Mental Health Services Act

Collaborative Statewide Early Psychosis Program Evaluation

Annual Innovation Report:

Summary Report of the Activities of the LHCN

Fiscal Year 2021-2022

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Background

Multiple California counties in collaboration with the UC Davis Behavioral Health Center of Excellence received approval to use Innovation or other Prop 63 funds to develop infrastructure for a sustainable learning health care network (LHCN) for early psychosis (EP) programs. Of those counties with approved funding, the following counties have processed and executed contracts between their behavioral health services departments and UC Davis: San Diego, Solano, Sonoma, Los Angeles, Orange, Stanislaus, and Napa. One Mind has also contributed $1.5 million in funding to support the project. This Innovation project seeks to demonstrate the utility of the network via a collaborative statewide evaluation to assess the impact of the network and these programs on the consumers and communities that they serve. This project, led by UC Davis in partnership with UC San Francisco, UC San Diego, University of Calgary and multiple California counties, brings consumer-level data to the providers' fingertips for real-time sharing with consumers, and allows programs to learn from each other through a training and technical assistance collaborative. This Statewide EP Evaluation and LHCN propose to 1) increase the quality of mental health services, including measurable outcomes, and 2) introduce a mental health practice or approach that is new to the overall mental health system. The project must comply with the regulatory and funding guidelines for evaluation as stipulated by the applicable Mental Health Services Act (MHSA) funding regulations, contract deliverables, and best practices.

There are three components to the data collected for the LHCN: County Level, Program Level, and Qualitative data (Figure 1). The protocol for collecting each component has been reviewed by an Institutional Review Board (IRB) and approved before commencement of data collection. Further, aspects of the data design has been shaped by the input of community partners, including mental health consumers, family members, and providers.

Figure 1. Three Components of the Evaluation Associated with the Statewide LHCN.
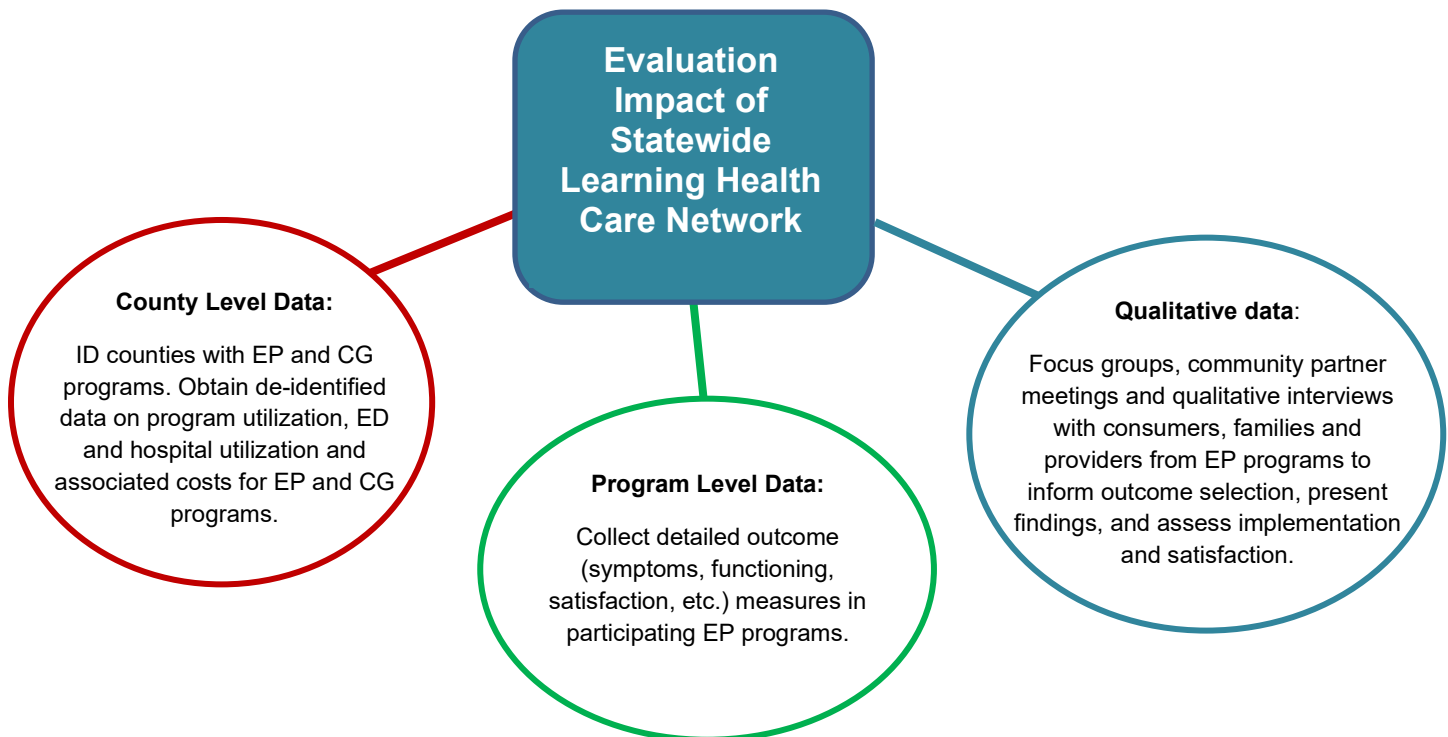
This project was approved for funding using Innovation Funds by the MHSOAC in December of 2018. The California Early Psychosis Learning Health Care Network (LHCN) represents a unique partnership between the

University of California, multiple California counties, and One Mind to build a network of California early psychosis (EP) programs. We leveraged this initial investment to obtain additional funding from the National Institutes of Health (NIH) in 2019, which enabled six university and two county early psychosis programs to join and also linked the California network to a national network of EP programs, including UCSF PATH, UCSD CARE, UCLA Aftercare & CAPPS, Stanford Inspire, San Mateo Felton BEAM UP/(re) MIND, UC Davis EDAPT and SacEDAPT programs. The overarching name of the project, which encompasses the LHCN and the NIH-funded components, is now "EPI-CAL." In this and future reports, we will refer to the LHCN only when describing components of the project that are specific to the LHCN evaluation (e.g., county data analysis).

Our EPI-CAL team has made significant progress towards our goals outlined in the innovation proposal during the 21/22 fiscal year, which are summarized in the current report.

Executive Summary

The purpose of this document is to provide the EP LHCN Mental Health Services Act (MHSA) Annual Innovation Report to review EP LHCN goals accomplished during FY2021/2022. This report will include summaries and status updates on the infrastructure of the LHCN, steps taken towards implementation, and barriers that have been identified over the course of the last fiscal year. While the counties involved in the EP LHCN may be at different stages in the process, the overarching LHCN is moving forward as planned.

- Prior to beginning activities for the LHCN, UC Davis had to have an executed contract with each of the participating counties so each party could mutually agree to a scope and terms of work. As of June 2022, UC Davis had executed contracts with Solano, San Diego, Los Angeles, Orange, Sonoma, Napa and Stanislaus counties. The Multi-County Collaborative (Colusa, Mono, Nevada) and Lake County LHCN contracts were under review at the time of June 2022. This represents two additional executed contracts (Napa and Stanislaus), and two new contracts under review for the past fiscal year. In addition to existing LHCN counties, Kern County has received approval to join the LHCN in May of 2022. We are working together to execute their contract before officially beginning activities in their county program.
- We have held two LHCN Advisory Committee meetings in the last fiscal year, which was comprised of a county representative from each participating county, a clinical provider from each participating EP program, and consumers and family members who have been or are being served by the participating programs. We will continue to hold Advisory committee meetings on a bi-annual basis and summarize meetings activities in our deliverables and annual reports.
- In the last year, we began fidelity assessments in EPI-CAL/LHCN clinics. We conducted a total of ten fidelity assessments across EPI-CAL clinics, including four LHCN county programs (San Diego, Solano, Orange, and Napa). We have submitted fidelity assessment reports to each program and met with individual program leadership to discuss their fidelity assessment results. We have scheduled fidelity assessments for all remaining participating programs in the LHCN network with an executed contract, with a goal of completing them in the current 22/23 fiscal year.
- In the past year, we continued implementation of the Beehive application in EPI-CAL/LHCN clinics, which has included extensive training and site-specific support. We have refined our training approach and have completed Beehive training in several participating EPI-CAL programs.
- After an initial enrollment period in pilot EP programs, we did an interim analysis of consumer demographics, data sharing preferences, and survey completion. We found that a large majority of consumers (83%) opted in to sharing data for research purposes with UC Davis, and high completion rates of enrollment surveys (80%). We will shift our focus in the future to higher survey completion rates, as we know that while the vast majority of consumers have completed some self-report surveys, not many have completed the full EPI-CAL bundle of surveys for each time point.
- LHCN enrollment progress is summarized in this report through the FY2021/2022. The goal was to have at least 405 individuals enrolled by the end of the FY21/22 . However, the observed rate of enrollment across the LHCN is 145 consumers. Due to the discrepancy in observed and expected

enrollment, we have focused on addressing barriers to enrollment in the current FY and have offered additional support to programs, where feasible. It is important to note that there were an additional 142 consumers who have been registered by the clinic in Beehive, but who have not engaged with Beehive by completing the End User License Agreement (EULA) or starting their surveys. Therefore, one of the points of intervention we have asked programs to focus on in enrolling their registered consumers.

- The needs and preferences of EP programs and the institutions of which they are a part have driven the design of Beehive. In this report, we summarize some of the recent revisions made to Beehive based on our EP program partner feedback. For example, security requirements of counties and institutions have led to increases in the security of Beehive. Feedback from users at EP Programs have identified several aspects of the application that could be improved to increase compatibility with their existing workflows and facilitate implementation of this novel technology.

- We report our preliminary findings from our interviews with EP community partners about the barriers and facilitators to implementing a LHCN into EP treatment programs.

