

Dental Epidemiology and Public Health Research

Programme leader: Professor Murray Thomson

Our work has the two main strands of (1) dental epidemiological research and (2) dental health services research. In our *dental epidemiological research*, we study the occurrence, determinants and natural history of the common oral conditions. To do this, we employ a number of standard dental epidemiological approaches (most notably the prospective cohort study and the cross-sectional survey) and techniques. Our *dental health services research* (HSR) work is concerned with how the dental healthcare system works (including dental workforce research), and the extent to which users are benefitting from it. Key activities are measuring oral health outcomes and increasing understanding of how (and why) people use (or do not use) dental services. Our group also continues to play an important role in the development and epidemiological validation of self-report measures, working in collaboration with a number of overseas researchers. We are also one of only three WHO Collaborating Centres in oral health in our particular WHO region; the other two are in Niigata (Japan) and Beijing (China).

Current research projects and focus areas

Activity 1. Life-course research in oral health (the Dunedin Study)

Description: Prospective observational research into the natural history of oral health and disease in a representative birth cohort now in adulthood

Aim: Unprecedented information on the natural history of oral health and disease

Source(s) of funding: NZ HRC, US NIH, Otago Medical Research Foundation

Outcomes during 2015-16: Work in this area continues to attract international attention and to be published in the top international journals: 8 papers were published, and a number of conference presentations were made. We completed the second 3 years of the 6-year HRC programme grant and obtained an HRC project grant for the age-45 assessments. The funded aims of the dental research component for age 38 were: (1) to document the natural history of oral health and disease from childhood through to early midlife; (2) to determine the nature of the relationship of those conditions and associated SES inequalities with antecedent characteristics and exposures; (3) to investigate the relation between chronic periodontitis and cardiovascular risk; and (4) to identify gene-by-environment associations in oral health and disease. The funded aims of the dental research component for age 45 are to: (1) produce unprecedented information on the natural history of oral health and disease; (2) test hypotheses for genetic and environmental risk factors for chronic dental diseases; (3) identify treatable early-life antecedents of high-rate dental caries and periodontitis in adulthood; (4) quantify ageing of the teeth and dentition, and relate this to early life exposures to environmental factors, along with genetic factors; and (5) quantify the public health significance and financial burden of the cost of treating acute and chronic dental conditions through life.



The Barningham building, former home of the Dunedin Multidisciplinary Health and Development Study, adjoining the west wing of the Walsh Building. Both were demolished in 2016 to make way for the new Clinical Services Building of the Faculty of Dentistry. As of late 2016 the Dunedin Study is based at Logan Park, while a new \$2.6M facility is built for the Study in Anzac Avenue near the University's premises at Forsyth Barr Stadium.

Activity 2. Other dental epidemiological and clinical research

Description: Dental epidemiological studies in NZ and overseas.

Aims: Various – enhancement of the knowledge base for dental epidemiology, dental public health, and clinical practice. An example is the International Collaborative Indigenous Health Research Partnership (ICIHRP) with Australia (University of Adelaide) and Canada (University of Toronto) investigating the oral health of Indigenous mothers and their infant children.

Source(s) of funding: Various – including NZ Ministry of Health, the International Collaborative Indigenous Health Research Partnership, NZDA Research Foundation, the Health Research Council of NZ, Dental Council of NZ.

Outcomes during 2015-16: 15 papers were published.

Activity 3. Dental health services research

Description: Dental health services research in NZ, including ongoing, systematic dental workforce research, work on social accountability, barriers to oral health for Pacific adolescents, and access to orthodontic treatment for disadvantaged adolescents.

Aims: Enhancement of the knowledge base for dental public health and clinical practice.

Source(s) of funding: Various – including NZDA Research Foundation, the Health Research Council of NZ, Dental Council of NZ.

Work in this area uses both quantitative and qualitative approaches, and continues to be diverse and productive.

Outcomes during 2015-16: 24 papers were published (this total includes 6 dental educational research papers by our team which are included here because they do not fit the other categories).

Activity 4. Development of new dental epidemiological, clinical and health services researchers and research capacity

Description: Training of new researchers for NZ and the Asia-Pacific region.

Aim: to build research capacity in our field.

Outcomes during 2015-16: successful postgraduate completions comprised 1 Doctor of Philosophy and 1 Doctor of Clinical Dentistry. We are currently supervising 2 Doctors of Philosophy, 7 Doctors of Clinical Dentistry, and 5 Masters degrees. We also continue to informally mentor colleagues working in the wider health sector, both internationally and in New Zealand.

