STATEMENT OF DAN SISKIND

I, Dan Jonathan Siskind, MBBS (UQ), MPH (Harvard), PhD (UQ), FRANZCP, Clinical Academic Psychiatrist, of Princess Alexandra Hospital, 199 Ipswich Rd, Woolloongabba, Queensland, 4102, Australia, say as follows:

- I make this statement on the basis of my own knowledge, save where otherwise stated. Where I make statements based on information provided by others, I believe such information to be true.
- 2 I am providing evidence to the Mental Health Select Committee in my personal capacity.

Background

Qualifications

- 3 I graduated with a Bachelor of Medicine, Bachelor of Surgery from the University of Queensland ("**UQ**") in 1998.
- I obtained a Master of Public Health International Health from Harvard University in 2005. I spent two years undertaking research at the Harvard School of Public Health evaluating cost effective treatments for mental illness in developing countries.
- 5 In 2006, I completed my psychiatry residency training at Boston University and was admitted as a Fellow of the Royal Australian and New Zealand College of Psychiatrists (FRANZCP). I was admitted as a Fellow of the American Psychiatric Association in 2011.
- 6 In 2014, I received my Ph.D from UQ, having completed my thesis on supported accommodation for people with severe and persistent mental illness.
- 7 Attached to this statement and marked 'DS-1' is a copy of my CV.

Overview of clinical and academic experience

- 8 I have more than 21 years of clinical mental health experience. I take a collaborative approach to both clinical consumer care and academic research.
- 9 My academic goal is to undertake research that makes a positive difference to the lives of people living with severe and persistent mental illness. This research is guided by my belief that mental health research should exist to reduce consumers' burden of mental illness and improve service quality and safety.

10 I have over 185 peer-reviewed publications and have received over AU\$35 million in research grants. I currently hold a National Health and Medical Research Council Emerging Leadership Fellowship (2021-2025). I was previously awarded a National Health and Medical Research Council Early Career Fellowship (2016-2019), looking at the cardio-metabolic health of people with severe and persistent mental illness.

Overview of current roles and responsibilities

- After completing my studies overseas, I returned to Brisbane in June 2008 to take on my current role as a Clinical Academic Psychiatrist at Metro South Mental Health Service, working with the Princess Alexandra Hospital ("PAH") Mobile Intensive Rehabilitation Team ("MIRT"). I am also an Eminent Senior Staff Specialist at PAH. I discuss the work of the MIRT further from paragraph 14 below.
- 12 In addition to my work at PAH, I also hold a number of other professional appointments:
 - a) I have been involved with the UQ School of Medicine since 2008, initially as a Senior Lecturer and, from 2014-2020, as an Associate Professor, and since 2020 as a Professor. In this role, I am involved in psychiatry teaching and examination for medical students.
 - b) Since 2016, I have been Chair of the Royal Australian and New Zealand College of Psychiatrists ("RANZCP") Committee for Research, advising RANZCP on research issues and awarding of research grants.
 - c) Since 2017, I have been a member of the Metro South Addiction and Mental Health, Physical Health Reference Group, as well as a Conjoint Principal Research Fellow with UQ's Queensland Brain Institute.
 - d) Since 2019, I have been a Visiting Scientist at the QIMR Berghofer Medical Research Institute.
- 13 I have held many other professional appointments and memberships, as detailed in my CV. For example:
 - a) From 2008 to 2009, I was a Committee Member with the Princess Alexandra Hospital Mental Health Service Integration Committee, an inter-sectoral committee for mental health, which brings together the non-government sector and public clinical mental health services.
 - From 2009 to 2013, I was a Clinical Senator with the Queensland Health Clinical Senate, a representative body which provides strategic advice to the Queensland Minister for Health.
 - From 2012 to 2013 I was Chair of the Queensland Committee of Medical Specialist Colleges and from 2012 to 2015, I was Chair of the RANZCP

Queensland Branch. Both of these roles involved advocacy to the Queensland State Government and Minister of Health on mental health policy, registrar training, research, clinical quality and staff retention issues. As Chair of the RANZCP Queensland Branch, I was also involved in co-ordinating Continuing Medical Education, community liaison and outreach activities.

Mobile Intensive Rehabilitation Team (MIRT)

- 14 The MIRT provides intensive case management based on the Assertive Community Treatment ("**ACT**") model. ACT is an evidence-based service delivery and treatment model that was developed in the United States in the 1970s to help people exit from long term psychiatric institutions.¹ This model has since been adapted globally, including here in Australia.
- 15 The ACT model is "designed to provide an integrated approach to care for the chronically and severely mentally ill... and has been shown to decrease inpatient hospitalization, improve housing stability and improve patient satisfaction when compared to other forms of case management".² As Elizabeth Wile-Exley and I have written elsewhere:

"Key elements of the ACT model include multidisciplinary staffing (including nurses, social workers, psychiatrists, and substance abuse & vocational rehabilitation specialists), team approach, low patient to staff ratios, integration of services, assertive outreach, rapid access, 24 [hour] availability, locus of contact in the community, medication management, focus on everyday living, individualized services and time unlimited care."³

16 In our team, we have around a 12 to 1 ratio of consumers to case managers. In contrast, many other mental health services have around a 30 to 1 ratio of consumers to case managers. By case managers, I mean clinically skilled case managers who have

¹ Stein, L. I., & Test, M. A. (1980). Alternative to mental hospital treatment. I. Conceptual model, treatment program, and clinical evaluation. *Archives of General Psychiatry*, 37(4), 392–397.

² Siskind, D. & Wiley-Exley (2009). Comparison of Assertive Community Treatment Programs in Urban Massachusetts and Rural North Carolina. *Administration and Policy in Mental Health and Mental Health Services Research*, 36, 236-246 at 236, citing Bond, G., Drake, R., Mueser, K., & Latimer, E. (2001). Assertive community treatment for people with severe mental illness: Critical ingredients and impact on patients. *Disease Management & Health Outcomes*, 9(3), 141–159; Burns, B., & Santos, A. (1995). Assertive community treatment: An update of randomized trials. *Psychiatric Services* (Washington, DC), 46(7), 669–675; Marshall, M., & Lockwood, A. (2000). Assertive community treatment for people with severe mental disorders. *Cochrane Database of Systematic Reviews (Online: Update Software)*, (2), CD001089.

³ Siskind, D. & Wiley-Exley (2009). Comparison of Assertive Community Treatment Programs in Urban Massachusetts and Rural North Carolina. *Administration and Policy in Mental Health and Mental Health Services Research*, 36, 236-246 at 236, citing Bond, G., Drake, R., Mueser, K., & Latimer, E. (2001).

university based higher degrees, as opposed to support workers who engage in case management (and who may have vocational qualifications).

17 The specific consumers I serve are people with severe and persistent mental illness and complex multi-agency needs. Almost exclusively, these are people with treatment refractory Schizophrenia. My evidence in this statement focuses on this cohort of people.

Mental Health, housing and homelessness

Defining homelessness and housing insecurity

- 18 Homelessness may refer to: inadequacy of dwelling; lack of tenure; or lack of control of, or access to, space in a living environment.
- 19 Drawing upon what is known as the "cultural definition", I conceptualise homelessness as falling within one of the following four domains:
 - a) Marginally housed: Experienced by people in housing which is not adequate for reasons such as no security of tenure, over-crowdedness, or a dwelling that does not meet 'minimum expectations' in that it does not have basic, or adequate, facilities.
 - b) **Tertiary homelessness:** Experienced by people staying in accommodation that falls below minimum community standards (e.g. boarding housing and caravan parks).
 - c) Secondary homelessness: Experienced by people who frequently move from one temporary shelter to another (e.g. emergency accommodation, youth refuges, "couch surfing").
 - d) Primary Homelessness: Experienced by people who do not have a regular place to sleep or are sleeping in unconventional accommodation such as a caravan park or a car.
- 20 Housing insecurity is closely linked to homelessness and particularly to primary homelessness. Where a person is experiencing housing insecurity, they are unsure whether they will have anywhere to live—or anywhere safe and reliable to live—in the coming days, weeks or months.

The role of intensive support services in assisting people with mental illness to maintain community housing

- 21 A substantial proportion of the work my team and I do involves assisting consumers to maintain community housing. Indeed, I would estimate that:
 - a) around a quarter of the consumers I serve struggle to maintain secure housing without *intensive* support (such as daily visits by support workers); and
 - b) around another half of the consumers I serve struggle to maintain secure housing without *mild* support (such as weekly visits by support workers).

That is, around 75% of the consumers I serve struggle to maintain secure housing without some support.

- A core role of intensive support services such as mine is to engage in complex multiagency negotiations on behalf of consumers, support consumers to link up with appropriate service providers, and navigate the complexities of the National Disability Insurance Scheme ("**NDIS**") system. These engagements can be critical to helping consumers to secure and maintain community housing.
- By way of example, my team often negotiates with a consumer's housing provider, psychiatrist, support worker, case manager, and other agencies such as the adult guardian or public trustee, to ensure rent and bills are paid on time and the consumer's finances are being properly managed. These negotiations could also involve assistance with financial planning and cashflow (such as arranging for funds to be provided to the consumer in smaller amounts on a more frequent basis, as this can be easier to manage than less regular, large lump sums). As discussed further below, financial management is critical to securing and maintaining housing.
- 24 We also help consumers obtain assistance from support agencies with tasks such as shopping, meal selection or meal preparation. We provide a lot of cooking training, so that people have the skills and knowledge to prepare reasonably healthy and affordable meals. We also liaise with housing providers when a consumer is too unwell to do so themselves. For example, during periods of acute psychiatric hospitalisation we might, if required, inform the housing provider that the consumer will not be in their tenancy for a period of time.

The link between mental health and housing and homelessness

As noted above, I work with people with severe and persistent mental illness, and primarily with people with Schizophrenia. The three core elements of Schizophrenia are:

- a) Positive symptoms, which may involve persecutory delusions (for example, an internal voice that says: "If I leave the house to go to the grocery store I will be attacked therefore I ought not leave the house") and/or auditory hallucinations which are distracting from maintaining focus on a task.
- b) Negative symptoms, which manifest as a lack of motivation and a perception that the effort involved in a task is much greater, and the value or reward is much lower.
- c) Functional deficits, whereby executive cognitive functions such as planning and sequencing of tasks are impaired as a result of the illness.
- 26 Thinking specifically about this cohort of people, there is a strong link between mental health, housing and homelessness. To understand this link, we need to recognise that, for a person to find and maintain housing, they must complete many complex tasks. These tasks include: identifying a suitable housing; securing sufficient income to pay rent and utilities; financial management skills (including the ability to transfer that income to a bank, and from the bank to the landlord or agent, and the utility providers, in the required amounts and by the due dates). These tasks are in addition to the daily tasks required to maintain a clean house and ensure self-care, from owning and stocking a fridge and larder to caring for one's own health and hygiene, including by showering and having clean clothes.
- 27 Because of the nature and impacts of their illness, people with severe and persistent mental illness often have a number of impairments which limit their ability to perform the tasks required to find and maintain stable and secure housing. Specifically for people with Schizophrenia, these impairments include:
 - a) **Auditory hallucinations:** These voices can be critical and distract people with Schizophrenia from being able to successfully attend to daily tasks.
 - b) Cognitive decline: The tasks described above are complex and require significant frontal lobe, executive function. We know that Schizophrenia is associated with cognitive decline, when comparing a person's premorbid cognitive function with their function once they have developed the illness.
 - c) Motivation and the effort-value equation: Schizophrenia also has a negative impact on a person's motivation to plan and execute day-to-day tasks. The effortvalue equation is different for a person with Schizophrenia than it is for the general adult population. By that I mean that, when compared with the general adult population, the tasks required to find and maintain housing generally require considerably more *effort* for people Schizophrenia or may be *valued* less by this cohort of people than the benefit of maintaining housing over the long term.

- 28 These impairments can limit a person's ability to maintain housing in a number of direct and indirect ways. For example, many of the consumers I serve have been issued with breach notices from their community housing provider for not keeping their house sufficiently clean and tidy. To help prevent this, where appropriate, my team and I will support a consumer to work with their NDIS provider to commission a forensic cleaner.
- 29 In addition, many people with severe and persistent mental illness experience loneliness and a strong, but unmet need for social connectedness. This can also impact their ability to maintain stable and secure housing.
- 30 By way of example, I have worked with some consumers for whom the 'price' of social interaction is that their house becomes a place for illegal drug activity and prostitution. For a person with severe and persistent mental illness, the 'price' of this arrangement or exploitation (which may include the consumer being issued with breach notices or being evicted) may not be valued as highly as the chance to fulfil their need for social connectedness. My team and I spend a lot of time working with consumers to provide them with the tools to deal with these situations so that their tenancy is not put in jeopardy.

Changes required to reduce the rate of people with severe and persistent mental illness being discharged from mental health services into homelessness

- 31 The key changes required to reduce the rates of people with severe and persistent mental illness being discharged from mental health services into homeless are:
 - an increase in the number of acute psychiatric beds, to avoid premature discharge where possible. Across Australia there is a deficit of acute psychiatric beds, which is leading to abbreviated admissions so that people are discharged from hospital before they are adequately stabilised. This is through no fault of the clinicians, but as a result of bed pressure;
 - b) an adequately functioning post-hospitalisation care and rehabilitation system, to ensure people are discharged into an appropriate, supportive environment. This system should provide a range of residential rehabilitation options, from intensive Community Care Units services to less intensive models such as Step up and Step Down units. Currently, there is an inadequate number of Step Up and Step Down units across Australia. There should be an increase in the number of these services. I describe the key elements of these services further below; and
 - c) appropriate supports to help people stabilise and integrate in the community. The three essential components of this support are:
 - adequately resourced public housing and community housing that is, enough available beds to meet demand. It is critical that there is sufficient public housing (provided by the Queensland government) and/or

community housing (provided by community housing providers) for people with severe and persistent mental illness;

- an intense community-based clinical support team such as an ACT team (known as Mobile Intensive Rehabilitation Teams in Queensland), which I discuss further below; and
- an NDIS package, and assistance to navigate the NDIS system because it is incredibly complex and hard to navigate, particularly for people with a severe and persistent mental illness.

These are the essential elements of an effective service model for supporting people living with severe mental illness to maintain secure housing in the community. Each of these elements is interrelated. It is necessary to address the whole journey from acute psychiatric hospitalisation to stable housing in order to achieve meaningful change.

- 32 In addition to these core elements, it is necessary to consider the structure, levers and funding mechanisms which underpin the service model. The Australian healthcare system is fragmented and difficult to navigate. In particular, the funding arrangements for case management are incredibly complex. In most Australian jurisdictions, there are multiple sources for case management.
- 33 For example, a consumer may receive support from a public psychiatrist (funded by the state public mental health service), clinical case management from a clinically trained and educated person such as a nurse, social worker, psychologist and/or occupational therapist (also funded by the state), and non-clinical case management from a support worker who may have vocational qualifications (funded by the Federal government, through an NDIS provider).
- 34 The system should be reformed so that there is one agency that pulls these elements together and takes overall ownership. This care coordination role is generally assumed by the clinical service through the clinical case manager. The Federal government previously provided funding for care coordination, however, that funding was inadequate to attract appropriately skilled staff. It is essential that the coordinating agency is adequately resourced to attract good staff and take carriage of drawing together the full suite of services for people living with severe mental illness.
- 35 Prior to the introduction of the NDIS, most state governments were responsible for funding and overseeing the three core levers of the mental healthcare system, namely: 1) housing; 2) clinical services; and 3) non-clinical support workers. With the advent of the NDIS, the states no longer have much, if any, control over support workers because those services are funded by the Federal government as part of NDIS support packages.

- 36 I can see a real benefit in changing the system so that the states oversee the operation and integration of these three levers (housing; clinical services and support workers), irrespective of where the funding comes from. I think the states are in the best position to undertake this coordination role because: *first*, the states control the two most expensive levers – housing and clinical support; and *second*, the states have the best visibility over where the areas of need are, and who the most vulnerable populations are.
- 37 At the very least, states should look to integrate funding, resourcing and service coordination for housing support and clinical services, being the two elements which are funded by the state. States could pool the resources which are currently separately allocated to these two areas and instead create an integrated package of care.
- Prior to the introduction of the NDIS, several Australian states funded and provided a set number of packages with guaranteed housing, clinical services and non-clinical support workers (e.g. the Housing and Support Packages (HASPs) in Queensland). This was a very effective way of drawing these services together for people with the highest level of need, being people with severe and persistent mental illness and complex multiagency needs.⁴
- 39 State jurisdictions should also negotiate with the Federal government to integrate NDIS services into these packages. This would require greater coordination between the state health ministers and social services ministers with the Federal health minister responsible for the NDIS. Because the states control the public housing stock, they are in the best position to oversee an appropriate, integrated response to people with severe and persistent mental illness, and to negotiate the agreements required to meet the housing and support needs of that cohort. Such negotiations would likely be most effective if conducted on a multi-jurisdictional basis, rather than between only one state and the Federal government.

Effective housing and support models for people living with severe mental illness

Residential rehabilitation services

40 Mental illnesses tend to be relapsing and remitting illnesses. Inpatient psychiatric units play an important role in helping to manage the symptoms of people who are acutely unwell. By "acutely unwell", I mean people who are placing themselves at risk (including through misadventure or self-harm) or placing others at risk (including because they are experiencing persecutory delusions that make them fearful of others and aggressive).

⁴ See, for example, Meehan, T., Stedman, T., Robertson, S., Drake, S. & King, R. (2011) Does supported accommodation improve the clinical and social outcomes for people with severe psychiatric disability? The Project 300 experience. *Australian and New Zealand Journal of Psychiatry* 45(7), 586-92.

This period of acute risk and illness tends to be very brief, at times less than three weeks. In contrast, the recovery and rehabilitation period is a long and slow process.

