Schizophrenia Bulletin vol. 49 no. 4 pp. 851–866, 2023
https://doi.org/10.1093/schbul/sbad024
Advance Access publication 6 April 2023

INVITED THEMED ARTICLE

Review of Major Social Determinants of Health in Schizophrenia-Spectrum Disorders: II. Assessments

Emily T. Sturm[1], Michael L. Thomas[*,1], Anastasia G. Sares[1], Subodh Dave[2], David Baron[3], Michael T. Compton[4], Barton W. Palmer[5,6], Dylan J. Jester[5], and Dilip V. Jeste[7]

[1]Department of Psychology, Colorado State University, Fort Collins, CO, USA; [2]Royal College of Psychiatrists, London, UK; [3]Western University of Health Sciences, CA, USA; [4]Department of Psychiatry, Columbia University Vagelos College of Physicians & Surgeons, and New York State Psychiatric Institute, New York, NY, USA; [5]Department of Psychiatry, University of California, San Diego, CA, USA; [6]Veterans Affairs San Diego Healthcare System, Mental Illness Research, Education, and Clinical Center, San Diego, CA, USA[7] Department of Psychiatry, University of California, San Diego, CA, USA (Retired)

*To whom correspondence should be addressed; 1876 Campus Delivery, Colorado State University, Fort Collins, CO 80523-1876, USA; tel: (970) 491-6820; e-mail: Michael.L.Thomas@colostate.edu

***Background and Aims*: Social determinants of health (SDoHs) impact the development and course of schizophrenia-spectrum psychotic disorders (SSPDs). Yet, we found no published scholarly reviews of psychometric properties and pragmatic utility of SDoH assessments among people with SSPDs. We aim to review those aspects of SDoH assessments. *Study Design*: PsychInfo, PubMed, and Google Scholar databases were examined to obtain data on reliability, validity, administration process, strengths, and limitations of the measures for SDoHs identified in a paired scoping review. *Study Results*: SDoHs were assessed using different approaches including self-reports, interviews, rating scales, and review of public databases. Of the major SDoHs, early-life adversities, social disconnection, racism, social fragmentation, and food insecurity had measures with satisfactory psychometric properties. Internal consistency reliabilities—evaluated in the general population for 13 measures of early-life adversities, social disconnection, racism, social fragmentation, and food insecurity—ranged from poor to excellent (0.68–0.96). The number of items varied from 1 to more than 100 and administration time ranged from less than 5 minutes to over an hour. Measures of urbanicity, low socioeconomic status, immigration status, homelessness/housing instability, and incarceration were based on public records or targeted sampling. *Conclusions*: Although the reported assessments of SDoHs show promise, there is a need to develop and test brief but validated screening measures suitable for clinical application. Novel assessment tools, including objective assessments at individual and community levels utilizing new technology, and sophisticated psychometric evaluations for reliability, validity, and sensitivity to change with effective interventions are recommended, and suggestions for training curricula are offered.**

Keywords: early-life adversity/food insecurity/social connections/racism/socioeconomic status

Introduction

External conditions such as the quality of the places where a person lives, learns, works, and interacts socially are considered social determinants of health (SDoHs).[1–4] SDoHs impact physical, cognitive, and mental health, quality-of-life, daily functioning, and longevity.[5] Both episodic and enduring environmental experiences play an important role in the integrated model of well-being in schizophrenia.[6] SDoHs may contribute to the initial development of schizophrenia-spectrum psychotic disorders (SSPD),[7] and/or worse course and outcomes of the illness[8] and greater medical comorbidity, which may result in premature mortality.[9,10]

In a paired scoping review, that precedes this article in the current Section on SDoHs in SSPD, we identified 9 SDoHs as reasonably well-studied major factors relevant to clinical outcomes in patients with SSPD: early-life adversities, social disconnection, racism, disadvantaged neighborhood (urbanicity and lower socioeconomic

© The Author(s) 2023. Published by Oxford University Press on behalf of the Maryland Psychiatric Research Center. All rights reserved. For permissions, please email: journals.permissions@oup.com

status), migration, social fragmentation, homelessness/housing instability, food insecurity, and incarceration.[11] These factors were associated with a greater risk of a diagnosis of SSPD and/or more severe illness. A critical issue in studies of SDoHs relates to the methods of their assessments.[12,13] While published studies and reviews of SDoHs include a discussion of measurement of specific SDoHs,[3,14–23] we did not find a review of the psychometric quality and practical clinical utility of these measures in people with SSPD. Assessments of seriously mentally ill individuals involve special challenges,[24] including cognitive impairment, delusions, or hallucinations that interfere with the validity of responses, and apathy that reduces motivation. Our aims for this review were to examine the psychometric properties (reliability and validity) and clinical utility (constructs measured, number of items, time required for administration, and developmental timeframe [ie, length of time period to which the measure refers]) of measures used to assess SDoHs in persons with SSPD and to provide recommendations for clinical care, research, and training.

Methods

We first systematically identified all the SDoH measures used in the studies that were identified in meta-analyses and systematic reviews covered in a paired scoping review by Jester et al.[11] By "measures," we broadly refer to any data that can form a variable that characterizes individual, group, or other differences in an SDoH. Next, relevant data were extracted from each article that included a specific measure of each SDoH, focusing on format of the measure, construct assessed, reliability, validity, number of items, number of Likert scale options (if applicable), time required, and developmental timeframe. Considering the diverse range of measures included in this review, and because not all of the articles reviewed included each of these data points, secondary nonsystematic reviews were conducted, as needed, on PubMed, PsycInfo, and Google Scholar using each measure name (eg, "childhood trauma questionnaire," "experience of discrimination") and characteristic (eg, "reliability," "validity") until we could identify reliability, validity, number of items, Likert scaling (if applicable), time required, and developmental timeframe. Nonsystematic secondary reviews were used because it is not feasible to systematically review every measure of each SDoH domain within a single paper; however, the systematic approach was needed to determine which measures were used most commonly in the literature included in the selected umbrella reviews. In the main text, we report data on both psychometric properties (reliability, validity) and clinical utility (construct measured, developmental timeframe, time required) for the most commonly used measures from the articles identified from meta-analysis or systematic reviews, within each domain. In the supplementary material, we report data on clinical utility (construct measured, developmental timeframe, time required) for all the measures employed in the various studies.

Results

Table 1 summarizes characteristics of the selected measures for each of the 9 SDoHs. An expanded version of this table containing all the named measures from the reviewed articles is reported in the supplementary material.

1. Early-life adversities

Of the 19 measures used for investigating early-life adversities, 14 were self-report-based questionnaires, 4 were interviews, and others utilized public or medical records (see supplementary table 1). A majority of these were study-specific questionnaires (ie, questions developed specifically for a particular study). The number of items varied from 1 to 70, and administration time ranged from less 5 minutes to over 15 minutes (see table 1).

The Childhood Trauma Questionnaire (CTQ) was the single most commonly used measure. The CTQ is a 70-item questionnaire in its original form, but there is also a 28-item version and also a 21-item version (developed when the goal is to avoid exposing young children to explicit material in questions).[40,45] Additionally, the CTQ has been translated into multiple languages. Clinical and nonclinical samples have been used in studies of its reliability and validity. The measure has good reliability and its validity[169] is broadly supported but there is lack of research in cross-cultural samples.[45]

Clinical interviews were also used to evaluate early childhood adversities, specifically relying on questions from post-traumatic stress disorder modules or modifications within the schizophrenia modules from structured clinical interviews (see table 1). Other approaches included evaluation of medical and public records such as police records (eg, reports of domestic violence and assault), records from services related to trauma such as victim centers, and hospital records.[25,53–55]

2. Social disconnection

Of the 12 social disconnection measures reviewed, 2 were self-report questionnaires and 10 were interviews (see supplementary table 1). The 2 most commonly used measures of social disconnection were the Social Network Schedule (SNS)[76] and the WHO Quality of Life (WHOQOL)—Social Relationships questionnaire (see table 1).

The most commonly used interview within this domain was the SNS,[76] which is available in both English and Spanish. The SNS was developed with a population of long-stay psychiatric patients. Patients are asked to identify the people they have had contact with over an extended period of time and then assess the quality of each relationship mentioned.[76] The inter-rater

Table 1. Psychometric Properties of Selected Measures

Instrument	Constructs Measured	Reliability	Validity	# Items	Likert Scoring	Time Required (in Minutes)	Developmental Timeframe
Early-life adversities							
Questionnaires							
Short questionnaires[25–39]	NF	NF	NF	2–7	Yes/no	NA	Childhood (<18 years old)
Childhood Trauma Questionnaire (CTQ)[a40–44]	Physical and emotional neglect/abuse	SF = strong internal consistency (see review[45])	SF = strong structural and content (see review[45])	70 28 (SF) 21 (nonexplicit)	5-Point	15 5 (SF)[46]	Lifetime
Interviews							
Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS)[39,47]	Physical abuse, sexual abuse, and domestic violence	Unknown for modified use	Unknown for modified use	NF	NA	NF	Childhood or lifetime
Bullying and Friendship Interview Schedule (BFIS)[38,48,49]	Bullying/social support	Cronbach's αs = 0.62–0.77[50–52]	Predictive (victimization) in elementary school and middle school	12	4-Point	NF	Past 6 months, 8, 10, or 13 years old
Medical or public records[25,53–56]	Physical abuse, sexual abuse, parental loss, divorce, use of childhood protective services	NA	NA	NA	NA	NA	<16, <24, and 14–24 years old
Limited social network							
Questionnaires							
WHO Quality of Life-Social Relationships[a57–70]	Network size	Cronbach's αs = 0.82–0.92[71] Test-retest r = 0.68–0.95[71,72]	Good convergent and discriminant[71,72]	100 36 (SF) 16 (screener)	7-Point	<40–90	Current
Interview							
Social Network Schedule (SNS)[73–75]	Network size and quality of relationships	Inter-rater r = 0.94–0.9932	Good convergent[76]	3 + 6 follow-up questions for each individual in network	NA	30	Current
Racism							
Questionnaires							
Study-specific questionnaires[77–84]							
Experience of Discrimination (EOD)[77,85–87]	Perceived racial discrimination	Cronbach's αs ≥0.74 Test-retest r = 0.70[88]	Best convergent compared to other measures[85]	9+ frequency	NA	NF	Lifetime
Everyday Discrimination Scale-Lifetime Discrimination Subscale (EDS)[77,89,90]	lifetime discrimination, recent discrimination, everyday mistreatment	Cronbach's αs = 0.63–0.88[90] Older African Americans (0.44–0.80)[91] Latinx (0.91)[92] Asian Americans (0.91))[89]	Good convergent	9+ follow-up questions	5-, 4-point	NF	Past year and lifetime

