



The Australian Longitudinal  
Study on Male Health

# Annual Report 2016



## Table of Contents

Acknowledgements .....	3
1 Introduction from the Chief Investigators.....	4
2 Study Personnel and Committees.....	6
2.1 Study Team.....	6
2.2 Steering Committee .....	7
2.3 Collaborators and Investigators.....	8
2.4 Publications.....	9
2.5 Annual Workshop.....	11
2.6 Conferences, presentations and other information dissemination activities .....	11
3 Study highlights and new findings .....	12
3.1 Highlights .....	12
3.2 New Findings .....	12
4 Research Themes.....	29
5 Student Projects.....	32

## Acknowledgements

The research on which this report is based was conducted as part of Ten to Men: The Australian Longitudinal Study on Male Health by the University of Melbourne. We are grateful to the Australian Government Department of Health for funding and to the boys and men who provided the survey data.

# 1 Introduction from the Chief Investigators

The past twelve months have been an exciting time for the Ten to Men team. Wave 2 data collection is complete; first results from Wave 1 have been accepted for publication, and planning for Wave 3 has begun. Wave 2 heralds the commencement of the longitudinal phase of the study where we begin to enrich the data and build capacity to investigate research questions involving patterns of health and behaviour over time. Wave 2 has been an important developmental phase for the study as we moved to new mixed-methods data collection protocol designed to maximise retention, particularly of hard-to-engage participants, and to build the long-term viability of the study by designing an approach that takes advantage of lower-cost data collection methods.

The protocol was pilot tested in June-September 2015 with a 75% response and Wave 2 data collection got underway in November 2015 with the online phase, followed by the mail-out phase in December 2015. In January 2016, 100 interviewers from Roy Morgan Research took to the field for the face-to-face phase of the protocol. Across the whole data collection period intensive tracking has been underway to locate participants who have moved. Wave 2 data collection concluded in early June 2016, and preliminary response is 76%.

The Wave 1 research dataset was made available from July 2015 and to date 10 requests have been approved. From June 2016 the research dataset will be housed at the Australian Data Archive and requests and data distribution administered via that site. The review and approval process will remain with the University of Melbourne study team. Wave 2 data will be delivered in late 2016 to the Australian Data Archive.

Over the past twelve months the study team have been disseminating information and promoting the study through a range of activities including the Annual Workshop, conference presentations, upgrades to the study website, and media activities. Initial publications are in preparation and will begin to appear in the second half of 2016. When the data is available and analysed by the study team and other researchers the study will start to meet its aim of becoming a resource for researchers, policy makers, and the broader male health community to better understand, and ultimately improve, the health and wellbeing of Australian males.

We would like to acknowledge the contributions of our dedicated team, especially Dianne Currier the study coordinator, all our study committee members and the professional staff at University of Melbourne for their efforts in moving the project forward over the past 12 months. We would also like to thank the Department of Health for their continued support and commitment to the success of the study. Finally, and most importantly, we thank the men and boys who joined the study for their generous contribution without which the study would not be possible. We look forward to a long and mutually rewarding association across subsequent waves.

Dallas English

Professor Dallas English



JP

Professor Jane Pirakis



## 2 Study Personnel and Committees

### 2.1 Study Team

**Professors Jane Pirkis and Dallas English**

Study Co-Chief Investigators

**Dr Dianne Currier**

Study Co-ordinator

**Ms Rachel Koelmeyer**

Research Fellow (until July 2015)

**Associate Professor Matthew Spittal**

Study Statistician

**Mr Robert Lukins**

Cohort Manager

**Mr Sashane Sahabandu**

Data Manager

**Mr Wayne Davidson**

Administration and Communications

**Ms Narelle White**

**Ms Samatha Croy**

Cohort Tracking Staff

## 2.2 Steering Committee

### **Professor Jane Pirkis**

Director - Centre for Mental Health  
Melbourne School of Population and  
Global Health  
The University of Melbourne

### **Professor Dallas English**

Deputy Head of School  
Melbourne School of Population and  
Global Health  
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### **Dr Dianne Currier**

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Center for Epidemiology & Biostatistics  
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### **Professor Anne Kavanagh**

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### **Professor George Patton**

Director of Adolescent Health Research  
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### **Professor Shyamali Dharmage**

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### **Professor Billie Giles-Corti**

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### **Professor Lena Sancic**

Head of Department, Chair of Primary  
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### **Professor David Studdert**

Centre for Health Policy/PCOR,  
Stanford University School of Medicine.  
Stanford Law School

### **Professor Jane Gunn**

Director, Primary Care Research Unit  
Department of Primary Care  
The University of Melbourne

### **Professor John Carlin**

Director - Clinical Epidemiology and  
Biostatistics Unit at Murdoch Childrens  
Research Institute  
Professorial Fellow - Centre for  
Epidemiology and Biostatistics  
Melbourne School of Population and  
Global Health  
The University of Melbourne

### **Professor Jane Hocking**

Unit Head – Sexual Health  
Melbourne School of Population and  
Global Health  
The University of Melbourne

### **Professor John Hopper**

Director (Research) - Centre for  
Epidemiology and Biostatistics  
Melbourne School of Population and  
Global Health  
The University of Melbourne

### **Professor Louisa Degenhardt**

NHMRC Senior Research Fellow  
National Drug and Alcohol Research  
Centre  
The University of New South Wales

### **Associate Professor Jo Williams**

Centre for Population Health Research  
School of Health and Development  
Deakin University

### **Associate Professor Matt Spittal**

Centre for Mental Health  
Melbourne School of Population and  
Global Health  
The University of Melbourne

**Dr Marisa Schlichthorst**  
Centre for Mental Health  
Melbourne School of Population and  
Global Health  
The University of Melbourne

**Associate Professor Belinda Lloyd**  
Population Health Research  
Turning Point Alcohol & Drug Centre  
Monash University, Melbourne

The Study Steering Committee gave expert advice, planning and development and met three times in the past 12 months. The focus of those meetings was developing the Wave 3 proposal and publication planning for publications based on the Wave 1 data.

## **2.3 Collaborators and Investigators**

This list includes the named investigators on currently active projects as recorded through the Data Access process.

**Mr Remy Lindner**  
The University of Melbourne

**Dr Angela Nicholas**  
The University of Melbourne

**Ms Marnie Downes**  
Murdoch Childrens Research Institute

**Professor Julie Simpson**  
The University of Melbourne

**Dr Gregory Armstrong**  
The University of Melbourne

**Dr Anna Machlin**  
The University of Melbourne

**Dr Allison Milner**  
Deakin University

**Professor Kelsey Hegarty**  
The University of Melbourne

**Dr Louise Keogh**  
The University of Melbourne

**Professor Gene Feder**  
University of Bristol

**Associate Professor Lena Sancic**  
The University of Melbourne

**Dr Patty Chondos**  
The University of Melbourne

**Mr Nigel Denning**  
The University of Melbourne

## 2.4 Publications

A Special Supplement of the BMC Public Health on Ten to Men has nine manuscripts examining different aspects of the Wave 1 data under review or accepted for publication. It is anticipated that the Supplement will appear in the second half of 2016. Key findings of those publications are summarised in Section 3 and abstracts provided.

