Estimating life-time burden of pediatric mental disorders: Implications from the Australian Experience

PROF IAN HICKIE AM MD FRANZCP FASSA
PROFESSOR OF PSYCHIATRY | NHMRC Senior Principal Research Fellow
Ian.hickie@sydney.edu.au

BRAIN & MIND RESEARCH INSTITUTE

THE UNIVERSITY OF SYDNEY

FEATURE

The mental wealth of nations

Countries must learn how to capitalize on their citizens' cognitive resources if they are to prosper, both economically and socially. Early interventions will be key.

John Beddington, Cary L. Cooper, John Field, Usha Goswami, Felicia A. Huppert, Rachel Jenkins, Hannah S. Jones, Tom B. L. Kirkwood, Barbara J. Sahakian and Sandy M. Thomas

To prosper and flourish in a rapidly changing

state-of-the-art scientific and other evidence to investigate the challenges and opportunities that lie ahead in the next 20 years. The report provides an independent assessment that is intended to inform policy-makers both in the United Kingdom and around the world.

during the development of mental capital in childhood and adolescence. Early learning in children can increase their resilience to stress and common mental disorders. Later in life, this resilience helps to engender well-being at work and into old age. And older individu-

Building mental Capital across the Life Cycle

MENTAL CAPITAL OVER THE COURSE OF LIFE
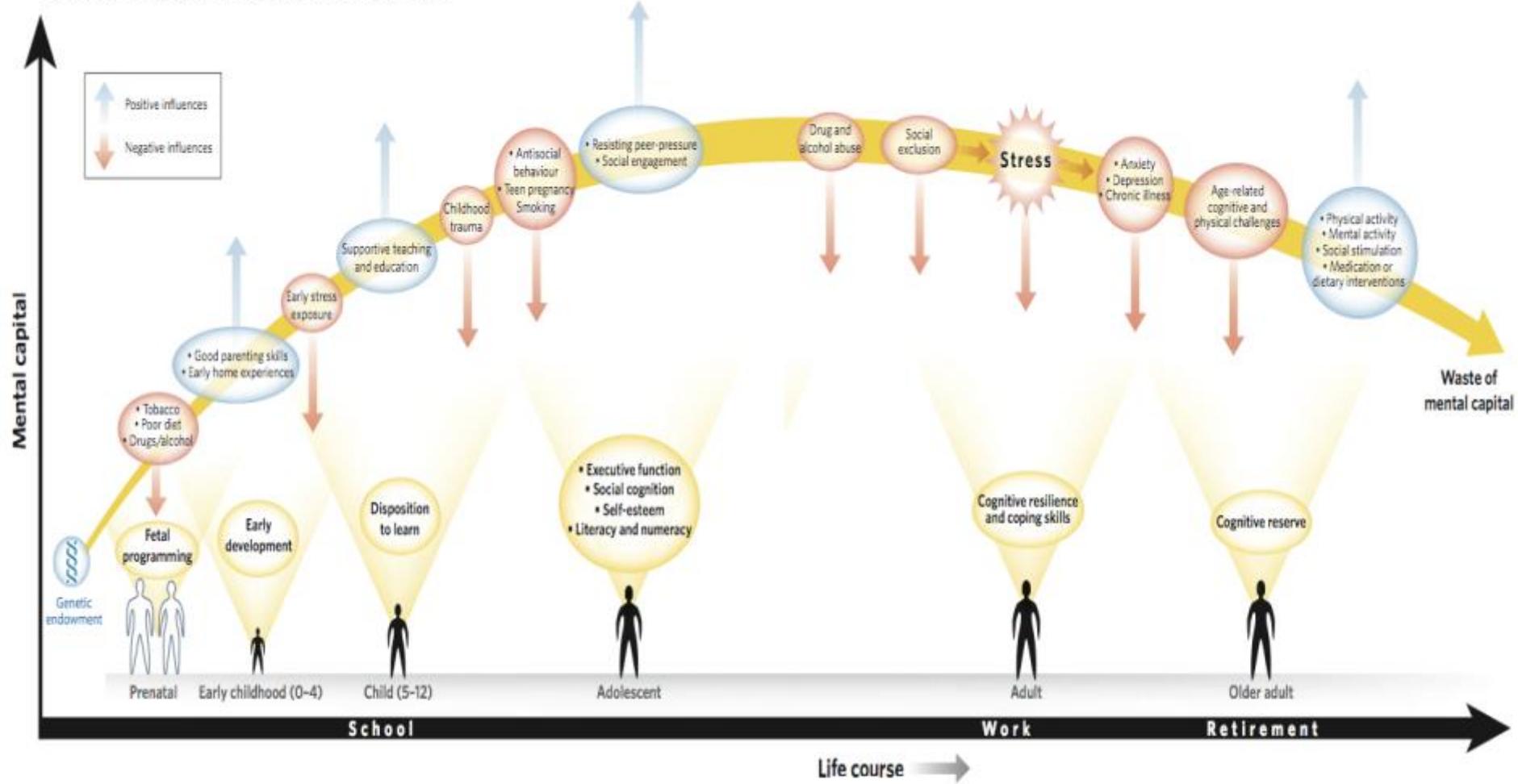
› **1. Mental Health Promotion: a population-based approach**