Table 1. Continued

Instrument	Constructs Measured	Reliability	Validity	# Items	Likert Scoring	Time Required (in Minutes)	Developmental Timeframe
Urbanicity and socioeconomic status							
Geographical location of address[93–100]	Population density of home location	NA	NA	NA	NA	NA	Current
Census data[98,99,101,102]	Material deprivation (assessed via components of census data such as unemployment, poverty, housing quality, etc.)	NA	NA	NA	NA	NA	Current
Immigration							
Hospital records[103–114]	Country of birth/current residence	NA	NA	NA	NA	NA	Birth/current
Census/national registry[79,106,108,115–138]							
Self-report[99,104,123,124,139–146]	Immigration status	NA	NA	NA	NA	NA	Birth/current
Interview[106,114,147–149]	First-/second-generation status	NA	NA	NA	NA	NA	Birth/current/parents
Social fragmentation							
Census data							
Social Fragmentation Index (SFI)[150]	Social fragmentation assessed via combination of homeownership, mobility, marital status, nonfamily households, single-person households, children, immigrants, non-English/Maori speakers, and long-term residents	Cronbach's αs = 0.73[150]	Moderate convergent[150]	NA	NA	NA	Current
Homelessness or housing instability							
Interview[151–153]	Housing instability	NA	NA	NA	NA	NA	Current
Food insecurity							
Interview							
USDA Household Food Security Survey (USDA-HFSS)[154–157]	Food security	Cronbach's αs = 0.73–0.95 Test-retest r = 0.75[158]	Evidence supports structural and convergent[158]	18 6 (SF)	NF	NF	1 year
Proxy							
Poverty, height/weight, iodine deficiency, low birthweight[159–163]	Nutritional availability	NA	NA	NA	NA	NA	NA
Incarceration							
Sampling method[164–168]	Incarceration	NA	NA	NA	NA	NA	Current
Public records[167,168]	History of incarceration	NA	NA	NA	NA	NA	Lifetime

Note: a, adapted; aka, also known as; avg., average; hr., hour; m, modified; min., minutes; NA, not applicable; NF, not found; SF, short form; SMI, severe mental illness; WHO, World Health Organization.
[a]Tested in samples other than healthy controls.

reliability for the SNS is generally excellent for the English language version. In a Spanish-language study the test-retest reliability was mostly acceptable.[76,170] A recent review cited the SNS as the best combination of practicality and accuracy among measures of social network.[171]

The most commonly used self-report-based tool within this domain was the WHOQOL Social Relationships questionnaire, which is available in multiple languages. The measure was developed from 15 international field centers simultaneously.[57] Test-retest reliability is generally adequate to excellent, and internal consistency reliability is generally good to excellent (see table 1). The WHOQOL also has well-established convergent and discriminant validity.

3. Racism

All 7 of the racism measures reviewed were self-report questionnaires to evaluate experiences with racism (ie, discrimination on the basis of race or ethnicity) (see supplementary table 1). The 3 most commonly used tools were study-specific questionnaires, the Experience of Discrimination questionnaire (EOD),[77,85–87] and the Everyday Discrimination Scale-Lifetime Discrimination Subscale (EDS) (see table 1).[77,89,90] The EOD and EDS contain 9 items each but differ in their follow-up questions regarding frequency as well as context and timeframe of events included. Both of these scales offer variable levels of resolution regarding types of discrimination (ie, racial vs. ethnic), frequency, and impact on daily life. Neither measure has been specifically validated in people with SSPD. The EOD has shown adequate reliability in a racially and ethnically diverse group of healthy individuals.[88] EDS scores have shown a range of reliability from poor to good when tested in populations of different ethnic and racial identities.

4. Disadvantaged neighborhoods (urbanicity and lower socioeconomic status)

Only geographical methods (eg, locations of addresses in city or rural areas) and census data were employed to measure urbanicity defined as a city or a part of a city (see supplementary table 1). Urbanicity was sometimes compared to rural areas nearby—using population or population density to divide the participants into urban/rural groups[93–95]—occasionally with an additional suburban category.[96–100] Given the nature of these measures, reliability and validity are often not considered in research. Socioeconomic status was measured at the neighborhood level in 4 articles used in the meta-analysis (see table 1). Each article had a slightly different combination of census questions included in the examination of socioeconomic status (eg, unemployment, housing quality, and poverty). Importantly, socioeconomic status was defined at either the individual-level or at the area-level.

5. Migration

There were 4 methods utilized to evaluate migrant status: hospital records, reviews of census-type demographic data (sometimes adjusting for potential under-reporting of migrant status), self-report questions about country of birth (written or verbally asked), or more extensive interviews (see supplementary table 1). The self-report question approach was mostly used when exploring first- and second-generation immigrant status since census data often do not include information about parents' country of birth (see table 1). Additionally, 1 article required staff of mental health facilities to report ethnicity or country of birth on behalf of the patient when severe mental illness hindered direct verbal communication.[103] Two studies mentioned the use of an interpreter when needed,[147,148] and one[147] collected a more detailed migration history including stress around the reasons for migration and level of competency in the interview language. Although convenience and face validity make the census-type review or self-report question approaches attractive, the reliability and validity of such measures are unknown.

6. Social fragmentation

One measure of social fragmentation was used in the papers reviewed: the Social Fragmentation Index (SFI).[150] The SFI is a neighborhood-based measure that uses commonly available census data that relate to social cohesion (eg, number of single-person households, number of single people, etc.) to assign values of social fragmentation to neighborhoods. SFI scores have shown adequate reliability.[150]

7. Homelessness or housing instability

No structured measures or questionnaires were used to assess homelessness in the articles used for meta-analyses about SSPD despite the existence of such measures mentioned below in the discussion (see supplementary table 1). Nearly every study of homeless populations recruited from places where people shelter or other places of service (such as meal providers). Investigators then used diagnostic clinical interviews to determine rates of SSPD. A small number of studies utilized interviews with demographic questions, including questions about homelessness, and a few assessed extended history of homelessness.[151–153]

8. Food insecurity

Of the 16 food insecurity measures reviewed, 8 were self-report questionnaires, and others employed proxies of food insecurity (see supplementary table 1). The most commonly used measures were the U.S. Department of Agriculture Household Food Security Survey Module (USDA-HFSS),[154–157] and proxies of food insecurity[159–163] (see table 1). The USDA-HFSS is also known as the Core Food Security Measurement

(CFSM)[172] and Current Population Survey (CPS) Food Security Supplement.[173] This measure can be administered in-person or via telephone interview and contains skip logic to reduce administration time. The USDA-HFSS has been investigated extensively in several languages.[158,174–177] In studies of SSPD, the USDA-HFSS has demonstrated good to excellent reliability.[178] A separate review of measures of food insecurity described the USDA-HFSS as one of the most highly validated and reliable measures available.[158]

Obtaining both individual- and area-level measures is useful to understand the broad undercurrents of SDoHs as they impact persons with SSPD. For example, food insecurity was sometimes evaluated through proxies such as income-level of country of residence,[162] height and weight of babies and children,[163] nutrition deficiencies,[163] poverty,[159,160] biological measurements, and survey questions.[161] Additionally, survey measures of food insecurity have been used for both screening/assessing individuals and gathering area-level data. These methods may be useful when other direct measures are not available, but they lack specificity.

9. Incarceration

As with homelessness, incarceration was assessed simply by recruiting individuals from incarcerated populations (see supplementary table 1). This often results in unisex samples from a single prison, often with heterogeneous criminal histories and sentence lengths. Some but not all studies collected criminal histories using self-report or criminal records. No standardized self-report or interview-based measures were used. Additionally, no data on reliability or validity were reported.

Discussion

The methods for assessing SDoHs were highly variable. Self-report was most common, followed by interview-based assessments, reviews of census-type data and other records, and targeted sampling methods (eg, recruiting from homeless shelters or prisons). Unsurprisingly, psychometric data on reliability and validity were often available for the first 2 types of assessment methods, but almost never for the last 2. Where reported, the psychometric quality of the tools generally ranged from adequate to excellent. Overall, our review paints an uneven picture of the quality of SDoH assessments in people with SSPD. Below we discuss assessments for each SDoH listed above, followed by limitations of this review and recommendations for next steps.

Early-Life Adversities

Early-life adversities had a relatively large number of measures that often-demonstrated good psychometric properties. The most common measure used was the CTQ, a reliable and valid measure of abuse and neglect experienced during childhood that exists in multiple languages. Reponses are collected via self-report. The briefest form can be completed in 5 minutes (compared to the original long form which can take 15 minutes). Additionally, the CTQ is readily available, unlike some similar measures of early-life adversities that are difficult to obtain.[169] The CTQ is a favorable option for both research assessments and clinical screenings; however, it restricts the broader construct of early-life adversities to abuse and neglect. Bullying is another topic of study within this SDoH, and there are several other constructs that were not discussed in the meta-analyses and umbrella reviews that formed the basis of our review[11] (eg, exposure to violence). Thus, it may be useful to consider more comprehensive measures such as the Adverse Childhood Experience (ACE) questionnaire[179] for more general assessment of adversities. The ACE is a 10-item self-report questionnaire that measures personal and family-related trauma that occurred before the age of 18.[180]

Another critical set of measures of childhood risk factors for SSPD includes pre-, peri-, and postnatal traumas of various types, based on hospital records and parental interviews, including poor maternal health and nutrition, parental psychopathology, and birth traumas. A recent analysis of SDoHs concluded that prenatal and perinatal complications were among the top 3 most important intermediary factors that link structural racism to outcomes in people with SSPD.[181] Targeting this category of SDoHs for early intervention and prevention could be highly effective as cost efficient.

Applying lessons learned from SDoH research enhances the role of clinicians from being only "interventionists" to also becoming "preventionists." For psychiatrists, this means not only treating patients but also becoming aware of (and addressing, if possible) the early-life adversities that children might be experiencing.

