The Australasian Epidemiological Association in conjunction with the University of Otago present:

Big Health Data for Epidemiology: opportunities and challenges using the SNZ IDI and other sources of “big data” for epidemiological research in NZ

Information on the presentations and speakers

Morning speakers/chairs – speaker details only

Graeme Osborne
Graeme is currently the Director for the Ministry of Health’s Information Group and the National Health IT Board. The Board is responsible for health IT leadership, and is driving the implementation of the next-phase Health IT Programme to create a person-centred view of the health system through better integration of information and systems. Previous to this, Graeme has worked in senior management roles in the financial, health insurance and information technology fields. He was the Accident Compensation Corporation’s general manager of information management, Statistics New Zealand’s general manager for information, and chief information officer of Southern Cross Healthcare.

Graeme was a member of the Land Information New Zealand Audit Committee, the e-GIF Management Committee, Institute of Directors and a trustee of the Computer Access New Zealand Trust. He was also a member of the Health Intranet Governance Board, the Telecommunications User Association of New Zealand Board and the Digital Strategy Advisory Group.

Bridget Kool
Dr Bridget Kool is a senior lecturer, Director of the BHSc Honours programme, and Academic Director at the University of Auckland’s School of Population Health. She was a paediatric nurse for 25 years and has since completed a MPH and PhD. Her current research interests focus on injury-related topics including: falls in young and working aged adults, traumatic brain injury, the role of alcohol in injury, trauma outcomes, and child maltreatment. For a number of years she has been involved with building research capacity in Fiji, working closely with Fiji National University. She is the current New Zealand President of the Australasian Epidemiological Association. She is an invited member of the Statistics New Zealand Working Group for Serious Injury Information, and the Major Trauma Clinical Network of New Zealand. She is an editor for the Australian and New Zealand Journal of Public Health, and Injury.
Tony Blakely
Tony is an epidemiologist at the University of Otago, Wellington. Tony initiated and implemented the New Zealand Census-Mortality Study (NZCMS) in the late 1990s, a pioneering study linking the national censuses with mortality data to allow monitoring and research on ethnic and socio-economic inequalities and the contribution of smoking to mortality (the NZ census periodically includes smoking). He has also led the parallel study, CancerTrends, that links census and cancer registration data to allow cancer incidence and survival studies. Built around these two studies, Tony directs the Health Inequalities Research Programme that includes the health component of a panel study of 20,000 adults followed up for eight years (Survey of Family, Income and Employment, SoFIE-Health), and a series of neighbourhoods and health research projects.

Since 2010, he directs the HRC-funded Burden of Disease Epidemiology, Equity and Cost Effectiveness Programme. This ambitious programme aims to build infrastructure (e.g. linked routine datasets) and capacity (e.g. economic decision modelling) to rapidly assess the health impact and cost effectiveness of a range of preventative and cancer control interventions – and examine their equity impacts.

Anna McDowell and Deb Potter
Anna is the Manager of the Integrated Data Infrastructure (IDI). Her team is responsible for the maintenance and expansion of the IDI. Anna has a background in working with administrative data and a special interest in social and injury statistics.

Deb is the Manager responsible for communications and engagement for the IDI and Microdata Access at Statistics NZ. Deb has a long background in social statistics and special interest in the labour market, social wellbeing and Māori and gender information.

Simon Ross
Simon is a MSc graduate of the University of Otago (2003) and has worked for various New Zealand health sector organisations since 2004 including: Southlink Health (2004-2006), Capital and Coast District Health Board (2007) and the Ministry of Health (2007-2015). Simon has had a leadership role in data and analysis at the Ministry since 2009 and is currently Manager, Analysis & Reporting where he works with two teams responsible for publishing information products and distributing National Collections datasets to researchers and operational users in the health and government sectors.

