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## Curtailing the communicability of psychiatric disorders

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## Abstract

Although psychiatric disorders are classified as non-communicable diseases, we believe this classification is too rigid and limiting. We present evidence of the communicability of psychiatric

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Contributors

MLW conceived the manuscript idea and further developed it with FC and LG. LH did the initial literature search, and along with MLW, drafted the outline and partial manuscript. All authors contributed with their own references and written sections, and participated in revising and editing the manuscript.

Declaration of interests

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disorders through three major pathways: infectious and ecological, familial, and sociocultural communicability. Successful strategies developed to control the spread of communicable infectious diseases are relevant to curtailing the communicability of psychiatric disorders, thereby reducing their burden. Current interventions and policies that conceptualise psychiatric illnesses as non-communicable mostly focus on the individual. By applying strategies from infectious disease and chronic illness prevention models within a socioecological framework, we posit a broad communicable chronic disease psychiatric illness control plan for effectively treating the patient with the psychiatric disorder (host) as early as possible, providing benefits to their family and the community, and preventing transmission to others.

## Introduction

WHO defines communicable diseases as those caused by infectious agents or their toxic products directly or indirectly transmitted from person to person, from animal to person, and from the environment to person (eg, through food, air, water, body fluids).<sup>1</sup> We believe that well established strategies developed to contain the spread of infectious diseases could be successfully applied to other illnesses that are transmitted from one person to another (either directly or through the indirect pathways noted above).

This Personal View examines how substance use and other mental health illnesses can be communicated through three major pathways.

## Evidence for the communicable nature of psychiatric disorders

### Infectious and ecological communicability

Pathogens and microorganisms that invade the brain can directly affect organ function, causing delirium, psychosis, mania, and depression.<sup>2–5</sup>

The brain–gut axis and the microbiome can interfere with fermentation processes in the intestinal flora that produce fatty acids such as butyrate, which is a neuropsychiatric regulator.<sup>6</sup> Shifts in the gut microbiome, due to changes in diet or as a response to stress,<sup>7</sup> can manifest as depression<sup>8</sup> and post-traumatic stress disorder.<sup>9</sup>

Exposure to environmental factors such as toxins (eg, lead, tobacco) or contaminated water sources put children at an increased risk of later developmental and psychiatric disorders.<sup>10</sup> Urbanicity is associated with an increased risk of psychosis, possibly related to individual-level environmental exposure to cannabis use, social adversity, exclusion, and discrimination.<sup>11</sup> Similar to man-made disasters,<sup>11,12</sup> natural disasters are associated with psychiatric illness, including depressive, anxiety, and post-traumatic stress disorders.<sup>12</sup>

### Familial communicability

Risks associated with having family members with psychiatric illness are multifaceted, including genetic, behavioural, prenatal and perinatal, and developmental pathways.

Whereas low-prevalence disorders such as schizophrenia (1–3% prevalence worldwide) and autism (1–2% prevalence) are highly heritable (0·70 heritability for schizophrenia<sup>13</sup> and

0·64–0·91 for autism<sup>14</sup>), more common disorders such as depression (4·67% prevalence) and anxiety (7·30% prevalence) have lower heritability (0·37–0·67 for depression and 0·32–0·49 for anxiety<sup>15</sup>). Substance use disorders have a worldwide prevalence of 6·8% and an estimated heritability as high as 0·50.<sup>16</sup> The established genetic basis of most psychiatric disorders<sup>17</sup> cannot explain the increased prevalence of psychiatric disorders among family members with no genetic relationship, such as spouses, and it cannot explain the adverse effects of psychiatric disorders on family members who do not have psychiatric illness.<sup>18</sup>

Assortative mating is the non-random mating pattern of people with specific attributes. This mating pattern might augment existing shared traits, behaviours, and life circumstances, which can explain why psychiatric disorders are highly heritable when they are associated with reduced fecundity, why some disorders are more highly heritable than others, and the genetic comorbidity across psychiatric disorders.<sup>19</sup> Assortative mating between people with psychiatric illness could lead to increased communicability within families through both genetic and nurturing influences.<sup>20</sup>