Social Disconnection

We found several self-report and interview-based measures of social disconnection that have good reliability and were developed and/or validated in seriously mentally ill populations. Of these, the SNS and WHOQOL Social Relationships questionnaire are excellent measures for obtaining interview- or self-reported social network size (respectively); however, additional qualities such as perceived support or participation in group membership would also be useful.[182] For more in-depth assessment, other tools are needed. The Inventory of Socially Supportive Behaviors is a 40-item self-report measure of social network size, quality, and types of support, and has good reliability and validity in the general population and should be included in future research in SSPD.[182]

Social Fragmentation

The SFI was the only measure used in the literature on this SDoH. Interestingly, it has high measurement quality but does not rely on self-report or interview-based data; instead, it relies on objective census data, which are not influenced by patients' mental states at the time of reporting. On the negative side, relying only on census-based measures may not be adequate in an individual patient context. Thus, self-report measures of social fragmentation (subjective experiences) should be added to objective community-level assessments. Social fragmentation at the school-level may be particularly important as it has been shown to partly explain the association between urban upbringing and onset of nonaffective psychotic disorders.[183,184] In addition to social fragmentation, neighborhood-level measures of social support should also be validated in people with SSPD in order to enrich the understanding of the possibly bidirectional relationship between symptoms of SSPD and social support. An example of such tools is the Social Cohesion Neighborhood Scale (SCNS), a 30-item survey with 4 items measuring social cohesion that ask whether people in the neighborhood are helpful, get along, can be trusted, and share the same values. The SCNS is currently being used in the Research All of Us initiative.[185,186]

Racism

Structural, institutional, and interpersonal racism are major causes of toxic stress and adverse socioeconomic consequences at a public health level for minoritized communities.[187] All of the measures of racism employed in the studies discussed above were based on individual experiences, and not on societal structure despite the existence of measures like redlining policies and the Institutional Racism subscale of the Index of Race-Related Stress.[77,188] Reviews of measures of perceptions of race/ethnicity-based discrimination already exist but they need to be tested in people with SSPD.[189] There is also a need to address other forms of harmful social discrimination in relation to psychosis, such as discrimination related to gender, sexuality, and aging. Measures for these experiences exist,[190–192] but have not been studied as well in persons with SSPD.

Migration

Studies of immigrants with SSPD routinely include questions about their country of birth; however, this may not provide enough detail to accurately characterize relationships between SSPD and migrant status. This review defined migration as any measure which attempted to quantify the geographic stability of individuals' home addresses across national borders. Measures of time spent in the new country, legal status, refugee status, first- versus second-generation immigrant status, and being expatriates were rarely included but should also be assessed. Internal migration (moving during childhood and adolescence) was not measured in any of the articles searched for measures despite being an important risk factor for nonaffective psychotic disorders.[193–196] Difference in the Gross Domestic Product (GDP) between birth and destination countries may also be considered, along with diplomatic relationships between the 2 countries as expressed by visa rules, presence of trade embargos, etc. Immigration within a country is often not considered despite the difficulties that may exist in moving from one culturally distinct region of a country to another. New technology-based geographical assessment methods, such as Global Positioning Systems (GPS), are available via smartphones and might be useful for measuring national migration statistics and could also be used to characterize an individual's experience with migration.[197] Intersectionality of gender and other cultural characteristics with immigration and refugee status are important considerations as well.[115,139] One study included a culturally sensitive clinical interview to address possible cultural confounds.[116] While migration is often associated with urbanicity, lower socioeconomic status, discrimination, and homelessness, these constructs should be measured separately as related but distinct factors contributing to neurological correlates.[198] Importantly, social, rather than physical qualities of environment could be more influential in the pathophysiology of SSPD. Growing up in poor cities does not confer the same risk for psychosis as growing up in poor neighborhoods after adjusting for potential confounders.[199]

In a third paired article that follows the SDH articles on Clinical Outcomes and Assessment, we address putative systemic pathophysiological processes (eg, epigenetics, alostatic load, accelerated aging with inflammation, and the microbiome) which have impacts on brain structures, brain function, neurochemistry, and neuroplasticity, leading to clinical outcomes in terms of development, severity, and course of SSPD.[200]

Homelessness (Housing Instability)

A lack of structured measures to assess housing instability in people with SSPD is an important limitation of studies of homelessness. The main approach employed in these reports consists of sampling methods seeking out people experiencing homelessness in shelters and utilizing services. Here, a clinical interview is conducted with participants experiencing homelessness, and the prevalence of SSPD is assessed in comparison to that in the general population or another cohort. Although informative, the sampling method for homelessness lacks reliability and validity information and can lead to varying results since no consensus definition of homelessness is employed. For example, many researchers do not include women living in battered women's shelters because they

are not identified as homeless, and these women do not see themselves as being homeless despite their housing instability.[151] In addition, homelessness is characterized by complex, multidimensional features such as duration (eg, no place to sleep for 1 night in the past 30 days vs majority of past 30 days)[201] and recency (eg, currently homeless vs having experienced homelessness in the last 30–90 days). Important clinical differences exist among persons with SSPD depending on how much time they have spent unhoused within recent years, suggesting a need for a history-taking approach as a compliment to the sampling method.[202,203] Migration should also be carefully considered when evaluating homelessness.[204] The Residential TimeLine Follow-Back Inventory is a promising measure that has been validated in psychiatric and nonpsychiatric populations of homeless individuals, but restricted to only a few longitudinal studies involving participants with SSPD.[205,206]

Food Insecurity

The USDA-HFSS is a well-validated self-report measure. However, 1 issue with such census-type questionnaires, whether used at the individual- or area-level is that they are often answered per household, making it difficult to assess which household members specifically experience significant stress directly associated with food insecurity. On the other hand, broader community-level aspects of food insecurity such as living in a food desert could be useful when investigating how food insecurity, housing instability, and structural racism interact as risk factors for SSPD.[207]

Incarceration

Challenges related to evaluating incarceration as an SDoH are similar to those for homelessness; instead of obtaining detailed histories or completing questionnaires, data are generally collected via sampling from a prison or a correctional institution. This leads to heterogeneity in the definition of incarceration, resulting in unaccounted-for differences among incarcerated persons in terms of lengths of their sentences, types of prison wards, etc. It would be useful to understand how the attitudes and behaviors that develop during incarceration interact with mental illness, especially openness to treatment. In this regard, the Structured Assessment of Correctional Adaptation (SACA) may be a useful tool.[208] The SACA is a structured interview that assesses 16 clinically relevant attitudes and behaviors related to incarceration, such as stigma and vigilance.[208]

Positive SDoHs

Positive SDoHs are markedly understudied. Future endeavors to measure positive SDoHs should expand upon existing assessments such as the APGAR instrument for family support.[209,210] There are numerous measures for assessing adult resiliency to childhood adversity (eg, Connor-Davidson Resilience Scale,[211] the Resilience Scale for Adults,[212] and Brief Resilience Scale[213]). Resilience has been linked to improved outcomes, especially in older patients.[214,215] Psychometrically, assessments on the "healthy" side of outcome distributions are often ignored in favor of those on the "unhealthy" side[216] despite factors like education,[217] nutrition,[218] instrumental support,[219] emotional support,[220] and active rather than avoidant coping styles,[221,222] being known to positively impact outcomes.[216] Measuring protective qualities of education presents particular challenges due to the possibility of masking quality of education by measuring only years of education and interaction with racial, ethnic, and gender identities.[223,224] Investigators need to intentionally evaluate positive and protective factors by adding appropriate tools to their clinical assessment battery.

Limitations of This Review

This review was restricted to assessments of the 9 major SDoHs in SSPD identified in our paired review.[11] It is not feasible to provide a systematic review of all possible SDoH measures used in SSPD research. Thus, 1 limitation is that our review necessarily omits work related to SDoHs and tools defined in ways that do not align with our methods. However, by conducting a high-level review of measures identified through meta-analyses and systematic reviews, this article highlights some of the more commonly reported measures and assessment methods published. Additionally, there is no unified SDoH framework in the field, making it difficult for clinicians to integrate SDoH concepts into their work,[225] and ultimately limiting the development of comprehensive assessment methods. Despite this, there have been attempts to create unified assessment tools such as the comprehensive but lengthy Accountable Health Communities Health-Related Social Needs Screening Tool,[226] NIH's PhenX Social Determinants of Health Assessments Collection,[227] and the HealthBegins Upstream Risks Screening Tool.[228]

Recommendations

Below we offer several recommendations for promoting meaningful research, clinical, educational, and public health practices and policies.

(1) *Definition of SDoHs*: It is important to create a consensus definition of major SDoH constructs. There is significant overlap among various fields and perspectives that relate to SDoHs, and increasing evidence linking SDoHs with a range of physical and mental health outcomes.[229] However, the translation of this evidence into clinical practice has been hampered by a lack of consensus definition of SDoH constructs or

even about the language or vocabulary used to discuss social determinants.

(2) *Quality of SDoH measures*: It is necessary is to promote development and testing of SDoH measures that are psychometrically robust, practical, and sensitive to the interrelatedness among SDoHS. As noted above, there are thoughtfully designed and broad-based measures; however, their use in daily clinical practice has drawbacks in terms of practicality and implementation. SDoHs are also hamstrung by a lack of specificity—that is, similar risk factors have been associated with multiple clinical outcomes and in different psychiatric disorders.[230]

(3) *Training and education*: Efforts aimed at unraveling the complex interaction of SDoHs and psychopathology are also hindered by a lack of training and education about SDoH assessments for current and future clinical practitioners.[231] Since its inception over a century ago, modern medical education has continued its traditional focus on the individual doctor-patient interaction rather than on the doctor-community relationship.[232] Clinical practitioners tend to see themselves as being solely responsible for the care of the individual patients but not for addressing community-level SDoHs. We need to build training capacity in the medical field that can support SDoHs assessment. In terms of educators and learners this should include curricula that provide a more extensive focus on the interaction between SDoHs and health, digital literacy needed to enable the use of new assessment technologies and data, clear focus on formulation skills using data on SDoHs obtained with validated assessment tools, and training and assessment resources that drive learners to acquire key knowledge, skills, and attitudes related to SDoHs and their role in clinical practice.