- During the last FY, we have finalized methods for multi-county-integrated evaluation of costs and utilization data. The proposed analysis focuses on consumer-level data related to program service utilization, other outpatient services utilization, crisis/ED utilization, and psychiatric hospitalization and costs associated with these utilization domains during two time periods: 1) the three years prior to implementation of the LHCN in the EP programs to harmonize data across counties and account for potential historical trends, and 2) for the 2.5 year period contemporaneous with the prospective EP program level data collection via Beehive.

- During the last FY, our team continued to hold meetings with the EP program managers and the county data analysts for each participating LHCN county to identify county-level available data and data transfer methods. We discussed services provided by the EP program, description of consumers served, staffing specifics and billings codes for each service. We also reviewed details of funding sources, staffing levels during certain time-periods and other types of services provided for specific types of consumers (i.e., foster care). We have discussed time-periods for which the LHCN team will request data, description of the consumers from EP programs and how similar consumers served elsewhere in the county will be identified, services provided by each program, other services provided in the county to the EP consumers (i.e., hospitalization, crisis stabilization and substance use treatment), and data transfer methods. Our research team has gathered all the information from each program/county and summarized it in a multicounty data table included in this report.

- During the last FY, our team finalized our plan and timeline for working with counties to support infrastructure to access final round of county-level cost and utilization data for EP and CG programs. One goal of this analysis was to provide a preliminary demonstration of the proposed method for accessing data regarding EP programs and CG groups across California. The secondary goal was to analyze service utilization and costs associated with those services across counties. Over the last FY, we successfully completed our primary goal and the first part of our secondary goal (service utilization comparison). We were unable to complete the cost comparison analysis due to the complexity of the data required to be harmonized across counties and the variety of data sources.

- In this report, we provide our preliminary findings on cost and utilization data from a single county. At this time, we did not have enough data to complete a multi-county integrated evaluation of costs and utilization data. However, our progress is summarized and plans for the multi-county analysis is described in this report.

Current Project Goals

The current document summarizes project activities conducted for the LHCN during the FY2021/22. This includes the following project activities:

1. Establish a community partner advisory committee that will meet at least every 6 months. Please note that our team is swiftly moving away from using the term "stakeholder" as it holds a violent connotation for Indigenous communities. We are now using the term "community partner" instead.

2. Schedule for EP program fidelity assessments and provide results from fidelity assessments of EP programs

3. Provide training and implementation of outcomes measurement on app in non-pilot EP programs, detailing training of EP program staff in data collection

4. Outline plan for training EP program staff from non-pilot programs on app implementation and outcomes measurement

5. Get preliminary results on program-level data from 2 pilot EP programs, including interviews with EP programs to understand barriers and facilitators to app implementation

6. Monitor enrollment and follow up completion rates for LHCN app in all EP programs

7. Submit report on LHCN enrollment and follow up completion rates for LHCN software application and dashboard in all EP Programs

8. Subcontractor to revise dashboard to include feedback from programs and community partners

9. Gather feedback from interviews with EP community partners about experience in EP treatment programs

10. Finalize methods for multi-county-integrated evaluation of costs and utilization data from preliminary multi-county integrated evaluation

11. Identification of county-level available data and data transfer methods, and statistical methods selected for integrated county-level data evaluation

12. Deliver a plan and timeline for working with counties to support infrastructure to access final round of county-level cost and utilization data for EP and CG programs.

13. Provide findings on cost and utilization data from preliminary multi-county integrated evaluation, identification of problems and solutions for county-level data analysis

1. Establish a community partner advisory committee that will meet at least every 6 months

The Advisory Committee for the LHCN is comprised of a county representative from each participating county, a representative of each participating EP program, and up to five consumers and five family members who have been, or are being served, by EP programs. This committee is co-led by Bonnie Hotz, family advocate from Sacramento County. Recruitment for the Advisory Committee is ongoing, and we have confirmed membership with multiple community partners. These include past consumers, family members, clinic staff and providers. Even though we have already held several Advisory Committee meetings, we continue to distribute flyers to all participating clinics, as their contracts are coming through, to make sure the Advisory Committee is open to all LHCN member clinics. In FY2021/22 , we held Advisory Committee meetings on December 15th, 2021 and June 10th, 2022.

November 15th 2021 Meeting
We held the first Advisory Committee meeting of the fiscal year on November 15th, 2021. The meeting was held remotely due to the COVID-19 pandemic. During the meeting, we introduce two new programs to the LHCN Committee, including Napa and Stanislaus Counties, who recently executed their contract with UC Davis. Dr. Loewy provided a brief update on the county data analysis progress, including reaching a milestone of collecting all initial services data from participating counties. Lindsay Banks then provided an update on the fidelity assessments thus far, as our team has conducted our first assessment with the Kickstart program of

San Diego. Hope Graven, program director of Kickstart, described the fidelity assessment experience from the program perspective.

A large part of the most recent meeting was providing an update on Beehive training progress, including the stage at which each program is at in their training goals and the barriers to implementing Beehive in EP programs thus far. Kali Cowden-Sherwood, a therapist from the Solano SOAR program, gave her perspective on what has been going well and what barriers she has experienced with using Beehive in a clinical setting. Common barriers included the time commitment to getting consumers set up in Beehive, as well as problem solving technical issues with consumers in real time. However, many of these issues are no longer present if the consumer is completing surveys in person on the tablet.

After summarizing training progress in LHCN/EPI-CAL programs, Kathleen Nye also summarized changes that were implemented in Beehive in response to user feedback, such as revising the dashboard layout and modifying clinic-entered survey layout. Upcoming changes to be implemented based on user feedback include lengthening the survey windows and enabling consumers to complete their EULA before their intake date. Dr. Karina Muro then provided an update on Spanish materials available in Beehive, and plans for supporting EP program staff in providing Beehive services in Spanish to consumers and their parents. One of the supports includes a training on Cultural Considerations and Working with Latinx Families that Dr. Muro will lead in December, 2021.

Peer advocates that usually attend the LHCN Advisory Committee meeting were not able to attend this time around. The peer voice is very important to the LHCN progress, so our team will make a greater effort to increase peer partner participation in future Advisory Committee meetings.

June 10th, 2022 Meeting

June 10th, 2022 Meeting
We held the most recent Advisory Committee meeting on June 10, 2022. The meeting was also held remotely. During the meeting, we discussed recruitment and enrollment progress and challenges. Kathleen Nye gave a general overview of the status of training and enrollment across the LHCN. While many programs are making progress using Beehive (i.e., enrolling consumers and supporting completion of surveys), as many programs have not integrated Beehive into their program to the degree necessary to achieve project aims. We discussed in the meeting that there are many reasons for this. For example, Lindsay Banks presented initial impressions from the barriers and facilitators interviews which have begun at sites who have been using Beehive consistently.

The next part of the meeting consisted of three breakout rooms, facilitated by EPI-CAL research team members, to brainstorm solutions to the challenges identified in the barriers and facilitators interview. The three topics for the breakout rooms were 1) Incorporating Beehive in Care, 2) Consumer Engagement, 3) Training & Beehive Learning Curve. The purpose of these groups was to hear from the EPI-CAL network what solutions they think would work best for them. To this end, each group was asked to identify two to three concrete and actionable solutions to address challenges and barriers associated with each discussion topic.

After the breakout rooms, the final portion of the meeting was devoted to debriefing in a large group discussion. Each breakout group shared their discussion and solutions with the larger group.

The Training & Beehive Learning Curve group shared that hands-on, one-on-one trainings have been helpful to reinforce concepts discussed in the large all-team Beehive core trainings. The group agreed that both live trainings and recordings of those trainings are important to engage different members of the team. Due to the large turnover at most programs, there is a need to retrain staff across multiple programs at regular intervals. One solution for this that was proposed is to offer network-wide trainings for new staff. There was agreement that having materials to reference alongside asynchronous training or to reference after a training is helpful

(e.g., Beehive Resource Guide), and that sites would like more materials to support their usage of Beehive, such as one-page instruction sheets for certain workflows in Beehive. Beehive office hours where individuals can drop-in and ask questions in a group setting was another proposed solution. Finally, group participants agreed it would be helpful to have more guidance on creating increased buy-in for consumers when clinicians are introducing Beehive. Currently, the EPI-CAL team has created scripts and flyers for this purpose, but the group agreed they would like to hear more from the other breakout rooms about additional solutions to this issue.

The Consumer Engagement group included our peer and family partners in attendance at the advisory committee meeting. One solution proposed for providers is understanding that the process for engaging each consumer will be somewhat unique and tailored to that individual. Flexibility is needed. For example, if the day the team planned to introduce Beehive seems to be a day where the consumer is very overwhelmed or symptomatic, the team can choose not to introduce on that day but should try to re-introduce another time. One family partner shared the importance of reminding consumers and families why this information is important in care. Some family members may not understand the relevance of questions about health history, for example. Explaining the relevance of certain questions and domains could increase buy-in. One peer shared the importance of including peers in clinical roles due to the powerful connection that peers can form with consumers. If a peer shares a message about why Beehive is important, that may mean more to a consumer. Similarly, the importance of reminding individuals that this application—and all the questions in it— were developed in collaboration with peers and family members across the state and include the things they thought were important was discussed.

The Incorporating Beehive Into Care group shared details about the barriers they have experienced and possible solutions for each. One challenge is that clinical teams are having trouble integrating Beehive into their existing process. Lack of resources and limited time when teams are short staffed is a huge barrier. Possible solutions for this are: 1) to create a specific policy for adding Beehive into the intake procedure, 2) for leadership to ensure that clinical teams have time set aside for Beehive use and learning, 3) and to consider collecting the minimum necessary information. Another barrier is that use of Beehive is a shift in usual practice, and a possible solution for this is increasing visual reminders about Beehive. One program leader shared that use of Beehive on the tablets was helpful for staff to become more familiar with Beehive. A clinician and supervisor shared that they might benefit from a Beehive flyer which could be a reminder to use Beehive. It was also mentioned from several different attendees that engaging Beehive and using Beehive in-person has been more successful than engaging consumers remotely via telehealth. To conclude the Advisory Committee meeting, Dr. Tara Niendam addressed that the change to practice needed to integrate Beehive into care is difficult, and we are all working hard to make the changes needed. To that end, closing remarks also addressed the need for program leadership to make the space and time for their program staff to learn and use Beehive.