- 41 The Community Care Unit (CCU) system in Queensland is an exemplar model of posthospitalisation community care and rehabilitation for people with severe mental illness who are at risk of housing insecurity and homelessness. The CCU system can be very useful in helping to support people to manage longer term recovery issues such as managing the distraction of ongoing auditory hallucinations and improving executive function, psychosocial functions and decision-making abilities.
- 42 In Queensland, CCUs offer residential intensive support for a medium to long term period, usually between six months to two years. They provide a stable bridge between hospitalisation and community tenure. While people in CCU facilities may not pose an acute risk to themselves or others, they might be at risk of misadventure or be unable to undertake the tasks necessary to maintain community tenure.
- 43 CCUs tend to be located in residential suburbs and look like an apartment building, meaning they have less stigma attached to them than acute hospital settings. Residents of CCUs receive their own apartment, with its own kitchen, bedroom, bathroom and living space. The apartment is usually partially furnished, and community agencies provide support to obtain essential items such as pots, pans, linen and toilet paper.
- 44 Importantly, a range of wrap-around services are offered on-site at CCUs. These services are critical to providing a period of extended stabilisation and helping consumers to identify and transition into independent housing. For example, on-site staff at CCUs can support residents to prepare meals (or provide links to groups such as Meals on Wheels) and provide assistance with managing and monitoring medication and symptoms.
- 45 CCUs also have on-site exercise programs and therapeutic groups focused on cognitive remediation and social cognition/interaction. Residents are also offered on-site cognitive behavioural therapy (CBT) or cognitive behavioural therapy for psychosis (CBTp), to help manage the distress associated with symptoms of mental illness.
- An evaluation of the CCU model in Queensland, and community based residential mental health services more broadly was conducted, finding it provided value for money and quality outcomes for consumers.⁵ Importantly:

⁵ Parker, S., Arnautovska, U., Siskind, D. et al. (2020) Community-care unit model of residential mental health rehabilitation services in Queensland, Australia: predicting outcomes of consumers 1-year post discharge. *Epidemiology and Psychiatric Sciences*, 29, e109, 1-11; Parker, S., Arnautovska, U., Siskind, D. et al. (2019) A comprehensive cohort description and statistical grouping of community-based residential rehabilitation service users in Australia *Frontiers in psychiatry* 10, 798; Parker, S., Siskind, D. and Park, F. (2017) Thoughts on 'Redefining residential rehabilitation in Australia'. *Australian Psychiatry*, 25(4), 414; Parker, S. et al. (2016) Longitudinal

"community based residential alternatives to acute psychiatric care suggests that these services are not alternatives for all patients, and as such are not completely substitutable for acute care. These services are best classified as 'sub-acute' and appear to only be able to service the needs of a select sub-group of patients."⁶

Step Up and Step Down units

- 47 Step Up and Step Down units are community based dwellings for people who need additional support for a short period of time prior to returning home after a period of hospitalisation. They are less intensively staffed than CCUs services, but do have some 24 hour staffing available. People tend to stay in a Step Up and Step Down unit for around two weeks.
- 48 Step Up and Step Down units provide a stable environment where people can stay and continue their post-hospitalisation rehabilitation with supports and services such as medication management and assistance with managing symptoms and stress. These units tend to look and feel like a house, which can reduce stigma and further assist with reintegration into the community.
- 49 Research on Step Up and Step Down units shows that they can assist people with severe and persistent mental illness to get out of hospital faster, but they are not a one-for-one substitution or replacement for an acute bed in the public psychiatric system. Part of the reason for this is that consumers who enter Step Up and Step Down units do not necessarily require immediate acute hospitalisation.⁷

Intensive community support

50 People with severe and persistent mental illness can transition to living in the community, if they have sufficient support around them. The availability of sufficient intensive support services like MIRTs or other ACT-style teams is essential to assist people with severe and persistent mental illness to maintain safe and secure housing in the community. While

comparative evaluation of the equivalence of an integrated peer-support and clinical staffing model for residential mental health rehabilitation: a mixed methods protocol incorporating multiple stakeholder perspectives. *BMC Psychiatry*, 16, 179; Parker, S, et al. (2019) A systematic review of service models and evidence relating to the clinically operated community-based residential mental health rehabilitation for adults with severe and persisting mental illness in Australia. *BMC Psychiatry* 19, 55.

⁶ Parker, S., Siskind, S., & Harris, M. (2015). Community based residential mental health services: What do we need to know? *Australian & New Zealand Journal of Psychiatry*, 49(1), 86-87, at 87. My colleagues and I reached this conclusion on the basis of a brief literature review of "the findings from randomised controlled trials comparing sub-acute residential services to acute inpatient services" (at 86).

⁷ Siskind, D., et al. (2013). A retrospective quasi-experimental study of a community crisis house for patients with severe and persistent mental illness. *Australian and New Zealand Journal of Psychiatry*, 47(7), 667-675.

not all people with severe and persistent mental illness will require these services, they play a critical role for individuals within that cohort who are vulnerable to homelessness or housing insecurity.

51 While the NDIS offers excellent services provided by support workers, those non-clinical services need to be complemented by intensive support services delivered by clinically trained staff. As a consumer becomes more comfortable and confident with community living, the intensive support services tend to fade away, and the consumer can continue with the non-clinical case management offered by the NDIS.

Integrated supported accommodation models

52 Based on my research, integrated supported accommodation models offer one of the most effective housing and support models for people with severe and persistent mental illness. Such models could involve having support workers on site or closely linked with a public or community housing provider.⁸

Housing availability and supports for people living with severe mental illness

Priority cohorts

- 53 Housing and support services for people experiencing housing insecurity and homelessness should prioritise people with severe and persistent mental illness and complex multi-agency needs. This cohort should be prioritised because they are the most vulnerable to housing insecurity and homelessness. With intensive wraparound services they are likely to maintain community tenure, leading to improved personal outcomes, and reduced costs to the health and welfare systems.
- 54 Research on the prevalence of mental illness in Queensland in 2009 estimated that 0.9% of the overall adult population was affected by a severe and persistent mental illness.⁹ Around 44% of people with severe and persistent mental illness (being 0.4% of the adult

⁸ Siskind, D., Harris, M., Pirkis, J., & Whiteford, H. (2012). Personalised support delivered by support workers for people with severe and persistent mental illness: a systematic review of patient outcomes. *Epidemiology and Psychiatric Sciences*, 21, 97–110; Siskind, D., Harris, M., Pirkis, J., & Whiteford, H. (2013). A domains-based taxonomy of supported accommodation for people with severe and persistent mental illness. *Social Psychiatry and Psychiatric Epidemiology*, 48(6), 875-894; Siskind, D., et al. (2013). A retrospective quasi-experimental study of a community crisis house for patients with severe and persistent mental illness. *Australian and New Zealand Journal of Psychiatry*, 47(7), 667-675; Siskind, D., et al. (2014). A Retrospective Quasi-Experimental Study of a Transitional Housing Program for Patients with Severe and Persistent Mental Illness. *Community Mental Health Journal*, 50(5), 538-547.

⁹ Siskind, D., Harris, M., Buckingham, B., Pirkis, J. & Whiteford, H. (2012) Planning estimates for the mental health community support sector. *Australian and New Zealand Journal of Psychiatry*, 46, 569-580 at 571-572. More broadly, this research found that 17.8% of the adult population (aged 18-65) in Queensland were estimated to have experienced mild (10.8%), moderate (4.2%) or severe (2.8%) mental illness in 2009.

population) were estimated to have complex, multi-agency needs, in that they "have lost their social connections and require ongoing, comprehensive services from multiple agencies to maintain their lives in the community."¹⁰ Without intensive support from multiple wraparound services, these people would struggle to navigate the community.

- 55 In considering the key characteristics of this cohort of people, it is important to disaggregate their mental illness and characterise people in terms of their symptoms and functional capacity, rather than simply their diagnosis. While most people in this cohort will have Schizophrenia, just because a person has Schizophrenia doesn't mean they fall within this group. People in this cohort will have impaired abilities in terms of executive function, decision-making and planning. These impairments may be caused by their chronic illness, acute symptoms or other features.
- 56 For example, people with Schizophrenia may never have acquired the skills required to live autonomously because Schizophrenia usually starts between the ages of 16 and 25, which are the years when most people achieve the key tasks of social autonomy – moving out of our parents' homes, learning how to shop for and prepare meals, and getting a job.

Exemplar models of support for people living with severe and persistent mental illness and experiencing housing insecurity or homelessness

57 In addition to the CCUs discussed above, there are two models which I think would benefit people living with severe mental illness and housing insecurity or homelessness: (a) the Housing First model and (b) Homeless Health Outreach Teams.

The Housing First model

- 58 Housing First is an evidence-based model that grew out of the Pathways to Housing model which was developed in the United States. The four key principles of the Housing First / Pathways model have been described in the literature as:
 - "1) Immediate provision of housing and consumer-driven services.
 - 2) Separation of housing and clinical services.
 - 3) Providing supports and treatment with a recovery orientation.
 - 4) Facilitation of community integration."11

¹⁰ Ibid. at 572.

¹¹ Aubry, T., Nelson, G., & Tsemberis, S. (2015) Housing First for People With Severe Mental Illness Who Are Homeless: A Review of the Research and Findings From the At Home–Chez soi Demonstration Project. *Canadian Journal of Psychiatry*, 60(11), 467-474 at 469, citing Nelson G, Goering P, Tsemberis S. Housing for people with lived experience of mental health issues: Housing First as a strategy to improve quality of life. In: Walker CJ, Johnson K, Cunningham E, editors. Community psychology and the socio-economics of mental distress: international perspectives. Basingstoke (GB): Palgrave MacMillan; 2012. p 191–205.

59 The Housing First model has been implemented outside of United States, including in Canada. A Canadian-led review of research literature evaluating the effectiveness of the Housing First model for people with severe mental illness who are homeless concludes: "Initial research conducted in the United States shows [Housing First] to be a promising approach, yielding superior outcomes in helping people to rapidly exit homelessness and establish stable housing."¹² The same paper also discusses the results of a "research demonstration project" conducted in five Canadian cities to test "the effectiveness of [Housing First] as an approach to address homelessness among people with [severe mental illness] and a history of homelessness."¹³ According to the researchers, the findings from this multi-city project:

> "reveal that [Housing First] can be successfully adapted to different contexts and for different populations without losing its fidelity. People receiving [Housing First] achieved superior housing outcomes and showed more rapid improvements in community functioning and quality of life than those receiving treatment as usual."¹⁴

60 Subsequent research published by Aubry and colleagues provides further support for the promise of the Housing First model, with ACT, for assisting people with mental illness "to exit homelessness as well as experience rapid gains in community functioning and quality of life".¹⁵ According to the authors:

> "In comparison, individuals receiving treatment as usual experienced poorer housing outcomes but similar non-housing outcomes. From a policy perspective, the choice becomes to either implement Housing First and significantly reduce homelessness while having a modest effect on mental health and addiction or to provide treatment first, then housing, with similar clinical outcomes but inferior housing outcomes."

61 In considering the appropriateness of the Housing First model, it is important to recognise that the United States has a much more fragmented health service than we do in Australia. The presence of a safety net in Australia may dilute the need for a service like Housing First. However, the success of the Housing First model (combined with ACT or

¹² Aubry, T., Nelson, G., & Tsemberis, S. (2015) Housing First for People With Severe Mental Illness Who Are Homeless: A Review of the Research and Findings From the At Home–Chez soi Demonstration Project. *Canadian Journal of Psychiatry*, 60(11), 467-474 at 467 and see also the discussion at 470.

¹³ Ibid at 470.

¹⁴ Ibid at 470.

¹⁵ Aubrey, T. et al., (2016) A Multiple-City RCT of Housing First With Assertive Community Treatment for Homeless Canadians With Serious Mental Illness. *Psychiatric Services*, 67(3), 275-281.

other intensive case management) in Canada offers relevant insights for the Australian context.

62 In my opinion, the Housing First model can also help to address the issue of people with mental illness not engaging with mental health services. My understanding of the Housing First model is that it provides people with severe and persistent mental illness, who would otherwise be homeless, with stable housing *irrespective of whether or not they engage with mental health services*. This is important because, in my experience, stable housing tends to lead to increased engagement with mental health services.

Homeless Health Outreach Teams

- 63 Homeless Health Outreach Teams ("**HHOTs**") provide advice and assistance to people who are homeless and are experiencing mental ill health or drug and alcohol issues. These teams operate in Queensland.
- 64 HHOTs are generally multidisciplinary teams and may comprise psychiatrists, social workers, general practitioners, nurses, psychologists and occupational therapists. These teams are entirely mobile they walk the streets and visit places such as crisis shelters or hostels to find and connect with consumers with mental illness. In this way, HHOTs meet the need or preference of many homeless consumers to be seen where they are. The outreach services provided by HHOTs include mental health services, such as helping to administer medication, manage symptoms and improve functions. HHOTs also seek to assist consumers who are homeless to obtain stable housing, by connecting them with appropriate housing support services.
- Some of the services provided by HHOTs are similar to those provided by MIRTs and ACT teams. However, by way of example, consumers can only access the services of the MIRT where I work if they have an address (which is a proxy for stable housing). This may also be a barrier for accessing other ACT teams in Australia. HHOTs can therefore fill an important gap in service provision and support for people with severe and persistent mental illness.

Service provision and design

Ensuring the physical health needs of people living with severe and persistent mental illness are understood and treated, alongside their mental health needs

The interrelationship between physical and mental health

66 People with severe and persistent mental illness die 16 years or more earlier than the general population. This significant mortality gap is mostly due to avertable illnesses such

as cardio-metabolic illness, diabetes, heart disease, metabolic syndrome and stroke. The causes of this premature mortality are multi-factorial and include the following factors:¹⁶

- a) **Genetic predisposition:** People with Schizophrenia have greater difficulty regulating glucose, even before they start taking any medication for their mental illness.
- b) Medications: The medications used for treating Schizophrenia alter glucose metabolism and food preferences. The main antipsychotics (clozapine, olanzapine and quetiapine) impact the glucagon-like peptide (GLP-1) system, which regulates glucose and satiety. One impact is that consumers taking these medications will not necessarily realise they are full after eating a meal. Because the homeostasis system is not functioning effectively, sugar is more readily converted into fat, which increases the likelihood of people on these medications becoming obese and/or developing diabetes.
- c) Impaired executive function and the effort-value imbalance: People with severe and persistent mental illness often make meal choices that are less nutritious, higher in fat and often are convenience or fast foods. This is partly a result of the cognitive functional deficits associated with the mental illness (which make the tasks required to prepare healthy meals more difficult), and partly because of the effort-value imbalance discussed in paragraph 27c) above – that is, the value placed upon a healthy meal is lower than the expected effort to prepare it.
- d) **Sedentary lifestyle:** Lifestyles factors associated with mental illness, and particularly among people with Schizophrenia, also contribute to poor physical health and premature mortality. Whereas the average adult population sits for around eight and a half hours a day, the average person with Schizophrenia sits for around eleven and a half hours a day. Compounding the detrimental effects of this additional three hours of sedentary behaviour, studies using accelerometers have shown that when people with Schizophrenia are sitting, they are completely still. In contrast, the general population tends to move a lot, even during sedentary periods of sitting (for example, by fidgeting, getting up regularly to interact with others or get a drink of water).
- 67 In addition, there should be a concerted effort to reduce the stigma associated with mental illness, and provide more accessible healthcare options for people with severe and persistent mental illness. For example, people with Schizophrenia are no more or less likely to develop cancer, but are much more likely to die of it; they are less likely to be

¹⁶ For a detailed discussion of the need for integrated physical health care for people with mental illness, see Firth, J. et al. (2019) The Lancet Psychiatry Commission: a blueprint for protecting physical health in people with mental illness *Lancet Psychiatry* 6, 675-712.

investigated for cancer and, even if they are investigated for cancer, they are less likely to get evidence-based care. I think there are two main drivers of this inequality:

- a) First, the cognitive impairments and reduced motivation that characterise Schizophrenia may make it difficult for a consumer to clearly and effectively convey their physical health needs and concerns to a primary healthcare provider, particularly during a brief 10-minute appointment with a General Practitioner ("GPs").
- b) Second, the stigma associated with mental illness may make it harder for healthcare professionals like GPs to hear the physical health issues above the mental health issues.

Integration of physical and mental health services

- 68 There needs to be greater integration between physical and mental health services. To achieve this integration:
 - a) primary care doctors (ie GPs) should be co-located within community mental health services; and
 - b) tertiary specialists, including endocrinologists and cardiologists, should be colocated within primary or community mental health services.
- 69 There is evidentiary support for the benefits of this integration. For example, a recent evaluation of the effectiveness of an endocrinologist spending half-a-day a week on-site at a community mental health service in Queensland found that, over and above improvements in consumers' metabolic glucose and cholesterol levels, other benefits include:
 - a) the attending psychiatrists felt more comfortable about addressing physical health issues, because of the presence of a specialist on-site who the psychiatrist can ask for advice;
 - b) very low "do not attend" rates. In public hospitals, very high rates of people with severe and persistent mental illness do not attend their specialist appointment with an endocrinologist. In contrast, the non-attendance rates at this community clinic are very low. This indicates that, by having the specialist co-located at the mental health service, consumers are more likely to attend their specialist appointment.
- 70 There also needs to be improved access to exercise programs and to dieticians who are skilled in delivering information to consumers in an understandable and impactful way.

- 71 In addition to integrating these services, they need to be adequately resourced and prioritised.
- 72 Attached to this statement and marked 'DS-2' is a copy of the *Lancet Psychiatry Commission* paper I co-authored, which discusses the need for integrated physical health care for people with mental illness. That paper also sets out a number of areas for system improvements.

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print name Dan Siskind

date 13 January 2021

The Lancet Psychiatry Commission: a blueprint for protecting $\mathcal{M} \stackrel{*}{\rightarrow} \mathbb{Q}$



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physical health in people with mental illness

Executive summary

Background

The poor physical health of people with mental illness is a multifaceted, transdiagnostic, and global problem. People with mental illness have an increased risk of physical disease, as well as reduced access to adequate health care. As a result, physical health disparities are observed across the entire spectrum of mental illnesses in low-income, middle-income, and high-income countries. The high rate of physical comorbidity, which often has poor clinical management, drastically reduces life expectancy for people with mental illness, and also increases the personal, social, and economic burden of mental illness across the lifespan.

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. The wide range and multifactorial nature of physical health disparities across the range of mental health diagnoses generate a vast number of potential considerations. Therefore, rather than attempting to discuss all possible combinations of physical and mental comorbidities individually, the aims of this Commission are to: (1) establish highly pertinent aspects of physical healthrelated 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. These aims are addressed across the five parts of the Commission: in Parts 1 and 2 we describe the scope, priorities, and key targets for physical health improvement across multiple mental illnesses; in Parts 3, 4, and 5, we highlight emerging strategies and present recommendations for improving physical health outcomes in people with mental illness.

