimate partner violence (American Dental Association Council on Access Prevention and Interprofessional Relations 2006, Saddki, Suhaimi and Daud 2010, Tam, Joyce, Gerber 2010). One study found oral trauma to be present in 13 per cent of injuries from intimate partner violence. This included: injury to the teeth and periodontium; the gums, palate and inside the cheek; jaw bones; lips; tongue; and tissue around the mouth that cover the jaws (Caldas, Grams, Afonso 2012). Dentists may also

observe signs of strangulation, including ligature marks, bruises, and breathing and swallowing difficulties (Gwinn, McClane, Shanel-Hogan 2004).

Dental neglect, caused by restricting access to dental care, can also be a sign of domestic violence in the form of financial abuse and manifest in untreated caries, infection or pain, and lack of continuity of care (National Health Resource Center on Domestic Violence 2005).

Women who have experienced violence have identified oral health as a significant issue. The *Australian Domestic and Family Violence Clearinghouse* conducted interviews and focus groups with women leaving violent relationships who raised dental and orthodontic care as one of six key areas in which they faced significant costs (Braaf and Meyering 2011). The report stated that 'participants called strongly for the [public health] system to provide more comprehensive coverage of medical treatment, and in particular, for Medicare to cover dentistry' (Braaf and Meyering 2011).

A number of studies have outlined the role of dental professionals in screening for and responding to signs of physical abuse in female patients (Caldas, Grams, Afonso 2012, Hendler and Sutherland 2007, Nelms, Gutmann, Solomon 2009). Internationally, the dental profession has been identified as having an obligation to screen for and identify intimate partner violence as well as to provide information on where to seek assistance (2007, Coulthard and Warburton 2007, Hendler and Sutherland 2007, Nelms, Gutmann, Solomon 2009, Ramesh, Ganda, Ganguly 2011). It has been reported that women suffering from intimate partner violence-related injuries may avoid seeking medical attention, but tend to keep their dental appointments (Nelms, Gutmann, Solomon 2009, RANZCP 2015). As a typical dentist appointment is around 45 minutes' duration compared to a 10 minute GP consultation, dentists are well placed to build the trust necessary to screen for family violence (National Health Resource Center on Domestic Violence 2005).

The 2015-16 Victorian Royal Commission into Family Violence (RCFV) found that 'mainstream services such as health services must be able to identify risk and refer victims to services that can provide more comprehensive support' (RCFV 2016). It stated that:

> The evidence shows that embedding family violence awareness across entire health systems is the most successful way of building confidence in practitioners to recognise and respond effectively to family violence, and increasing the numbers of victims who are able to disclose family violence (RCFV 2016).

A number of submissions to the RCFV identify dentists as potential allies in early detection of, and intervention in, family violence by facilitating disclosure, offering support and referral, and providing appropriate medical services. (RANZCP 2015, RCFV 2016). The RCFV report identified a willingness to act among dental professionals, but 'a feeling of helplessness at what to do or where to go' and a need for policies, guidelines and training (RCFV 2016).

Appropriate and culturally safe family violence identification training for dentists would facilitate collaboration with protective and family violence services and increase opportunities for early detection and intervention. The RCFV recommended the development of a workforce development and training strategy that would provide for minimum standards and core competencies to guide identifying, risk assessment and risk management practice across family violence specialist services, mainstream services and universal services (Recommendation 3). Consistent with Recommendation 1, these minimum standards and

core competencies should be based on the Common Risk Assessment Framework (CRAF), which is currently being revised, to ensure a consistent approach to screening, risk assessment, risk management, information-sharing and referral (RCFV 2016).

The *American Dental Association* (Crozier 2015) and the *National Institute for Health and Care Excellence* in the UK have policies in place to encourage and support dental professionals in the identification and reporting of intimate partner violence. The UK guidelines also state that dental services 'should be trained to respond to disclosure of domestic violence and abuse sensitively and in a way that ensures people's safety' (NICE (UK) 2014).

Training of dental students in identifying and responding to family violence is beginning to emerge in Australia. While lectures on this topic have been delivered in some tertiary institutions, it is yet to be made part of the tertiary dental health education syllabus. The Australian Dental Association has indicated that they would welcome 'specialised training for dentist students and support for dentists to recognise and assist patients who present with trauma that could be related to domestic violence' (RCFV 2016).

Eating disorders

Women are more affected by eating disorders than men (Steinberg 2014); in fact, the strongest risk factor for eating disorders is being female (Treasure, Claudino and Zucker 2010). Lifetime prevalence of anorexia nervosa in Australian women has been estimated to be 1.9 per cent, and 2.9 per cent for both bulimia nervosa and binge eating disorder (Wade, Bergin, Tiggemann 2006). Eating disorders such as anorexia nervosa, bulimia nervosa and binge eating disorder can manifest oral signs within six months of consistent behaviours (such as malnutrition, dehydration and vomiting) (DeBate, Cragun, Severson 2014).

There are a number of oral health impacts associated with eating disorders. Dental erosion (irreversible loss of dental hard tissue due to exposure to acid) is reported as the most common oral health impact of eating disorders (Johansson, Norring, Unell 2012, Jugale, Pramila, Murthy 2014, Romanos, Javed, Romanos 2012, Uhlen, Tveit, Stenhagen 2014). Other oral health impacts include:

- high rates of dental caries (Jugale, Pramila, Murthy 2014, Lo Russo, Campisi, Di Fede 2008)
- low salivary flow (Dynesen, Bardow, Petersson 2008)
- swelling of the salivary glands (Lo Russo, Campisi, Di Fede 2008) and
- periodontal disease (Bhargava, Motwani and Patni 2013, Romanos, Javed, Romanos 2012).

These impacts are caused by vitamin and nutritional deficiencies associated with disordered eating, dietary behaviours, eating disorder behaviours and oral health behaviours (Lo Russo, Campisi, Di Fede 2008). A meta-analysis of 10 studies worldwide found that those with an eating disorder had five times the rate of dental erosion and had significantly more decayed, missing and filled teeth regardless of whether they practised self-induced vomiting (Kisely, Baghaie, Lalloo 2015). Frequency and number of vomiting episodes were not linearly associated with higher rates of tooth erosion, and may be more closely aligned with acidic diet and consumption of acidic foods (Kisely, Baghaie, Lalloo 2015).

There appears to be a complex relationship between eating disorders and other factors that contribute to poor oral health, such as vomiting (Bhargava, Motwani and Patni 2013, Romanos, Javed, Romanos 2012, Steinberg 2014, Uhlen, Tveit, Stenhagen 2014), high acid diets (Lo Russo, Campisi, Di Fede 2008)(Milosevic 1997 article ordered), and the use of antidepressant medication (Bhargava, Motwani and Patni 2013, Dynesen, Bardow, Petersson 2008, Romanos, Javed, Romanos 2012). More research is needed to establish whether the observed relationships are causal or due to the confounding effects of other factors.

Many women with eating disorders experience poor oral health. Therefore oral health promotion messages and dental treatment should be included as a routine component of eating disorder treatment. The *Royal Australian and New Zealand College of Psychiatrists* clinical guidelines for the treatment of eating disorders recommends oral care for people with eating disorders, specifically, dental referral for tooth erosion (Hay, Chinn, Forbes 2014). Dentists have an opportunity to engage in secondary or tertiary prevention of eating disorders, however this function is often not performed due to lack of expertise in eating disorders and fear of offending patients (DeBate, Cragun, Severson 2014).

Women with eating disorders appear to have higher levels of dental anxiety than the general population (Sirin, Yucel, Firat 2011). Dental anxiety often leads to the avoidance of dental treatment which can lead to worsening oral health (Mehrstedt, John, Tönnies 2007). Given the potentially significant oral health implications of eating disorders, it is especially important that women with eating disorders seek oral health care.

Osteoporosis

Osteoporosis is estimated to affect 23 per cent of Australian women aged 50 years and over (AIHW 2014). It is characterised by decreased bone mass which is associated with an increased likelihood of fracture (American Dental Association Council on Access Prevention and Interprofessional Relations 2006). Impacts of osteoporosis on oral health stem from the resorption of the jaw bone (bone loss), which negatively affects the attachment of teeth and can lead to tooth loss (Hughes 2007). Osteoporosis has been linked to periodontitis, however it is not thought to be a cause. Rather osteoporosis can worsen pre-existing periodontitis, thereby increasing the risk of tooth loss (Grover, More, Singh 2014). Bisphosphonate medications, commonly given to treat osteoporosis, can result in bisphosphonate-associated osteonecrosis of the jaw. This is when the jaw bone becomes exposed, typically after invasive dental treatment (such as tooth extraction) and has trouble healing due to the medication's effects. Patients taking high and/or intravenous doses of bisphosphonate medications are most at risk (Zitzmann, Schilling, Weiger 2007). The increase in the number of older women will likely lead to an increase in the use of these medications in the future. Therefore preventative dental health and avoiding invasive treatment will be important for this cohort.

