

Design of a Payment Decision Support Tool for Coordinated Specialty Care for Early Psychosis

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Online Supplements

Part 1. User-defined CSC team make-up, full-time-equivalents, and wage rates

personnel credential	Yes/No	FTE	wage rate
Licensed/qualified master social worker	<input type="checkbox"/>		
Licensed/qualified clinical social worker	<input type="checkbox"/>		
Licensed psychologist	<input type="checkbox"/>		
Licensed/qualified mental health counselor	<input type="checkbox"/>		
Licensed/qualified marriage and family counselor	<input type="checkbox"/>		
Licensed/qualified creative art therapist	<input type="checkbox"/>		
M.D./Psychiatrist	<input type="checkbox"/>		
Nurse practitioner, psychiatry	<input type="checkbox"/>		
R.N.	<input type="checkbox"/>		
Physician Assistant	<input type="checkbox"/>		
Certified peer specialist	<input type="checkbox"/>		
Supported Employment and Education provider	<input type="checkbox"/>		
Other (Specify):	<input type="checkbox"/>		
Other (Specify):	<input type="checkbox"/>		

Part 2. Data and approaches to calculating proportions of team operation costs accounted for by different categories of CSC services

Four categories of CSC services

Smith et al. 2019 reported on findings of a time study conducted by the New York State Office of Mental Health in July 2017 (1). The time study aimed to assess the adequacy of Medicaid-based revenue to support and sustain the operation of CSC teams in New York State’s implementation of CSC known as OnTrackNY. The study categorized CSC services into four categories based on the existence and streams of Medicaid-related funding mechanisms. We adopted this categorization but adapted the definition of each category to better reflect national consensus regarding components of CSC services (Table SA1).

Table SA1. Definition of four categories of CSC services

Category of Services	Definition	Examples
Clinical services	Provided by a licensed clinician or clinicians, typically reimbursable by Medicaid and other insurance on a per-service basis.	Pharmacotherapies, individual or group psychotherapies provided by licensed therapists
Supported Employment and Education (SEE) and peer specialist services	Non-clinical, typically involving direct interactions with or involvement of a client.	SEE specialist accompanies client to a job interview, peer-specialist-led skill-building sessions
Case management	Case or care management, may or may not directly involve a client or family	CSC team meeting to discuss cases, follow-ups with clients and families, care coordination with clients’ providers
Administrative and operational activities	Administrative and operational tasks to support daily operation of the program including community outreach, education, and engagement, staff supervision and training	Medical record documentation, patient outcome tracking and reporting; Visits to local referral sites (hospitals, schools, police departments) to introduce the program and set up referral protocols

Data Source

We used data from the CSC time study conducted by New York State’s Office of Mental Health in July, 2017. The time study randomly selected 78 Medicaid clients actively receiving care at one of 13 OnTrackNY sites at the time of the data collection. Sampling was stratified based on time since enrollment in the program. Program staff at each site used a daily activity log template to document all activities, billable or non-billable, involving or directed at a selected client over a

two-week period. For each documented activity, the activity log collects information on the credential of the staff person conducting the activity, his/her time on the activity, a brief service or activity description, and other information. The resulting client-activity level data file contains a total of 528 activities and becomes the source of data of our analysis.

Analytical Approach

Our objective was to estimate the proportion of total team operation costs that are attributed to the four categories of CSC services. Below are steps we took to derive these estimates.

Step 1: Data cleaning and recoding of staff time spent on each CSC activity

In the OnTrackNY time study, time spent on activity was collected in the following categories: <15 minutes, 15 minutes, 30 minutes, 45 minutes, 60 minutes, and >60 minutes. We converted these reported times into hours. For activities reported as lasting <15 minutes, we randomly assign values of 0.08, 0.17, or 0.25 hours (5, 10, and 15 minutes, respectively) with equal probabilities. For all therapy activities reported as lasting >60 minutes and all peer-led group sessions reported as lasting >60 minutes, we assigned a value of 1 hour to such activities. For all community-based activities reported as lasting >60 minutes, we randomly assigned values of 2, 3, or 4 hours, with equal probabilities. For all activities reported as Group Therapy, we divided the reported time spent by a randomly generated number of 2, 3, or 4 group members, with equal probabilities. These recoding decisions were made based on discussion with clinical collaborators and OnTrackNY staff.

