THE UNIVERSITY OF SYDNEY

Faculty of Dentistry

Supporting excellence in oral health

Gateway for improved health outcomes

PUTTING THE MOUTH BACK INTO HEALTH

Forest Stewardship Council (FSC®) is a globally recognised certification overseeing all fibre sourcing standards. This provides guarantees for the consumer that products are made of woodchips from well-managed forests, other controlled sources and reclaimed material with strict environmental, economical and social standards.

Our mouth is the gateway to our body and good health.

Gateway for improved health outcomes

Supporting excellence in oral health

THE UNIVERSITY OF SYDNEY

Centre of excellence in oral health
Putting the mouth back into health

The Faculty of Dentistry's new research centre will tackle the global challenge of chronic disease with a deeper understanding of the impact of oral health on the whole body.

The World Health Organization has established that cardiovascular diseases are the leading causes of death in the world[1]. Mental health disorders such as depression are among the 20 leading causes of disability worldwide. Almost one million Australians have diabetes[2]. These startling statistics are compounded by the fact that two in three Australians are regarded as being overweight or obese.

The impact of these disease states on the population is well known. On the other hand, it is not common knowledge that more than 15 years of internationally recognised research indicates oral infection, in particular periodontal (gum) disease, increases the risk of these systemic diseases.

Despite this evidence, billions of dollars are directed at funding and research into the prevention, management and treatment of chronic disease, with little attention paid to oral health.

The role of oral health as a gateway to many chronic diseases is typically neglected in terms of funding and research and overlooked by governments and industry bodies.

Through the University of Sydney's new centre of excellence in oral health, Australia has an opportunity to lead medical and health advances that could have a profound impact on the broader, systemic health of humans.

The centre is committed to:

- improving the prevention and treatment of major chronic disease
- raising awareness among clinicians, research funders and policy makers
- advocating opportunities to improve health outcomes and clinical healthcare through improved oral health.

For a full list of references see page 24

Dental health
Gateway for improved health outcomes

Dental disease is one of society's most common chronic diseases.

One in seven Australians experienced toothache in the past year[3], and people with chronic disease are twice as likely to suffer frequent toothaches. More than half of Australia's children experience dental decay, with some so serious that they require the removal of all their teeth under anaesthesia, resulting in preventable hospitalisations.

Scientific research reveals that poor oral health is correlated with chronic diseases such as obesity, diabetes and heart disease.

The following are likely important contributors:

Societal inequality

Oral health neglect is often an outcome of wider inequalities in society. Poor education, low income and lack of access to health services can all adversely affect oral health. For example, Aboriginal Australians have more tooth decay and tooth loss than the non-Aboriginal population.[4]

Lack of understanding

Many Australians have poor oral health because they have not visited a dentist in the past year[5]. For many, dental health remains a cosmetic issue, a nice to have rather than a must have.

While many people are aware of the benefits of keeping teeth in good shape, few people understand the association between poor dental health and wider health outcomes.

Some Australians may believe they will eventually require complete dentures, like their parents did in later life. It is a melancholy fact that 50 years ago[6] half the Australian population older than 40 wore complete dentures. This statistic has improved, yet still one in five adults have lost all of their teeth.

This impacts self-esteem and the practical ability to bite, chew and swallow. It limits food choices such that people with no teeth have a lower intake of fruits and vegetables, dietary fibre, and carotene, and increased intakes of cholesterol and saturated fats.[7]

People with chronic conditions such as heart disease, diabetes, depression and arthritis are more likely to have dental problems such as toothaches, chipped teeth and being uncomfortable with their oral appearance. These lead to further complications, including food avoidance, toothache, and discomfort.[8]

Cost

In Australia the dental health system is removed from the rest of the health system. To date governments have resisted calls for it to be included, citing the expected increase in healthcare costs as prohibitive. As a result, oral health care remains outside Medicare, removed from integrated funding streams and in many cases outside the hospital management system.

This means people on low incomes struggle to afford check-ups and treatment for themselves and their dependants.