Jeroen Douwes
Jeroen Douwes is a Professor of Public Health and Director of Massey University’s Centre for Public Health Research (CPHR) in Wellington. He obtained his MSc and PhD in environmental epidemiology from Wageningen University, The Netherlands. He leads a comprehensive programme of public health research with a focus on respiratory disease and environmental and occupational health. Jeroen is
Associate Editor of the International Journal of Epidemiology and Community Health, has published 130+ peer reviewed publications and has an H-index of 44. He serves on the board of the Health Research Council (HRC) and is the Chair of the HRC’s Public Health Research Committee.

**Suneela Mehta**
Suneela is a Public Health Medicine Specialist and a Research Fellow with the Vascular Informatics Using Epidemiology and the Web (VIEW) team based at the University of Auckland. Much of her research has drawn on big health datasets, including analyses investigating demographic differences in the use of pharmacotherapy for primary and secondary prevention of cardiovascular disease, and the health needs and service utilisation of Asian people across the Auckland region. She is currently examining whether it is possible to develop cardiovascular risk prediction models solely from routinely collected national health data for people without a history of cardiovascular disease.

**Giorgi Kvizhinadze**
Giorgi is a researcher on the Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE³). Giorgi’s role on the programme includes mathematical modeling, uncertainty and sensitivity analysis. Giorgi’s other research interests include expert opinion use in health economics, elicitation methodologies and statistical methods in health economic evaluation.

**Andrea McDonald**
Andrea is a Public Health Medicine Registrar and Research Fellow on the New Zealand Census Mortality Study and Cancer Trends (NZCMS/CT) BODE³ Programme. Her role on NZCMS/CT is to develop mortality, cancer and smoking papers and undertake other knowledge translation and dissemination activities. On BODE³ she is leading a paper examining the cost-effectiveness of a screening programme for H. pylori in New Zealand and how cost-utility varies by age, gender and ethnicity.

Before joining the University of Otago, Wellington in 2015, Andrea worked in quality improvement at Te Awakairangi Health Network in the Hutt Valley; on policy advice for sugar sweetened beverage taxation at the Secretariat of the Pacific Community in Noumea; and at Regional Public Health, Wellington she did an evaluation for a housing coordinator pilot programme and worked in health promotion addressing alcohol harm. Previous research includes a systematic review and meta-analysis examining the impact of household crowding on infectious disease incidence and prevalence. Andrea’s interests are in epidemiology and public health, particularly in research that promotes equity and health improvement and is responsive to stakeholder needs.
Data, Development and Sovereignty - Andrew Sporle
Indigenous nations are already making use of big data to inform their own development. This presentation will outline the international and national context for indigenous data sovereignty, highlighting how these contexts will inform Maori aspirations about the governance and application of Maori data.

**Speaker details:** Andrew Sporle is a Maori health researcher based in the Statistics Department at the University of Auckland, where he teaches in courses on survey methods and official statistics. A former Maori research manager at the HRC, his current research interests include indigenous statistics, social inequities and the creation of tools for accessing and applying existing official data. Much of his research consulting work since 2004 has involved big data in the health and social sectors, including being part of the original development team for PRIMHD. He is a founding member of Te Mana Rauranga and the NZ Social Statistics Network.

Better Start, National Science Challenge – Rick Audus
The Better Start National Science Challenge (E Tipu e Rea) aims to identify critical health, education and mental health issues in childhood and adolescence that, if prevented, would have a major positive impact across the life-course. Three critical areas will be targeted: obesity, early literacy, and behavioural problems. National linked administrative datasets – accessed through the IDI – will play a crucial role in analyses. I will describe how IDI data will be used to answer research questions across the three areas, and how we plan to use the IDI to create indicators, create a virtual cohort, and undertake modelling. I will also discuss some potential pitfalls of the data and how these may impact data analysis and interpretation.

**Speaker details:** Rick Audas is a Senior Research Fellow and Project Leader on the 'Big Data' component of the Better Start National Science Challenge. Rick is a Health Economist with a long-standing interest in the use of big data for policy analysis.