Part 1: Physical health disparities for people with mental illness

Part 1 summarises the findings of almost 100 systematic reviews and meta-analyses on the prevalence of physical comorbidities among people with mental illness. Around 70% of the meta-research focuses on cardiometabolic diseases, and consistently reports that mental illnesses are associated with a risk of obesity, diabetes, and cardiovascular diseases that is 1.4-2.0 times higher than in the general population. Although cardiometabolic diseases have mostly been studied in patients with severe mental illness (particularly psychotic disorders), the prevalence of cardiometabolic disease is also increased in individuals with a broad range of other diagnoses, including substance use disorders and socalled common mental disorders (such as depression and anxiety).

Part 2: Key modifiable factors in health-related behaviours and health services

Part 2 presents a hierarchical model of evidence synthesis to evaluate modifiable risk factors for physical diseases in mental illness. Most top-tier evidence has identified that smoking, excessive alcohol consumption, sleep disturbance, physical inactivity, and dietary risks are increased for a broad range of diagnoses, across various economic settings, and from illness onset. Additionally, parts 1 and 2 identify a scarcity of meta-research on the prevalence or risk factors of infectious diseases and physical multimorbidity in mental illness. We also highlight that increased attention on these areas will be particularly important in addressing the physical and mental comorbidities observed in low-income and middle-income settings.

Part 3: Interplay between psychiatric medications and physical health

Part 3 examines the interactions between psychotropic medications and physical health across a range of conditions. Antipsychotics remain the best evidencebased treatments for psychotic disorders and reduce mortality rates compared with no treatment, but they have adverse effects on many aspects of physical health. Although drugs for depression have a less immediate effect on cardiometabolic health than drugs for psychosis per individual, drugs for depression are prescribed much more commonly, and the number of prescriptions is increasing over time. Therefore, further research is required to establish the population burden of the cardiometabolic side-effects of drugs for depression, particularly from long-term use. Part 3 also discusses emerging pharmacological strategies for attenuating and managing physical health risks, and provides recommendations for improving prescribing practices.

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Part 4: Multidisciplinary approaches to multimorbidity

Part 4 discusses multidisciplinary lifestyle interventions in mental health care. The Diabetes Prevention Program (DPP) is an example of a gold-standard lifestyle intervention that has broadly been successful in the general population. However, people with mental illness rarely have access to programmes based on the principles of the DPP, through either primary care or secondary care services. Based on the findings of largescale clinical trials, we propose that future lifestyle interventions in mental health care must adopt the core principles of the DPP by partnering with appropriately trained physical health professionals, and by providing sufficient access to supervised exercise services. Prevention is a key focus of the DPP. Similarly, lifestyle interventions for people with mental illness should be available pre-emptively to protect metabolic health from the point of the first presentation of illness. Priorities for future initiatives and research include translating the principles of the DPP into interventions for people with mental illness across primary care, secondary services, and low-income and middle-income settings, and using implementation science and costeffectiveness evaluations to develop a business case for integrating DPP-based interventions as the standard of care in mental health care.

Part 5: Innovations in integrating physical and mental health care

Part 5 focuses on the availability, content, and context of physical health care for people with mental illness. We summarise valuable new resources and guidelines from national and international health bodies that aim to address inequalities in both public health and clinical settings. National health strategies urgently need to give greater consideration to individuals with mental illness, who are often left behind from population gains in public health. The development of integrated care models for efficient management of physical and mental multimorbidity is an important step forwards, particularly in low-income and middle-income settings where health inequalities for people with mental illness are greatest. Similarly, taking a syndemic approach to the interaction between physical and mental comorbidities might improve the implementation of customised health interventions for a specific location or social setting. Continuing advances in digital health technologies also present new opportunities for addressing health inequalities on a global scale, although realising this potential will be dependent on further rigorous research. The Commission concludes with a discussion the accountabilities and responsibilities of on governments, health commissioners, health providers, and research funding bodies in implementing the recommendations of this Commission and protecting the physical health of people with mental illness.

Part 1: Physical health disparities for people with mental illness Introduction

The premature mortality of people with mental illness has been recognised by the medical community for more than half a century.^{1,2} Although premature mortality was initially shown in patients with severe mental illnesses such as schizophrenia and bipolar disorder,3-5 there is now evidence that individuals who have diagnoses across the entire spectrum of mental disorders have a substantially reduced life expectancy compared with the general population.³⁻¹¹ Although suicide contributes to a considerable proportion of these premature deaths (with approximately 17% of mortality in people with mental illness attributed to unnatural causes),^{12,13} the majority of years of life lost in people with mental illness relate to poor physical health, specifically due to comorbid non-communicable and infectious diseases.^{11,14–19} The consequent poor physical health outcomes of people with mental illness have been alluded to as a human rights issue,20 and the amount of research on this topic has increased substantially over the past two decades (appendix p 2).

Despite the increasing amount of research in this area and more general advancements in health care and medicine, the poor physical health outcomes (and the associated decrease in life expectancy) of people with mental illness have not improved.^{3,12,21} In fact, the number of years of life lost due to physical health conditions in people with mental illness might be increasing.^{3,21-23} The premature mortality of people with mental illness reflects a large number of health inequalities between people with and without mental illness throughout the life course. Although the psychiatric literature is largely unified on the consensus that physical comorbidities have a lifeshortening effect for people with mental illness, the prevalence and specific effects of the physical comorbidities that can potentially affect individuals with diagnoses across the spectrum of mental disorders (not only severe mental illness) have not yet been widely examined.

Comorbidity of mental and physical diseases: a literature meta-review

To provide an overview of the literature in this field, we systematically identified all systematic reviews and metaanalyses of chronic physical disorders in people with common mental disorders, severe mental illnesses, alcohol and substance use disorders, and various other mental health disorders, published between Jan 1, 2000, and Oct 26, 2018. In particular, we sought to identify the top-tier evidence on the prevalence of chronic conditions in comparison with the general population (generally defined as individuals without mental illness). Further details on our search strategy and selection criteria are in the appendix (pp 2–5). We considered this body of metaresearch and key recent reports from health-care and governmental bodies in developing the scope, priorities, and recommendations of this Commission (figure 1).

South London and Maudsley

NHS Foundation Trust,



Figure 1: Strategies to protect physical health in people with mental illness

Strategies are applicable from the stage of mental illness indicated, and onwards. White boxes are areas that require further recognition. Grey boxes are actions for health policy and services. Orange boxes are promising areas for future research. Boxes that have a gradient of two colours are included in two of these categories.

As detailed in table 1, since 2000, almost 100 systematic reviews and meta-analyses have been published on the physical health comorbidities associated with mental illness. The findings from the most recent systematic reviews and meta-analyses on the prevalence or risk of physical illness for each category of mental illness are shown in the appendix (pp 6–14). In common with another review,¹²¹ we found a shortage of evidence from low-income and middle-income countries. Most meta-research on the physical health of individuals with mental disorders has focused on cardiovascular or metabolic diseases in highincome countries. Overall, the available evidence shows that for individuals with diagnoses across the entire spectrum of mental health disorders, the risk for cardiometabolic disease is increased by 1.4-2.0 times compared with individuals without mental illness (appendix pp 6-14). For instance, for patients with depression, the risk of developing cardiac disease, hypertension, stroke, diabetes, metabolic syndrome, or obesity is around 40% higher than in the general population. Similarly, 16 reviews of cardiovascular and metabolic health in patients with severe mental $illness^{{\scriptscriptstyle 14,54-58,77-80,91-95,100}}$ showed clear evidence of an increase in risk of 1.4-2.0 times across all cardiovascular and metabolic diseases examined. Although fewer studies have been done for other mental disorders, the existing reviews of anxiety disorders,46,76,87,98 substance use disorders,81,96 attention-deficit hyperactivity disorder,101 and personality disorders104 consistently find evidence of poor cardiometabolic health in patients with these diagnoses, with substantially higher rates of obesity, diabetes, and metabolic syndrome than in the general population (appendix pp 6–14). The only inverse relationship that has been identified between cardiometabolic health and mental disorders is the reduced incidence of diabetes in patients with anorexia nervosa (odds ratio [OR] 0.71) compared with those without anorexia nervosa.⁸² However, because of the physically damaging behaviours that are inherent to the disorder, individuals with anorexia nervosa are at a much higher risk for other health issues, such as a

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| | Common ment | tal disorders (48 | reviews) | Severe mental i | illnesses (30 reviev | ws) | Alcohol and use disorder (6 reviews) | l substance rs | Other mental illnesses (8 reviews) | | Mixed mental illness (7 reviews) | Total | | |
|--|-----------------------------|----------------------------|---------------------------------------|-------------------------------|-------------------------|--------------------------------|--|------------------------------|--|--------------------------------|---|--------------------------|----------------------------|----|
| | Depression | Anxiety | Mixed common mental disorder | Schizophrenia | Bipolar disorder | Mixed severe mental illness | Alcohol use disorder | Substance use disorder | Attention- deficit hyperactivity disorder | Autism spectrum disorder | Eating disorders | Personality disorders | - | |
| Number of reviews | 33 | 12 | 3 | 15* | 8 | 7* | 5 | 1 | 4 | 1 | 2 | 1 | 7 | 99 |
| Non-communica | ble diseases | | | | | | | | | | | | | |
| Asthma | 2 reviews ^{24,25} | | | | 1 review ²⁶ | | | | 1 review ²⁷ | 1 review ²⁸ | | | | 5 |
| Autoimmune disorders | | | | | | 1 review ²⁹ | | | | | | | | 1 |
| Cardiovascular disease | 16 reviews ³⁰⁻⁴⁵ | 6 reviews ⁴⁶⁻⁵¹ | 2 reviews52,53 | 2 reviews54.55 | 1 review ⁵⁶ | 3 reviews14,57,58 | | | | | | | | 30 |
| Cancer | 4 reviews59-62 | | | 5 reviews63-67 | | | | | | | | | 1 review68 | 10 |
| Diabetes | 7 reviews69-75 | 1 review ⁷⁶ | | 2 reviews77.78 | 2 reviews79,80 | 1 review ⁵⁸ | 1 review ⁸¹ | | | | 1 review ⁸² | | 2 reviews ^{83,84} | 17 |
| Metabolic syndrome | 2 reviews ^{85,86} | 3 reviews ⁸⁷⁻⁸⁹ | 1 review90 | 3 reviews ^{78,91,92} | 3 reviews93-95 | 1 review ⁵⁸ | 1 review96 | | | | | | 1 review97 | 15 |
| Obesity | | 2 reviews98,99 | | | 1 review ¹⁰⁰ | | | | 3 reviews101-103 | | | 1 review ¹⁰⁴ | 2 reviews97,105 | 9 |
| Osteoporosis or bone loss | 1 review ¹⁰⁶ | | | 1 review ¹⁰⁷ | | | | | | | 1 review ¹⁰⁸ | | | 3 |
| Parkinson's disease | 1 review ¹⁰⁹ | | | | | | | | | | | | | 1 |
| Rheumatoid arthritis | | | | 1 review ¹¹⁰ | | 1 review ²⁹ | | | | | | | | 2 |
| Infectious disease | s | | | | | | | | | | | | | |
| Hepatitis B | | | | | | 3 reviews ¹¹¹⁻¹¹³ | | | | | | | | 3 |
| Hepatitis C | | | | | | 3 reviews ¹¹¹⁻¹¹³ | 1 review ¹¹⁴ | 1 review ¹¹⁵ | | | | | | 5 |
| HIV | | | | | | 3 reviews ¹¹¹⁻¹¹³ | 1 review ¹¹⁶ | | | | | | 1 review ¹¹⁷ | 5 |
| Syphilis | | | | | | 1 review ¹¹² | | | | | | | | 1 |
| Tuberculosis | | | | | | | 1 review ¹¹⁸ | | | | | | | 1 |
| Other | | | | | | | | | | | | | | |
| Mixed illnesses or comorbidities | | | | 2 reviews ^{119,120} | 1 review ⁹⁵ | 1 review ⁵⁸ | | | | | | | | 4 |
| *Includes studies th | at examined severa | al different mental | illnesses. | | | | | | | | | | | |
| Table 1: Map of sy | stematic review | s and meta-analy | yses that have ex | amined physical | comorbidities acro | oss different men | tal illnesses | | | | | | | |

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| | Alcohol | Tobacco use | Physical activity | Sedentary behaviour | Poor diet | Poor sleep |
|-----------------------------------|---|--|---|---|--|---|
| Major depression | SR: around 30% of patients have or have had alcohol use disorder ¹²⁴ | SR: patients are more likely to smoke and be dependent on nicotine, are less likely to quit, and are more likely to relapse ¹²⁵ | MA: around 60–70% of patients do not meet physical activity guidelines ^{126,127} | MA: patients are sedentary for 8-5 h per day ¹²⁷ | ES: patients have significantly higher food intake and poorer diet quality than the general population ¹²⁸ | ES: patients have significantly poorer continuity of sleep and reduced sleep depth compared with healthy controls ¹²⁹ |
| Anxiety disorders | ES: 17-9% of patients have alcohol dependence or misuse ¹³⁰ | MA: 41% increase in risk of regular smoking and 58% increase in risk of nicotine dependence ¹³¹ | ES: individuals with panic disorders, social phobia, and agoraphobia report significantly less activity ¹³² | SR: inconsistent evidence for increased sedentary time in people with anxiety ¹³³ | Insufficient evidence | MA: anxiety disorders ^{129,134} and obsessive-compulsive disorder ¹³⁵ are associated with reduced sleep quality |
| Bipolar disorder | MA: 1 in 3 patients have or have had alcohol use disorder ¹³⁶ | MA: increased rates of current smoking (higher than in patients with major depression but lower than in patients with schizophrenia) ¹³⁷ | MA: the majority of patients meet physical activity guidelines and are no different to the general population ^{81,126} | MA: patients are sedentary for more than 10 h per day ^{81,126} | MA: patients consume around 200 calories more than the general population per day ¹³⁸ | MA: even between episodes, people with bipolar disorder have increased sleep-wake disturbance, similar to patients with insomnia ¹³⁹ |
| Schizophrenia | MA: 1 in 5 patients have or have had alcohol use disorder ¹⁴⁰ | MA: significantly higher rates of current smoking, heavy smoking, and nicotine dependence ¹⁴¹ | MA: the majority of patients do not meet physical activity guidelines ^{108,126} | MA: patients are sedentary for around 11 h per day ¹⁴² | MA: patients consume around 400 calories more than the general population per day ¹³⁸ | MA: patients have significantly reduced sleep time and quality of sleep ^{129,134} |
| First-episode psychosis | MA: 27% of patients have or have had alcohol use disorder or alcohol dependence ¹⁴³ | MA: 58% of patients use tobacco, which is a significantly higher prevalence than in matched controls ¹⁴⁴ | MA: patients are less active than individuals with long-term schizophrenia ¹⁰⁸ | Insufficient evidence | Insufficient evidence | MA: patients have significantly reduced sleep time and quality of sleep ¹³⁴ |
| Post-traumatic stress disorder | SR: increased prevalence of comorbid alcohol misuse (10–61%) compared with the general population ¹⁴⁵ | MA: patients are 22% more likely to be current smokers than the general population ⁹⁸ | MA: patients are 9% less likely to be physically active than the general population ⁹⁸ | Insufficient evidence | MA: patients are 5% less likely to have a healthy diet than the general population ⁹⁸ | MA: significantly poorer continuity of sleep and reduced sleep depth compared with healthy controls ¹²⁹ |

Results described as significant had p<0-05. Comparisons are with the general population unless otherwise stated. SR=systematic review of case-control, clinical, or epidemiological research. MA=meta-analysis of multinational data. ES=large-scale epidemiological studies.

Table 2: Prevalence of behavioural risk factors across different mental health diagnoses

12 times greater incidence of osteoporosis,¹⁰⁸ and one of the highest rates of premature mortality across all mental disorders (all-cause standardised mortality ratio 5.9, 95% CI 4.2–8.3).¹² Furthermore, individuals with other eating disorders, such as bulimia, have a much higher risk of diabetes (OR 3.45) than people without eating disorders.⁸²

The relationship between mental illnesses and cancer risk is uncertain. Although some reviews have found that mental illnesses are associated with a small increase in overall cancer risk,59 other reviews have found no relationship, or a decreased cancer risk.63,68 The risk of cancer associated with mental illness might vary for different cancer types. For instance, whereas patients with common or severe mental illnesses have an increased risk of lung cancer, the risk of colorectal cancer appears to be similar to (or even lower than) that in the general population.59,63 Further research is required to understand these relationships, but a possible explanation is that people with mental illness have a reduced life expectancy, resulting in a reduced lifetime rate of cancer in this group. Another area requiring further investigation is the relationship between psychiatric and neurological disorders, because the tendency to separate these two types of illness into different categories, despite their overlapping characteristics, could result in underestimations of the true burden of mental illness on a global level.¹²² A recent meta-analysis has shown that for people with depression, the risk of developing Parkinson's disease is doubled compared with people without depression,¹⁰⁹ but the relationships between other psychiatric and neurological disorders have yet to be established.

Gaps in the meta-research

Our meta-research showed an absence of meta-analyses on chronic obstructive pulmonary disease (COPD) in people with mental disorders, although individual health database studies^{19,123} have found an increased prevalence of COPD in people with severe mental illness.

The harmful effects of infectious diseases on the physical health of people with mental disorders might also be underestimated, because they have largely been unexplored in mental health disorders other than severe mental illnesses (table 2). The reviews that we identified on infectious diseases in populations with severe mental illness found that the average prevalence (across multiple countries) for hepatitis B infection, hepatitis C infection, and HIV was 15.63%, 7.21%, and 7.59%, respectively,^{m1} and the prevalence of syphilis was 1.1-7.6%.¹¹² Within specific settings or countries, prevalence data highlight that individuals with mental illness have an increased risk of infectious disease compared with the general population.

