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Measurement of unnecessary psychiatric readmissions in the context of care transition interventions: a scoping review

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ABSTRACT

Objective The objective of this study was to examine how published studies of inpatient to outpatient mental healthcare transition processes have approached measuring unnecessary psychiatric readmissions.

Design Scoping review using Levac *et al*'s enhancement to Arksey and O'Malley's framework for conducting scoping reviews.

Data sources Medline (Ovid), Embase (Ovid), PsycINFO, CINAHL, Cochrane and ISI Web of Science article databases were searched from 1 January 2009 through 28 February 2019.

Eligibility criteria for selecting studies We included studies that (1) are about care transition processes associated with unnecessary psychiatric readmissions and (2) specify use of at least one readmission time interval (ie, the time period since previous discharge from inpatient care, within which a hospitalisation can be considered a readmission).

Data extraction and synthesis We assessed review findings through tabular and content analyses of the data extracted from included articles.

Results Our database search yielded 3478 unique articles, 67 of which were included in our scoping review. The included articles varied widely in their reported readmission time intervals used. They provided limited details regarding which readmissions they considered unnecessary and which risks they accounted for in their measurement. There were no perceptible trends in associations between the variation in these findings and the included studies' characteristics (eg, target population, type of care transition intervention).

Conclusions The limited specification with which studies report their approach to unnecessary psychiatric readmissions measurement is a noteworthy gap identified by this scoping review, and one that can hinder both the replicability of conducted studies and adaptations of study methods by future investigations. Recommendations stemming from this review include (1) establishing a framework for reporting the measurement approach, (2) devising enhanced guidelines regarding which approaches to use in which circumstances and (3) examining how sensitive research findings are to the choice of the approach.

BACKGROUND

Care transition for individuals being discharged from inpatient mental healthcare

Strengths and limitations of this study

► Closely following Levac *et al*'s established methodological framework for conducting scoping reviews, this study performed a comprehensive search of how unnecessary psychiatric readmissions are measured by studies concerned with inpatient to outpatient mental healthcare transitions.

► Aligning to the purpose of scoping reviews to identify current gaps in knowledge and establish a new research agenda, this review does not assess the effectiveness of the approaches mentioned by the included studies in measuring unnecessary psychiatric readmissions.

► There may exist other approaches to unnecessary psychiatric readmissions measurement used (1) by studies not concerned with care transitions or (2) within individual healthcare organisations, which have not been publicly shared through the mechanism of peer-reviewed journal articles that are indexed by the databases included in our review.

► This scoping review is a critical step towards enabling the field to evaluate various care transition interventions' comparative effects on unnecessary psychiatric readmission rates.

to outpatient settings is a growing focus for many healthcare delivery systems.[1 2] Drivers of this increased interest include inpatient treatment's high-resource requirements[3] (especially for longer and repeated inpatient stays), as well as individuals being able to better maintain family, work, educational and other responsibilities alongside outpatient treatment.[4] Studies of inpatient to outpatient mental healthcare transition processes, both observational[1 5] and interventional,[2 6] are thus on the rise, and many of them use the rate of post-discharge readmissions as an individual-level outcome measure to assess the quality of transition.[7 8] Readmission rate associated with a care setting is its proportion of individuals who are rehospitalised within a certain time period since their previous hospitalisation.

Defining readmission rate requires, at minimum, (1) specification of the time period (ie, readmission time interval), (2) classification of 're'hospitalisation (ie, related to the previous hospitalisation and therefore possibly unnecessary or preventable, as opposed to an unrelated hospitalisation due to a new care need), and (3) cases that should be included/excluded from consideration. These specifications are becoming more important now than ever, as healthcare policymakers, payers, and professional groups are increasingly paying attention to accurately identifying unnecessary readmissions and better incentivising their prevention.[9–13] However, it is unclear whether and how the increasingly prevalent studies of inpatient to outpatient mental healthcare transitions are defining each of these aspects of the measure.

Also unclear is whether there is a shared understanding by the field regarding which definition is appropriate for which mental healthcare circumstances. 3M Health Information Systems' Potentially Preventable Readmissions Classification System[14] offers a widely used proprietary methodology for measuring readmissions. It is difficult to glean from its publicly available information, however, what constitutes a meaningful readmission time interval and any mental health-specific considerations that need to be made when measuring unnecessary psychiatric readmissions.

Without established approaches to measuring unnecessary psychiatric readmissions (which, if not uniform, ought to at least be made explicit as to how they relate to or differ from one another), various transitional interventions using the measure cannot be adequately assessed alongside one another. Establishing widely usable, accepted and comparable approaches to this measurement means setting clear definitional parameters as to what constitutes an unnecessary psychiatric admission. Thus, as a first step towards being able to evaluate the interventions' comparative effects on unnecessary psychiatric readmission rates, we conducted a scoping review of peer-reviewed literature to delineate the current landscape of how published studies have approached measuring unnecessary psychiatric readmissions.

METHODS
We structured the scoping review according to Levac et al's enhancement[15] to Arksey and O'Malley's six-stage methodological framework for conducting scoping reviews.[16] The framework's stages are (1) defining the research question, (2) identifying relevant literature, (3) study selection, (4) data extraction, (5) collating, summarising and reporting the results, and (6) consultation process and engagement of knowledge users. We aligned to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews[17] (online supplemental file 1). Our team previously published a study protocol paper detailing the methods for this review[18]; briefly, they are summarised below.

Stage 1: defining the research question
Aligning the notion of 'unnecessary readmission' to Goldfield et al's[19] concept of 'potentially preventable readmission' (defined as a subsequent admission that occurs within the readmission time interval and is clinically related to a prior admission), the scoping review aimed to answer the following questions:
1. What durations are used as the unnecessary psychiatric readmission time interval?
2. What criteria are applied to designating a psychiatric readmission as unnecessary?
3. What risks are adjusted for in calculating unnecessary psychiatric readmission rates?

Stage 2: identifying relevant literature
We conducted a comprehensive review of the existing literature and evidence base to systematically examine what is known about measuring unnecessary psychiatric readmissions. Working with our institutions' librarians with extensive experience in building systematic and comprehensive search strategies, we iteratively developed our search strategy. In particular, we refined our search strategy to include terms that are often used interchangeably. For example, in addition to 'readmission,' our initial preliminary searches based on early iterations of the strategy helped us identify related terms to include, such as unnecessary hospitalisation, inappropriate hospitalisation, unplanned admission and unscheduled admission. We harvested search terms using benchmark article terms and subject headings, titles and abstracts of key articles, dictionaries, and synonyms and subject headings within Embase and PubMed's Medical Subject Headings database. We used Boolean logic and proximity operators to combine and refine the search terms. The search strategy was initially formulated for Medline (Ovid) (table 1), then further tailored as appropriate for use with Embase (Ovid), PsycINFO, CINAHL, Cochrane and ISI Web of Science article databases. These sources include relevant journals within the fields of medicine, health services and the social sciences, and were selected to capture a comprehensive sample of literature.