2. Schedule EP program fidelity assessments and provide results from fidelity assessments of EP programs

Each early psychosis clinic undergoes a fidelity assessment to determine their adherence to evidence-based practices for first-episode services using a revised version of the First Episode Psychosis Services Fidelity Scale (FEPS-FS). The FEPS-FS represents a standardized measure of fidelity to EP program best practices (Addington et al., 2016; First Episode Psychosis Services Fidelity Scale: (FEPS-FS 1.0), 2015). The FEPS-FS was developed using an international expert consensus method, focused on six domains: (1) population-level interventions and access, (2) comprehensive assessment and care plan, (3) individual-level intervention, (4)

group-level interventions, (5) service system and models of intervention, and (6) evaluation and quality improvement. The FEPS-FS has been recently revised to meet the agreed upon standards of EP care in the US and allow large-scale fidelity evaluation. Additionally, most programs within EPI-CAL also provide services to individuals with the clinical high-risk syndrome (CHR), for whom evidence-based best practice differs from FEP care in a number of respects. Consequently, to provide a program assessment that most accurately represents the care delivered, alongside the FEP-FS, we will be piloting a new scale under development designed to assess the components of care delivered to individuals with the diagnosis of CHR, known as the CHRP-FS.

Each EP program will participate in an assessment of EP program components using the revised FEPS-FS/CHRPS-FS, which will be completed via web-based teleconference. The fidelity assessment will be used to identify program strengths and possible areas for improvement, which can serve an important driver to improving early psychosis care delivered in EP programs in the LHCN. Additionally, the ability to evaluate the impact of service-level factors on consumer-level outcomes collected by Beehive will provide us with important new insights into what particular components of the EP program of care are associated with improved outcomes in different domains. These findings can then be disseminated across the network (and beyond), further informing care and shaping service delivery.

Assessments are completed in groups of 2-6 programs per quarter, starting in November 2021 until December 2022. Assessments are completed by trained clinical staff with expertise in early psychosis care and supported by evaluation administrative and research staff. Prior to the assessment taking place, the assessors and administrative/research support staff undergo a two-day training to go through the manual and conduct a mock site visit based on real cases. Prior to the evaluation, EP program sites participate in an introductory meeting, in which an overview of the FEPS is provided and the components of the evaluation are discussed. The assessments are conducted in consultation with Don Addington, M.D. from the University of Calgary, author of the FEPS-FS and CHRPS-FS scales.

As of June 30th, 2022 (the time period summarized in this report), EP program fidelity assessments have been initiated or completed for ten EPI-CAL programs: Orange County OC CREW (November 29 - December 3, 2021), San Diego Kickstart (November 1-5, 2021), Aldea SOAR Solano (January 17-21, 2022), San Mateo Felton (April 18, 2022), UCLA CAPPS (April 18-22, 2022), SacEDAPT (May 23-27, 2022), EDAPT (June 6-10, 2022), UCLA Aftercare (June 6-10, 2022), Aldea SOAR Napa (June 13-17, 2022), and UCSD CARE (June 20-24, 2022). The five LACDMH programs are scheduled for the third quarter of 2022 (July, August, September), and Stanislaus LIFE Path program, and Aldea SOAR Sonoma programs are schedule for the fourth quarter of 2022 (October, November, December).

Eight fidelity assessments have been completed using the First Episode Psychosis Service – Fidelity Scale (FEPS-FS) and the Clinical High Risk for Psychosis Service—Fidelity Scale (CHRPS-FS). The FEPS-FS includes 37 items, resulting in a score range from 37 to 185 and the CHRPS-FS includes 32 items, resulting in a score range from 32 to 160. All item scores range from 1 to 5, with an item score of '4' indicating good fidelity, and a score of '5' indicating high fidelity. In the completed assessments, FEPS-FS scores range from 129 to 154 and CHRPS-FS scores range from 108 to 136. Nine assessments are currently in progress with expected completion by the end of the calendar year.

Notably, these tools have been developed as an international standard, so achieving high fidelity scores may be constrained by state, local, or insurance coverage decisions outside of the control of the specific program. With that in mind, frequent low scoring items include population served (all clinics scored 1) and age ranged served (all clinics scored 1).

There is notable heterogeneity across programs (FEPS-FS mean score range: 3.36 – 4.16, CHRPS-FS mean score range: 3.48 –4.39). All clinics had over 50% of items at good or high fidelity. Particular heterogeneity can be found in items such as clozapine administration (interquartile range (IQR): 1-5), the delivery of supported employment (IQR: 1-3) and education services (IQR: 1-5), active engagement and outreach (IQR: 1-5), patient retention (IQR: 1-5), the involvement of peers in care (IQR: 1-4), and communication between the CSC team and inpatient services (IQR: 1-4).

3. Provide training and implementation of outcomes measurement on app in non-pilot EP programs, detailing training of EP program staff in data collection

In our original LHCN proposal, we proposed in-person visits to each program to conduct the core training for the Beehive application. However, due to the COVID-19 pandemic, we had to adjust our training plan and conduct the core trainings remotely.

The core trainings begin with a pre-training meeting with leadership at the program to discuss which program staff members would be designated as providers, group analysts, or group and clinic admin in Beehive (roles described below), as well as to cover topics around integrating Beehive into their current data collection system. Next, we conducted a training series consisting of a pre-training meeting with program leadership to introduce the training plan, three training sessions to introduce Beehive to each program (Part 1, Part 2, and Part 3), and an intake-workflow meeting with key clinic staff to understand clinic workflow and brainstorm how to best implement Beehive within their program context.

Figure 2: Beehive Training Schedule
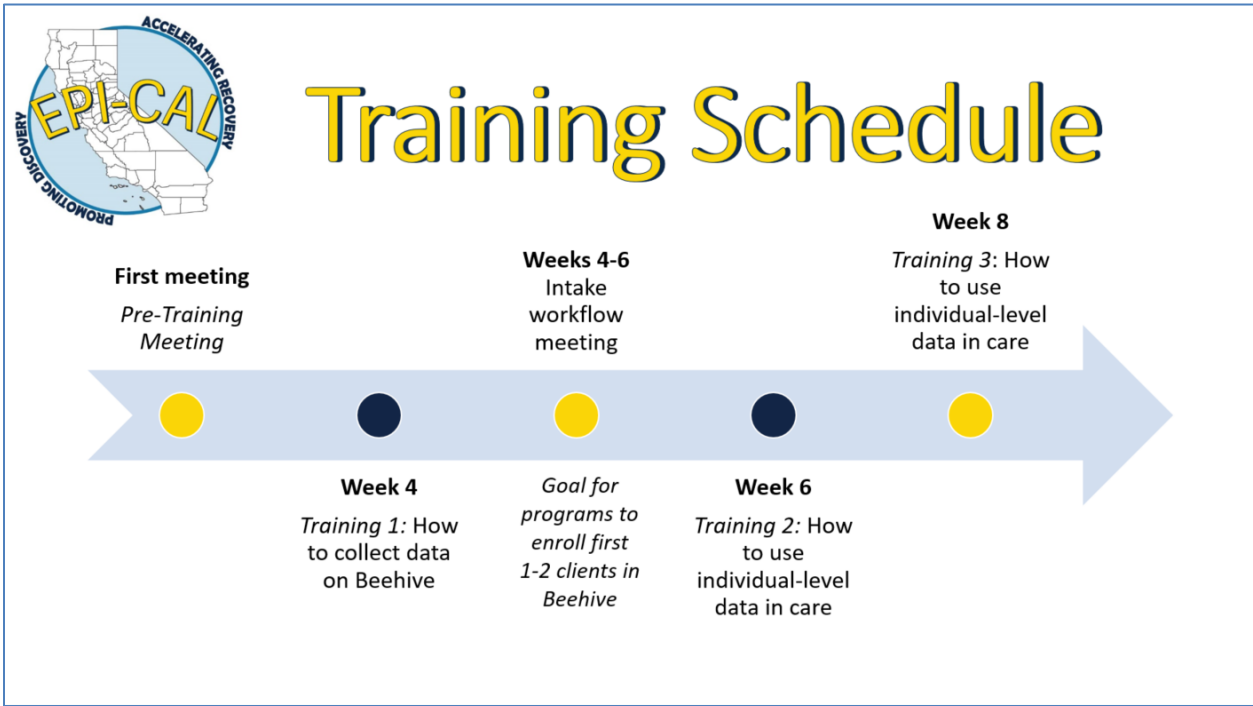
Our remote trainings began with our pilot programs in March 2021. In June 2021, we began to onboard non-pilot programs, starting with the Los Angeles County PIER programs. See table below for all core trainings conducted through June 2022. Note that booster trainings (for entire program or for individuals at the program) have also been conducted in addition to the core trainings and are not included on the table below.

