Developing the ‘mental wealth’ of Australian youth: Implications from neuro and social sciences!

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Co-Director, Health and Policy, Brain and Mind Centre, University of Sydney
Disclosures

- 5% Equity Holding in Innowell — A joint venture between University of Sydney and PwC to develop IT-based management systems for assessment and management of mental disorders

- Commissioner of the Australian National Mental Health Commission
What are the real issues we face?

1. Growing the mental ‘wealth’ of young people
   - Critical personal, social and national issues
   - RECOGNISING INDIVIDUAL DIFFERENCES IN DEVELOPMENT!!

2. RECOGNISING THE IMPLICATIONS OF NEW SCIENCES
   - NO SIMPLE AVERAGES……..

3. Focusing on broad institutional responses
   - Serious, systemic and sustained

4. Engagement with young people as partners
   - Moving from paternalism to partnerships in student experiences

5. Recognising the place of key transitions
   - PUBERTY, MID-ADOLESCENCE, SCHOOL LEAVING

6. Genuine Commitments to effective care
   - accessible and high quality early intervention
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 E. 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 secure and flourish in a rapidly changing world, children must learn to support and protect themselves. The report highlights 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.

The project looks at the implications of future changes in life expectancy and wellbeing in the United Kingdom and around the world. 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 individuals who report higher levels of well-being also have better mental and physical health.
Building mental Capital across the Life Cycle

MENTAL CAPITAL OVER THE COURSE OF LIFE

- Positive influences
- Negative influences

- Genetic endowment
- Fetal programming
- Early development
- Disposition to learn
- School

- Supportive teaching and education
- Good parenting skills
- Early home experiences
- Tobacco
- Poor diet
- Drugs/alcohol

- Childhood trauma
- Antisocial behaviour
- Teen pregnancy
- Smoking
- Alcohol

- Resisting peer pressure
- Social engagement
- Drug and alcohol abuse
- Social exclusion

- Stress
- Anxiety
- Depression
- Chronic illness
- Age-related cognitive and physical challenges

- Cognitive resilience and coping skills
- Executive function
- Social cognition
- Self-esteem
- Literacy and numeracy

- Cognitive reserve
- Physical activity
- Mental activity
- Social stimulation
- Medication or dietary interventions

- Waste of mental capital

Life course

School

Work

Retirement
Whole Brain
Cracking the Brains Code: ABA

Cracking the Brain’s Code
The overarching goal of the ABI is to “crack the brain’s code.” This is defined as understanding the mechanisms or “codes” that underlie how neural circuitry develops, how it encodes and retrieves information, how it underpins complex behaviors, and how it adapts to external and internal changes.
Essential Questions??

Figure 1. Cracking the Brain’s Code
Human Nervous System – Monitoring the environment
Brain and Body interactions
Environmental processes associated with regulation of Circadian system
Changing Brain Sciences by changing the view
Structural brain change: 100 years apart
Establishing high-quality neuroimaging platforms
Human Motor Cortex
Cajal’s key drawings – early 1900’s
Cellular Transmission – increasing Complexity
Brain Development in Childhood and Adolescence

Figure 2: Synapses form most rapidly in the brain during childhood (0-10 years), as this graph shows. During adolescence there is a decline in synapses. The adolescent period is one during which psychoses occur such as schizophrenia. The childhood period is one of vulnerability to diseases such as Autism and Fragile X Retardation. The thick line fits the observed data points. The thin line indicates excessive loss of synapses that may lead to psychosis. The dashed line indicates failure of synapse formation in the newborn leading, for example, to Autism (see Bennett (2008) Dual constraints on synapse formation and regression in schizophrenia. Australian & New Zealand Journal of Psychiatry In press).
Normal Brain Development

Age 5

Age 8

Age 12

Age 16

Age 20

Maturing brain. An NIMH study of 13 individuals over a decade reveals a process—still under way in the late teens—in which gray matter is replaced throughout the cortex, starting at the rear.
Brain Development in Teenagers: Cortical-Subcortical Processes

Figure: Crews F, Boettiger C (2009) Impulsivity, frontal lobes and risk for addiction.
Developing brain connections