Step 2: Estimate staff time costs pertaining to each documented activity

Staff unit time cost (wage rates) differ substantially by credentials but also by geographic locations. We adopted the national average wage rates (reported by Bureau of Labor Statistics (2) or BLS in 2017) pertaining to each staff credential reported in the time study. The BLS does not report wage rates for “Supported Employment and Education (SEE) specialist”. Consultation with OnTrackNY team at the Center for Practice Innovation (3) indicated that a SEE specialist typically had a wage rate that was 110-120% of that of a peer specialist. We thus applied a 20% mark-up to the national average wage rate of a peer specialist to derive the wage rate for a SEE specialist. We multiplied staff time spent on each activity by the BLS wage rate to derive time cost for each activity.

Step 3: Estimate total staff time costs accounted for by the four categories of CSC services

The OnTrackNY time study team assigned each of the 528 documented activities to one of the four categories of CSC services (Table SA1). We adopted this categorization, aggregated the activity-level staff time cost to the client level over the two-week period, and derived mean estimates of costs for each category.

Because teams in the OnTrackNY time study were asked to document activities involving or directed at specific clients, activities not directed at specific clients but essential for the operation of the CSC program may not have been adequately captured. In particular, community outreach and engagement, typically conducted by the team leader/program director, does not involve any

enrolled client. We consulted staff at the Center for Practice Innovation at New York Psychiatric Institute and asked them to provide an estimate of average time (in hrs) an OnTrackNY team leader spends on community outreach and engagement. A collective discussion led us to an estimate of 6 hours per month. We applied the national average wage rate of a clinical psychologist (\$39.10) as the wage rate for the team leader. We then spread the cost of team leader time on community outreach and engagement across a caseload of 35 clients, which is the median caseload seen in OnTrackNY. We added this additional cost to the per-client cost for administrative and operational activities and to the per-client total staff time costs.

Step 4: Calculate % of total staff time costs accounted for by each category of CSC services

$\% \text{ of total staff time costs accounted for by each of the 4 categories} = \text{mean staff time costs on a given category of services per client over two weeks} / \text{mean total staff time costs per client over the same two weeks}$

References

1. Smith TE, Kurk M, Sawhney R, et al.: Estimated Staff Time Effort, Costs, and Medicaid Revenues for Coordinated Specialty Care Clinics Serving Clients With First-Episode Psychosis. *Psychiatr Serv* 70:425-7, 2019
2. Bureau of Labor Statistics: May 2017 National Occupational Employment and Wage Estimates, United States. Washington, DC, 2018. https://www.bls.gov/oes/2017/may/oes_nat.htm. Accessed January 23, 2020.
3. Center for Practice Innovations at Columbia Psychiatry New York State Psychiatric Institute: OnTrackNY. New York, NY, 2020. <http://www.ontrackny.org/>. Accessed May 3, 2017.

Part 3. Data and approaches to simulate patient outcomes over a reporting period to estimate outcome-based payment

CSC patient outcomes considered

The current version of the CSC payment design tool provides the following three patient outcomes. Users of the tool can choose any combinations of the outcomes in their design of the outcome-based payment.

- No hospitalization or emergency department (ED) visit for behavioral health concerns
- Enrolled in a school or employed or in an internship
- Not involved in any new legal issue or on parole/probation

The outcome “No hospitalizations or emergency department visit for behavioral health concerns” is a composite measure of “no hospitalization” and “no ED visit.” These three outcomes reflect the recovery orientation of CSC and receive high endorsement among CSC providers as measures of CSC outcomes. CSC payers and providers may choose to include additional outcomes that are salient to local stakeholders but also feasible to track and report on. We do not include these additional outcomes here primarily because the data source we use (below) does not provide robust measures of additional outcomes that would allow us to conduct simulation.