Table 1: EPI-CAL Program Training Completion

Program	Pre-Training	Training 1	Intake Workflow	Training 2	Training 3
UCD SacEDAPT	3/10/2021	3/22/2021	3/10/2021	4/5/2021	6/14/2021
UCD EDAPT	3/10/2021	3/22/2021	3/10/2021	4/5/2021	6/14/2021
Solano SOAR	3/18/2021	3/22/2021	3/29/2021	4/12/2021	6/7/2021
Napa SOAR	7/23/2021	8/19/2021	10/21/2021	10/14/2021	12/2/2021
Sonoma SOAR	8/24/2021	9/29/2021	10/21/2021	10/14/2021	12/2/2021
Kickstart Pathways	3/24/2021	3/31/2021	6/8/2021	4/14/2021	7/28/2021
LAC- IMCES 3	5/10/2021	6/21/2021	8/11/2021	11/10/2021	12/8/2021
LAC - IMCES 4	5/10/2021	6/21/2021	8/11/2021	11/10/2021	12/8/2021
LAC - SFVCMHC	5/11/2021	6/18/2021	7/19/2021	11/18/2021	12/9/2021
LAC- The Whole Child	5/13/2021	6/17/2021	7/21/2021	11/23/2021	1/25/2022
LAC- The Help Group	5/14/2021	6/14/2021	8/10/2021	11/29/2021	1/5/2022
OC CREW	7/13/2021	8/12/2021	8/23/2021	10/13/2021	12/8/2021
San Mateo Felton	7/14/2021	10/20/2021	12/9/2021, 4/27/2022, & 5/16/2022	7/13/2022	TBD
UCLA - Aftercare	7/29/21	9/1/2021	2/9/2022	5/13/2022	TBD
UCLA - CAPPS	9/23/2021	11/22/2021	2/1/2022	5/3/2022	TBD
UCSF PATH	9/21/2021	5/6/2022	5/25/2022	7/8/2022	TBD
UCSD CARE	4/7/2022	5/23/2022	7/15/2022	9/30/2022	TBD
Stanislaus LIFE Path	2/23/2022	4/8/2022	5/10/2022	5/31/2022	9/22/2022
Stanford INSPIRE	TBD	TBD	TBD	TBD	TBD
Totals	**18**	**18**	**17**	**14**	**12**

Pre-Training Meeting

The pre-training meeting is conducted between EPI-CAL staff, including the program's assigned point person, program leadership, and a program IT representative. The purpose of this meeting is to introduce the training schedule and gather information to facilitate the first training. For example, the program leadership are invited to Beehive to test network compatibility (e.g., ensure that invite emails are not blocked by institution, ensure that program staff can access web application). The IT representative is engaged as needed to resolve technical issues (e.g., add beehive email address to approved senders list).

Part 1 Training

The general outline for the first training is as follows:

1. Re-introduction to the EPI-CAL project, including the overarching purpose and goals of data collection via Beehive
2. Presentation on the value of Beehive and data collection
3. Beehive Application training session (see Figure 3)

Presentation- "The Value of Beehive and Data Collection"
An EPI-CAL team member, Leigh Smith, Ph.D., gives a brief presentation that first focuses on how Beehive was developed using input from community partners and providers. Next, she provides a historical example of data collection that led to significant innovation in health care by giving a brief vignette of John Snow's work with the Cholera outbreak in London in 1854. She then draws parallels between Snow's work and how Beehive was designed, focusing on a meaningful connection between providers and community partners, a holistic approach to data collection, and prioritization of record keeping through automation and data consolidation. After, she speaks about Beehive's power to facilitate dialogue between providers and consumers, and within/between clinics, through reports provided by the Beehive team or generated within Beehive. Dr. Smith covers the purpose of participating in a Learning Health Care Network (LHCN), and how valuable information collection can be in informing treatment. Finally, she emphasizes the ability of Beehive's data collection in shaping care by illustrating how over a million points of data can be generated if each of the 18 EPI-CAL clinics enrolled 80% of their consumers and completed the baseline and two follow-up surveys in the first year. If Dr. Smith cannot attend in person, she has a recorded version of this presentation which is shown.

Figure 3: Training Agenda

Part A: Using Beehive Support Resources
We provide all EP program staff with the link to our detailed resource guide, accessed here: https://sites.google.com/view/beehiveguide/home

The resource guide was created so that EP program staff may reference, in detail, how to use the Beehive application and complete the tasks reviewed during the training. This includes: Creating Clinic or Group Admin Account & Inviting them to Beehive, Accepting Beehive Invite & Completing Registration, and Adding a Provider and Inviting them to Beehive. The resource guide also provides information on how to complete the "homework" that was assigned during the first training, including Adding a Consumer & Support Person and Completing Clinician Data Entry.

End User License Agreement (EULA) Video
We show the EULA video to all EP program staff for two reasons: 1) to streamline the registration process for staff during the training (as all users watch this video as part of the registration process), and 2) to orient them to what consumers and families also see when they first access the Beehive system. The EULA video can be

accessed here: https://youtu.be/3E8hiEkIvSQ. The Spanish EULA video is available here: https://youtu.be/UgY7ZUhe-Fk. The EULA video was developed through focus groups with EPI-CAL community partners (consumers, family members and providers) to ensure that core aspects of Beehive (e.g., security, consent and data sharing) were clear to users. The EULA video describes what Beehive is and how it is part of the EPI-CAL project, the purpose of Beehive, how data is shared and stored, and users' options for data sharing. Every new user of Beehive will be presented with the EULA video before making their data sharing choices.

Part B: Training Tasks: Setting up Clinic Admin/Provider Accounts and Registering Consumers

There are three main types of accounts in Beehive; each account is associated with the ability to complete certain actions in the Beehive system in line with that person's job duties:

- Group Admin account: For program-level staff members who provide supervision and administrative support across clinics within a particular group – for example, a Group Admin is a person whose position includes oversight of activities at more than one clinic.
- Clinic Admin account: For staff members who provide supervision and administrative support within a specific clinic in a group.
- Provider account: For staff members providing direct services to consumers in a particular clinic, for example therapists, prescribers, and peer support specialists.

There is a general hierarchical structure to the relationship between these account types, such as who can invite new users and who can download data from Beehive.

The first training task is to set up Clinic Admin and Provider accounts in Beehive. For the initial Part 1 trainings, EPI-CAL staff created Group and Clinic Admin accounts prior to the first training meeting and sent those specific users their invitations during the live training (for trainings of non-pilot programs, EPI-CAL staff assist all admin users to register at the pre-training meeting). Once participants with Clinic Admin-level accounts accept their invitations and completed the registration process, EPI-CAL staff guide them through creating provider-level accounts for their staff and inviting those staff to complete registration in Beehive. For programs utilizing a Single Sign-On (SSO) authentication scheme, the EPI-CAL staff also walk them through the process to log in through their institution.

Part C: Next Steps

Once all providers conclude the registration process, EPI-CAL staff demonstrate the process of registering a consumer and their support persons. Next, the survey collection timeline is introduced. Baseline surveys are available for four months after the consumer's intake date. After baseline, follow up surveys are sent, which are due every 6 months from baseline will open two months prior to the due date and close four months after the due date. Next, the process for consumers and primary support persons to complete/request help to complete surveys is shown, along with the steps to manually resend surveys. Participants are then given the goal to register two consumers and their support persons (if applicable) in Beehive, and have the consumers complete their surveys before the next training session (see Figure 4). These consumers can be at any point in treatment when they are enrolled in Beehive. A Beehive consumer introductory script is provided to support the program staff in talking about Beehive to potential participants.

Figure 4: Training Checklist

TRAINING CHECKLIST

Tasks we completed together

☑ **Task:** Set up Provider Accounts

Goals for you to work on before our next training together

☐ **Goal 1:** Set up Client & Support Person Accounts

☐ **Goal 2:** Follow Up with Client & Support Person

☐ **Goal 3:** Use our Support Resources

Intake Workflow Meeting

After the Part 1 Training, EPI-CAL staff, including the program's point person, meet with the program's key staff involved in intakes. The purpose of this meeting is to understand the program's current workflow to facilitate a smooth transition to implementing Beehive. Once EPI-CAL team have a basic understanding of the program's intake process, they ask questions to operationalize how Beehive will be integrated into this process (e.g., "Who will be responsible for registering consumers in Beehive?"). They may offer suggestions or ideas based on what has worked at other programs. The goal of this meeting is to create an initial plan for the program to introduce Beehive into their current workflow. Please see Appendix I for a template of the questions asked at the intake workflow meeting.

Part 2 Training

The second Beehive training focuses on how providers can utilize individual level data in care. The Beehive team introduces the EPI-CAL Core Assessment Battery (CAB), including its domains and how these domains were selected from community partner input. Next, the trainer presents two surveys from the EPI-CAL CAB: the Modified Colorado Symptom Index (MCSI) and the Questionnaire about the Process of Recovery (QPR). Then, the trainer shows participants where to find consumer data in Beehive. The trainer then demonstrates how to present the data visualizations available in Beehive and asks the group what clinical questions or concerns the sample visualizations elicit from them. Participants then participate in small group exercises focused on example data visualizations of the MCSI with the goals of 1) exercising their data comprehension skills and 2) practicing using data to explore a consumer's story.

During small group exercises, an example consumer's MCSI scores are displayed, and participants are prompted to discuss the "story" that could be illustrated by this data set. For example, providers are presented with a graph in which MCSI scores are going up over time (indicating more frequent and/or distressing symptoms; Figure 5A) and then asked to interpret possible situations that could be leading to these data trends for this sample consumer. After providers correctly identify that the example consumer is experiencing an increase in frequency and/or number of symptoms, they are asked how they might use this information in treatment (e.g., modify the consumer's treatment plan to help reduce the frequency of these symptoms,

engage new treatment techniques to reduce these symptoms, request psychiatry consultation to review medication).

Figure 5: MCSI Example Graphs from Beehive
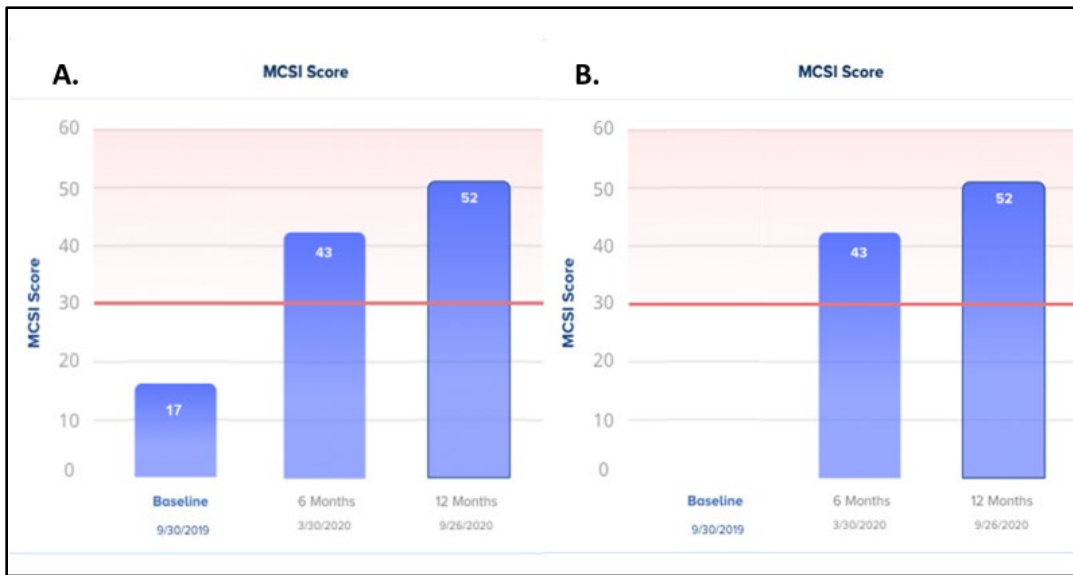
Figure legend: A. Representation of data showing increasing trend in MCSI symptom severity; B. Representation of how missing data (shown here at baseline) impacts the visualization

After these exercises conclude, small groups reconvene back into the larger group, with a member from each group presenting their group's discussion/findings to the rest of the program as a whole. As each small group has different themes and discussions that come up during the exercises, the larger group discussion is meant to help to broaden participants' understanding of data interpretation.