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For instance, in the USA, the prevalence of both hepatitis B and hepatitis C infections in patients with severe mental illness is around 20%, whereas the prevalence of these infectious diseases in the US population is estimated to be 0.3% and 1.0%, respectively.146,147 Similarly, the median prevalence of HIV among people with severe mental illness in the USA is 1.8%, which is almost four times greater than the general US population.146 In low-income and middle-income settings, infectious diseases are a major cause of mortality in people with severe mental illness. For example, in a 10-year follow-up study in Ethiopia.148 individuals with severe mental illness died 30 years prematurely compared with the general population, and half of the deaths among individuals with severe mental illness were from infectious diseases. Further scientific and governmental attention is required for infectious diseases among people with mental illness in low-income and middle-income settings, particularly given that rates of infection are highest in these settings, and inequalities between people with and without mental illness are most pronounced.149 Furthermore, despite the compelling evidence for increased risk of infectious diseases in adults with severe mental illness, the prevalence of infectious diseases in other mental disorders, and the extent to which this increased risk applies to young people with mental illness, is not well established. Future research should also aim to identify the underlying factors resulting in an increased rate of infectious diseases among people with mental illnesses so that more appropriate and targeted solutions can be developed (as discussed in Part 2).

Much of the published literature assessing physical health in mental illness to date has examined the prevalence of specific health outcomes or disorders in isolation. The prevalence and specific effects of physical multimorbidity (ie, the presence of more than one chronic physical disorder) in people with mental illness are not fully understood. Some large-scale, multinational studies have shown that people with severe mental illness,123,150 common mental disorders,151,152 and substance use disorders^{18,153} are at a greatly increased risk of physical multimorbidity from the point of onset of the mental illness.154 The average age of onset of multimorbidity is younger in people with mental illness compared with the general population.^{123,154} Multimorbidity greatly increases the personal and economic burden associated with chronic conditions, and reduces life expectancy compared with a single morbidity.^{155,156} Urgent attention is required to address the onset and accumulation of physical multimorbidity, particularly in low-income and middleincome settings, where physical multimorbidity is increased among people with mental illness compared with the general population,^{81,83,151} but services do not have the resources to deal with the burden and complexity of these cases. Additionally, the development of costeffective approaches that address the root causes of multimorbidity is needed to prevent long-term disability in people with mental illness.

Further considerations

Although the impact of physical comorbidities on the life expectancy of individuals with mental illnesses is well established,13,14 further research is needed to examine whether the psychological distress associated with mental illness is compounded by the additional burden of these chronic conditions. For instance, in the general population, diabetes is commonly associated with distress, which can have a considerable effect on the person's quality of life and their ability to manage their overall health.¹⁵⁷ Diabetesrelated distress also affects people with common mental disorders,157 severe mental illness,158 and substance use disorders.¹⁵⁹ The prevalence of obesity is considerably increased across most classes of mental disorder compared with the general population (appendix pp 6-14). Weight gain can be distressing and negatively affect an individual's quality of life and self-esteem, and might impede treatment-seeking behaviour because an individual is concerned about further weight gain.¹⁶⁰ Similarly, obesity can perpetuate lifestyle behaviours, such as social withdrawal¹⁶¹ and sedentary behaviour,¹²⁶ that are characteristic of many mental disorders, and are also key risk factors for poor cardiometabolic health.¹⁶² Emerging evidence suggests that obesity and metabolic syndrome are independent predictors of relapse and rehospitalisation for those with severe mental illness.^{163,164} This relationship could be explained by the inflammatory effects of abdominal obesity; inflammation has also been associated with worse mental health¹⁶⁵ and increased suicidality.¹⁶⁶ In addition to the personal burden, physical comorbidities in people with mental illness result in an increased financial cost, the extent of which requires further research (panel 1).

To address physical health inequalities in people with mental illness compared with those without mental illness, we must focus on both reducing the prevalence of chronic health conditions, and lessening their effects across the life course. In particular, cardiometabolic diseases are a relevant and transdiagnostic target for improving physical health outcomes across a broad spectrum of mental illnesses. Although schizophrenia is typically associated with the greatest degree of cardiovascular risk (partly due to the side-effects of drugs for psychosis), there is compelling evidence that the risk of obesity, metabolic syndrome, diabetes, and cardiometabolic disease is similarly increased in other mental disorders, including common mental disorders. 46,76,83,85,87,97,98,175-177 Given the high prevalence of these mental disorders, developing strategies for improving health outcomes that can be applied across many different mental health diagnoses (including severe mental illness) could considerably reduce premature mortality and the lifelong burden of poor physical health for people with mental illness. The effects and prevalence of other non-communicable diseases and infectious diseases in low-income, middle-income, and high-income countries cannot be neglected. As such, understanding the epidemiology of mental and physical comorbidities in low-income and middle-income countries,178 and developing evidence-based interventions that integrate mental and physical health care in these settings,¹⁷⁹ is increasingly recognised as a major research priority for global health. The following parts of the Commission discuss key modifiable factors that drive mental and physical health comorbidities, describe strategies for improving the management and prevention of these conditions, and present directions for both immediate clinical action and future research to reduce physical health inequalities for people with mental illness (figure 1).

Part 2: Key modifiable factors in health-related behaviours and health services Introduction

Part 1 identified cardiometabolic diseases as a category of physical comorbidities that is particularly pervasive and has profound effects on patient wellbeing, morbidity, and mortality, across many mental disorder diagnoses.^{46,76,81,83,85,87,96–98,157–159,175–177,180} In addition to the sideeffects of psychotropic medications (described in Part 3), the reasons for increased cardiometabolic morbidity and mortality in people with mental illness can be separated into patient-related factors and provider-level or system-level factors.¹²¹

Lifestyle risk factors, such as smoking, poor diet, and inactivity, are modifiable, patient-related factors that are known to be associated with cardiometabolic disease,^{108,128,138,141} as well as affecting many other aspects of physical health.^{46,76,81,83,85,87,96–98,175–177} However, the extent to which lifestyle risk factors in patients with various mental disorders differ from the general population is not fully established. As a result, current lifestyle interventions for people with mental illness could be imprecise, or could focus too much on one behavioural modification at the expense of other important risk factors (eg, increasing physical exercise without considering the impact of diet, or focusing on smoking over alcohol intake).

We applied a systematic hierarchical approach (appendix pp 15, 16) to identify top-tier evidence on lifestyle risk factors for non-communicable diseases in people with mental illness. We focused on behavioural risk factors in affective and psychotic disorders, rather than on mental health illnesses that are characterised by physically damaging behaviours, such as eating disorders and substance or alcohol use disorders (in which the greatest behavioural risks to physical health are the behaviours that define the conditions). Table 2 summarises findings from meta-analyses, systematic reviews, and population-scale studies, published since 2000, on lifestyle risk factors in various mental health populations.

Lifestyle risk factors across various diagnoses

Although the initial aim of our hierarchical evidence synthesis was to determine key lifestyle risk factors that are associated with individual mental disorders, most of

Panel 1: Adding up the costs of physical comorbidities in people with mental illness

Cost-of-illness studies, which assess the economic burden of a diagnosis or group of diagnoses, have found that people with combined physical and psychiatric comorbidity have higher hospital costs, increased readmission rates, and higher total health sector costs compared with people without psychiatric diagnoses.^{163,167-171}

Although cost-of-illness studies are important for describing economic burden, only economic evaluations can estimate the cost-effectiveness of interventions to support decision making on the investment of limited health-care (and other sector) resources. Economic evaluations are used to assess pharmaceuticals and health technologies in many countries. Evidence regarding the cost-effectiveness of referral programmes and lifestyle interventions for people with mental illness and increased cardiovascular disease risk factors is mostly positive, but little evidence is available.¹⁷²⁻¹⁷⁴ Further economic evaluations that collect cost and outcome data, and that are done alongside clinical trials, will be needed to provide convincing evidence of the economic benefits of these programmes in people with mental health diagnoses.

Challenges to trial-based economic evaluations include excessive respondent burden and respondent bias in collecting cost information, although these might be overcome by using administrative data systems. Fragmentation of information and poor availability of data for some populations present additional challenges. Trial-based evaluations, which often use intermediate efficacy endpoints (eg, LDL cholesterol levels), will be an important source of data for modelled economic evaluations. Modelled evaluations will be crucial to establish the long-term cost-savings and improvements in outcomes (eq, quality of life and mortality) through the avoidance of future health consequences, such as metabolic syndrome and cardiovascular disease events. As this area of research develops, both trial-based and modelled economic evaluations will need to adhere to published methodology standards, including presenting health-care and societal perspectives to assist policy makers.

the published literature showed that all psychiatric diagnoses are associated with a wide spectrum of lifestyle risk factors (table 2). People with mental illness tend to have more unhealthy lifestyles compared with the general population, and among people with mental illness, those with schizophrenia have a particularly high risk of smoking, sedentary behaviour, and poor diet.^{128,137,138} Socioeconomic factors could partly mediate this trend, because the incidence of schizophrenia is higher in low-income communities.¹⁸¹ and such communities also have higher rates of behavioural risk factors compared with high-income communities.¹⁸² However, lifestyle risk factors are still greater in patients with schizophrenia than those with other mental health disorders, even when controlling for socioeconomic factors. For instance, a

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Figure 2: Dietary intake by food group in patients with major depressive disorder (n=14 619), bipolar disorder (n=952), and schizophrenia (n=262)

Bar heights represent the age-adjusted and sex-adjusted mean differences. Error bars represent 95% CIs of adjusted means. Data are based on the UK Biobank study and reproduced from Firth and colleagues.¹²⁸ *p<0.05 compared with healthy controls.

population-scale study from 2018 that used data from the UK Biobank¹²⁸ found that individuals with severe mental illness ate more obesogenic food than the general population, particularly those with schizophrenia (figure 2), and the differences in diet persisted after adjusting for social deprivation and education.¹²⁸ The use of second-generation antipsychotics (SGAs) could contribute to changes in diet, because trials in healthy volunteers found that SGAs such as olanzapine can reduce satiety, increase appetite¹⁸³ and lethargy, and have sedative effects.¹⁸⁴⁻¹⁸⁶ Although some SGAs, such as olanzapine, have the most obvious cardiometabolic sideeffects, other more widely prescribed psychotropic medications also have cardiometabolic side-effects that accumulate over time. Thus, early intervention strategies for managing lifestyle and cardiometabolic risk for patients treated with psychotropic medications are important for preventing cardiometabolic diseases from arising (panel 2) The side-effects of SGAs and other psychotropic medications (such as drugs for depression) are discussed further in Part 3.

Lifestyle risk factors in low-income and middle-income settings

Although most of the data presented in table 2 are from high-income countries, similar trends have been found in low-income and middle-income countries.137,141,194-199 For instance, data from the WHO Study on Global Ageing and Adult Health and the WHO World Health Survey show that individuals with depression in low-income and middleincome countries are more likely to smoke (OR 1.41),¹⁹⁴ to not meet physical activity guidelines (OR 1.42),195 and to have sedentary behaviour for 8 h or more per day (OR 1.94)¹⁹⁶ than individuals without depression. Similarly, low levels of physical activity are found in individuals with anxiety and psychotic disorders in low-income and middleincome countries.^{137,141,197-199} Despite the differences in sociocultural factors in low-income and middle-income countries compared with high-income countries, people with mental illness in both settings have more lifestyle risk factors compared with the general population. In lowincome and middle-income countries, there are new challenges to maintaining a healthy lifestyle caused by the spread of fast-food restaurants, new technologies that allow for reduced physical inactivity, and tobacco promotion and legislation.²⁰⁰⁻²⁰² Because lifestyle risk factors, such as physical inactivity and poor diet, are elevated in people with mental illness (table 2), further efforts are needed to develop lifestyle interventions that address these factors appropriately for those with mental illness living in low-income and middle-income settings (see Part 5).

In addition to non-communicable diseases, other behavioural risk factors, such as intravenous drug use and high-risk sexual behaviours, are also over-represented in people with severe mental illness in low-income, middle-income, and high-income settings (see Part 1),

and can lead to infectious disease. Most available data are for adults with severe mental illness, so the prevalence in other age groups and for other diagnoses might be underestimated. For instance, a recent meta-analysis²⁰³ of 3029 adolescents with a range of psychiatric diagnoses showed a 15% (95% CI 3-50) lifetime prevalence of sexually transmitted illnesses, and found that 40% (95% CI 23-78) of the adolescents had shown high-risk sexual behaviour during their most recent sexual encounter. Furthermore, recent alcohol use increased the likelihood of having unprotected sex (OR 1.66, 95% CI 1.09-2.52).²⁰³ The interactions between risk factors for non-communicable diseases and infectious diseases should not be overlooked, and suggest that screening for multiple lifestyle factors, rather than single factors or biological markers alone, will be the most efficient method for improving health outcomes for people with mental illness.

Interventions for multiple lifestyle risk factors in mental illness

In summary, although our evidence synthesis process aimed to identify key behavioural risk factors for specific mental disorders, the evidence suggests that simultaneously considering multiple lifestyle factors is more appropriate in understanding and managing risk factors across all mental health diagnoses. However, such transdiagnostic, multifactorial approaches are not widely reflected in the published literature, which generally focuses on specific factors for individual disorders. Furthermore, no suitable tools are available for clinicians to comprehensively assess lifestyle factors as part of standard care. The sole use of biological markers for physical health assessment (such as >7% increase in bodyweight, high blood pressure, and an abnormal lipid profile) could mean that interventions are applied only when it is too late to protect metabolic health or pre-empt obesity (panel 2). Clinical guidelines are increasingly recommending that assessments of diet, physical activity, and health risk behaviours are done alongside assessments of anthropomorphic parameters and blood markers of metabolic status,²⁰⁴ to more accurately assess current physical health and future risk.

To comprehensively promote the physical health of people with mental illness, a positive first step would be developing quick and widely applicable tools for lifestyle screening. These tools could be used across different diagnoses, settings, and services, to assess a range of behavioural risk factors (eg, exercise, diet, substance use, and sleep) at once, and thus identify key drivers of poor physical health on a case-by-case basis. A comprehensive lifestyle assessment would give patients more actionable physical health information than that which is typically provided from screening for biological markers, because patients will be informed of specific lifestyle changes they could make to protect their physical health. Selfreport questionnaires are often burdensome and

Panel 2: Why wait for weight? Tipping the scales towards prevention

Clinical guidelines for metabolic screening upon initiation or continuation of second-generation antipsychotics recommend that blood pressure, body-mass index, blood glucose, and lipid profile should be checked at least every 6 months.¹⁸⁷⁻¹⁸⁹ This is a positive example of considering physical health outcomes for people with severe mental illness. However, a large body of research in the general population has shown that preventing conditions such as obesity and metabolic syndrome from arising is considerably more efficient than attempting to reverse their long-term consequences.¹⁹⁰ Thus, proactive lifestyle interventions in mental illness might not have their maximal effect if the interventions are only provided after large changes in biological or clinical markers of adverse metabolic health are found during screening.

Individuals with first-episode psychosis are at considerable lifestyle risk from illness onset (table 2), because they tend to be less physically active and have a higher rate of alcohol use disorders than those with long-term schizophrenia, and also have nutrient deficits and a high rate of smoking (around 60% for both first-episode psychosis and schizophrenia, which is much higher than in the general population). Many other behavioural risk factors also seem to precede, rather than accompany, the onset of psychotic disorders.¹⁹¹ and metabolic disturbance might be present from illness onset.¹⁹²

Although treatment with second-generation antipsychotics (SGAs) can be important for stabilising mental health, taking these drugs can further increase metabolic risk (see Part 3). Given the high likelihood of physical health deterioration while taking SGAs, clinicians who prescribe them to patients have a duty of care to ensure that the patients are given access to evidence-based lifestyle interventions (as detailed in Part 4) from the start of treatment. Lifestyle interventions should be made available even to those with intact metabolic health. Although health screening should continue, more timely and effective strategies for improving health outcomes will require intervening on the basis of lifestyle plus pharmacological risk, rather than waiting for visible weight gain or metabolic dysfunction to happen.¹⁹³

inaccurate, reducing their suitability for capturing lifestyle factors in people with mental illness.²⁰⁵ Thus, a priority for future research is to examine if digital technologies (including smartphones and wearable technologies) could provide feasible and accurate methods of broad lifestyle assessment.^{205,206}

In addition, more efficient care pathways are needed to help people with mental illness minimise behavioural risk factors (see Part 4). For instance, multidisciplinary referral pathways (available through both primary and secondary care) could provide access to specialised physical activity, smoking cessation, dietetics, and other allied health services, depending on the individual's specific behavioural profile and health goals. The dissemination of risk behaviour interventions in lowincome and middle-income countries is an urgent challenge, because individuals with mental illness in these countries are disproportionately affected by an increased risk for infectious diseases and noncommunicable diseases.