(4) *Multifaceted assessments*: Research should focus on more balanced use of different types of assessments—self-report-based, informant report-based, objective, and community-based. While there is no shortage of subjective evaluations, objective assessments using technology have been poorly researched. An example of such tools is the measurement of the quantity and quality of social connections using a combination of smartphone-based GPS and ecological momentary assessment employing a small number of questions related to the cognitive and emotional quality of social connections.[233] Methodologically, multitrait, multimethod psychometric techniques can be used to support integrated assessment approaches. It would be helpful to distinguish between, and incorporate, both individual- and community-level measures. Providing holistic care requires 2 lenses: understanding the individual and understanding the environment where the person comes from. These 2 perspectives are being employed in the new Royal College of Psychiatrists' curricula[234] based on its Report on person-centered care.[235] Community-based measures of racism offer an example of evaluating SDoHs at a societal level. Efforts are required to validate such tools specifically in SSPD populations. Whereas individual-level assessments can help with individual-level interventions, community-level measures can help examine the impact of changes in public health policies in an objective way. Given the increasing need for making essential changes in social and structural factors that impact health and longevity, it is critical to prioritize this mission and propose successive steps at community level to be taken during the coming years and decades.

(5) *Assessments in routine clinical practice*: At the same time, it is our job to improve individual patients' abilities to cope with the existing social anomalies like social fragmentation and racism in order to improve the well-being of the patients and their families. Thus, clinicians should use brief but reliable and valid SDoH tools in their daily practice. They should make a concerted effort to know the environments their patients emanate from, including both the assets and the liabilities, and choose assessment tools accordingly. Practitioners need to become aware of the resources that will provide them with this information. Clinical assessments of SDoHs do not have to be performed by busy clinicians but can be done by paramedical staff or via computerized tools.

Knowledge of SDoHs is useful only if the clinical practice and broader healthcare policies are changed appropriately to understand and improve the patients' health and well-being at individual and population levels. The recommendations listed above should help initiate that process.

Supplementary Material

Supplementary material is available at *Schizophrenia Bulletin* online.

Funding

This work was supported by National Institute of Mental Health (R01MH120201 to BWP, R01MH121546 to ETS and MLT, and T32MH019934, PI: Twamley).

Acknowledgments

The authors have declared that there are no conflicts of interest in relation to the subject of this study.

References

1. Guloksuz S, van Os J. The slow death of the concept of schizophrenia and the painful birth of the psychosis spectrum. *Psychol Med.* 2018;48(2):229–244.

2. Radua J, Ramella-Cravaro V, Ioannidis JPA, *et al.* What causes psychosis? An umbrella review of risk and protective factors. *World Psychiatry.* 2018;17(1):49–66.
3. Alegría M, NeMoyer A, Falgàs Bagué I, Wang Y, Alvarez K. Social determinants of mental health: where we are and where we need to go. *Curr Psychiatry Rep.* 2018;20(11):95.
4. *Social Determinants of Health | CDC*. Published September 30, 2021. https://www.cdc.gov/socialdeterminants/index.htm. Accessed August 2, 2022.
5. *Social Determinants of Health—Healthy People 2030 | health.gov*. https://health.gov/healthypeople/priority-areas/social-determinants-health. Accessed August 2, 2022.
6. Yanos PT, Moos RH. Determinants of functioning and well-being among individuals with schizophrenia: an integrated model. *Clin Psychol Rev.* 2007;27(1):58–77.
7. Taylor MJ, Freeman D, Lundström S, Larsson H, Ronald A. Heritability of psychotic experiences in adolescents and interaction with environmental risk. *JAMA Psychiatry.* 2022;79(9):889–897.
8. Zipursky RB. Why are the outcomes in patients with schizophrenia so poor? *J Clin Psychiatry.* 2014;75(suppl 2):22442.
9. Hjorthoj C, Sturup AE, McGrath J, Nordentoft M. Life expectancy and years of potential life lost in schizophrenia: a systematic review and meta-analysis. In: International Congress on Schizophrenia Research. Published online 2022.
10. Fonseca de Freitas D, Pritchard M, Shetty H, *et al.* Ethnic inequities in multimorbidity among people with psychosis: a retrospective cohort study. *Epidemiol Psychiatr Sci.* 2022;31:e52.
11. Jester D, Thomas M, Sturm E, *et al.* Social determinants of mental health for schizophrenia spectrum disorders: a scoping review. Under review.
12. Roach M, Lin D, Graf M, *et al.* Schizophrenia population health management: perspectives of and lessons learned from population health decision makers. *JMCP.* 2021;27(10-a suppl):S1–S13.
13. Reynolds CF, Jeste DV, Sachdev PS, Blazer DG. Mental health care for older adults: recent advances and new directions in clinical practice and research. *World Psychiatry.* 2022;21(3):336–363.
14. *Tools to Assess and Measure Social Determinants of Health—RHIhub Toolkit*. https://www.ruralhealthinfo.org/toolkits/sdoh/4/assessment-tools. Accessed September 5, 2022.
15. Mooney G, Fohtung NG. Issues in the measurement of social determinants of health. *Health Inf Manag J.* 2008;37(3):26–32.
16. Morone J. An integrative review of social determinants of health assessment and screening tools used in pediatrics. *J Pediatr Nurs.* 2017;37:22–28.
17. O'Brien KH. Social determinants of health: the how, who, and where screenings are occurring; a systematic review. *Soc Work Health Care.* 2019;58(8):719–745.
18. Sokol R, Austin A, Chandler C, *et al.* Screening children for social determinants of health: a systematic review. *Pediatrics.* 2019;144(4):e20191622.
19. Houlihan J, Leffler S. Assessing and addressing social determinants of health: a key competency for succeeding in value-based care. *Prim Care.* 2019;46(4):561–574.
20. Jeste DV, Pender VB. Social determinants of mental health: recommendations for research, training, practice, and policy. *JAMA Psychiatry.* 2022;79(4):283–284.
21. Jeste DV. Non-medical social determinants of health in older adults. *Int Psychogeriatr.* 2022;34(9):755–756.
22. Compton MT, Shim RS. The social determinants of mental health. *Focus*. 2015;13(4):419–425.
23. Barrett CB. Measuring food insecurity. *Science.* 2010;327(5967):825–828.
24. Boyer L, Baumstarck K, Boucekine M, Blanc J, Lançon C, Auquier P. Measuring quality of life in patients with schizophrenia: an overview. *Expert Rev Pharmacoecon Outcomes Res.* 2013;13(3):343–349.
25. Reiff M, Castille DM, Muenzenmaier K, Link B. Childhood abuse and the content of adult psychotic symptoms. *Psychol Trauma: Theory Res Pract Policy.* 2012;4(4):356–369.
26. Agid O, Shapira B, Zislin J, *et al.* Environment and vulnerability to major psychiatric illness: a case control study of early parental loss in major depression, bipolar disorder, and schizophrenia. *Mol Psychiatry.* 1999;4:163–172.
27. Giblin S, Clare L, Livingston G, Howard R. Psychosocial correlates of late-onset psychosis: life experiences, cognitive schemas, and attitudes to ageing. *Int J Geriatr Psychiatry.* 2004;19(7):611–623.
28. Bartels-Velthuis AA, van de Willige G, Jenner JA, Wiersma D, van Os J. Auditory hallucinations in childhood: associations with adversity and delusional ideation. *Psychol Med.* 2012;42(3):583–593.
29. Ross CA, Joshi S. Schneiderian symptoms and childhood trauma in the general population. *Compr Psychiatry.* 1992;33(4):269–273.
30. Kim HS, Kim HS. Incestuous experience among Korean adolescents: prevalence, family problems, perceived family dynamics, and psychological characteristics. *Public Health Nurs.* 2005;22(6):472–482.
31. Shevlin M, Dorahy MJ, Adamson G. Trauma and psychosis: an analysis of the national comorbidity survey. *AJP.* 2007;164(1):166–169.
32. Shevlin M, Houston JE, Dorahy MJ, Adamson G. cumulative traumas and psychosis: an analysis of the national comorbidity survey and the British Psychiatric Morbidity Survey. *Schizophr Bull.* 2007;34(1):193–199.
33. Nishida A, Tanii H, Nishimura Y, *et al.* Associations between psychotic-like experiences and mental health status and other psychopathologies among Japanese early teens. *Schizophr Res.* 2008;99(1–3):125–133.
34. Shevlin M, Murphy J, Read J, Mallett J, Adamson G, Houston JE. Childhood adversity and hallucinations: a community-based study using the National Comorbidity Survey Replication. *Soc Psychiatry Psychiatr Epidemiol.* 2011;46(12):1203–1210.
35. van Nierop M, van Os J, Gunther N, *et al.* Phenotypically continuous with clinical psychosis, discontinuous in need for care: evidence for an extended psychosis phenotype. *Schizophr Bull.* 2012;38(2):231–238.
36. Boden JM, van Stockum S, Horwood LJ, Fergusson DM. Bullying victimization in adolescence and psychotic symptomatology in adulthood: evidence from a 35-year study. *Psychol Med.* 2016;46(6):1311–1320.
37. De Loore E, Drukker M, Gunther N, *et al.* Childhood negative experiences and subclinical psychosis in adolescence: a longitudinal general population study. *Early Interv Psychiatry.* 2007;1(2):201–207.
38. Fisher HL, Schreier A, Zammit S, *et al.* Pathways between childhood victimization and psychosis-like symptoms in the ALSPAC birth cohort. *Schizophr Bull.* 2013;39(5):1045–1055.
39. Kelleher I, Harley M, Lynch F, Arseneault L, Fitzpatrick C, Cannon M. Associations between childhood trauma, bullying

