PLENARY
Dr Oscar Lederman
Physical activity and mental illness

An emerging role for exercise physiologists in mental illness treatment and prevention

Oscar Lederman PhD
Accredited Exercise Physiologist | Keeping the Body in Mind (SESLHD)
Associate Adjunct Lecturer | School of Medical Science, UNSW
Mental health – mental ill health: a continuum
Treatment

- Multidisciplinary treatment team
- Aims are to
  - reduce or minimize symptoms
  - focus on psychosocial recovery
- Medications (antipsychotic medication, mood stabilisers or antidepressant medication)
- Polypharmacy is common - consequences
- Psychosocial recovery:
  - Psychoeducation
  - Vocational and educational goals
  - Family support and education
  - Cognitive remediation
  - Physical health care
Mental Health Services and Workers

<table>
<thead>
<tr>
<th>Medical</th>
<th>Allied Health</th>
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<tbody>
<tr>
<td>• Psychiatrist</td>
<td>• Psychologist, clinical psychologists</td>
</tr>
<tr>
<td>• General Practitioner</td>
<td>• Social Work</td>
</tr>
<tr>
<td>Mental health nurses</td>
<td>• Occupational Therapist</td>
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<tr>
<td></td>
<td>• Smoking cessation specialists</td>
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<td></td>
<td>• Exercise Physiologists</td>
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<td>• Dietitians</td>
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Peer support changes lives.
Mental illness and physical health
Bidirectional relationship

People have an increased risk of developing mental illness if they experience chronic illnesses including:

- Musculoskeletal disorders
- Chronic pain
- Cancer diagnoses
- Individuals with functional impairment
- Social isolation
- Obesity
- Intensive/disruptive diagnostic and treatment regimens

(Luppino et al., 2010; Stubbs et al., 2016)

Having depression can impact the management/health outcomes associated with chronic illness:

- Poorer treatment compliance
- Greater risk of complications
- Longer hospital stay
- Worse recovery outcomes
- Increase
Chronic conditions in people with psychosis: SHIP study

2010 Australian survey of 1,825 PLW psychosis and 484 GP’s

- 2/3rd smokers
- 75% were overweight/obese
- 80% central abdominal obesity
  (more than ½ met criteria for MetS)

- 43% adverse effects of long term antipsychotic treatment
  Weight gain, dyslipidaemia/ hyperlipidaemia and drowsiness = most common.

- 32% had treated for a metabolic, cardiovascular or kidney problem in the last 12 months, and 11% had referred to specialists

Scandal of premature mortality

Fig. 2. Average age of death by year for the schizophrenia and general population over three decades with intentional self-harm excluded as cause of death.
Premature mortality among people with severe mental illness — New evidence from linked primary care data

Ann John a, b, 1, 2, Joanna McGregor a, b, Ian Jones b, 1, Sze Chim Lee a, b, James T.R. Walters b, 1, Michael J. Owen b, 1, Michael O’Donovan b, 1, Marcos DelPozo-Banos a, b, Damon Berridge a, Keith Lloyd a, b

standardised mortality ratios (SMRs)
Prevalence, incidence and mortality from cardiovascular disease in patients with pooled and specific severe mental illness: a large-scale meta-analysis of 3,211,768 patients and 113,383,368 controls

Christoph U. Correll1-5, Marco Solmi5-7, Nicola Veronese5, Beatrice Bortolato5,8, Stella Rosson6, Paolo Santonastaso6, Nita Thapa-Chhetri9, Michele Fornaro10, Davide Gallicchio6, Enrico Collantoni6, Giorgio Pigato6, Angela Favaro6, Francesco Monaco5, Cristiano Kohler11, Davy Vancampfort12,13, Philip B. Ward14, Fiona Gaughran15, André F. Carvalho5,11, Brendon Stubbs5,15-17

Patients with serious mental illness:
• 53% higher risk of having CVD
• 78% higher risk of developing CVD
• 85% higher risk of death from CVD

Correll et al 2017 World Psychiatry
Cardiovascular Risk factors

Hippocrates:
“Healing is a matter of time, but it is sometimes also a matter of opportunity.”