Key personnel and collaborations

Professor WM Thomson

Professor JR Broughton

Associate Professor LA Foster Page

Dr JM Broadbent

Ms DM Shearer (funded by an HRC programme grant; working on oral-general health)

Our collaborations are very important to the work and impact of the group. Current collaborations include institutions in New Zealand (including Raukura O Hauora Tainui and the Waikato-Tainui College for Research and Development, Canterbury District Health Board), Australia (the Universities of Adelaide and Melbourne), Canada (The University of Toronto, McGill University), Japan (Osaka University), Malaysia (Universiti Malaya), the USA (Duke University, the University of Michigan and the University of North Carolina), Britain (GKT Dental Institute, the University of London, Sheffield University, Dundee University), Chile (University of Chile) and Brazil (Federal University of Pelotas and the University of Rio Grande do Sul).

Research funding (over \$5,000)

2015. Ministry of Health Research Fund. *Exploring oral health care planning and service delivery models for dependent older adults in aged residential care facilities: feasibility and acceptability in the aged-care sector.* Smith MB, Thomson WM. (\$34,421).

2015. Health Research Council. Broadbent JM, Thomson WM, Moffitt TE, Caspi A, Poulton R. Oral health from childhood to mid-life. 2015-2020 (\$1,193,937).

2015. Maurice and Phyllis Paykel Trust. Broadbent JM, Thomson WM. A lifecourse study on chronic dental conditions and ageing of the teeth and dentition: equipment grant application. (\$12,500)

2016. New Zealand Dental Association Research Foundation. Broadbent JM, Thomson WM. A lifecourse study on chronic dental conditions and ageing of the teeth and dentition: equipment grant application. (\$13,500)

2016. Deckel Maho Gildermeister (DMG) Germany. *What are barriers and enablers for dentists to non-invasively manage proximal caries lesions?* Foster Page LA, Schwendicke F, Baker SR, Fontana M, Thomson WM. (\$32,000)

2016. Ministry of Health Research Fund. *Reading between the lines: how do young New Zealanders from lower socio-economic backgrounds feel about not getting their teeth straightened?* Foster Page LA, Antoun J, Jack H. (\$29,345)

2016. Ministry of Health Health Research Fund. *Pasifika adolescents' understandings and experiences of oral health care*. Smith L, Foster Page LA, Richards R. (\$36,097)

2016. Ministry of Health Research Fund. *Cognitive function, dependency and oral health among frail older New Zealanders: a national survey*. Thomson WM, Smith MB, Kerse NM, Ferguson CA. (\$37,789).

2016. University of Otago Research Grant. *I just want my teeth straightened*. Foster Page LA (PI), Antoun J, Jack H, Fowler P. (\$36,000).

Key publications

In total, 47 papers were published in the peer-reviewed international scientific literature during 2015-16. The total number of conference presentations made was 41 (including 21 keynote addresses – see below for details).

Key publications by researcher

Dr JM Broadbent

Broadbent JM, Zeng J, Foster Page LA, Baker S, Ramrakha S, Thomson WM. Oral health-related beliefs, behaviours, and outcomes through the life course. *Journal of Dental Research*. (2016) doi: 10.1177/0022034516634663 (2016).

Broadbent JM, Theodore M, Te Morenga L, Thomson WM, Brunton P. Ethnic and socioeconomic inequalities in dental treatment at a school of dentistry. *New Zealand Dental Journal* 112: 55-61 (2016).

Theodore M, Broadbent JM, Nagin D, Ambler A, Hogan S, Ramrakha S, Cutfield W, Williams MJ, Harrington H, Moffitt TE, Caspi A, Milne B, Poulton R. Childhood to Early-Midlife Systolic Blood Pressure Trajectories: Early-Life Predictors, Effect Modifiers, and Adult Cardiovascular Outcomes. *Hypertension* 66: 1108-1115 (2015).

Professor JR Broughton

Broughton J.R., Lawrence, H.P., and Jamieson, L.M. Tikanga Māori (Māori Customary Practices) in Oral Health Research. *Journal of Health Care for the Poor and Underserved* 27: 101-109 (2016).

