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Reasons for Discharge in a National Network of Early Psychosis Intervention Programs

Peter L. Phalen[*,1], William R. Smith[2], Nev Jones[3], Samantha J. Reznik[4], C. Nathan Marti[4], John A. Cosgrove[5], Molly Lopez[4], Monica E. Calkins[2], and Melanie E. Bennett[1]

[1]Department of Psychiatry, University of Maryland School of Medicine, Baltimore, Maryland, USA; [2]Department of Psychiatry, University of Pennsylvania, Philadelphia, Pennsylvania, USA; [3]School of Social Work, University of Pittsburgh, Pittsburgh, Pennsylvania, USA; [4]Texas Institute for Excellence in Mental Health, Steve Hicks School of Social Work, University of Texas at Austin, Austin, Texas, USA; [5]Westat, Rockville, Maryland, USA

[*]To whom correspondence should be addressed; Division of Psychiatric Services Research, University of Maryland School of Medicine, 737 W Lombard St, Baltimore, MD 21201, USA; e-mail: pphalen@som.umaryland.edu

***Background*: Discharge from early psychosis intervention is a critical stage of treatment that may occur for a variety of reasons. This study characterizes reasons for discharge among participants in early psychosis intervention programs participating in the Early Psychosis Intervention Network (EPINET) which comprises >100 programs in the United States organized under 8 academic hubs. *Study Design*: We analyzed 1787 discharges, focusing on program completion, unilateral termination by the client/family, and lost contact with the client/family. We performed exploratory analyses of demographic, clinical, and functional predictors of discharge reason. Variables predictive of discharge type were included in multilevel logistic regressions, allowing for the estimation of predictors of discharge reason and variability in rates by program and hub. *Study Results*: An estimated 20%–30% of enrolled patients completed the program. Program completion rates were higher among participants who were older on admission, had lower negative symptoms severity, spent more time in education, employment, or training, and who were covered by private insurance (a close proxy for socioeconomic status). Programs were more likely to lose contact with male participants, Black participants, and participants who were never covered by private insurance. After accounting for patient-level factors, there was substantial program-level variation in all 3 discharge outcomes, and hub-level variability in the proportion of participants who completed the program. The impact of race on program completion varied substantially by program. *Conclusions*: Participants were discharged from early psychosis intervention services for diverse reasons, some of which were associated with sociocultural factors. Disengagement is a widespread problem affecting all hubs.**

Key words: schizophrenia/Coordinated Specialty Care/EPINET/early intervention/schizoaffective

Introduction

Discharge from early psychosis intervention services marks a key stage of treatment[1–3] and is a critical juncture for understanding clinical and functional outcomes.[4] Specialized early psychosis programs typically last for 2–5 years and individuals may transfer to higher, lower, or no services after program completion. However, people may leave treatment for a variety of reasons other than program completion, including self-initiated disengagement, administrative reasons (eg, ineligibility), transfer to residential services that preclude concurrent treatment, or physically moving outside their program's catchment area. Assessing reasons for patient discharge can help characterize treatment outcomes and provide insight into how well programs are serving participants.

Systematic reviews and meta-analyses have identified some predictors of early discharge from early psychosis services, including substance use, medication nonadherence, negative symptoms, minority status, low family involvement, and vocational participation.[5,6] These same reviews have found substantial cross-site and cross-national variation,[5,6] which may be partially attributable to differences in policy and political environments as well as the sociostructural barriers of the clientele that sites serve.

One notable limitation of studies of discharge from early psychosis programs is that they have typically focused on a binary outcome: comparing participants who are discharged before some specified duration to participants who continue engaging in treatment.[6,7] This dichotomization passes over the diversity of discharge contexts and risks framing all disengagement as negative. Discharges may occur for a complex variety of reasons, all of which may occur at *any* time after the initiation of treatment, not only on a timeline predetermined by program norms.[8] Some reasons for discharge are clearly negative (eg, patient death, or inability of the program to make contact with the patient), whereas others would typically be considered positive (eg, program completion, or leaving treatment early to pursue university or career opportunities). Still others have ambiguous valence (eg, moving out of the clinic's catchment area). Additionally, in line with recovery-oriented care, some people may find that they prefer different kinds of support (within or outside of the traditional mental health system). There is a need for research that considers the circumstances of discharge rather than its binary occurrence.