Cardiometabolic Risk in Children & Adolescents
Changes within 3/12 of Starting Antipsychotics

Correll et al. 2009 JAMA.
Underestimation of anti-psychotic induced weight gain in FEP

Alvarez-Jimenez et al; CNS Drugs, 2008
Physical health disparities and mental illness: the scandal of premature mortality†
Graham Thornicroft

‘If such a disparity in mortality rates were to affect a large segment of the population with a less stigmatised characteristic, then we would witness an outcry against a socially unacceptable decimation’ (Thornicroft, 2011).
Diabetes in Psychosis and SMI

N = 118, n = 438,245
SMI = significantly more T2D than controls (RR=1.85, 95% CI: 1.45-2.37, p<0.001, p<0.001; 38 studies).
- no significant differences between groups
Perveance was greatest if;
Multiple episodes vs first episode 13.1% vs 4% (p<0.001)
Clozapine was highest (19.5%)
Females > males
Association with age and treatment duration
Positive Cardiometabolic Health: An early intervention framework for adolescents on psychotropic medication

Adolescent Version

Lifestyle
- Smoking
- Diet
- Activity

Overweight / Obesity
- Weight, BMI
- Waist

Blood Pressure

Glucose
- FPG ≥ 5.5 mmol/L
- OR
- RGP ≥ 11.1 mmol/L

Blood Lipids

Polycystic ovary syndrome

Lifestyle advice to include diet, physical activity and smoking prevention or cessation

Current Smoker
- Poor diet
- Sedentary lifestyle

Intensity and individualise structured nutritional counseling and lifestyle interventions (consider dietitian and/or exercise professional referral)

Medication review (consider antipsychotic switching; review medications and rationalise any polypharmacy)

Individualised Smoking cessation program
- ↓ Energy intake
- Stop salt drinks / juices
- ↑ Vegetables & fibre
- ↑ Physical activity

↓ Sedentariness
- ↓ Screen time
- ↑ Physical activity

Consider metformin
- BMI ≥ 95th centile*
- refer to specialist

≥ 95th centile**
- refer to GP or specialist

At high risk of Diabetes
- FPG > 5.6-6.5 mmol/L
- Hba1c > 42-47 mmol/mol (6.6-7.0%)
- OGTT: if abnormal, refer to specialist
- Consider metformin

Diabetes
- FPG > 7.0 mmol/L
- RGP > 11.1 mmol/L
- Hba1c > 42-47 mmol/mol (6.6-7.0%)
- Endocrine referral

Refer to GP or specialist

Check prolactin
- Consider metformin
- (ensure contraception if sexually active)

Smoking prevention or cessation
- Improve quality of diet
- Physical activity
- (eg > 60 min per day)
- Screen-based activities
- < 2 hrs/day

BMI
- ≥ 95th centile*
- Waist: height ratio ≤ 0.5

< 90th centile

Prevent Diabetes
- FPG ≤ 3.9 mmol/L
- Hba1c < 42 mmol/mol (5.6-7.0%)

Hba1c > 42-47 mmol/mol (6.6-7.0%)

Total Chol > 5.2 mmol/L
- HDL < 1.03 mmol/L
- Trig ≥ 1.7 mmol/L

Delayed adolescence, No periods for 3 months, Acne, Hirsutism

* BMI sex-specific centile chart, either US CDC or WHO. Ensure that the same chart is used over time to allow for consistent monitoring of growth. **Pediatrics 2000; 114,555
B MI = Body Mass Index | F PG = Fasting Plasma Glucose | R PG = Random Plasma Glucose | Total Chol = Total Cholesterol | LDL = Low Density Lipoprotein | HDL = High Density Lipoprotein | Trig = Triglycerides

Physical activity or exercise?

Physical Activity

Unplanned/Incidental
- Catching the Bus
- Walking up the stairs
- Housework

Planned ‘exercise’
- e.g. Aerobic Exercise
  - Walking
  - Jogging
- e.g. Resistance Exercise
  - Push Ups
  - Squats
Physical Activity guidelines

How much exercise is recommended?

- Sitting: As little as possible
- Strength training: At least 2 days a week
- Aerobic exercise plus stretching: At least 30 minutes 5 times a week
- Unplanned activity: Daily or as much as possible

Lifestyle and everyday activity: Get active - keep your body moving!
Correlates of PA in psychosis (based of SHIP data) n = 1801

Physical activity levels

- Low PA: 14%
- Moderate PA: 38%
- High PA: 48%

Physical activity was associated with;
1. Younger age groups (<35 yrs)
2. Studying (vs not studying)
3. Employed (vs unemployed)
4. No antipsychotic use (vs AP use)
5. Nil social dysfunction (vs social dys.)
6. Non-loneliness (vs lonely)
7. Healthy BMI (vs obese)
8. Healthy waist circ. (vs abdominal obesity)

Suetani et al., 2016 Acta Psychiatrica Scand
PA as a vital sign in schizophrenia

<table>
<thead>
<tr>
<th>not achieving vs. achieving 150 mins/week PA</th>
<th>RR</th>
</tr>
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<tbody>
<tr>
<td>Gender (f vs. m)</td>
<td>3.2</td>
</tr>
<tr>
<td>BMI ($\geq$25 vs. &lt;25)</td>
<td>1.67</td>
</tr>
<tr>
<td>Abdominal obesity (y vs. no)</td>
<td>1.83</td>
</tr>
<tr>
<td>Hypertension (y vs. no)</td>
<td>4.65</td>
</tr>
<tr>
<td>Dyslipidemia (y vs. no)</td>
<td>1.07</td>
</tr>
<tr>
<td>Hyperglycemia (y vs. no)</td>
<td>2.88</td>
</tr>
<tr>
<td>Metabolic syndrome (y vs. no)</td>
<td>2.99</td>
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</tbody>
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Factors Influencing Physical Activity Participation