› A. Individual Brain Development

› B. The family and social context of development

› C. The educational and experiential aspects

› D. Promoting autonomy, social connection and physical activity

› **2. Effective Prevention & Early and continuing intervention for mental health Problems**

› A. Focus on Early Universal Prevention

- Reducing risks, trauma, alcohol, drugs, inappropriate technology use

- Reducing Harms – suicide and self-harm

› B. Focus on Early Intervention for anxiety and depression

› C. Continuing care supported by technology

› D. Building new service delivery platforms

› **Estimates of age of onset of key disorders:**

- Child onset: Anxiety-Dep, Autism/Developmental, ADHD

- Adolescent Onset: Mood, Psychotic, Substance

› **Screening Issues:**

- Pre-school: Age 3-4 years

- Emotional and developmental prior to school commencement

› **Key Issues: What is real impact (DALYs/1,000 popn)**

- Persistence of emotional difficulties

- Impacts on educational and social progression

-

# Percentage distribution of YLD by mental disorders and nervous system disorders, Australia 1996

Bar chart showing Percent of total YLD (y-axis) by Years of age (x-axis) for Mental disorders and Nervous system disorders.
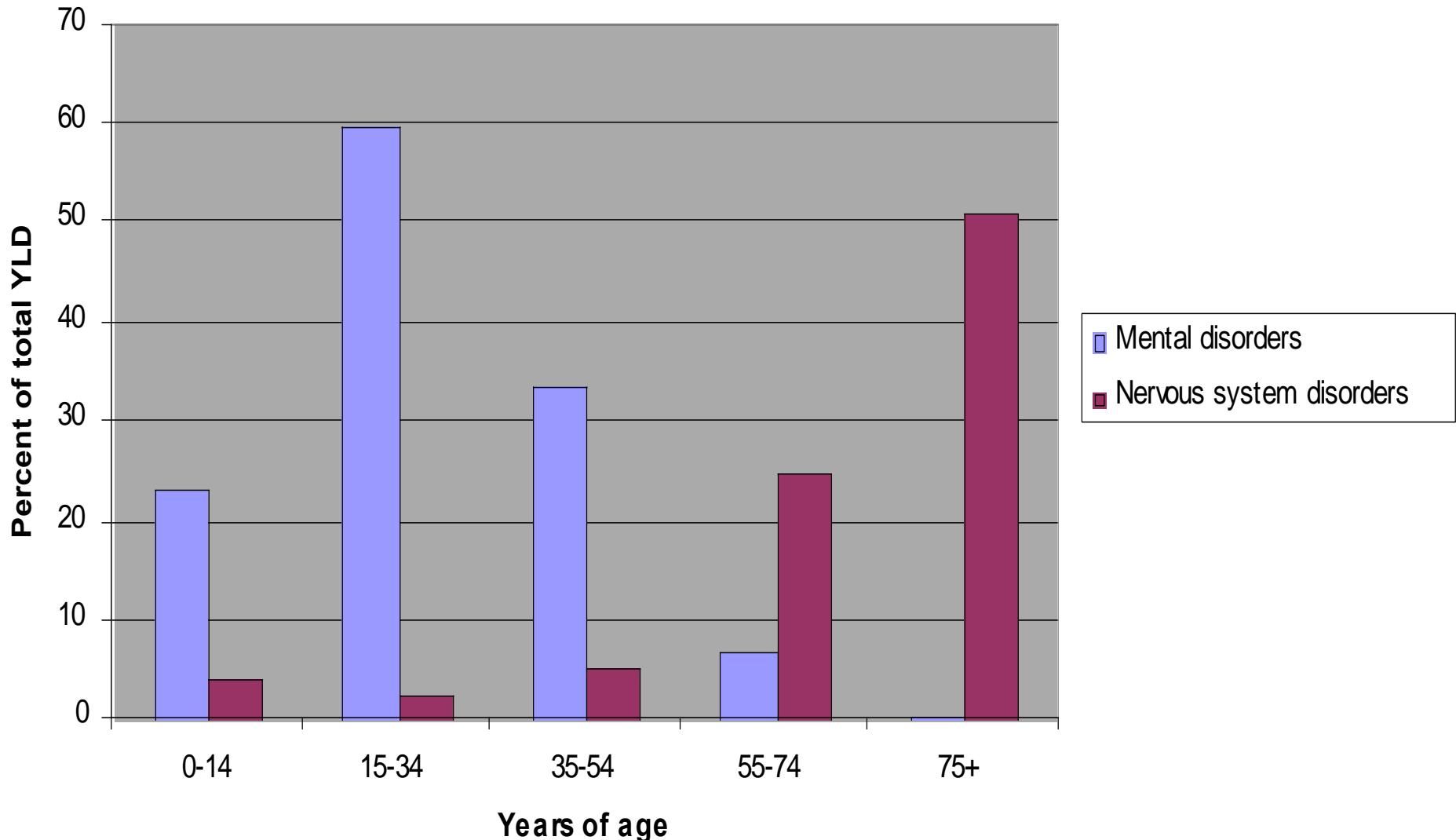
Legend:
- Mental disorders
- Nervous system disorders

Figure 19 Incident YLD rates per 1,000 population by mental disorder, age and sex, Victoria, 2001