Understanding how the brain matures in healthy individuals is critical for evaluating deviations from normal development in psychiatric and neurodevelopmental disorders. The brain’s anatomical networks are profoundly re-modelled between childhood and adulthood, and diffusion tractography offers unprecedented power to reconstruct these networks and their pathways in vivo. Here we tracked changes in structural connectivity and network efficiency in 453 right-handed individuals aged 12 to 30 (211 female/136 male adults, mean age = 21.0, SD = 3.13; 37 female/74 male 12-year-olds, mean age = 12.3, SD = 0.58; and 25 female/32 male 16-year-olds, mean age = 16.2, SD = 0.37). All participants were scanned with high angular resolution diffusion imaging (HARDI) at 4.0 T. After we performed whole-brain brain parcellation, 70 cortical grey-based regions of interest were extracted from each participant’s co-registered anatomical scans. The proportion of fibre connections between all pairs of cortical regions, or nodes, was found to change symmetrically with density, reflecting the structural brain network. From these 70 × 70 matrices we computed graph theory metrics characterising structural connectivity. Several key global and nodal metrics changed across development, showing increased network integration, with some connections pruned and others strengthened. The increase and decrease in fibre density, however, were not distributed proportionally across the brain. The frontal cortex had a disproportionate number of decreases in fibre density while the temporal cortex had a disproportionate number of increases in fibre density. This large-scale analysis of the developing structural connectome offers a foundation to develop statistical criteria for aberrant brain connectivity at the human brain matures.

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Brain Connections in the 21st C (new insights)
More information = More insight??

The brain is full of Manhattan-like grids

POSTED THU, 03/29/2012

London's streets are a mess. Roads bend sharply, end abruptly, and meet each other at unlikely angles. Intuitively, you might think that the cells of our brain are arranged in a similarly haphazard pattern, forming connections in random places.
DEVELOPING SOCIAL COGNITION

48 Males assigned to OT or placebo nasal spray
Post-Drug: Presented with 24 neutral human faces

Eyes

Nose and Mouth

Forehead/Cheek

Fixation Count

Gaze Time

Oxytocin

Placebo
Big EU Perspective

Understanding the Brain Through Large, Multidisciplinary Research Initiatives
posted on 15 Feb 2017
The multidisciplinary and multicenter approach needed to tackle the issues around understanding the brain are highlighted in an article in the latest issue of Lancet Neurology. Written by...
View »

HBP Begins Work on Gender Equality
posted on 26 Jan 2017
The HBP aims to play a pioneering role in advancing gender equality by targeting a balanced share of male and female scientists in research teams and decision-making, as well as promoting...

First HBP Stakeholder Webinar Series
posted on 19 Jan 2017
We would like to invite you to join in the first HBP Stakeholder Forum Webinar. HBP Stakeholder Forums allow HBP researchers and external stakeholders to discuss matters around controversial...
US Brain Initiative = Technology and Circuits

WHAT IS THE BRAIN INITIATIVE?

The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative is aimed at revolutionizing our understanding of the human brain. By accelerating the development and application of innovative technologies, researchers will be able to produce a revolutionary new dynamic picture of the brain that, for the first time, shows how individual cells and complex neural circuits interact in both time and space. Long desired by researchers seeking new ways to treat, cure, and even prevent brain disorders, this picture will fill major gaps in our current knowledge and provide unprecedented opportunities for exploring exactly how the brain enables the human body to record, process, utilize, store, and retrieve vast quantities of information, all at the speed of thought.

Highlights of The BRAIN Initiative®

News: 2016 Funded Awards BRAIN Initiative Funding Opportunities
Great Visualization!!

Advancing Our Understanding Of The Brain
Different cortical thinning patterns

- Different pattern of cortical thinning between young bipolar and psychosis subjects.
- Psychosis similar to reports in older patients
- Bipolar similar to reports in pediatric BPD
Similar pathology = similar cognitive deficits

- Shared regions of cortical thinning were strongly related to neurocognitive deficits commonly seen in young people with either psychosis or bipolar disorder.