**Barriers**
- Presence of negative symptoms
- Cardiometabolic comorbidities such as metabolic syndrome and obesity
- Medication side effect,
- Lack of knowledge in cardiometabolic risk factors,
- Low self-efficacy and physical self-perception,
- Unhealthy eating habits,
- Social isolation.
- Lack of support

**Motivators (most common)**
- Losing weight’ (83% of patients),
- Improving mood (81%)
- Reducing stress (78%).

Firth et al., (2016). *Psychological medicine*
Exercise interventions in schizophrenia

90 mins/week of MVPA (30mins/day, 3x/wk for 12 weeks) = improvements in; Fitness, mental health symptomatology, functional disability and cognition$^{1,2}$

*Change in symptoms occur independent of changes in body mass*

= cannot measure success of exercise through weight loss!

Firth et al 2015 Psy Med$^1$; Dauwan et al 2015 Schiz Bull$^2$
Exercise significantly reduces psychiatric symptoms (positive and negative symptoms) (SMD=0.72)

Exercise significantly improves global cognition $g = 0.43$

Largest effects
- Social cognition ($g = 0.71$)
- Working memory ($g = 0.39$)
- Attention ($g = 0.66$)

Factors associated with intervention effectiveness:
- Exercise dose (mins/week)
- Qualification of supervisor (e.g. exercise physiologist)

Firth et al 2016 Schiz Bull
Physical activity and mental illness

Depression in mental illness: large pooled effect, SMD=0.80; N=20

- 10 trials with reduced risk of bias (PEDro≥6), moderate effect SMD=0.39 vs 1.35

Schizophrenia: large pooled effect, SMD=1.0, N=8

Considerable heterogeneity among interventions
Sedentary behaviour

How sedentary are people with psychosis? A systematic review and meta-analysis

Brendon Stubbs a,b,c,*, Julie Williams b,c, Fiona Gaughran c,d,e, Tom Craig b,c

a Physiotherapy Department, South London and Maudsley NHS Foundation Trust, Denmark Hill, London SE5 8AZ, United Kingdom
b Health Service and Population Research Department, Institute of Psychiatry, Psychology and Neuroscience, King’s College London, De Crespigny Park, London Box SE5 8AF, United Kingdom
c The Collaboration for Leadership in Applied Health Research and Care (CLAHRC), South London Psychosis Research Team, United Kingdom
d Psychosis Studies, Institute of Psychiatry, Psychology and Neuroscience, London, United Kingdom
e National Psychosis Service, South London and Maudsley NHS Foundation Trust, London, United Kingdom
Sedentary behaviour

Australia’s biggest killer is sitting in your house.
Physical activity prevention of psychosis?

- Family risk $\chi^2=3.0$, $p=0.23$
- Presence of prodromal symptoms $\chi^2=21.4$, $p<0.001$

Data supported by another study → Sormunen, et al., (2017). *NPJ schizophrenia*

Cardiorespiratory fitness (CRF)

Low CRF is a strong and independent predictor of CVD & all-cause mortality¹

SMI = ↓ CRF of -8.96 mL/kg/min vs. controls (g= -1.01)²

Modest incremental increases in CRF of 3.5 ml/kg/min associated with 13% and 15% decrements in risk of all-cause and CVD mortality respectively¹

Jackie Curtis and Alan Rosen at SMHR

Kodoma et al 2009¹; Vancampfort et al 2016 Sports Med²
Fitness

*Fig. 1.* Relationship between the distance walked on the 6 minute walk test (6MWT) and the global assessment of functioning (GAF) score.