Victorian State Government. Victorian Burden of Disease Study: Mortality and morbidity in 2001. Accessed 1/3/2010 http://www.health.vic.gov.au/healthstatus/bodvic/bod_current.htm
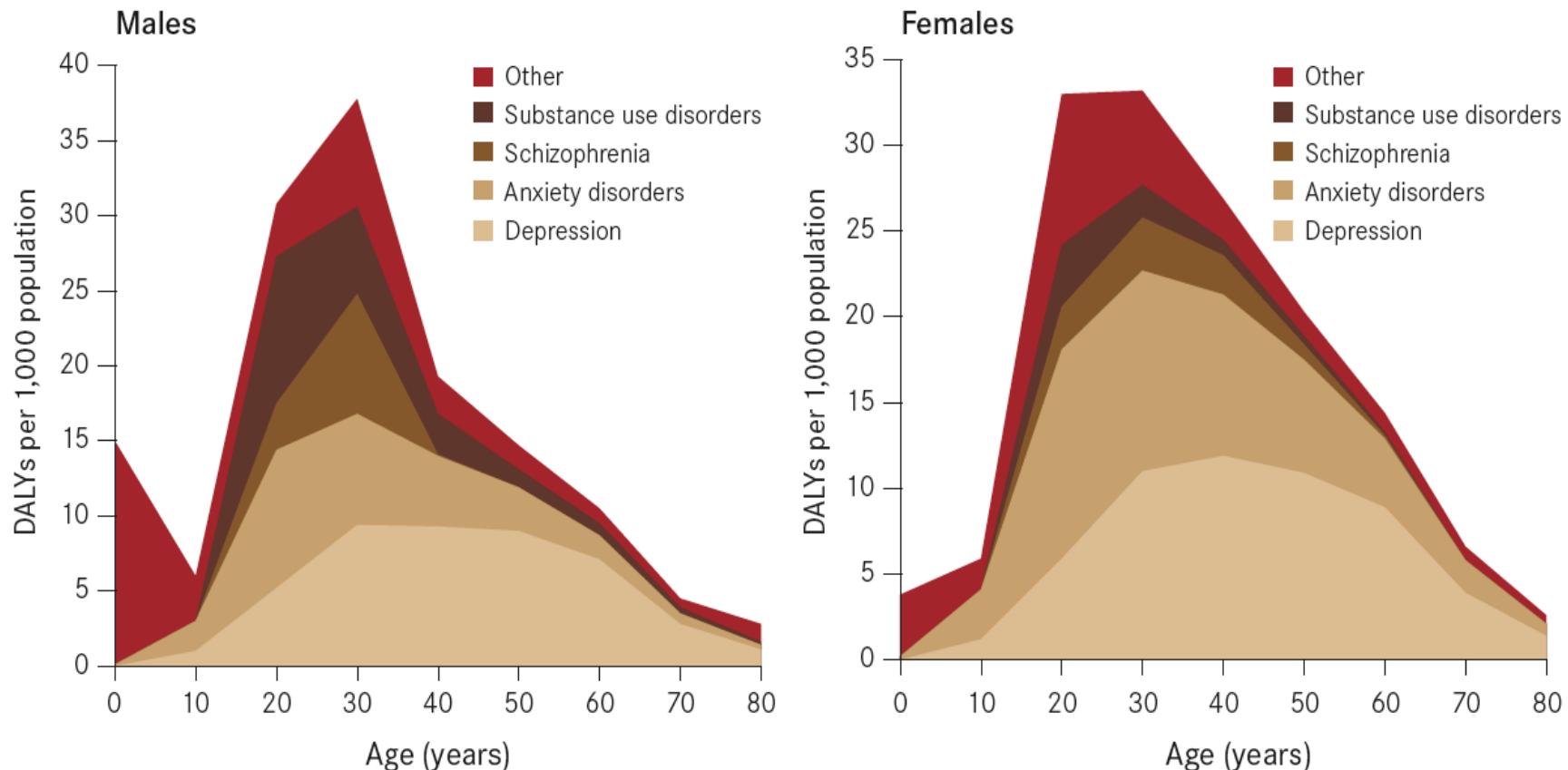
› **Tracking of developmental trajectories:**

  › in the education system –currently at the school level (NAPLAN) throughout primary and early secondary school

  › Proposals to start to use as the basis for individual emotional tracking

› **Support for assisted intervention:**

  - School-based educational supports

  - National Disability Insurance Scheme implementation/trials

THE UNIVERSITY OF SYDNEY

› Nick Martin & Naomi Wray – QIMR & QBI

Figure 1. Brisbane Longitudinal Twin Study
[Sample size now; *projected end 2015*]

Adolescent twins and sibs

12
- Personality [2900; *3800*]
- Psychiatric signs [1400; *2300*]
- Cognition [200; *1100*]
- *Sleep patterns [1000]*
- *Inattention [1000]*
- **Vitamin D [2644]**
- **Antibodies [2644]**

14
- Personality [2200; *3100*]
- Psychiatric signs [1100; *2000*]
- Binocular Rivalry [800; *1700*]
- **Vitamin D [2130]**
- **Antibodies [2130]**

16
- Personality [2500; *3200*]
- Psychiatric signs [1500; *2000*]
- Cognition [2500; *3200*]
- Brain Imaging [80; *800*]
- Migraine [1000; *1800*]
- **Vitamin D [2233]**
- **Antibodies [2233]**

