# Rates of Inpatient and Emergency Room Use Before and After Discharge Among Medicaid Enrollees in OnTrackNY

**Jennifer L. Humensky, PhD**[1,2], **Ilana Nossel, MD**[1,2], **Iruma Bello, PhD**[1,2], **Igor Malinovsky, PsyD**[1,2], **Marleen Radigan, DrPH**[3], **Gyojeong Gu, MPP**[3], **Rui Wang, MS**[3], **Melanie M. Wall, PhD**[2,4], **Nev Jones, PhD**[5], **Lisa B. Dixon, MD, MPH**[1,2]

[1]Division of Behavioral Health Services and Policy Research, New York State Psychiatric Institute, New York, NY

[2]Department of Psychiatry, Columbia University Irving Medical Center, New York, NY

[3]Office of Performance Measurement and Evaluation, New York State Office of Mental Health, Albany, NY

[4]Mental Health Data Science, New York State Psychiatric Institute, New York, NY

[5]Department of Psychiatry and Behavioral Neurosciences, University of South Florida, Tampa, FL

## Abstract

**Objective:** This study examines hospital and emergency room (ER) use among Medicaid enrollees before and after discharge from OnTrackNY, a coordinated specialty care program for recent-onset psychosis.

**Methods:** Medicaid claims data is linked to program data. Inpatient hospitalization, inpatient days, and ER visits are assessed in the 6 months prior to OnTrackNY enrollment and 6 months prior to and after discharge. Sample is 138 participants with continuous Medicaid enrollment during the periods studied.

**Results:** Inpatient visits significantly declined from the pre-OnTrackNY enrollment period to the pre-discharge period (β=−1.23,Standard Error (SE)=0.22, p<0.001), did not significantly change in the first six months after discharge (β=0.19,SE=0.26, p=0.48), and remained significantly lower than before OnTrackNY enrollment (β=−1.05,SE 0.20, p<0.001). Similar patterns were observed for inpatient days and ER use.

**Conclusions:** ER and hospital use declined during OnTrackNY participation and did not significantly change in the first 6 months after discharge.

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Corresponding author: Jennifer L. Humensky, jennifer.humensky@nyspi.columbia.edu.

Approximately 100,000 youth and young adults in the US experience a first episode of psychosis (FEP) each year[1]. Onset of non-affective psychosis typically occurs at ages 15–25, interrupting developmental milestones that include independent living, educational attainment and vocational planning[2]. However, specialized early intervention services (EIS) after onset of psychosis has the potential to help improve functional outcomes for people with non-affective psychotic disorders. In the US, such specialized early intervention services are typically called "Coordinated Specialty Care (CSC)." These early intervention services vary widely across programs, but generally include access to a set of evidence-based practices including medication management, psychotherapy, substance use treatment, peer support, case management, family education and support, and supported employment and education services, offered in a team-based approach[2]. Early intervention services are designed to improve functional recovery, help reduce the duration of untreated psychosis (DUP) and improve symptoms. Early intervention services have been associated with substantial improvements in outcomes during treatment, including treatment continuation, hospitalization, symptom severity, and school/work participation[3].

However, the extent of the sustainability of the gains after services end is a complex issue. There is limited data on the long term effectiveness of early intervention in the US due to relative recency of the use of such services here. . A number of international studies have found that initial gains during early intervention treatment attenuate over time[4–6],. However, a few studies have found that intervention groups continued to do better than historical control group for some outcomes. A UK study found higher treatment engagement in an early intervention group at five years after treatment initiation, versus historical control group, but found no differences in hospitalization rates[7]. An Australian study found greater symptom reduction and improved course of illness in an early intervention group versus historical control group at 8 years after treatment initiation[8]. Likewise, meta-analyses found greater relapse prevention[9] and remission and recovery[10] for the intervention groups versus controls. In response to the limited evidence of sustainability in gains, programs, including in Hong Kong, Canada, and Denmark, have extended early intervention services, with mixed results. A trial of a one-year extension of Hong Kong's Early Assessment Service for Young People with Early Psychosis (EASY) program found improvement in symptoms and treatment engagement, compared to those without the extended treatment[11]. A trial of a three-year extension of an early intervention program in Montreal, Canada, found that the extended treatment had a positive impact on symptom remission[12]. A trial of a three-year extension in Denmark's OPUS II study found higher rates of engagement and satisfaction with treatment, but no differences in symptoms, between the early intervention and control groups[13].

Because early intervention services are newer in the United States than in some other countries[2], even less is known about the long-term sustainability of initial benefits in the US. Once early intervention services end, clients may not transition to community-based treatment, and if they do, the transition into the mainstream health care system can be challenging, with community-based treatment typically being less coordinated than what may be found in coordinated specialty care settings and lacking specialized competencies in treating psychosis. Moreover, services may not be as recovery-focused as early intervention services, and specialized services such as peer support and education and employment

supports may not be readily available; in particular, private insurers may be especially unlikely to cover these services.