Diabetes

Diabetes prevalence is higher in men than women (6 per cent compared to 4 per cent) and is three times more likely to affect those in the lowest socio-economic group than the highest (AIHW 2012). Aboriginal and Torres Strait Islander women report diabetes and/or high blood sugar at a higher rate (9.6 per cent) than Aboriginal men (7.7 per cent) (Burrow and Ride

2016). Aboriginal women are also over 1.5 times as likely to develop gestational diabetes as non-Aboriginal women (AIHW 2010, Burrow and Ride 2016).

Diabetics are more susceptible to infection anywhere in the body, which makes them more likely to have periodontal disease (Victoria. Department of Health 2011). In particular, diabetics with poor blood glucose control are especially at risk of developing periodontal disease. Emerging research indicates that the relationship between periodontal disease and diabetes is interdependent – the presence of periodontal disease may also cause difficulty for diabetics in controlling their blood sugar (Casanova, Hughes and Preshaw 2014). People with diabetes are twice as likely to have urgent dental treatment needs as those without this condition (Victoria. Department of Health 2011).

Sjogren's syndrome

Sjogren's syndrome is an autoimmune disease that affects the production of saliva and tears. It affects about 0.5 per cent of the population and per cent of sufferers are women (Błochowiak 2016). Oral symptoms may include dry mouth, difficulty talking, chewing, or swallowing; a sore or cracked tongue; dry or burning throat; a change in the sense of taste or smell; increased dental decay; joint pain; and digestive problems (MOVE Muscle Bone and Joint Health 2016). The reduction in production of saliva associated with Sjogren's syndrome increases the risk of oral infections (Błochowiak 2016).There is no cure but patients with oral dryness are advised to apply artificial saliva or anticholinergic drugs.

Dementia and Alzheimer's Disease

In Australia, women make up 64 per cent of those identified with Alzheimer's Disease or dementia (ABS 2012). Studies have shown that earlier gum disease is associated with greater risk of developing dementia. Periodontitis is common in elderly people and may also be a contributing factor to cognitive decline in people with Alzheimer's Disease (Ide, Harris, Stevens 2016). The body's inflammatory response to increased rates of cognitive decline suggests that it would be worth exploring whether the treatment of gum disease might also benefit the treatment of dementia and Alzheimer's Disease (Ide, Harris, Stevens 2016).

At risk and diverse population groups

Pregnant women

During pregnancy, women can experience increased risks of gum disease and tooth decay (Zitzmann, Schilling, Weiger 2007). The hormonal impacts of pregnancy on oral health have already been outlined. Pregnancy hormones can change the blood supply to the gums and, when plaque is present, can cause pregnancy gingivitis (Zitzmann, Schilling, Weiger 2007).

For women who experience nausea and vomiting during pregnancy, there is increased risk for erosion of tooth surface enamel (Steinberg, Hilton, Iida 2013). Pregnant women may also experience 'pregnancy epulis' (localised swelling of the gum), which usually shrinks in the postpartum period (Steinberg, Hilton, Iida 2013).

Studies have found associations between poor oral health, particularly moderate to severe periodontitis, and adverse pregnancy outcomes such as preterm birth and low birth weight (Glascoe, Brown, Marshall 2015). However, causation has not been proven. Risk factors for periodontitis are similar to those for preterm birth and include smoking and low socio-

economic status (Glascoe, Brown, Marshall 2015). There is also a high degree of variability in these study populations, recruitment and assessment methods, and definition of 'periodontitis case' (Ide and Papapanou 2013). Whether or not treating periodontitis in pregnant women reduces adverse pregnancy outcomes is contested (Schwendicke, Karimbux, Allareddy 2015). A meta-analysis is currently underway to form a better understanding of the relationship between periodontitis and pregnancy outcomes, as well as the efficacy of preventative measures and interventions (Vanterpool, Tomsin, Reyes 2016).

Despite the impacts of pregnancy on women's oral health, and the discomfort that is associated with them, most women do not access dental care while pregnant. In fact, studies have consistently found that more than half of pregnant women had not been to the dentist in the previous 12 months. Furthermore, only a third of pregnant women report seeing a dentist during their most recent pregnancy, even though between 40 and 60 per cent recalled having sore and/or bleeding gums (Keirse and Plutzer 2010, Thomas, Middleton and Crowther 2008).

A number of barriers have been found to affect the oral health seeking behaviour of pregnant women. The cost of dental treatment is the predominant reason for a lack of dental care during pregnancy in Australian women (Keirse and Plutzer 2010, Thomas, Middleton and Crowther 2008). However, Dental Health Services Victoria offers discounted or free services to those who hold Health Care or Pensioner Concession Cards, refugees and Aboriginal and Torres Strait Islander people, with eligible pregnant women given priority access to dental care.[4]

Despite there being no evidence of dental treatment being harmful to pregnant women or the developing foetus (George, Johnson, Blinkhorn 2010), research from the United States indicates that misunderstanding about the safety of dental procedures during pregnancy is common (George, Johnson, Duff 2012), even among some dental professionals (Kloetzel, Huebner, Milgrom 2012). Reasons for these misunderstandings centre around a lack of information and a lack of emphasis on the importance of dental care in pregnancy (George, Johnson, Duff 2012).

In what appears to be an effort to address some of the barriers to accessing dental care in pregnancy, there has been a recent shift in the Australian *Clinical practice guidelines for antenatal care* to include oral health information and advice as part of standard antenatal care (Australian Health Ministers' Advisory Council (AHMAC) 2012). However, financial barriers have not been addressed, and calls for an expansion of public dental services to include all pregnant women have been unsuccessful (George, Johnson, Blinkhorn 2010).

There is currently a trial underway in Australia to determine the effectiveness of a Midwife Initiated Oral Health-Dental Service (MIOH-DS). As oral health during pregnancy continues to be poorly resourced, the MIOH-DS aims to provide pregnant women with oral assessments and dental referrals by midwives, improve oral health knowledge and increase the uptake of dental services (Johnson, George, Dahlen 2015).

Older women

Oral health in old age is influenced by oral health and general health and wellbeing throughout the life course (Griffin, Jones, Brunson 2012, Holm‐Pedersen, Schultz‐Larsen,

[4] See '*Policy context*' section for more information on Victorian public dental care eligibility.

Christiansen 2008). Oral health is also affected by poorer mobility, increased tiredness and need for assistance, which are associated with advancing age (Avlund, Holm‐Pedersen and Schroll 2001).

Australian women live longer than men, with more chronic disease and disability (AIHW 2014). Women's oral health declines with age. Older women (aged 65 years and over) in Victoria were least likely of all Victorian women to rate their oral health as 'excellent' or 'very good' (Victoria. Department of Health 2014).

The AIHW's 2015 Oral Health report found that 21 per cent of women aged over 65 years had no natural teeth, compared with 17 per cent of men (AIHW 2016). This figure does not represent the complete picture of edentulism in Victoria, as people living in residential care facilities were not included in the survey. Recent studies of Victorian residential aged care facilities support these figures, and found female residents were more often edentulate, had fewer remaining teeth and were more likely to wear dentures than male residents (Hopcraft, Morgan, Satur 2012, Silva, Hopcraft and Morgan 2014).

A number of health impacts have been associated with edentulism in older women, including obesity (Österberg, Dey, Sundh 2010) and also significant weight loss (Ritchie, Joshipura, Silliman 2000), the onset of disability and higher risk of mortality (Holm‐Pedersen, Schultz‐Larsen, Christiansen 2008). Partial edentulism in older women has been linked to increased risk for both coronary heart disease and a fatal coronary event (Hung, Joshipura, Colditz 2004), and has been found to be a strong predictor of mortality (Ansai, Takata, Soh 2010).

While retaining natural teeth into old age is a positive indicator of overall health, it also means these teeth are susceptible to decay and more visits to the dentist are required (Hopcraft, Morgan, Satur 2012). Around a third of older women participating in the *Australian Longitudinal Study of Women's Health* saw a dentist at least once in the previous year (Sibbritt, Byles and Tavener 2010). Five per cent of women in the sample group had needed to see a dentist in the previous year but did not – the most common reasons for this were long wait times for an appointment, being unable to afford the consultation fee, and transport difficulties (Sibbritt, Byles and Tavener 2010). Older women who are in better general health are more likely to see a dentist, while smokers, women who are having trouble living on their income, and/or those who have a lower educational level are less likely to consult a dentist (Sibbritt, Byles and Tavener 2010).