Young Adults

21-29
- Brain imaging [800; *1350*]
- Neuroticism [800; *1800*]
- Psychiatric signs [800; *1800*]
- **Hair Cortisol [500]**
- **Stress [500]**

18-30
- **Psychiatric diagnosis [625; *3561*]**
- **Substance use [703; *3561*]**
- **Life events [703; *3561*]**

Longitudinal:
Vitamin D; Antibodies; Neuroticism (JEPQ, NEO);
Psychiatric signs (SPHERE);
Cross-sectional (^to be longitudinal):
Hair Cortisol
^Cognition (Verbal, Performance IQ, Working Memory, Information Processing);
Binocular rivalry (Rivalry rate);
^Brain imaging (sMRI, dTI, fMRI, & N-back);
Substance use (Alcohol, Tobacco, Recreational drugs);
Sleep patterns (Actigraphy);
Psychiatric diagnosis (Psychosis Screen, CIDI: Depression, Phobias, Panic Disorder);
Life events/social support (e.g. early home environment, family relationships, traumatic events, socioeconomic factors).

Genetic co-morbidity between neuroticism, anxiety/depression and somatic distress in a population sample of adolescent and young adult twins

N. K. Hansell[1*], M. J. Wright[1], S. E. Medland[1], T. A. Davenport[2], N. R. Wray[1], N. G. Martin[1] and I. B. Hickie[2]

[1] Genetic Epidemiology, Queensland Institute of Medical Research, Brisbane, Australia
[2] Brain and Mind Research Institute, University of Sydney, Sydney, Australia

Background. Genetic studies in adults indicate that genes influencing the personality trait of neuroticism account for substantial genetic variance in anxiety and depression and in somatic health. Here, we examine for the first time the factors underlying the relationship between neuroticism and anxiety/depressive and somatic symptoms during adolescence.

Method. The Somatic and Psychological Health Report (SPHERE) assessed symptoms of anxiety/depression (PSYCH-14) and somatic distress (SOMA-10) in 2459 adolescent and young adult twins [1168 complete pairs (35.4% monozygotic, 53% female)] aged 12–25 years [mean = 15.5 ± 2.9]. Differences between boys and girls across adolescence were explored for neuroticism, SPHERE-34, and the subscales PSYCH-14 and SOMA-10. Trivariate analyses partitioned sources of covariance in neuroticism, PSYCH-14 and SOMA-10.
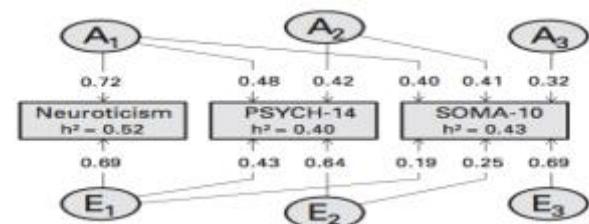
Fig. 3. Parameter estimates for the trivariate AE Cholesky model showing covariation between neuroticism, PSYCH-14 and SOMA-10. The model includes additive genetic (A1, A2, A3) and unshared environmental (E1, E2, E3) sources. Estimates are standardized such that when squared they indicate the percentage of variance accounted for. The factors A1 and E1 account for all of the variance for neuroticism [i.e. they include specific genetic (23%) and environmental (33%) variance for neuroticism], while the factors A2 and E2 are independent of neuroticism [Note: A2 and E2 include specific genetic (7%) and environmental (36%) variance for PSYCH-14]. Heritability (h²) is shown for each variable.