Stage 3: study selection
We screened peer-reviewed articles published in English from January 2009 through February 2019. We set the review time frame to start in 2009, so that it follows the 2008 publication of Goldfield et al's[19] concept of 'potentially preventable readmission,' to which we align our notion of 'unnecessary readmission'. We set the review time frame to end in February 2019, as we initiated our review tasks in March 2019. We included an article if it (1) concerns the adult mental health population, (2) measures psychiatric readmission rates, (3) is set in a healthcare context, (4) is conducted in (and explicitly mentions) the context of some care transition process that is either already being carried out (for non-intervention studies) or is being tested as an intervention (for intervention studies), and (5) specifies at least one readmission time interval used.

Table 1 Medline (Ovid) search strategy

Search term/ line number	Conceptual term of interest	Search term entered into Ovid-Medline	Number of hits
1	Mental disorders	psychiatric.ti. OR "mental disorder".ti. OR "mental disorders".ti. OR "mental illness".ti. OR "mentally ill".ti.	83 986
2	Inpatient psychiatric settings	Exp "Psychiatric hospitals"/ OR Exp "hospital Psychiatric Department"/ OR "Psychiatric treatment center".mp. OR "Psychiatric Hospital".mp. OR "psychiatric unit".mp. OR "psychiatric units".mp. OR "Mental Institution".mp. OR "Mental Hospital".mp. OR "Psychiatric Department".mp. OR "Psychiatric treatment centers".mp. OR "Psychiatric Hospitals".mp. OR "Mental Institutions".mp. OR "Mental Hospitals".mp. OR "Psychiatric Departments".mp. OR "Psychiatric Ward".mp. OR"psychiatric inpatient".mp. OR "psychiatric inpatients".mp.	41 507
3	Inpatient psychiatric admission	"psychiatric hospitalization".mp. OR "psychiatric hospitalizations".mp. OR "psychiatric readmission".mp. OR "psychiatric readmissions".mp. OR "psychiatric rehospitalization".mp. OR "psychiatric rehospitalizations".mp. OR "psychiatric admission".mp. OR "psychiatric admissions".mp	2905
5		1 or 2 or 3	110 553
6	Patient readmission	Exp "Patient Readmission"/	14 332
7	Readmission	Readmission*.mp. OR readmitted.ti.	28 315
8	Rehospitalisation	Rehospitali*.mp.	5515
9	Unnecessary admissions	"Unnecessary admission".mp. OR "preventable hospitalizations".mp. OR "preventable hospitalization".mp.	315
10		6 or 7 or 8 or 9	31 946
11		5 and 10	1747

We excluded editorials and other articles that report on individual viewpoints. For each of the title/abstract and full-text screening phases, the criteria were initially applied to 10% of articles to be screened, where two screeners (CW and BK) first independently screened, then compared with one another their individual decisions on, whether each article meets the criteria. For articles for which the individual decisions differed, the screeners held discussions to reach consensus. The resulting shared understanding of the criteria was applied to screening the remaining articles, for which CW and BK each served as the primary screener for a distinct half of the articles. For articles that the primary screener deemed as needing additional discussion, the non-primary screener among CW or BK served as the secondary screener, and discussions were held to reach consensus.

Stage 4: data extraction
Data extraction from articles to be included in the scoping review used an Excel[20] -based template. The template was piloted on 10% of articles to be reviewed, where CW served as the primary data extractor for half of the articles, and BK served as the secondary extractor, reviewing the same articles to verify and augment the extraction. The other half of the articles had BK as the primary data extractor and CW as the secondary extractor. Articles for which the primary and secondary data extractors did not agree on the extracted content were discussed to reach consensus. The resulting shared understanding of the approach to data extraction was applied to the remaining articles, for which CW and BK each served as the primary extractor for a distinct half of the articles. For articles that the primary extractor deemed as needing additional discussion, the non-primary extractor among CW or BK served as the secondary extractor, and discussions were held to reach consensus.

Stage 5: collating, summarising and reporting the results
Aligning to the specific questions that our scoping review aimed to answer (listed under the Stage 1: defining the research question section), we summarised findings along the dimensions of (1) readmission time interval, (2) unnecessary readmission definition and (3) case-mix adjustment approach used by our reviewed articles. We also assessed the extracted data for any prevalent trends in study characteristics across our reviewed articles, and independently reviewed the data to identify any emergent themes. We used constant comparison combined with consensus-building discussions[21] to finalise notable trends and themes to be reported.

Stage 6: consultation process and engagement of knowledge users
We closely engaged our multidisciplinary research colleagues and partnered healthcare system representatives for each of stages 1 through 5 above. These

individuals we consulted have clinical and administrative expertise in mental healthcare services, as well as in how the services are structured and integrated to be delivered across different levels of the mental healthcare system. They included front-line practitioners, leadership of local, regional and national care networks, and health services researchers with expertise in care transitions and admissions data.

Patient and public involvement

Our consultants included patient representatives who helped shape the research team's study steps. These representatives came to be involved with our work through the first author's research centre (Center for Healthcare Organization and Implementation Research (CHOIR), a Department of Veterans Affairs Health Services Research and Development Center of Innovation)'s established Veteran Engagement in Research Group (VERG). VERG is a CHOIR-based community that is explicitly chartered to engage veterans and their family members as active partners in research through communication regarding opportunities to be involved, codevelopment of research ideas and collaboration on tasks. The representatives played a key role in helping us understand the current status of readmissions and formulating the questions that our scoping review focused on answering. They were consulted on developing the criteria for study selection and disseminating our findings to the larger healthcare community beyond the scientific community.

RESULTS
Characteristics of reviewed articles

The database searches identified 3478 unique articles (figure 1). Through screening the title and abstract for each of these articles, 762 were designated for full-text screening. The full-text screening found 67 articles to include in the review, containing information related to measurement of unnecessary psychiatric readmissions in the context of some inpatient to outpatient care transition process.[1 2 6 8 22–84] Included studies were conducted in 19 different countries—Australia, Brazil, Canada, China, Colombia, Denmark, Finland, France, Germany, Iran, Israel, Italy, Japan, Norway, Singapore, South Africa, Switzerland, the UK and the USA. Table 2 lists the characteristics of each included article. Table 3 presents a summary of findings from the included articles. The articles spanned original research to systematic reviews, and methods used included quantitative, qualitative and mixed-methods approaches. Seventeen of these articles reported on a randomised controlled trial of a care transition intervention.