Using routinely collected data for pharmacoepidemiological studies: what is possible? – Lianne Parkin
Adverse drug reactions are a common cause of morbidity in New Zealand patients and result in substantial costs for the health care system. Internationally, there have been increasing calls to use routinely collected health and prescribing data to study the safety and utilisation of drugs, with the aim of improving outcomes for patients and reducing the burden on health care services. In New Zealand, we are in a very strong position to undertake such research because we have high-quality collections of demographic, health, and pharmaceutical dispensing data which cover the entire population and can be linked at the individual patient level. This presentation will outline the general approach to using these
data for pharmacoepidemiological studies, provide some examples of recent and current work, and will consider whether the IDI can be used for drug safety and utilisation research.

**Speaker details:** Lianne Parkin is a Senior Lecturer in the Department of Preventive and Social Medicine at the University of Otago. She completed a medical degree and a post-graduate diploma in obstetrics at the University of Otago, before training and working for several years in general practice in New Zealand and Australia. Subsequently, she undertook further training in public health medicine and completed a PhD with a pharmacoepidemiological focus. Her current research interests include the use of routinely collected electronic health and pharmaceutical dispensing data to study the safety and utilisation of medicines.

**The employment and income effects of chronic health conditions: Treasury report – Sylvia Dixon**

This research used data from IDI to examine the impact of eight different health conditions on the employment and incomes of working-aged New Zealanders who develop them. The conditions studied were stroke, traumatic brain injury, coronary heart disease, diabetes, chronic obstructive pulmonary disease, breast cancer, melanoma, and prostate cancer. The research focused on 20-59 year olds who were in wage or salaried employment, who were first diagnosed in 2008 or 2009, and survived for at least four years after their diagnosis. The impacts were estimated by comparing the post-diagnosis employment and incomes of the adults who developed each condition with those of a matched comparison group. The study found evidence of significant reductions in employment rates and income losses during the four years after the first diagnosis, for people with six of the eight conditions. Significant variations in impact size and the timing of the impacts were found between and within the conditions. The results shed light on the economic consequences of these illnesses for patients and their families.

**Speaker details:** Sylvia Dixon is a senior analyst at The Treasury. She is part of a small team of researchers in Treasury who analyse linked administrative data, providing information and research findings to inform social policy decisions.

**Household and family units in the IDI – Barry Milne**

The inclusion of Census 2013 in the IDI increases the research possibilities both in health and in other areas of functioning. One of the most exciting data additions – unique to Census data – is the ability to classify a whole population of individuals within family and household units. This enables household/family-level indicators to be defined – e.g., household poverty, overcrowding – for (more-or-less) the whole population. These data also enable between-person relationships to be defined, and as such allow assessments of disease associations within families, and allow analytic techniques such as
discordant sibling designs to control for familial confounding. I will describe the data, the possibilities with them, and some of the barriers and pitfalls of their use.

**Speaker details:** Barry Milne is a social science researcher with the Centre of Methods and Policy Application (COMPASS) at the University of Auckland. His research has focussed on analysis of longitudinal data to determine risk factors for child and early adult outcomes, particularly in the area of mental health; micro-simulation of child and adolescent developmental outcomes; and analysis of whole population data to determine socio-economic influences on health outcomes. Barry is a named investigator on the National Science Challenge, *A Better Start - E Tipu e Rea*, and a member of the Executive Board of the Virtual Health Information Network.

**VIEW2020: Current research, future directions – Daniel Exeter**
The VIEW programme has been designed to: i) develop risk prediction algorithms to support more accurate assessment of vascular disease risk; ii) identify under- and over-treatment; and iii) create an information platform that supports research and practice initiatives to facilitate better vascular risk prediction and risk management. Since 2011, our programme has focussed on establishing and growing the VIEW data ecosystem and on ‘whole of population’ risk prediction and risk management. The focus of VIEW2020 will be on risk prediction and risk management in ‘high-risk populations’, on reducing inequities and on creating updatable vascular risk prediction algorithms linked to an information platform to support continuous improvement in risk management and outcomes.