and psychotic symptoms among a school-based adolescent sample. *Br J Psychiatry.* 2008;193(5):378–382.
40. Kramer IMA, Simons CJP, Myin-Germeys I, *et al.* Evidence that genes for depression impact on the pathway from trauma to psychotic-like symptoms by occasioning emotional dysregulation. *Psychol Med.* 2012;42(2):283–294.
41. Bendall S, Hulbert CA, Alvarez-Jimenez M, Allott K, McGorry PD, Jackson HJ. Testing a model of the relationship between childhood sexual abuse and psychosis in a first-episode psychosis group: the role of hallucinations and delusions, posttraumatic intrusions, and selective attention. *J Nerv Ment Dis.* 2013;201(11):941–947.
42. Daalman K, Diederen KMJ, Derks EM, van Lutterveld R, Kahn RS, Sommer IEC. Childhood trauma and auditory verbal hallucinations. *Psychol Med.* 2012;42(12):2475–2484.
43. Heins M, Simons C, Lataster T, *et al.* Childhood trauma and psychosis: a case-control and case-sibling comparison across different levels of genetic liability, psychopathology, and type of trauma. *AJP.* 2011;168(12):1286–1294.
44. Perona-Garcelán S, Carrascoso- López F, García-Montes JM, *et al.* Dissociative experiences as mediators between childhood trauma and auditory hallucinations. *J Trauma Stress.* 2012;25(3):323–329.
45. Georgieva S, Tomas JM, Navarro-Pérez JJ. Systematic review and critical appraisal of Childhood Trauma Questionnaire—Short Form (CTQ-SF). *Child Abuse Negl.* 2021;120:105223.
46. Bernstein DP, Stein JA, Newcomb MD, *et al.* Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse Negl.* 2003;27(2):169–190.
47. Harley M, Kelleher I, Clarke M, *et al.* Cannabis use and childhood trauma interact additively to increase the risk of psychotic symptoms in adolescence. *Psychol Med.* 2010;40(10):1627–1634.
48. Schreier A, Wolke D, Thomas K, *et al.* Prospective study of peer victimization in childhood and psychotic symptoms in a nonclinical population at age 12 years. *Arch Gen Psychiatry.* 2009;66(5):527–536.
49. Wolke D, Lereya ST, Fisher HL, Lewis G, Zammit S. Bullying in elementary school and psychotic experiences at 18 years: a longitudinal, population-based cohort study. *Psychol Med.* 2014;44(10):2199–2211.
50. Armitage JM, Wang RAH, Davis OSP, Bowes L, Haworth CMA. Peer victimisation during adolescence and its impact on wellbeing in adulthood: a prospective cohort study. *BMC Public Health.* 2021;21(1):148.
51. Zwierzynska K, Wolke D, Lereya TS. Peer victimization in childhood and internalizing problems in adolescence: a prospective longitudinal study. *J Abnorm Child Psychol.* 2013;41(2):309–323.
52. Bowes L, Wolke D, Joinson C, Lereya ST, Lewis G. Sibling bullying and risk of depression, anxiety, and self-harm: a prospective cohort study. *Pediatrics.* 2014;134(4):e1032–e1039.
53. Cutajar MC, Mullen PE, Ogloff JRP, Thomas SD, Wells DL, Spataro J. Psychopathology in a large cohort of sexually abused children followed up to 43 years. *Child Abuse Negl.* 2010;34(11):813–822.
54. Elklit A, Shevlin M. Female sexual victimization predicts psychosis: a case-control study based on the Danish Registry system. *Schizophr Bull.* 2011;37(6):1305–1310.
55. Lee WE, Kwok CHT, Hunter ECM, Richards M, David AS. Prevalence and childhood antecedents of depersonalization syndrome in a UK birth cohort. *Soc Psychiatry Psychiatr Epidemiol.* 2012;47(2):253–261.
56. van der Ven E, Dalman C, Wicks S, *et al.* Testing Ødegaard's selective migration hypothesis: a longitudinal cohort study of risk factors for non-affective psychotic disorders among prospective emigrants. *Psychol Med.* 2015;45(4):727–734.
57. WHO. *WHOQOL User Manual.* Published online rev. 2021. 1998. file:///C:/Users/etkra/Downloads/WHO_HIS_HSI_Rev.2012.03_eng.pdf
58. Gomes E, Bastos T, Probst M, Ribeiro JC, Silva G, Corredeira R. Quality of life and physical activity levels in outpatients with schizophrenia. *Braz J Psychiatry.* 2016;38:157–160.
59. Sum MY, Ho NF, Sim K. Cross diagnostic comparisons of quality of life deficits in remitted and unremitted patients with schizophrenia and bipolar disorder. *Schizophr Res.* 2015;168(1):191–196.
60. Afonso P, Figueira ML, Paiva T. Sleep–wake patterns in schizophrenia patients compared to healthy controls. *World J Biol Psychiatry.* 2014;15(7):517–524.
61. Kerling A, Tegtbur U, Ziegenbein M, Grams L, Heinze DR, Sieberer M. Exercise capacity and quality of life in patients with schizophrenia. *Psychiatr Q.* 2013;84(4):417–427.
62. Maat A, Fett AK, Derks E; GROUP Investigators. Social cognition and quality of life in schizophrenia. *Schizophr Res.* 2012;137(1):212–218.
63. Lucas-Carrasco R. The WHO quality of life (WHOQOL) questionnaire: Spanish development and validation studies. *Qual Life Res.* 2012;21(1):161–165.
64. Vancampfort D, Probst M, Scheewe T, *et al.* Lack of physical activity during leisure time contributes to an impaired health related quality of life in patients with schizophrenia. *Schizophr Res.* 2011;129(2):122–127.
65. Woon PS, Chia MY, Chan WY, Sim K. Neurocognitive, clinical and functional correlates of subjective quality of life in Asian outpatients with schizophrenia. *Prog Neuropsychopharmacol Biol Psychiatry.* 2010;34(3):463–468.
66. Ulaş H, Polat S, Akdede BB, Alptekin K. Impact of panic attacks on quality of life among patients with schizophrenia. *Prog Neuropsychopharmacol Biol Psychiatry.* 2010;34(7):1300–1305.
67. Picardi A, Rucci P, de Girolamo G, Santone G, Borsetti G, Morosini P. The quality of life of the mentally ill living in residential facilities. *Eur Arch Psychiatry Clin Neurosci.* 2006;256(6):372–381.
68. Akvardar Y, Akdede BB, Özerdem A, Eser E, Topkaya S, Alptekin K. Assessment of quality of life with the WHOQOL-BREF in a group of Turkish psychiatric patients compared with diabetic and healthy subjects. *Psychiatry Clin Neurosci.* 2006;60(6):693–699.
69. Awadalla AW, Ohaeri JU, Salih AA, Tawfiq AM. Subjective quality of life of family caregivers of community living Sudanese psychiatric patients. *Soc Psychiatry Psychiatr Epidemiol.* 2005;40(9):755–763.
70. Alptekin K, Akvardar Y, Akdede BBK, *et al.* Is quality of life associated with cognitive impairment in schizophrenia? *Prog Neuropsychopharmacol Biol Psychiatry.* 2005;29(2):239–244.
71. Burckhardt CS, Anderson KL. The Quality of Life Scale (QOLS): reliability, validity, and utilization. *Health Qual Life Outcomes.* 2003;1(1):60.
72. Dong M, Lu L, Zhang L, *et al.* Quality of life in schizophrenia: a meta-analysis of comparative studies. *Psychiatr Q.* 2019;90(3):519–532.
73. Becker T, Leese M, Clarkson P, *et al.* Links between social networks and quality of life: an epidemiologically representative

study of psychotic patients in South London. *Soc Psychiatry Psychiatr Epidemiol.* 1998;33(7):299–304.
74. Howard L, Leese M, Thornicroft G. Social networks and functional status in patients with psychosis. *Acta Psychiatr Scand.* 2000;102(5):376–385.
75. Thorup A, Petersen L, Jeppesen P, *et al.* Social network among young adults with first-episode schizophrenia spectrum disorders: results from the Danish OPUS trial. *Soc Psychiatry Psychiatr Epidemiol.* 2006;41(10):761–770.
76. Dunn M, O'Driscoll C, Dayson D, Wills W, Leff J. The TAPS Project. 4: an observational study of the social life of long-stay patients. *Br J Psychiatry.* 1990;157(6):842–848, 852.
77. Bardol O, Grot S, Oh H, *et al.* Perceived ethnic discrimination as a risk factor for psychotic symptoms: a systematic review and meta-analysis. *Psychol Med.* 2020;50(7):1077–1089.
78. Karlsen S, Nazroo JY, McKenzie K, Bhui K, Weich S. Racism, psychosis and common mental disorder among ethnic minority groups in England. *Psychol Med.* 2005;35(12):1795–1803.
79. Veling W, Selten JP, Veen N, Laan W, Blom JD, Hoek HW. Incidence of schizophrenia among ethnic minorities in the Netherlands: a four-year first-contact study. *Schizophr Res.* 2006;86(1–3):189–193.
80. Veling W, Hoek HW, Mackenbach JP. Perceived discrimination and the risk of schizophrenia in ethnic minorities. *Soc Psychiatry Psychiatr Epidemiol.* 2008;43(12):953–959.
81. Bécares L, Nazroo J, Stafford M. The buffering effects of ethnic density on experienced racism and health. *Health Place.* 2009;15(3):700–708.
82. Chakraborty AT, McKenzie KJ, Hajat S, Stansfeld SA. Racism, mental illness and social support in the UK. *Soc Psychiatry Psychiatr Epidemiol.* 2010;45(12):1115–1124.
83. Berg M, Wendt S. *Racism in the Modern World: Historical Perspectives on Cultural Transfer and Adaptation*. New York: Berghahn Books; 2011.
84. el Bouhaddani S, van Domburgh L, Schaefer B, Doreleijers TAH, Veling W. Psychotic experiences among ethnic majority and minority adolescents and the role of discrimination and ethnic identity. *Soc Psychiatry Psychiatr Epidemiol.* 2019;54(3):343–353.
85. Anglin DM, Lui F, Espinosa A, Tikhonov A, Ellman L. Ethnic identity, racial discrimination and attenuated psychotic symptoms in an urban population of emerging adults. *Early Interv Psychiatry.* 2018;12(3):380–390.
86. Anglin DM, Greenspoon M, Lighty Q, Ellman LM. Race-based rejection sensitivity partially accounts for the relationship between racial discrimination and distressing attenuated positive psychotic symptoms. *Early Interv Psychiatry.* 2016;10(5):411–418.
87. Anglin DM, Lighty Q, Greenspoon M, Ellman LM. Racial discrimination is associated with distressing subthreshold positive psychotic symptoms among US urban ethnic minority young adults. *Soc Psychiatry Psychiatr Epidemiol.* 2014;49(10):1545–1555.
88. Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: validity and reliability of a self-report measure for population health research on racism and health. *Soc Sci Med.* 2005;61(7):1576–1596.
89. Oh H, Cogburn CD, Anglin D, Lukens E, DeVylder J. Major discriminatory events and risk for psychotic experiences among Black Americans. *Am J Orthopsychiatry.* 2016;86(3):277–285.
90. Williams DR, Anderson NB, Yu Y, Jackson JS. Racial differences in physical and mental health. *J Health Psychol.* 1997;2(3):335–351.
91. Taylor TR, Kamarck TW, Shiffman S. Validation of the Detroit area study discrimination scale in a community of older African American adults: the Pittsburgh Healthy Heart Project. *Int J Behav Med.* 2004;11(2):88–94.
92. Fortuna LR, Porche MV, Alegria M. Political violence, psychosocial trauma, and the context of mental health services use among immigrant Latinos in the United States. *Ethn Health.* 2008;13(5):435–463.
93. Allardyce J, Boydell J, Van Os J, *et al.* Comparison of the incidence of schizophrenia in rural Dumfries and Galloway and urban Camberwell. *Br J Psychiatry.* 2001;179(4):335–339.
94. Kirkbride JB, Fearon P, Morgan C, *et al.* Heterogeneity in incidence rates of schizophrenia and other psychotic syndromes. *Arch Gen Psychiatry.* 2006;63:250–258.
95. Pelayo-Terán JM, Pérez-Iglesias R, Ramírez-Bonilla M, *et al.* Epidemiological factors associated with treated incidence of first-episode non-affective psychosis in Cantabria: insights from the Clinical Programme on Early Phases of Psychosis. *Early Interv Psychiatry.* 2008;2(3):178–187.
96. Szöke A, Charpeaud T, Galliot AM, *et al.* Rural-urban variation in incidence of psychosis in France: a prospective epidemiologic study in two contrasted catchment areas. *BMC Psychiatry.* 2014;14:1–6.
97. Sundquist K, Frank G, Sundquist J. Urbanisation and incidence of psychosis and depression: follow-up study of 4.4 million women and men in Sweden. *Br J Psychiatry.* 2004;184(4):293–298.
98. Omer S, Kirkbride JB, Pringle DG, Russell V, O'Callaghan E, Waddington JL. Neighbourhood-level socio-environmental factors and incidence of first episode psychosis by place at onset in rural Ireland: the Cavan–Monaghan First Episode Psychosis Study [CAMFEPS]. *Schizophr Res.* 2014;152(1):152–157.
99. Lasalvia A, Bonetto C, Tosato S, *et al.*; PICOS-Veneto Group. First-contact incidence of psychosis in north-eastern Italy: influence of age, gender, immigration and socioeconomic deprivation. *Br J Psychiatry.* 2014;205(2):127–134.
100. Chien IC, Chou YJ, Lin CH, Bih SH, Chou P, Chang HJ. Prevalence and incidence of schizophrenia among national health insurance enrollees in Taiwan, 1996–2001. *Psychiatry Clin Neurosci.* 2004;58(6):611–618.
101. Boydell J, van Os J, McKenzie K, *et al.* Incidence of schizophrenia in ethnic minorities in London: ecological study into interactions with environment. *BMJ.* 2001;323(7325):1336.
102. Veling W, Susser E, Selten JP, Hoek HW. Social disorganization of neighborhoods and incidence of psychotic disorders: a 7-year first-contact incidence study. *Psychol Med.* 2015;45(9):1789–1798.
103. Thomas CS, Stone K, Osborn M, Thomas PF, Fisher M. Psychiatric morbidity and compulsory admission among UK-Born Europeans, Afro-Caribbeans and Asians in Central Manchester. *Br J Psychiatry.* 1993;163(1):91–99.
104. Bebbington PE, Hurry J, Tennant C. Psychiatric disorders in selected immigrant groups in Camberwell. *Soc Psychiatry.* 1981;16(1):43–51.
105. Fossion P, Ledoux Y, Valente F, *et al.* Psychiatric disorders and social characteristics among second-generation Moroccan migrants in Belgium: an age–and gender–controlled study conducted in a psychiatric emergency department. *Eur Psychiatry.* 2002;17(8):443–450.