- Visual sustained attention, semantic verbal fluency, verbal learning and verbal memory.

HATTON, S. N. et al. (2013)
### Neurotoxic Effects of Alcohol

#### Neurodegeneration

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Binge Ethanol</th>
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<tr>
<td>Silver Stain Degeneration – Black</td>
<td><img src="image1" alt="Control" /></td>
<td><img src="image2" alt="Binge Ethanol" /></td>
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<tr>
<td>FluoJade B Degeneration – Green</td>
<td><img src="image3" alt="Control" /></td>
<td><img src="image4" alt="Binge Ethanol" /></td>
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</table>

Figure: Alcohol reduces new neuron dendritic growth. Crews F. & Boettiger C.
Neurotoxic Effects of Alcohol

Figure: Clusters (darkened areas) overlaid on average fractional anisotropy mask highlight where binge drinking adolescents had lower fractional anisotropy than controls. McQueeney T, et al
Regional Effects of Alcohol

Figure: Hippocampal volume for adolescents with different substance use patterns. Squeglia L et al.

Figure: Ventral prefrontal volume in adolescents with minimal and heavy drinking histories; ventral prefrontal region is highlighted in white in the figure to the right. Squeglia L et al.
Neuropsychological differences between binge drinkers and non-bingers with co-morbid mood disorders

Figure: Profile of neuropsychological measures in mood disorder non-bingers (N=54; blue) versus binge drinkers (N=61; red)

De Regt et al (under review) J Int Neuropsychol Soc
Alcohol-related Policy: Fearful and Reactive

AUSTRALIA: THE HEALTHIEST COUNTRY BY 2020

National Preventative Health Strategy – the roadmap for action
30 June 2009
prepared by the National Preventative Health Taskforce
Public Policy Issues

- Community attitudes to alcohol use and particularly early alcohol use
  - Parental and adult attitudes
  - Community leadership vs common role models
  - Pricing and taxation issues
  - Presentation Issues – high alcohol levels
- Access to alcohol at early ages
- Moderation of alcohol use with age and changing patterns – but less in those with existing problems
Adolescent onset of major disorders

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

Some Insights - II

- Childhood-onset disorders:
  - variable impacts of life-long development:
  - differing effects of neurodevelopmental vs emotional

- More severe Adolescent disorders:
  - Very common
  - At least half have continuing impacts into adult life
  - Need serious early and effective intervention
But nothing really matters much, it’s doom alone that counts

I was burned out from exhaustion, buried in the hail
Poisoned in the bushes an’ blown out on the trail
Hunted like a crocodile, ravaged in the corn
“Come in,” she said, “I’ll give you shelter from the storm”

Bob Dylan, Nobel Prize, Literature 2016

The name (diagnosis) doesn’t really matter much, it’s a better future (SOCIAL FUNCTION) that counts!!
Percentage distribution of YLD by mental disorders and nervous system disorders, Australia 1996
The Mental Health of Children and Adolescents

REPORT ON THE SECOND AUSTRALIAN CHILD AND ADOLESCENT SURVEY OF MENTAL HEALTH AND WELLBEING

Figure 6: Severity of mental disorders experienced by 4-17 year-olds in the past 12 months by age group

2015
Impacts of Mental Disorders

Figure 13: Days absent from school in the past 12 months due to mental disorder symptoms

Figure 17: Self harm in the past 12 months in 12-17 year-olds by sex and age group
Adolescents and young adults who are not in employment, education, or training
Their problems are more than economic

Jan Scott professor of psychiatry, David Fowler professor of clinical psychology, Pat McGorry professor of youth mental health, Max Birchwood research director, Eoin Killackey associate professor, Helen Christensen executive director, Nicholas Glozier professor of psychiatry, Alison Yung professor of psychiatry, Paddy Power consultant in youth mental health, Merete Nordentoft professor of psychiatry, Swaran Singh head of department, Elisa Brietzke professor of psychiatry, Simon Davidson professor of child and adolescent psychiatry, Philippe Conus professor of psychiatry, Frank Bellivier professor of psychiatry, Richard Delorme professor of child and adolescent psychiatry, Iain Macmillan consultant psychiatrist, John Buchanan head of department, Francesc Colom clinical psychologist, Eduard Vieta professor of psychiatry, Michael Bauer head of department, Phillip McGuire head of department, Kathleen Merikangas head of department, Ian Hickie director
Patterns of use of Common Substances: National Household survey 2013