Perinatal and parenting-related patterns also have a role in familial communicability. A psychiatric disorder within a family is associated with poorer mental health in offspring than in families who do not have a psychiatric disorder. Aside from genetics, this association could be attributed to exposure to stress at multiple levels<sup>21</sup> (ie, biological, behavioural, socioeconomic) during developmentally formative years. In addition, maternal depression is associated with adverse outcomes in the fetus, infant, and child.<sup>22,23</sup> Brain development begins in utero, and is influenced by maternal stress, anxiety and depression, and the toxic effects of alcohol and other substances, which all have negative effects on neurodevelopment.<sup>22,24–26</sup> Postnatal maternal anxiety and depression affect early development and mental health, possibly through changes in maternal behaviours such as caressing the infant<sup>27</sup> and provision of support<sup>28</sup>—crucial factors in the development of stress and emotion regulation systems during infancy. Maternal depression, anxiety, and stress are shown to be bidirectionally associated with offspring depression and experiences of stress.<sup>29</sup> Symptoms of post-traumatic distress have been shown to affect the psychiatric disorders of those close to the patient with post-traumatic distress.<sup>30</sup> Both maternal stress specifically, and parental psychopathology generally, have been shown to be associated with the psychiatric health of children.<sup>31,32</sup> Living with a relative with a psychiatric disorder as a young child can be an adverse childhood event.<sup>33</sup> Substance use disorders are a powerful risk factor for household dysfunction, abuse and neglect, and placement into alternative living arrangements such as foster care.<sup>33</sup>

Epigenetic patterns are caused by molecular alterations (eg, DNA methylation, microRNA expression, and histone modifications) that can turn genes on or off selectively. They change in association with stress and the family nurturing environment<sup>34–36</sup>. Altered epigenetic regulation can explain some of the intergenerational and intrafamilial correlation, including endocrine and brain development. Alterations of gene expression due to stress exposure can also contribute to clustering of psychiatric illness, termed transgenerational epigenetic inheritance,<sup>34</sup> and can begin during intrauterine development, emphasising once more the crucial role of mothers in the communicability of psychiatric diseases. A 9-year follow-up study of a birth cohort in 20 large American cities (n=2420) showed that children with father

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loss have significant epigenetic changes—shorter telomeres. Paternal death had the largest association with shorter telomeres; interestingly, when fathers were lost due to separation or divorce, loss of telomere length was greatly mediated by loss of income. However, loss of income had a less substantial contribution to loss of telomere length when fathers were lost due to death or incarceration, emphasising the role of fathers beyond provision of tangible goods and the strong negative effects of parental incarceration.<sup>37</sup>

### Sociocultural communicability

In addition to the well described social determinants, including social inequities, ongoing racism, discrimination, and physical health disparities,<sup>38,39</sup> psychiatric illnesses show a pattern of transmission within cultures<sup>40</sup> and social networks,<sup>41</sup> particularly in young people.<sup>42</sup>

Poverty, famine, social disadvantage, and structural discrimination are common risk factors for psychiatric illness.<sup>10,38</sup> Natural<sup>12</sup> and man-made disasters increase the prevalence of psychiatric illness and can have long-term and intergenerational effects. Many so-called epidemics of psychiatric illness have been recorded in areas afflicted by ongoing armed conflict and forced migration,<sup>43</sup> terrorist attacks,<sup>44</sup> and financial crises.<sup>45</sup> Rape, female genital mutilation, societal restrictions, and violence directed at girls and women are associated with adverse psychiatric consequences.<sup>46,47</sup> Among the lesbian, gay, bisexual, and transgender (LGBT) population, prejudice and stigma—from self, family, and community institutions, in addition to discrimination, childhood abuse, sexual victimisation, and harsh criminal prosecution—might account for some of the enhanced risk for poor mental health.<sup>48–52</sup> Indeed, any minority identity—eg, historically colonised Indigenous populations—can have a heightened risk of collective generational and lifespan traumas, increased vulnerability to multiple lifetime disorders (through pathways of childhood adversity and negative family environments), and collective generational adversity.<sup>39</sup>

Substance use disorders are the most prevalent and burdensome example<sup>53</sup> of a psychiatric disorder arising from institutional culture, with both a familial<sup>54</sup> and a social pattern of communicability, particularly when use occurs as part of the institutional culture observed in correctional facilities, schools, and colleges.<sup>55</sup> The diversity of pathways in the initiation of so-called gateway substances (ie, tobacco, alcohol, cannabis) and how this initial substance use can progress to use of other illicit drugs provides evidence for communicability.<sup>56</sup>