Health provider-level and system-level factors

Lifestyle-related factors are unlikely to be the only explanations for poor physical health outcomes in people with mental illness.¹²¹ For severe mental illness

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in particular, mortality remains high even after adjusting for behavioural risk factors such as smoking, physical activity, and body-mass index.207 Increasingly, evidence suggests that the poor physical health outcomes of people with mental illness are partly driven by differences in the availability and quality of health care that they receive. For instance, people with severe mental illness are less able to access adequate health care than the general population. In the USA, people with severe mental illness are twice as likely as those without mental disorders to have been denied medical insurance because of a pre-existing condition.²⁰⁸ These disparities exist at all levels of health services. In primary care, people with severe mental illness are less likely to have a physical examination (eg, weight and blood pressure),209 or to be assessed and treated for hyperlipidaemia, than people without mental illness.^{210,211} People with mental illness also have more emergency department visits and more avoidable admissions to hospital for physical conditions that with appropriate primary care should not require inpatient treatment.212 Patients with a range of psychiatric diagnoses, including depression, anxiety, substance use disorder, and severe mental illness, have reduced access to oral health care.213,214

In secondary health services, physical health might also be poorly managed for people with mental illness.215 In particular, people with mental illness are less likely to receive medical or surgical interventions that are commonly given in the general population. For example, people who have had prior contact with mental health services are less likely to receive cardiac catheterisations and coronary artery bypass grafting than people who have no prior contact, which contributes to the higher mortality for circulatory disease among people with a history of mental illness.²¹⁶⁻²¹⁸ People with mental illness are also less likely to receive appropriate medications, such as β blockers and statins, at discharge after myocardial infarction.²¹⁹ The incidence of many cancer types (including common types, such as breast, colorectal, and prostate cancer and melanoma) among patients with psychiatric illness is only slightly higher than that of the general population (see Part 1), but mortality is markedly higher.^{220,221} Disparities at the health-service level are thought to be responsible for increased cancer mortality, because people with mental illness are less likely to be offered cancer screening,222 have a reduced likelihood of surgery for all types of cancer, and wait longer for surgery.223

A possible explanation for disparities in care for people with mental illness is that clinicians attribute emerging somatic symptoms to the patient's underlying psychiatric disorder, resulting in missed diagnoses (sometimes known as diagnostic overshadowing).^{224,225} In addition, people with mental illness can have difficulties with reporting medical problems, distinguishing physical symptoms from the symptoms of mental illness, and engaging with health services (ie, attending follow-up appointments), particularly if the services are non-inclusive, or perceived as non-inclusive, of people with mental illness.^{224,226}

Physicians might be reluctant to offer some medical procedures to people with mental illness because of the ensuing psychological stress, difficulties with obtaining informed consent or compliance with postoperative care, or contraindications, such as substance misuse and smoking.226 However, contraindications to specialised interventions, such as smoking or problems with informed consent, are not relevant to the prescription of vascular drugs, such as angiotensin-converting enzyme inhibitors, β blockers, or statins, that are known to reduce morbidity and mortality.227 Furthermore, people with schizophrenia are as adherent to diabetes medication as the general population.²²⁸ Access to secondary health care for people with mental illness might be restricted by financial costs, fragmentation of care, and social stigma.^{224,226,229} Although health-care providers should recognise that challenging behaviour can be a symptom of illness, evidence shows that some health-care providers have stigmatised views towards people with mental illness.^{224,225} Nonetheless, health services should routinely offer health screening and lifestyle interventions for people with psychiatric disorders, in the same way as for patients with chronic physical conditions.230

In conclusion, people with mental illness are likely to receive a poorer standard of health care compared with people without mental illness who have the same physical health problems. To address this discrepancy, changes need to be made in the training of health providers and to the overall health system (see Part 5). Greater integration of physical and mental health care in primary care settings is a key recommendation for improving the management of physical comorbidities in people with mental illness. Mental health clinicians should be wary of attributing emerging somatic symptoms solely to an underlying mental illness, and refresher training on the detection, management, and prevention of chronic medical conditions needs to be available to mental health staff.²²⁹ Furthermore, developing clinical tools for comprehensive lifestyle assessment, and improving referral pathways to targeted interventions, will enable practitioners to identify and manage cardiometabolic risk factors in a timely manner. At the service level, screening procedures need to be improved to support prevention initiatives, alongside investment in the integration of physical health within mental health services, and vice versa

Part 3: Interplay between psychiatric medications and physical health Introduction

As discussed in Part 1, a broad range of psychiatric diagnoses are associated with high comorbidity for physical conditions (particularly cardiometabolic diseases).

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Although lifestyle risk factors for chronic illness seem to be consistent across a wide range of mental illnesses (Part 2), the physical health risks associated with individual mental health diagnoses are modified by the types of psychotropic medications that are given to treat each condition. In this section, we present research on the interactions between psychotropic medications and physical health, and discuss pharmacological strategies for managing the physical health risks associated with mental illness and avoiding psychotropic adverse drug reactions (ADRs).

ADRs associated with psychotropic medications

Antipsychotic medications are a key component of treatment for psychotic disorders, because they reduce acute symptoms,²³¹ and reduce the risk of relapses,³³² emergency hospital admissions,²³³ rehospitalisation,^{234,235} and mortality.^{21,236} Antipsychotic medications are also used for bipolar affective disorder.^{237,238} However, the long-term effects of ADRs related to physical health are a major concern, and can be broadly divided into the following categories: cardiometabolic, endocrine, neuromotor, and other ADRs. The ADRs associated with specific antipsychotics are described in the appendix (p 17).

Cardiometabolic ADRs

Weight gain is an important ADR because it mediates other cardiometabolic outcomes, such as type 2 diabetes and cardiovascular diseases. Weight gain is the most distressing side-effect reported by callers to mental health helplines,188 and is associated with poorer quality of life239-241 and barriers to social engagement.²⁴² As a result, patients who gain weight have a reduced adherence to treatment, which can lead to relapse and poor mental health outcomes.^{163,164} Although most antipsychotic medications lead to weight gain, clozapine and olanzapine have the highest propensity, and haloperidol, lurasidone, and ziprasidone have the lowest propensity.243,244 Weight gain pathways induced by antipsychotic medication include those involving histamine H1 receptors, D2 dopamine receptors, blockade of 5-hydroxytryptamine receptor 2C, and dysregulation of glucagon-like peptide-1.243,245 Metaanalyses (table 1) have found that the risk of metabolic syndrome and type 2 diabetes is at least twice as high in people with schizophrenia, bipolar affective disorder, and major depressive disorder compared with the general population (appendix pp 6-13).

Endocrine ADRs

Antipsychotic-induced hyperprolactinaemia is the most common endocrine ADR.²⁴⁶ Antipsychotic medications block dopamine in the tuberoinfundibular pathway, leading to reduced inhibition of prolactin synthesis and secretion. Hyperprolactinaemia is most commonly found with first-generation antipsychotics, as well as risperidone, paliperidone, and amisulpride.²⁴⁷ Hyperprolactinaemia can be asymptomatic, or can lead to complications, such as menstrual disturbance and sexual dysfunction (including reduced libido, erectile dysfunction, vaginal dryness, and orgasmic dysfunction²⁴⁸) in the short-term,²⁴⁷ and osteopenia in the long-term.²⁴⁹

Neuromotor ADRs

Extrapyramidal side-effects are the most common neuromotor ADRs of antipsychotics. These side-effects can be socially stigmatising and are associated with poor quality of life, treatment dissatisfaction, and nonadherence to treatment.239,240 Extrapyramidal side-effects include dystonia (muscle spasm), Parkinsonism (tremor, rigidity, and bradykinesia), akathisia (subjective restlessness), and tardive dyskinesia (abnormal involuntary movements). The detailed mechanisms of these sideeffects are unknown, but they are likely to be related to blockade of dopamine receptors in the nigrostriatal pathway.250 The annual incidence of tardive dyskinesia is lower among patients taking SGAs compared with those taking first-generation antipsychotic medications.251 Neuroleptic malignant syndrome is a rare but serious condition (incidence of one to two cases per 10000 people per year) that can be life-threatening.²⁵² It is characterised by fever, severe rigidity, autonomic disturbances, and confusion.252 The incidence of neuroleptic malignant syndrome has reduced since SGAs became more widely used.252

Other ADRs

Antipsychotics are associated with varying degrees of cardiac conduction delay, indicated by a prolonged QTc interval, that can predispose the patient to torsade de pointes and lead to sudden death.²⁵³ Therefore, cardiac conduction should be monitored in patients at risk.

Anticholinergic effects are common side-effects of antipsychotic medications, particularly chlorpromazine, clozapine, and olanzapine.²⁵⁴ Anticholinergic effects are mediated by antagonism of acetylcholine by inhibition of the muscarinic receptors. They can be either central (eg, impairment of cognition, memory, and concentration, and sedation) or peripheral (eg, constipation, dry eyes, mouth, and skin, blurred vision, tachycardia, and urinary retention). These effects are particularly burdensome in the older population and can have cumulative effects when multiple anticholinergic agents are used.²⁵⁴

Somnolence, sedation, and hypersomnia are also common side-effects of antipsychotics.²⁴⁴ Although sedation might have short-term benefits for an acutely exacerbated or agitated patient, in the long term, somnolence and sedation can affect physical activity, bodyweight, concentration, and the ability to participate in daily activities or psychosocial rehabilitation, and could lead to medication non-adherence.²³⁹

Most antipsychotic medications can reduce the seizure threshold. The greatest dose-related risk for seizures is associated with clozapine.²⁵³

Clozapine

Clozapine is the only approved antipsychotic medication for people with treatment-resistant schizophrenia.255 It is the most effective antipsychotic medication for reducing positive symptoms²⁵⁶ and hospitalisations.²⁵⁷ However, clozapine is associated with severe neutropenia (agranulocytosis; incidence 0.9%; 95% CI 0.7-1.1), usually in the first month after commencement, that can rarely cause death (0.013%; 0.010-0.017).²⁵⁸ Cardiac ADRs can be life-threatening and include myocarditis (incidence of 0.03-1.00%, usually within the first month)^{259,260} and cardiomyopathy (incidence of 0.06-0.12%, usually after the first year).^{259,261} Other ADRs of clozapine include weight gain, type 2 diabetes, sedation, sialorrhoea, constipation, tachycardia, postural hypotension, gastro-oesophageal reflux, nocturnal enuresis, seizures, and obsessivecompulsive symptoms.262

Mood stabilisers

Mood stabilisers are prescribed for bipolar affective disorder²⁶³ and adjunctively for refractory schizophrenia.^{264,265} Individuals who are prescribed lithium have a mean weight gain of 4 kg over 2 years.²⁶⁶ Lithium is also associated with thyroid disease,²⁶⁷ including development of goitre (in up to 50% of patients²⁶⁸), hypothyroidism,²⁶⁹ or hyper-thyroidism.²⁷⁰ Lithium is also associated with polydipsia, polyuria, diabetes insipidus, and other forms of renal dysfunction.²⁶⁹ Sodium valproate is associated with metabolic effects, with at least half of individuals gaining weight in the first 3 months after initiation,²⁷¹ with a mean weight gain of 6 · 4 kg over 3 months.²⁷² It is also associated with insulin resistance, which increases the risk of developing type 2 diabetes.²⁷³

Antipsychotic medications are often prescribed concurrently with mood stabilisers; additional caution is required in this situation because the metabolic effects of the two classes of medication could be additive.⁹³ Although lithium and sodium valproate are the two most widely prescribed mood stabilisers, other mood stabilisers have a lower propensity for weight gain (eg, carbamazepine)²⁷¹ or have no effect on weight (eg, lamotrigine).²⁷⁴ All mood stabilisers are associated with teratogenic effects and should be avoided in pregnancy and lactation (appendix p 18).

Drugs for depression

Common ADRs with newer-generation drugs for depression include headache, nausea, agitation, sedation, dizziness, sexual dysfunction, hyponatraemia, weight gain, and metabolic abnormalities.²⁷⁵ Gastrointestinal side-effects, headache, and sexual side-effects are associated with all proserotonergic drugs for depression, whereas sedation, weight gain, and metabolic effects vary across agents. Antihistaminergic agents (eg, mirtazapine) are more associated with cardiometabolic effects and sedation. Less commonly, drugs for depression can have cardiac (eg, arrhythmias), neurological (eg, seizures), and

hepatic ADRs.²⁷⁵ Treatment with tricyclic antidepressants is associated with anticholinergic effects, including dry mouth, sedation, blurred vision, constipation, and urinary retention, as well as increased appetite, weight gain, and hyponatraemia (especially in older patients).²⁷⁶ Furthermore, tricyclic antidepressants are associated with a risk of orthostatic hypotension and falls.²⁷⁷ They also have a known arrhythmogenic effect; electrocardiogram (ECG) changes can include prolongation of PR interval, QRS interval, and PT (appendix p 19).

Pharmacological management of ADRs and physical health comorbidities

For the physical comorbidities associated with serious mental illness that are also commonly seen in the general population (eg, cardiovascular disease), national and international prescribing guidelines developed for the general population should be followed. By contrast, conditions that are secondary to psychiatric pharmacological treatment (eg, extrapyramidal side-effects) require a specialised approach. Close monitoring of physical health parameters is required for people taking antipsychotic medications, and evidence-based pharmacological treatments are needed.278 If it is safe and feasible, modifying psychiatric medications that are associated with an ADR (eg, by reducing doses or switching medications) should be considered, in consultation with the patient. Here, we provide a targeted, evidence-based approach to addressing commonly observed physical health ADRs in patients with severe mental illness.

Type 2 diabetes

Pharmacological management of type 2 diabetes for patients with severe mental illness should follow guidelines for the general population (appendix p 20). The first-line pharmacological therapy is metformin monotherapy, and second-line therapies are listed in the appendix (p 20). The relative risks and benefits of different type 2 diabetes treatments for patients with severe mental illness are presented in table 3. Metformin reduces the risk of transition from prediabetes to type 2 diabetes,^{283,284} and should be considered for individuals with severe mental illness and prediabetes. Glucagon-like peptide 1 receptor agonists also reduce the transition from prediabetes or non-diabetes to type 2 diabetes, as well as leading to clinically significant weight loss.²⁸²

Weight gain

When behavioural interventions are ineffective, pharmacological methods for attenuating weight gain in patients with severe mental illness should be considered. Pharmacological agents are described in detail in the appendix (p 21); the most evidence in individuals treated with drugs for psychosis is for metformin and topiramate.²⁸⁵ Bariatric surgery can also be considered as a last-resort treatment if both behavioural and pharmacological interventions are not effective. Weight gain associated with

| | Mechanism | Risks | Benefits | Evidence base in severe mental illness |
|---|--|---|--|--|
| Biguanide (metformin) | Increases insulin sensitivity; reduces hepatic synthesis and release of glucose; increases peripheral glucose uptake | Lactic acidosis; B12 deficiency; gastrointestinal effects (a modified release formulation can be tried if these occur); contraindicated in patients with estimated glomerular filtration rate <30 mL/min per 1.73 m ² | Weight loss (3 kg); low risk of hypoglycaemia | Good evidence for use in patients with severe mental illness, and should be considered a first-line treatment, ²⁷⁹ consider use in patients with pre-diabetes who are receiving olanzapine and clozapine ²⁸⁰ |
| DPP4 inhibitor (eg, sitagliptin) | Inhibits action of DPP4 that acts to break down incretins (eg, GLP-1), resulting in increased incretin effect, as seen with GLP-1 receptor agonists | Possible increase in hospitalisations for heart failure with alogliptin and saxagliptin; possible increased risk of pancreatitis | No effect on weight; low risk of hypoglycaemia | Insufficient trial data in patients with severe mental illness |
| GLP-1 receptor agonist (eg, exenatide) | Incretin mimetic: stimulates release of insulin; reduces glucagon release; delays gastric emptying; reduces appetite | Nausea or vomiting; possible increased risk of pancreatitis; subcutaneous administration | Weight loss (3-0–4-5 kg); low risk of hypoglycaemia; liraglutide is approved by the FDA for prevention of major cardiac events | Current evidence base suggests it should be considered a second-line therapy in patients with severe mental illness; some evidence for the use of exenatide in patients treated with clozapine; ²⁸¹ GLP-1 receptor agonists have been shown to reduce the transition to type 2 diabetes ²⁸² |
| Sulfonylurea (eg, gliclazide) | Increases endogenous production of insulin | Weight gain; hypoglycaemia | None established | Insufficient trial data in patients with severe mental illness |
| SGLT2 inhibitor (eg, dapagliflozin) | Inhibits SGLT2 in the proximal renal tubule, thereby reducing reabsorption of glucose and promoting glucosuria | Polyuria; postural hypotension; urinary tract infection; diabetic ketoacidosis can occur in stress settings; mild fracture risk | Weight loss (2–3 kg); low risk of hypoglycaemia; empagliflozin is approved by the FDA to reduce cardiovascular mortality; canagliflozin reduces cardiac events | Insufficient trial data in patients with severe mental illness |
| Thiazolidinedione (eg, pioglitazone) | Improves insulin sensitivity by promoting adipogenesis and reducing circulating fatty acid and lipid availability | Weight gain; heart failure; oedema; bone fractures | Might reduce stroke risk; low risk of hypoglycaemia | Insufficient trial data in patients with severe mental illness |
| Insulin | Supplements the insufficient endogenous production of insulin | Weight gain; hypoglycaemia | In acute settings or in poorly controlled type 2 diabetes, it might be the only effective treatment for stabilising sugars | Insufficient trial data in patients with severe mental illness |
| DPP4=dipeptidyl peptidase 4. | GLP-1=glucagon-like peptide 1. FDA=US Foo | od and Drug Administration. SGLT2=sodium-gl | ucose cotransporter 2. | |

Table 3: Risks and benefits of different drug classes for diabetes treatment and the evidence base for their use in patients with severe mental illness

drugs for psychosis is not usually dose-dependent, so dose reduction will not be effective in reducing weight.²⁸⁶

Arterial hypertension

Pharmacological management of hypertension in patients with severe mental illness should follow guidelines used for the general population (appendix p 20).

Dyslipidaemia

Data on dyslipidaemia treatments that are specific for people with mental illness are scarce. Therefore, the best guidance available comes from general population studies. Statins reduce the risk of coronary heart disease events by 20–30%.^{287–289} Cardiovascular risk calculators that incorporate factors such as age, hypertension, and type 2 diabetes diagnosis, and particularly those that include diagnosis of severe mental illness and use of drugs for psychosis (eg, QRISK3 calculator).²⁹⁰ inform decisions about the initiation of statin therapy.²⁹¹The pharmacological management of dyslipidaemia in patients with severe mental illness should follow guidelines used in the general population (panel 3). No strong evidence is available to support targeting hypertriglyceridaemia therapeutically to decrease cardiovascular risk.

Sinus tachycardia

Sinus tachycardia in patients with severe mental illness could be a feature of the illness, of drug withdrawal, or of an acute drug reaction (eg, serotonin syndrome or neuroleptic malignant syndrome). Psychotropic-related tachycardia is persistent, and usually dose-related.²⁹⁵ If dose reduction or switching medication is not feasible, and inappropriate sinus tachycardia has been confirmed (including a 24-h ECG), the first-line treatment is a cardioselective β blocker (eg, atenolol 25–100 mg per day) with uptitration until the heart rate normalises (60–100 beats per min). If β blockers are not tolerated (eg, in patients with postural hypotension), or are ineffective, then ivabradine (5·0–7·5 mg twice a day) can be introduced.²⁹⁶ Ivabradine has been shown to be effective and tolerated in clozapine-induced tachycardia.²⁹⁷

Postural hypotension

In addition to the causes of postural hypotension that exist in the general population, it can be related to taking psychotropic medication, notably clozapine and quetiapine.²⁹⁸ If increased fluid intake and salt consumption are ineffective, a dose adjustment or switch of the responsible psychiatric medication should be

Panel 3: General principles for prescribing antihypertensives and statins to people with severe mental illness

Antihypertensives

- If the patient has no indications for a specific medication, then any of the following four medication classes can be used as first-line treatment:²⁹² thiazide diuretics, long-acting calcium-channel blockers (eg, amlodipine), angiotensin-converting enzyme inhibitors, and angiotensin II receptor antagonists
- A thiazide-like diuretic or long-acting dihydropyridine calcium-channel blocker should be used as the initial monotherapy for black patients²⁹³

Statins

- Consider using a cardiovascular disease risk assessment tool (eg, QRISK3 calculator)²⁹⁰ to guide whether statins should be used; measure total and HDL cholesterol to achieve the best estimate of cardiovascular disease risk²⁹⁴
- Before offering statins to the patient for primary prevention of cardiovascular disease, discuss the benefits of lifestyle modification, and optimise the management of other modifiable cardiovascular disease risk factors, if possible
- Offer statin therapy (eg, atorvastatin 20 mg once a day) for primary prevention of cardiovascular disease if the QRISK3 assessment tool shows that the individual has a 10-year risk of developing cardiovascular disease of 10% or higher²⁹⁴

considered if safe to do so. If dose adjustment or medication switch is not feasible, non-pharmacological therapy (appendix p 22) with regular blood pressure monitoring should be undertaken.