In the past twelve months two manuscripts have been accepted for publication:

**Cohort profile: Ten to Men (The Australian Longitudinal Study on Male Health).**

Pirkis J, Currier D, Carlin JB, Degenhardt L, Dharmage SC, Giles-Corti B, Gordon IR, Lyle C, Gurrin, Hocking JS, Kavanagh AM, Louise Keogh, Koelmeyer R, La Montagne AD, Patton G, Sanci LA, Spittal MJ, Schlichthorst M, Studdert D, Williams J, English DR

*International Journal of Epidemiology (In Press)*

**Cohort purpose:** Ten to Men was set up to provide evidence on the gender-related and other factors that influence male health across the lifespan.

**Cohort Basics:** Using a stratified, multi-stage, cluster random sampling design, we recruited a national sample of 15,988 Australian males between October 2013 and July 2014 and collected baseline(Wave 1) data from them. At recruitment, 1,087 participants were aged 10-14 (boys), 1,017 were aged 15-17 (young men) and 13,884 were aged 18-55 (adults). Our primary unit of sampling was the household. Figure 1 shows household and individual response.

**Follow-up and attrition:** We plan to follow the cohort up every 2-3 years. Wave 2 data collection began in November 2015 and is still underway. Our current estimate is that 75% of the cohort will participate in Wave 2.

**Design and Measures:** Ten to Men is a prospective cohort study. At baseline, data on the boys were collected via an interview with participants themselves and a questionnaire completed by one of their parents. Data on the young men and adults were collected via two self-complete questionnaires, one tailored to each of these major age groups. Interview/questionnaire data cover five broad domains: physical health; mental health and wellbeing; health behaviours; social determinants of health; and health service utilisation and health knowledge. We will link the interview/questionnaire data to a range of health and other administrative datasets, the National Death Index and various disease registries. We are proposing linkage to geospatial data on residential and work locations, and the collection of biospecimens.

**Unique features:** Ten to Men is the largest nation-wide longitudinal study devoted to male health that includes boys and adult men. It is important because it will permit an exploration of whether various male gender-related constructs (e.g., masculinity) and male-specific contextual factors (e.g., significant life events like becoming a father for the first time) influence male health.

**Reasons to be cautious:** Ten to Men relies on self-reported information. The cohort contains relatively fewer boys and young men than adults which will limit the potential

for some analyses. We were unable to include males living in remote areas and males who were not sufficiently proficient in English to participate, which may have implications for the generalisability of the findings.

**Age matters: Exploring correlates of self-rated health across four generations of Australian males.** Koelmeyer R, Currier D, Matthew Spittal, Schlichthorst M, Pirkis J and English DR.

*Behavioural Medicine (In Press)*

**Abstract:** The importance of addressing health disparities experienced by boys and men reached tangible prominence in Australia with adoption of the 2010 National Male Health Policy and the establishment of a national longitudinal study on male health - Ten to Men. Ten to Men is based on a holistic model of health with a strong focus on social determinants and health and wellbeing over the life course. Given the life course focus, we set out to assess if health-related characteristics and the correlates of self-rated health differ across the life course amongst four sociologically-defined generations of Australian males. While some differences in the correlates of good or excellent health were observed across generations, addressing obesity and depression appear to be important for improving the health of Australian males of all ages.

## **2.5 Annual Workshop**

In October 2015 the fourth Ten to Men Annual Workshop was held as part of the proceedings of the 2015 Australian Men's Health Gathering in Terrigal, NSW. This is the major event in the Male Health calendar and made the workshop accessible to a substantially wider range of male health researchers and practitioners. Attendance once again increased from the previous year, and included attendees from a wide range of organisations including Foundation 49, Andrology Australia, National Men's Shed Association, Victorian Department of Health, Movember, Men's Health Victoria, University of Melbourne, Men's Health Services, University of South Australia, Federation University, Deakin University, the University of New South Wales, and the Commonwealth Department of Health.

## **2.6 Conferences, presentations and other information dissemination activities**

### **Presentations:**

Professor Jane Pirkis: Andrology Australia Young Men's Stakeholders Meeting. March 2016. Parliament House, Canberra. ACT.

Professor Dallas English and Dr Dianne Currier: Centre for Epidemiology and Biostatistics Work in Progress –Ten to Men 4 Years On. (November 2015). Melbourne, VIC

Professor Jane Pirkis: Centre for Mental Health Work in Progress – Masculinity and Suicidal Behaviour. (November 2015). Melbourne. Vic.

Professor Dallas English and Dr Dianne Currier; Australian Men's Health Gathering - Ten to Men: the Australian Longitudinal study on male health (Ten to Men Annual Workshop). (October 2015). Terrigal, NSW.

Professor Dallas English, Professor Jane Pirkis and Dr Dianne Currier: Commonwealth Department of Health. (July 2015) Canberra. ACT.

### **Media**

An article describing the study and providing information on data access was published in the April 2016 edition of Party Line the quarterly publication of the Australian Rural Health Association.

Professor Dallas English was interviewed about the study on ABC Central Coast Radio on September 8, 2015 in the run up to the 2015 Men's Health Gathering.

### **Teaching**

Members of the study team have also used Ten to Men as a teaching resource in the Masters of Public Health and Masters of Epidemiology courses at the University of Melbourne, including Gender and Health, Epidemiology 1, and Epidemiology 3.

## 3 Study highlights and new findings

### 3.1 Highlights

- Completion of Wave 2 data collection with >75% retention rate
- Two papers accepted for publication (refer to publications section)

### 3.2 New Findings

#### Major Report

##### **Young Australian Men in 2014: health, lifestyle and socio-environmental influences.**

As part of the life-stage research theme a Major Report has been prepared using baseline data for 2264 young men aged 18-25. We describe current health conditions, health behaviours, use of health services, health information access and attitudes to health and investigating if these factors vary by region, area-level socioeconomic disadvantage and Year 12 completion status. A summary of key findings is presented below. The full report will be available in July 2016 at <http://www.tentomen.org.au/index.php/technical-reports.html>.

##### Representativeness

- Young men aged 18-25 participating in Ten to Men are similar to same-age men in the Australian population in Indigenous status, proportion married, proportion in the workforce and occupational categories.
- Young men in Ten to Men have higher rates of Year 12 completion and having a Bachelor Degree than same-age men in the Australian population.
- The major demographic differences between young men in the Australian population and those in the Ten to Men are region of residence, country of birth and English being the main language spoken in the home. These differences reflect design decisions including oversampling of males from regional areas in order to be able to fully investigate regional disparities in health and wellbeing, and the decision not to provide survey materials in languages other than English due to resource constraints.
- Sample weights have been developed to address these design issues.

### Tobacco Use

- Reflecting the historical decline in smoking rates in the population overall resulting from public health measures pursued by Governments over the past several decades, fewer than 20% of young men aged 18-25 in the Ten to Men cohort report current smoking.
- Ten to Men findings of men aged 18-25 are comparable to the 2014-15 National Health Survey where 17.5% were current smokers.
- Young men aged 18-25 who have not completed Year 12 had the highest rate of current smoking (33%) more than double that of those who have completed Year 12 (13%), and thus are a group that need to be targeted for further intervention.