Living in a residential aged care facility is associated with being functionally dependent for basic personal care (Kandelman, Petersen and Ueda 2008), including oral care. In Australia, 70 per cent of people living in residential aged care are women (AIHW 2012). While more older people are retaining their natural teeth, living in residential aged care facilities appears to be exposing residents to poor oral health. The high level of dependency of nursing home residents is strongly associated with a higher number of decayed teeth (Silva, Hopcraft and Morgan 2014). This is most likely due to poor and irregular oral hygiene assistance from residential aged care facility staff together with resident resistance to oral hygiene assistance (Silva, Hopcraft and Morgan 2014, Tham and Hardy 2013). Poor oral hygiene is associated with aspiration pneumonia in older people living in residential aged care facilities, and interventions to improve oral hygiene in these settings have reduced the number of pneumonia infections (van der Maarel-Wierink, Vanobbergen, Bronkhorst 2013).

For more information on the oral health of older women, see also ‘Osteoporosis’ and ‘Dementia and Alzheimer’s disease’ in the ‘Issues associated with poor oral health’ section of this paper.

Aboriginal and Torres Strait Islander women

The health status of Aboriginal and Torres Strait Islander women is significantly worse than that of other Australian women, the gap being described as ‘very, very wide’ (Burns, MacRae, Thomson 2013). In relation to oral health, Aboriginal and Torres Strait Islander people experience more frequent and more severe tooth decay, higher rates of gingivitis and periodontal disease, higher rates of oral cancer, and higher rates of complete tooth loss at a younger age, coupled with the scarcity of timely, culturally appropriate dental services (Williams, Jamieson, MacRae 2011) (Aboriginal Health and Medical Research Council 2016).

Tooth decay and periodontal disease is significantly associated with many of the chronic diseases that contribute to the gap in life expectancy between Aboriginal and non-Aboriginal people in Australia (Aboriginal Health and Medical Research Council 2016, Dental Health Services Victoria 2011), including diabetes, which affects 10 per cent of Aboriginal women compared to 8 per cent of Aboriginal men (ABS 2014).

A South Australian study comparing the oral health of 446 pregnant Aboriginal women to the general female population found that twice as many reported a need for fillings and six times as many reported a need for tooth extractions (Jamieson 2013). About two thirds of the Aboriginal women involved in this study reported avoiding dental care due to cost (Jamieson 2013).

The adverse oral health experiences of Aboriginal and Torres Strait Islander people have been attributed to socioeconomic disadvantage and poor access to culturally appropriate services, as well as a lack of access to healthy food, oral hygiene products and preventative and restorative oral health care (Williams, Jamieson, MacRae 2011) (Aboriginal Health and Medical Research Council 2016).

The Aboriginal and Torres Strait Islander oral health disparity is so severe that drastic action for population-wide benefit is understandably the focus of oral health interventions. Developing an understanding of the oral health of Aboriginal and Torres Strait Islander women, along with an understanding of the gendered nature of women’s experiences would add value to current policy, service design and provision. Currently, the University of Sydney is conducting a systematic review of Aboriginal and Torres Strait Islander cultural competence in dentistry and oral health higher education (Forsyth, Irving, Gilroy 2016).

Rural women

A small number of studies of older rural women have confirmed the poor availability of dental care outside urban areas of Australia (Adams, Slack‐Smith, Larson 2004, Sibbritt, Byles and Tavener 2010). Older women living in rural areas show poorer rates of dental visiting than older women living in urban areas, and older women living in remote areas have still poorer visiting rates (Adams, Slack‐Smith, Larson 2004).Older people (over 55) living in rural Victoria are three times more likely to be edentulate than city-dwelling non-healthcare card holders and much less likely to have used a dental service within the last 12 months. Though 90 per cent of the population in this study were eligible for low fee public dental care,

barriers cited were cost, waiting list and availability of clinics/services (Marino, Khan, Tham 2014).

A recent study into the oral health of older people in rural Victoria found that a significant proportion of participants had a fatalistic attitude towards ageing and oral health, believing that tooth loss was inevitable (Mariño, Hopcraft, Ghanim 2015). This finding, coupled with findings of poor understanding of periodontal disease and oral cancer, suggests that it is vital to improve health literacy in older rural populations. The study also identified potential delivery models for oral health services such as via social clubs, retirement homes and residential aged care, as well as teledentistry (Mariño, Hopcraft, Ghanim 2015).

Culturally and linguistically diverse (CALD) women

Very little research exists on the oral health experience of women from culturally and linguistically diverse (CALD) backgrounds. One recent study of migrant mothers in Melbourne found that they experience significant barriers to accessing dental care, including having insufficient information to navigate the public / private dental system, waiting lists for public dental care, the cost of services, and communication with dental health professionals (Riggs, Gussy, Gibbs 2014). A study of Afghan and Sri Lankan women found that many believe that dental treatment during pregnancy is unsafe, are unaware of the impacts of poor maternal oral health and are unaware that pregnant refugee women are entitled to free public dental care in Victoria. (Riggs, Yelland, Shankumar 2016).

Women with disabilities

Australians with disabilities live with poorer oral health than the rest of the population, and face significant barriers to oral health promotion and dental treatment (Australian Health Ministers' Advisory Council. Oral Health Monitoring Group 2015). There is an absence of information on the oral health status, needs and service usage of people with disabilities, and no Australian population oral health data specific to people with disabilities exists (Australian Health Ministers' Advisory Council. Oral Health Monitoring Group 2015) (Australia. National Oral Health Plan Development Group 2015). There is also no research on the oral health experiences and needs of women with a disability. People with disabilities who are receiving care from a disability service provider are deemed priority patients for low fee public dental care. However, cost and information barriers may still remain.

Women in prison

Women in prison have poorer oral health than other women and engage in behaviours that are more harmful to their oral health (Rouxel, Duijster, Tsakos 2013). Prisoners in Victoria have higher rates of tooth decay, gum disease and tooth loss, and, in terms of their exposure to oral health risk factors, are more likely to have: experience of social disadvantage; early exposure to tobacco, alcohol and other drugs; and minimal contact with oral health care and oral health promotion interventions (Deloitte Consulting 2003).

Prisoners in Victoria have access to ‘dentistry and oral health care’ (Victoria. Department of Justice and Regulation 2015), however the specifics of these services are not publicly reported. In some instances, prisoners only become aware of their poor oral health when they enter prison and commence a substance use detoxification program. Detoxification can unmask oral disease that was previously hidden due to the analgesic properties of substances such as opiates or alcohol (Scottish Oral Health Improvement Prison Programme (SOHIPP) 2014).The prison setting offers a unique opportunity to move beyond

the provision of clinical and health information interventions to improve the long-term oral health of inmates through changes to the prison environment, and capacity building and empowering inmates to improve their oral health (Rouxel, Duijster, Tsakos 2013).

Policy context

Federal level

The *National Oral Health Plan 2015-2024* calls for increased access to dental health services and oral health promotion efforts to reduce preventable oral disease. The plan recognises that socioeconomic status affects a person's ability to access dental and preventative services and that low socioeconomic status is linked with higher consumption of sugar, alcohol and tobacco which increases the risk of tooth decay, gum disease and oral cancer. However the plan contains no gendered data or analysis. The plan does not consider pregnant women a priority population despite evidence that poor maternal oral health is associated with adverse pregnancy outcomes. Nor does the plan take into consideration the role of women's sex hormones in oral health (Australian Health Ministers' Advisory Council. Oral Health Monitoring Group 2015) or other gender-related impacts.

In April 2016, the Federal Government abolished the Child Dental Benefits Scheme (CDBS) and replaced it with the Child and Adult Public Dental Scheme (caPDS) promising subsidised dental care for every Australian child under 18 and eligible low-income adults. While the old program provided vouchers for treatment at private clinics, the new scheme will be directed towards publicly funded dentists.

The National Oral Health Alliance and the Australian Dental Association have raised concerns with the caPDS, particularly in relation to inadequate funding, rural access to public dental care, and the strain it will place on the public health system (National Oral Health Alliance 2016) (ADA 2016). Affordability may also differ from state to state as state governments will have to meet co-funding requirements. Given children and adults on concession cards have differing needs, it has been argued that it would be better to create CBDS-like programs to target other at-risk populations rather than attempt to address diverse needs through a single scheme (National Oral Health Alliance 2016).

At the time of writing, the status of the caPDS was unclear. It was legislated to commence on 1July 2016, but the federal election means that the CDBS will likely remain in operation until a newly elected parliament votes otherwise, possibly later in 2016.

State level

The goal of the *Victorian Action Plan for Oral Health Promotion 2013-2017* (Victoria. Department of Health 2013) is to improve the oral health of Victorians including population groups at higher risk of poorer oral health. The action plan provides a framework for whole-of-sector partnerships necessary to strengthen the oral health promotion system.

The Department of Health & Human Services funds Dental Health Services Victoria (DHSV) to deliver public dental services (the Victorian Dental Health Program). DHSV provides services to eligible Victorians directly through the Royal Dental Hospital Melbourne (RDHM) and purchases services from 54 integrated and registered community health services and hospitals.