A second limitation of previous research on discharge from early psychosis services is that these studies have typically focused on single programs or small networks of early psychosis programs, whereas different programs are often quite variable in terms of treatment model, measurement, and setting.[6] An opportunity to address this limitation arose in late 2023 with the first release of a nationwide Early Psychosis Intervention Network (EPINET) dataset. The National Institute of Mental Health (NIMH) established EPINET in 2019 in the United States to create a learning health system that now encompasses over 100 early psychosis programs across eighteen of the United States managed by 8 distinct academic "hubs," with a centralized data governance and management system. All EPINET programs implement the Coordinated Specialty Care (CSC) model for early psychosis intervention, which typically consists of a multidisciplinary team composed of psychiatrists, therapists, peer support specialists, and supported education/employment specialists, providing generally time-limited (2–5 years) intervention for participants experiencing early psychosis.[9,10] Data from the EPINET initiative were released for the first time in fall 2023, enabling the research community to examine variability in reasons for discharge across a very large, diverse sample from numerous CSC programs.

In the present study, we examine reasons for discharge and predictors of reasons for discharge in this national sample of CSC participants, as well as variability by program and hub. These analyses allow for the examination of critical areas of potential disparity, including ethnoracial identity, insurance status, age, and gender. In sum, we present the first American national description of reasons for discharge from early psychosis intervention programs using the largest United States early psychosis intervention dataset to date.

Methods

The current national EPINET dataset (as of May 1, 2024) consists of 16 722 assessments of 5166 patients drawn from 120 CSC programs organized under 8 hubs. A subset of these patients had discharge information available, representing an analytic sample of 6986 assessments of 1787 discharged patients from 96 programs across all 8 hubs. Twenty-nine patients had been recorded as discharging twice and 1 discharged 3 times. Given their small number, we selected only their longest program duration for analysis.

All EPINET hubs are required to use a standardized assessment package called the Core Assessment Battery (CAB), which is a patient- and program-level standard suite of measures that was developed collaboratively by the hubs' principal investigators, NIHM project officers, and the EPINET National Data Coordinating Center (ENDCC). The CAB includes both client- and clinician-reported items that assess multiple domains of early psychosis treatment and recovery. Although all EPINET hubs are required to administer the CAB, hubs can have distinct data collection policies and procedures. For example, CSC programs in the OnTrack New York hub are expected to administer the CAB every 3 months, whereas programs in all other hubs are expected to administer the CAB every 6 months. There is also some variation in the measures used. For example, while all hubs are required to administer the Colorado Symptom Index (CSI) for self-reported symptom severity, hubs are allowed to choose between the Brief Psychiatric Rating Scale (BPRS),[11] the COMPASS-10,[12] or the Positive and Negative Symptoms of Schizophrenia Scale (PANSS)[13] for clinician-rated symptom assessment. Finally, hub size varies considerably, with the sample size of discharged patients ranging from 43 to 522 between hubs.

As an administrative, real-world program evaluation, missing data were common. Of the 1787 discharged patients included in the present analysis, race was unreported or unknown for 211 patients, and age was unknown or unreported for 178 patients. Of the 3 clinician-rated symptom assessments described above, the BPRS and PANSS were overwhelmingly missing due to hubs mostly choosing to administer the COMPASS and were therefore not included in later analyses. Additionally, provider-rated medication adherence (which is often a strong predictor of disengagement[6]) was only available for approximately 7% of assessments, and thus was not sufficiently powered for our analysis.

Given patterns of data availability and prior findings of predictors for discharge,[5,6] we chose to examine the following potential predictors of discharge type: race/ethnicity, age, gender, health insurance coverage (public,

private, or uninsured, which is a close proxy for socioeconomic status (SES) among young people in the United States[14]), COMPASS-10 positive and negative symptom scores, Questionnaire about the Process of Recovery (QPR) scores, CSI scores, and proportion of assessments at which the patient was not in employment, education, or an internship (sometimes referred to as "NEET" for Not in Employment, Education, or Training). All analyses were confirmed as Not Human Subjects Research (NHRS) by the University of Maryland Baltimore Institutional Review Board.