Figure 2.1: Relationships between daily smoking, risky drinking\(^{(a)}\) and recent illicit drug use\(^{(b)}\), people aged 14 or older, 2013 (per cent)

\(^{(a)}\) 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.
Brisbane Longitudinal Study of Adolescent Twins
(from 1992, Ages 12-30, n= 3500)

Nick Martin & Naomi Wray – QIMR & QBI

<table>
<thead>
<tr>
<th>Young Adults</th>
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<tr>
<td>21-29</td>
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<tr>
<td>18-30</td>
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Longitudinal:
- Vitamin D, Antibodies, Neuroticism (JEPQ, NEO)
- Psychiatric signs (SCHCIRI)
- Cross-sectional (*to be longitudinal):
  - Hair Cortisol
  - Cognition (Verbal, Performance IQ, Working Memory, Information Processing)
  - Binocular rivalry (Rivality 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)

Figure 1. Brisbane Longitudinal Twin Study

<table>
<thead>
<tr>
<th>Sample size now: projected end 2015</th>
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<tbody>
<tr>
<td>Adolescent twins and sibs</td>
</tr>
<tr>
<td>- Personality [2000; 3800]</td>
</tr>
<tr>
<td>- Psychiatric signs [1400; 2300]</td>
</tr>
<tr>
<td>- Cognition [200; 1100]</td>
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<tr>
<td>- Sleep patterns [1000]</td>
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<td>- Inattention [1000]</td>
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<td>- Vitamin D [2644]</td>
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<td>- Antibodies [2644]</td>
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<td>- Personality [2200; 3100]</td>
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<td>- Psychiatric signs [1100; 2000]</td>
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<td>- Binocular Rivalry [800; 1700]</td>
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<td>- Vitamin D [2130]</td>
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<td>- Antibodies [2130]</td>
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<tr>
<td>- Personality [2500; 3200]</td>
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<tr>
<td>- Psychiatric signs [1500; 2000]</td>
</tr>
<tr>
<td>- Cognition [2500; 3200]</td>
</tr>
<tr>
<td>- Brain Imaging [80; 600]</td>
</tr>
<tr>
<td>- Migraine [1000; 1800]</td>
</tr>
<tr>
<td>- Vitamin D [2233]</td>
</tr>
<tr>
<td>- Antibodies [2233]</td>
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</tbody>
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Genetic co-morbidity between neuroticism, anxiety/depression and somatic distress in a population sample of adolescent and young adult twins

N.K. Hansell*, M.J. Wright*, S.E. Medland†, T.A. Davenport‡, N.R. Wray†, N.G. Martin† and I.B. Hickie*

1 Genetic Epidemiology, Queensland Institute of Medical Research, Brisbane, Australia
2 Data and Method 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 (SIPHER) assessed symptoms of anxiety/depression (PSYCH-14) and somatic distress (SOMA-10) in 2699 adolescent and young adult twins [3196 complete pairs (55.4% monogamous, 35.3% familial)] aged 12-23 years (mean = 15.5 ± 2.9). Differences between boys and girls across adolescence were explored for neuroticism; SIPHER-94, 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 co-variation 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.
Transitions in ‘caseness’ in early teenage period

Figure 1: Schematic diagram representing the different trajectories between depression caseness (C) and non-caseness (N) for 600 individuals who completed three consecutive SPHERE assessments at 12, 14 and 16 years (see text for details).
Service use by age & sex