Anderson, V.R., Rapana, S.T., Broughton, J.R., Seymour, G.J., and Rich, A.M. Preliminary findings from the Oranga Niho dental student outplacement project. *New Zealand Dental Journal* 111: 6-14 (2015).

Broughton, J.R., Anderson, V., Lawrence, M., Steinman, M., Nichol, J., Wright, S., Johnson, R., Johnson, M., McGibbon, M., Laing, B., and Hikairo, P. *Oranga niho me ngā tangata whaiora. Oral health and Māori mental health patients*. Research report, University of Otago, September 2013. Released June 1, 2015.

Broughton, J.R. (2015) *Michael James Manaia "Act II"* in "The Penguin Book of New Zealand War Writing." Eds, H. Ricketts and G. McLean. Penguin Random House New Zealand. ISBN 978-0-14-357309-8. Pages 426-435.

Associate Professor LA Foster Page

Foster Page LA, Chen V, Gibson B, McMillan J. Overcoming structural inequalities in oral health: the role of dental curricula. *Community Dental Health* 33:1-5 (2016).

Foster Page LA, L Gray, P Gallagher, E McKinlay, A M Rich. Untangling the web of influences on interprofessional education for dental students. *Journal of Dental Education* 80: 677-685 (2016).

Foster Page LA, Thomson WM, Beckett D, Cameron C. Can the Child Health Utility 9D measure be useful in oral health research? *International Journal of Paediatric Dentistry* 25: 349-357 (2015).

Schwendicke F, Dorfer C, Schlattmann P, Foster Page LA, Thomson WM, Paris S. Socioeconomic inequality and caries: A systematic review and meta-analysis. *Journal of Dental Research* 94: 10-18 (2015).



Master of Public Health student Deanna Beckett, supervised by A/Prof Lyndie Foster Page and Prof Murray Thomson, won the Oral Presentation Award for the Dental Epidemiology and Public Health session at the 2016 SJWRI Research Symposium.

Ms DM Shearer

Shearer DM, Thomson WM, Mann J, Poulton R. Periodontitis is not associated with metabolic risk during the fourth decade of life. In press, *Journal of Clinical Periodontology*.

Shearer DM, Thomson WM, Broadbent JM, McLean R, Poulton R, Mann J. High-risk glycosylated hemoglobin trajectories established by mid-20s: findings from a birth cohort study. *BMJ Open Diabetes Res Care*.4(1):e000243 (2016). doi: 10.1136/bmjdr-2016-000243

Professor WM Thomson

Thomson WM. Public health aspects of paediatric dental treatment under general anaesthetic. *Dentistry Journal* 4: 20 (2016). doi:10.3390/dj4020020

Thomson WM, Zeng J, Broadbent JM, Foster Page LA, Shalev I, Moffitt TE, Caspi A, Williams SM, Braithwaite AW, Robertson SP, Poulton R. Telomere length and periodontal attachment loss: a prospective cohort study. *Journal of Clinical Periodontology* 43: 121-127 (2016).

Healey DL, Gauld RDC, Thomson WM. Treatment-associated changes in malocclusion and OHRQoL: a four-year cohort study. *American Journal of Orthodontics and Dentofacial Orthopedics* 150: 811-817 (2016).

Benn AML, Broadbent JM, Thomson WM. Occurrence and impact of xerostomia among dentate adult New Zealanders: findings from a national survey. *Australian Dental Journal* 60: 362-367 (2015).

Keynote addresses

Broughton, J.R. "Taku hikoi ki hauora Māori: My journey through Māori health." Invited speaker at the Hui-A-Tau (Annual Conference) of Te Ohu Rata O Aotearoa, the Māori Medical Practitioners' Association, Papakura Marae, 24 September 2016.

Broughton, J.R. "Dentistry at the Normandy Invasion, World War II." Invited opening address at the University of Otago Sir John Walsh Research Institute Research Day, Dunedin Public Art Gallery, Dunedin, 1 September 2016.

Broughton, J.R. "A timely toothache in World War II." Invited opening address at the International Association for Dental Research, Australia and New Zealand Division Conference, Dunedin, 24 August 2015.

Broughton, J.R. "Special Operations In Dentistry." Invited opening address at the University of Otago Sir John Walsh Research Institute Research Day, Dunedin Public Art Gallery, Dunedin, 9 July 2015.

Broughton, J.R. "Ma te huruhuru te manu ka rere. With feathers a bird can fly," Invited opening address at the Dunedin Writers and Readers Festival, Regent Theatre, Dunedin, 7 May 2015.