Data Source

We used clinical assessment data from New York State’s implementation of CSC known as OnTrackNY. Longitudinal clinical assessments are conducted with all clients enrolled in OnTrackNY at admission, follow ups every 3 months, and discharge from the program. OnTrackNY teams used data collection instruments developed by the Center for Practice Innovation at the New York State Psychiatric Institute (1). For the three CSC outcomes indicated above, data were based on CSC provider observation and assessment.

As of January 2019, there were 1349 clients that had been admitted into OnTrackNY, of which 695 were “active” clients, defined as clients that have not yet been discharged from the program and have had at least one contact with the OnTrackNY team during the 90 days prior to the assessment. Given our purpose of assessing outcomes among a snapshot of the client panel, we used the most recent OnTrackNY assessment data collected for a total of 695 active clients. Because the statistics we derive should reflect patient outcomes in relatively mature CSC programs (i.e., avoiding programs in their start-up phase), we restricted the sample to clients enrolled at a time that was at least 12 months after the OnTrackNY team started operation. This restriction reduced our sample size to 429.

Client outcomes typically improve over follow-up time and the joint-distribution of outcomes may also change over follow-up time. On the other hand, sample size of reported outcomes declines with length of time since enrollment as clients are lost to follow-up or discharged from the program. Descriptive statistics of outcomes derived at a 3-month interval suggest that the following grouping would preserve substantial differences in outcomes over follow-up time while ensuring adequate sample sizes for each group: at admission, 3 months, 6-9 months, and 12+ months.

Analytical Approach

Our analysis of the OnTrackNY data indicates the following distribution of a given CSC client panel based on January 2019 snapshot across the four groups based on time since enrollment (Table SB1)

Table SB1. Distribution of CSC client panel based on January 2019 data snapshot by time since enrollment

Time since enrollment	% of client panel of N	Number of clients
Admission, not yet 3 months	21%	n1=N*21%
At least 3 but not yet 6 months	17%	n2=N*17%
At least 6 but not yet 12 months	27%	n3=N*27%
At least 12 months	35%	n4=N*35%

The OnTrackNY assessment collected data on hospitalization and ED visits for behavioral health concerns separately. Even though one of the three outcomes we considered is “No hospitalization OR ED visit for behavioral health concerns”, we chose to model these two outcomes separately. This approach affords us the flexibility of specifying outcomes for hospitalization alone, ED visit alone, or as a composite, i.e., hospitalization or ED. We derived sample means and polychoric correlations of the four client outcomes for each of the four groups by time since enrollment. The probabilities of client outcomes and correlation matrices are shown in Tables SB2 and SB3.

Table SB2. Probabilities of client outcomes by client group

Client group	HOS	ED	EDU	LEGAL
Admission, not yet 3 months	0.69	0.64	0.42	0.08
At least 3 but not yet 6 months	0.11	0.17	0.59	0.08
At least 6 but not yet 12 months	0.11	0.12	0.70	0.08
At least 12 months	0.12	0.10	0.71	0.06

HOS = At least one hospitalization for behavioral health concerns; ED = At least one emergency department visit for behavioral health concerns. EDU = Enrolled in a school or employed or in an internship; LEGAL = Involved in any new legal issue or on parole/probation.

Table SB3. Correlation matrices of client outcomes by client group

Client group		HOS	ED	EDU	LEGAL
Admission, not yet 3 months	HOS	1.00			
	ED	0.50	1.00		
	EDU	-0.22	-0.22	1.00	

	LEGAL	0.23	-0.28	-0.19	1.00
At least 3 but not yet 6 months	HOS	1.00			
	ED	0.92	1.00		
	EDU	-0.68	-0.42	1.00	
	LEGAL	-0.99	-0.01	-0.35	1.00
At least 6 but not yet 12 months	HOS	1.00			
	ED	0.99	1.00		
	EDU	-0.14	-0.21	1.00	
	LEGAL	0.43	0.41	-0.21	1.00
At least 12 months	HOS	1.00			
	ED	0.96	1.00		
	EDU	-0.19	-0.36	1.00	
	LEGAL	0.22	0.26	-0.21	1.00

HOS = At least one hospitalization for behavioral health concerns; ED = At least one emergency department visit for behavioral health concerns. EDU = Enrolled in a school or employed or in an internship; LEGAL = Involved in any new legal issue or on parole/probation.