### Alcohol Use

- Alcohol is widely consumed among young Australian men aged 18-25 with 86% reporting they had drunk alcohol in the past 12 months. This is same as the 2014-15 National Health Survey where 86% of men aged 18-25 had consumed alcohol in the past 12 months.
- Young men residing in areas of greater socioeconomic disadvantage (SEIFA IRSD Quintile 1– 81.3%, Quintile 2 – 86%) were less likely to have drunk alcohol in the past 12 months than young men residing in areas of least disadvantage (SEIFA IRSD Quintile 5 – 90.8%).
- The proportion of young men who had used alcohol in the past 12 months did not vary by region of residence or Year 12 completion status.
- Overall 16% of young men drank in excess of the NHMRC national guidelines of no more than two standard drinks per day. While computed as an average over 12 months, this is comparable to 2014-15 National Health Survey which found 19.7% of young men exceeding national guidelines over a 7 day average.
- Young men living outside major cities had similar and significantly higher frequency of drinking in excess of national guidelines (Major Cities – 14.0%; Inner Regional – 20.5%; Outer Regional – 19.1%)
- Young men who have not completed Year 12 were more likely to drink in excess of national guidelines than those who have completed Year 12 (21.8% vs. 14.1%).

### Illicit drug Use

- 31% of young men in the Ten to Men cohort reported 12 month marijuana use and 15% use of other illicit drugs in the past 12 months. This is higher than the 24.8% reporting 12 month marijuana use in the National Drug Strategy Household Survey. Young men who have not completed Year 12 reported more 12 month marijuana use (36%) and 12 month other illicit drug use (23%) compared to young men who have completed Year 12 (23% and 12% respectively).
- More young men living in Major Cities (32%) reported of 12 month marijuana use than those in Outer Regional areas (26%). There was no regional difference in 12 month use of other illicit drugs.

### Physical activity

- More than three quarters (76%) of young men age 18-25 are meeting guidelines for sufficient physical activity, somewhat higher than the 63% of 18-25 year old men who meet sufficient activity guidelines in the 2014-15 National Health Survey
- The proportion of young men undertaking sufficient physical activity declined as area disadvantage increased and was lowest in areas of greatest disadvantage compared to areas of least disadvantage (82% in SEIFA IRSD Quintile 5 compared to 70% in Quintile 1).
- Young men living in regional areas reported lower levels than young men living in Major Cities (77%), with those in Outer Regional areas reporting the lowest level (67%).
- Young men who have not completed Year 12 were less likely to undertake sufficient physical activity than young men who have completed Year 12 (77% vs. 63%).

### Body Weight

- Almost 40% of young men in the Ten to Men cohort are overweight or obese (BMI >25). The 2014-15 National Health survey found 46.6% of men aged 18-25 were overweight or obese.
- Half the young men residing in regional areas (Inner Regional – 49.4%; Outer Regional – 49.3%) are overweight or obese compared to 40% in Major Cities.
- Young men living in areas of greater socioeconomic disadvantage (SEIFA IRSD Quintiles 1 and 2) have higher prevalence of overweight and obesity than young men living in areas of least disadvantage (Quintile 5) (52%, 49% and 38% respectively)
- 53% of young men who have not completed Year 12 are obese or overweight compared to 40% of young men who have completed Year 12.

### Physical Health

- Overall the majority (95%) of young men aged 18-15 rated their health as good-excellent. This is slightly higher than the 88% reported among 18-25 year old men in the 2014-15 National Health Survey.
- The proportion of young men rating their health as good-excellent was lower in young men who resided in bottom three SEIFA IRSD quintiles (Q1 – 92%, Q2 – 93%, Q3 – 95%) compared to the quintile of least disadvantage (97%) and those who have not completed Year 12 compared to those who have completed year 12 (90% vs 96%).
- Asthma was the most commonly reported doctor diagnosed chronic physical condition with 26% of young men reporting a lifetime diagnosis and 10% reporting 12 month symptoms or treatment.
- Young men who have not completed Year 12 were more likely to report 12 month asthma than young men who have completed Year 12 (14% vs. 10%).
- Almost half (47%) of young men reported having back pain symptoms at some point in their life, with higher rates in young men who have not completed Year 12 compared to those who have completed Year 12 (62% vs. 45%).
- 6% of young men were assessed as having a disability.
- Young men who have not completed Year 12 had more than double the proportion with a disability than those who have completed Year 12 (11.5% vs 4.3%).

- Subsequent waves of data will be able to track if disability contributes to non-completion of Year 12, or if early exit from education increases the risk of acquiring a disability.

#### Mental health

- Depression and anxiety were among the most common doctor diagnosed chronic disorders reported.
- 16% of young men reported being diagnosed with depression at some time in their life, and 11% had depression in the past 12 months.
- 16% of young men screened positive for clinically significant depression in the past two weeks. This is in excess of the 11% who reported having symptoms or treatment for depression in the past 12 months, suggesting that depression may be underdiagnosed in this population group.
- 13% reported lifetime diagnosis of an anxiety disorder and 8% experienced anxiety in the past 12 months.
- More young men who have not completed Year 12 reported a lifetime diagnosis of depression (23%) and of anxiety (16%) compared to those who have completed Year 12 (13% and 10% respectively).
- Longitudinal data over the course of the study will allow us to examine non-completion of Year 12 is a risk factor for the onset of depression and/or anxiety or if the onset of depression and/or anxiety increase the likelihood of exiting education before completing Year 12.

#### Suicidal behaviour

- One in five (22%) young men reported that they had thought about killing themselves at some point and one in fourteen (7%) reported having made a suicide attempt.
- The suicide attempt rate was highest among young men who have not completed Year 12 at 10%.
- Region of residence and area disadvantage did not have independent effects on the risk for suicide attempt or suicidal ideation indicating that suicidal behaviour is an issue for young men generally.

#### Health service use

- Contrary to popular notions that men do not go to the doctor, three-quarters (75%) of young men had visited their GP in the past twelve months.
- We do not have data on the reasons for GP visits however only 30% of young men reported that they went to the doctor for a check-up when they were not sick at least once a year.
- The relatively high level of contact with GP over a 12 month period presents an opportunity to potentially engage in some health promotion activities or information sharing with young men during those visits.
- There was a substantially lower use of dental services; with 36% reported visiting a dentist the past twelve months.
- Preference for male doctors

- The majority (71%) of young men have no preference for the gender of their doctor, and fewer than 10% indicated that they always preferred to see a male doctor.
- There were no regional or area disadvantage differences in preference for a male doctor.

#### Private health insurance

- Over half (57%) of young men did not have private health insurance.
- Fewer young men living in regional areas (Inner Regional – 36%, Outer Regional – 35%) had private health insurance compared to those in Major Cities (45%).
- As area disadvantage increased the proportion of young men with private health insurance decreased (Q5 – 66%, Q4 – 46%, Q3 – 38%, Q2 – 33%, Q1 – 26%).
- 23% of young men who have not completed Year 12 had private health insurance compared to 48% of those who have completed Year 12.

#### Unable to obtain healthcare when needed

- Only a small proportion (5%) of young men were unable to get health care when they needed it in the past 12 months.
- Cost (65%) was the reason given for being unable to get health care major factor followed by wait times or no appointments available (43%).
- Being unable to get healthcare was more often reported by young men residing in Outer Regional areas (8.3%) than by young men in Major Cities (5.2%).
- As area disadvantage increased the proportion of young men reporting inability to get healthcare also increased (Q5 – 3.0%, Q4 – 4.8%, Q3 – 6.9%, Q2 – 7.6%, Q1 – 8.5%).
- 10% of young men who have not completed Year 12 reported being unable to get healthcare when they needed compared 5% of those who have completed Year 12.