Statistical Approach

Discharges were recoded into 8 categories: program completion, unilateral termination by the patient/family, lost contact with the patient, transfer to another program or moving out of the program catchment area, ineligibility for CSC, the pursuit of a positive opportunity such as education or career, incarceration or hospitalization, death, or "other." (Please see supplementary material for an R markdown that details all data preprocessing and analyses, as well as additional descriptive findings such as number of discharges by hub and rates of unrecoded discharge types.) The present article focuses on estimating the proportion of and predictors of program completion, unilateral termination by the patient/family, and lost contact. The categories of incarceration/hospitalization, pursuing a positive opportunity, ineligibility, death, and "other" were not separately modeled because they were infrequent, collectively comprising less than 20% of discharges and consisting of very small counts as individual categories (see Results for exact percentages). Results from modeling the "transferred or moved" category are included in supplementary material but not reported in the body of this article because the category is difficult to interpret and is in many instances likely unrelated to the process of treatment.

To determine potential predictors of program completion, unilateral termination, and lost contact, we initially performed exploratory analyses to assess their relationships with demographic, clinical, and functional variables. Variables that appeared predictive of either completion, unilateral termination, or lost contact were subsequently included in multilevel logistic regressions of discharge type. In each model, the focal discharge type (eg, program completion) was contrasted against all other discharge cases. Each multilevel model included random intercepts for program, hub, and race.[15] Given the possibility that race outcomes could be different at different programs or hubs, we also included varying intercepts for race by program and race by hub.

Sensitivity Analysis EPINET is an ongoing data collection effort, with many monitored patients still enrolled in treatment. As of the present analysis, discharge assessments were available for 35.2% of patients, with most of the remaining 64.8% of individuals presumably still enrolled in CSC (some proportion of these may also have missing discharge information). These 64.8% of patients could go on to experience any discharge outcome (program completion, unilateral termination, lost contact, or other). However, their ultimate enrollment duration will be on average longer than their latest observed enrollment duration, and enrollment duration is one of the strongest predictors of program completion (for each additional month in the program, odds of completion increase by 2.7 [95% CI: 2.4–3.1] in the present sample). Thus, a naive estimated proportion of patients who complete treatment assumed to match the observed proportion from among patients who have already discharged could produce an underestimate of completion for the total EPINET client population.

To account for this potential bias, we conducted a sensitivity analysis by refitting our multilevel model of program completion with CSC enrollment duration added as a predictor, and using this multilevel model to predict program completion in the currently enrolled sample under 3 plausible assumptions about enrollment duration outcomes: that the not-yet-discharged patients would ultimately be enrolled for (1) their own latest enrollment duration, (2) at least the average enrollment duration of patients with observed discharge, or (3) at least the upper quartile enrollment duration of patients with observed discharge. The outcomes of this analysis provide a plausible (1) lower bound, (2) point estimate, and (3) upper bound on national CSC program completion.

Reproducibility Statement

Please see supplementary material for a fully annotated markdown that provides all the R code used to carry out the above analytic strategy, including data preprocessing, exploratory analyses, and modeling, along with complete annotated code output. Analysts with access to the EPINET data portal can use this markdown to fully reproduce our results.

Results

There were 1787 discharges recorded in the national dataset. The majority of discharged clients had self-identified as male (63.3%). Clients were self-identified as Black (32.8%), White (29.4%), Hispanic (15.6%), Asian/Pacific Islander (5.1%), Multiracial (4.5%), and Other or Unknown (12.6%). The average age at admission was 21.9 years old (SD = 4.2).

Discharges were coded as being due to program completion (24.1%), unilateral termination by the patient/family (23.9%), transferring or moving (16.6%), lost contact with the patient and/or family (15.6%), ineligibility for CSC (4.8%), incarceration or hospitalization (1.7%),