![Bar chart showing service use by age and sex](image)
1. Improving the range of key outcomes
   A. Maximising economic, educational and social participation
      • OECD focus on ‘NEETs’ in the 18-25 (30) year old age group
   B. Reducing self-harm, accidents and suicidal behaviours
      • Requiring much more specific focus
   C. Preventing development of alcohol/substance misuse
      • Major community and personal issue
   D. Improving physical health outcomes
      • Cardiovascular (smoking) and metabolic risks
   E. Prevention of syndrome progression
      • The most contentious but perhaps the least important
Supporting ‘mental wealth’ and resilience

– Twin Objectives for the individual:
  – Personal Autonomy AND Social Connectedness

– Critical Aspects of transition
  – Entry to study, exam periods, professional developments, transition to work environments

– Role of Institution (beyond ‘duty of care’)
  – Inverse rule of connection
  – Paternalism vs partnerships
  – Work experience and Education
Personal level: What should we be supporting? and
Personal responsibility or Organisational Action

– 1. Sleep-Wake Cycle Maintenance
– 2. Physical Activity
– 3. Reduced alcohol and other drug misuse
– 4. Social participation
  – Within the education structures
  – Across the education facility
– 5. Active Social connection – and at stressful periods
– 6. Stress-management
– 7. Self-monitoring and learning
Personal Devices – When/What will you monitor

- Mood trackers
- Sleep Trackers
- Physical Activity Trackers
- Social Connection use

- Exam times:
- Transitions in education and work experiences
- Transitions in life – Relationships Families etc
Hypothetical Trajectories/Pathways to Adolescent-Onset Depressive Disorders

- PROPOSING THREE DOMINANT PATHS:
- ANXIETY, NEURODEVELOPMENTAL, CIRCADIAN
Key Issues for those actually seeking mental health care

1. Developing more personalised care regimes

- Major conceptual, biological and psychological challenge
- Role of TRAJECTORIES AND STAGES of illness
- Models of key pathophysiological pathways – NOT DX
  (e.g. anxious, circadian, impaired development)
- Staged care is NOT stepped care!!

2. Delivering evidence-based and personalised care at scale

- Designated services (Headspace +)
- E-health developments (full range of services online)
Actively addressing mental health care

- Is there access to high quality care?
  - Issues of geography and price
- Is it facilitated by the institution?
  - Are pathways in place and promoted?
- What are the options in care?
  - Online entry
  - Clinical services
- Providing much better evidence
  - It's an educated audience
- What are the personal (beliefs and attitudes) barriers
  - Do interventions actually work?
  - Does the downside outweigh any upside?
  - Issues of culture, social group support, responses of the institution
Where to get more information??

- On-line
  - Aus has many!!
  - (beyondblue, black dog, reach out, orygen youth health, headspace)
  - Head to health (Aus Govt)
- In-person
  - Access to Psychological and Medical Care
- Levels of Care
  - Which specialists
- Evidence-based guidelines etc
  - NICE etc, NIMH etc

- DO A COGNITIVE-BEHAVIOURAL COURSE!!!! (online or in person)
3 million Australians are living with anxiety or depression

beyondblue provides information and support to help everyone in Australia achieve their best possible mental health, whatever their age and wherever they live.
Exercise Your Mood

Research shows that physical activity can be used to boost mental fitness. We’re encouraging Australians everywhere to get active this May!

View facts, tools and tips

News

The latest news in mental health research

How to exercise when you feel like you can’t

We all know about the benefits of exercise, but what about those who can’t find the motivation to do it? Here are some tips on how you can take on exercise when you aren’t at your best.

Read more

World Bipolar Day: what we know in 2018

Why being present can help this long weekend

Australian-first ‘burnout’ study seeks par...

See more news
Head to health

6 ways Head to Health can help you

Find the right Australian digital mental health resources.

Find Australian mental health resources

Australia has great mental health services and resources, but it can be tough finding the ones that suit you best. We’ve made your search easier by hand-picking resources from publicly funded providers.

1

Search resources
self-directed or therapist-guided

Made4Me - Mental Health Self Management

Made4-Me (M4M) is an interactive 11-week cognitive behavioural program (choose self-directed or therapist-guided) developed by Swinburne University of Technology for self-managing symptoms of anxiety, depression, and panic disorders. The program tailors content to the symptoms you experience.
Moodgym – CBT online

Welcome to moodgym

moodgym is like an interactive self-help book which helps you to learn and practise skills which can help to prevent and manage symptoms of depression and anxiety.