The separation between general health and oral health disciplines has become entrenched, with silos in funding, research, administration, education and treatment preventing collaboration and cooperation for the benefit of overall population health.

Lack of suitable alternatives

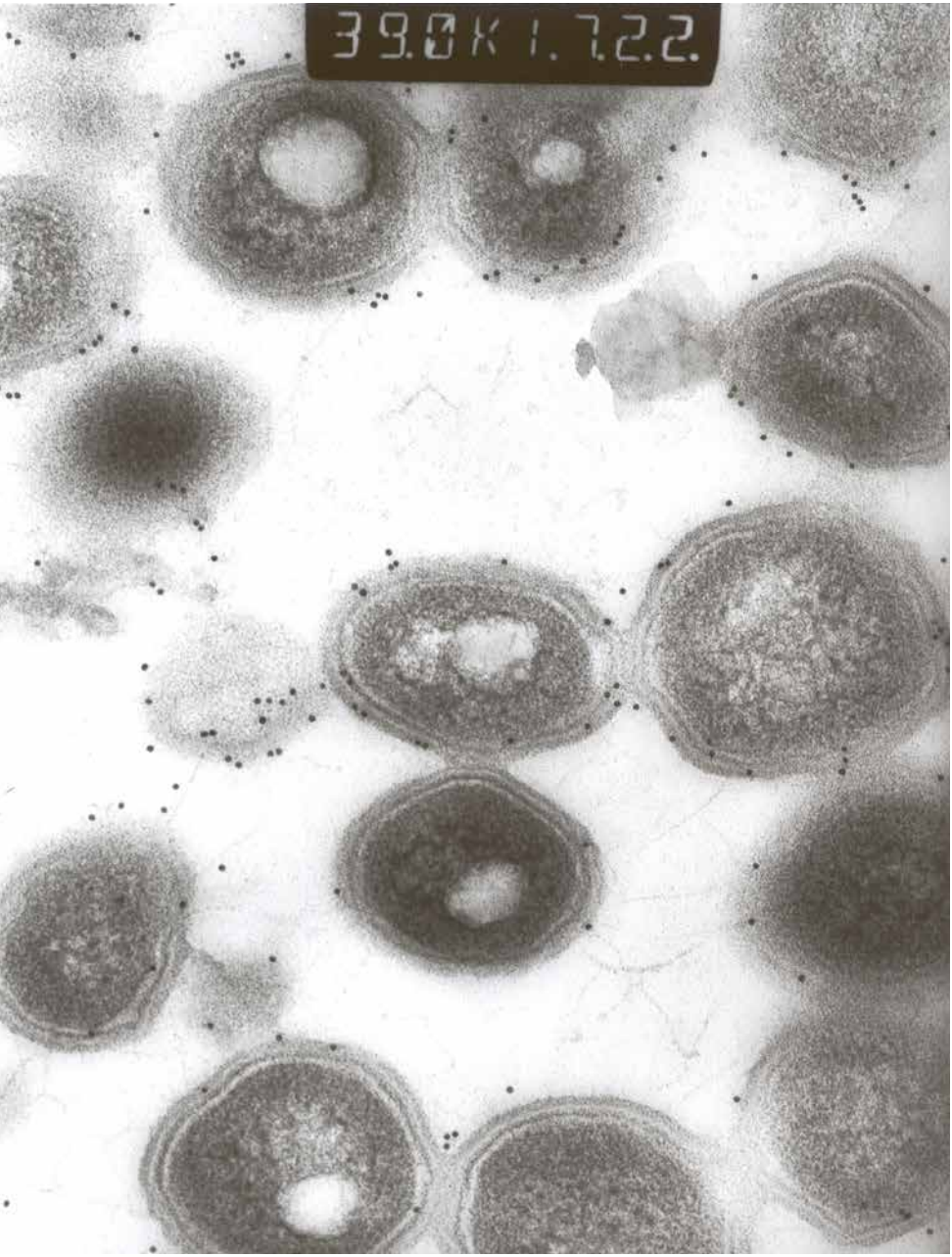
With so many economic, educational, societal and structural reasons preventing people from accessing adequate dental care for their teeth, too many Australians will continue to experience poor oral health. In turn, poor oral health at the population level is likely to add to the burden of chronic diseases that affect the nation's health bill.