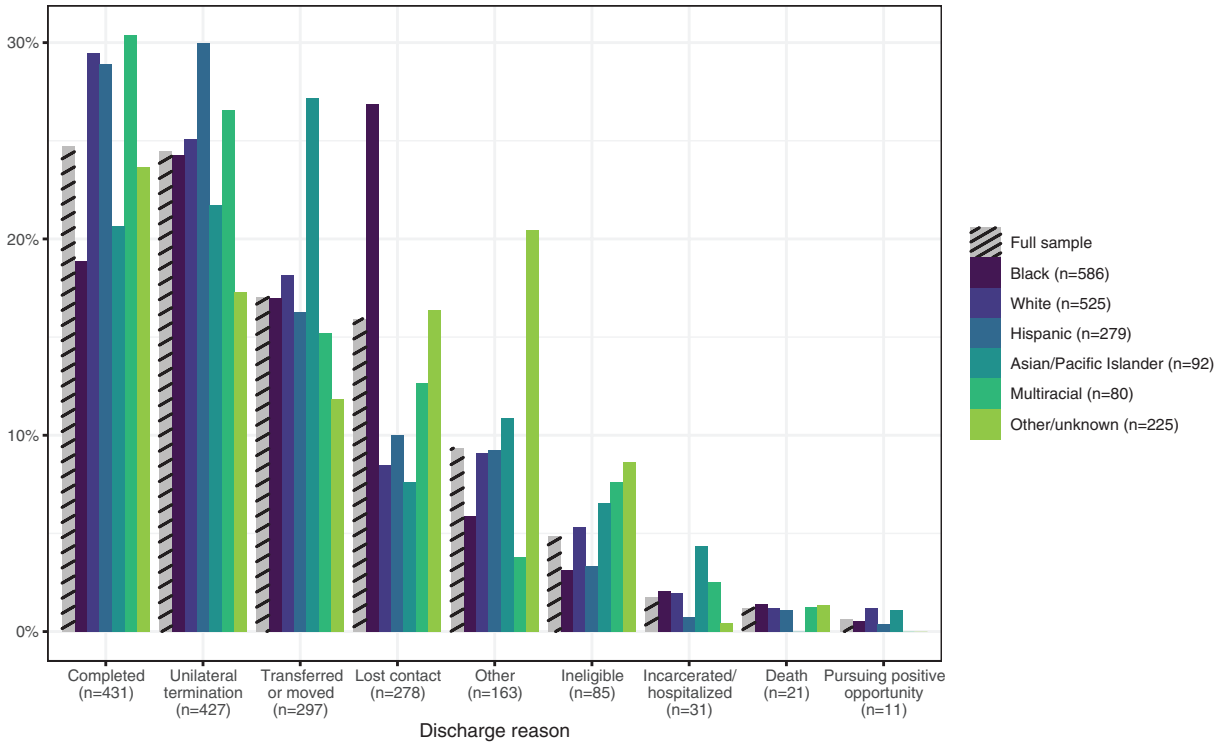

Fig. 1. Rates of discharge type by race/ethnicity. Discharge reasons are ordered from left to right by overall frequency.

death (1.2%), and pursuing a positive opportunity such as education or career (0.6%). Additionally, 9.1% were categorized as "Other," and 2.4% of discharge visits had missing reasons for discharge. Figure 1 displays the discharge rate by reason for the overall dataset and for each race/ethnicity.

All demographic variables showed an independent association with at least 1 discharge type and were thus included in multilevel logistic regressions with hub- and program-level variation estimated by the model. Additionally, higher average clinician-rated negative symptom severity (but not its trajectory over time) was significantly predictive of not completing the program (standardized OR = 0.4, 95% CI: 0.14–0.89), and higher average subjective levels of recovery (but not its trajectory over time) was predictive of *greater* likelihood of lost contact (standardized OR = 2.7, 95% CI: 1.4–6.1). Neither self-reported symptom severity, clinician-rated positive symptom severity, nor their trajectories over time showed significant relationships with any discharge outcome. (See Section 3 of supplementary material for detailed descriptive statistics and exploratory analyses.)

Figure 2 displays adjusted log odds for each predictor of program completion, discharge due to loss of contact, and discharge due to unilateral termination. Multilevel logistic regression suggested that patients who had a higher proportion of visits at which they were in employment, education, or internship were more likely to complete their CSC program (OR = 2.6, 95% CI: 1.4–2.4), as were those who were older on admission (standardized OR = 1.3, 95% CI: 1.1–1.6) and those who were ever on private insurance (OR = 1.8, 95% CI: 1.4–4.3). Patients with greater clinician-rated negative symptom severity were less likely to complete (standardized OR = 0.67, 95% CI: 0.5–0.8). Male participants were significantly more likely to be discharged due to lost contact (OR = 1.5, 95% CI: 1.1–2.1) and people who were ever on private insurance during treatment were less likely to be discharged due to lost contact (OR = 0.6, 95% CI: 0.46–0.88). There was substantial variability in lost contact by ethnoracial group, with significantly greater odds of lost contact for Black patients as compared with every other ethnoracial category except multiracial or "other" (White patients [OR = 3.0, 95% CI: 1.2–5.2], Asian/Pacific islanders [OR = 3.7, 95% CI: 1.2–8.5], and Hispanic [OR = 2.9, 95% CI: 1.2–5.4]). No other demographic variables were statistically significant.