106. Harrison G, Glazebrook C, Brewin J, *et al.* Increased incidence of psychotic disorders in migrants from the Caribbean to the United Kingdom. *Psychol Med.* 1997;27(4):799–806.
107. Hitch PJ, Clegg P. Modes of referral of overseas immigrant and native-born first admissions to psychiatric hospital. *Soc Sci Med.* 1980;14(4):369–374.
108. Hogerzeil SJ, van Hemert AM, Veling W, Hoek HW. Incidence of schizophrenia among migrants in the Netherlands: a direct comparison of first contact longitudinal register approaches. *Soc Psychiatry Psychiatr Epidemiol.* 2017;52(2):147–154.
109. Mitter PR, Krishnan S, Bell P, Stewart R, Howard RJ. The effect of ethnicity and gender on first-contact rates for schizophrenia-like psychosis in Bangladeshi, Black and White elders in Tower Hamlets, London. *Int J Geriatr Psychiatry.* 2004;19(3):286–290.
110. Rwegellera GG. Psychiatric morbidity among West Africans and West Indians living in London. *Psychol Med.* 1977;7(2):317–329.
111. Selten JP, Slaets JPJ, Kahn RS. Schizophrenia in Surinamese and Dutch Antillean immigrants to The Netherlands: evidence of an increased incidence. *Psychol Med.* 1997;27(4):807–811.
112. Smith GN, Boydell J, Murray RM, *et al.* The incidence of schizophrenia in European immigrants to Canada. *Schizophr Res.* 2006;87(1–3):205–211.
113. Tortelli A, Morgan C, Szoke A, *et al.* Different rates of first admissions for psychosis in migrant groups in Paris. *Soc Psychiatry Psychiatr Epidemiol.* 2014;49(7):1103–1109.
114. Van Os J, Castle DJ, Takei N, Der G, Murray RM. Psychotic illness in ethnic minorities: clarification from the 1991 census. *Psychol Med.* 1996;26(1):203–208.
115. Leão TS, Sundquist J, Frank G, Johansson LM, Johansson SE, Sundquist K. Incidence of schizophrenia or other psychoses in first- and second-generation immigrants: a National Cohort Study. *J Nerv Ment Dis.* 2006;194(1):27–33.
116. Zandi T, Havenaar JM, Smits M, *et al.* First contact incidence of psychotic disorders among native Dutch and Moroccan immigrants in the Netherlands: influence of diagnostic bias. *Schizophr Res.* 2010;119(1–3):27–33.
117. Anderson KK, Cheng J, Susser E, McKenzie KJ, Kurdyak P. Incidence of psychotic disorders among first-generation immigrants and refugees in Ontario. *CMAJ.* 2015;187(9):E279–E286.
118. Bansal N, Bhopal R, Netto G, Lyons D, Steiner MFC, Sashidharan SP. Disparate patterns of hospitalisation reflect unmet needs and persistent ethnic inequalities in mental health care: the Scottish health and ethnicity linkage study. *Ethn Health.* 2014;19(2):217–239.
119. Bhugra D, Hilwig M, Hossein B, *et al.* First-contact incidence rates of schizophrenia in Trinidad and one-year follow-up. *Br J Psychiatry.* 1996;169(5):587–592.
120. Cantor-Graae E, Pedersen CB, Mcneil TF, Mortensen PB. Migration as a risk factor for schizophrenia: a Danish population-based cohort study. *Br J Psychiatry.* 2003;182(2):117–122.
121. Cantor-Graae E, Zolkowska K, McNeil TF. Increased risk of psychotic disorder among immigrants in Malmö: a 3-year first-contact study. *Psychol Med.* 2005;35(8):1155–1163.
122. Cantor-Graae E, Pedersen CB. Risk for schizophrenia in intercountry adoptees: a Danish population-based cohort study. *J Child Psychol Psychiatry.* 2007;48(11):1053–1060.
123. Cheng F, Kirkbride JB, Lennox BR, *et al.* Administrative incidence of psychosis assessed in an early intervention service in England: first epidemiological evidence from a diverse, rural and urban setting. *Psychol Med.* 2011;41(5):949–958.
124. Dean G, Walsh D, Downing H, Shelley E. First admissions of native-born and immigrants to psychiatric hospitals in South-East England 1976. *Br J Psychiatry.* 1981;139(6):506–512.
125. Dykxhoorn J, Hollander AC, Lewis G, Magnusson C, Dalman C, Kirkbride JB. Risk of schizophrenia, schizoaffective, and bipolar disorders by migrant status, region of origin, and age-at-migration: a national cohort study of 1.8 million people. *Psychol Med.* 2019;49(14):2354–2363.
126. Hollander AC, Dal H, Lewis G, Magnusson C, Kirkbride JB, Dalman C. Refugee migration and risk of schizophrenia and other non-affective psychoses: cohort study of 1.3 million people in Sweden. *BMJ.* 2016;352:i1030. doi:10.1136/bmj.i1030
127. Krupinski J, Cochrane R. Migration and mental health—a comparative study. *J Intercult Stud.* 1980;1(1):49–57.
128. Manhica H, Hollander AC, Almquist YB, Rostila M, Hjern A. Origin and schizophrenia in young refugees and intercountry adoptees from Latin America and East Africa in Sweden: a comparative study. *BJPsych Open.* 2016;2(1):6–9.
129. Markkula N, Lehti V, Gissler M, Suvisaari J. Incidence and prevalence of mental disorders among immigrants and native Finns: a register-based study. *Soc Psychiatry Psychiatr Epidemiol.* 2017;52(12):1523–1540.
130. Mortensen PB, Cantor-Graae E, McNeil TF. Increased rates of schizophrenia among immigrants: some methodological concerns raised by Danish findings. *Psychol Med.* 1997;27(4):813–820.
131. Mulè A, Sideli L, Capuccio V, *et al.* Low incidence of psychosis in Italy: confirmation from the first epidemiological study in Sicily. *Soc Psychiatry Psychiatr Epidemiol.* 2017;52(2):155–162.
132. Schofield P, Thygesen M, Das-Munshi J, *et al.* Neighbourhood ethnic density and psychosis—is there a difference according to generation? *Schizophr Res.* 2018;195:501–505.
133. Selten JP, Sijben N. First admission rates for schizophrenia in immigrants to the Netherlands: the Dutch national register. *Soc Psychiatry Psychiatr Epidemiol.* 1994;29(2):71–77.
134. Sendra-Gutiérrez JM, de Francisco Beltrán P, Iribarren M, Vargas Aragón ML. Outpatient psychiatric care in the immigrant population of Segovia (2001–2008): descriptive study. *Rev Psiquiatr Salud Ment (Engl Ed).* 2012;5(3):173–182.
135. Tarricone I, Mimmi S, Paparelli A, *et al.* First-episode psychosis at the West Bologna Community Mental Health Centre: results of an 8-year prospective study. *Psychol Med.* 2012;42(11):2255–2264.
136. Werbeloff N, Levine SZ, Rabinowitz J. Elaboration on the association between immigration and schizophrenia: a population-based national study disaggregating annual trends, country of origin and sex over 15 years. *Soc Psychiatry Psychiatr Epidemiol.* 2012;47(2):303–311.
137. Westman J, Johansson LM, Sundquist K. Country of birth and hospital admission rates for mental disorders: a cohort study of 4.5 million men and women in Sweden: sources of support: this work was supported by the Swedish Research Council (Grant No. K2004-21X-11651-09A), the National Institutes of Health (Grant No. R01-H271084-1), and the Knut and Alice Wallenberg Foundation. *Eur Psychiatry.* 2006;21(5):307–314.
138. Sørensen HJ, Nielsen PR, Pedersen CB, Benros ME, Nordentoft M, Mortensen PB. Population impact of familial and environmental risk factors for schizophrenia: a nationwide study. *Schizophr Res.* 2014;153(1–3):214–219.