Under the Victorian Dental Health Program, free emergency and general dental care is available to Aboriginal and Torres Strait Islander people, refugees and asylum seekers, homeless people and those at risk of homelessness, children aged 0-17 years who are dependent on a Health Care Card or Pensioner Concession Card holder, youth justice clients and those in out-of-home-care aged up to 18 years, registered clients of mental health and disability services, and those experiencing financial hardship. However, fees apply for specialist services. Discounted emergency, general, denture and specialist dental care can be accessed by Health Care Card or Pensioner Concession Card holders. In 2016, discounted fees for general dental are $27 per visit or capped at $108 for a course of dental care. Specialist services are capped at $326. In circumstances where local community dental clinics are not available, eligible patients may obtain a voucher from DHSV for treatment at a private clinic for the cost of public dental care, however vouchers may not cover all private dental costs.[5]

All eligible clients presenting for care are assessed and those requiring routine care are placed on one of three waiting lists: general care, denture care and urgent denture care. Specific populations of eligible people who experience barriers to accessing health services are given priority. This means they are offered the next available appointment and not placed on a waiting list. Priority populations include children, pregnant women, Aboriginal people, refugees and asylum seekers, people facing homelessness and people registered as clients of mental health and disability services.

While Health Care Cardholders are eligible for public dental services,the average waiting time for general dental care in Victoria has increased over the past year from 12.7 months to 14.6 months (VCOSS 2015, Victoria. Department of Health 2016).

Gaps

This Issues Paper highlights gaps in research on the effects of both sex and gender on women's oral health.

The sex and gender differences between women and men's oral health have been given insufficient consideration (Doyal and Naidoo 2010). Women's oral health is predominantly studied in relation to hormonal changes and reproduction, which ignores the complexity of women's lives and the influences of gender (Martinez-Mier and Zandona 2013). There is a particular lack of evidence on the links between gender and dental health (Martinez-Mier and Zandona 2013).

Though research on differences in patterns of oral health between women and men is growing, not enough attention has been paid to how this translates into practice (Doyal and Naidoo 2010).Connections can be made between risk factors, for example, women are more exposed to poverty, and those in poverty have poorer oral health, therefore poverty is a factor in women's poorer oral health, however direct links between gender, oral health and other social determinants have not yet been established.

[5] Please see Dental Health Services Victoria's website for more information: https://www.dhsv.org.au/patient-information/who-is-eligible

When both sex and gender differences are combined, a profile of women's oral health emerges that raises many questions. There is a lack of empirical evidence to explain phenomena such as women's higher rates of tooth decay and tooth loss but lower rates of periodontal disease, and the extent to which women's protective health behaviours such as good oral hygiene and dental treatment rates protect them from poor oral health outcomes. With evidence emerging of the role that genetics and hormones play in determining women's oral health, a better understanding of the most effective ways of lowering rates of tooth decay and tooth loss in women could potentially have a significant impact on future oral health outcomes.

More research is needed on the links between poor maternal oral health and adverse pregnancy outcomes as well as the relationship between women's cardiovascular and oral health. There are also gaps in research around the oral health and experiences of women with disabilities and mental illness, as well as gendered research on the oral health of Aboriginal and Torres Strait Islander women and culturally and linguistically diverse women.

Good oral health throughout the lifespan is important, particularly because women have a longer life expectancy. Available evidence points to a need for more affordable and more accessible oral health care for women, and all Australians. As a structural determinant of health, changes to the dental health system in Australia could have broad, long-lasting effects on health that include and go beyond women's oral health.

In addition to improving the affordability and accessibility of oral health care overall, there are many opportunities to improve dental health and general health care for women. These include building the capacity of dentists to identify and refer to specialist services patients who may have an eating disorder or be experiencing intimate partner violence. Including dental care as an essential component of antenatal care would not only improve maternal health, but may also reduce adverse pregnancy outcomes associated with poor oral health. Improving health literacy around the impacts of hormonal changes and fluctuations across the lifespan would also lead to oral health improvements for women.

Conclusion and recommendations

This Issues Paper has brought together evidence on some of the ways women experience oral health and ill health. It explores the complexity of the determinants of women's oral health and has highlighted gaps in evidence, which may be impeding progress on improving women's oral health outcomes. Women's Health Victoria recommends:

1. More research be undertaken on the impact of sex and gender on oral health.
    - There is limited research on the way sex and gender influence women's oral health risk factors, access to services and health service visiting behaviour. For example, there is little understanding of the reasons why, despite women's overall better dental care attendance, women have more decayed, missing or filled teeth than men.
2. That dental care be subsidised through Medicare to improve affordability and access.
    - Currently, dental care is out of reach for many Australian women and men due to cost as well as service availability. Dental care is only subsidised at 27

per cent compared to general medical services, which are subsidised at 70 per cent.
    - Those who are not eligible for public dental care, but cannot afford private care, slip through the cracks of the Australian dental system.
    - Women are more likely than men (42.5 per cent compared to 33 per cent) to report financial barriers or hardship related to visiting a dentist and more than a third of women reported avoiding or delaying dental care because of the cost.
3. Efforts to improve consumer health literacy about the effects of hormonal changes during pregnancy on oral health and the importance of maintaining good oral health during pregnancy.
4. That all pregnant women be entitled to free or low fee dental care as part of antenatal care.
    - Hormonal changes, especially during pregnancy, can lead to increased risk for various types of gum disease, and have been associated with adverse pregnancy outcomes such as low birth weight and preterm birth.
    - Despite these risks, many pregnant women do not access dental care while pregnant.
5. Capacity-building for oral health professionals to identify indicators of family violence in patients, and how to respond to this.
    - This involves incorporation of core competencies relating to family violence into the dental curriculum, as well as education for established oral health professionals, and development of resources for use in dental surgeries.
    - Consistent with the recommendations of the Victorian Royal Commission into Family Violence, training for dentists and dental students to recognise and assist women experiencing family violence should be based on the revised Common Risk Assessment Framework (CRAF).
6. Capacity-building for oral health professionals to identify indicators of eating disorders in patients, and how to respond to this, including referral to appropriate services.
    - This involves training for dental students at university, education for established oral health professionals, and development of resources for use in dental surgeries.
7. Oral health promotion messages and dental treatment be included as a routine component of eating disorder treatment.
    - This may involve educating and building the capacity of services supporting women with eating disorders to better understand and respond to the oral health needs of their clients.
8. Efforts to improve health literacy regarding eligibility for public dental care (especially targeted at culturally and linguistically diverse communities) and improve service accessibility in regional and rural Victoria through teledentistry and other alternative service models.

- Many of those who are entitled to discounted or free public dental care are unaware that they are eligible, including refugees, asylum seekers and other CALD concession card holders.
- Barriers to accessing oral health care for regional and rural Victorians include cost, service availability and the length of wait lists. Service delivery via teledentistry and other alternative delivery models have been suggested.

9. More Aboriginal community-controlled and culturally safe oral health services for Aboriginal and Torres Strait Islander people and an increase in the Aboriginal and Torres Strait Islander oral health workforce to deliver these services.

    - The adverse oral health experiences of Aboriginal and Torres Strait Islander people have, among other drivers, been attributed to a lack of culturally appropriate dental services.

10. Greater emphasis on oral health practices, including regular dental check-ups and tooth brushing, for older women (and men) in residential care.

    - Women's oral health declines with age and women have higher rates of edentulism than men, which can have significant impacts on general health.
    - Those living in residential aged care (70 per cent of whom are women) appear to have poor oral health, including a higher number of decayed teeth.

11. Improve oral health literacy for women in prison and provide regular oral health check-ups and treatments.

    - Women in prison have poorer oral health than other women and engage in behaviours that are more harmful to their oral health.
    - The prison setting offers a unique opportunity to move beyond the provision of clinical and health information interventions to improve the long-term oral health of inmates through capacity building and empowering inmates to improve their oral health.

12. Gendered research be undertaken on the oral health of women with a disability, Aboriginal and Torres Strait Islander women, CALD, migrant and refugee women and rural women.

    - There is little, if any, gendered research on the oral health of Aboriginal and Torres Strait Islander women, rural women, culturally and linguistically diverse (CALD) and refugee women, and women with disabilities.
    - These populations tend to have poorer oral health than the general population of Australian women and face barriers to dental care such as cost and poor health literacy.

References

(2007) **Volunteers needed : brighten the smiles of women at the YWCA**. *Canadian Journal of Dental Hygiene*. 41 (4):199. Available from: https://www.cdha.ca/pdfs/Profession/Journal/v41n4.pdf.

Aboriginal Health and Medical Research Council (2016) **AHMRC Oral health position paper : achieving oral health equity for Aboriginal communities in NSW**. AHMRC, Sydney. Available from: http://www.ahmrc.org.au/index.php?option=com_content&view=article&id=376:oral-health-position-paper.