After accounting for the above factors, there was substantial variability by program on all 3 outcomes: with the SD of the log odds of the program effect estimated at 0.66 (95% CI: 0.24–1.3) for program completion, 0.29 (95% CI: 0.01–0.75) for lost contact, and 0.29 (95% CI: 0.09–0.61) for unilateral termination. There was also substantial variability by hub with respect to the proportion of discharges that were completions (with an estimated SD of 1.31 [95% CI: 0.06–4.7] for the log odds). Finally, the relationship between race and program completion itself varied substantially by program (SD: 0.4 [95%

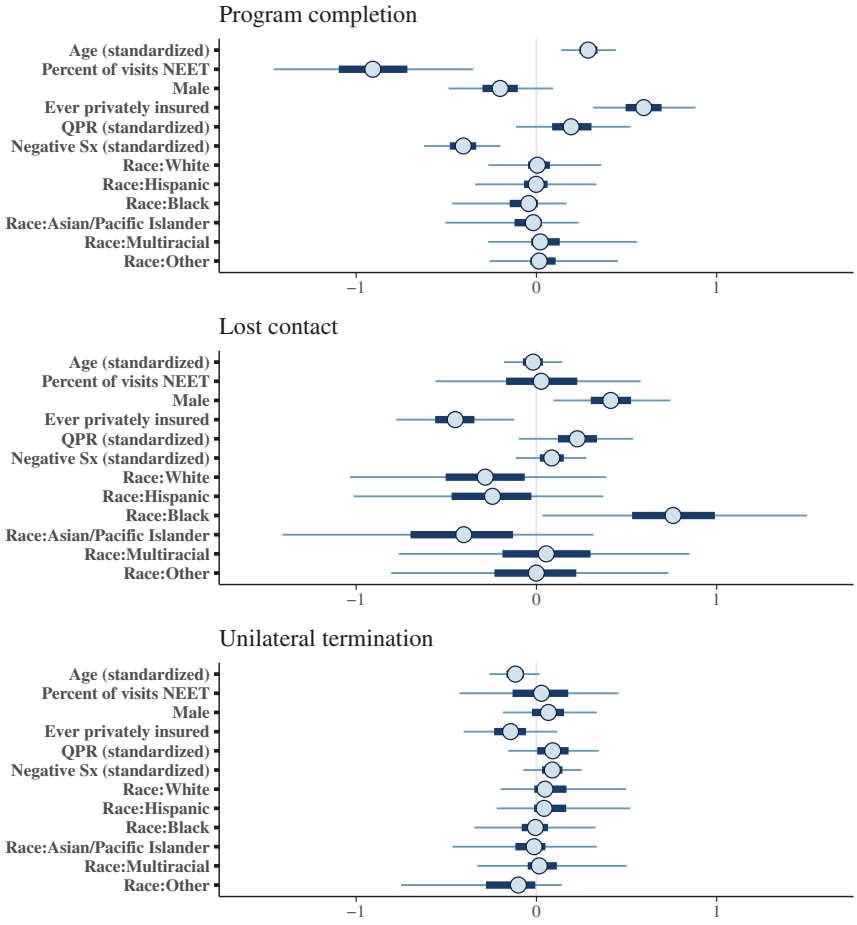

Fig. 2. Coefficient plot of estimated adjusted log odds of each outcome of interest for each discharge outcome, also adjusting for hub- and program-level variability. The inner bar displays the middle 50% credible intervals and the outer gives the middle 95% credible intervals. "NEET" means "Not in Employment, Education, or Training." QPR is the Questionnaire about the Process of Recovery.

CI: 0.05–1.0]), indicating that ethnoracial group had a stronger effect on the likelihood of completion at some programs than others.