#### First source of health information

- 48% of young men indicated that family members, including spouses/partners, were the first source from which they sought health information.
- A relatively low percentage of young (25%) used the internet as their first source of health information.
- There were no differences by region or area disadvantage in use of the internet as the first source of health information, however more young men who have completed Year 12 used this source (27%) compared to those who have not completed Year 12 (15%).
- Young men were least likely to first seek health information from friends (8%), and this did not vary depending on region, area disadvantage or Year 12 completion.

#### Attitudes towards health

- Almost all young men (98%) indicated their health was important to them, although only 65% reported that they actively looked after their health.

- 79% only visited the doctor when they were feeling unwell suggesting that preventive check-ups with a GP are not included in young men's active looking after their health.
- The majority of young men (78%) felt confident that they could find trustworthy health information, although a substantial number (37%) indicated that they avoided talking about their health.

## Other New Findings

### Methodology Research Theme

#### Wave 2

Overall ~76% of Wave 1 respondents participated in Wave 2 (compared to 70% in the Melbourne Collaborative Cohort Study, 90% in Hilda, 69% in the young cohort and 92% and 83% in the older cohorts of the Australian Longitudinal Study on Women's Health). In terms of the mixed-methods approach adopted in Wave 2, approximately a quarter of respondents over the age of 15 opted for online completion. Uptake of the online questionnaire was higher amongst adults than young men (25% and 21% response rates respectively). The window of effectiveness of reminders for the online option was 3-4 days following the reminder. Finally, in Wave 2, face-to-face data collection was substantially more effective in achieving a response than either online or mail approaches with an approximately 50% response rate.

#### Ten to Men design and methods

**The Australian Longitudinal Study on Male Health – Methods.** Currier D, Pirkis J, Carlin JB, Degenhardt L, Dharmage SC, Giles-Corti B, Gordon IR, Gurrin L, Hocking JS, Kavanagh AM, Keogh LA, Koelmeyer R, LaMontagne AD, Schlichthorst M, Patton G, Sanci LA, Spittal MJ, David M. Studdert, Williams J, English DR.

*BMC Public Health Special Supplement (In Press)*

**Background:** The Australian Longitudinal Study on Male Health (Ten to Men) was established in 2011 to build the evidence base on male health to inform policy and program development.

**Methods:** Ten to Men is a national longitudinal study with a stratified multi-stage cluster random sample design and oversampling in rural and regional areas. Household recruitment was conducted from October 2013 to July 2014. Males who were aged 10 to 55 years residing in private dwellings were eligible to participate. Data were collected via self-completion paper questionnaires (participants aged 15 to 55) and by computer-assisted personal interview (boys aged 10 to 14). Household and proxy health data for boys were collected from a parent via a self-completion paper-based questionnaire. Questions covered socio-demographics, health status, mental health and wellbeing, health behaviours, social determinants, and health knowledge and service use.

**Results:** A cohort of 15,988 males aged between 10 and 55 years was recruited representing a response fraction of 35%.

**Conclusion:** Ten to Men is a unique resource for investigating male health and wellbeing. Wave 1 data are available for approved research projects.

### **Analytical strategies for adjusting for study design**

Using the population sample weights developed means that further adjustments for cluster design are generally not required.

**Ten to Men sampling design and weighting: Implications for analysis and interpretation** Spittal MJ, John B. Carlin, Currier D, Downes M, English DR, Gordon IR, Pirkis J, Gurrin L.

*(Under Review)*

**Background:** The Ten to Men study used a complex sampling scheme to identify potential participants for the baseline survey. This raises important questions about when and how to adjust for the sampling design when analysing data from the baseline survey.

**Methods:** We describe the sampling scheme used in Ten to Men focusing on four important elements: stratification, multi-stage sampling, clustering and sample weights. We discuss how these elements fit together when using baseline data to estimate a population parameter (e.g., population mean or prevalence) or to estimate the association between an exposure and an outcome (e.g., an odds ratio). We illustrate this with examples using a continuous outcome (weight in kilograms) and a binary outcome (smoking status).

**Results:** Estimates of the population mean or prevalence of a disease are likely to be influenced by the extent to which the sampling design is addressed in an analysis. Treating the data as if they came from a simple random sample and ignoring the sample weights is likely to give biased estimates and to give confidence intervals that are too narrow. Accounting for the sample design using weights and acknowledging the hierarchical (clustered) nature of the data in the method of analysis will likely produce unbiased population estimates that have wider confidence intervals than an unweighted analysis. In contrast, estimates of an association between an exposure and an outcome are generally similar whether the sampling design is accounted for or not.

**Conclusions:** The extent to which the Ten to Men sampling design is accounted for in any analysis of the baseline data will depend on the research question. When the goals of the analysis are to estimate the prevalence of a disease or risk factor in the population or the magnitude of a population-level exposure-outcome association, our advice is to adopt an analysis that respects the sampling design.

### **Analytical approaches to investigating age effects**

A major report exploring optimal approaches for analysing the cohort based on age concluded that for most analyses treating age as a continuous variable, rather than using arbitrary groupings yielded the most information and was most responsive to the different patterns of health behaviours and changing health status over time.

**Ten to Men 2015 Major Report - Exploring differences in risk and protective factors and health status by age in the Ten to Men cohort.** Koelmeyer R, Spittal MJ, Currier D, Pirkis J, English DR:

*(Melbourne: The University of Melbourne; 2015.)*

<http://www.tentomen.org.au/index.php/technical-reports.html>

### **Wave 1 Questionnaire performance**

Analyses of Wave 1 questionnaire performance found that in the Adult questionnaire, the average overall missing proportion for all data elements in the Wave 1 adult dataset was 4.3% (SD 9.0) with half of the elements having less than 2.5% missing. Of the 12 data elements which had more than 10% missing data these were found to largely be due to the question response format and could be addressed with data cleaning rules.

**Evaluating the performance of the Ten to Men Wave 1 Adult questionnaire.** Wei T, Koelmeyer R, Currier D.

*(Melbourne: The University of Melbourne; 2015)*

See Student Projects Section 5 below for more details.

## Physical Health Research Theme

### **Cohort health and lifestyle characteristics**

98% do not meet guidelines on fruit and vegetable consumption, 46% do not meet physical activity guidelines, 62% are overweight or obese, 18% are current smokers, 55% consumed alcohol in excess of national guidelines; 90% reported good to excellent self-rated health. In terms of mental health depression was prevalent with 13% of adults reporting depression in the past 12 months, and 6% screening positive for major depression (PHQ9) in the past two weeks. There was also concerning levels of suicidality in males aged 15 years and older with 18-19% reporting lifetime suicidal ideation, 11% lifetime plan for suicide, and 5-6% a lifetime suicide attempt.

Adult males from regional areas are less likely than those living in major cities to undertake sufficient physical activity or to have seen a GP in the past 12 months, and being more likely to be current smokers and to be living with the effect of an injury. It also reported that associations between insufficient physical activity and increased likelihood of reporting depression, diabetes, high blood pressure and high cholesterol in the past 12 months.

**Disability**

Adult men with disabilities experience marked social and economic disadvantage and poorer health and wellbeing. Men with disabilities were less likely to have completed secondary school, be employed and live in affordable housing, and were more likely to live on low incomes, in more socio-economically disadvantaged areas, and in rental accommodation and to experience shortages of money. Men with disabilities had lower levels of social support and community participation and poorer mental and physical health and overall wellbeing.