Next, the training details the types of urgent clinical issues that are currently tracked by Beehive, including "Risk to self", "Risk to others", "Risk of homelessness," and "Plan to stop taking medication". These issues were identified during focus groups with EP program community partners as critical moments for intervention during treatment. The training team also explains where each one of these alerts can be triggered within the assessment battery. Importantly, we stress that Urgent Clinical Issues in Beehive are not a replacement for each clinic's standard risk management procedures; instead, Beehive can be used as an additional tool to inform their standard risk management approaches. We also cover how to resolve urgent clinical issues using the responses programmed into Beehive (i.e., "Modified treatment plan", "Conducted risk assessment" or "Sent for emergency care") as appropriate for these alerts.

To conclude the training, the trainer introduces the "Data Use in Care" question pop up and its different response options (see Figures 6 and 7 below). This pop-up appears intermittently when a user leaves a page on Beehive which displays consumer's data. It asks the user whether they reviewed the data with the consumer or family and then asks them how the data impacted treatment. These response options are the same as the response options programmed into the urgent clinical issues – the training team intentionally takes the approach of presenting these two Beehive features together to help maximize participant comprehension. These data will contribute to a data-driven understanding of Beehive's impact (e.g., whether and how staff use data as part of treatment) on the participating programs of the LHCN.

Figure 6: Data Use in Care Question 1
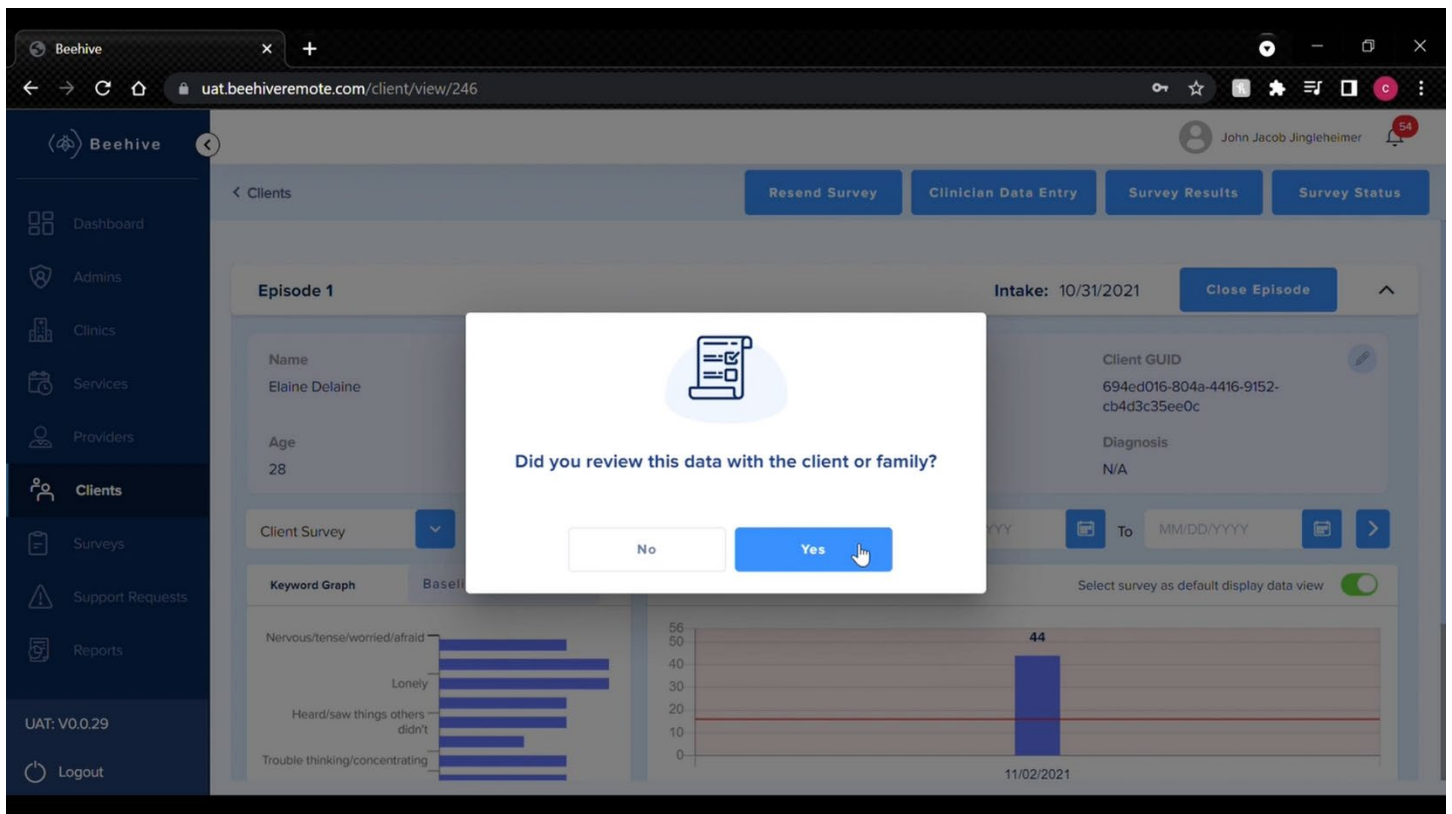
Figure 7: Data Use in Care Question 2
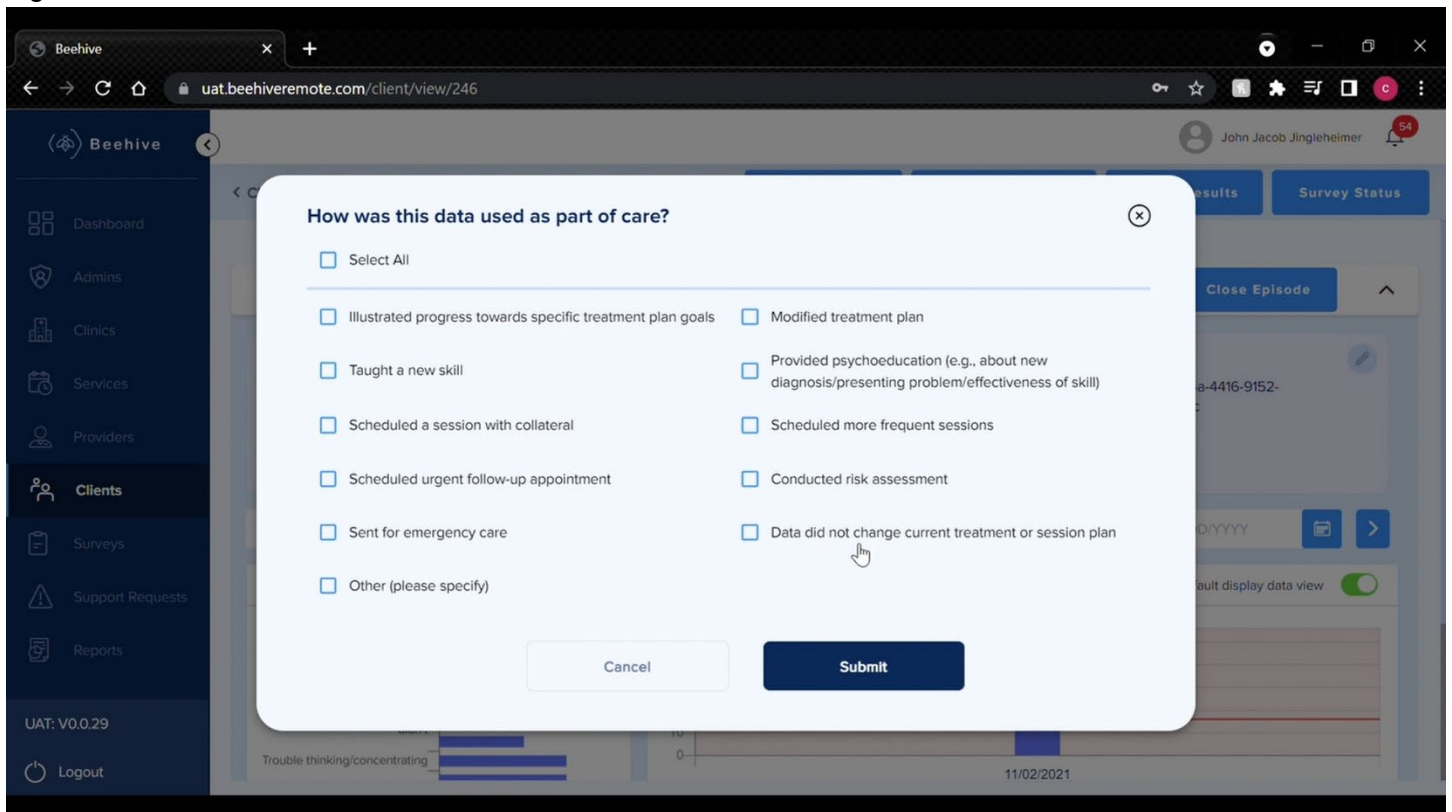
Data-Entry Workflow Meeting

After the Part 2 Training, EPI-CAL staff, including the program's point person, meet with the program leadership. The purpose of this meeting is to help the program create a reasonably sustainable plan for completing clinic-entered data about each consumer's clinical outcomes in Beehive. EPI-CAL team will ask question to understand whether there is an existing data-entry workflow in place as well as which roles on the teams are involved in the process. Once EPI-CAL team have an understanding of the program's existing data-entry workflow, they ask questions to operationalize how Beehive will be integrated into this process (e.g., "Who will be responsible for entering clinic-entered data for consumers?"). They may offer suggestions or ideas based on what has worked at other programs. The goal of this meeting is to support the program to create an initial plan to complete clinic-entered surveys about key consumer outcomes. This should include a plan for which team members will monitor and track completion and which team members will enter the data. Please see Appendix II for a template of the questions that will be asked as part of the data-entry workflow meeting.