ABS (2008) **4326.0 - National Survey of Mental Health and Wellbeing : Summary of Results, 2007**. Australian Bureau of Statistics, Canberra. Available from: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/4326.0Main%20Features32007?opendocument&tabname=Summary&prodno=4326.0&issue=2007&num=&view=.

ABS (2012) **Australian Social Trends December 2012 : People identified as having dementia or Alzheimer's disease**. Australian Bureau of Statistics, Canberra. Available from: http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/3BE18B47DA7A1252CA257AD0000F2CD8/$File/41020_dementiaalzheimers_dec2012.pdf.

ABS (2013) **4727.0.55.001 - Australian Aboriginal and Torres Strait Islander Health Survey: First Results, Australia, 2012-13** Australian Bureau of Statistics, Canberra. Available from: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/39E15DC7E770A144CA257C2F00145A66?opendocument.

ABS (2014) **4364.0.55.007 - Australian Health Survey : nutrition first results - foods and nutrients, 2011-12** Australian Bureau of Statistics, Canberra.

ABS (2014) **Diabetes**. *In:* 4727.0.55.006 - Australian Aboriginal and Torres Strait Islander Health Survey : Updated Results, 2012–13 Australian Bureau of Statistics, Canberra. Available from: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4727.0.55.006~2012%E2%80%9313~Main%20Features~Diabetes%20and%20high%20sugar%20levels~8.

ABS (2016) **4329.0.00.003 - Patterns of Use of Mental Health Services and Prescription Medications, 2011** Australian Bureau of Statistics, Canberra. Available from: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4329.0.00.003~2011~Main%20Features~Antidepressants~10008.

ADA (2016) **Government's new dental scheme no substitute for CDBS**. Australian Dental Association, Sydney. - (Media Release). Available from:

http://www.ada.org.au/News-Media/News-and-Release/Latest-News/Governments-new-dental-scheme-no-substitute-CDBS.

Adams C, Slack-Smith L, Larson A, O'Grady M (2004) **Dental visits in older Western Australians : a comparison of urban, rural and remote residents**. *Australian Journal Of Rural Health*. 12 (4):143-9.

AIHW (2010) **Diabetes in pregnancy : its impact on Australian women and their babies**. Australian Institute of Health and Welfare, Canberra. - (Diabetes series no. 14; Cat. no. CVD 52). Available from: http://www.aihw.gov.au/publication-detail/?id=6442472448&tab=2.

AIHW (2012) **How many Australians have diabetes?** Australian Institute of Health and Welfare, Canberra. Available from: http://www.aihw.gov.au/how-common-is-diabetes/.

AIHW (2012) **Residential aged care in Australia 2010-2011 : a statistical overivew**. Australian Institute of Health and Welfare, Canberra. - (Aged Care Statistics Series; 36; Cat. no. AGE 68).

AIHW (2014) **Australia's health 2014**. Australian Institute of Health and Welfare, Canberra. - (Cat. no. AUS 178).

AIHW (2014) **Estimating the prevalence of osteoporosis in Australia**. Australian Institute of Health and Welfare, Canberra (Cat. No. PHE 178). Available from: http://www.aihw.gov.au/publication-detail/?id=60129548484.

AIHW (2014) **Oral health and dental care in Australia : key facts and figures trends 2014**. Australian Institute of Health and Welfare, Canberra (Cat. no. DEN 228).

AIHW (2016) **Oral health and dental care in Australia : key facts and figures 2015**. Australian Institute of Health and Welfare, Canberra. Available from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129554609.

American Academy of Pediatrics. Committee on School Health (2004) **Soft drinks in schools**. *Pediatrics*. 113 (1):152-4. Available from: http://pediatrics.aappublications.org/content/pediatrics/113/1/152.full.pdf.

American Dental Association Council on Access Prevention and Interprofessional Relations (2006) **Women's oral health issues**. American Dental Association. Available from: http://www.ada.org/2758.aspx?currentTab=2.

Anikeeva O, Brennan D, Teusner D (2013) **Household income modifies the association of insurance and dental visiting**. *BMC Health Services Research*. 13 (1):432. Available from: http://www.biomedcentral.com/1472-6963/13/432.

Ansai T, Takata Y, Soh I, Awano S, Yoshida A, Sonoki K, et al. (2010) **Relationship between tooth loss and mortality in 80-year-old Japanese community-dwelling subjects**. *BMC Public Health*. 10 (1):386. Available from: http://www.biomedcentral.com/1471-2458/10/386.

Armfield JM, Mejia GC, Jamieson LM (2013) **Socioeconomic and psychosocial correlates of oral health**. *International Dental Journal*. 63 (4):202-9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23879256.

Australia. Department of Health (2016) **Table 3: Comparison of 2010 and 2013 State and Territory tobacco smoking status, people aged 14 years or older, by sex and jurisdiction (age-standardised)**. *In:* Tobacco control key facts and figures. Australia. Department of Health, Canberra. Available from: http://www.health.gov.au/internet/main/publishing.nsf/Content/tobacco-kff.

Australia. National Oral Health Plan Development Group (2015) **National oral health plan : people with disabilities : challenges in obtaining care** Australia. National Oral Health Plan Development Group, Wembley, W.A. Available from: http://oralhealthplan.com.au/tags/people-disabilities.

Australian Health Ministers' Advisory Council. Oral Health Monitoring Group (2015) **Healthy mouths, healthy lives: Australia's national oral health plan 2015-2024**. COAG Health Council, South Australia. Available from: http://www.coaghealthcouncil.gov.au/Portals/0/Australia%27s%20National%20Oral%20Health%20Plan%202015-2024_uploaded%20170216.pdf.

Australian Health Ministers Advisory Council (AHMAC). Steering Committee for National Planning for Oral Health (2001) **Oral health of Australians : national planning for oral health improvement : final report**. South Australia. Department of Human Services for the Australian Health Ministers Conference, Adelaide. Available from: http://www.adelaide.edu.au/arcpoh/downloads/publications/reports/national-oral-health-plan/oral-health-australians-cover.pdf.

Australian Health Ministers' Advisory Council (AHMAC) (2012) **Clinical practice guidelines : antenatal care : module 1**. Australia. Department of Health and Ageing, Canberra. Available from: http://www.health.gov.au/antenatal.

Avlund K, Holm-Pedersen P, Schroll M (2001) **Functional ability and oral health among older people : a longitudinal study from age 75 to 80**. *Journal of the American Geriatrics Society*. 49 (7):954-62.

Balakrishnan M, Simmonds RS, Tagg JR (2000) **Dental caries is a preventable infectious disease**. *Australian Dental Journal*. 45 (4):235-45. Available from: http://dx.doi.org/10.1111/j.1834-7819.2000.tb00257.x.

Bertea PC, Staehelin K, Dratva J, al e (2007) **Female gender is associated with dental care and dental hygiene, but not with complete dentition in the Swiss adult population**. *Journal of Public Health*. 15 (5):361-7.

Bhargava S, Motwani MB, Patni V (2013) **Oral implications of eating disorders : a review**. *Archives of Orofacial Sciences*. 8 (1):1-8. Available from: http://www.dental.usm.my/aos/docs/Vol_8/issue_1/0108_130113.pdf.

Błochowiak K, Olewicz-Gawlik, A., Polańska, A., Nowak-Gabryel, M., Kocięcki, J., Witmanowski, H., & Sokalski, J., (2016) **Oral mucosal manifestations in primary and secondary Sjögren syndrome and dry mouth syndrome**. *Advances in Dermatology and Allergology*. 33 (1):23-7. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4793060/.

Boggess KA, Edelstein BL (2006) **Oral health in women during preconception and pregnancy : implications for birth outcomes and infant oral health**. *Maternal and Child Health Journal*. 10 (5):S169-74.

Braaf R, Meyering I (2011) **Seeking security : promoting women's economic wellbeing following domestic violence**. Australian Domestic and Family Violence Clearinghouse, New South Wales.

Buhlin K, Gustafsson A, Ahnve S, et al (2005) **Oral health in women with coronary heart disease**. *J Periodontol*. 76 (4):544-50.

Burns J, MacRae A, Thomson N, et al. (2013) **Summary of Indigenous women's health** Australian Indigenous HealthInfoNet, Mount Lawley, W.A. Available from: http://www.healthinfonet.ecu.edu.au/population-groups/women/reviews/our-review.

Burrow S, Ride K (2016) **Review of diabetes among Aboriginal and Torres Strait Islander people**. Australian Indigenous HealthInfoNet. Available from: http://www.healthinfonet.ecu.edu.au/chronic-conditions/diabetes/reviews/our-review#incidence.

Caldas IM, Grams AC, Afonso A, Magalhães T (2012) **Oral injuries in victims involving intimate partner violence**. *Forensic Science International*. 221 (1):102-5.

Campbell JC (2002) **Health consequences of intimate partner violence**. *The Lancet*. 359 (9314):1331-6.