Extrapyramidal side-effects

Around 10% of individuals who are taking antipsychotic medications have acute dystonia.²⁹⁹ It is more common in antipsychotic-naive individuals, and can occur rapidly after the initiation of the drug for psychosis. Acute dystonia can be treated with an anticholinergic medication (eg, benzatropine), which is given orally, intramuscularly, or intravenously, depending on urgency. Parkinsonism is seen in approximately 20% of individuals taking antipsychotic medications.300 If changing medication or reducing the dose is not effective or feasible, patients can be given an anticholinergic medication. The risk of akathisia varies for different drugs for psychosis, but is estimated to occur in 25% of individuals taking first-generation antipsychotics.301 If dose reduction of the causative medication is unsuccessful, a switch to quetiapine, olanzapine, or clozapine can be considered. 302,303 Other treatments include β blockers (eg, propranolol 30–90 mg per day),³⁰⁴ 5-hydroxytryptamine receptor 2 antagonists (eg, mirtazapine 15 mg per day, mianserin 30 mg per day, or cyproheptadine 16 mg per day),³⁰⁴⁻³⁰⁶ antimuscarinics (eg,

benzatropine 6 mg per day),³⁰⁷ and benzodiazepines (eg, clonazepam 0.5-3.0 mg per day).³⁰⁴ Tardive dyskinesia occurs in 5% of patients per year of exposure to drugs for psychosis.²⁵¹ If tardive dyskinesia occurs, it is recommended that anticholinergics are stopped and treatment is rationalised (ie, stopping the causative drug or reducing the dose), with clozapine most likely to provide symptomatic relief.³⁰⁸ Adjunctive treatments include tetrabenazine,³⁰⁹ and novel vesicle monoamine transporter type 2 inhibitors that have been approved by the US Food and Drug Administration, such as valbenazine and deutetrabenazine.³¹⁰

Anticholinergic effects

The first-line management of anticholinergic ADRs of drugs for psychosis is dose reduction, if it is feasible.²⁹⁸ For constipation caused by an anticholinergic-related reduction in gastric motility,³¹¹ stool softeners (eg, macrogols or docusates) and a stimulant laxative (eg, senna) might be effective.³¹² For patients taking clozapine, sialorrhoea is common. Augmentation with diphenhydramine or benzamide antipsychotics (eg, amisulpride) can ameliorate sialorrhoea.³¹³

Sexual side-effects

Sexual side-effects can include reduced libido, delayed or blocked ejaculation, erectile dysfunction, decreased orgasm, persistent genital arousal, lactation, and numbness of the vagina or nipples. Patients with sexual side-effects should be assessed by examining prolactin concentration, concomitant medications, and comorbid causes (which can be psychological or physical—eg, diabetes or cardiometabolic disease).²⁹⁸ If prolactin is elevated, the antipsychotic dose might need to be reduced or the drug might need to be switched. Alternatively, low-dose aripiprazole could be prescribed.²⁹⁸ Patients who are taking SSRIs and have sexual dysfunction could be switched to another drug for depression, or given a trial of bupropion or sildenafil, if appropriate.³¹⁴

Thyroid disease

In patients with hyperthyroidism who are taking lithium, a pertechnetate scan might be required to determine the cause of the thyroid disorder. Graves' hyperthyroidism or toxic multinodular goitre can be treated with thionamides, radioidine, or surgery, whereas if the patient has lithium-induced thyroiditis, cessation of lithium should be considered.²⁶⁷ Lithium-induced hypothyroidism can occur in the presence or absence of goitre. When lithium-induced hypothyroidism is present, treatment with levothyroxine is indicated, according to general guide-lines for the management of primary hypothyroidism.³¹⁵ Lithium-induced goitre requires an ultrasound examination to assess for diffuse versus nodular enlargement, and where appropriate, fine needle aspiration should be done to guide diagnosis. Levothyroxine might stabilise or

reduce lithium-induced goitre.³¹⁶ Because of the high incidence of thyroid disease in patients who are taking lithium, baseline clinical thyroid examination and sero-logical assessment of thyroid function is recommended, with at least annual monitoring during treatment. The development of thyroid dysfunction while taking lithium does not usually require lithium therapy to be stopped; the risks and benefits of continuing treatment should always be considered.

Renal disease

Lithium-induced nephrogenic diabetes insipidus, with associated polyuria and polydipsia, can affect a patient's quality of life. It is usually at least partially reversible with cessation of lithium, although it can be permanent after prolonged therapy.317 If ongoing lithium treatment is required and the patient only has a mild-to-moderate renal-concentrating defect, the introduction of amiloride (which is thought to reduce the accumulation of lithium in collecting tubule cells) can reduce urine volume, increase urine osmolality, and improve responsiveness to antidiuretic hormone.³¹⁸ Thiazide diuretics with a lowsodium diet have also been found to have a paradoxical effect of reducing urinary output in nephrogenic diabetes insipidus.³¹⁹ For patients with chronic kidney disease secondary to chronic interstitial nephritis, lithium cessation might be indicated if renal insufficiency progresses. Some renal function might be recovered after discontinuation of lithium, although progressive renal failure can occur.320 Regular monitoring of renal function is required, and monitoring of other risk factors for renal failure (eg, hypertension and diabetes) is also important.

Nicotine and smoking cessation

Smoking, and its associated physical morbidity, is a key contributor to the excess mortality of individuals with mental illness.^{321,322} Therefore, reducing smoking rates is a priority. However, clinicians should be aware that abrupt smoking cessation can change the pharmacokinetics and pharmacodynamics of many psychotropic medications (eg, increasing blood concentrations of clozapine, and to a lesser extent olanzapine and fluvoxamine). Patients who are planning to stop smoking should be followed up closely; plasma concentrations of medications should be monitored, if possible, and appropriate dose adjustments should be made.

In the general population, nicotine replacement therapy increases the odds of successful smoking cessation by 1.5-2.0 times, with good evidence of efficacy in patients with mental illness.³²³ Nicotine replacement therapies should be used for approximately 8–12 weeks. Different preparations are available, including sublingual tablets, gum, patches, nasal spray, inhalators, lozenges, and electronic cigarettes (e-cigarettes). Bupropion and varenicline can increase the likelihood of successful smoking cessation without increasing the risk of neuropsychiatric events in people with severe mental illness. $^{\scriptscriptstyle 324}$

In conclusion, the burden of ADRs associated with psychotropic medications is important to consider in the context of treatment effectiveness and patient acceptability. Drugs for psychosis (or antipsychotics) are the best evidence-based treatments for psychotic disorders, and lead to lower all-cause mortality in schizophrenia than giving no treatment.325 Mood stabilisers are the most effective treatment for bipolar affective disorder,263 and drugs for depression (or antidepressants) have an important role in the treatment of depression.326 Careful and regular monitoring of laboratory and clinical parameters could help to identify ADRs early, and prevent the development of iatrogenic comorbidities. We would advise against ceasing or switching psychotropic treatments to modalities that are less effective without careful consideration of the risk of relapse. Involvement of the patient in treatment decisions is important when balancing the effectiveness of a medication against its ADRs.327

Part 4: Multidisciplinary approaches to multimorbidity

Lifestyle interventions: what works?

Modifiable lifestyle factors, such as physical activity, diet, and smoking, are increasingly recognised as being fundamental to both physical and mental health. Interventions targeting these modifiable risk factors, delivered by practitioners with specific expertise, are referred to as multidisciplinary lifestyle interventions. The efficacy of such multidisciplinary lifestyle interventions in reducing the risk of cardiometabolic-related morbidity in the general population is well established.²⁸³ Accordingly, the 2018 WHO guidelines³²⁸ recommend that lifestyle interventions are considered as first-line strategies for the management of physical health (including weight management, cardiovascular disease and cardiovascular risk reduction, and diabetes treatment and prevention) in adults with severe mental illness. However, a broad spectrum of mental disorders, not only severe mental illness, are associated with high rates of cardiometabolic diseases (Part 1) and lifestyle risk factors (Part 2) that are compounded by the medications that are commonly used to treat mental illnesses (Part 3). Thus, a first step in reducing physical health disparities for people with mental illness is the adoption, translation, and routine provision of evidence-based lifestyle interventions as a standard component of mental health care. However, not all lifestyle interventions are equally useful. The efficacy and effectiveness of multidisciplinary lifestyle interventions are impacted by both their content and timing of delivery. Some key considerations for the individual components of multidisciplinary interventions are presented in panel 4.

Although it might seem counterintuitive to dedicate intensive resources to individuals with relatively good metabolic health, focusing on cardiometabolic protection

Panel 4: Key components of lifestyle interventions

Smoking cessation

Challenge: general population approaches have not worked for people with mental illness

- Although smoking rates have substantially decreased for the general population since the mid-1990s, they have remained high for people with mental illness;³²⁹ as a result, people with mental illness now consume around half of all cigarettes sold in the USA, Australia, and the UK^{321,330}
- People with mental illness are as motivated to stop smoking as people without mental illness, but they are more nicotine-dependent and less likely to seek out and receive appropriate interventions tailored to their needs^{331,332}
- Smoking-related deaths disproportionally affect people with mental illness, and smoking is a leading cause of the premature mortality observed in this population^{321,322}

Emerging solution: specialised cessation interventions

- Evidence on pharmacological interventions shows that they could be effective; for instance, a 2016 meta-analysis³²⁴ showed that bupropion and varenicline were the most effective interventions for smoking cessation for people with severe mental illness, and both resulted in a five times increase in smoking cessation compared with placebo treatments
- For non-pharmacological interventions to be effective, they must account for the additional barriers to treatment that people with mental illness can have (eg, cognitive impairments);³³³ for instance, the SCIMITAR+ programme is a candidate model of a bespoke smoking cessation intervention for people with severe mental illness, which was developed with service users to address the needs of this population³³⁴

Policy-level interventions can also be implemented; for instance, in 2016 NHS England announced that all mental health services would become smoke free, which included a ban on smoking on mental health wards and hospital premises, and the dissemination of smoking cessation interventions throughout community care.³³⁵ Initial data suggest that smoking bans and bespoke smoking cessation programmes are well received in inpatient settings, and they could have broader benefits by supporting a culture of physical health and wellbeing within mental health services³³⁶

Future research priorities: improve the accessibility and timing of cessation interventions

- Training on smoking cessation is now freely available online for health-care professionals, which could increase access to evidence-based interventions for people with mental illness; for instance, a concise e-learning tool on smoking from the National Centre for Smoking Cessation and Training³³⁰ could help front-line mental health staff to deliver smoking cessation advice
- Electronic cigarettes (e-cigarettes) are already widely used among people with a range of mental health disorders,³³⁷ and are a potentially useful tool for reducing smoking-related deaths. The UK Science and Technology Committee has advised mental health trusts to allow e-cigarette use on their premises; however, e-cigarettes are not authorised or available in many countries, and further research is required to establish the health outcomes of using e-cigarettes as a smoking harm-reduction intervention³³⁶
- Early intervention for smoking is feasible,³³⁹ and could improve cessation rates and long-term physical-health outcomes³⁴⁰

(Continues on next page)

in at-risk populations could be the optimal approach for lifestyle interventions (panel 2). The Diabetes Prevention Program (DPP),²⁸³ developed and evaluated in the USA, is an example of a gold-standard lifestyle intervention (panel 5). The key features of DPP include individual case managers; frequent face-to-face contact with participants; a structured educational component that includes behavioural self-management strategies; supervised physical activity sessions; a maintenance intervention that combines group and individual approaches, motivational strategies, and individualisation through a so-called toolbox of adherence strategies; tailoring of materials and strategies to address ethnic diversity; and an extensive network of training, feedback, and clinical support.²⁸³

The primary study on DPP²⁸⁴ recruited 3234 adults without diabetes who were at risk of developing type 2 diabetes (established via multiple risk factors); patients were assigned to receive placebo, metformin, or a lifestyle intervention that involved at least 150 min of physical activity per week with the goal of at least a 7% weight

loss. The lifestyle intervention resulted in a 58% reduction in the development of type 2 diabetes over the 3-year study, with 4.8 cases of diabetes per 100 person-years observed in the lifestyle intervention group, compared with 11.0 cases in the placebo group (incidence in the metformin group was 7.8 cases per 100 person-years).^{283,284} Furthermore, both the clinical benefits and costeffectiveness of the DPP lifestyle intervention were maintained over a 10-year follow-up, as compared with metformin as the control condition.361,362 These results show that lifestyle interventions with beneficial components (panel 5) can reduce the incidence and burden of cardiometabolic diseases when used as a preventive strategy in at-risk populations. Notably, the DPP has also been adapted and successfully delivered in primary-care settings.363

Considering the increased metabolic and lifestyle risk observed across multiple classes of mental health disorder (Parts 1 and 2), the DPP could be adapted for people with mental illness and made available through

(Panel 4 continued from previous page)

Physical activity

Challenge: patients find it difficult to stay motivated

 Weight loss is often a primary motivation factor for physical activity,³⁴¹ but exercise alone in the absence of dietary modification will not reliably reduce a patient's bodyweight, particularly in the short term;³⁴² exercise can attenuate further weight gain, but weight maintenance might not be a strong motivator for people with mental illness, particularly if they were overweight before the onset of mental illness, which can result in disengagement with exercise

Emerging solution: fitness goals designed by fitness professionals

- Rather than focusing on weight loss, improving fitness might be a more motivating³⁴¹ and achieveable^{343,344} goal for exercise interventions for people with mental illness; improving fitness can also have important health benefits, because even a modest improvement is associated with a 15% decrease in mortality in the general population³⁴⁵
- Exercise interventions delivered by qualified exercise professionals (with a university qualification in exercise prescription, such as physiotherapists or exercise physiologists) have significantly greater physical and psychological benefits and adherence compared with interventions delivered by non-specialised practitioners.³⁴⁶⁻³⁴⁸ In addition, the integration of qualified exercise professionals into mental health services could ensure that mental health staff have the knowledge and training to give clear advice on exercise

Future research priorities: varied and personalised exercise programmes

- Although most research on physical activity has focused on aerobic exercise, evidence from the general population increasingly shows that strength and resistance training or so-called high-intensity interval training can have beneficial effects for both metabolic and mental health³⁴⁹⁻³⁵¹
- Given that enjoyment and satisfaction are key factors in determining exercise adherence,³⁵² offering a range of exercise options that accommodate patient preferences and goals will be important for establishing sustainable and engaging exercise routines

primary care, on a referral basis. The use of such transdiagnostic, evidence-based, and cost-effective lifestyle interventions could help to protect the cardiometabolic health of people with mental illness who are treated in primary care settings. Furthermore, evidence increasingly shows that supervised exercise training (a key component of the DPP) can improve psychiatric symptoms, cognition, and functioning across a range of mental health diagnoses.^{346,364,365} Therefore, integrating the DPP principles into mental health care could improve overall recovery, not only metabolic health. However, the majority of DPP studies to date have excluded individuals with a "major psychiatric disorder which, in opinion of

Diet

Challenge: additive effect of medication and diet

 Dietary risks are a leading risk factor for cardiometabolic disease identified by the Global Burden of Disease Study;³⁵³ for people with mental illness, the risk is exacerbated^{128,138} because of the side-effects of psychotropic medications (eg, excessive or insatiable hunger, cravings for high-calorie, low-nutrient foods),^{183,354} an insensitive reward system and poor cognitive control,³⁵⁵ and food insecurity and financial constraints³⁵⁶

Emerging solution: dietary support

- Improved diet quality³⁵⁷ and reduced bodyweight³⁵⁸ are both associated with decreased mortality in the general population
- Dietary interventions in people with mental illness are more effective if they are delivered by specialist clinicians, such as dietitians, and at an early stage of treatment;³⁵⁹ cardiometabolic care and subsequent dietary intervention should be implemented within a multidisciplinary framework³⁶⁰

Future research priorities: personalised pathways to health and fitness

- As with exercise, the most effective dietary regime for people with mental illness will be one that is sustainable; future research might identify strategies that alleviate the obesogenic effects of psychotropic medications, and that address the insensitive reward system and poor cognitive control of some people with mental illness
- Links between dietary intake, the microbiome, inflammation, and obesity are increasingly becoming clear, and could provide new ways to improve physical outcomes for people with mental illness

clinic staff, would impede conduct of the DPP".²⁸⁴ The DPP needs to be analysed as a transdiagnostic lifestyle intervention for people with mental illness through primary care services and specialised mental health services. Although the core principles of the DPP are crucial to its design and delivery, more support is likely to be required by people with severe mental illness compared with the amount needed to effect change in the general population. A randomised controlled trial of an adapted version of the DPP for people with severe mental illness found significant reductions in obesity and other metabolic risk markers associated with antipsychotic treatment compared with usual care.³⁶⁶

Panel 5: Lifestyle intervention guidelines adapted from the Diabetes Prevention Program²⁸³

Measurable and specific goals

- Maintain bodyweight or reduce by between 5% and 7% of total bodyweight
- Reduce calorie intake (500–1000 kcal less than the calorie intake needed for weight maintenance per day, and a maximum of 25% of calories from fat), and improve diet quality
- Increase the number of minutes of physical activity (meet recommendations of 150 min per week of moderate-to-vigorous physical activity)
- Replace sedentary behaviour with light intensity activity as often as possible
- Increase cardiorespiratory fitness
- Cessation of smoking