This workflow meeting has been added as an iterative update to the core training series based on experience working with initial programs. Our team has identified that programs often need support to operationalize this workflow in their program, so we have added this as a meeting to the core training series. Because this is a recent edition, we have not conducted it at any program yet but are reaching out to programs to schedule.

Part 3 Training

Part 3 training revolves around applying and expanding the data interpreting skills gained in Part 2 training, with actual data from consumers that was collected after the last (Part 2) training. During Part 3 training, participants are oriented on how to input and view Clinic-entered data and how to assign additional surveys to consumers, and how to close and re-open consumer episodes in Beehive.

Part 3 training also familiarizes participants to two more measures included in the Core Assessment Battery: the SCORE-15 and the Burden Assessment Scale (BAS). These measures were selected because they both capture quantifiable scores on domains (family impact and family burden, respectively) that were identified as high priorities by EP community partners during EPI-CAL outcomes focus groups. These measures were chosen for this training as, like the Modified Colorado Symptom Index and Questionnaire on the Process of Recovery covered in Part 2 Training, they are scored measures which are visualized in Beehive.

Next, participants are split into small groups, and given a globally unique identifier (GUID) of a consumer that receives services at their clinic and has completed surveys in Beehive. This is to ensure that each small group has real-world data to interpret. At the beginning of the small group, an EPI-CAL team member orients the group to a worksheet which includes training activities and discussion questions about finding, interpreting, and using consumer data as part of care. As these trainings require participants to examine their consumer's data (i.e., PHI), EPI-CAL training team members are only present for the beginning of the small group exercise to introduce the activity, but they leave prior to any discussion or sharing of PHI. EPI-CAL staff encourage each participant to take an active role within the small group: note taker, screen sharer, delegate to report during large group debrief, etc. Each small group uses the small group worksheet (Appendix III) to guide their time in the small group.

After the small group exercise, participants rejoin the larger group to share their findings. After each small group has presented their findings with the rest of the groups as a whole, the EPI-CAL team facilitates a large group discussion which encourages participants to look for trends and assess what they could mean. After encouraging pattern recognition of common patterns in the data, the training team encourage participants to view their consumer's data through this analytical lens and demonstrate how their treatment plans could benefit from this approach.

Each program has an EPI-CAL staff point person to provide regular check-ins to provide training and implementation support. The point persons are introduced during pre-training and the Beehive training series. Initially, we request weekly meetings or calls with key program staff (as determined by the program). At these meetings, point persons can help programs troubleshoot issues and support staff with accessing resources and learning to use Beehive.

In addition to regular check-ins with key program staff, point persons may also provide booster trainings to individuals at the program or to groups of program staff. These may be conducted remotely via web conferencing. More recently we have begun to visit sites in-person as initially proposed and planned prior to COVID-19 in-person meeting restrictions.

Point persons will also respond to ad hoc requests from the program for technical support and troubleshooting. For example, if a program experiences a bug or glitch while using Beehive, they are told to contact their point person who can help to troubleshoot or escalate this report.

4. Outline plan for training EP program staff from non-pilot programs on app implementation and outcomes measurement

Our team has learned a great deal from the initial Beehive trainings regarding the most efficient way to approach training for non-pilot EP programs. One of the consistent messages was that the initial trainings were too fast paced for many users. Another major learning opportunity was that we did not have enough time to sufficiently cover all the content we had planned in each session. Therefore, instead of breaking out the initial trainings into two 2-hour sessions, we have revised our training plan to include at least three 2-hour sessions for the introduction to Beehive for non-pilot programs as well as provide a fourth training to cover additional content for admin staff (see Figure 2: Beehive Training Schedule). We will continue to incorporate any changes and feedback from additional trainings into all future trainings, as we view improvement of our training approach as an iterative process. One change we implemented to save time during Part 1 training was to register all admin users (Clinic and Group Admin) during the pre-training meetings so that we only had to register the remaining providers during the first training. This has saved a substantial amount of time in subsequent Part 1 trainings thus far. We have also broken out into small groups to register providers during Part 1 training so several people can be registered in parallel, which has also saved time.

Another important piece of information we learned from these first trainings was the need to meet with each program's IT department ahead of time to make sure that emails/server requests from Beehive are not blocked by their organization's network security protocols. For example, Solano Aldea SOAR had delays in the first training because the emails from Beehive were being quarantined. While we were able to work with IT to unblock these emails, we will meet with IT ahead of time and test the sign-up email process in the pre-training meeting with leadership to avoid the delays during the training in the future. Additionally, meetings with site IT to ensure Beehive's ability to properly communicate with its servers through site networks will be conducted. Thus far, we have modified our pre-training approach with five additional programs in preparation from their training and were able to verify ahead of time that Beehive emails would not be blocked during Beehive training.

We have also identified the need to understand more about each program's intake process so that we may customize our training and support approach to each program's existing clinical workflow. To better understand each program's unique process, we now schedule an additional "Intake Workflow Meeting" with programs between their Part 1 and 2 training to collect information and meet with intake coordinators from each program

to understand data collected during phone screen and intake, and how and where Beehive consumer registration and surveys will fit into their existing process.

Additionally, the team has updated the training material to reflect changes based on each program's needs and how their feedback is incorporated into the application. A multitude of training videos and slides that were accurate earlier in the year have required updating. As the Beehive application continues to evolve, the training team will continue to ensure our training materials will follow.

We have also found that providing more live demonstrations of Beehive features has been helpful during the trainings. Many of the materials that were originally covered in pre-recorded videos during prior trainings are now administered as a live demonstration. Additionally, we provide more information during breakout rooms as we find smaller group sizes to be more amenable for training purposes. Please see Table 1 for an up-to-date list of all Beehive trainings provided thus far through June 30th, 2022.

5. Get preliminary results on program-level data from 2 pilot EP programs, including interviews with EP programs to understand barriers and facilitators to app implementation.

Preliminary results on program-level data from 3 pilot EP programs
After our initial trainings with EDAPT/SacEDAPT and Solano SOAR Aldea programs in March 2021, programs began enrolling consumers into Beehive. Kickstart in San Diego County had also started enrolling consumers in Beehive a few months after the initial launch. Basic demographic information is collected via phone screen and entered into Beehive by clinic staff when initially registering a consumer and their support persons. All consumers had to complete the EULA before being presented with surveys. When consumers complete the EULA, they indicate whether they want to share their data with UC Davis and/or the NIH for research purposes beyond using Beehive for the purpose of their clinical care. Their choices are explained in detail in the EULA video. Our goal is to have 70% of consumers agree to share their data with UC Davis and NIH.

For this annual report, we are reporting on data collected in those three pilot programs up through December 3rd, 2021 for those who agreed to share their data with UC Davis. After that date, we started summarizing enrollment and survey completion rates for all participating programs, which can be found in the section below titled Submit report on LHCN enrollment and follow up completion rates for LHCN software application and dashboard in all EP Programs. One hundred and twenty-five consumers were registered in Beehive across the three pilot clinics, and of those, 66 completed their EULA indicating their data sharing permissions. Of those who completed their EULA, 55 consumers agreed to share their data with UC Davis (83%). Therefore, in the current report, we are reporting demographic data for those 55 individuals across three clinics who have registered in Beehive, completed their EULA, and agreed to share data with UC Davis. It is important to note that clinic staff register consumers and invite them to Beehive. Consumers complete their registration and then have the ability to complete surveys. So, if someone has been registered in Beehive, it does not necessarily mean that they have completed any of the outcomes surveys available in Beehive.

Here we report demographic information that is completed at registration, which is a subset of the demographic questions that are asked in Beehive (Table 2). Complete demographic information, including all required PEI fields, are administered via a required consumer-entered Beehive survey. For any cell that has an N less than 5 individuals, this data was masked and both the N and proportion cells were updated with "<5" and "<9%", respectively. If there were 0 individuals who endorsed a response option in the demographic surveys, the category is not represented on Table 2 (e.g., intersex under Sex at Birth); we will continue to add categories to each demographic variable if there are ≥1 individuals in each respective category.

Table 2: Preliminary Demographic Data from Beehive Pilot Testing

SacEDAPT, Solano SOAR, and Kickstart Combined Demographics (through 12/3/21)		
Display Language	**N**	**%**
English	55	100%
Age	**N**	**%**
12-17	18	33%
18-23	27	49%
≥24	10	18%
Sex at Birth	**N**	**%**
Female	26	47%
Male	29	53%
Gender	**N**	**%**
Female	21	38%
Male	27	49%
Non-binary	<5	<9%
Questioning or unsure of gender identity	<5	<9%
Prefer not to say	<5	<9%
Pronouns	**N**	**%**
He/Him	27	49%
She/Her	22	40%
They/Them	<5	<9%
N/A	<5	<9%
Race	**N**	**%**
African/African American/Black	13	24%
Asian	<5	<9%
American Indian/Alaskan Native	<5	<9%
Hispanic/Latinx Only	14	25%
White/Caucasian	13	24%
More than one race	8	15%
Other	<5	<9%
Prefer not to say	<5	<9%
Ethnicity	**N**	**%**
No - I do not identify as Hispanic/Latinx	32	58%
Yes - I identify as Hispanic/Latinx	16	29%
Prefer not to say	<5	<9%
Unsure/Don't know	6	11%

Additionally, providers are able to enter a consumer's diagnosis when they register individuals in Beehive, which is reported in Table 2. In the same manner as the table above, cells with less than 5 individuals were masked and both the N and proportion cells were updated with "<5" and "<9%", respectively. For most

diagnostic categories, except Schizoaffective disorder and mood disorders with psychotic features, there were less than 5 individuals per cell. Diagnoses are grouped according to two classes of early psychosis: 1) individuals who are deemed to be at clinical high risk for psychosis (CHR), and 2) individuals who have experienced psychotic level symptoms (First Episode Psychosis, FEP). This reflects the wide range of psychosis diagnoses that are served by the EP clinics represented in this sample.