Findings regarding the three research questions
Readmission time interval

We found wide variation in the readmission time intervals used by included studies, ranging from 7 days to 60 months. The most prevalent intervals were 1 month (including intervals specified as 28 or 30 days) and 12 months, used by 22 and 29 included studies (32.8% and 43.3%), respectively. Twenty studies (29.9%) used more than one readmission time interval (eg, 12 and 24 months), and eight studies (11.9%) used a unique interval that was not used by other included studies (eg, 210 days). Studies using the unit of 'month' for the readmission time interval did not address the variability of the number of days included in a month depending on the time of the calendar year.

Unnecessary readmission definition

Each of our included studies, per our inclusion criteria mentioned above, was a study conducted in the context of some care transition process that the study examined for potential association with unnecessary psychiatric readmissions (ie, readmissions that should be minimised). Only two included studies, however, reported within a single article,[29] specified a criterion by which they excluded a readmission from being considered unnecessary—namely, when the readmission was deemed a component of their planned care transition process. Otherwise, included studies did not make explicit the criteria that they applied to designating a readmission as unnecessary.

Case-mix adjustment approach

Forty-nine of the included studies (73.1%) did not specify risk adjustments that they made in calculating readmission rates. The most prevalent variables for which adjustments were specified were clinical (including diagnosis), service use, and sociodemographic, specified by 12, 13 and 14 included studies (17.9%, 19.4% and 20.9%), respectively. Thirteen studies (19.4%) specified adjustments for more than one type of variable (eg, service use and sociodemographic). Adjustments for geographical area and insurance type variables were specified by two and three included studies (3.0% and 4.5%), respectively, and healthcare site variables and homelessness variables were specified as having been adjusted for by one included study (1.5%) each.

Additional findings from the review
Study setting

Forty-eight of the included studies (71.6%) were conducted in the setting of one or more freestanding psychiatric hospitals (nine of which also involved community settings), while 10 (14.9%) were conducted at general hospitals or healthcare systems offering inpatient psychiatric services. Three studies (4.5%) were conducted in community settings only (eg, not specific to or managed by one or more hospitals or healthcare systems), and psychiatric prison units and residential programmes were the focus of one included study (1.5%) each.

Target population

Each of our included studies, per our inclusion criteria, concerned the adult mental health population. Seventeen studies (25.4%) specified taking into consideration
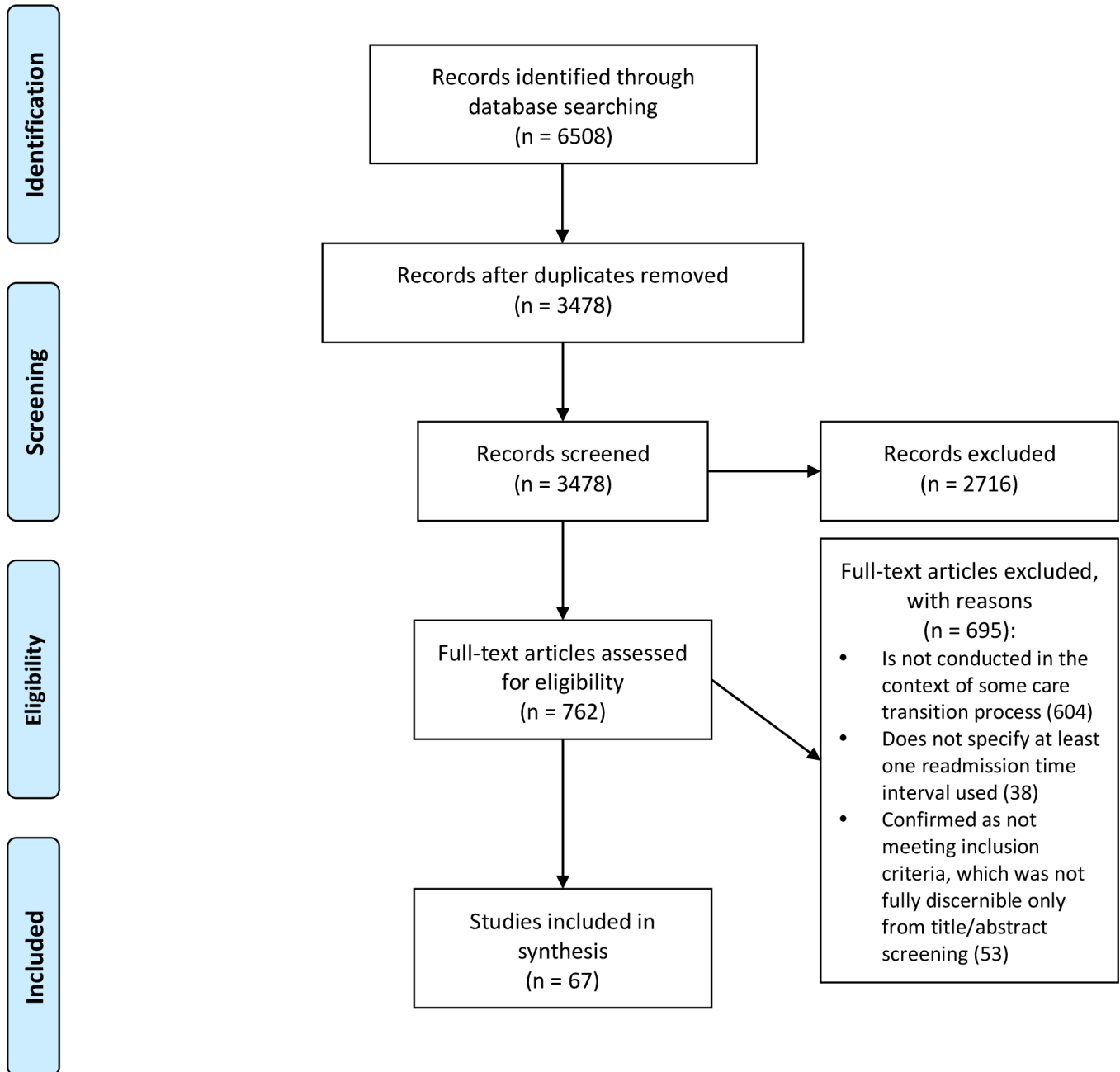
Identification