Case managers or lifestyle coaches with university (or equivalent) training in nutrition and dietetics, exercise prescription, or behavioural change

- Allow for individualised programme design and delivery
- Offer a combination of group sessions and one-on-one sessions
- Provide supervised exercise and nutrition sessions at least two times per week (eg, community centre sessions, neighbourhood group walks, or one-on-one personal training)
- Do relevant assessments at regular intervals
- Ensure lifestyle coaches have training in psychopathology and the basic principles of working with people with mental illness

Frequent contact and ongoing intervention

- Deliver core curriculum on topics including nutrition (modifying energy intake), physical activity (and sedentary behaviour), and behavioural self-management (barrier identification and problem solving)
- Provide a flexible maintenance programme with supplemental group classes
- · Provide motivation campaigns and restart opportunities

Individualisation through a toolbox of adherence strategies

- Self-monitoring of outcomes and behaviours, such as weight, physical activity, sedentary behaviour, and dietary intake (fat and calorie intake)
- Barriers to treatment are identified and addressed with simple, individualised resources (eg, a cookbook might be given to a patient trying to improve their diet)

Strategies that are adapted for culturally and ethnically diverse groups

- Translation of documentation to local languages
- Identification of culturally appropriate resources and intervention approaches
- Cooking groups that allow for dietary restrictions or religious requirements

Local and national network of training, feedback, and clinical support

- Appropriate training of existing and emerging mental health staff
- Clear referral pathways and the integration of lifestyle coaches into a standard multidisciplinary mental health team
- · Monitoring and evaluation of effectiveness and adherence

Conversely, in some situations, adaptation of evidencebased programmes for people with mental illness can threaten their effectiveness. For instance, reducing the amount or frequency of interventional components, because of conflicting demands on the priorities and workload of mental health staff and diagnostic overshadowing,²⁰ could mean the programme is insufficient to effect change for those patients. The challenge for policy makers, clinicians, and service providers is to apply established, effective principles of behaviour change to people with mental illness, particularly with regards to adopting a framework of early intervention and prevention.¹³

Implementing lifestyle interventions for severe mental illness

A 2019 meta-review²⁸⁵ aggregated data from 27 metaanalyses of physical health interventions for people with schizophrenia. Exercise, diet, and broader lifestyle interventions (eg, sleep hygiene, smoking cessation strategies, motivational interviewing) had significant benefits for multiple cardiometabolic outcomes (including bodyweight, waist circumference, blood pressure, and glucose and lipid markers), with a similar efficacy to pharmacological management of metabolic health.²⁸⁵ However, the clinical trials from which these efficacy data were predominantly derived could reduce the generalisability and external validity of the findings, because trials are rarely done under real-world conditions and are typically resourced differently to routine clinical care.³⁶⁷

Few studies have been done on the effectiveness, pragmatic implementation, or sustainability of lifestyle interventions in people with mental illness.368 Furthermore, several large-scale clinical trials in people with mental illness have had null findings. To provide guidance on effective implementation of lifestyle interventions within mental health services, the interventions that are associated with negative and positive outcomes in trials should be considered. Trials of lifestyle interventions in mental health care often do not meet all the principles of programmes such as the DPP (appendix p 23). Specific aspects of the DPP that have been poorly implemented in trials are: (1) using qualified exercise professionals and dietitians to deliver lifestyle interventions, (2) providing sufficient access to supervised exercise services, and (3) ensuring that existing mental health staff are familiar with the lifestyle interventions. Large-scale clinical trials of lifestyle interventions addressing multiple risk factors in people with mental illness are described in the appendix (pp 24-30).

The high acceptability of lifestyle interventions among patients^{365,366,369,370} means that they are a novel route to reach typically disengaged service users in more traditional mental health treatment. For example, providing gymbased resistance exercise is a potential clinical pathway to care for young people with early psychosis,369 or veterans with post-traumatic stress disorder.371 However, an important consideration is how such programmes are applied across different clinical and broader public health settings. Flexibility in delivery, a focus on practical exercise and dietary advice, and provision of support to integrate the lifestyle measures into daily life are highly recommended.372,373 Further research is needed on how interventions are delivered; a mixed model that involves both online and face-to-face delivery is a potentially balanced and cost-effective way forward (appendix pp 31-34).^{206,193}

Training health professionals for a culture shift

Multidisciplinary teams in mental health settings are rapidly evolving to include allied health professionals with expertise in nutrition, physical activity, behaviour change, and other aspects of mental health, such as psychoeducation and mindfulness training. For this transition to be successful, allied health practitioners should receive at least introductory training in psychopathology and in the principles of working with patients with mental illness. Accordingly, the curriculum for health professionals, including dietitians, physiotherapists, and exercise physiologists should be updated to reflect the increasing role for such professionals within mental health teams.³⁷⁴

In addition, medical and mental health professionals should receive training on working with allied health professionals in an integrated manner, and understanding the principles of lifestyle interventions. The importance of training medical students in so-called lifestyle medicine is increasingly being recognised globally.375 Efforts towards integrating lifestyle interventions within routine mental health care should avoid an isolated focus on individuallevel behavioural changes, and should also include broader changes to service structure, delivery, and culture (see Part 5). For instance, evidence suggests that medical and nursing practitioners who have healthy lifestyle behaviours are more likely to recommend such behaviours to patients.376 Advances in implementation science could also provide ways to ensure that lifestyle interventions have meaningful benefits for patient outcomes.368

Barriers, opportunities, and future research

Some of the issues, emerging solutions, and research priorities for smoking cessation, physical activity, and dietary interventions for people with mental illness are presented in panel 4. For all types of lifestyle intervention, a gradient of intervention intensity, or so-called stepped care, needs to be considered. For example, intervention intensity might vary between individuals, treatment settings, and cultures, and could depend on the readiness to provide lifestyle interventions, particularly in lowresource settings.

Even in high-resource settings, only providing intensive lifestyle interventions through mental health services could cause issues for individuals who do not attend mental health centres frequently; those who have been discharged might find it difficult to stay engaged with lifestyle changes. One strategy for sustaining engagement with health behaviour interventions is the use of primary care referral schemes. For example, exercise referral schemes for people with mental illness typically involve health-care providers referring individuals to communitybased organisations to provide free (or discounted) access to a wide range of fitness activities, facilities, and expertise through community leisure centres and services. Community-based interventions might also be a non-resource-intensive strategy for maintaining physical activity behaviour in a way that complements and supports clinician-led strategies. Exercise referral has already been introduced through multiple large-scale implementation projects for sedentary adults in primary care in the UK, although only small beneficial effects have been found to date.^{172,377} However, preliminary data show that community exercise can be beneficial and engaging for young people with mental illness, including for those with severe conditions.^{178,379} Community-based diet programmes, such as Weight Watchers, are costeffective weight-loss interventions when delivered via primary care to obese individuals.^{570,380} Research is now warranted to determine the suitability and effectiveness of such programmes for psychiatric populations.

Mobile device health (or mHealth) technologies could provide new routes for applying adapted versions of programmes such as the DPP in patients with mental illness. For example, a pilot study³⁸¹ found that FitBit activity trackers could potentially be used alongside fitness applications (apps) in people with schizophrenia to deliver DPP-based interventions, with features such as daily prompts, motivational messages, and self-determined step-count goals. Participants found the technology to be engaging, motivating, and empowering,381 but a small sample size (n=25) makes it difficult to determine efficacy. Although they have only been evaluated in small-scale pilot studies to date, mHealth technologies present potential opportunities to deliver a wide range of novel, scalable, and sustainable lifestyle interventions for people with mental illness. mHealth interventions could also be disseminated easily, even in low-resource settings. Therefore, further development and evaluation of evidence-based mHealth interventions for improving physical health in people with mental illness is warranted.

In conclusion, the principles of existing gold-standard prevention programmes, such as the DPP, can be used as a benchmark for the implementation and maintenance of lifestyle interventions as an integrated, routine component of mental health care (panel 5). However, programmes might need to be adapted to specific care settings, and for particular patient needs. Efforts are required to translate the DPP principles into both (1) preventive, transdiagnostic lifestyle interventions available through primary care, and (2) intensive interventions for specialist services. If these efforts are successful, effective programmes for protecting the cardiometabolic health of people living with mental illness could be implemented.

Part 5: Innovations in integrating physical and mental health care Introduction

Social determinants, including poverty, poor education, unemployment, homelessness, and childhood abuse, increase the risk for both mental and physical illnesses.^{182,382} The relationships between adversity, physical health, and mental health are complex, and risk factors can act synergistically to reinforce disadvantage and disability.¹⁸² For instance, people with mental illness are more likely to be in poverty and to have cardiometabolic and infectious diseases (see Parts 1 and 2), and conversely, chronic physical health conditions and social deprivation are key risk factors for mental illness.^{182,183,184} A 2017 *Lancet* Series³⁸⁵ on the co-occurrence of chronic health conditions described how syndemic frameworks could be used to understand how health risks and comorbidities interact with one another within the broader environmental context. For instance, epidemiological research has applied syndemic frameworks to characterise the complex

| | Directions and rationale | Actioned by |
|---|---|---|
| Treating syndemics | Examining how broader societal factors affect the interaction between physical and mental health conditions within a given region can provide insight into these comorbidities and their risk factors; in turn, this can inform the development and implementation of preventive strategies and interventions for chronic health conditions within a given socioeconomic setting | Led by public health; developed and implemented by national and local health-care providers |
| Preventing multimorbidity | Evidence-based integrated care should be provided from the onset of mental illness; changes are needed at the primary, secondary, and tertiary levels of care to reduce the prevalence and impact of physical health conditions in people with mental illness (panel 5) | Led by public health; delivered by primary, secondary, and tertiary care, and community groups |
| Primary and parallel care | Primary care is the first point of contact for most patients, and is an important part of care after discharge from specialist services. Implementing integrated models of mental and physical health care through primary care services could be effective for efficient management of physical health comorbidities in people with mental illness; however, the management of comorbid substance use disorders might depend on improving accessibility, referral pathways, and quality of dedicated parallel services | Led by commissioners of health-care organisations; developed via culturally sensitive integrated care models designed by local health professionals; and implemented by health-care practitioners |
| Implementation in low-income and middle-income countries | Incorporating integrated care models within the emerging mental health services of low-income and middle-income countries is important for reducing physical health inequalities for people with mental illness, and might also provide a more cost-effective approach to health-care provision in these settings | Led by commissioners of health-care organisations; developed via culturally sensitive integrated care models designed by local health professionals; and implemented by health-care practitioners |
| mHealth technology solutions | mHealth technology and other digital technologies provide many novel methods for promoting physical health and delivering interventions remotely. The low cost, scalability, and global accessibility of such approaches are highly appealing, particularly in low-income and middle-income settings; while the evidence-base is still nascent, this can be considered a high-priority area for future research | Led by mental health commissioners; developed with communities, researchers, and industry; and implemented by health-care practitioners |
| mHealth=mobile device health. | | |

Table 4: Considerations and directions for integrating health care

| | Year | Organisation | Illness | Outcomes | |
|---|------|-----------------------------------|-----------------------|-----------------------------------|--|
| Management of physical health conditions in adults with severe mental disorders: WHO guidelines ³²⁸ | 2018 | WHO | Severe mental illness | Morbidity, premature mortality | |
| Health matters: reducing health inequalities in mental illness $^{\scriptscriptstyle 330}$ | 2018 | Public Health England | Severe mental illness | Morbidity, premature mortality | |
| Bringing together physical and mental health: a new frontier for integrated care ³⁸⁶ | 2016 | King's Fund, London, UK | All mental illness | Cardiometabolic health | |
| Improving physical healthcare for people living with severe mental illness in primary care: guidance for CCGs ³⁸⁷ | 2018 | NHS England | Severe mental illness | Premature mortality | |
| The physical health of people with mental health conditions and/or addiction ³⁸⁸ | 2017 | Te Pou, Auckland, New Zealand | Severe mental illness | Mortality, morbidity | |
| Excess mortality in persons with severe mental disorders: a multilevel intervention framework and priorities for clinical practice, policy, and research agendas ²²¹ | 2017 | World Psychiatric Association | Severe mental illness | Premature mortality | |
| Helping people with severe mental disorders live longer and healthier lives ¹⁴⁹ | 2017 | WHO | Severe mental illness | Premature mortality | |
| Improving the physical health of adults with severe mental illness: essential actions ³⁸⁹ | 2016 | Royal College of Psychiatrists | Severe mental illness | Premature mortality | |
| CCG=clinical commissioning group. | | | | | |
| Table 5: Key resources on the integration of physical and mental health | | | | | |

relationships between poverty, diabetes, mental illness, and infectious diseases in low-income settings.¹⁷⁸ This syndemic approach highlights that national and local conditions affect the interplay between physical and mental health, and shows the importance of taking social, political, and economic factors into account when designing public health interventions, or implementing changes to health services (table 4).¹⁷⁹

Numerous national and international health-care and advisory bodies are now focusing on health inequalities in people with mental illnesses. Resources from these organisations (table 5, appendix pp 35-42) present new ideas and best practice approaches for improving the integration of physical and mental health care at the individual, health service, and societal levels. Several key health organisation guidelines149,330,386 and academic articles179 have included case studies of new local and national initiatives that account for the surrounding environmental conditions and improve the integration of physical and mental health care. As well as detailing required improvements to health care for existing patients, some sets of guidelines discuss approaches to prevention of chronic physical and mental health conditions.330,386 Wide-scale adoption and implementation of strategies that aim to prevent chronic conditions (physical or mental), multimorbidity, and risk of premature mortality are required to reduce health inequalities for patients with mental illness in the future. Some examples and considerations for prevention at the primary, secondary, and tertiary levels are presented in panel 6.

Improving integrated care for people with mental illness

Effective management of multimorbidity requires integrated care to be provided in a holistic manner,³⁹¹ so that common risk factors and the bidirectional interaction between physical and mental health disorders, and the treatments for each, can be addressed together.³⁸⁶ Internationally, health organisations agree that primary care is the optimal setting for addressing and coordinating the management of multimorbity.^{392,393} In many countries, most people with mental illness first present to the health system through primary care, and most mental health care is delivered in primary care.¹⁷⁹ Patients requiring specialist mental health services still need ongoing engagement with primary care to deliver and coordinate other aspects of their health care, including prevention and management of comorbid physical illness. The aim of primary care is to provide equitable, accessible, safe, effective, comprehensive, person-centred care that meets the needs of individuals, families, and communities throughout life.394 Therefore, primary care is ideal for managing multimorbidity, which requires an individualised approach that not only addresses the increased burden of multimorbidity, but also manages competing or conflicting treatment needs by accounting for individual preferences and treatment priorities.³⁹² Further discussion on how primary care settings should provide physical health care

Panel 6: Prevention of physical health morbidity and mortality in individuals with mental illness

Primary prevention

Primary preventive strategies aim to provide people with the tools needed to live a healthy lifestyle¹⁹⁰ by avoiding smoking, alcohol and substance misuse, poor diet, and physical inactivity. Among those with mental illness, a healthy lifestyle should ideally be adopted in the early stages of illness to build healthy habits, and to protect physical health as much as possible. Primary prevention strategies need to be adapted for people with mental illness, because public health strategies that are effective in the general population are not always as effective for those with mental illness. Separation of patients into diagnostic categories (eq, depression, anxiety, and schizophrenia) is not an effective way of determining the best primary prevention strategies for physical health. Instead, transdiagnostic approaches that account for individual-level differences (eq, gender, cultural and ethnic identity, lifestyle risk factors, medication use, and social circumstances) will be more effective (see Part 2).

Secondary prevention

Secondary preventive strategies, such as screening and preventive treatments, are often underused in people with mental illness.^{216-218,222} Many people with mental illness are affected by comorbid physical diseases, which can be present from illness onset (see Part 1). Population-scale data from NHS England³⁹⁰ indicate that physical health intervention is required even from childhood for those with mental illness. At the age of 11–19 years, children with mental illness are three times as likely to be obese as children without mental illness.

Tertiary prevention

Tertiary preventive strategies involve improving treatment and recovery from disease. To be engaging and responsive, integrated care services require flexibility from individual clinicians and service planners. For example, cardiac mortality among patients with severe mental illness is significantly reduced by efficient administration of cardioprotective medications after first cardiac events.²²⁷ This supports the claim made in new guidelines^{328,387} that tertiary preventive measures for people with mental illness are underused, despite their potential to improve health and reduce premature mortality.

for people with mental illness is presented in the 2018 guidelines from NHS England³⁸⁷ (appendix p 38).

As a minimum level of integration, health providers should communicate with each other frequently to ensure the safety and effectiveness of treatment. Ideally, services should take further steps towards integration, aiming for multidisciplinary care that is structured, comprehensive, and proactive. However, integration of this type usually involves overcoming bureaucratic barriers at the service level, such as difficulties in sharing medical records. Governance and funding issues can also restrict the



Figure 3: Proposed model of collaborative care for people with physical and mental comorbidities

provision of coordinated health care (figure 3). A 2016 report³⁸⁶ from the King's Fund in the UK presents an aspirational approach towards improving integrated care across a range of physical and mental health conditions, with advice on overcoming common barriers to implementation. For instance, the report recommends a curriculum redesign to give all health professionals a common foundation in mental and physical health and encourage a whole-person approach, and creating opportunities for skills transfer between professionals (appendix p 35). Some examples of integrated care models, and their evaluated outcomes, are described in panel 7.