Table 3 Consumer Diagnoses from Beehive Pilot Testing

Diagnosis	N	%
Clinical High Risk (CHR)		
Attenuated Psychosis Symptoms	<5	<9%
First Episode Psychosis (FEP)		
Substance Induced Psychotic Disorder with onset during intoxication	<5	<9%
Mood disorders with psychotic features	6	11%
Schizoaffective Disorder (Bipolar or Depressive Type Combined)	11	20%
Schizophrenia	<5	<9%
Schizophreniform Disorder	<5	<9%
Unspecified Psychosis	5	9%
CHR or FEP Status Not Confirmed		
Anxiety Disorders	<5	<9%
Missing	25	45%

When consumers finish registration in Beehive, they then have access to Beehive surveys. After registration is complete, Beehive makes three surveys available for completion: Adverse Childhood Experiences (ACES), primary caregiver background, and questions about other lifetime experiences as well as a static demographics information (see EPI-CAL Enrollment Life Questions, see Table 4 and Figure 9). If a consumer is in a survey window (e.g., at intake or six months), Beehive makes available 15 additional surveys that assess various community partner-chosen outcomes including family functioning, education, social relationships, demographics and background, medications, and symptoms (see Table 4). These surveys are presented in different bundles that are grouped based on subject matter and/or timing of the surveys (i.e., whether they receive the survey just at enrollment, or at enrollment and every six months thereafter). EPI-CAL enrollment and required bundles are automatically assigned to every consumer who registers in Beehive. However, each individual clinic also has the option of assigning addition surveys if they choose to do so. The current data only include EPI-CAL enrollment and required bundles.

Table 4 EPI-CAL Enrollment and Required Survey Bundles

Bundle Name	Survey Name	Bundle Timing
EPI-CAL Enrollment Life Questions	EPI-CAL Enrollment Life Questions	Enrollment only
	Adverse Childhood Experiences (ACES)	
	Primary Caregiver Background	
EPI-CAL Experiences Bundle	Life Outlook	

	Questionnaire About the Process of Recovery (QPR)	Every 6 months, including intake
	Modified Colorado Symptom Index (MCSI)	
	Substance Use	
	Legal Involvement and Related	
EPI-CAL Treatment bundle	Intent to Attend and Complete Treatment Scale	Every 6 months, including intake
	End of Survey Questions	
	Hospitalizations	
	Shared Decision Making (SDM)	
	Medications	
EPI-CAL Life Bundle	SCORE-15	Every 6 months, including intake
	Demographics and Background	
	Social Relationships	
	Employment and Related Activities	
	Education	

When enrolled at intake, consumer and identified support persons can be registered in Beehive by clinic staff. Beehive will then prompt them to complete registration, review the EULA, and choose data sharing permissions. Beehive then shows them the surveys that are available for them to complete within each bundle (see Figure 8 below). Respondents can choose which surveys they wish to complete in the order they wish to complete them.

Figure 8: Survey Window Timing

Example Survey Window Timing for a Consumer with Intake on April 1

Weblink Automatically Sent

Weblink Automatically Sent

6 Months After Intake Date

April 1

Aug 1

Aug 1

Oct 1

Feb 1

Baseline Surveys Open

Baseline Surveys Close

Follow-Up Surveys Open

Follow-Up Surveys Close

Baseline surveys are available for **4 calendar months** after the weblink is sent (intake)

Follow Up surveys are available **2 calendar months before** and **4 calendar months after** the 6-month mark

Figure 9: Subset of Surveys Available for Consumer to Complete at Baseline

Beehive

Getting Started — 0% — 3 Surveys — ~ 8 Minutes

| First Contact Questions | NOT STARTED |
| ~ 3 Minutes | John |

| Primary Caregiver Background | NOT STARTED |
| ~ 2 Minutes | John |

| Stressful Life Events | NOT STARTED |
| ~ 3 Minutes | John |

My Experiences — 0% — 5 Surveys — ~ 10 Minutes

| Life Outlook | NOT STARTED |
| ~ 2 Minutes | John |

| Staying Well Questionnaire | NOT STARTED |
| ~ 2 Minutes | John |

| Substance Use | NOT STARTED |
| ~ 2 Minutes | John |

During the initial phase of Beehive roll out, we asked clinics to enroll consumers and support persons who were already engaged in EP care. When these active consumers are enrolled, Beehive prompts them to complete registration, review the EULA, choose data sharing permissions, and complete enrollment surveys. If they are within the active 6-monthly survey window, they are also able to complete the EPI-CAL required bundles.

At this time, we are reporting the survey completion rate from 55 consumers on the three available enrollment surveys (EPI-CAL Enrollment Life Questions, "Getting Started," Figure 9) because some consumers were enrolled outside of survey windows and thus were not presented with the remaining 15 surveys. The distribution of survey completion is reported in Figure 10. Survey completion rate ranges from 0-100%, with 80% of individuals completing all three enrollment surveys. The point person at each clinic site will track survey completion and inform clinic staff if there are consumers who are not completing their surveys so that the clinic staff may check in and provide support to ensure survey completion.

Figure 10: Preliminary Survey Completion Rate for Enrollment Surveys
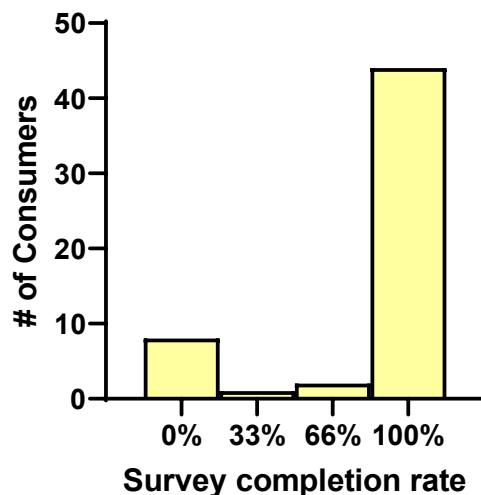
Exploration of barriers and facilitators to implementation of the Beehive system
Results from additional barrier and facilitator interviews in the past fiscal year are summarized below.

6. Monitor enrollment and follow up completion rates for LHCN app in all EP programs

EPI-CAL staff monitor enrollment progress and symptom survey completion for LHCN across all EP programs in LHCN on a weekly basis. The following metrics are monitored and visualized:

- Beehive registrations
- Beehive enrollments (i.e., consumers with a completed EULA)
- Opt-ins for data sharing with UCD and/or NIH for research purposes
- Completion of Modified Colorado Symptom Index (MCSI) at Baseline, 12 month, and 24 months.

Please find the report on recent data for these metrics in the deliverable: Submit report on LHCN enrollment and follow up completion rates for LHCN software application and dashboard in all EP Programs in study.

While reviewing these figures each week, the team discusses observed barriers for sites which are enrolling at a rate below the average LHCN enrollment rate. EPI-CAL team will also discuss solutions or interventions to address barriers. This may include developing additional trainings, making changes to Beehive application, reaching out to the program to ask what additional support they may need and brainstorm solutions, etc. Even when barriers are outside the scope of EPI-CAL project, (e.g., program turnover, dedication of program staff efforts), the team will still attempt to understand how we can accommodate the program given their needs at that moment.

The EPI-CAL team also discusses the facilitators for sites which are enrolling above the average LHCN enrollment rate. EPI-CAL staff develop strategies to disseminate facilitators among all LHCN sites. For example, we noticed that sites who distribute the effort of Beehive implementation across their team, rather than relying on one or two people to carry the weight of implementation, have better rates of enrollment and survey completion. We now strongly recommend this distributed model during our workflow meetings with sites. We have also noticed that sites using the tablet (rather than the weblink) have been more successful in enrolling consumers. We are now encouraging all sites to use the tablet as much as they can.

7. Submit report on LHCN enrollment and follow up completion rates for LHCN software application and dashboard in all EP Programs

LHCN Overview

Figure 11 shows the LHCN Progress towards EPI-CAL Enrollment targets as of June 10, 2022. Consumers are considered enrolled if they have completed the Beehive EULA and agreed to share their data with UC Davis for use in research. If consumers do not allow their data for use in research, but agree to use Beehive as part of clinical care, their data may be used for quality management or quality assurance purposes only. The goal at this point in the project was to have 405 individuals enrolled (endpoint of black line in figure below). The observed rate of enrollment across the LHCN is 145 consumers (solid blue line in figure below). There are an additional 142 consumers who have been registered by the clinic in Beehive (dashed blue line in figure below), but who have not engaged with Beehive by completing the EULA or starting their surveys. We monitor the number of registered individuals because it serves as a proxy for program census (however we know that most clinics do not yet have all active consumers registered) and allows us to see what possible enrollment across the network could be.