Screening

Eligibility

Included

Records identified through
database searching
(n = 6508)

Records after duplicates removed
(n = 3478)

Records screened
(n = 3478)

Records excluded
(n = 2716)

Full-text articles assessed
for eligibility
(n = 762)

Full-text articles excluded,
with reasons
(n = 695):
- Is not conducted in the
  context of some care
  transition process (604)
- Does not specify at least
  one readmission time
  interval used (38)
- Confirmed as not
  meeting inclusion
  criteria, which was not
  fully discernible only
  from title/abstract
  screening (53)

Studies included in
synthesis
(n = 67)

Figure 1 Flow chart of the scoping review. From Moher *et al*. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA statement. PLoS Med. 2009;6:e1000097. For more information, visit www.prisma-statement.org.

their population's substance use diagnoses, while one and two studies (1.5% and 3.0%) specified considering their population's medical diagnoses and both substance use and medical diagnoses, respectively. Seventeen studies (25.4%) focused specifically on one or more mental health disorder type (eg, depressive disorders, psychotic disorders). Six, three and three studies (9.0%, 4.5% and 4.5%) were on military veterans, Medicaid enrollees and male individuals, respectively. Individuals with experience of homelessness and justice-involved individuals were the focus of two studies (3.0%) each, and one study (1.5%) focused on individuals aged 65 and over.

Sample size and comparisons conducted
Sample size among the included studies varied widely, ranging from 23 to 60 254 participants among the studies that specified a sample size. Of the 13 studies (19.4%) that did not specify sample sizes, 7 were literature reviews and 2 were study protocols. Twenty-seven studies (40.3%) examined comparisons with usual care, while 20 studies (29.9%) did not have comparison groups.

Voluntariness of readmissions
Forty-eight studies (71.6%) did not specify whether they were differentiating between voluntary and involuntary readmissions. Of the remaining 19 studies (28.4%), 12

Table 2 Characteristics of articles included in the scoping review

Author(s)	Publication year	Country	Design	Healthcare context and setting	Study/target population	Diagnoses and comorbidities	Care transition process category	Sample size	Control	Voluntariness of re/admissions	Readmission time interval	Criteria for designating a readmission as unnecessary	Criteria for excluding a readmission from being considered unnecessary	Risk adjustments in calculating readmission rates
Baeza et al[22]	2018	Brazil	Observational	Hospital(s)	Adults	Mental health disorders	Outpatient follow-up	401	No control	Unspecified	12 months	Unspecified	Unspecified	Unspecified
Barekatain et al[23]	2014	Iran	Randomised controlled trial	Hospital(s)	Adults	Bipolar I and schizophrenia/schizoaffective disorders	Outpatient follow-up; patient education	123	Usual care	Unspecified	12 months	Unspecified	Unspecified	Unspecified
Barker et al[24]	2011	UK	Observational	Community setting(s)	Adults	Mental health and substance use disorders	Outpatient follow-up	Unspecified	Historical control(s)	Both involuntary and voluntary	7 days–12 months	Unspecified	Unspecified	Unspecified
Bastiampillai et al[25]	2010	Australia	Observational	Psychiatric hospital(s)	Adults	Mental health disorders	Community liaison; outpatient follow-up	Unspecified	Historical control(s)	Unspecified	28 days	Unspecified	Unspecified	Unspecified
Bernet[26]	2013	USA	Observational	Healthcare system(s)	Adults (military veterans)	Mental health and substance use disorders	Outpatient follow-up	124	No control	Unspecified	12 months	Unspecified	Unspecified	Sociodemographic variables
Bonsack et al[27]	2016	Switzerland	Randomised controlled trial	Community setting(s) and psychiatric hospital(s)	Adults	Mental health disorders	Care coordination; community liaison; discharge planning; outpatient follow-up; patient education	102	Usual care	Unspecified	12 months	Unspecified	Unspecified	Clinical and sociodemographic variables
Botha et al[28]	2018	South Africa	Quasi-experimental	Psychiatric hospital(s)	Adults (male)	Serious mental illnesses	Outpatient follow-up; patient education	120	Patients who had been discharged on non-recruitment days during the same time period	Unspecified	90 days	Unspecified	Unspecified	Unspecified
Burns et al[29]	2016	UK	Randomised controlled trial	Community setting(s) and psychiatric hospital(s)	Adults	Psychotic disorders	Outpatient follow-up	333 (study 1 of 2); 330 (study 2 of 2)	Patients without community treatment orders	Both involuntary and voluntary	12 months (study 1 of 2); 36 months (study 2 of 2)	Unspecified	Recall to hospital of a patient on a community treatment order (CTO), as this is understood as being part of the CTO process rather than an outcome (if a recall ended in the CTO being revoked, then considered a readmission, calculated from the first day of the recall)	Unspecified
Bursac et al[30]	2018	USA	Quasi-experimental	Psychiatric prison unit(s)	Adults (male and justice-involved)	Mental health disorders	Care coordination; community liaison; discharge planning; patient education	30	Patients who are frequently rehospitalised and participants themselves pre-intervention	Involuntary	15 days	Unspecified	Unspecified	Unspecified
Callaly et al[31]	2010	Australia	Observational	Psychiatric hospital(s)	Adults	Mental health disorders	Outpatient follow-up	115	No control	Unspecified	28 days	Unspecified	Unspecified	Unspecified
Chen et al[32]	2019	China	Randomised controlled trial	Psychiatric hospital(s)	Adults	Bipolar I disorder	Patient education	140	Usual care	Unspecified	12 months	Unspecified	Unspecified	Service use variables
Clibbens et al[33]	2018	Various (predominantly middle-income to high-income countries)	Rapid review	Community setting(s) and psychiatric hospital(s)	Adults	Mental health disorders	Discharge planning	Various	Various	Unspecified	Various (28, 30 days)	Unspecified	Unspecified	Unspecified
Currie et al[34]	2018	Canada	Observational	Community setting(s) and psychiatric hospital(s)	Adults (with experience of homelessness)	Mental health disorders	Outpatient follow-up	497	No control	Unspecified	2, 6, 12 months	Unspecified	Unspecified	Service use and sociodemographic variables