This study examines post-discharge hospitalization and emergency room (ER) usage among Medicaid enrollees from OnTrackNY, New York State's early intervention program for individuals experiencing a first episode of nonaffective psychosis. On average, about half of OnTrackNY participants have been enrolled in Medicaid; in June 2020, 53% of participants were enrolled. The OnTrackNY program has established improvements in outcomes such as hospitalization, work/school participation, symptoms, social and occupational functioning, during treatment[14–15]; this paper focuses on post-discharge outcomes.

## Methods

The OnTrackNY program serves individuals aged 16–30 who have experienced non-affective psychosis for at least one week but less than two years[16]. Participants receive a set of coordinated, team-based services that include the entire early intervention package described above. The program sites across the state operate in a variety of settings, including community agencies, community and academic hospitals, and state-operated facilities. The program aims to provide treatment for an average of two years, with the duration of treatment varying according to client needs. The program has developed a rich set of clinical data collected every three months during program participation[17].

This study utilizes a deidentified data set including additional Medicaid claims data linked with OnTrackNY clinical program data provided by the New York State Office of Mental Health (OMH). The New York State Psychiatric Institute Institutional Review Board (IRB) determined that this analysis of de-identified data is not human subjects research.

We examine clients who are continuously enrolled in OnTrackNY for at least six months, and in Medicaid in the six months prior to program entry, the six months prior to OnTrackNY discharge, and the six months after OnTrackNY discharge. This allowed us to compare rates of hospitalization and ER use at these three time points[18]. We examined participants who were enrolled from October 2013 through June 2019; 138 participants met inclusion criteria from the 22 program sites that were active during the study timeframe. This sample includes all participants who were discharged, regardless of the circumstances of discharge (i.e., both program-initiated and client-initiated discharges), and included those who may have achieved their goals for treatment and those who decided to leave the program without having achieved their goals. Dependent variables are number of inpatient hospitalizations, number of inpatient days, and number of ER visits in each of the six-month time periods. This includes hospitalizations from all causes (i.e. due to psychiatric or medical conditions). The model controls for client demographics (age, gender, race/ethnicity) and months of OnTrackNY enrollment. Program site was not significant in these analyses and was removed from the model to conserve degrees of freedom.

Negative binomial random effects models are used to assess trends in hospital and ER use over time. Goodness of fit tests (Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC)) were used to compare linear, Poisson and negative binomial

models; negative binomial models achieved the best fit. Pairwise comparisons compared predictive margins across the time points. Analyses were conducted using Stata SE 14.2.

## Results

At baseline, of the 138 participants, 105 (76%) were male; 21 (15%) were white, non-Hispanic, 55 (40%) were black, non-Hispanic, 44 (32%) were Hispanic, 12 (9%) were Asian and 6 (4%) were of another race/ethnicity or were missing race/ethnicity; Because of the small numbers, the categories of Asian, other and mixed race-ethnicity were combined (in a sensitivity analysis, neither Asians or those with other/missing race/ethnicity were significant as separate categories). The average age at admission was 20.9 (Standard deviation (SD)=3.3), and the average number of months of OnTrackNY enrollment (given that enrollment of at least six months was required for inclusion in the sample) was 19.9 (SD 11.0). In the pre-enrollment period, participants had an average of 0.80 (SD= 0.88) inpatient visits, 12.88 (SD=19.27) inpatient days, and 1.45 (SD=1.93) ER visits. This decreased to an average of 0.26 (SD=0.65) inpatient visits, 3.70 (SD=10.50) inpatient days and 0.88 (SD=3.26) ER visits in the six months before OnTrackNY discharge, and an average of 0.30 (SD=0.62) inpatient visits, 4.97 (SD=11.95) inpatient days and 0.83 (SD=1.42) ER visits in the six months post-discharge.

Table 1 presents regression results. Total hospital inpatient visits significantly declined during OnTrackNY enrollment participation ($\beta=-1.23$, Standard Error (SE)=0.22, $p<0.001$), did not significantly change in the first six months after discharge ($\beta=0.19$, SE=0.26, $p=0.48$), and remained significantly lower than before OnTrackNY program entry ($\beta=-1.05$, SE=0.20, $p<0.001$). Similar patterns were observed for inpatient days and total ER visits. Overall, participants who were non-Hispanic black had more hospitalizations ($\beta=0.60$, SE=0.29, $p=0.04$) and more inpatient days ($\beta=0.87$, SE=0.31, $p=0.01$), compared to white, non-Hispanic participants; Hispanic participants also had more inpatient days ($\beta=0.71$, SE=0.32, $p=0.02$), than white, non-Hispanic participants. Participants who were older at admission had fewer ER visits ($\beta=-0.05$, SE=0.03, $p=0.04$). Hospitalization and ER outcomes did not significantly vary by gender or months in OnTrackNY. In a sensitivity analysis, hospitalization and ER outcomes were dichotomized and analyzed using logistic regression; results were similar.