A growing body of research is showing that lack of access to adequate oral health care could have far-reaching consequences not just for dental health, but wider health. This can amount to billions in healthcare costs and have destructive societal impacts in Australia and around the world.

Increasing evidence also reveals that poor oral health can lead to systemic health issues, and vice versa.

Internationally recognised research indicates that oral infection, in particular periodontal (gum) disease, increases the risk of systemic diseases, such as cardiovascular disease, rheumatoid arthritis, aspiration pneumonia, adverse pregnancy outcomes and poor diabetic control. It can have a negative impact on mental conditions such as Alzheimer's.

There is also good evidence that improving oral health could radically improve the targeting of prevention and early intervention programs for society's most common health problems.



Electron microscope image of the bacterium *Porphyromonas gingivalis* that is prevalent in periodontal (gum) disease and may also be involved in triggering rheumatoid arthritis and thickening of the artery walls seen in cardiovascular disease in susceptible individuals.

“At the University of Sydney, we provide more than a quarter of a million hours of direct patient care for the most disadvantaged people in our communities.”

Professor Chris Peck
Dean, Faculty of Dentistry

Body of evidence
Gateway to diseases

There is a compelling case for integrating oral health into our national health strategy.

Cost to health services

Although the cost of high-profile diseases such as heart disease and diabetes attract considerable attention, dental decay is the second most costly diet-related disease in Australia.

Despite spending more than $8.7 billion on dental services (2012-13) and dedicating more than 5.9 percent[9] of the total health budget in Australia, decay and periodontal disease continues to have a significant impact.[10]

Directly, it impacts the dental health of the nation. Indirectly, it impacts on a wide range of other diseases and health issues including unnecessary visits to general practitioners, presentations to hospital emergency departments and loss of work productivity.

This is why oral health must become a key integrated part of our overall national health strategy.

Cardiovascular disease

One Australian dies from cardiovascular disease every 12 minutes.[11] Affecting the heart and blood vessels, cardiovascular disease (CVD) is the most common cause of death. It affects the lives of one in six Australians, or 3.72 million people[12], and is the most expensive disease, costing 12 percent of all healthcare spending.[13]

Tooth decay and oral health appear to play a contributing role, with evidence showing that a person with fewer than 10 of their own teeth is seven times more likely to die of coronary disease than someone with more than 25 of their own teeth.[14]

Also, recent evidence by University of Sydney scholars reveals that treating gum disease improves vascular health.[15 16]

Dementia

Dementia is not one disease. It is a term used to refer to a wide range of symptoms associated with a decline in memory or other thinking skills, severe enough to reduce a person's ability to perform everyday activities. Alzheimer's disease accounts for 60 to 80 percent of cases.[17]

The link between Alzheimer's and tooth loss has been identified, with other studies linking impaired/delayed memory and mathematical ability with periodontal disease.

In relation to Alzheimer's, a study of more than 4000 Japanese participants, aged 65 and older, who underwent a dental examination and a psychiatric assessment, found those with missing teeth were much more likely to have experienced memory loss or have early-stage Alzheimer's disease.[18]

Diabetes

People with diabetes are more likely to have periodontal disease than those without it. In fact, periodontal disease is often considered the 'sixth complication' of diabetes and those who do not manage their diabetes well are more likely to develop periodontal disease than people whose diabetes is well controlled.

We also need greater understanding about the impact of periodontal disease on the development of end-stage kidney disease in patients with diabetes.[19]

Adverse pregnancy outcomes

Infection with bacteria from periodontal disease may affect uterine health in pregnant women, leading to low birth weight and premature contractions of the uterus.[20] A significant study in 1996 showed for the first time an association between pre-term birth and periodontal disease.[21]

Arthritis

Research by the European Congress of Rheumatology in Berlin has suggested that tooth loss may predict rheumatoid arthritis[22] and its severity. It indicates that the more teeth a person has lost, the greater their risk of developing rheumatoid arthritis.