9

TOTALS:
DLEp (depression-like episode) = 724
HMLEp (hypomanic-like episode) = 235
PLEp (psychotic-like episode) = 150
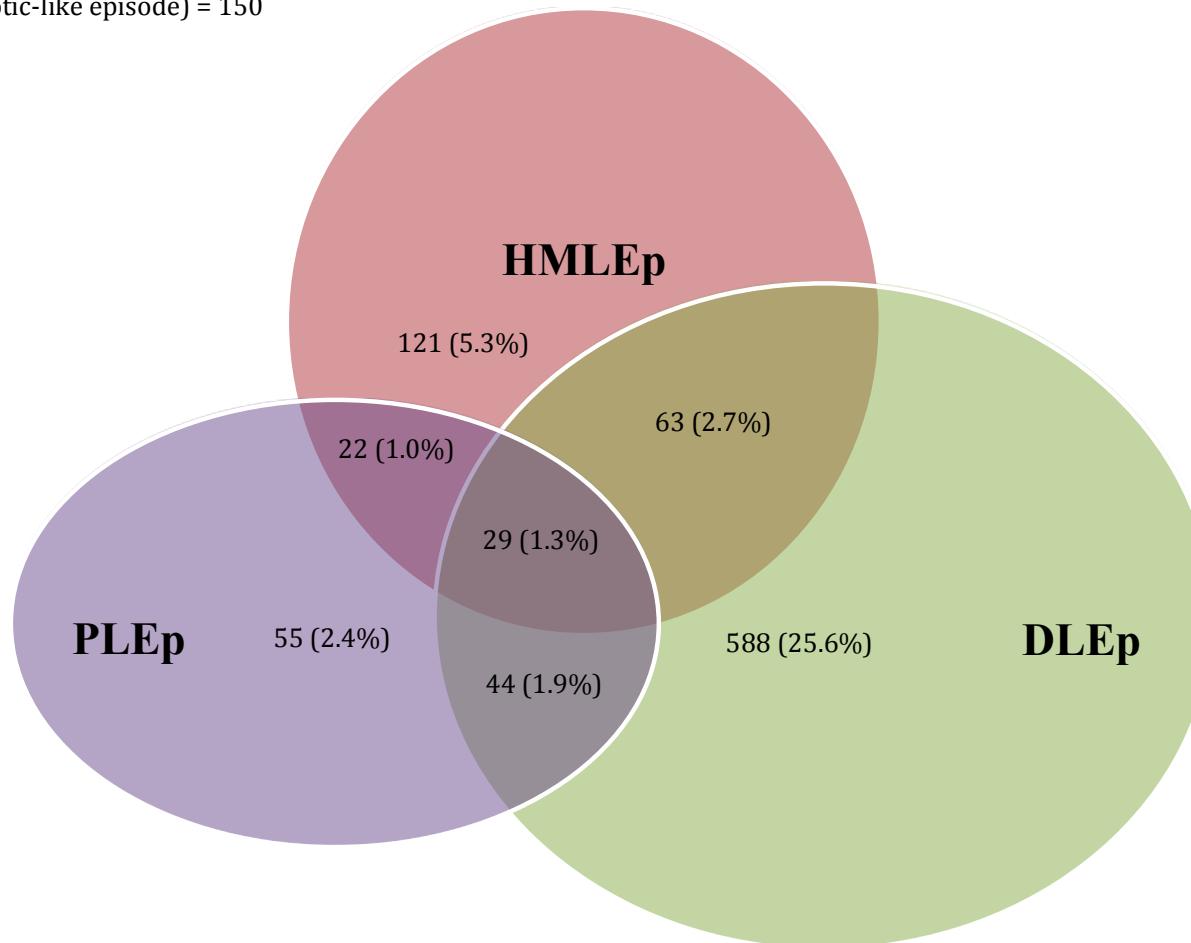
HMLEp

121 (5.3%)

63 (2.7%)

22 (1.0%)

29 (1.3%)

PLEp   55 (2.4%)

44 (1.9%)

588 (25.6%)   **DLEp**

Any risky drinking(a)
29.2%

Recent illicit drug use(b)
15.0%

16.9%

5.9%

4.4%

3.1%

3.2%

1.6%

People not represented in any circle
59.6%

4.9%

Daily smoking
12.8%

(a) Either on average had more than 2 standard drinks per day or had more than 4 standard drinks on 1 occasion at least once a month or both.

(b) Illicit use of at least 1 of 17 drugs in the past 12 months.