Casanova L, Hughes F, Preshaw P (2014) **Diabetes and periodontal disease : a two-way relationship**. *British Dental Journal*. 217 (8):433-7. Available from: http://dx.doi.org/10.1038/sj.bdj.2014.907.

Chaturvedi AK (2010) **Beyond cervical cancer: burden of other HPV-related cancers among men and women**. *Journal of Adolescent Health*. 46 (4S):S20-6.

Chi DL, Tucker-Seeley R (2013) **Gender-stratified models to examine the relationship between financial hardship and self-reported oral health for older US men and women**. *American Journal Of Public Health*. 103 (8):1507-15.

Chrisopoulos S, Harford JE (2013) **Oral health and dental care in Australia : key facts and figures 2012**. Australian Institute of Health and Welfare, Canberra (Cat. no. DEN 224). Available from: http://www.aihw.gov.au/publication-detail/?id=60129543390.

Cogliano VJ, Baan R, Straif K, Grosse Y, Lauby-Secretan B, El Ghissassi F, et al. (2011) **Preventable exposures associated with human cancers**. *Journal of the National Cancer Institute*. 103 (24):1827-39. Available from: http://jnci.oxfordjournals.org/content/103/24/1827.long.

Coulthard P, Warburton A (2007) **The role of the dental team in responding to domestic violence**. *British Dental Journal*. 203 (11):645-8.

Cox P (2015) **Violence against women in Australia : additional analysis of the Australian Bureau of Statistics' Personal Safety Survey, 2012** Australia's National Research Organisation for Women's Safety, Sydney. - (Horizons Research Report; Issue 1). Available from: http://media.aomx.com/anrows.org.au/s3fs-public/151022%20Horizons%201.1%20PSS.pdf.

Crozier S (2015) **House of Delegates updates domestic violence policy**. *ADA News (American Dental Association)* (Jan 5):1. Available from: http://www.ada.org/en/publications/ada-news/2015-archive/january/house-of-delegates-updates-domestic-violence-policy.

D'Souza G, Dempsey A (2011) **The role of HPV in head and neck cancer and review of the HPV vaccine**. *Preventive Medicine*. 53:S5-S11.

DeBate RD, Cragun D, Severson HH, et al (2014) **Psychosocial and skill-based differences between dental and dental hygiene students regarding secondary prevention of eating disorders**. *Oral Hygiene and Health*. 2 (1):6. Available from: http://www.esciencecentral.org/journals/psychosocial-and-skillbased-differences-between-dental-and-dental-hygiene-students-2332-0702.1000123.pdf.

Deloitte Consulting (2003) **Victorian prisoner health study**. Victoria. Department of Justice, Melbourne. Available from: http://www.corrections.vic.gov.au/utility/publications+manuals+and+statistics/victorian+prisoner+health+study.

Dental Health Services Victoria (2011). **Links between oral health and general health - the case for action**. Available from: https://www.dhsv.org.au/news/news-stories/archive-news/dental-decay-linked-to-chronic-diseases-the-case-for-action?SQ_DESIGN_NAME=print.

Desvarieux M, Schwahn C, Völzke H, et al (2004) **Gender differences in the relationship between periodontal disease, tooth loss, and atherosclerosis**. *Stroke*. 35 (9):2029-35. Available from: http://stroke.ahajournals.org/content/35/9/2029.long.

Dost F, Ford P, Farah C (2013) **Heightened risk of second primary carcinoma of the head and neck following cervical neoplasia**. *Head and Neck*. 36 (8):1132-7.

Doyal L, Naidoo S (2010) **Why dentists should take a greater interest in sex and gender**. *British Dental Journal*. 209 (7):335-7. Available from: http://www.nature.com/bdj/journal/v209/n7/full/sj.bdj.2010.883.html.

Dynesen AW, Bardow A, Petersson B, Nielsen LR, Nauntofte B (2008) **Salivary changes and dental erosion in bulimia nervosa**. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 106 (5):696-707.

Ellsberg M, Jansen HA, Heise L, Watts CH, Garcia-Moreno C (2008) **Intimate partner violence and women's physical and mental health in the WHO multi-country study on women's health and domestic violence : an observational study**. *The Lancet*. 371 (9619):1165-72.

Ferraro M, Vieira AR (2010) **Explaining gender differences in caries : a multifactorial approach to a multifactorial disease**. *International Journal Of Dentistry*. 2010 (649643):1-5. Available from: http://www.hindawi.com/journals/ijd/2010/649643/.

Ford P, Cramb S, Farah C (2014) **Oral health impacts and quality of life in an urban homeless population**. *Australian Dental Journal*. 59 (2):234-9.

Ford P, Farah C (2013) **Oral health therapists : what is their role in Australian health care?** *International Journal of Dental Hygiene*. 11 (1):22-7.

Forsyth C, Irving M, Gilroy J, Short S, Kruger E, Tennant M (2016) **Talking Teeth : How to improve the standard of dental care to Aboriginal and Torres Strait Islander people?** *Croakey (Melbourne)* (Jan 17):1. Available from: https://croakey.org/how-to-improve-the-standard-of-dental-care-to-aboriginal-and-torres-strait-islander-people/.

George A, Johnson M, Blinkhorn A, Ellis S, Bhole S, Ajwani S (2010) **Promoting oral health during pregnancy : current evidence and implications for Australian midwives**. *Journal of Clinical Nursing*. 19 (23-24):3324-33.

George A, Johnson M, Duff M, Ajwani S, Bhole S, Blinkhorn A, et al. (2012) **Midwives and oral health care during pregnancy : perceptions of pregnant women in south-western Sydney, Australia**. *Journal of Clinical Nursing*. 21 (7/8):1087-96. Available from: http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2702.2011.03870.x/abstract.

Gillison ML, Chaturvedi AK, Lowy DR (2008) **HPV prophylactic vaccines and the potential prevention of noncervical cancers in both men and women**. *Cancer*. 113 (S10):3036-46.

Glascoe AL, Brown RS, Marshall KL, Smith DR (2015) **Periodontal and oral–systemic relationships : reproductive health**. *Austin Journal of Dentistry*. 2 (3):1-5. Available from: http://austinpublishinggroup.com/dentistry/fulltext/jd-v2-id1022.php.

Griffin SO, Jones JA, Brunson D, Griffin PM, Bailey WD (2012) **Burden of oral disease among older adults and implications for public health priorities**. *American Journal of Public Health*. 102 (3):411-8.

Grover CM, More VP, Singh N, Grover S (2014) **Crosstalk between hormones and oral health in the mid-life of women : a comprehensive review**. *Journal of International Society of Preventive and Community Dentistry*. 4 (Suppl 1):S5-S10.

Gwinn C, McClane GE, Shanel-Hogan KA, Strack GB (2004) **Domestic violence : no place for a smile**. *J Calif Dent Assoc*. 32 (5):399-409.

Harford J, Islam S (2013) **Adult oral health and dental visiting in Australia : results from the National Dental Telephone Interview Survey 2010**. Australian Institute of Health and Welfare, Canberra (Series no. 65. Cat. no. DEN 227).

Hay P, Chinn D, Forbes D, Madden S, Newton R, Sugenor L, et al. (2014) **Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for the treatment of eating disorders**. *Australian and New Zealand Journal of Psychiatry*. 48 (11):977-1008.

Hendler TJ, Sutherland SE (2007) **Domestic violence and its relation to dentistry: a call for change in Canadian dental practice**. *Journal of the Canadian Dental Association*. 73 (7):617. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17868511.

Hocking J, Stein A, Conway E, Regan D, Grulich A, Law M, et al. (2011) **Head and neck cancer in Australia between 1982 and 2005 show increasing incidence of potentially HPV-associated oropharyngeal cancers**. *British Journal of Cancer*. 104 (5):886-91.

Holm-Pedersen P, Schultz-Larsen K, Christiansen N, Avlund K (2008) **Tooth loss and subsequent disability and mortality in old age**. *Journal of the American Geriatrics Society*. 56 (3):429-35.

Hopcraft MS, Morgan MV, Satur JG, al e (2012) **Edentulism and dental caries in Victorian nursing homes**. *Gerodontology*. 29 (2):e512-9.

Hughes P (2007) **Women, aging and oral health needs**. *Access*. 21 (5):1-13.

Hung H-C, Joshipura KJ, Colditz G, Manson JE, Rimm EB, Speizer FE, et al. (2004) **The association between tooth loss and coronary heart disease in men and women**. *J Public Health Dent*. 64 (4):209-15. Available from: http://dx.doi.org/10.1111/j.1752-7325.2004.tb02755.x.

Ide M, Harris M, Stevens A, Sussams R, Hopkins V, Culliford D, et al. (2016) **Periodontitis and cognitive decline in Alzheimer's disease**. *PLoS ONE*. 11 (3):e0151081. Available from: http://dx.doi.org/10.1371%2Fjournal.pone.0151081.