In this presentation, we highlight recent research from the VIEW programme before exploring potential questions we aim to address using the IDI in our future research.

**Speaker details:** Dr Daniel Exeter is a quantitative health geographer whose research focuses on geographical variations in health outcomes. With an interest in reducing health disparities due to socio-economic position, area disadvantage or ethnicity his research combines Geographical Information Science, Epidemiology and Big Data. He is the Principal Investigator on research developing alternative measures of area-level disadvantage in NZ (HRC 13/428) and co-investigator on the Vascular Informatics using Epidemiology and the Web (VIEW) research programme, which investigates social disparities in cardiovascular health service utilisation and outcomes New Zealand (HRC 11/800). He is currently using the VIEW datasets to explore the influence residential mobility has on CVD outcomes.

**Monitoring the incidence of injury using administrative data: Proceed with caution! – Gabrielle Davie**
The Injury Prevention Research Unit (IPRU) has been effectively utilising administrative health and injury datasets for research for over a decade. This valuable research has utilised both individual administrative datasets (e.g. National Minimum Dataset (NMDS) of hospital discharges) and bespoke
linked administrative datasets (e.g. Traffic Crash Reports linked to the NMDS). Through a number of research projects, IPRU has developed methods that enable administrative health data to be appropriately used for monitoring the incidence of injury over time. These methods include the use of two derived variables, a readmissions indicator and a measure of severity, both created by IPRU from existing NMDS variables. High-quality coding and appropriate liaison with data providers are also both essential in ensuring meaningful output from analyses of routinely collected data.

**Speaker details:** Gabrielle Davie first used one of NZ’s “big health datasets” for public health research almost 15 years ago. As a Senior Research Fellow in the Injury Prevention Research Unit at the University of Otago, her more recent research in injury prevention and rehabilitation has had a particular focus on utilising routinely collected datasets from the Ministry of Health, NZ Transport Agency & ACC. Gabrielle is currently a named investigator on two Health Research Council projects that rely on administrative health data and she has started analysing data in the IDI with two other projects.

**Linked data for research on infectious diseases, housing, environment and health - Michael Baker**

This presentation will focus on uses of linked data for research on infectious diseases, housing, and environmental health more broadly. It will draw on the experience of three research groups in the Department that have actively used ‘big data’ in this way. Lessons learned and some directions for the future will be described, including the potential to better quantify the relationship between environmental conditions/exposures and health outcomes; broadening the range of outcomes that can be measured using ‘big data’; and increasing opportunities to evaluate the effectiveness of interventions and natural experiments.

**Speaker details:** Professor Michael Baker is a public health physician and professor in the Department of Public Health at the University of Otago, Wellington. He is Director of the Health Environment and Infection Research Unit (HEIRU), Co-Director of He Kainga Oranga / Housing and Health Research Programme, and a Principal Investigator with the New Zealand Centre for Sustainable Cities. Michael has made extensive use of public health surveillance and administrative data for investigating, describing and controlling infectious diseases and environmental health hazards in New Zealand and for evaluating public health interventions.

**Ministry of Health analysis using the IDI – first steps, future plans – Steven Johnston**

The Ministry of Health began contributing data to the Integrated Data Infrastructure (IDI) in 2014. During 2015 we also took our first steps as users of the IDI, mainly through contributing to work led by The Treasury to identify groups of young New Zealanders at risk of poor outcomes. Beginning in 2016,
we will have a much stronger focus on using the IDI to investigate topics and populations of health policy interest. This presentation will briefly outline what we have been doing, and our plans for future analysis projects.

**Speaker details:** Steven Johnston is a statistician in the Health and Disability Intelligence group at the Ministry of Health. His current priority is initiating a work programme around analysis of the IDI, as well as the statistical design and analysis of the New Zealand Health Survey. He has previously worked in the Research and Evaluation group at the Ministry of Social Development and the Statistical Methods group at Statistics New Zealand.