139. Coid JW, Kirkbride JB, Barker D, *et al.* Raised incidence rates of all psychoses among migrant groups: findings from the East London first episode psychosis study. *Arch Gen Psychiatry.* 2008;65(11):1250–1258.
140. Adriaanse M, van Domburgh L, Hoek HW, Susser E, Doreleijers TAH, Veling W. Prevalence, impact and cultural context of psychotic experiences among ethnic minority youth. *Psychol Med.* 2015;45(3):637–646.
141. Castle D, Wessely S, Der G, Murray RM. The incidence of operationally defined schizophrenia in Camberwell, 1965–84. *Br J Psychiatry.* 1991;159(6):790–794.
142. Fearon P, Kirkbride JB, Morgan C, *et al.*; AESOP Study Group. Incidence of schizophrenia and other psychoses in ethnic minority groups: results from the MRC AESOP Study. *Psychol Med.* 2006;36(11):1541–1550.
143. Kirkbride JB, Barker D, Cowden F, *et al.* Psychoses, ethnicity and socio-economic status. *Br J Psychiatry.* 2008;193(1):18–24.
144. Kirkbride JB, Hameed Y, Ankireddypalli G, *et al.* The epidemiology of first-episode psychosis in early intervention in psychosis services: findings from the Social Epidemiology of Psychoses in East Anglia [SEPEA] study. *AJP.* 2017;174(2):143–153.
145. Reeves SJ, Sauer J, Stewart R, Granger A, Howard RJ. Increased first-contact rates for very-late-onset schizophrenia-like psychosis in African- and Caribbean-born elders. *Br J Psychiatry.* 2001;179(2):172–174.
146. Vanheusden K, Mulder CL, van der Ende J, *et al.* Associations between ethnicity and self-reported hallucinations in a population sample of young adults in The Netherlands. *Psychol Med.* 2008;38(8):1095–1102.
147. Zolkowska K, Cantor-Graae E, McNEIL TF. Increased rates of psychosis among immigrants to Sweden: is migration a risk factor for psychosis? *Psychol Med.* 2001;31(4):669–678.
148. Selten JP, Veen N, Feller W, *et al.* Incidence of psychotic disorders in immigrant groups to the Netherlands. *Br J Psychiatry.* 2001;178(4):367–372.
149. Goater N, King M, Cole E, *et al.* Ethnicity and outcome of psychosis. *Br J Psychiatry.* 1999;175(1):34–42.
150. Ivory V, Witten K, Salmond C, Lin EY, You RQ, Blakely T. The New Zealand Index of neighbourhood social fragmentation: integrating theory and data. *Environ Plan A.* 2012;44(4):972–988.
151. Greifenhagen A, Fichter M. Mental illness in homeless women: an epidemiological study in Munich, Germany. *Eur Arch Psychiatry Clin Nuerosci.* 1997;247(3):162–172.
152. Kovess V, Mangin Lazarus C. The prevalence of psychiatric disorders and use of care by homeless people in Paris. *Soc Psychiatry Psychiatr Epidemiol.* 1999;34(11):580–587.
153. Muñoz M, Vázquez C, Koegel P, Sanz J, Burnam MA. Differential patterns of mental disorders among the homeless in Madrid (Spain) and Los Angeles (USA). *Soc Psychiatry Psychiatr Epidemiol.* 1998;33(10):514–520.
154. Teasdale SB, Müller-Stierlin AS, Ruusunen A, Eaton M, Marx W, Firth J. Prevalence of food insecurity in people with major depression, bipolar disorder, and schizophrenia and related psychoses: a systematic review and meta-analysis. *Crit Rev Food Sci Nutr.* 2021:1–18. doi:10.1080/10408398.2021.2002806
155. Shim RS, Compton MT. The social determinants of mental health: psychiatrists' roles in addressing discrimination and food insecurity. *FOC.* 2020;18(1):25–30.
156. Carlson SJ, Andrews MS, Bickel GW. Measuring food insecurity and hunger in the United States: development of a national benchmark measure and prevalence estimates. *J Nutr.* 1999;129(2S suppl):510S–516S.
157. Gundersen C, Ziliak JP. Food insecurity and health outcomes. *Health Aff.* 2015;34(11):1830–1839.
158. Marques ES, Reichenheim ME, de Moraes CL, Antunes MM, Salles-Costa R. Household food insecurity: a systematic review of the measuring instruments used in epidemiological studies. *Public Health Nutr.* 2015;18(5):877–892.
159. Clarke NMA, Grantham-McGregor SM, Powell C. Nutrition and health predictors of school failure in Jamaican children. *Ecol Food Nutr.* 1991;26(1):47–57.
160. Cueto S. Height, weight, and education achievement in rural Peru. *Food Nutr Bull.* 2005;26(2 suppl 2):S251–S260.
161. Lund C, Brooke-Sumner C, Baingana F, *et al.* Social determinants of mental disorders and the Sustainable Development Goals: a systematic review of reviews. *Lancet Psychiatry.* 2018;5(4):357–369.
162. Stein AD, Behrman JR, DiGirolamo A, *et al.* Schooling, educational achievement, and cognitive functioning among young Guatemalan adults. *Food Nutr Bull.* 2005;26(2 suppl 1):S46–S54.
163. Walker SP, Wachs TD, Meeks Gardner J, *et al.* Child development: risk factors for adverse outcomes in developing countries. *Lancet.* 2007;369(9556):145–157.
164. Baillargeon J, Black SA, Pulvino J, Dunn K. The disease profile of Texas prison inmates. *Ann Epidemiol.* 2000;10(2):74–80.
165. Black DW, Arndt S, Hale N, Rogerson R. Use of the Mini International Neuropsychiatric Interview (MINI) as a screening tool in prisons: results of a preliminary study. *J Am Acad Psychiatry Law.* 2004;32(2):6.
166. Staton M, Leukefeld C, Webster JM. Substance use, health, and mental health: problems and service utilization among incarcerated women. *Int J Offender Ther Comp Criminol.* 2003;47(2):224–239.
167. DiCataldo F, Greer A, Profit WE. Screening prison inmates for mental disorder: an examination of the relationship between mental disorder and prison adjustment. *Bull Am Acad Psychiatry Law.* 1995;23(4):573-585.
168. Eyestone LL, Howell RJ. An epidemiological study of attention-deficit hyperactivity disorder and major depression in a male prison population. *Bull Am Acad Psychiatry Law.* 1994;22(2):181-193.
169. Strand VC, Pasquale LE, Sarmiento TL. Child and adolescent trauma measures: a review. The National Child Traumatic Stress Network. 2003: 1–161. https://ncwwi.org/files/Evidence_Based_and_Trauma-Informed_Practice/Child-and-Adolescent-Trauma-Measures_A-Review-with-Measures.pdf
170. Griep RH, Dóra C, Faerstein E, Lopes C. Confiabilidade teste-reteste de aspectos da rede social no Estudo Pró-Saúde. *Rev Saúde Pública.* 2003;37(3):379–385.
171. Wang J, Lloyd-Evans B, Giacco D, *et al.* Social isolation in mental health: a conceptual and methodological review. *Soc Psychiatry Psychiatr Epidemiol.* 2017;52(12):1451–1461.
172. *USDA ERS—Survey Tools*. https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/survey-tools/#household. Accessed August 25, 2022.
173. Bureau UC. *Current Population Survey (CPS)*. Census.gov. https://www.census.gov/programs-surveys/cps.html. Accessed August 4, 2022.
174. Derrickson JP, Fisher AG, Anderson JEL. The core food security module scale measure is valid and reliable when used with Asians and Pacific Islanders. *J Nutr.* 2000;130(11):2666–2674.