Continued

Table 2 Continued

Author(s)	Publication year	Country	Design	Healthcare context and setting	Study/target population	Diagnoses and comorbidities	Care transition process category	Sample size	Control	Voluntariness of re/admissions	Readmission time interval	Criteria for designating a readmission as unnecessary	Criteria for excluding a readmission from being considered unnecessary	Risk adjustments in calculating readmission rates
Dixon et al[35]	2009	USA	Randomised controlled trial	Healthcare system(s)	Adults (military veterans)	Serious mental illnesses	Community liaison; discharge planning; outpatient follow-up; patient education	135	Usual care	Unspecified	6 months	Unspecified	Unspecified	Healthcare site variables
Donisi et al[36]	2016	Various (Australia, Canada, Colombia, Egypt, Germany, Ireland, Israel, Japan, Malaysia, New Zealand, Saudi Arabia, Taiwan, UK, USA)	Systematic review	Community setting(s) and psychiatric hospital(s)	Adults	Mental health disorders	Various	Various	Various	Both involuntary and voluntary	Various (30 days; 1–12 months; more than 1 year)	Unspecified	Unspecified	Various variables (including clinical, service use and sociodemographic)
Faurholt-Jepsen et al[37]	2017	Denmark	Randomised controlled trial	Psychiatric hospital(s)	Adults	Unipolar and bipolar disorders	Patient education	To be determined (study not completed at time of publication)	Usual care	Unspecified	3, 6 months	Unspecified	Unspecified	Service use and sociodemographic variables
Fullerton et al[38]	2016	USA	Observational	Various	Adults (Medicaid enrollees)	Mental health, substance use and medical disorders	Outpatient follow-up	32 037	Patients with similar propensity scores who did not receive intermediate services	Unspecified	90 days	Unspecified	Unspecified	Unspecified
Giacco et al[39]	2018	Various (Australia, Japan, Switzerland, UK)	Systematic review	Psychiatric hospital(s)	Adults	Mental health disorders	Various	Various	Various	Both involuntary and voluntary	Various (12 months; 12, 24 months; unspecified)	Unspecified	Unspecified	Unspecified
Gouzoulis-Mayfrank et al[40]	2015	Germany	Randomised controlled trial	Psychiatric hospital(s)	Adults	Schizophrenia/schizophreniform/schizoaffective and substance use disorders	Outpatient follow-up; patient education	100	Usual care	Voluntary	3, 6, 12 months	Unspecified	Unspecified	Unspecified
Grinshpoon et al[41]	2011	Israel	Observational	Psychiatric hospital(s)	Adults	Mental health disorders	Outpatient follow-up	908	No control	Unspecified	180 days	Unspecified	Unspecified	Various variables
Habit et al[42]	2018	USA	Quasi-experimental	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Information provision	Unspecified	No control	Unspecified	30 days	Unspecified	Unspecified	Unspecified
Hanrahan et al[43]	2014	USA	Randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health and major medical (eg, diabetes, asthma, cancer) disorders	Outpatient follow-up; patient education	40	Usual care	Unspecified	30 days	Unspecified	Unspecified	Unspecified
Hegedüs et al[44]	2018	Switzerland	Pilot/exploratory	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Patient education	29	Usual care	Unspecified	7 days	Unspecified	Unspecified	Unspecified
Hengartner et al[45]	2017	Switzerland	Secondary analysis following a randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Community liaison; discharge planning; outpatient follow-up	151	Usual care	Both involuntary and voluntary	12 months	Unspecified	Unspecified	Unspecified
Hengartner et al[46]	2016	Switzerland	Randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Community liaison	151	Usual care	Unspecified	3, 12 months	Unspecified	Unspecified	Unspecified
Hennemann et al[47]	2018	Various (Finland, Germany, Hungary, the Netherlands, Sweden)	Systematic review	Various	Adults	Mental health disorders	Patient education	Various	Various	Unspecified	Various (4, 9, 12, 18, 24 months)	Unspecified	Unspecified	Unspecified
Hutchison et al[48]	2019	USA	Observational	Psychiatric hospital(s)	Adults (Medicaid enrollees)	Mental health and substance use disorders	Community liaison; outpatient follow-up	1724	Usual care	Unspecified	30 days	Unspecified	Unspecified	Diagnosis, geographical area, service use and sociodemographic variables
Kidd et al[49]	2016	Canada	Quasi-experimental	Psychiatric hospital(s)	Adults	Serious mental illnesses	Community liaison; outpatient follow-up	23	No control	Unspecified	1, 6 months	Unspecified	Unspecified	Unspecified