Suicide clusters<sup>57</sup> have been described in various institutional and community contexts, suggesting a substantial social contagion effect, particularly in young people.<sup>42</sup> Proposed underlying mechanisms have included direct transmission, imitation, common context, and affiliation.<sup>57</sup> Mass psychogenic illness has been reported globally from North America<sup>58</sup> to Africa<sup>59</sup> and southeast Asia.<sup>60</sup> Symptoms are often attributed to witchcraft<sup>61</sup> or environmental toxicity,<sup>58</sup> but can be evoked in psychology laboratory settings.<sup>62</sup> Culture-bound syndromes, such as koro (an anxiety disorder associated with the fear that one's genitals are shrinking), also appear in clusters, suggesting transmission.<sup>40</sup>

## Addressing the communicability of psychiatric illness

We believe that successful strategies developed to control the spread of communicable infectious diseases are relevant to curtailing the communicability of psychiatric disorders, thereby reducing their burden. Interventions and policies that conceptualise psychiatric illnesses as non-communicable mostly focus on the individual. By applying strategies from infectious disease<sup>63</sup> and chronic illness prevention models<sup>64</sup> within a socioecological framework,<sup>65</sup> we suggest a broad communicable chronic disease psychiatric illness control plan (figure) to effectively treat the psychiatric patient (host) as early as possible and prevent transmission to others.

### At the individual level

Undiagnosed patients with psychiatric disorders, and patients at risk of these disorders, should be identified by integrating routine (self-administered or easy to administer), state-of-the-art, multilevel validated screenings (including household assessments and, eventually, biological testing) into primary care and the community, through public health strategies across urban, suburban, and rural settings.

Linking to care, and treating and retaining in care, patients who have a positive screen for psychiatric illness should be prioritised, as is facilitating adherence to maximise treatment outcomes, reduce disability, and prevent further transmission by using evidence-informed treatment as prevention.

### At the family level

Intervention and prevention strategies should be developed, targeting people at a high-risk of developing psychiatric disorders, including first-degree relatives and household members of patients with psychiatric illness.

Intervention and prevention strategies targeting those whose psychiatric disorders will impact others, including parents and other caregivers of children, should be implemented. Keeping such people free of, or in remission from, psychiatric disorders can be expected to reduce the risk of communicability.

### At the community and systems level

Awareness and prevention strategies should be promoted, within and beyond the health system, including overall communities and their specific constituents: families, schools, hospitals, churches, jails, and the armed forces. Structural interventions to maximise salutary psychiatric outcomes should be applied, including psychosocial support, prevention of interpersonal violence, discrimination, bullying, and traumatic brain injuries, organisation of community youth activities, and implementation of effective alcohol and substance misuse policies. Such interventions would increase knowledge, reduce incidence and burden, decrease stigma and social isolation, reduce barriers to care, and, for individuals with the most severe psychiatric disorders, provide opportunities for employment and housing.

Surveillance, identification, and early intervention should be prioritised for specific communities at a high risk of developing psychiatric disorders. Communities that would

benefit from this strategy include conflict zones, high crime and low-resourced neighbourhoods, areas affected by natural disasters and those affected by epidemics of substance use, psychogenic illness, and suicide cluster incidence.

This novel framework applies successful strategies developed to control the spread of communicable infectious diseases to curtail the communicability of psychiatric disorders and reduce their burden. Implementing multiple interventions—some of them already in use—within public systems of care, would offer an efficient way of utilising resources, particularly important in low-resource settings, to reduce the communicability and chronic occurrence of psychiatric disorders. Although a few countries have recognised the need to scale up mental health services using some of these strategies for various disorders,<sup>66–68</sup> and some funding agencies have allocated monies to address the global mental health treatment gap,<sup>69</sup> the comprehensive approach described here is yet to be implemented. An ongoing hybrid cost-effectiveness and implementation scale-up study in Mozambique will provide evidence regarding this framework (NCT03610750).

Even though psychiatric disorders are the leading cause of years lost to disability globally<sup>70</sup> and are estimated to account for more than half of the projected total economic burden from non-communicable diseases by 2030,<sup>71</sup> on average, only 0·5% (in low-income and middle-income countries) to 5·1% (in high-income countries) of national health-care budgets have been devoted to mental health disorders.<sup>72</sup> In contrast, low-income and middle-income countries affected by the HIV epidemic have instituted multiple approaches to eradicate this epidemic, combining local and global funding. Global funding for infectious diseases and non-psychiatric non-communicable diseases are, respectively, 17 times and four times higher than funds targeted to mental health disorders.<sup>73,74</sup> Classifying diseases as either communicable or non-communicable might create conceptual barriers to effective public health strategies and skew funding priorities. The little funding available for psychiatric illness typically facilitates intervention at the individual level. Funding for interventions at the family level, to address the communicability embedded in the mother-child dyad, should target integration of psychiatric services into care for women and children<sup>63</sup> as a feasible, cost-effective way of delivering services and curtailing communicability. Substance misuse and domestic violence would be other important targets of intervention at the family level. Community gateways, such as schools and primary care with community health workers, family-oriented centres and associations, and hospitals, should have staff trained in the delivery of family-level and community-level strategies, enlisting medical, psychiatric, and social welfare professionals, along with community and social leaders. Policy reform and collaboration with governments and legal systems are needed to implement this framework. A shift from a purely non-communicable disease approach, to incorporating communicable disease strategies for psychiatric illnesses would enable families, networks, and communities to mobilise resources and integrate treatment into care systems aimed at psychiatric illness awareness and prevention.