Sensitivity Analysis

The average last observed enrollment duration for people with observed discharge was 16 months as compared with 13.7 months for people with unobserved discharge. Our multilevel model predicted the true in-sample program completion rate within 1 percentage point and had 87% accuracy against individual cases, suggesting a decent fit to the data. Program completion rates for the full sample (both observed and unobserved discharge) were point estimated as 20.2%, 23.8%, or 29.3%, respectively, on the 3 assumptions about program duration for patients who have not yet been discharged (corresponding to discharge at latest observed enrollment duration, a minimum eventual discharge at the 16-month average of those patients already discharged, and a minimum eventual discharge at the 24-month upper quartile of the sample with observed discharge).

Discussion

This study found that reasons for discharge and predictors of those reasons are heterogenous for CSC patients in the United States. 20%–30% of patients are likely to be categorized by their teams as having completed the program. About a quarter of patients choose to terminate services without completing the program, and about 15% are discharged from treatment because the program loses contact with them. Some clients leave treatment for positive reasons such as pursuing career or academic opportunities (0.6%), others discharge under manifestly unfortunate circumstances (such as death [1.2%] or hospitalization/incarceration [1.7%]), and a still larger proportion of clients (at least 17%) discharges for reasons that are neither clearly positive nor negative, such as transferring services or moving out of the service area.

We identified several sociodemographic predictors of discharge outcome, suggesting key equity issues that require further exploration. Clients were more likely to complete the program if they were more frequently engaged in work, education, or training during treatment, and if they were covered by private insurance. Programs

were also more likely to lose contact with clients who were never privately insured. While it is possible that private insurance coverage has a direct effect on outcomes, in the particular case of CSC we find this to be less likely given that the majority of CSC programs fund their services primarily through public sources such as Medicaid, state/local funding, and (in the majority of cases) the Community Mental Health Services Block Grant (MHBG) set-aside.[16] Instead, the measured effect of private insurance coverage is likely a proxy for the effect of higher socioeconomic status, which is very closely associated with private insurance among young people in the United States.[14] As such, these findings suggest that lower SES may be a risk factor for lower program completion and higher lost contact, reinforcing prior research that has concerningly suggested that CSC programs may be more effective for higher SES individuals.[17] Individuals with lower SES may have different priorities, needs (safe housing, food access, etc.), treatment outcomes, and mediators of treatment outcomes, and future research should explore how to better serve them.

Additionally, programs were more likely to lose contact with male clients and Black clients. The finding that programs were more likely to lose contact with Black clients is notable as a racial equity issue. Prior research has similarly found significant disparities for Black people in CSC programs[18] even adjusting for insurance status.[19] Racial discrimination or trauma impacts approximately 50% of young people at risk of psychosis[20] and is associated with increased negative psychosis experiences for Black individuals in the United States.[21,22] The results of the present study continue to highlight the pressing need to focus on meeting the needs of Black Americans with psychosis.[23]

We did not identify any significant patient-level predictors of unilateral termination by the service user or their family. Rationales for unilateral discharge were unmeasured and likely heterogenous. For example, unilateral termination could occur because a program was unhelpful or even harmful, but could also occur because the client believes the program has already met their goals or that further program involvement is unnecessary. The high rates of termination identified, and variation across programs, nevertheless raise concerns about the extent to which all CSC programs are achieving their goals of individualized person-centered, recovery-oriented, trauma-informed care. Given prior literature,[24] service user dissatisfaction with the treatment program is likely a strong mediator of early termination, and this finding speaks to the importance of investment in research focused on understanding the perspectives of clients who have disengaged and their insights into changes in policy and practice that might strengthen engagement.

Overall, our findings foreground the importance of additional practice-based research designed to ensure that CSC programs are meeting clients' needs. In particular, the high measured rates of discharge due to loss to contact and unilateral termination (together comprising 39.5% of client outcomes) indicate that there is a large-scale disengagement challenge for CSC in the US context and an urgent need to develop and evaluate strategies to more effectively engage and meet client needs.

Our estimated 70%–80% national non-completion rate is difficult to compare with other studies of early discharge and/or disengagement estimated from smaller networks of CSC services, because (as confirmed by our study) there is substantial true variability in rates of disengagement across programs even after accounting for demographics and other patient characteristics. For example, a Texas-based implementation study reported a 41% rate of disengagement within just 9 months[25] whereas a Connecticut-based clinic reported between 12 and 26% rates of disengagement over the entire 2-year treatment duration.[26] This variability may arise from a number of local factors with profound effects on CSC outcomes that may not be receiving sufficient attention in the literature, but comparison is challenging given the substantial variability in the operationalization of discharge or disengagement across studies.[6,7] For example, Melbourne's EPPIC program reported that only 7% of patients were disengaged by the end of their treatment program[27]; however, the authors characterized someone as reengaged if they called the treatment team to explain that they no longer wanted services, which in our study would have been coded as unilateral termination.