Continued

Table 2 Continued

Author(s)	Publication year	Country	Design	Healthcare context and setting	Study/target population	Diagnoses and comorbidities	Care transition process category	Sample size	Control	Voluntariness of re/admissions	Readmission time interval	Criteria for designating a readmission as unnecessary	Criteria for excluding a readmission from being considered unnecessary	Risk adjustments in calculating readmission rates
Kim et al[49]	2011	USA	Observational	Hospital(s)	Adults (military veterans)	Mental health and substance use disorders	Outpatient follow-up	53 363	No control	Unspecified	84 days (other than study period)	Unspecified	Unspecified	Diagnosis, insurance type, service use and sociodemographic variables
Kisely et al[50]	2014	Various (UK, USA)	Systematic review	Community setting(s)	Adults	Serious mental illnesses	Outpatient follow-up	Various	Usual care	Unspecified	Various (11–12, 12 months)	Unspecified	Unspecified	Unspecified
Kolbasovsky[51]	2009	USA	Quasi-experimental	Psychiatric hospital(s)	Adults	Mental health disorders	Community liaison; outpatient follow-up; patient education	652	Historical control(s)	Unspecified	30 days	Unspecified	Unspecified	Diagnosis, insurance type, service use and sociodemographic variables
Kurdyak et al[1]	2018	Canada	Observational	Psychiatric hospital(s)	Adults	Schizophrenia	Outpatient follow-up	19 132	No physician follow-up	Unspecified	210 days	Unspecified	Unspecified	Clinical, geographical area, service use and sociodemographic variables
Lay et al[52]	2015	Switzerland	Randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Patient education; outpatient follow-up	238	Usual care	Involuntary	12 months	Unspecified	Unspecified	Unspecified
Lay et al[53]	2012	Switzerland	Randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health disorders	Patient education; outpatient follow-up	To be determined (study not completed at time of publication)	Usual care	Both involuntary and voluntary	12, 24 months	Unspecified	Unspecified	Unspecified
Lee et al[54]	2015	China	Quasi-experimental	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Outpatient follow-up	210	Usual care	Unspecified	6, 12, 18 months	Unspecified	Unspecified	Unspecified
Liem and Lee[55]	2013	China	Systematic review	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Outpatient follow-up	140	Usual care	Unspecified	12, 24 months	Unspecified	Unspecified	Unspecified
Mattei et al[56]	2017	Italy	Observational	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Patient education	52	Not taking part in any psychoeducation groups/rehabilitation activities	Both involuntary and voluntary	6 months	Unspecified	Unspecified	Unspecified
McDonagh et al[57]	2018	USA	Quasi-experimental	Hospital(s)	Adults (military veterans)	Mental health disorders	Care coordination; patient education	Unspecified	No control	Unspecified	30 days	Unspecified	Unspecified	Unspecified
Nubukpo et al[58]	2016	France	Observational	Psychiatric hospital(s)	Adults	Mental health and substance use disorders	Outpatient follow-up	330	No control	Unspecified	24 months	Unspecified	Unspecified	Unspecified
Ortiz[59]	2018	USA	Observational	Psychiatric hospital(s)	Adults	Mental health disorders	Care coordination; outpatient follow-up	60 254	No control	Both involuntary and voluntary	30 days	Unspecified	Unspecified	Diagnosis and service use variables
Passley-Clarke[60]	2018	USA	Quasi-experimental	Psychiatric hospital(s)	Adults	Mental health disorders	Patient education	216 patients, 2 staff	No control	Unspecified	30 days	Unspecified	Unspecified	Unspecified
Perez et al[61]	2017	Colombia	Observational	Psychiatric hospital(s)	Adults	Mental health disorders	Outpatient follow-up	224	No control	Unspecified	12 months	Unspecified	Unspecified	Unspecified
Prochaska et al[62]	2014	USA	Randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health disorders	Patient education	224	Usual care	Both involuntary and voluntary	3, 6, 12, 18 months	Unspecified	Unspecified	Clinical variables
Rabovsky et al[63]	2012	Switzerland	Randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health disorders	Patient education	87	Open social activity group	Unspecified	12 months	Unspecified	Unspecified	Unspecified
Rios et al[64]	2018	Norway	Randomised controlled trial	Community setting(s) and psychiatric hospital(s)	Adults	Mental health disorders	Community liaison; outpatient follow-up	41	Usual care	Voluntary	12 months	Unspecified	Unspecified	Unspecified
Rothbard et al[65]	2012	USA	Quasi-experimental	Psychiatric hospital(s)	Adults	Mental health disorders	Outpatient follow-up	176	Usual care	Involuntary	12 months	Unspecified	Unspecified	Clinical, diagnosis, insurance type, service use and sociodemographic variables

Continued

Table 2 Continued

Author(s)	Publication year	Country	Design	Healthcare context and setting	Study/target population	Diagnoses and comorbidities	Care transition process category	Sample size	Control	Voluntariness of re/admissions	Readmission time interval	Criteria for designating a readmission as unnecessary	Criteria for excluding a readmission from being considered unnecessary	Risk adjustments in calculating readmission rates
Rowley et al[68]	2014	UK	Pilot/exploratory	Psychiatric hospital(s)	Adults (male)	Mental health, substance use and medical disorders	Care coordination; discharge planning	50 staff	No control	Unspecified	1 month	Unspecified	Unspecified	Unspecified
Shaffer et al[2]	2015	USA	Quasi-experimental	Community setting(s)	Adults	Mental health disorders	Community liaison; outpatient follow-up	149	Historical control(s)	Unspecified	30, 31–180 days	Unspecified	Unspecified	Diagnosis, service use and sociodemographic variables
Shimada et al[67]	2016	Japan	Non-controlled intervention	Psychiatric hospital(s)	Adults	Schizophrenia	Outpatient follow-up	44	Group occupational therapy only	Unspecified	12 months	Unspecified	Unspecified	Unspecified
Simpson et al[68]	2014	UK	Pilot/exploratory	Psychiatric hospital(s)	Adults	Mental health disorders	Outpatient follow-up	46	Usual care	Unspecified	1, 3 months	Unspecified	Unspecified	Unspecified
Sledge et al[69]	2011	USA	Randomised controlled trial	Psychiatric hospital(s)	Adults	Serious mental illnesses	Outpatient follow-up	74	Usual care	Unspecified	9 months	Unspecified	Unspecified	Unspecified
Sloan et al[70]	2010	USA	Quasi-experimental	Hospital(s)	Adults (military veterans)	Mental health and substance use disorders	Outpatient follow-up	1409	Patients discharged while in the continuity of care model	Unspecified	30 days	Unspecified	Unspecified	Unspecified
Taylor et al[71]	2016	USA	Observational	Psychiatric hospital(s)	Adults (Medicaid enrollees)	Mental health disorders	Patient education	195	Usual care	Both involuntary and voluntary	30 days	Unspecified	Unspecified	Homelessness, service use and sociodemographic variables
Thambyrajah et al[72]	2014	Singapore	Observational	Various	Adults	Mental health disorders	Community liaison	88	No control	Unspecified	12 months	Unspecified	Unspecified	Unspecified
Thomas and Rickwood[73]	2013	Various (UK, USA)	Systematic review	Various	Adults	Mental health disorders	Outpatient follow-up	Various	Various	Voluntary	Various (12, 37–42 months)	Unspecified	Unspecified	Unspecified
Tomita et al[74]	2014	USA	Secondary analysis following a randomised controlled trial	Residential programme(s)	Adults (with experience of homelessness)	Serious mental illnesses	Community liaison	150	Usual care	Unspecified	13.5–18 months	Unspecified	Unspecified	Unspecified
Tomko et al[75]	2013	USA	Observational	Hospital(s)	Adults	Mental health and substance use disorders	Patient education; outpatient follow-up	504	Patients excluded from the discharge medication service (eg, due to being a part of other treatment teams)	Unspecified	30 days	Unspecified	Unspecified	Unspecified
Valimaki et al[76]	2017	Finland	Randomised controlled trial	Psychiatric hospital(s)	Adults	Psychotic disorders	Information provision; patient education	1139	Usual care	Both involuntary and voluntary	12 months	Unspecified	Unspecified	Unspecified
Videbech and Deleuran[77]	2016	Denmark	Research database construction	Community setting(s) and psychiatric hospital(s)	Adults	Depressive disorders	Outpatient follow-up	54 001	Not applicable (study is on constructing a research database)	Unspecified	30 days	Unspecified	Unspecified	Unspecified
Vigod et al[78]	2013	Various (USA, other high-income countries)	Systematic review	Various	Adults	Mental health disorders	Various	Various	Various	Voluntary	Various (3, 6–24 months)	Unspecified	Unspecified	Unspecified
Vijayaraghavan et al[7]	2015	USA	Observational	Community setting(s) and psychiatric hospital(s)	Adults	Mental health and substance use disorders	Outpatient follow-up	4663	No control	Unspecified	30 days	Unspecified	Unspecified	Diagnosis, service use and sociodemographic variables
Von Wyl et al[9]	2013	Switzerland	Randomised controlled trial	Psychiatric hospital(s)	Adults	Mental health disorders	Community liaison; discharge planning; outpatient follow-up; patient education	160	Usual care	Unspecified	3, 12 months	Unspecified	Unspecified	Unspecified
Wong[80]	2015	China	Observational	Hospital(s)	Adults (aged 65 and over)	Mental health disorders	Outpatient follow-up	368	No control	Unspecified	1, 3, 6, 12, 18, 24 months	Unspecified	Unspecified	Sociodemographic variables
Xiao et al[81]	2015	China	Observational	Psychiatric hospital(s)	Adults	Schizophrenia	Outpatient follow-up	876	No control	Unspecified	12 months	Unspecified	Unspecified	Unspecified