175. Kim K, Kim MK. Development and validation of food security measure. *Korean J Nutr.* 2009;42(4):374–385.
176. Lyles CR, Nord M, Chou J, Kwan CML, Seligman HK. The San Francisco Chinese Food Security Module: validation of a translation of the US household food security survey module. *J Hunger Environ Nutr.* 2015;10(2):189–201.
177. Rabbitt M, Coleman-Jensen A. Rasch analyses of the standardized Spanish translation of the U.S. household food security survey module. *J Econ Soc Meas.* 2017;42:171–187.
178. Bickel G, Nord M, Hamilton W, Cook J. *Guide to Measuring Household Food Security*. Published online 2000. http://www.ers.usda.gov/briefing/foodsecurity. Accessed September 3, 2022.
179. Cristofaro SL, Cleary SD, Ramsay Wan C, *et al.* Measuring trauma and stressful events in childhood and adolescence among patients with first-episode psychosis: initial factor structure, reliability, and validity of the Trauma Experiences Checklist. *Psychiatry Res.* 2013;210(2):618–625.
180. *Adverse Childhood Experience Questionnaire.* http://theannainstitute.org/Finding%20Your%20ACE%20Score.pdf. Accessed November 26, 2022.
181. Anglin DM, Ereshefsky S, Klaunig MJ, *et al.* From womb to neighborhood: a racial analysis of social determinants of psychosis in the United States. *Am J Psychiatry.* 2021;178(7):599–610.
182. Gottlieb BH, Bergen AE. Social support concepts and measures. *J Psychosom Res.* 2010;69(5):511–520.
183. Ku BS, Compton MT, Walker EF, Druss BG. Social fragmentation and schizophrenia: a systematic review. *J Clin Psychiatry.* 2021;83(1):38587.
184. Zammit S, Lewis G, Rasbash J, Dalman C, Gustafsson JE, Allebeck P. Individuals, schools, and neighborhood: a multilevel longitudinal study of variation in incidence of psychotic disorders. *Schizophr Res.* 2010;117(2):181–182.
185. All of Us Research Program | National Institutes of Health (NIH). *All of Us Research Program | NIH.* Published June 1, 2020. https://allofus.nih.gov/future-health-begins-all-us. Accessed October 23, 2022.
186. Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science.* 1997;277(5328):918–924.
187. Utsey SO. Assessing the stressful effects of racism: a review of instrumentation. *J Black Psychol.* 1998;24(3):269–288.
188. Groos M, Wallace M, Hardeman R, Theall K. Measuring inequity: a systematic review of methods used to quantify structural racism. *J Health Dispar Res Pract.* 2018;11(2):190-201. https://digitalscholarship.unlv.edu/jhdrp/vol11/iss2/13
189. Kressin NR, Raymond KL, Manze M. Perceptions of race/ethnicity-based discrimination: a review of measures and evaluation of their usefulness for the health care setting. *J Health Care Poor Underserved.* 2008;19(3):697–730.
190. Morrison TG, Bishop C, Morrison MA, Parker-Taneo K. A psychometric review of measures assessing discrimination against sexual minorities. *J Homosex.* 2016;63(8):1086–1126.
191. de la Torre-Pérez L, Oliver-Parra A, Torres X, Bertran MJ. How do we measure gender discrimination? Proposing a construct of gender discrimination through a systematic scoping review. *Int J Equity Health.* 2022;21(1):1-11.
192. Furunes T, Mykletun RJ. Age discrimination in the workplace: validation of the Nordic Age Discrimination Scale (NADS). *Scand J Psychol.* 2010;51(1):23–30.
193. Paksarian D, Eaton WW, Mortensen PB, Pedersen CB. Childhood residential mobility, schizophrenia, and bipolar disorder: a population-based study in Denmark. *Schizophr Bull.* 2015;41(2):346–354.
194. Price C, Dalman C, Zammit S, Kirkbride JB. Association of residential mobility over the life course with nonaffective psychosis in 1.4 million young people in Sweden. *JAMA Psychiatry.* 2018;75(11):1128–1136.
195. Newbury JB, Arseneault L, Caspi A, *et al.* Association between genetic and socioenvironmental risk for schizophrenia during upbringing in a UK longitudinal cohort. *Psychol Med.* 2022;52(8):1527–1537.
196. Ku BS, Addington J, Bearden CE, *et al.* Association between residential instability at individual and area levels and future psychosis in adolescents at clinical high risk from the North American Prodrome Longitudinal Study (NAPLS) consortium. *Schizophr Res.* 2021;238:137–144.
197. Lai S, Erbach-Schoenberg E, Pezzulo C, *et al.* Exploring the use of mobile phone data for national migration statistics. *Palgrave Commun.* 2019;5(1):1–10.
198. Vargas TG, Damme KSF, Mittal VA. Differentiating distinct and converging neural correlates of types of systemic environmental exposures. *Hum Brain Mapp.* 2022;43(7):2232–2248.
199. March D, Hatch SL, Morgan C, *et al.* Psychosis and place. *Epidemiol Rev.* 2008;30(1):84–100.
200. Jeste DV, Malaspina D, Bagot K, *et al.* Review of major social determinants of health in schizophrenia-spectrum psychotic disorders: III. *Biology.* Under review.
201. Smith A. Can we compare homelessness across the Atlantic? A comparative study of methods for measuring homelessness in North America and Europe. *Eur J Homelessness.* 2015;9(2):233–257.
202. Susser E, Struening EL, Conover S. Psychiatric problems in homeless men: lifetime psychosis, substance use, and current distress in new arrivals at New York City shelters. *Arch Gen Psychiatry.* 1989;46:845–850.
203. Busch-Geertsema V. Defining and measuring homelessness. *Homelessness Res Europe.* Published online 2012:19–39.
204. Hermans K, Dyb E, Knutagard M, Novak-Zezula S, Trummer U. Migration and homelessness: measuring the intersections. *Eur J Homelessness.* 2020;14(3):13–34.
205. Tsemberis S, Mchugo G, Williams V, Hanrahan P, Stefancic A. Measuring homelessness and residential stability: the residential time-line follow-back inventory. *Sam Tsemberis.* 2007;35:29-40. doi:10.1002/jcop.20132
206. Drake RE, Luciano AE, Mueser KT, *et al.* Longitudinal course of clients with co-occurring schizophrenia-spectrum and substance use disorders in urban mental health centers: a 7-year prospective study. *Schizophr Bull.* 2016;42(1):202–211.
207. Satcher LA. Multiply-deserted areas: environmental racism and food, pharmacy, and greenspace access in the Urban South. *Environ Sociol.* 2022;8(3):279–291.
208. Carr WA, Rotter M, Steinbacher M, *et al.* Structured Assessment of Correctional Adaptation (SACA): a measure of the impact of incarceration on the mentally ill in a therapeutic setting. *Int J Offender Ther Comp Criminol.* 2006;50(5):570–581.
209. Smilkstein G. The family APGAR: a proposal for a family function test and its use by physicians. *J Fam Pract.* 1978;6(6):9.
210. Santamaría-García H, Baez S, Gómez C, *et al.* The role of social cognition skills and social determinants of health in predicting symptoms of mental illness. *Transl Psychiatry.* 2020;10(1):1–13.

211. Lee EE, Martin AS, Tu X, Palmer BW, Jeste DV. Childhood adversity and schizophrenia: the protective role of resilience in mental and physical health and metabolic markers. *J Clin Psychiatry.* 2018;79(3):2559.
212. Friborg O, Hjemdal O, Rosenvinge JH, Martinussen M. A new rating scale for adult resilience: what are the central protective resources behind healthy adjustment? *Int J Methods Psychiatr Res.* 2006;12(2):65–76.
213. Smith BW, Dalen J, Wiggins K, Tooley E, Christopher P, Bernard J. The Brief Resilience Scale: assessing the ability to bounce back. *Int J Behav Med.* 2008;15(3):194–200.
214. Laird KT, Lavretsky H, Wu P, Krause B, Siddarth P. Neurocognitive correlates of resilience in late-life depression. *Am J Geriatr Psychiatry.* 2019;27(1):12–17.
215. Oughli HA, Simmons S, Nguyen SA, Lavretsky H. Resilience and mind-body interventions in late-life depression. *CP.* 2022;21(12):29-35. doi:10.12788/cp.0308
216. Thomas ML. Advances in applications of item response theory to clinical assessment. *Psychol Assess.* 2019;31:1442–1455.
217. Ayesa-Arriola R, Miguel-Corredera M, de la Foz VOG, *et al.* Education and long-term outcomes in first episode psychosis: 10-year follow-up study of the PAFIP cohort. *Psychol Med.* 2023;53(1):66–77.
218. Firth J, Carney R, Stubbs B, *et al.* Nutritional deficiencies and clinical correlates in first-episode psychosis: a systematic review and meta-analysis. *Schizophr Bull.* 2018;44(6):1275–1292.
219. Pitschel-Walz G, Leucht S, Bäuml J, Kissling W, Engel RR. The effect of family interventions on relapse and rehospitalization in schizophrenia—a meta-analysis. *Schizophr Bull.* 2001;27(1):73–92.
220. Tempier R, Balbuena L, Lepnurm M, Craig TKJ. Perceived emotional support in remission: results from an 18-month follow-up of patients with early episode psychosis. *Soc Psychiatry Psychiatr Epidemiol.* 2013;48(12):1897–1904.
221. Chen H, Xu J, Mao Y, Sun L, Sun Y, Zhou Y. Positive coping and resilience as mediators between negative symptoms and disability among patients with schizophrenia. *Front Psychiatry.* 2019;10:2-6. https://www.frontiersin.org/articles/10.3389/fpsyt.2019.00641. Accessed January 26, 2023.
222. Zhu X, Xu X, Xu C, *et al.* The interactive effects of stress and coping style on cognitive function in patients with schizophrenia. *Neuropsychiatr Dis Treat.* 2019;15:523–530.
223. Whaley AL. Psychiatric and demographic predictors of memory deficits in African Americans with schizophrenia: the moderating role of cultural mistrust. *Psychiatr Q.* 2012;83(2):113–126.
224. Aikman S, Halai A, Rubagiza J. Conceptualising gender equality in research on education quality. *Comp Educ.* 2011;47(1):45–60.
225. Ghaemi SN. The biopsychosocial model in psychiatry: a critique. 2011;6(1):8.
226. *The Accountable Health Communities Health-Related Social Needs Screening Tool.* Centers for Medicare & Medicaid Innovation. Published online 2019. https://innovation.cms.gov/files/worksheets/ahcm-screeningtool.pdf. Accessed September, 2022.
227. PhenX SDOH Toolkit. *NIMHD*. https://www.nimhd.nih.gov/programs/collab/phenx/. Accessed November 19, 2022.
228. HealthBegins. *HealthBegins*. https://healthbegins.org/. Accessed November 19, 2022.
229. Marmot M. Health equity in England: the Marmot review 10 years on. *BMJ.* 2020;368:m693.
230. Uher R, Zwicker A. Etiology in psychiatry: embracing the reality of poly-gene-environmental causation of mental illness. *World Psychiatry.* 2017;16(2):121–129.
231. Doobay-Persaud A, Adler MD, Bartell TR, *et al.* Teaching the social determinants of health in undergraduate medical education: a scoping review. *J Gen Intern Med.* 2019;34(5):720–730.
232. Khan N, Rogers A, Melville C, *et al.* Using medical education as a tool to train doctors as social innovators. *BMJ Innov.* 2022;8(3):190–198.
233. Depp CA, Moore RC, Perivoliotis D, Granholm E. Technology to assess and support self-management in serious mental illness. *Dialogues Clin Neurosci.* 2016;18(2):171–183.
234. *Curricula and Guidance | Royal College of Psychiatrists.* www.rcpsych.ac.uk, https://www.rcpsych.ac.uk/training/curricula-and-guidance. Accessed December 12, 2022.
235. *Person-Centred Care—Implications for Training in Psychiatry (CR215, Sept 2018).* www.rcpsych.ac.uk, https://www.rcpsych.ac.uk/improving-care/campaigning-for-better-mental-health-policy/college-reports/2018-college-reports/cr215. Accessed December 12, 2022.