Figure 2.1: Relationships between daily smoking, risky drinking(a) and recent illicit drug use(b), people aged 14 or older, 2013 (per cent)
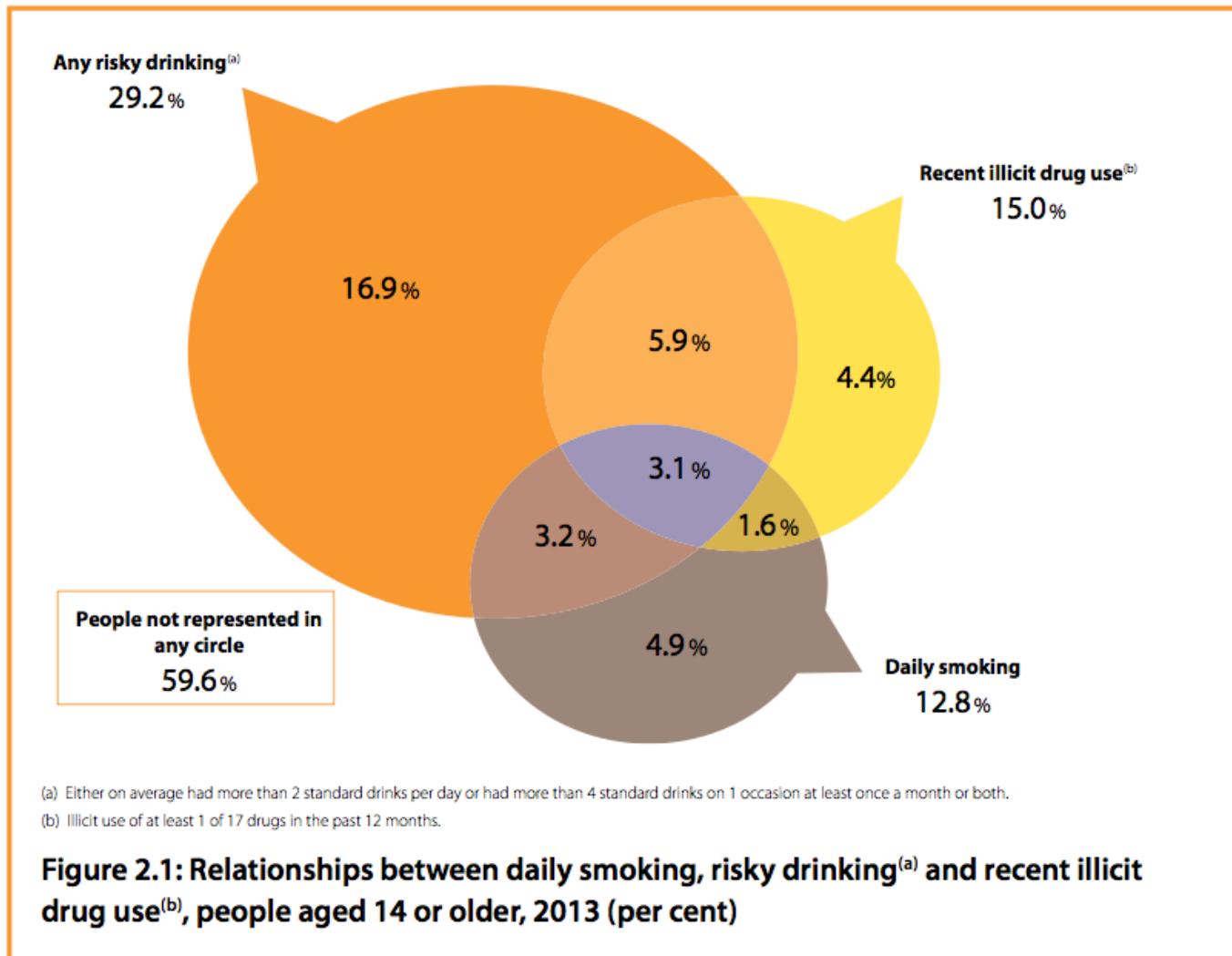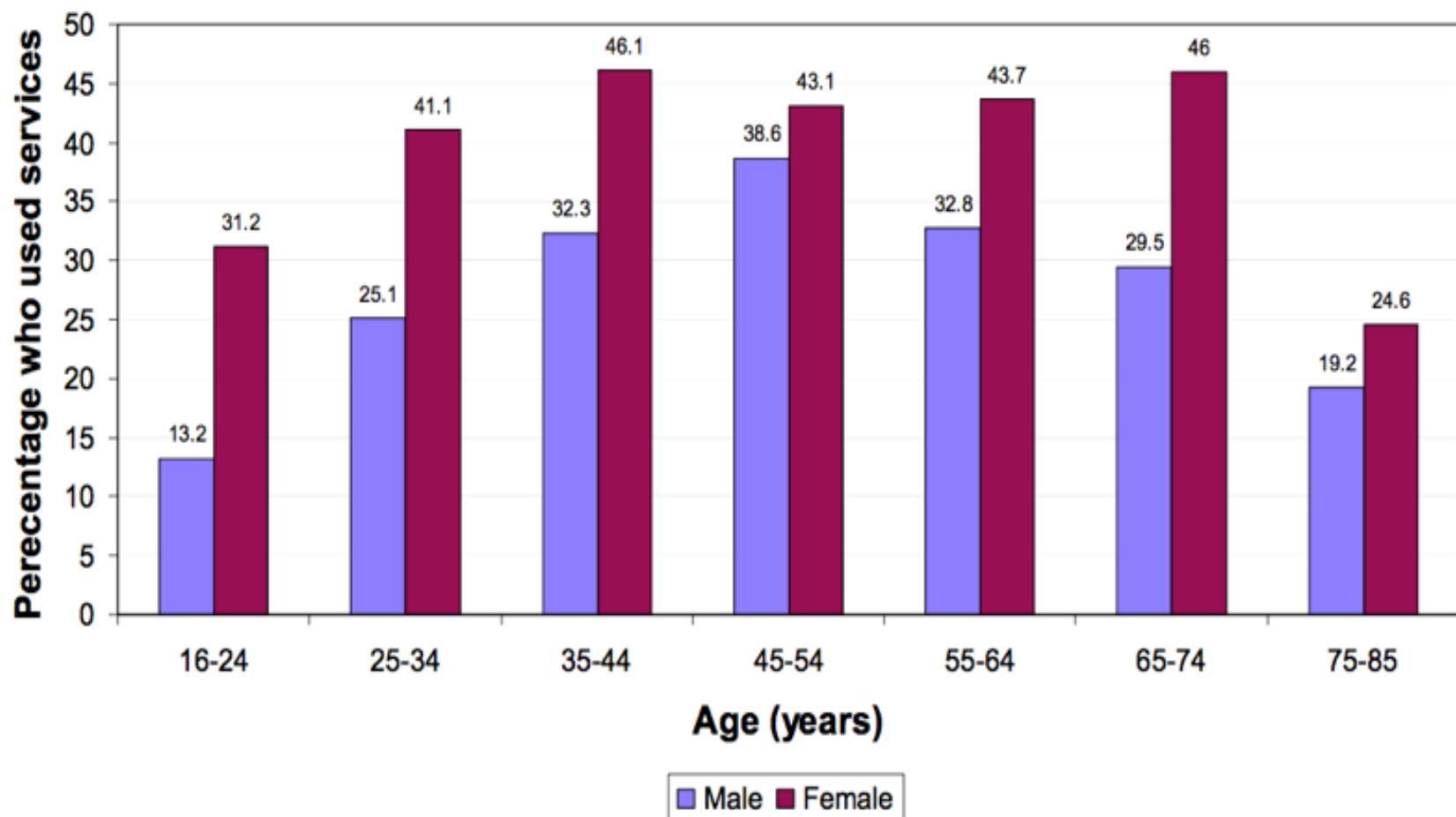
› **1. Improving the range of key outcomes**