Managing substance comorbidity and promoting smoking cessation

Across many mental illnesses, the use of alcohol, tobacco, and illicit drugs is more prevalent than in the general population, and is associated with worse physical and mental health outcomes (table 2).⁴⁰⁵⁻⁴⁰⁷ A bidirectional relationship exists between substance misuse and mental illnesses, because substance misuse can cause and exacerbate mental illness, yet it is often used by patients as a way of reducing anxiety, dysphoria, and other symptoms.⁴⁰⁸ Genetic risk factors for schizophrenia also appear to predispose individuals towards illicit drug use.⁴⁰⁹

Addressing substance misuse within mental health services should be a high priority.⁴⁰⁸ However, many

services have no standardised screening for substance use, and mental health clinicians are often not trained to treat substance misuse.⁴¹⁰ For example, in high-income countries, people with severe mental illness report wanting to quit smoking as much as the general population, but are unlikely to be supported to do so.^{331,332} Furthermore, patients are sometimes excluded from drug treatment programmes or mental health services if they have comorbid drug or alcohol use disorder.⁴¹¹

Because of the complexity of comorbid mental health and substance use disorders, patients need individualised treatment that has an emphasis on overcoming the barriers associated with mental illness and enhancing engagement with evidence-based treatments. Readiness for change, cognitive ability, and cognitive distortions resulting from mental illness need to be taken into account. Evidence-based treatments include motivational interviewing, cognitive behavioural therapy, and family interventions (also known as family therapy).⁴⁰⁸

Evidence-based interventions can be a challenge to implement in mental health services that are already struggling to meet demand. Notably, little evidence is available to recommend integrated interventions as compared with sequential or parallel treatment programmes, particularly in alcohol use disorders.⁴¹² Each approach has advantages and disadvantages. One advantage of an integrated approach is that the patient

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does not need to receive care from two services, whereas a disadvantage is that it requires substantial resources and investment from within the mental health system to train mental health clinicians in the treatment of substance use disorder. An advantage of sequential or parallel treatments is that the interventions are delivered within a highly specialised substance use programme. However, the approach requires coordination and sharing of information between agencies. A clear referral policy between mental health and substance misuse treatment services (including those in primary care) should be developed so that a programme of patient care is delivered consistently and in full.

Regardless of how interventions are provided, investment in screening within mental health services is a priority. Mental health clinicians should be trained to do regular assessments of comorbid substance use, to assess patients' readiness for change, and to provide motivational interviewing. An emphasis on a so-called no wrong door policy for accessing substance misuse treatments, in which everyone is accepted and offered treatment wherever they present, and the development of clear referral policies between mental health and substance misuse treatment services should be a priority.³³⁰

If cessation of substance misuse is not possible, harmminimisation strategies should be adopted. For instance, patients might be able to switch to alternative, safer forms of the drug (eg, e-cigarettes, methadone, or buprenorphine and naloxone) or access could be provided to safe injecting facilities. The challenges and innovations regarding smoking cessation interventions for people with mental illness are presented in panel 4. The Royal College of Physicians published a report in 2016 on harm minimisation for those who are unable or find it difficult to quit, which recommended e-cigarettes, nicotine replacement therapy, and other non-tobacco nicotine products.⁴¹³

Innovations in integration for low-income and middle-income countries

In most low-income and middle-income countries, less than 1% of the health budget is spent on mental health,⁴⁴ including mental health care within specialist mental health services, general health services, and social care services.⁴⁴ As a result, mental health services are poorly resourced; 90% of people who need treatment do not receive any care.⁴¹⁵ Mental health services in low-income and middle-income countries predominantly rely on expensive psychotropic drugs, which are seldom available, and are associated with various side-effects that require close management (see Part 3).⁴¹⁶ Previously, little attention has been given to the complex bidirectional relationship between physical and mental health, and the relevance of screening, in low-income and middle-income settings.^{416,417}

WHO guidelines from 2018 state that health inequalities for people with severe mental illness could be worse in low-income and middle-income countries than

Panel 7: Examples of integrated care for physical and mental illness

Within the broad category of integrated care, collaborative care models are emerging as effective approaches that can simultaneously reduce costs and improve clinical outcomes and treatment adherence in the management of both mental illness and chronic physical conditions.³⁹⁵⁻³⁹⁸ A core component of collaborative care models is the involvement of several health-care professionals working as a team, including a physician, a case manager, and a mental health clinician.³⁹⁵⁻³⁹⁶ Although the specific actions vary between models, all collaborative care approaches use structured management plans, scheduled patient follow-ups, and extensive interprofessional communication.³⁹⁵ Figure 3 shows the potential components of a collaborative care model for improving health management in people with physical and mental comorbidities.

The TEAMcare intervention^{399,400} in 14 primary care clinics in Washington, USA, is an example of a collaborative care approach within primary care. TEAMcare was designed for adults with depression plus diabetes, heart disease, or both, and comprised pharmacological care management with integrated behavioural change support delivered by a nurse. Compared with usual care, the TEAMcare intervention resulted in significant improvements in metabolic health over 12 months, with a decrease in the percentage of glycated haemoglobin of -0.56% (95% CI -0.85 to -0.27), a decrease in LDL cholesterol of -9.1 mg/dL (-17.5 to -0.8), and a decrease in systolic blood pressure of -3.4 mm Hg (-6.9 to 0.1). A reduction in Symptom Checklist Depressive Scale score of more than 50% was found in more than three times as many patients in the TEAMcare group compared with usual care (odds ratio 3.37, 95% CI 1.84 to 6.17), as well as improved perceived self-efficacy, and greater patient satisfaction with medical care.³⁹⁹⁻⁴⁰¹

The COINCIDE trial³⁹⁷ tested a psychological intervention for people with depression and comorbid diabetes or cardiovascular disease that addressed behavioural activation, healthy lifestyle, exercise, and diet. This integrated approach resulted in significant improvements in depression and patient satisfaction at 4 months.¹⁷³ Health benefits were sustained at a 24-month follow-up, and the intervention was found to be cost-effective.¹⁷³ Additionally, evidence from the RAINBOW trial, published in 2019, supports the use of collaborative care models for improving both physical and mental health outcomes in people with common mental disorders and cardiometabolic comorbidities.⁴⁰² However, these evaluations of collaborative care models have all been done in high-income settings; similar evaluations in low-income and middle-income settings are needed (see Part 5).

Although collaborative care models have been shown to be effective for people with common mental disorders, the evidence for their use in people with long-standing severe mental illness is conflicting,^{174,403,404} and optimal models of integrated care in this group are yet to be found. The PRIMROSE study¹⁷⁴ compared integrated primary care with usual care in 327 people with severe mental illness, and found no significant benefits for HDL cholesterol over 12 months. However, integrated care did have a 12-month mean cost difference of -£824 (95% CI -568 to 1079) compared with usual care, and was found to be cost-effective because of fewer hospital readmissions over a 12-month period.¹⁷⁴

high-income countries, because "the resources are inadequate, the institutions are not well managed and access to quality mental health care and physical care is limited".³²⁸ The largest gaps in life expectancy for people with severe mental illness compared with the general population are observed in low-income settings.^{5,149} Mental health care systems in low-income and middle-income countries need to be reoriented towards integrated models. However, many low-income and middle-income countries do not have integrated physical health and mental health services, and have poorly developed community-based services, resulting in over-reliance on institutional psychiatric care.⁴¹⁶ In many countries, mental health legislation and policies are outdated.⁴¹⁷ Specific barriers to the development and implementation of integrated mental and physical health policies include: insufficient coordination across different government levels; a shortage of trained staff at all levels of care; a need for commitment from health services; governmental bureaucracy; and shortage of funding. In addition, funding for health services is provided by several different sources, which makes the sharing of decisions and responsibility challenging.¹⁷⁹ As a consequence, in daily clinical practice, mental health providers in community settings do not generally ask about or test for physical health issues because they are not considered to be a priority, and time and resources are limited.418

In low-income and middle-income countries, there is an urgent need to increase awareness that patients with mental health illness could have physical health needs, and vice versa.⁴¹⁶ For example, public health campaigns could increase awareness of the links between chronic physical and mental disorders. In a 2016 review⁴¹⁹ of interventions for mental disorders at the population and community levels in low-income and middle-income countries, mass public awareness campaigns and schoolbased awareness programmes were considered to be good practice, with limited but promising evidence to support their use.

At the system level, the physical health of people with mental illness could be improved by increasing the competencies of existing staff at all levels of care. Although education campaigns on the links between chronic physical and mental health conditions are important tools, bringing about changes to skills and behaviour will require a long-term approach. Multiple training sessions and subsequent top-ups will usually be required, with rolling programmes to support staff turnover.420 In addition, mental health policies in lowincome and middle-income countries need to be changed to make an integrated care model the central focus of mental health care action plans. A review across highincome, middle-income, and lower-income settings179 presents clear evidence for the rationale and effectiveness of integrated care. The Practical Approach to Care Kit (PACK), which comprises a guide, a training strategy, a health system strengthening intervention, and monitoring and evaluation, is an example of a bestpractice approach towards providing universal integrated primary health care.421 PACK has been successfully implemented in several low-income and middle-income countries, including Botswana, Brazil, Ethiopia, Nigeria, and South Africa.422 Development of clinical practice guidelines that build on best-practice examples such as PACK and consider the local context, including staff attitudes and available resources, will be crucial in encouraging policy uptake in low-income and middleincome countries. The local context, including prevalent

knowledge, behaviours, and attitudes towards mental health conditions, is a good predictor for the success of implementing changes to clinical practice.⁴²⁰

Clinical practice guidelines should also incorporate strategies for collaboration between formal primary care and mental health services, and community-based providers, such as traditional healers. Approximately half of individuals seeking formal health care for mental disorders in low-income and middle-income countries choose traditional and religious healers as their first care provider, and this choice is associated with delays in accessing formal mental health services.423 Based on research into collaboration between traditional healer and biomedical health systems in Uganda,424 strategies should involve improving clinicians' understanding of traditional healers' explanatory models for illness, and vice versa. Trust between the two types of health-care providers needs to be improved so that they can interact, rather than operating in isolation. In particular, negative attitudes of clinicians towards traditional healers need to be addressed. The quality of care provided by traditional healers needs to be enhanced by improving hygiene practices and eliminating unethical practices.

Task sharing with key community-based providers is a potentially effective implementation strategy in lowresource settings. Task sharing is the process of transferring a task usually delivered by a scarce resource, such as a physician, to a rapidly trained and less scarce resource, such as a health-care worker.425,426 Research on the implementation of task-sharing collaborative-care models is being done,⁴²⁷⁻⁴²⁹ and the findings could improve our understanding of the quality, safety, effectiveness, and acceptability of such strategies for mental health disorders in low-income and middle-income countries. Case studies from non-governmental organisations show that inefficient health system structures can present barriers to successful task sharing,427 indicating a need for more collaborative care services. However, whether such approaches will be successful in reducing premature mortality, improving wellbeing, and achieving better social outcomes in low-income and middle-income settings has yet to be fully established.427

Digital technologies for people with mental illness

Digital technology plays an increasing role in promoting health, addressing risk factors, and managing physical disease, with growing evidence for its effectiveness. Mobile phones provide a particularly convenient platform for digital health-care delivery (also known as mHealth). WHO estimates that 95% of the global population lives in an area covered by mobile networks, and over 7 billion mobile contracts have been issued, which is one for almost every person on the planet.⁴³⁰ Smartphone technologies are closing the so-called digital divide (ie, between those who have easy access to computers and the internet, and those who do not) that was previously present in low-income and middle-income countries.⁴³¹

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Unlike traditional health services that require attendance at a specific time and location, digital technology is available at a time and place that suits the patient.

Technologies as simple as text messaging have been shown to support lifestyle improvement. For example, in the TEXT ME trial of 710 patients with coronary heart disease,432 patients in the intervention group received four personalised text messages per week for 6 months that provided advice, motivation, and support to change lifestyle behaviours. After 6 months, levels of LDL cholesterol were significantly lower in intervention participants compared with patients who received usual care, with concurrent reductions in systolic blood pressure and body-mass index, significant increases in physical activity, and a significant reduction in selfreported smoking. Further studies to assess the sustainability of these positive changes, and the effectiveness of text messaging in participants who have not yet experienced a cardiovascular event, are underway.433 Text messaging can also support other important health behaviours, such as medication adherence for people with chronic conditions.434

Smartphone apps might promote healthy lifestyle change, but they vary in quality, and the quality of reported evaluation research is also inconsistent.⁴³⁵ To date, few studies have examined clinical effectiveness or cost-effectiveness.⁴³⁶ In addition, user engagement could be lower in everyday clinical practice than in trial settings.^{437,438} Key strategies for effective user engagement include designing interventions in collaboration with patients, personalisation of interventions, and just-in-time adaptation (in which an intervention supports an individual's changing behaviours and contexts over time).⁴³⁹ An example is the Australian FoodSwitch app, which uses a smartphone camera to scan the barcode of a food item, and recommends healthier alternatives from a crowd-sourced database of nutritional information.⁴⁴⁰

Several smartphone functionalities could be valuable for improving health, including the recording and analysis of data from sensors measuring activity or biological variables; access to health information via the internet; and the ability to engage with social media campaigns on lifestyle change.⁴⁴¹ Increasingly, people can access elements of their electronic health records via their smartphone or other portable device, providing an important opportunity for partnership between patients and health professionals, and for empowerment of patients to be more involved in decisions about their health care. However, because smartphones are more expensive than basic mobile phones and require an internet or data connection, text messaging might be required to reach the wider population in some lowincome settings.442

To date, most studies using mHealth to promote healthy behaviours have recruited from the general population. Increasing numbers of individuals with severe mental illness also want to use technology to manage their health.443 Although few evaluations of mHealth for physical health in mental illness have been done, emerging evidence indicates that online peersupport platforms, smartphone apps, and fitness trackers can successfully increase walking and physical activity in people with severe mental illness.^{381,444,445} Furthermore, a review of digital health technologies for people with depression⁴⁴⁶ found that online lifestyle interventions can have positive effects on various health behaviours, including alcohol use, sleep, and physical activity. Although the evidence is only preliminary, mHealth is a promising route towards reducing physical health disparities for people with mental illness globally, and further research is warranted (figure 1). Widespread adoption of mHealth will depend not only on technological advances, but also on rigorous evaluation of digital health interventions and overcoming of common limitations, such as consumer perceptions (particularly around safety, reliability, and trustworthiness) and ethical risks, such as the potential for intrusion, coercion, and data privacy breaches.408,447

Who is responsible?

To turn ideas into actions, governments, health commissioners, and care providers must acknowledge their respective responsibilities for improving physical health for people with mental illness, and clear accountabilities must be established. For instance, primary prevention is often regarded as the duty of governments, rather than health services.448 The increased risk for physical disease among people with mental illness, which can be present even before the first diagnosis of mental illness, could represent a failure at the public health level, and perhaps even wilful abandonment of educational and health promotion initiatives to reach this marginalised group. However, socioenvironmental factors that contribute to poor physical health, such as a shortage of green spaces and walking routes, the affordability and accessibility of fast foods compared with healthy foods, and tobacco and alcohol advertising (and associated legislation), are all areas that could feasibly be targeted by local and national health policy to improve the physical health of people with mental illness.

Furthermore, increasing evidence suggests that obesity,^{49,450} smoking,^{451,452} and physical inactivity^{453,454} are dual risk factors for both chronic physical conditions and mental illnesses. Because these risk factors are also associated with social deprivation,^{182,455} greater investment in public health schemes and policy to proactively address them in at-risk groups, particularly in young people, could potentially reduce the incidence of both physical and mental illnesses. However, the effectiveness of such schemes has yet to be demonstrated, and should be considered a promising area for future research (figure 1).

The risk of physical disease in people with mental illness is further compounded by barriers to health care

at the personal, service, and social levels for this population. As a priority action, governments must address the inequalities in health insurance and access to care for people with mental illness, to provide a suitable environment for effective medical and lifestyle interventions. Additionally, health commissioners must acknowledge the shortage of resources allocated to the protection of cardiometabolic health in mental health services, and the broad neglect of physical health risks in the treatment of mental illness.

Clinical staff should also reflect on the duty of care that they have to people with mental illness, both at an individual level and through their national associations. Given the foreseeable nature of poor physical health outcomes, protecting the physical health of people receiving treatment for mental illness should be regarded as within the scope of clinical duty of care. Within sufficiently resourced settings, this duty of care must include: (1) measuring and addressing the physical health of the patient; (2) clearly explaining the risks associated with treatment; and (3) taking appropriate action to mitigate those risks and protect the physical health of the patient. As demonstrated in this Commission, and evidenced in guidelines (appendix pp 35-42), good clinical practice in mental health care is increasingly considered to include monitoring the physical health of service users.

The allocation of research funding is another pathway through which systemic discrimination affects the health and wellbeing of people with mental illness. Major research councils must aim to provide more funding to address the physical health disparities that affect people with mental illness. As a solely economic justification, the allocation of resources should at least correspond with the demonstrated financial cost of physical and mental comorbidities (see panel 2). This economic burden must also be considered alongside the unresolved (and worsening^{3,21-23}) personal burden of comorbid physical diseases that disproportionately affect people with mental illness across the entire life course. Substantial research investment in this area is now required to eliminate physical health inequalities, and to develop novel methods that will prevent these disparities from arising in future generations.

Conclusion

Large disparities in physical health for those with mental illness are an ongoing health issue, and might even be worsening in some regions. Although this inequity is increasingly gaining attention, further investment, intervention, and research are urgently required to address the premature mortality and lifelong burden of poor physical health associated with mental illness.

Nonetheless, our Commission takes an optimistic approach, and describes how disparities could be reduced through evidence-based prescribing and better integration of physical and mental health care. Our priority actions for health policy, clinical services, and future research are presented in figure 1. Promisingly, multiple national and international guidelines now present feasible actions for improving the integration of physical and mental health, across various health and social care settings. Broader implementation of lifestyle interventions for mental illness is also required to reduce elevated cardiometabolic risk and attenuate medication side-effects. Whenever possible, interventions should maintain the core principles of evidence-based lifestyle programmes (such as the DPP) and be made accessible to those who do not have current physical comorbidities, with the aim of protecting cardiometabolic health from the earliest stages of mental health treatment. From a public health perspective, further exploration of population-scale strategies for primary prevention of co-occurring physical and mental disorders is warranted. Additionally, more government action is required to prevent discrimination and ensure equitable access to all aspects of health care for those with mental illness. Overall, protecting the physical health of people with mental illness should be considered an international priority for reducing the personal, social, and economic burden of mental health conditions.

Contributors

The Commission consisted of five independent parts to which authors were assigned as lead authors or co-authors. NS was the lead author for Part 1. AK was the lead author for Part 2. DSi was the lead author for Part 3. SR was the lead author for Part 4. CG was the lead author for Part 5. Co-authors for each part are detailed in the appendix, and all authors contributed equally to the writing of their respective sections. All authors have approved the final versions.

Declaration of interests

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