**Inequalities in socio-economic characteristics and health and wellbeing of men with and without disabilities: A cross-sectional analysis of the baseline wave of the Australian Longitudinal Study on Male Health.** Kavanagh AM, Aitken Z, Emerson E, Sahabandu S, Milner A, Bentley R, LaMontagne AD, Pirkis J, Studdert D

*(Under Review)*

**Background:** Internationally, men with disabilities have higher rates of social and economic disadvantage and poorer health and wellbeing than men without disabilities. No single study has provided comprehensive, population-level information about the magnitude of such differences among adult men using a well-validated instrument to measure disability.

**Methods:** We analysed baseline data from *Ten to Men* – an Australian longitudinal study of male health. *Ten to Men* used a stratified multi-stage cluster random sample design to recruit a national sample of males aged 10 to 55 years residing in private dwellings. Data were collected between October 2013 and July 2014 from 15,988 males. This analysis was restricted to 18-55 year old participants with data available on age and disability (n = 13,569). We compared the demographic, socio-economic characteristics and health and wellbeing of men with and without disabilities using chi squared tests for proportions and t tests for continuous variables. Linear regression adjusted for age was used to assess the association between disability status and health and wellbeing, which were measured using the SF-12 mental and physical health component scores and the Personal Wellbeing Index.

**Results:** 6.4% of men had a disability (compared with 7.94% of age and region matched men in the 2014-15 National Health Survey reporting mild to severe limitation due to disability). Men with disabilities were statistically significantly older and more likely to be born in Australia, speak English at home, be Aboriginal or Torres Strait Islander (ATSI) and were less likely to be married or de facto, or to live in urban areas. They were less likely to have completed secondary school, be employed and live in affordable housing, and were more likely to live on low incomes, in more socio-economically disadvantaged areas, and in rental accommodation and to experience shortages of money. Among employed men, those with disabilities were less likely to be in high skilled jobs, work fewer hours and were more likely to report that they would prefer to work more. Men with disabilities had lower levels of social support and community participation and poorer mental and physical health and overall wellbeing.

**Conclusion:** Adult men with disabilities experience marked social and economic disadvantage and poorer health and wellbeing. Improving the health and wellbeing of disabled men should be a priority for public health researchers and policy-makers.

### **Sexual Difficulties**

Experiencing sexual difficulties is relatively common among Australian men. 54% of adult men experienced at least one sexual difficulty over the past 12 months. While more common in older men aged 45 to 55 years, almost half of 18 to 24 year old men (48%) also reported at least one SD. Lifestyle factors associated with an increased sexual difficulty rate in men of all ages included smoking, harmful alcohol consumption and drug use in the past 12 months. Health factors associated with increased sexual difficulty rate included poor overall self-rated health, daily pain medication, disability, a physical health condition and a mental health condition.

**Health and lifestyle factors associated with sexual difficulties in men** – results from a study of Australian men aged 18 to 55 years. Schlichthorst M, Sanci LA, Hocking JS

*(Under Review)*

**Background:** Sexual difficulties (SD) are common among men of all ages and can have considerable impact on quality of life and indications for future health. SD are associated with mental and physical wellbeing and with relationship satisfaction, yet they are rarely discussed with medical professionals who are often ill equipped to assess and manage them. This paper provides an overview on the status of SD in Australian men from 18 to 55 years of age and will form a baseline comparison for future analyses of SD based on Ten to Men data.

**Methods:** We used data from Ten to Men, the Australian Longitudinal Study on Male Health. SD was measured using eight items on organic and psychological sexual problems. We examined associations of a range of health and lifestyle factors (smoking, alcohol consumption, illicit drug use, obesity and new sexual partners, self-rated health status, disability, pain medication, diagnosed physical and mental health conditions) with the specific SDs and the rate of SD using logistic and negative binomial regression. The sample included 12,636 adult males who had previously been sexually active. Analysis was stratified by age (18-34 years versus 35-55 years).

**Results:** This paper shows that experiencing SD is relatively common among Australian men – overall half the sample (54%; 95%CI: 0.53-0.55) experienced at least one SD for more than three months over the past 12 months. While more common in older men aged 45 to 55 years, almost half the 18 to 24 year old men (48%) also reported at least one SD highlighting that SD affects men of all ages. We found that the rate of SD was associated with both lifestyle and health factors, although the strongest associations were observed for health factors. Lifestyle factors associated with an increased SD rate in men of all ages included smoking, harmful alcohol consumption and drug use in the past 12 months. Health factors associated with increased SD rate included poor overall self-rated health, daily pain medication, disability, a physical health condition and a mental health condition. Obesity was only associated with an increased rate of SD in men aged 35 to 55 years.

**Early-onset diabetes**

Australian males living with early-onset diabetes are more likely to be socio-economically disadvantaged and suffer substantially worse health status than Australian males living without early-onset diabetes. The strongest correlates of reporting early-onset diabetes, associated with a  $\geq 2$ -fold change in the odds of reporting early-onset diabetes were being aged 35-49 years, being unemployed, being obese, seeing a doctor for a check-up more frequently, reporting comorbid high blood pressure or physical or mental health comorbidities and worse self-rated and physical health status.

**Diabetes in young adult men: Social and health-related correlates.** Koelmeyer R, Dharmage SC, English DR.

*BMC Public Health Special Supplement (In Press)*

**Background:** Diabetes is a global public health issue. It is associated with significant disability, morbidity and mortality risks and substantial healthcare costs. Of great concern is the fact that its prevalence is rising, particularly amongst the young, while epidemiological data regarding the incidence, prevalence and complications of early-onset type 2 diabetes is noted to be sparse.

**Methods:** We used data from the baseline wave of Ten to Men, a national cohort study of Australian males, to investigate the social and health-related correlates of Australian males aged 18 - 49 years reporting being diagnosed with diabetes.

**Results:** 2.95% (95% CI: 2.54% - 3.43%) of men aged 18-49 in the Ten to Men cohort reported having been diagnosed with diabetes in their lifetime (compared to 1.35% of age and region matched men in the 2014-15 National Health Survey). Within this age group, approximately 75% of those diagnosed with diabetes are expected to be living with a known diagnosis of type 2 diabetes; the remainder are expected to have been living with type 1 diabetes. Of the twenty social and health-related factors considered, we found evidence to support the association of eighteen factors after adjusting for age and body mass index. The strongest correlates of reporting a diabetes diagnosis, associated with a  $\geq 2$ -fold increase in the odds of reporting diabetes were being aged 35-49 years, being unemployed, being obese, seeing a doctor for a check-up more frequently, reporting comorbid high blood pressure or physical or mental health comorbidities and worse self-rated and physical health status.

**Conclusion:** Australian males aged 18-49 years who are living with a known diagnosis of diabetes are more likely to be socio-economically disadvantaged and suffer substantially worse health status than Australian males aged 18-49 years living without a diabetes diagnosis. Based on the associations detected in this study, older, single males living in regional areas who are socioeconomically disadvantaged, obese and/or who have other comorbidities may be an important subgroup to target for diabetes screening, disease management and prevention efforts.

**Sleep Apnoea**

Compared with the men without sleep apnoea, men with sleep apnoea had a higher prevalence of cardiovascular, metabolic, respiratory and mental health conditions. Men with

sleep apnoea were also more likely to be overweight or obese, undertake insufficient physical activity, and smoke and consume alcohol at harmful levels.