- Over 1 million users worldwide
- Anonymous, confidential
- Secure handling of your data
- Access anytime, at your own pace
- Scientifically evaluated

New users register here

Frequently Asked Questions

See Emergency help if you are in crisis or need immediate help.

Looking for other languages?

- German available at moodgym.de
- Norwegian, Dutch, Chinese and Finnish no longer available - see FAQ
Mindspot clinical service

About Us

The MindSpot Clinic is a free telephone and online service for Australian adults troubled by symptoms of anxiety or depression.

We provide Free Online Screening Assessments to help you learn about your symptoms, free Treatment Courses to help you to recover, or we can help you find local services that can help.

Learn more about the MindSpot Clinic

How MindSpot Works In 3 Easy Steps

1. Learn
   Read the information on this website and try taking the Depression or Anxiety Quiz.

2. Get Assessed
   Complete a telephone or Online Screening Assessment. We will provide information about your symptoms and provide recommendations.

3. Treatment
   Based on the results of your assessment we may recommend one of our free 8 week Treatment Courses, or provide referrals to other services.

Take The Brief Depression Quiz
Take The Brief Anxiety Quiz

Our Partners

Head to Health

A program supported by

MACQUARIE University
Reachout - next step
Headspace centres

Welcome to headspace
We’re the national youth mental health foundation dedicated to improving the wellbeing of young Australians.

Get to know us  Find a centre  Talk to eheadspace

For help or info, tell us who you are...

For help or info, tell us who you are...

friend or family member
Orygen youth health

Orygen's vision is for all young people to enjoy optimal mental health as they grow into adulthood.

Mental ill-health is the number one health issue facing young people worldwide. As the leading cause of disability in those aged between 10 and 24 years, it contributes 40% of the overall burden of disease. There is a powerful case for transformational reforms of our current mental health system both here in Australia and indeed give pride of place to our young people. Orygen is the engine room driving this reform in Australia and across the globe.

Guidelines needed for use of therapy animals in mental health treatment

Professor Patrick McGorry AO
Executive Director

Connect with Orygen
Real Challenges in National and Global Mental Health Service Provision

— ACCESS AND QUALITY!! (NOT Access OR Quality)
  — Staged not stepped care
  — Expertise at entry to systems and ongoing
  — Person-Centred
  — Inclusive of others (families, communities)
  — ‘Sub-syndromal’ does NOT equal absence of impairment
Do Psychological Therapies work?

– Very effectively!!
  – Mild-moderate anxiety or depression
  – Utility in primary and secondary prevention and recurrence prevention

– On-line
  – As effective as clinically-based

– Clinically-based
  – Particularly relevant as more severe and more complex
eHealth interventions for the prevention of depression and anxiety in the general population: a systematic review and meta-analysis

M. Dready\textsuperscript{1,4}, I. Choi\textsuperscript{2}, R. A. Calvo\textsuperscript{3}, N. Glozier\textsuperscript{2}, H. Christensen\textsuperscript{4} and S. B. Harvey\textsuperscript{4,5}

Abstract

Background: Anxiety and depression are associated with a range of adverse outcomes and represent a large global burden to individuals and health care systems. Prevention programs are an important way to avert a proportion of

Fig. 2 Effects of eHealth prevention interventions on symptoms (post-intervention)
Using CBT during the intern year

Web-Based Cognitive Behavioral Therapy Intervention for the Prevention of Suicidal Ideation in Medical Interns
A Randomized Clinical Trial

Constance Guille, MD; Zhao Zhao, MS; John Krystal, MD; Breck Nichols, MD; Kathleen Brady, MD, PhD; Sijian San, MD, PhD

**IMPORTANCE** In the United States, approximately 1 physician dies by suicide every day. Training physicians are at particularly high risk, with suicidal ideation increasing more than 4-fold during the first 3 months of internship year. Despite this increase, to our knowledge, very few efforts have been made to prevent the escalation of suicidal thoughts among training physicians.