- A. Prevention of syndrome progression

  - The most contentious but perhaps the least important

- B. Maximising economic, educational and social participation

  - OECD focus on 'NEETs' in the 18-25 (30) year old age group

- C. Reducing risk of self-harm, accidents and suicide

  - Requiring much more specific focus

- D. Preventing development of alcohol/ substance misuse

  - Major community and personal issue

- E. Improving physical health outcomes

  - Cardiovascular (smoking) and metabolic risks

2. Developing more personalised care regimes

Major conceptual, biological and psychological challenge

Models of key pathophysiological pathways

(e.g. anxious, circadian, impaired development)

Role of stage of illness

3. Delivering evidence-based and personalised care at scale

Designated services (Headspace +)

E-health developments (full range, not just existing services online)

› **Challenges of Cross-sectional Surveys:**

› Prevalence – Categorical vs Dimensional Models of Distress

› Impacts: Measures of educational and social function

› Patterns of Physical and Mental Health Service Use

› ??Relationships with persistence or recurrence of distress/disorder

› **Methods:**

› Subject Reporting vs Parent and other reporting with increasing age

› Capacity to use on-line systems for repeating reporting from same individuals at more regular intervals

› Capacity to use on-line to investigate selected groups at much greater depth

› 1. National Prevalence on its own – not that informative as have reasonable categorical estimates from multiple other sources – more dimensional approaches identify more need

› 2. Patterns of services use – in physical and mental health but also increasingly on welfare services much more informative

› 3. Need to look at importance of tracking – nature of disorders and their impacts on social and educational development

› 4. New Ways of looking at data collection – use of new-technologies for more in-depth of selected populations

› 5. Childhood-onset disorders vary greatly on life-long impacts (differing effects of neurodevelopmental vs emotional)

› 6. More severe Adolescent disorders – common with major life-long impacts: Need serious early and effective intervention

BMRI as key participant

Stream 3: Enhanced Services
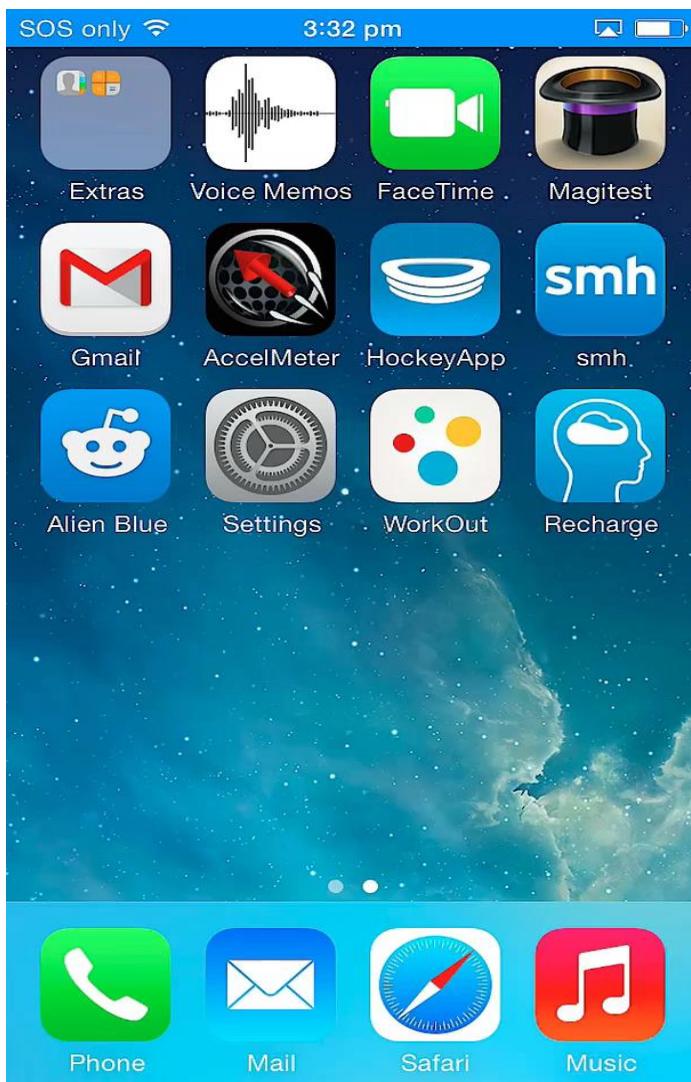
- **Version 1.0 now available in the App Store**

- **Version 1.1 will be available late October 2015**

UB WELL:

KEEPING YOUR HEALTH ON TRACK

Presented by

Professor Ian Hickie on behalf of the UBWELL Team – Tracey Davenport, Django White, Frank Iorfino