One of the arguments against developing a stronger focus on expanding efforts to treat mental illnesses in resource-limited environments is that health-care systems are already overburdened and imposing additional tasks is unrealistic, especially without an expansion of the health-care workforce. However, we believe that our approach will lessen the burden

on the health-care system. The communicable chronic disease psychiatric illness control plan must first be reviewed to determine where it will be implemented, who will be responsible for each phase, and the best methods to train those who will carry it out and monitor and sustain its implementation.

The brain and the body function as an integrated system, but the care system for conditions affecting the brain and body usually operates in silos. Stigma about mental illness, which pervades the education of all health-care providers, creates the belief that treating mental illnesses can be avoided through triage to specialists. In practice, people with common mental health disorders routinely present to medical providers with somatic complaints such as those seen in anxiety disorders (eg, palpitations, shortness of breath, gastrointestinal problems) and depressive disorders (eg, fatigue and pain). Failure to diagnose and treat psychiatric disorders results in multiple futile medical visits. Recognising that the brain and the body are one system, and that diseases can be both chronic and communicable, creates the unity we need to better improve the health of all populations.

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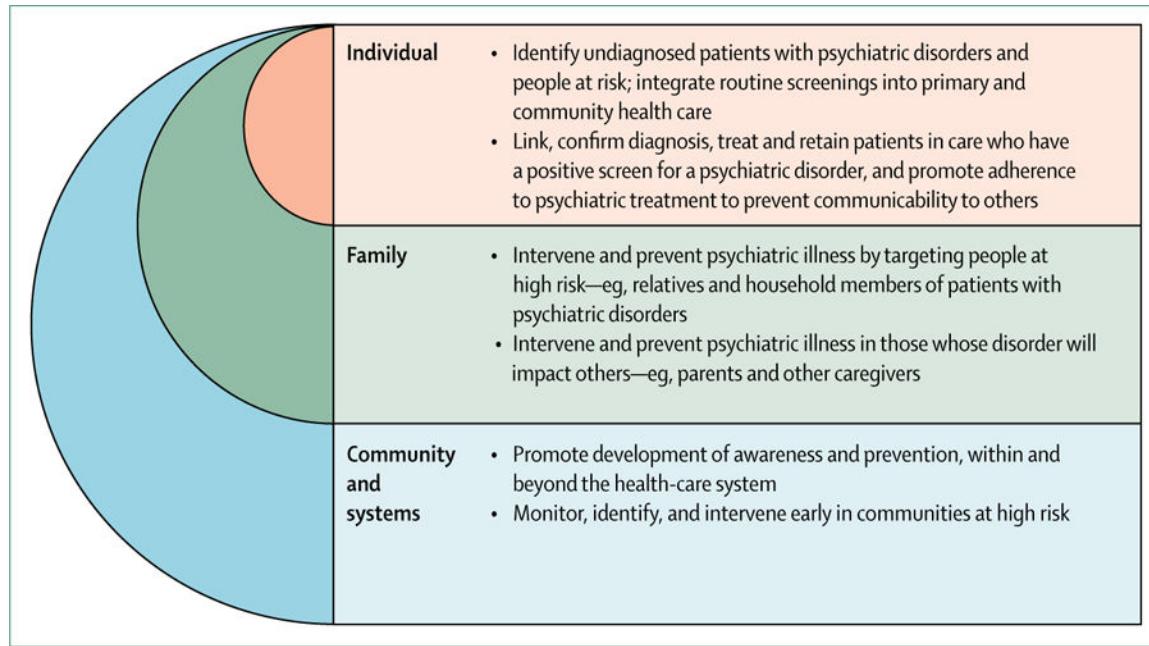
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**Figure:**  
Communicable chronic disease psychiatric illness control plan