**OBJECTIVE** To assess the effectiveness of a web-based cognitive behavioral therapy (wCBT) program delivered prior to the start of internship year in the prevention of suicidal ideation in medical interns.

**DESIGN, SETTING, AND PARTICIPANTS** A randomized clinical trial conducted at 2 university hospitals with 199 interns from multiple specialties during academic years 2009-2010 or 2011-2012. The current study was conducted from May 2009 to June 2010 and May 2011 to June 2012, and data were analyzed using intent-to-treat principles, including last observation carried forward.

**INTERVENTIONS** Interns were randomly assigned to 2 study groups (wCBT and attention-control group [ACG]), and completed study activities lasting 30 minutes each week for 4 weeks prior to starting internship year. Participants assigned to wCBT completed online CBT modules and those assigned to ACG received emails with general information about depression, suicidal thinking, and local mental health professionals.

*Figure 3. Number of Interns Endorsing Suicidal Ideation During Internship Year*

wCBT indicates web-based cognitive behavioral therapy.
Antidepressants save lives!

Association between antidepressant prescribing and suicide in Australia, 1991-2000: trend analysis
Wayne D Hall, Andrea Mant, Philip B Mitchell, Valerie A Rendle, Ian B Hickie, Peter McManus

Abstract

Objective To examine the association between trends in antidepressant prescribing and suicide rates in Australia for 1991-2000.

Design Analysis of databases of suicide and rates of antidepressant prescribing according to age and sex.

Setting Australian Bureau of Statistics data, sales data from the Australian pharmaceutical industry, prescribing data in general practice.

Subjects Men and women aged 15 years and over in 10 year age groups.

They examined data for 1977-97 (using official mortality statistics) and data on antidepressant use from surveys of sales to pharmacies. They found that suicide rates declined over the whole study period, but the rate of decline accelerated after the SSRIs were introduced in 1990. In Hungary in 1984-98 antidepressant prescribing rose steeply after the introduction of SSRIs in the early 1990s and rates of suicide declined, despite steep increases in unemployment and per capita alcohol consumption.

Contrary to these positive findings, however, in India Barbi et al did not find an association between exposure to antidepressants and suicide rates.

Fig 1 Change in suicide rate by level of exposure to antidepressants in each age group among men and women aged >15 years.
Efficacy of antidepressants (2018)

Comparative efficacy and acceptability of 21 antidepressant drugs for the acute treatment of adults with major depressive disorder: a systematic review and network meta-analysis


Summary
Background Major depressive disorder is one of the most common, burdensome, and costly psychiatric disorders worldwide in adults. Pharmacological and non-pharmacological treatments are available; however, because of inadequate resources, antidepressants are used more frequently than psychological interventions. Prescribing of these agents should be informed by the best available evidence. Therefore, we aimed to update and expand our previous work to compare and rank antidepressants for the acute treatment of adults with unipolar major depressive disorder.

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http://dx.doi.org/10.1002/jmj.30172
See Related Comment http://dx.doi.org/10.1002/jmj.30191-1

Findings We identified 28552 citations and of these included 522 trials comprising 116477 participants. In terms of efficacy, all antidepressants were more effective than placebo, with ORs ranging between 2.13 (95% credible interval [CrI] 1.89-2.41) for amitriptyline and 1.37 (1.16-1.63) for reboxetine. For acceptability, only agomelatine (OR 0.84, 95% CrI 0.72-0.97) and fluoxetine (0.88, 0.80-0.96) were associated with fewer dropouts than placebo, whereas clomipramine was worse than placebo (1.39, 1.01-1.98). When all trials were considered, differences in ORs between antidepressants ranged from 1.15 to 1.55 for efficacy and from 0.64 to 0.83 for acceptability, with wide CrIs on most of the comparative analyses. In head-to-head studies, agomelatine, amitriptyline, escitalopram, mirtazapine, paroxetine, venlafaxine, and vortioxetine were more effective than other antidepressants (range of ORs 1.19-1.96), whereas fluoxetine, fluvoxamine, reboxetine, and trazodone were the least efficacious drugs (0.51-0.84). For acceptability, agomelatine, citalopram, escitalopram, fluoxetine, sertraline, and vortioxetine were more tolerable than other antidepressants (range of ORs 0.43-0.77), whereas amitriptyline, clomipramine, duloxetine, fluvoxamine, reboxetine, trazodone, and venlafaxine had the highest dropout rates (1.30-2.32). 46 (9%) of 522 trials were rated as high risk of bias, 380 (73%) trials as moderate, and 96 (18%) as low; and the certainty of evidence was moderate to very low.