**Sleep apnoea in Australian men: Disease burden, co-morbidities, and correlates from Ten to Men study.** Senaratna, C.V., English, D.R., Currier, D., Perret, J.L., Lowe, A., Lodge, C., Russell, M., Sahabandu, S., Matheson, M.C., Hamilton, G.S., Dharmage, S.C.

*BMC Public Health Special Supplement (In Press)*

**Background:** Obstructive sleep apnoea is a common disorder with under-rated clinical impact, which is increasingly being recognised as having a major bearing on global disease burden. Men are especially vulnerable and become a priority group for preventative interventions. However, there is limited information on prevalence of the condition in Australia, its co-morbidities, and potential risk factors.

**Methods:** We used data from 13,423 adult men included in the baseline wave of Ten to Men, an Australian national study of the health of males, assembled using stratified cluster sampling with oversampling from rural and regional areas. Those aged 18-55 years self-completed a paper-based questionnaire that included a question regarding health professional-diagnosed sleep apnoea, physical and mental health status, and health-related behaviours. Sampling weights were used to account for the sampling design when reporting the prevalence estimates. Odds ratios were used to describe the association between health professional-diagnosed sleep apnoea and potential correlates while adjusting for age, country of birth, and body-mass index (BMI).

**Results:** Prevalence of self-reported health professional-diagnosed sleep apnoea increased from 2.2% in age 18-25 years to 7.7% in the age 45-55 years. Compared with those without sleep apnoea, those with sleep apnoea had significantly poorer physical, mental, and self-rated health as well as lower subjective wellbeing and poorer concentration/remembering ( $p < 0.001$  for all). Sleep apnoea was significantly associated with older age ( $p < 0.001$ ), unemployment ( $p < 0.001$ ), asthma ( $p = 0.011$ ), chronic obstructive pulmonary disease/chronic bronchitis ( $p = 0.002$ ), diabetes ( $p < 0.001$ ), hypercholesterolemia ( $p < 0.001$ ), hypertension ( $p < 0.001$ ), heart attack ( $p < 0.001$ ), heart failure ( $p < 0.001$ ), angina ( $p < 0.001$ ), depression ( $p < 0.001$ ), post-traumatic stress disorder ( $p < 0.001$ ), other anxiety disorders ( $p < 0.001$ ), schizophrenia ( $p = 0.002$ ), overweight/obesity ( $p < 0.001$ ), insufficient physical activity ( $p = 0.006$ ), smoking ( $p = 0.005$ ), and high alcohol consumption ( $p < 0.001$ ).

**Conclusion:** Health professional-diagnosed sleep apnoea is relatively common, particularly in older males. Associations between sleep apnoea and cardiovascular, metabolic, respiratory, and psychiatric disorders have important clinical and public health implications. As men are especially vulnerable to sleep apnoea as well as some of its chronic co-morbidities, they are potentially a priority group for health interventions. Modifiable lifestyle related factors such as smoking, alcohol consumption, level of physical activity and BMI are possible key foci for interventions.

### **GP service use**

81% of Adult men saw a GP for consultation in the past 12 months. Older men, smokers and those who rate their health as excellent were less likely to visit a GP in the last 12 months, but those on daily pain medication or with co-morbidities were more likely to have visited a GP. 39% of Adult men reported having an annual health check. The odds of a regular health check increased with obesity and daily pain medication, but decreased with harmful levels of alcohol consumption.

**Why do men go to the doctor? Socio-demographic and lifestyle factors associated with healthcare utilisation among a cohort of Australian men.**  
Schlichthorst M, Sanci LA, Pirkis J, Spittal MJ, Hocking JS.

*BMC Public Health Special Supplement (In Press)*

**Background:** Men use health services less often than women and frequently delay seeking help even if experiencing serious health problems. This may put men at higher risk for developing serious health problems which, in part, may explain men's higher rates of some serious illnesses and shorter life span relative to women. This paper identifies factors that contribute to health care utilisation in a cohort of Australian men by exploring associations between socio-economic, health and lifestyle factors and the use of general practitioner (GP) services.

**Methods:** We used data from Ten to Men, the Australian Longitudinal Study on Male Health. Health care utilisation was defined in two ways: at least one GP visit in the past 12 months and having at least yearly health check-ups with a doctor. Associations between these two measures and a range of contextual socio demographic factors (education, location, marital status, country of birth, employment, financial problems etc.) as well as individual health and lifestyle factors (self-rated health, smoking, drinking, healthy weight, pain medication) were examined using logistic regression analysis. The sample included 13,763 adult men aged 18 to 55 years. Analysis was stratified by age (18 to 34 year versus 35 to 55 years).

**Results:** Overall, 81% (95%CI: 80.3-81.6) of men saw a GP for consultation in the 12 months prior to the study (compared to 76.8% of age and region matched men in the 2014-15 National Health Survey). The odds of visiting a GP increased with increasing age ( $p < 0.01$ ), but decreased with increasing remoteness of residence ( $p < 0.01$ ). Older men, smokers and those who rate their health as excellent were less likely to visit a GP in the last 12 months, but those on daily pain medication or with co-morbidities were more likely to have visited a GP. However, these factors were not associated with consulting a GP in the last 12 months among young men.

Overall, 39% (95%CI: 38.3-39.9) reported having an annual health check. The odds of having an annual health check increased with increasing age ( $p < 0.01$ ), but showed no association with area of residence ( $p = 0.60$ ). Across both age groups, the odds of a regular health check increased with obesity and daily plain medication, but decreased with harmful levels of alcohol consumption.

**Conclusion:** The majority of men (61%) did not engage in regular health check-up visits, representing a missed opportunity for preventative health care discussions. Lower

consultation rates may translate into lost opportunities to detect and intervene with problems early and this is where men may be missing out compared to women.

## Mental Health Research Theme

### **Prevalence of depression and suicidality**

13% of adults reported depression in the past 12 months, and 6% screening positive for major depression (PHQ9) in the past two week. There was also concerning levels of suicidality in males aged 15 years and older with 18-19% reporting lifetime suicidal ideation, 11% lifetime plan for suicide, and 5-6% a lifetime suicide attempt.

### **Suicidal ideation and life events**

Depression is the strongest risk factor for experiencing suicidal ideation, nevertheless experiencing serious stressful life events does increase the risk for suicidal ideation in some males even if they are not depressed.

**Life stress and suicidal ideation in Australian men – cross-sectional analysis of Ten to Men baseline data.** Currier D, Spittal MJ, Patton G, Pirkis J.

*BMC Public Health Special Supplement (In Press)*

**Background:** Suicide is a leading cause of death in Australian males aged 18 to 55. Non-fatal suicidal behaviours and thoughts are indicators of increased risk for future suicide. Suicidal behaviour is complex and multi-determined. Research supports the involvement of stressful life events in suicide and suicidal behaviour, however the evidence regarding suicidal thoughts is less developed. This study investigates stressful life events in relation to suicidal ideation in a large cohort of adult males recruited into Ten to Men, the Australian Longitudinal Study on Male Health.

**Methods:** Baseline data from a national cohort of 13, 884 males aged 18-55 years on suicidal behaviour, psychiatric disorder and life events was used. Multivariable logistic regressions were conducted with current suicidal ideation as the outcome and 12 month life events, 12 month depression, anxiety and harmful/hazardous alcohol use, and socio-demographics as covariates. Further logistic regression models investigated the relative risk of life stress alone, depression/alcohol/anxiety alone and co-occurring life stress and depression/alcohol/anxiety.