Spearman’s $\rho = 0.7$, $p < 0.01$
Rethinking treatment
Rethinking treatment

Slide courtesy of Simon Rosenbaum
Special considerations for exercise in SMI

<table>
<thead>
<tr>
<th>Presentation</th>
<th>How to address</th>
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| **Mania**                                        | → higher risk of over-exercising or exceeding their physical capacities  
• Avoid moderate or high intensity exercise  
• Mind-body exercises e.g. stretching, breathing exercises, yoga and mindfulness  
• May be more appropriate to avoid exercise                    |
| Positive psychotic symptoms (delusions, hallucinations) | • Reducing stimuli e.g. music, screens, distractions  
• Have a good understanding of presenting symptoms beforehand (if possible)                                |
| Negative psychotic symptoms (depression, amotivation) | • Exercise prescription – tailored, progressive and flexible  
• Activities that are enjoyable, relatable and encourage autonomy                                              |
| Cognitive impairments                             | • Clear demonstration, simple feedback, verbal and visual cues                                                                                   |
| Suicidal ideation                                 | • Be aware of the appropriate steps of action                                                                                                  |
Integrating exercise as a routine component of care

Rosenbaum et al., 2018. Translational Journal of the American College of Sports Medicine
Changing culture and practice
Consensus statement on the role of Accredited Exercise Physiologists within the treatment of mental disorders: a guide for mental health professionals

Oscar Lederman¹,², Kristine Grainger³, Robert Stanton⁴, Angela Douglas⁵, Kirrily Gould⁶, Amy Perram⁷, Rishi Baldeo⁷, Theodora Fokas⁷, Fiona Nauman⁷, Amanda Semaan⁸,⁹, Jude Hewavasam¹¹, Louise Pontin¹¹, Simon Rosenbaum¹²,¹³

¹Keeping the Body in Mind Team, South Eastern Sydney Local Health District, ²School of Psychiatry, University of New South Wales, ³School of Medical Sciences, University of New South Wales, ⁴Macquarie Hospital, Northern Sydney Local Health District, ⁵School of Medical and Applied Sciences, Central Queensland University, ⁶School of Medicine, University of Wollongong, ⁷St John of God Hospital, ⁸Queensland University of Technology, School of Exercise & Nutrition Science, ⁹University of Sydney, Faculty of Health Sciences, ¹⁰Integrated Care Unit, South Eastern Sydney Local Health District, ¹¹Monash Health ¹²Headspace, Alfred Health, ¹³The George Institute for Global Health
This Commission summarises advances in understanding on the topic of physical health in people with mental illness, and presents clear directions for health promotion, clinical care, and future research.

It aims to:
(1) establish highly pertinent aspects of physical health-related morbidity and mortality that have transdiagnostic applications;
(2) highlight the common modifiable factors that drive disparities in physical health;
(3) present actions and initiatives for health policy and clinical services to address these issues; and
(4) identify promising areas for future research that could identify novel solutions.
EPA guidance on physical activity as a treatment for severe mental illness: a meta-review of the evidence and Position Statement from the European Psychiatric Association (EPA), supported by the International Organization of Physical Therapists in Mental Health (IOPTMH)

Brendon Stubbs\textsuperscript{a,b,\ast}, Davy Vancampfort\textsuperscript{c}, Mats Hallgren\textsuperscript{d}, Joseph Firth\textsuperscript{e,f}, Nicola Veronese\textsuperscript{g}, Marco Solmi\textsuperscript{h}, Serge Brand\textsuperscript{i,j,k}, Joachim Cordes\textsuperscript{l}, Berend Malchow\textsuperscript{m}, Markus Gerber\textsuperscript{l}, Andrea Schmitt\textsuperscript{m,n}, Christoph U. Correll\textsuperscript{b,p,q}, Marc De Hert\textsuperscript{l}, Fiona Gaughran\textsuperscript{a,h}, Frank Schneider\textsuperscript{a}, Florence Kinnafick\textsuperscript{l}, Peter Falkai\textsuperscript{m}, Hans-Jürgen Möller\textsuperscript{m}, Kai G. Kahl\textsuperscript{u}

**6.4. People with SMI should be screened for PA habits in primary and secondary care (Based on expert opinion, D)**
Specialist clinicians embedded within the mental health team
- Exercise Physiologist
- Dietitian
- CNC

Group program and individual components
- Sports/ running groups
- Cooking groups
- Health coaching

→ Evaluate pre/post 12 weeks
→ 3 teams (+ .6 EP inpatient) Rolled out across the SESLHD
Before and after
**A Timeline**

- **2013**: KBIM initial evaluation for FEP clients
- **Sept 2014**: KBIM teams employed
  - 9 clinicians
  - 3 peer workers
- **March 2015**: KoSiM Wave 1
- **KBIM Maroubra employed**
- **March 2015**: Phase 1 rollout: FEP clients
- **February 2016**: Phase 2 rollout: Clozapine clients
- **March 2016**: KoSiM Wave 2
- **2017**: Phase 3 rollout: Depot clients
Mental illness means shorter life expectancy but physical health is key, experts say

People with mental illness have a shorter life expectancy by about 20 years, a new Australian-led report suggests, and experts say early intervention in physical health is a key to closing that gap.

"The disparities in physical health outcomes for people with mental illness are currently regarded as a human rights scandal," said Dr Joseph Firth, chairman of the Lancet Psychiatry Commission."
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@oscarlederman