For a given client panel size provided by the user (N), we first generate the number of clients that fall into each group (n1 to n4) based on the distribution reported in Table SB1. With the probabilities and correlation matrices reported in Tables SB2 and SB3, our program constructs a multivariate normal distribution of the four outcomes for each of the client group. For a given simulated client in a client group, all four outcomes will be randomly drawn following the multivariate normal distribution. The simulation will repeat the above process until the user-specified number of clients (and their outcomes) are generated.

Following the steps described above, we generate a simulated client panel and their outcomes in a given reporting period (3 months). For each client who has been in the program for at least 3 months and thus “eligible” to be considered in the outcome-based payment, the CSC team will receive an outcome-based payment (see formula in the text) if the client reports a positive outcome. Aggregating over all clients and all outcomes provides an estimate of total outcome-based payment for the team for a single reporting period of 3 months. With the assumption that this quarterly payment remains stable over a year, we then multiply the estimated payment by 4 to derive an estimate for 12 months.

References

1. Center for Practice Innovations at Columbia Psychiatry New York State Psychiatric Institute: Center for Practice Innovations at Columbia Psychiatry. 2020. <https://practiceinnovations.org/>. Accessed February 24, 2020.

Part 4. Two examples of design choices, user inputs, and estimated payment

The two examples we show below have the same user inputs with regard to CSC team make-up, wage rates, fringe benefit rate, indirect cost rate, and CSC team caseload. They differ in the design choices. In the first example, the user chooses to cover all four types of CSC services under the case rate payment. In the second example, the user chooses to use the case rate payment to cover SEE and peer services, case management, and administrative and operational tasks, leaving out clinical services. The payment summaries below show estimated per-client-per-month case rate payment, an estimated 3-month total case rate payment to the team (given the team caseload), estimated outcome-based payment (given choice of outcome target, proportion of case rate payment withheld for outcome-based payment and based on simulation), and estimated total payment over a 12-month period.

Payment Design 1				Estimated Per-Member Per-Month Payment	Estimated 3-Month Total Payment to a team
Part I. Case Rate Payment EDIT		Make-up of CSC Team	FTE	Wage rate	
Services covered:	Clinical services	Licensed master social worker	0.3	23.9	\$1,619/month
	SEE and peer services	Licensed clinical social worker	1.0	28.1	
	Case management	Licensed psychologist	0.4	41.0	
	Administrative	Licensed mental health counselor	0.3	23.0	
Fringe rate:	40%	M.D./Psychiatrist	0.3	106.0	
Indirect cost rate:	30%	R.N.	0.2	36.3	
Expected caseload:	25	Certified peer specialist	0.5	20.9	
		SEE provider	1.0	25.1	
					Subtotal: \$121,460
Part II. Outcome-based Payment EDIT					
Outcome:	No hospitalization or ED visit for behavioral health concerns				Subtotal:
Proportion of case-rate payment set aside:	5%				\$5,826
					12-month TOTAL: \$509,144

Payment Design 2				Estimated Per-Member Per-Month Payment	Estimated 3-Month Total Payment to a team
Part I. Case Rate Payment EDIT		Make-up of CSC Team	FTE	Wage rate	
Services covered:	SEE and peer services	Licensed master social worker	0.3	23.9	\$802/month
	Case management	Licensed clinical social worker	1.0	28.1	
	Administrative	Licensed psychologist	0.4	41.0	\$60,183
Fringe rate:	40%	Licensed mental health counselor	0.3	23.0	
Indirect cost rate:	30%	M.D./Psychiatrist	0.3	106.0	
Expected caseload:	25	R.N.	0.2	36.3	
		Certified peer specialist	0.5	20.9	
		SEE provider	1.0	25.1	
					Subtotal:
					\$60,183
Part II. Outcome-based Payment EDIT					
Outcome:	No hospitalization or ED visit for behavioral health concerns				Subtotal:
Proportion of case-rate payment set aside:	5%				52,887

NOTE: This design does not cover all CSC services. CSC provider teams will have to find other funding sources to cover the costs of these services.

12-month TOTAL: \$252,280