Ide M, Papapanou PN (2013) **Epidemiology of association between maternal periodontal disease and adverse pregnancy outcomes : systematic review**. *Journal of Peridontology*. 84 (4 Suppl):S181-94.

Jamieson LM (2013) **Oral health and other characteristics of pregnant Aboriginal women compared with general population estimates**. *Australian Dental Journal*. 58 (1):120-4.

Jatrana SC, Peter. (2012) **Gender differences in financial barriers to primary health care in New Zealand**. *Journal of Primary Health Care*. 4 (2):10.

Johansson AK, Norring C, Unell L, et al (2012) **Eating disorders and oral health : a matched case–control study**. *European Journal of Oral Sciences*. 120 (1):61-8.

Johnson M, George A, Dahlen H, Ajwani S, Bhole S, Blinkhorn A, et al. (2015) **The midwifery initiated oral health-dental service protocol : an intervention to improve oral health outcomes for pregnant women**. *BMC Oral Health*. 15 (2):1-9. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4324677/.

Jugale PV, Pramila M, Murthy AK, Rangath S (2014) **Oral manifestations of suspected eating disorders among women of 20-25 years in Bangalore City, India**. *Journal of Health, Population and Nutrition (JHPN)*. 32 (1):46-50.

Kandelman D, Petersen PE, Ueda H (2008) **Oral health, general health, and quality of life in older people**. *Special Care in Dentistry*. 28 (6):224-36.

Kandiyoti D (1998) **Bargaining with patriarchy**. *Gender and Society*. 2 (3):274-90. Available from: http://org.uib.no/smi/seminars/Pensum/kandiyoti,%20Deniz.pdf.

Keirse MJ, Plutzer K (2010) **Women's attitudes to and perceptions of oral health and dental care during pregnancy**. *Journal of Perinatal Medicine*. 38 (1):3-8.

Kisely S, Baghaie H, Lalloo R, Johnson NW (2015) **Association between poor oral health and eating disorders: systematic review and meta-analysis**. *British Journal of Psychiatry*. 207 (4):299-305.

Kloetzel MK, Huebner CE, Milgrom P, Littell CT, Eggertsson H (2012) **Oral health in pregnancy : educational needs of dental professionals and office staff**. *J Public Health Dent*. 72 (4):279-86.

Kruse AL, Bredell M, Grätz KW (2011) **Oral cancer in men and women : are there differences?** *Oral And Maxillofacial Surgery*. 15 (1):51-5.

Lo Russo L, Campisi G, Di Fede O, Di Liberto C, Panzarella V, Lo Muzio L (2008) **Oral manifestations of eating disorders : a critical review**. *Oral diseases*. 14 (6):479-84.

Lockhart PB, Bolger AF, Papapanou PN, Osinbowale O, Trevisan M, Levison ME, et al. (2012) **Periodontal disease and atherosclerotic vascular disease : does the evidence support an independent association? : a scientific statement from the American Heart Association**. *Circulation*. 125 (20):2520-44.

Lukacs JR (2011) **Gender differences in oral health in South Asia : metadata imply multifactorial biological and cultural causes**. *American Journal Of Human Biology*. 23 (3):398-411.

Lukacs JR, Largaespada LL (2006) **Explaining sex differences in dental caries prevalence : saliva, hormones, and "life-history" etiologies**. *American Journal Of Human Biology*. 18 (4):540-55. Available from: http://pages.uoregon.edu/jrlukacs/Dr.%20John%20R.%20Lukacs%20Website/downloads/AJHB%2018%20-%202006.pdf.

Marcenes W, Kassebaum NJ, Bernabé E, al e (2013) **Global burden of oral conditions in 1990-2010 : a systematic analysis**. *Journal of Dental Research*. 92 (7):592-7.

Mariño R, Hopcraft M, Ghanim A, Tham R, Khew C-W, Stevenson C (2015) **Oral health-related knowledge, attitudes and self-efficacy of Australian rural older adults**. *Gerodontology* (12202):[Epub ahead of print]. Available from: http://dx.doi.org/10.1111/ger.12202.

Marino RJ, Khan AR, Tham R, Khew CW, Stevenson C (2014) **Pattern and factors associated with utilization of dental services among older adults in rural Victoria**. *Australian Dental Journal*. 59 (4):504-10.

Martinez-Mier EA, Zandona AF (2013) **The impact of gender on caries prevalence and risk assessment**. *Dental Clinics of North America*. 57 (2):301-15.

Mehrstedt M, John MT, Tönnies S, Micheelis W (2007) **Oral health-related quality of life in patients with dental anxiety**. *Community Dentistry and Oral Epidemiology*. 35 (5):357-63.

Mejia G, Jamieson LM, Ha D, Spencer AJ (2014) **Greater inequalities in dental treatment than in disease experience**. *Journal Of Dental Research*. 93 (10):966-71.

MOVE Muscle Bone and Joint Health (2016) **Sjogren's syndrome**. Victoria. Department of Health and Human Services, Melbourne. - (Better Health Channel Factsheet). Available from: https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/sjogrens-syndrome.

National Health Resource Center on Domestic Violence (2005) **Enhancing dental professionals' response to domestic violence**. Family Violence Prevention Fund, San Francisco. Available from: https://www.futureswithoutviolence.org/userfiles/file/HealthCare/dental.pdf.

National Oral Health Alliance (2016) **New Federal plan is trying to do dental care using smoke and mirrors**. National Oral Health Alliance, Canberra? - (Media Release). Available from: http://www.oralhealth.asn.au/sites/default/files/documents/NOHA_MR_240416.pdf.

Nelms AP, Gutmann ME, Solomon ES, Dewald JP, Campbell PR (2009) **What victims of domestic violence need from the dental profession**. *J Dent Educ*. 73 (4):490-8. Available from: http://www.jdentaled.org/content/73/4/490.long.

NHMRC (2013) **Eat for health : Australian Dietary Guidelines providing the scientific evidence for healthier Australian diets**. Australia. National Health and Medical Research Council, Canberra. Available from: https://www.eatforhealth.gov.au/sites/default/files/files/the_guidelines/n55_australian_dietary_guidelines.pdf.

NICE (UK) (2014) **Domestic violence and abuse : how health services, social care, and the organizations they work with can respond effectively**. National Institute for Health and Care Excellence, London. - (NICE Public Health Guidance; PH50). Available from: https://www.nice.org.uk/guidance/ph50.

Österberg T, Dey DK, Sundh V, Carlsson GE, Jansson J-O, Mellström D (2010) **Edentulism associated with obesity : a study of four national surveys of 16,416 Swedes aged 55-84 years**. *Acta Odontologica Scandinavica*. 68 (6):360-7.

Otomo-Corgel J (2013) **Dental management of the female patient**. *Periodontology 2000*. 61 (1):219-31.

Oxford University Press (ed.) (2015) **Estrogen**. *In:* Oxford dictionaries : American English. Oxford University Press, [London].

Petersen PE (2003) **The World oral health report 2003 : continuous improvement of oral health in the 21st century : the approach of the WHO Global Oral Health Programme**. *Community Dentistry and Oral Epidemiology*. 31 (s1):3-24.

Pussinen PJ, Könönen E (2016) **Oral health : a modifiable risk factor for cardiovascular diseases or a confounded association?** *European Journal of Preventive Cardiology*. 23 (8):834-8. Available from: http://cpr.sagepub.com/content/early/2016/02/25/2047487316636506.short.

Ramesh A, Ganda K, Ganguly R, al e (2011) **Dentistry : the first line of defense against domestic violence**. *Journal of the Massachusetts Dental Society*. 60 (3):38-9.

RANZCP (2015) **RANZCP Victorian Branch Submission to the Victorian Royal Commission on Family Violence**. Royal Australian and New Zealand College of Psychiatrists, Melbourne. Available from: http://www.rcfv.com.au/getattachment/563D575B-0370-4BFD-BDDF-9387E9805F7D/Royal-Australian-and-New-Zealand-College-of-Psychiatrists

RCFV (2016) **Royal Commission into Family Violence: Summary and recommendations, Parliamentary Paper No 132 (2014–16).** Victoria. Royal Commission into Family Violence, Melbourne. Available from: http://files.rcfv.com.au/Reports/Final/RCFV-All-Volumes.pdf.

Riggs E, Gussy M, Gibbs L, van Gemert C, Waters E, Kilpatrick N (2014) **Hard to reach communities or hard to access services? : migrant mothers' experiences of dental services**. *Australian Dental Journal*. 59 (2):201-7.

Riggs E, Yelland J, Shankumar R, Kilpatrick N (2016) **'We are all scared for the baby' : promoting access to dental services for refugee background women during pregnancy**. *BMC Pregnancy Childbirth*. 16 (1):12. Available from: http://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-015-0787-6.