**Results:** In multivariable models there was an independent contribution to suicidal ideation for six of 24 life events (ORs 1.27-1.95), 12 month depression (OR 4.49) harmful alcohol use (OR 1.38) and anxiety disorders (OR 1.27). Life events co-occurring with depression (OR 10.3) was higher risk than either alone (depression OR 6.6; life stress OR 2.6). There was a lesser effect for co-occurrence in the anxiety and harmful alcohol use models.

**Conclusion:** Life events appear to be related to suicidal ideation independent of depression, anxiety and harmful alcohol use in adult males, however if life events occur in the context of depression that risk is substantially increased.

### **Psychosocial job quality and wellbeing**

Extending the study of psychosocial job quality and demonstrating associations with a global measure of subjective wellbeing, a dose-response relationship between psychosocial job quality and each of the two outcome measures of mental health and subjective wellbeing was found after adjustment for potential confounders, with higher magnitude associations between psychosocial job quality and subjective wellbeing.

**Psychosocial job quality, mental health, and subjective wellbeing: a cross-sectional analysis of the baseline wave of the *Australian Longitudinal Study on Male Health*.** LaMontagne AD, Milner A, Krnjacki L, Schlichthorst M, Kavanagh AM, Pirkis J.

*BMC Public Health Special Supplement (In Press)*

**Background:** Employment status and working conditions are strong determinants of male health, and are therefore an important focus in the Australian Longitudinal Study on Male Health (*Ten to Men*). In this paper, we describe key work variables included in *Ten to Men*, and present analyses relating psychosocial job quality to mental health and subjective wellbeing at baseline.

**Methods:** A national sample of males aged 10 to 55 years residing in private dwellings was drawn using a stratified multi-stage cluster random sample design. Data were collected between October 2013 and July 2014 for a cohort of 15,988 males, representing a response fraction of 35%. This analysis was restricted to 18-55 year old working age participants (n = 13,456). Work-related measures included employment status, and, for those who were employed, a number of working conditions including an ordinal scale of psychosocial job quality (presence of low job control, high demand and complexity, high job insecurity, and low fairness of pay), and working time-related stressors such as long working hours and night shift work. Associations between psychosocial job quality and two outcome measures, mental health and subjective wellbeing, were assessed using multiple linear regression.

**Results:** The majority of participants aged 18-55 years were employed at baseline (85.6%), with 8.4% unemployed and looking for work, and 6.1% not in the labour force. Among employed participants, there was a high prevalence of long working hours (49.9% reported working more than 40 hours/week) and night shift work (23.4%). Psychosocial job quality (exposure to 0/1/2/3+ job stressors) prevalence was 36%/ 37%/ 20%/ and 7% of the working respondents. There was a dose-response relationship between psychosocial job quality and each of the two outcome measures of mental health and subjective wellbeing after adjustment for potential confounders, with higher magnitude associations between psychosocial job quality and subjective wellbeing.

**Conclusions:** These results extend the study of psychosocial job quality to demonstrate associations with a global measure of subjective wellbeing. *Ten to Men* represents a

valuable new resource for the longitudinal and life course study of work and health in the Australian male population.

### **Depression and physical activity**

Adult males who meet NHMRC guidelines for physical activity (150 minutes p/week, have lower odds of reporting depression than those who do not. There is no apparent dose effect of physical activity with respect to protecting against depression.

**Exploring the association between physical activity and depression in Australian Males aged 18-55.** Lindner R, Currier D, Spittal MJ, Jane M, English DR.

*(In preparation).*

See Student Projects Section 5 below for more details.

## Life Stage Research Theme

### **Young men's health and lifestyle characteristics: regional and socioeconomic influences.**

Young men living in regional Australia were more likely to insufficiently physically active or sedentary, more likely to be current smokers, and to be overweight or obese but no different with respect to drug and alcohol use than those living in major cities. Young men living in areas of greater socioeconomic disadvantages (below median SEIFA IRSD rating) were less likely to use alcohol at harmful hazardous levels, or have used alcohol in the past 12 months than those in areas of lower disadvantage. However they were more likely to be overweight/obese, undertake insufficient physical activity and to be a current smoker.

### **Generational differences in health status and behaviours**

**Age matters: exploring correlates of self-rated health across four generations of Australian males.** Koelmeyer R, Currier D, Spittal MJ, Schlichthorst M, Pirkis J, English DR.

*Behavioural Medicine (In Press)*

20-34 year old (Gen Y) males were more likely to report good-excellent self-rated health than males aged 50-55 years (Baby boomers) (93.4% and 85.4% respectively). There were generational differences in some health behaviours, but not others. Generation Y participants were most likely to report sufficient physical activity (62.9%), followed by males aged 35 – 49 years (Generation X) (56.6%) and then the Baby Boomer cohort (53.4%); the level of physical activity amongst Generation Z 50%. The prevalence of obesity increased with age, ranging from 10.6% of males aged 10-19 years (Generation Z) to 25.8% of Baby Boomer males. Other factors did not vary across the four generations, with 93.6% - 96.1% of participants not achieving the recommended serves of fruit and vegetables.

## Masculinity Research Theme

### **Masculinity and suicidal ideation**

**Masculinity and suicidal thinking.** Pirkis J, Spittal MJ, Louise Keogh, Mousaferiadis T, Currier D

*(Under Review)*

**Background:** Males feature prominently in suicide statistics, but relatively little work has been done to date to explore whether endorsement of dominant masculinity norms heightens the risk of or is protective against suicidal thinking.

**Method:** We used data from 13,884 men (aged 18-55) in the Australian Longitudinal Study on Male Health (*Ten to Men*) cohort. These men filled in self-complete questionnaires in 2013/14 which covered a range of topics, including conformity to dominant masculinity norms and suicidal thinking. We conducted logistic regression analyses to estimate the strength of association between these two variables.

**Results:** After controlling for other key predictors of suicidal thinking, one characteristic of dominant masculinity – self-reliance – stood out as a risk factor for suicidal thinking (AOR = 1.34; 95%CI = 1.26-1.43).

**Limitations:** Self-report assessment of psychiatric history and the use of a single item to ascertain current suicidal ideation.

**Conclusions:** It is easy to see how self-reliance might confer risk for suicidality. Men who are self-reliant may believe that they should be strong in the face of any adversity, consider that feeling down is a sign of weakness, and be unlikely to reach out to friends, family or professional sources for help. We need to ensure that clinical and population-based suicide prevention activities that men actively address self-reliance, and promote broader definitions of masculinity at a societal level.

## 4 Research Themes

Ten to Men was developed as a resource for the broader research community to use in researching topics of their own interest. Within the Ten to Men team and co-investigators there are a number of research themes that were taken up in 2015.

### ***Methodology***

An important ongoing contribution of the Study will be in the area of methodology and statistical analysis techniques. The unique nature of the cohort offers the opportunity to investigate a range of methodological issues around understanding the characteristics of the cohort and data and investigating analytical approaches and issues. The initial task undertaken was the development of sample weights. This involved theoretical investigation as well as analytical application and testing to develop a useful set of sample weights as well as guidance on how and when to use them. That latter information is provided in the Data User Manual for reference by researchers working with the data, and the former has been prepared for publication (currently under review). The Ten to Men Statistical Methods and Analysis Group, which oversaw the development of the sampling weights, was convened to explore at a number of relevant methodology issues and undertake research in these areas. Current projects in the methodology area are investigating non-response and characteristics of responders and non-responders, exploring methods for imputing missing data, examining the analytical effects of clustering at the household level and developing analytic strategies to adjust for those effects, and investigating the statistical implications of alternative top-up methodologies for example snowballing from existing participants.