These findings support earlier research from the University of Minnesota, which reported that a person with moderate to severe periodontitis had more than twice the risk of rheumatoid arthritis, compared to those with mild or no periodontitis.[23]

Stroke

Stroke is one of the top three causes of death worldwide, with more than 40,000 Australians experiencing a stroke each year.[24] The risk of stroke in individuals with periodontal disease is 1.5 to 2.5 times higher than in those without.[25] While more research is needed on the links between gum disease and stroke, the link could be due to the chronic bacterial infection of periodontal disease increasing general inflammation that contributes to atherosclerosis and stroke.

Obesity

Research is continuing to find links between obesity and oral health. While obesity is a well-known risk factor for hypertension, heart disease and stroke, there is a growing body of data indicating that obesity is also associated with periodontitis.[26] Furthermore, there is limited availability of specialised dental chairs and equipment to treat morbidly obese patients.


DO NOT USE THIS EQUIPMENT UNTIL
YOU ARE FULLY TRAINED BY LAB
SUPERVISOR

"My research interest is to study the mechanisms involved in the development of periodontal (gum) disease and the link between periodontal disease and other diseases such as rheumatoid arthritis. The long-term aim is to help prevent and treat diseases of the mouth and their possible consequences."

Dr Ky-Anh Nguyen
Senior Lecturer Oral Biology,
Faculty of Dentistry

Dr Adler's research focuses on understanding how the oral microbiome (predominantly the group of bacteria in the mouth) evolves from a state of health to the current state of highly prevalent chronic infection and disease.

"I am interested in the complexity of bacteria rather than any one particular bacterium, and what factors can push a bacterial community toward maintenance of health or the development of oral diseases, particularly dental caries."

Dr Christina Adler
Associate Lecturer, Faculty of Dentistry

Research, education and practice
Bringing oral and general health together

A growing body of international evidence supports a conclusion that oral and general health research, education and practice need to be aligned.

Progressing a deeper understanding of the links between oral and systemic health is an urgent issue, given an ageing population and rapidly rising outlays on health expenditure. Currently there is limited coordination of thinking and research into this area, locally and internationally.

To progress research, the University of Sydney's Faculty of Dentistry has established the first Chair of Lifespan Oral Health. The vision is to push the boundaries of our understanding of dental and systemic health and find new ways to prevent chronic disease.

The chair will lead the Charles Perkins Centre Dental Node, with a bold aim to stop the onset of chronic disease using new methods of oral disease management and prevention.

Building on the University's research strengths, the new chair will facilitate research collaborations between laboratory, clinical and social scientists, and disseminate findings to effectively improve healthcare outcomes.

Based at Westmead Precinct and the Charles Perkins Centre, the chair will work across adult, children's and private hospitals, research institutes, and health facilities across NSW and beyond. The chair will link with dental researchers globally, investigating oral-systemic interactions including arthritis, cardiovascular disease and psychological wellbeing.

Ultimately, research conducted under the guidance of the chair will change the role of dentistry in healthcare and investigate the dental origins of diseases.

The Faculty of Dentistry
Driving change

The faculty has been a pioneer in dental oral health education, training and research for nearly 115 years.

Its long history of pioneering oral health initiatives is enhanced by its breadth of research and health education programs.

The faculty fosters research excellence, innovation and collaboration at the highest level, across the spectrum of basic science, clinical practice and population oral health. It sits at the centre of the dental community in Australia, creating exceptional graduates, offering continuing education and conducting research that has real-world impacts.

The University's collaborative approach to problem solving and its first-class research reputation mean it is uniquely positioned to tackle major issues in health. This, combined with our links to the community, help us understand issues from the front line.

Its graduates are caring, clear thinking, clinically outstanding and research capable. They are engaged, globally aware and have the capability to become leaders in oral health, dentistry and research.