Brain & Mind Research Institute

THE UNIVERSITY OF SYDNEY
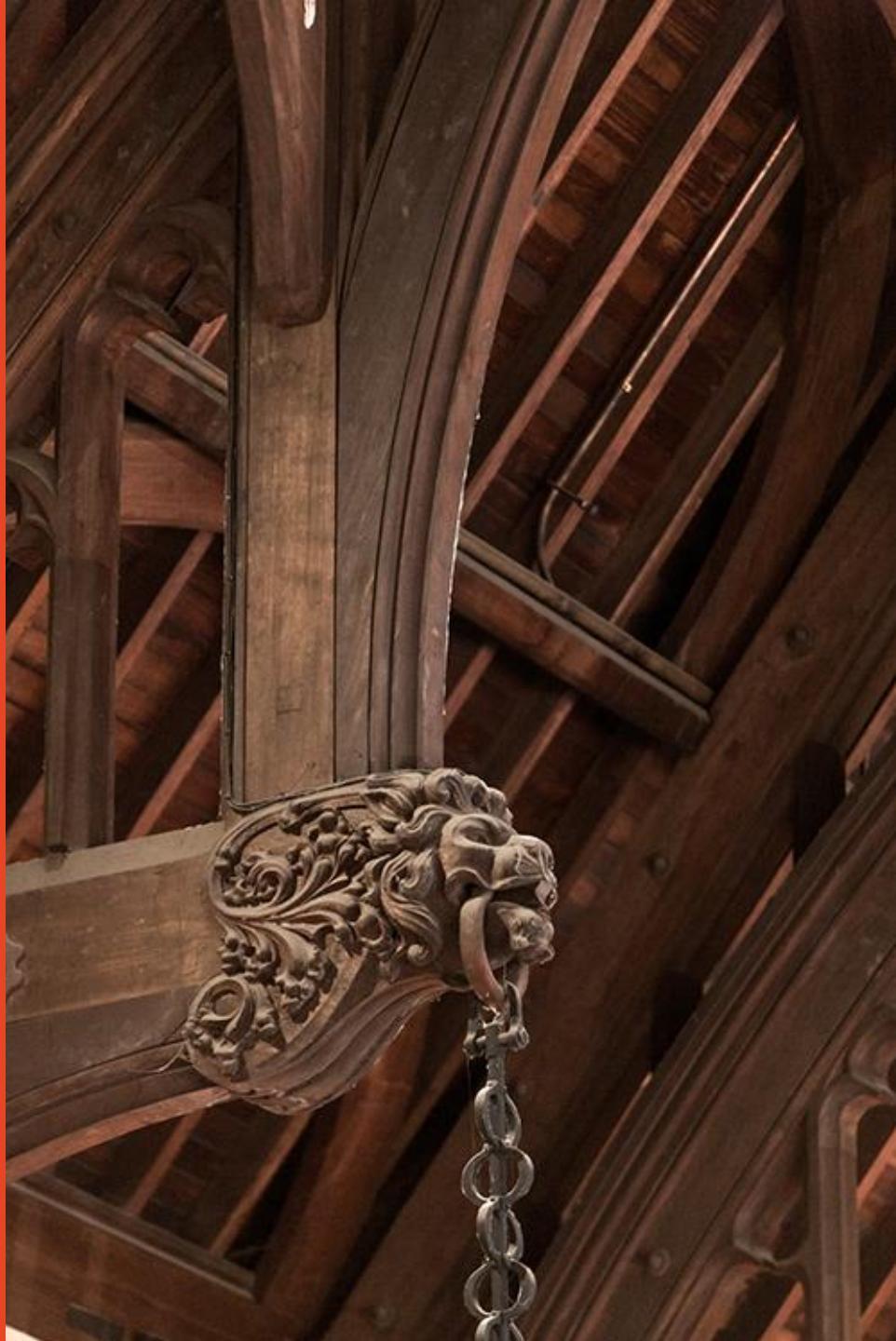
› A mobile-phone, app-based tool.

› <u>Continuous</u>, <u>real-time</u> data tracker which can <u>link</u> to current available wearable technology (i.e. Fitbit) and other smart software systems (i.e. HealthKit, Google Fit and Project Synergy) to collect <u>physiological</u> and <u>experiential</u> measures and then monitor, analyse and report these results.

› UBWELL currently measures physical activity, sleep, mood, anxiety, energy, substance use (alcohol, tobacco), functional engagement (relationships, work, study), healthy eating and weight.

› Data can be used by an individual to help maintain good health and wellbeing; as well as by health professionals to more effectively plan, implement and monitor treatment to patients, thus providing superior healthcare.

› https://youtu.be/LLf2gCcIP1c

e-Mental Health Clinic

- A web-based tool designed and developed through a partnership between the Young and Well CRC, the Brain & Mind Research Institute and the School of Electrical and Information Engineering at The University of Sydney.

- Aims to deliver best practice clinical services to young people experiencing mental health problems.

- Jumps traditional barriers and makes clinical care accessible, affordable and available to young people wherever and whenever they need it most – putting the young person back in charge of their own health care!

- https://www.youtube.com/watch?v=0Ot4E4S_C_A

- A web-based tool designed and developed through a partnership between the Young and Well CRC and the Brain & Mind Research Institute at The University of Sydney.

- A specifically designed e-system that helps young people assess their current needs and priorities as a means to develop a personalised wellbeing plan.

  Guides goal achievement by recommending relevant and appropriate Young and Well CRC approved apps and tools that have been synergised to allow for easy and accurate monitoring of progress within the wellbeing plan.

  https://www.youtube.com/watch?v=06HklNf8qIw