Ritchie CS, Joshipura K, Silliman RA, Miller B, Douglas CW (2000) **Oral health problems and significant weight loss among community-dwelling older adults**. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*. 55 (7):M366-M71.

Romanos GE, Javed F, Romanos EB, et al (2012) **Oro-facial manifestations in patients with eating disorders**. *Appetite*. 59 (2):499-504.

Rouxel P, Duijster D, Tsakos G, et al (2013) **Oral health of female prisoners in HMP Holloway : implications for oral health promotion in UK prisons**. *British Dental Journal*. 214 (12):627-32.

Russell SL (2013) **Pregnancy is associated with various degrees of increased gingival inflammation in healthy women**. *Journal of Evidence Based Dental Practice*. 13 (4):155-6.

Russell SL, Gordon S, Lukacs JR, Kaste LM (2013) **Sex/gender differences in tooth loss and edentulism : historical perspectives, biological factors, and sociologic reasons**. *Dental Clinics of North America*. 57 (2):317-37.

Saddki N, Suhaimi AA, Daud R (2010) **Maxillofacial injuries associated with intimate partner violence in women**. *BMC Public Health*. 10 (268):1-6.

Schwendicke F, Karimbux N, Allareddy V, Gluud C (2015) **Periodontal treatment for preventing adverse pregnancy outcomes : a meta- and trial sequential analysis**. *PLoS ONE*. 10 (6):e0129060. Available from: http://dx.doi.org/10.1371%2Fjournal.pone.0129060.

Scottish Oral Health Improvement Prison Programme (SOHIPP) (2014) **The oral health and psychosocial needs of Scottish prisoners and young offenders**. Dundee Dental Hospital and School. Dental Health Services Research Unit Dundee. Available from: http://dentistry.dundee.ac.uk/sites/dentistry.dundee.ac.uk/files/media/SOHIPP-report.pdf.

Shah N (2003) **Gender issues and oral health in elderly Indians**. *International Dental Journal*. 53 (6):475-84.

Sheiham A (2005) **Oral health, general health and quality of life**. *Bulletin of the World Health Organization*. 83 (9):644.

Shen TK, Teknos TN, Toland AE, Senter L, Nagy R (2014) **Salivary gland cancer in BRCA-positive families : a retrospective review**. *JAMA Otolaryngology - Head and Neck Surgery*. 140 (12):1213-7.

Sibbritt DW, Byles JE, Tavener MA (2010) **Older Australian women's use of dentists : a longitudinal analysis over 6 years**. *Australasian Journal on Ageing*. 29 (1):14-20. Available from: http://dx.doi.org/10.1111/j.1741-6612.2010.00396.x.

Silva M, Hopcraft M, Morgan M (2014) **Dental caries in Victorian nursing homes**. *Australian Dental Journal*. 59 (3):321-8.

Sirin Y, Yucel B, Firat D, Husseinova-Sen S (2011) **Assessment of dental fear and anxiety levels in eating disorder patients undergoing minor oral surgery**. *Journal of Oral and Maxillofacial Surgery*. 69 (8):2078-85.

Steinau M, Hariri S, Gillison ML, Broutian TR, Dunne EF, Tong Z-Y, et al. (2014) **Prevalence of cervical and oral human papillomavirus infections among US women**. *Journal of Infectious Diseases*. 209 (11):1739-43.

Steinberg BJ (2014) **Medical and dental implications of eating disorders**. *Journal of Dental Hygiene : JDH*. 88 (3):156-9. Available from: http://jdh.adha.org/content/88/3/156.full.

Steinberg BJ, Hilton IV, Iida H, Samelson R (2013) **Oral health and dental care during pregnancy**. *Dental Clinics Of North America*. 57 (2):195-210.

Takács D, Koppány F, Mihályi S, et al (2011) **Decreased oral cancer risk by moderate alcohol consumption in non-smoker postmenopausal women**. *Oral Oncol*. 47 (6):537-40.

Tam S, Joyce D, Gerber MR, Tan A (2010) **Head and neck injuries in adult victims of intimate-partner violence**. *Journal of Otolaryngology - Head and Neck Surgery*. 39 (6):737-43.

Tham R, Hardy S (2013) **Oral healthcare issues in rural residential aged care services in Victoria, Australia**. *Gerodontology*. 30 (2):126-32.

Thomas NJ, Middleton PF, Crowther CA (2008) **Oral and dental health care practices in pregnant women in Australia : a postnatal survey**. *BMC Pregnancy Childbirth*. 8:13-. Available from: http://www.biomedcentral.com/1471-2393/8/13/.

Thursfield V, Giles G, Farrugia H (2014) **Cancer in Victoria : statistics and trends 2013**. Cancer Council Victoria, Melbourne.

Treasure J, Claudino AM, Zucker N (2010) **Eating disorders**. *The Lancet*. 375 (9714):583-93. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0140673609617487.

Uhlen M-M, Tveit AB, Stenhagen KR, Mulic A (2014) **Self-induced vomiting and dental erosion : a clinical study**. *BMC Oral Health*. 14 (1):92. Available from: http://bmcoralhealth.biomedcentral.com/articles/10.1186/1472-6831-14-92.

van der Maarel-Wierink CD, Vanobbergen JNO, Bronkhorst EM, Schols JMGA, de Baat C (2013) **Oral health care and aspiration pneumonia in frail older people : a systematic literature review**. *Gerodontology*. 30 (1):3-9. Available from: http://dx.doi.org/10.1111/j.1741-2358.2012.00637.x.

Vanterpool SF, Tomsin K, Reyes L, Zimmermann LJ, Kramer BW, Been JV (2016) **Risk of adverse pregnancy outcomes in women with periodontal disease and the effectiveness of interventions in decreasing this risk : protocol for systematic overview of systematic reviews**. *Systematic Reviews*. 5 (1):1-6. Available from: http://dx.doi.org/10.1186/s13643-016-0195-7.

VCOSS (2015) **State Budget Submission 2015-16 : Create healthy and inclusive communities**. Victorian Council of Social Service, Melbourne. Available from: http://vcoss.org.au/state-budget-submission-2015-16-create-healthy-and-inclusive-communities/.

Victoria. Department of Health (2011) **Evidence-based oral health promotion resource**. Victoria. Department of Health. Prevention and Population Health Branch, Melbourne. Available from: https://www2.health.vic.gov.au/getfile/?sc_itemid=%7B82AF49BB-860C-4F2A-A4F1-B0D4A6FE70A6%7D&title=Evidence-based%20oral%20health%20promotion%20resource%20(2011).

Victoria. Department of Health (2013) **Action plan for oral health promotion 2013-2017**. Victoria. Department of Health, Melbourne. Available from: https://www2.health.vic.gov.au/about/publications/researchandreports/Action%20plan%20for%20oral%20health%20promotion%20-%202013-2017.

Victoria. Department of Health (2014) **Victorian Population Health Survey 2011-2012, survey findings**. Victoria. Department of Health, Melbourne.

Victoria. Department of Health (2016) **Statewide - Average time to treatment for general dental care - Quarterly Data**. *In:* Victorian Health Services Performance : dental care. Victoria. Department of Health, Melbourne. Available from: http://performance.health.vic.gov.au/Home/Report.aspx?ReportKey=18.

Victoria. Department of Health and Human Services (2015) **Victorian public health and wellbeing plan 2015–2019**. Victoria. DHHS, Melbourne. Available from: https://www2.health.vic.gov.au/about/health-strategies/public-health-wellbeing-plan.

Victoria. Department of Justice and Regulation (2015) **Corrections, prisons and parole : Health care**. Victoria. Department of Justice and Regulation, Melbourne. Available from: http://www.corrections.vic.gov.au/home/prison/health+care/.

Victorian Health Promotion Foundation (VicHealth) (2004) **The health costs of violence : measuring the burden of disease caused by intimate partner violence**. Victorian Health Promotion Foundation (VicHealth), Melbourne.

Wade TD, Bergin JL, Tiggemann M, Bulik CM, Fairburn CG (2006) **Prevalence and long-term course of lifetime eating disorders in an adult Australian twin cohort**. *Australian and New Zealand Journal of Psychiatry*. 40 (2):121-8.

Williams S, Jamieson L, MacRae A, Gray C (2011) **Review of Indigenous oral health**. *Australian Indigenous HealthInfoNet*.

World Health Organization (2013) **Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence**. World Health Organization, Geneva. Available from: http://www.who.int/reproductivehealth/publications/violence/9789241564625/en/.

Zavras AI, Shanmugam P, Shetty D, Dolecek TA, Kaste LM (2013) **Oral and pharyngeal cancer in women**. *Dental Clinics Of North America*. 57 (2):339-55.

Zitzmann NU, Schilling J, Weiger R, et al (2007) **Gender-specific dental health issues and treatment considerations**. *The International Journal Of Prosthodontics*. 20 (4):360-8.