The faculty is uniquely positioned to lead change, nurture the links between education, clinical care and scientific research and improve oral health in the community.

Chair of Lifespan Oral Health
Building a centre of excellence

The creation of a Chair of Lifespan Oral Health is the critical first step in achieving our vision of putting the mouth back into health.

The new chair at the Faculty of Dentistry was funded through a generous private donation. It will allow the University of Sydney, the dental profession and associated research communities to coordinate further study and practice in the area of lifespan oral health.

For this vision to be truly realised, the University needs to build upon the chair with further tangible actions.

The most tangible requirement is a home for the centre of excellence for research, education and clinical practice – a place where oral and wider health disciplines can come together to achieve a generational change in health education, prevention and treatment.

To be located in the Westmead Health Precinct and the Charles Perkins Centre at the University of Sydney, the proposed centre will provide researchers and the profession with resources to further uncover the interrelationship between oral health and general health.

The centre will provide researchers with the necessary support and understanding to transform the health trajectories of entire generations of Australians.

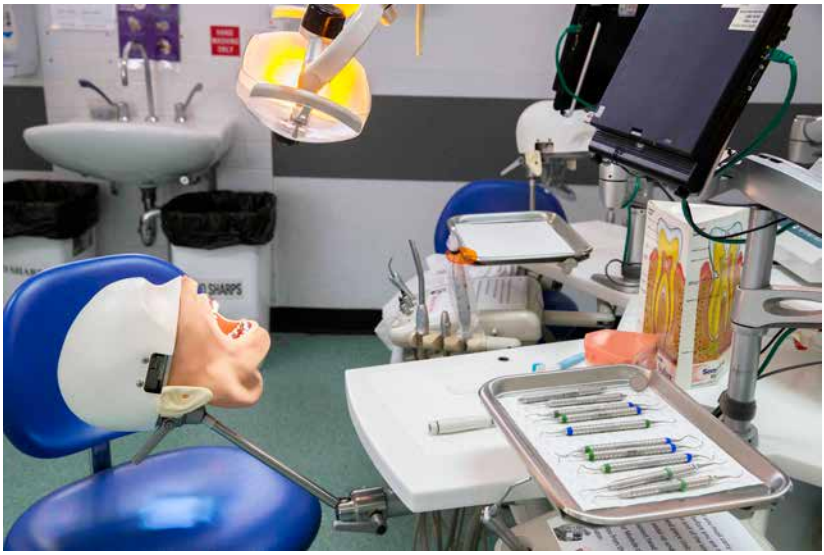
Developing a whole-of-health disease prevention strategy will provide benefits to individuals, the community and government, through improved health, reduced costs and evidence-based health policy development.

It is intended that the impact of the chair and the new centre will extend further than Australia. The knowledge will be disseminated through the Faculty of Dentistry's international outreach activities and, more broadly, through the publication of research in scientific journals and presentations at international conferences – promoting the adoption of new practices on a global scale.

“Your support can help deliver better population health outcomes by focusing on improving the oral health of the community in which we live.”

Professor Chris Peck
Dean, Faculty of Dentistry

The centre
Overview



The proposed centre will include a multi-chair clinical facility, a digital laboratory, clinical research office and seminar rooms.

It will introduce state-of-the-art equipment for teaching and patient care and will enable research to be fully integrated with clinical treatment.

Such a facility will attract internationally distinguished researchers and teachers and support the teaching of specialty courses. It will also enable more people who are currently missing out on dental care to receive treatment.

Achieving our vision
How you can support the University

Achieving the goal of establishing a centre for excellence at Westmead will require the efforts of more than the University.

It is projected that $20 million will be needed to turn the current vision for the centre into reality. This will require support from the University, governments and private donations.

Supporting this new dental clinic and research centre offers a tangible, long-lasting way to make a difference to our healthcare approach in Australia and around the world.

By moving from treatment to prevention, the centre hopes to enhance health outcomes for future generations.

Our focus will be on improving the oral health of our community.