### ***Physical Health***

Ten to Men was designed as a longitudinal study in order to uncover over the course of the study the causal pathways pertaining to the onset of the health conditions and the behavioural factors that underlie the premature mortality and morbidity that males in general and specific population groups of males experience. In order to establish the foundation for that future work, Wave 1 collected data on a broad range of health conditions, individual and socio-environmental risk and protective factors, as well as information on health service use, health knowledge and attitudes. While unable to address questions of causality with this single wave of cross-sectional data, there is ample opportunity to investigate the correlates of health conditions and behaviours in order to a) characterise the cohort; and b) begin to build hypotheses of causality to be tested with future waves of data. The inclusion of novel constructs (i.e. masculinity) and a broad range of social determinants allows for more complex models to be developed which will potentially provide a broader range of targets for intervention. Current research is directed at characterising the health status and behaviours of the cohort, identifying a correlates of health outcomes and health-harming behaviours from both individual level and socio-environmental level domains, a focus on disorders in the research areas of co-investigators, and developing novel approaches to characterising risk groups.

### ***Mental Health***

Mental health is a major cause of disease burden in males and a risk factor for premature mortality; due to suicide but also as recent literature is increasingly documenting in association with cardiovascular and other chronic diseases. It is estimated by the WHO that mental illness will be the leading cause of global disease burden in coming years. In keeping with the broader design and aims of Ten to Men, mental health is approached as an element in a holistic model of health and wellbeing and thus needs to be investigated with respect to individual level and socio-environmental level determinants. The Study Team has strong expertise in mental health and self-harm and has been engaged in a range of projects investigating individual and socio-environmental dimensions of mental health including occupational factors, masculinity, life events and stressors, physical activity, alcohol and substance use and clustering of risk factors.

### ***Life-stage***

A key design feature of the study is the continuous age span of the cohort and the early age of recruitment. This offers the opportunity to follow the cohort through key life transitions over the longitudinal course of the study, and identify key risk stages as targets for preventive interventions. While it will be some years until that work can produce findings, with the single baseline wave of data there is still considerable scope to investigate the characteristics of different age groups within the cohort including their lifestyle and health status and how their individual behaviour and broader socio-environmental contexts influence their current health and wellbeing. The 2015 Major Report began that investigation by examining analytical approaches for exploring age-related issues with the cohort. A subsequent research publication (Koelmeyer et al. In Press) undertook a comparison of selected health and wellbeing indicators across the cohort grouped by sociologically defined generations (Baby boomers, Gen X, Gen Y, millennials). A major report currently being prepared examining health status, behaviours and service use related factors as well as socio-environmental factors influencing health and wellbeing in young adult men. Another current project is examining the youngest segment of the cohort and taking a cluster analysis approach to identify high-risk clusters of behaviours and with the availability of Wave 2 data, factors influencing the move between high and low risk status.

### ***Masculinity***

Ten to Men is focusing on the ways in which gender shapes the health of boys and men's health over the life course. While a consideration on the role of gender is often central to studies of women's health, investigation of the epidemiology of male health largely ignores gender. This is important because there is increasing evidence, predominantly from small-scale quantitative and qualitative studies, that gender norms and relations are critical to male health. Those studies have demonstrated how masculinity shapes health behaviours, in some cases in health enhancing ways, but more often traits related to dominant formulations of masculinity such as risk taking, self-reliance, dominance etc. are associated with more deleterious health behaviours. Similarly, gender norms and expectations shape relationships between males and females and between males and other males which may manifest in behaviours such as the perpetration and experience of violence. Importantly gender intersects with other social determinants to shape health.

For example, gender shapes the choice of job and the meaning of work. The Wave 1 questionnaire included an instrument assessing conformity to masculine norms and a number of analyses are underway investigating health behaviours and outcomes with respect to that, including suicidal behaviour, occupation and mental health, and health service use and engagement.

## 5 Student Projects

### Completed MPH Research Project

**Exploring the association between physical activity and depression in Australian Males aged 18-55.** Lindner R, Currier D, Spittal MJ, Pirkis, J, English DR.

**Summary:** Physical activity is a low-cost, low-risk intervention that has established protective effects against depression. Current NHMRC physical activity guidelines have demonstrated efficacy in increasing general health and preventing physical illness. Limited research exists on how these physical activity guidelines relate to depression.

We used the adult cohort of the cross sectional data from phase 1 of the Ten to Men longitudinal cohort study of Australian males aged 10-55 years. This study used Wave 1 data from 13,763 males aged 10-55 participating in the Australian Longitudinal Study on Male Health (Ten to Men) to compare incidence of depression among individuals who completed sufficient/insufficient physical activity. Using multivariate logistic regression, we then examined the effects of socio-demographic and lifestyle factors on the depression/physical activity relationship.

Completion of recommended quantity of physical activity was associated with a 38% protective effect against moderate/severe depression (OR=.62 95% CI .55;.70,  $p < 0.001$ ). Multivariable analysis found that there was no dose relationship between total physical activity and depression. Additionally, multivariable analysis found no relationship between total vigorous intensity minutes / moderate intensity minutes of physical activity, and depression.

In adult males, physical activity at the recommended level is associated with a reduced risk for depression, however the nature of that relationship requires further investigation, as there does not appear to be a direct dose-response relationship between duration of exercise and lower risk for depression.

**Evaluating the performance of the Ten to Men Wave 1 Adult questionnaire** Wei T, Koelmeyer R, Currier D.

**Summary:** The Australian Longitudinal study on Male Health (Ten to Men), funded by the Commonwealth Government Department of Health, aims to examine Australian male health and its key determinants, to address gaps in knowledge of male health, and to identify policy opportunities to support males and improve male health. A self-completed questionnaire was used for data collection on adults during Wave 1 of the study. Self-completed questionnaires can be susceptible to missing response issues. In view of the negative impacts of missing data, the evaluation of study instrument performance focused on assessing missing data in Wave 1 adult dataset. This report provides a detailed description of the level and pattern of missing data as well as suggestions for data cleaning rules and questionnaire refinement to minimise future data loss.

Chapter 1 provides a brief introduction of the Ten to Men study and Wave 1 data collection in addition to describing the potential negative impact of missing data on the validity of research results. Chapter 2 outlines the methodology used to conduct analyses of missing data which consist of summarising the proportion of missing data for data elements, summarising the proportion of missing applicable variables per participant and investigating associations between participants' characteristics and non-response. Chapter 3 details the level and pattern of missing data in Wave 1 dataset. Chapter 4 provides a discussion on potential reasons behind higher levels of missing data as well as providing recommendations to mitigate issues caused by those missing data. Finally, Chapter 5 summarises key findings of the evaluation and concludes the report. The appendices contain detailed information regarding data elements with concerning levels of missing data and the complete set of result of the participants' characteristics analysis.

Overall, the adult questionnaire performed well with low levels of missing data both for data elements and for individual participants. In addition, refinements made following the pilot study were found to be effective as the current evaluation identified improvement on previous issues found with missing data in the Wave 1 pilot. While we hypothesise that there are different reasons for higher levels of missing data, the majority of missing data can be dealt with similar data cleaning rules. Certain questions may also be modified to reduce the burden of participant and thereby reduce missing data.