## Discussion

Consistent with previous studies of early intervention services for young people with recent-onset psychosis[5] and prior studies of outcomes during OnTrackNY participation[14–15], rates of hospitalization and ER use declined during OnTrackNY participation. Notably, hospitalization rates have been shown to decrease in the first three months after OnTrackNY enrollment and remain relatively steady thereafter[14]; this study shows that these rates do not significantly increase in the first six months after discharge. To our knowledge, this study is the first to examine postdischarge outcomes among a U.S. sample of coordinated specialty care clients, and helps shed light on client trajectories during and after these services.

OnTrackNY participants served by Medicaid may differ from the full OnTrackNY population, as Medicaid recipients are more likely to be economically disadvantaged. Notably, only 15% of this sample is non-Hispanic white, while about 24% of participants ever served by OnTrackNY are non-Hispanic white. The differences in outcomes observed across racial/ethnic groups are identified in the pre-OnTrackNY admission period. Future analyses should further examine the impact of racial/ethnic disparities.

Study limitations should be noted. First, this is observational data from one early intervention program in one US state, and the sample is further limited by the need for enrollment in Medicaid. The time period after discharge is limited to six months. Future studies should examine larger samples, longer post-discharge time periods, and examine additional outcomes and predictors. This study does not have a control group, and it is possible that hospitalizations may naturally attenuate over time, e.g. "regression to the mean", particularly as many participants are referred to the program from hospital settings. Moreover, if there is an effect of treatment, there is no way to know whether it is due to the OnTrackNY model or if other interventions would be similarly effective. Future analyses should also include data on samples beyond Medicaid enrollees, which was not possible in this analysis. For example, OnTrackNY helps clients who are uninsured at program entry apply for Medicaid; these individuals are not included as it was not possible to analyze pre-enrollment hospitalization rates for those not enrolled in Medicaid.

## Conclusions

Although more research is needed, particularly of larger populations and over a longer time frame, this study provides an initial indication that improvements in hospitalization and ER usage are maintained and do not significantly increase in the first 6 months after discharge from OnTrackNY.

## Funding

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**Highlights**

- This study examines hospital and emergency room (ER) use among Medicaid enrollees before and after discharge from OnTrackNY, a coordinated specialty care program for recent-onset psychosis.

- ER and hospital use declined during OnTrackNY enrollment (pre-enrollment to predischarge) and did not significantly change in the first 6 months after discharge.

**TABLE 1.**

Regression analysis of hospitalization and emergency room (ER) use among Medicaid-enrolled OnTrackNY clients (N=138) during and after program participation

| | Number of hospitalizations | | | Number of inpatient days | | | Number of ER visits | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | β | SE | p | β | SE | p | β | SE | p |
| Time period (Ref: Prior to OnTrackNY enrollment) | | | | | | | | | |
| Prior to OnTrackNY discharge | −1.23 | 0.22 | <0.001 | −1.47 | 0.22 | <0.001 | −0.93 | 0.18 | <0.001 |
| After OnTrackNY discharge | −1.05 | 0.20 | <0.001 | −1.30 | 0.21 | <0.001 | −0.57 | 0.16 | <0.001 |
| Age at admission | 0.01 | 0.03 | 0.76 | 0.01 | 0.03 | 0.83 | −0.05 | 0.03 | 0.04 |
| Male | −0.05 | 0.19 | 0.81 | −0.08 | 0.19 | 0.67 | −0.07 | 0.18 | 0.70 |
| Race/ethnicity (Ref: White, non-Hispanic) | | | | | | | | | |
| Black, non-Hispanic | 0.60 | 0.29 | 0.04 | 0.87 | 0.31 | 0.01 | 0.50 | 0.27 | 0.06 |
| Hispanic | 0.56 | 0.30 | 0.06 | 0.71 | 0.32 | 0.02 | 0.33 | 0.27 | 0.23 |
| Asian, other, missing | 0.35 | 0.36 | 0.33 | 0.56 | 0.37 | 0.13 | 0.01 | 0.34 | 0.98 |
| Number of months in OnTrackNY | −0.01 | 0.01 | 0.29 | −0.01 | 0.01 | 0.15 | 0.004 | 0.01 | 0.55 |

Comparison of outcomes between time periods prior to and after OnTrackNY discharge: Hospitalizations ($\beta$=0.19, SE=0.26, p=0.48). Inpatient days: ($\beta$=0.17, SE=0.26, p=0.53). ER visits: ($\beta$=0.36, SE=0.20, p=0.07).