There are a number of ways you can support the centre and the University would welcome a conversation about giving for this purpose.

Contact us
ene.juurma@sydney.edu.au
+61 2 8627 0465

– sydney.edu.au/dentistry/give

EMERGENCY
AMBULANCES
ONLY

References

1 www.who.int/mediacentre/factsheets/fs317/en/
2 static.diabetesaustralia.com.au/s/fileassets/diabetes-australia/e7282521-472b-4313-b18e-be84c3d5d907.pdf
3 inspired.sydney.edu.au/filling-the-gap-in-oral-health-care/
4 www.adelaide.edu.au/arcpoh/iohu/indigenoushealth/
5 www.aihw.gov.au/dental-and-oral-health/
6 Todd JE, Walker AM, Dodd P. *Adult dental health*. Volume 2. United Kingdom. 1978. London: Her Majesty's Stationery Office, 1982.
7 www.ncbi.nlm.nih.gov/pmc/articles/PMC3664508
8 www.aihw.gov.au/publication-detail/?id=10737423228
9 www.aihw.gov.au/publication-detail/?id=60129552713
10 www.dhsv.org.au/__data/assets/pdf_file/0013/2515/links-between-oral-health-and-general-health-the-case-for-action.pdf
11 donate.hri.org.au/campaign/heart-disease-the-facts?gclid=CP3P782TmcgCFUMrvQodvUcMKw
12 www.heartfoundation.org.au/information-for-professionals/data-and-statistics/Pages/default.aspx
13 www.aihw.gov.au/cardiovascular-disease/expenditure/
14 Holmlund A, Holm G, Lind L. 2010, Number of teeth as a predictor of cardiovascular mortality in a cohort of 7,674 subjects followed for 12 years. *Journal of Periodontology* 81(6):870-876
15 sydney.edu.au/news/84.html?newsstoryid=13695
16 http://hyper.ahajournals.org/content/early/2014/06/23/HYPERTENSIONAHA.114.03359.abstract
17 www.alz.org/what-is-dementia.asp
18 Okamoto N, Morikawa M, Okamoto K, Habu N, Iwamoto J, Tomioka K, Saeki K, Yanagi M, Amano N, Kurumatani N. 2010, Relationship of tooth loss to mild memory impairment and cognitive impairment: findings from the fujiwara-kyo study. *Behavioral and Brain Functions* 6:77.
19 Shultis WA, Weil EJ, Looker HC, Curtis JM, Shlossman M, Genco RJ, Knowler WC, Nelson RG. 2007, Effect of periodontitis on overt nephropathy and end-stage renal disease in type 2 diabetes. *Diabetes Care* 30(2):306-311.
20 Cullinan MP, Ford PJ, Seymour GJ. 2009, Periodontal disease and systemic health: current status. *Australian Dental Journal* 54:(1Suppl):S62-S69.
21 Offenbacher S, Katz V, Fertik G, Collins J, Boyd D, Maynor G, McKaig R, Beck J. 1996, Periodontal infection as a possible risk Links between oral health and general health - the case for action Page 12 Dental Health Services Victoria factor for preterm low birth weight. *Journal of Periodontology* 67(10 Suppl):1103-1113.
22 www.arthritis.org/living-with-arthritis/comorbidities/gum-disease/ra-and-gum-disease.php
23 www.arthritis.org/living-with-arthritis/comorbidities/gum-disease/ra-and-gum-disease.php
24 Libby, P et al, 2008 and Brain Foundation, 2011.
25 www.sciencedirect.com/science/article/pii/S0741521411023251
26 Pischon N, Heng N, Bernimoulin JP, Kleber BM, Willich SN, Pischon T. Obesity, inflammation, and periodontal disease. *J Dent Res* 2007;86:400-409

Produced by Marketing and Communications, the University of Sydney,
October 2015. The University reserves the right to make alterations to
any information contained within this publication without notice. 15/5325

Contact us
ene.juurma@sydney.edu.au
+61 2 8627 0465
sydney.edu.au/dentistry/give