Interpretation All antidepressants were more efficacious than placebo in adults with major depressive disorder. Smaller differences between active drugs were found when placebo-controlled trials were included in the analysis, whereas there was more variability in efficacy and acceptability in head-to-head trials. These results should serve evidence-based practice and inform patients, physicians, guideline developers, and policy makers on the relative merits of the different antidepressants.
Efficacy and Acceptability (2018)

![Graphs illustrating efficacy and acceptability data for various antidepressants.](image)

Figure 3: Forest plots of network meta-analysis of all trials for efficacy (A) and acceptability (B). Antidepressants were compared with placebo, which was the reference compound. OR = odds ratio. CI = credible interval.
Light-Dark Cycle as the principle driver of rhythms

The 24-hour light-dark cycle is the primary environmental time cue that entrains the circadian system we have adapted (almost) to live on a 24-hour planet (actually humans have 24.2 hr cycle)
Characteristics of a functioning clock
Till Roenneberg ‘Internal Time’ 2012

– 1. Our body’s internal day is controlled by its own biological clock;
– 2. Since the biological clock is not 24 hours in length it must be periodically re-set to match the external world;
– 3. The biological clock varies from individual to individual (AND BY DISEASE STATE));
– 4. We feel best “WELLBEING” when all of our bodily functions oscillate in synchrony.
Manipulating the sleep-wake cycle and circadian rhythms to improve clinical management of major depression

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Abstract

Background: Clinical psychiatry has always been limited by the lack of objective tests to substantiate diagnoses and a lack of specific treatments that target underlying pathophysiology. One area in which these twin failures has been most frustrating is major depression. Due to very considerable progress in the basic and clinical neurosciences of sleep-wake cycles and underlying circadian systems this situation is now rapidly changing.

Discussion: The development of specific behavioral or pharmacological strategies that target these basic regulatory systems is driving renewed clinical interest. Here, we explore the extent to which objective tests of sleep-wake cycles and circadian function - namely, those that measure timing or synchrony of circadian-dependent physiology as well as daytime activity and nighttime sleep patterns - can be used to identify a sub-class of patients with major depression who have disturbed circadian profiles.
Staying well during intern year!

Effects of Sleep, Physical Activity, and Shift Work on Daily Mood: a Prospective Mobile Monitoring Study of Medical Interns

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BACKGROUND: Although short sleep, shift work, and physical inactivity are endemic to residency, a lack of objective, real-time information has limited our understanding of how these problems impact physician mental health.

OBJECTIVE: To understand how the residency experience affects sleep, physical activity, and mood and to understand.

Figure 1 The relationship between mood and sleep, and mood and physical activity through internship.
Headspace: a national development of regional service partnerships
3. Implementing the Framework within enhanced primary-care based ‘headspace’ services
$40m Co-operative Research Centre for Young People, Technology and Wellbeing
1. Focusing on growing mental wealth!!
RIGHT CARE, RIGHT PLACE, FIRST TIME, EVERY TIME
Mental Health eClinic: example dashboard of results
Share plan (decision tool) wireframe - clinical support
Mental Health eClinic: example dashboard of results
Share plan (decision tool) wireframe - clinical support
Conclusions

– Growing mental wealth is an institution-level responsibility in the 21st C.
– Mental Health Promotion, Prevention and early intervention are all out there!
– Does your institution have a serious, sustained plan – if not, why not?
– Using partnership approaches not paternalism
– MAKING USE OF NEW SCIENCES – INDIVIDUALISED APPROACHES TO DEVELOPMENT