Continued

Table 2 Continued

Author(s)	Publication year	Country	Healthcare context and setting	Design	Study/target population	Diagnoses and comorbidities	Care transition process category	Sample size	Control	Voluntariness of re/admissions	Readmission time interval	Criteria for designating a readmission as unnecessary	Criteria for excluding a readmission from being considered unnecessary	Risk adjustments in calculating readmission rates
Yates et al[82]	2010	USA	Psychiatric hospital(s)	Non-controlled intervention	Adults (justice-involved)	Mental health and substance use disorders	Patient education	145	No control	Unspecified	6–60 months	Unspecified	Unspecified	Unspecified
Zisman-Ilani et al[83]	2018	Israel	Psychiatric hospital(s)	Quasi-experimental	Adults	Mental health disorders	Discharge planning	101	Usual care	Unspecified	6–12 months	Unspecified	Unspecified	Unspecified
Zuehlke et al[84]	2016	USA	Hospital(s)	Quality improvement	Adults (military veterans)	Mental health disorders	Care coordination; discharge planning	352 patients, 27 staff	No control	Unspecified	30 days	Unspecified	Unspecified	Unspecified

studies specified considering both voluntary and involuntary readmissions, while four and three studies considered only voluntary and involuntary readmissions, respectively.

Care transition processes

Guided by Burke *et al*'s Ideal Transition in Care (ITC) framework,[85] we assigned our included studies' associated care transition processes to six categories:

▶ *Care coordination* (eg, among different provider disciplines, interprofessional treatment teams and/or clinics), aligned to ITC's 'coordinating care among team members' component.

▶ *Community liaison* (eg, arranging for community-based case management services and/or enlisting help of social/community/informal supports), aligned to ITC's 'enlisting help of social and community supports' component.

▶ *Discharge planning* (eg, collaborative preparation with the patient and their family), aligned to ITC's 'discharge planning' component.

▶ *Information provision* (eg, reminders (eg, via telephone and/or postcards) to attend upcoming appointments), aligned to ITC's 'complete communication of information' and 'availability, timeliness, clarity and organisation of information' components.

▶ *Outpatient follow-up* (eg, including telephone check-ins, home visits, peer support and crisis teams, handled primarily by the hospital or healthcare system rather than by community programmes (in order to differentiate from care transition processes that are categorised as community liaison)), aligned to ITC's 'outpatient follow-up' component.

▶ *Patient education* (eg, for self-management via individual/family/group psychoeducation, regarding disorder-specific therapy and/or use of crisis cards), aligned to ITC's 'educating patients to promote self-management' component.

(Note: care transition processes exhibiting ITC's 'medication safety' and 'monitoring and managing symptoms' components were categorised as either *outpatient follow-up* or *patient education*, depending on whether the safety and management component of the process was conducted during outpatient follow-up or for patient education, respectively. ITC's 'advance care planning' component was not exhibited by our included studies' care transition processes.)

Forty-four studies' (65.7%) care transition processes exhibited *outpatient follow-up*, 24 (35.8%) exhibited *patient education*, and 11 (16.4%) exhibited both *outpatient follow-up* and *patient education*. The category of *information provision* was least prevalent and exhibited by care transition processes of two included studies (3.0%). Twenty-six studies' (38.8%) care transition processes exhibited more than one of the six categories.

Notably, there were no perceptible trends or emergent themes in associations between the findings regarding the three research questions (ie, readmission time interval, unnecessary readmission definition and case-mix

Table 3 Summary of findings from the 67 articles included in the scoping review

Domain	Summary of findings
Readmission time interval	► Wide variation from 7 days to 60 months ► Most prevalent were 1 and 12 months, reported by 32.8% and 43.3% of the included articles, respectively
Unnecessary readmission definition	► Only one article made explicit the criterion that was applied to designating a readmission as unnecessary (ie, preventable/avoidable)
Case-mix adjustment approach	► 73.1% of the articles did not specify risk adjustments that were made ► Most prevalently adjusted variables were clinical (including diagnosis; 17.9%), service use (19.4%) and sociodemographic (20.9%)
Study setting	► 71.6% of the articles reported on studies conducted in the setting of one or more psychiatric hospitals ► 14.9% reported on studies conducted at general hospitals/systems
Target population	► 25.4% of the articles reported on studies considering their population's substance use diagnoses ► 9.0% reported on studies of military veterans
Sample size and comparisons conducted	► Wide variation among studies reporting (23–60 254 participants) ► 40.3% and 29.9% of the articles reported on studies examining comparisons to usual care and having no comparisons, respectively
Voluntariness of readmissions	► 73.1% of the articles did not state whether they were differentiating between voluntary and involuntary readmissions ► 17.9% stated including both voluntary and involuntary readmissions
Care transition processes	► 65.7% and 35.8% of the articles were on care transition processes involving outpatient follow-up and patient education, respectively (these and other process categories are defined in the main text)

adjustment approach), and the included studies' setting, target population, sample size, comparisons conducted, voluntariness of readmissions or categories of care transition processes.

DISCUSSION

As healthcare systems increasingly focus on enhancing inpatient to outpatient mental healthcare transitions, care transition interventions in support of this effort are being actively observed, devised and tested. Unnecessary psychiatric readmissions is a commonly measured outcome for these investigations. However, conducting valid comparisons across different investigations is only possible if either (1) the measurement is approached in a standardised way or (2) deviations in approaches are made explicit. Our scoping review thus focused on examining how peer-reviewed published studies on care transition interventions have approached measuring unnecessary psychiatric readmissions.