Strengths and Limitations

A major limitation of both the extant American and international literatures is an inattention to structural factors that may help explain reasons for discharge. Such factors may include relative social and structural disadvantage (poverty; housing instability; racism in healthcare and social service systems) as well as service user's own motivations for unilateral discharge from services and perceptions of the quality and effectiveness of care.[28–30] Service users were not involved in measure selection for the present study and structural factors were essentially unmeasured (we used insurance status as a proxy for SES, which has limitations[31]). Although available qualitative studies help illuminate potential mechanisms and processes underlying disengagement,[32,33] our findings suggest a need for substantially larger and more representative mixed methods research to further unpack the underpinnings of disengagement and sources of disconnect between programs and clients. Furthermore, there is a need for studies designed to model the likely complex mechanisms of disengagement. For example, our finding of an association between NEET status and program completion is open to a range of interpretations and could reflect confounding variables underlying both outcomes (such as unmeasured sociostructural disadvantage and discrimination[34]).

Our study has several major limitations typical of real-world data collection efforts. Hubs sometimes varied in how they coded discharges, with hub-level categories subsequently harmonized by the ENDCC insofar as possible before being released in the national EPINET dataset, but it was not always possible to match codes across hubs. For example, the Pennsylvania/Maryland hub (Connection Learning Healthcare System) allows programs to enter a distinct code for discharges due to ineligibility and applies that code to nearly 14% (n = 54) of their discharges, whereas the New York State hub (OnTrackNY) does not have such a code and so had zero discharges for that category in the ENDCC dataset. Beyond such hub-level variability, programs themselves may have differed due to a range of potential factors including program eligibility criteria, staffing, norms about program duration and discharge, and local availability of alternative mental health services.

Another major complication of the present study is that it includes data from ongoing, often recently established clinical programs and clients who are often still in treatment. Because it generally takes longer to complete a clinical program than it does to (eg) unilaterally leave it, time in treatment is a strong predictor of program completion. The subset of clients in the dataset who have already discharged may therefore be disproportionately less likely to have completed it, and those clients who have not yet discharged may be increasingly likely to complete treatment as they continue to progress through the program in the future. In an attempt to account for this concern, we modeled discharge outcomes for clients who had not yet discharged under several plausible assumptions about the length of time they would remain in the program, and reported an estimated overall program completion rate that correspondingly ranged between 20% and 30%. However, these estimates are necessarily model based (rather than observed) and rely on associated assumptions.

Finally, although EPINET affords the opportunity for the first national-level CSC study on discharge reasons in the United States, we cannot estimate the degree to which EPINET clinics may reflect the broader range of CSC practice in the United States or of early psychosis care in general. Moreover, the role of EPINET academic hubs in managing program evaluation and continuous education may induce unique effects that would not be present in programs that are not being actively monitored in a similar way.

In the context of the above limitations, a major strength of our analysis is the use of a very large sample of clients from a diverse range of CSC programs that are being evaluated by a number of distinct research groups from multiple major regions of the United States. Unlike previous studies which are mostly constrained to a small number of clinics and a single research team, the current study is better positioned to (1) establish some findings that appear to obtain across research groups and clinics and (2) estimate the degree to which findings may vary by research group or clinic. All of the limitations discussed above (eg, missing data, contingent researcher choices about measurement, etc.) have had at least as strong an impact on previously published evaluations of CSC programs,[7] but those limitations have been essentially unmeasurable because those studies have not been able to assess the degree to which their findings may vary or persist across different settings. In contrast, the current analysis is able to not only acknowledge but also formally estimate and account for the impact of some of these common limitations.

Overall, our findings point to a serious problem of low rates of completion of CSC and large-scale unilateral termination and loss of contact with clients. They suggest an urgent need for future research to develop and evaluate client-centered strategies and interventions designed to reduce disengagement and ensure that the needs and priorities of clients are better met.

Supplementary Material

Supplementary material is available at https://academic.oup.com/schizophreniabulletin/.

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