Broughton, J.R. "Oranga Niho @ Otago" Invited opening address, Hui-a-Tau (Annual Conference), Te Ao Mārama, New Zealand Māori Dental Association, Dunedin, 17 April 2015.

Foster Page LA. *Child self-reported questionnaires in oral health research and service evaluation: what are they and do we need them?* Keynote address to the 25th Congress (biennial conference) of the International Association for Paediatric Dentistry, Glasgow, Scotland, 3 July 2015.

Thomson WM. *What can the findings of life-course research tell us about the challenges in promoting oral health through life.* Presented to the 70th Anniversary Celebration of Shanghai Stomatological Hospital, Fudan University, Shanghai, China, 25 October, 2016.

Thomson WM. *Reflections on a quarter century of research in DPH.* Keynote address to the 2016 conference of the New Zealand Society of Hospital and Community Dentistry, New Plymouth, 29 July 2016.

Thomson WM. *Beware of the fashionable: Keeping it real in oral epidemiological research.* Keynote address to the 7th International Meeting on Methodological Issues in Oral Health Research, Bergen, Norway, 13 May 2016.

Thomson WM. Two keynote addresses (*Writing a paper – what to do and what not to do and Navigating the publication process*) to the annual conference of the Indian Association of Public Health Dentistry, Manipal, India, 20 November 2015.

Thomson WM. Two keynote addresses (*Dry mouth and The Dunedin Study*) to the 47th Semana Academica de Odontologia at Universidade Federal Rio Grande Do Sul, Porto Alegre, Brazil, 8 and 9 October 2015.

Thomson WM. *The oral health of older people: what we know and what we should know.* Keynote address to the Annual Scientific Meeting, National Dental Centre Singapore, Singapore, 29 August 2015.

Thomson WM. (1) *Gerodontology research: issues, opportunities and challenges.* (2) *The Dunedin Study: documenting the natural history of oral health and disease through life.* (3) *Periodontitis in adults: natural history, antecedents and impact.* Keynote addresses to the Research Day conference, National Dental Centre Singapore, Singapore, 28 August 2015.

Thomson WM. *New Zealand's ageing population and "teeth for life": be careful what you wish for...* Keynote address to the New Zealand Dental Association biennial conference, Auckland, 20 August 2015.

Thomson WM. *Psychosocial aspects of paediatric dental GA*. Keynote address to the 25th Congress (biennial conference) of the International Association for Paediatric Dentistry, Glasgow, Scotland, 4 July 2015.

Thomson WM. *Insights from 25 years of gerodentological research*. Keynote address to the Geriatric Oral Research Group at the 93rd General Session of the International Association for Dental Research, Boston, USA, 13 March 2015.

Honours and awards

Professor Broughton was made a Companion of the New Zealand Order of Merit for services to Māori Health, theatre and the community. Queen's Birthday Honours, June 2016

Professor Broughton received the Dr Maarire Goodall Award, honouring service by Māori health professionals to Māori communities for Māori health development, by Te Ohu Rata O Aotearoa, New Zealand Māori Medical Practitioners Association, 24 September 2016.

Dr Shearer received the 2015 IADR Colgate Research in Prevention Travel Award

Dr Broadbent received the 2015 Investigator Award for Excellence in Preventive and Community Dentistry Research from the International Association of Dental Research Australia New Zealand Division.

Dr Broadbent received the 2015 Award for Basic Research, University of Otago Sir John Walsh Research Institute.

Associate Professor Foster Page was awarded a Fulbright travel Grant in 2015.

Editorial positions

Professor Thomson assumed the Editor-in-Chief position for *Community Dentistry and Oral Epidemiology* in January 2015. He also remains as Associate Editor for the *European Journal of Oral Sciences*.

Associate Professor Foster Page was appointed as Section Editor for *BMC Oral Health*, and to the Editorial Advisory Board for *Community Dentistry and Oral Epidemiology* (3-year term).

Postgraduate student completions 2015-16

Doctor of Philosophy: Dara Shearer. *Longitudinal associations between periodontal disease and glycaemic control* (Supervisors: WM Thomson, J Mann, R Poulton). Completed February 2016.

Doctor of Clinical Dentistry: Azza Al-Ani. *Genetics of hypodontia* (Supervisors: M Farella, JS Antoun, A Merriman, WM Thomson). Completed November 2016.