The 67 articles included in our review varied widely in their reported readmission time intervals used. Only one article reported a criterion for not considering a readmission as unnecessary, and a majority of the articles did not specify risks that they adjusted for in calculating unnecessary psychiatric readmission rates. Each of (1) the time interval used, (2) readmissions that are considered unnecessary (ie, preventable) versus necessary (ie, not an indication of improvable care quality), and (3) risks that are accounted for are key specifications for calculating

the readmission rate as an outcome. Hence, the limited details with which these specifications are reported are a noteworthy gap identified by this scoping review, and one that can hinder both the replicability of conducted studies and adaptations of study methods by future investigations.

Variation in definitions used, or even variation in the level of measurement details reported, would be less of a concern if there were patterns to the variation that indicate different specifications' prevalence among subgroups of investigations (eg, for different diagnoses, for different study settings, for different types of care transition interventions, for different lengths of inpatient stay). For instance, if these patterns were present, there may be clinically appropriate reasons (even if not reported in detail) to guide future investigations' decisions for which specifications of time interval, unnecessariness criteria and risk adjustments to use when measuring unnecessary psychiatric readmissions. However, as noted above, this scoping review identified no perceptible trends in associations between the specifications and study characteristics. This gap in knowledge makes it difficult for future studies of care transition interventions to make informed decisions about how to measure unnecessary psychiatric readmissions in light of their specific study's characteristics.

These findings point to several directions in which future research can proceed to address the identified gaps. One direction is to establish a framework that studies can standardly use to specify and report their

approaches to measuring unnecessary psychiatric readmissions. Such a framework is imperative for subsequent development of a precise and shared taxonomy, which studies can use to describe their approaches so that their similarities and differences can be clearly understood. A second direction is to devise enhanced guidelines regarding readmission intervals, definitions of unnecessariness and risk adjustments that are especially relevant for specific study contexts (eg, particular target populations, types of intervention and/or lengths of inpatient stay). Both clinical and measurement expertise ought to be reflected in the development of such guidelines. Especially when applied to studying the impact of an intervention on readmissions, the guidelines can be extended to encompass important additional requirements regarding the intervention process, such as including intervention fidelity and the handling of the timing of implementing key intervention components (eg, time interval measurement should be appropriately adjusted in cases for which readmission is part of the intervention design). A third direction is to conduct empirical data-based investigations into how sensitive research findings are to specific choices of intervals, definitions and adjustments that are used for readmissions measurement. For example, if conclusions of studies using the measure are altered when using one definition of unnecessariness versus another, the aforementioned framework and guidelines should focus on requiring studies to justify their choice of definition.

Four limitations must be noted regarding this scoping review. First, the review does not assess the appropriateness of the unnecessary psychiatric readmissions measurement approaches used by the included studies (eg, whether a study's measurement approach was adequate in light of the study's research objectives). However, this closely aligns to the purpose of scoping reviews to (1) identify a current state of knowledge in the literature, (2) elucidate any gaps and (3) establish a new research agenda. Thus, the purpose of our scoping review was not to collate empirical evidence regarding which measurement approaches are appropriate for which types of studies concerned with care transition interventions. The main motivation for conducting this review is rather to make explicit the work that is still needed to establish clearly defined and comparable measurement approaches, so that studies of care transition interventions that report unnecessary psychiatric readmissions as an outcome can be appropriately compared alongside one another.

Second, there are alternative categorisations possible for data of each of our extracted domains (eg, 'serious mental illnesses' can be further specified into individual diagnoses), which can impact how our review's findings are interpreted. We decided on the categorisations that we used by balancing two considerations: (1) where possible, we adhered closely to the terminologies used by the included studies themselves in referring to the categories for which we were extracting data; (2) we sought close feedback through our consultation process on the broadness versus specificity of our categorisations in

order to allow the audience to comprehend our findings at a high level and also seek desired additional information by accessing our cited included studies.

Third, limiting the included studies to those concerning care transition interventions (as recommended by peer reviewers of our protocol to ensure feasibility of our review, given the widespread use of readmissions as a measure) could have led to findings that are less widely applicable to studies that measure unnecessary psychiatric readmissions but are not conducted in the context of care transition interventions. Additional reviews of such studies can be expected to identify, to varying extents, similar issues of studies using different definitions of unnecessary psychiatric readmissions and reporting limited details surrounding their choice of definition. Our recommendations above for future work (establishing a reporting framework, devising guidelines for measuring unnecessary readmissions and investigating the sensitivity of research findings to varied specifications of the readmissions measure) can in turn be applicable to psychiatric readmissions beyond those that are considered in the context of care transition interventions. Further, understanding how those other studies trend in their approaches to measuring unnecessary psychiatric readmissions, similarly to or differently from our included studies, will be important for establishing widely usable, accepted and comparable approaches to this measurement. It will be important for us and others to be mindful of the care transition focus of our search when building on this review in future research.

Fourth, there may exist unnecessary psychiatric readmissions measurement approaches that individual healthcare organisations use to assess their care transition interventions, which have not been publicly shared through the mechanism of peer-reviewed journal articles that are indexed by the databases included in our review. Other grey literature and non-English articles may also describe approaches that we did not include. As our research moves forward from this review to examine the evidence for appropriate measurement approaches, we will specifically plan for soliciting expert knowledge (as we have done through this scoping review's consultation process) from a wide range of healthcare researchers, practitioners, industry leaders and certainly individuals experiencing psychiatric readmissions to maximise our opportunity to learn of additional potential measurement approaches existent in the field.

CONCLUSIONS

Findings from this scoping review enable an increased understanding of how peer-reviewed published studies on care transition interventions have approached measuring unnecessary psychiatric readmissions. The articles included in our review varied widely in their reported readmission time intervals used, and they provided limited details regarding which readmissions they considered unnecessary and which risks they accounted for in

their measurement. For studies of care transition interventions that report unnecessary psychiatric readmissions as an outcome to be replicable, adaptable and appropriately comparable alongside one another, recommended steps for the field include (1) establishing a framework that studies can standardly use to specify and report their approaches to measuring unnecessary psychiatric readmissions, (2) devising enhanced guidelines regarding readmission intervals, definitions of unnecessariness and risk adjustments that are especially relevant for specific study contexts (eg, particular target populations and/or types of intervention), and (3) conducting empirical data-based investigations into how sensitive research findings are to specific choices of intervals, definitions and adjustments that are used for measurement.

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