Figure 11: LHCN Progress Towards EPI-CAL Enrollment Targets
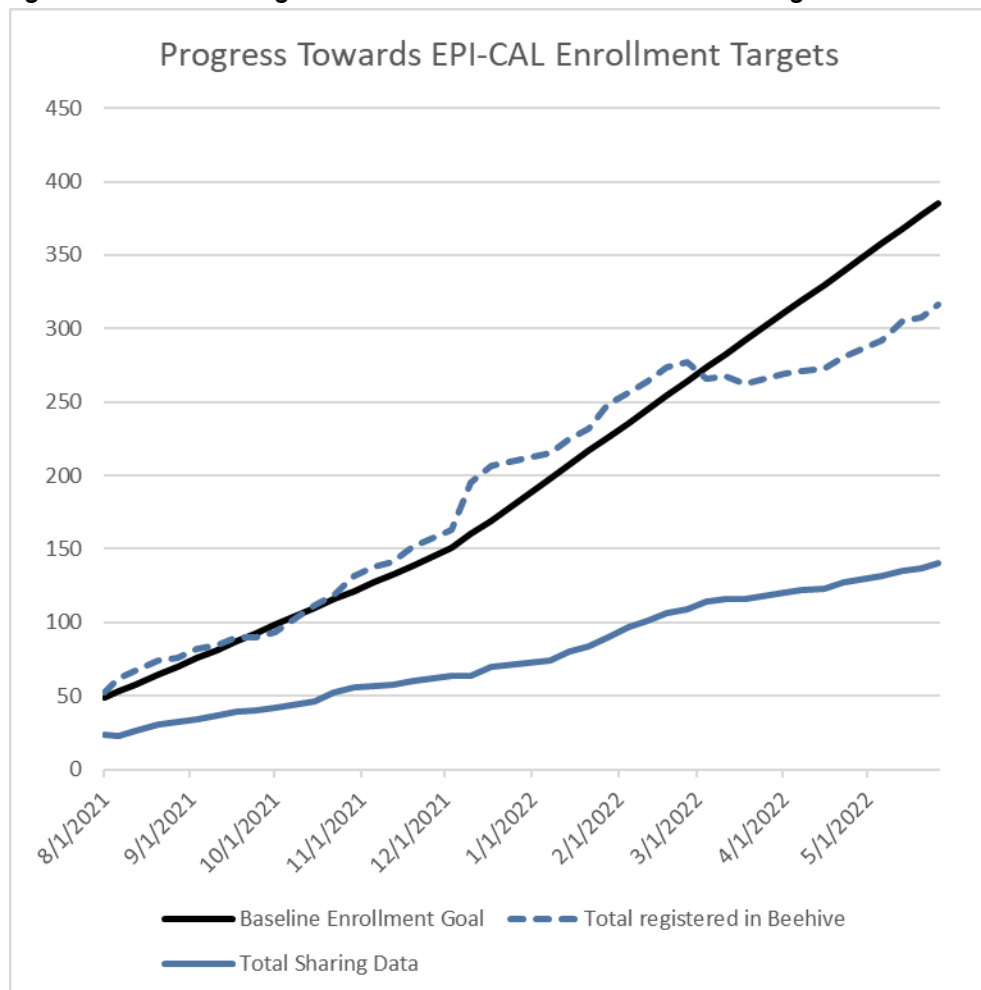
Figures 12-13 show a site-by-site breakdown of the proportion of individuals who agreed to data sharing with UC Davis for research purposes as of June 10, 2022. Figure 12 shows all registered consumers, regardless of

EULA completion status. Hence this figure shows the room for growth if sites support consumers to complete their EULA in Beehive if those consumers agree to data sharing.

Figure 12: Proportion of Data Sharing with UCD for Research by Site
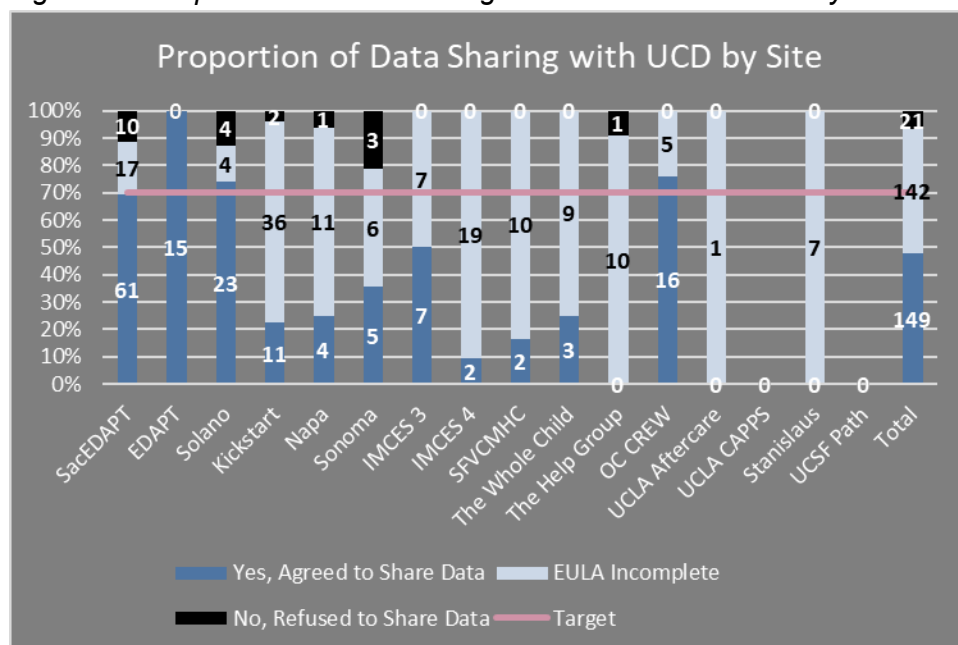
Figure 13 shows the proportion of data sharing choices made by those consumers who have completed their EULA in Beehive. We can see that some sites on this graph do not have a bar at all because they do not have any consumers who have completed the Beehive EULA.

Our goal is that 70% of active consumers at each site agree to use Beehive and share their data for research purposes. When considering all consumers known to EPI-CAL (i.e., all those registered in Beehive), we can see that only a few sites are meeting this metric. However among those individuals who have actually engaged with Beehive and completed the EULA, we are exceeding our target across the network, and at most sites individually as well. We are seeing rates of data sharing closer to 90% when considering all enrolled consumers across the LHCN.

Figure 13: Proportion of Data Sharing with UCD for Research among Completed EULAs
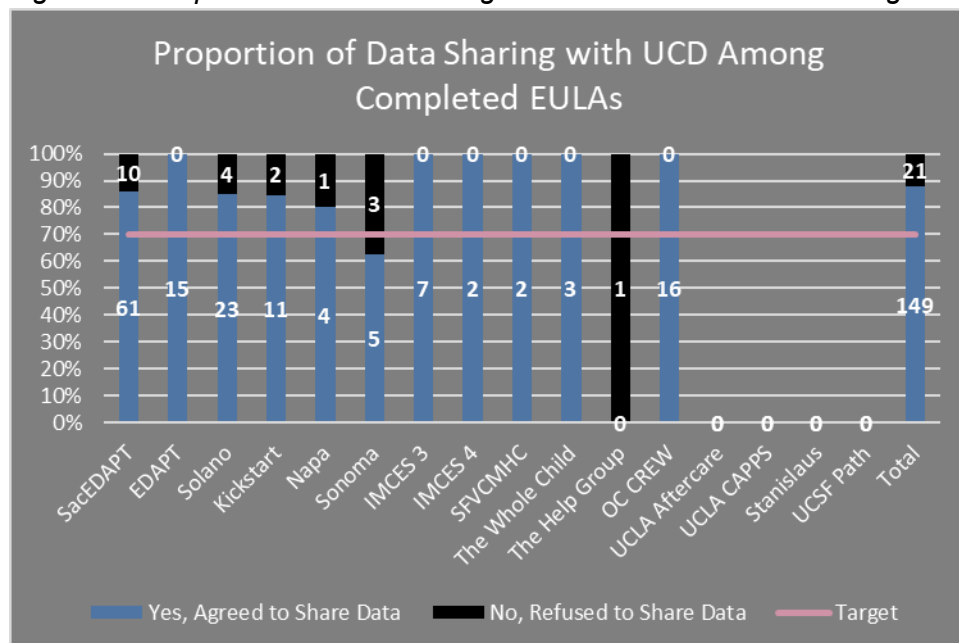
Figure 14 shows network-level survey completion rates by time point as of May 26, 2022. Note that all consumers are able to complete enrollment surveys regardless of when in their treatment they are enrolled. Consumers are not able to complete some survey windows (e.g., baseline) if they are enrolled later in treatment. Some consumers have completed surveys at more than one time point. Seventy-six percent of enrolled consumers (n=107) have completed at least one enrollment survey.

Figure 14: Survey Completion Rates Across EPI-CAL Network
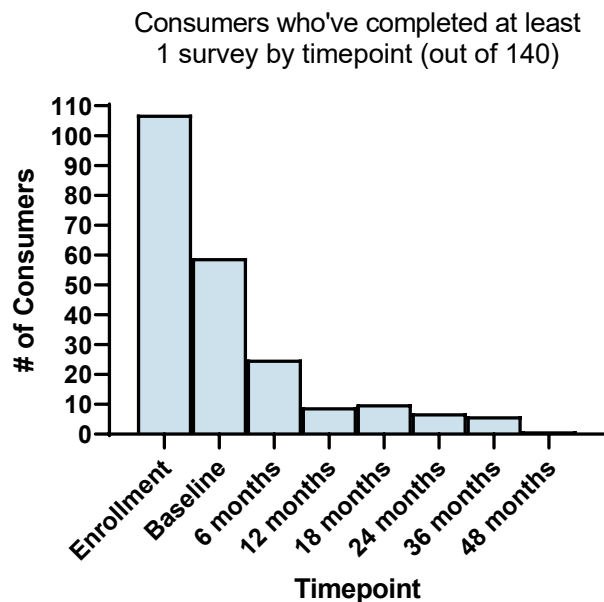
8. Subcontractor to revise dashboard to include feedback from programs and community partners

As Beehive has been designed for EP Programs, the needs and preferences of EP programs and the institutions of which they are a part have driven the design of Beehive. Security requirements of counties and institutions have led to increases in the security of Beehive. Feedback from users at EP Programs has identified several aspects of the application that could be improved to increase compatibility with their existing workflows and facilitate implementation of this novel technology.

Notably, pentesting was conducted by Azacus.io Cybersecurity on the Beehive application as a security requirement for several programs. Penetration testing, or pentesting, is a simulated hack to test the security of a system. Azacus.io conducted pentesting on both the web and iOS applications between June 21, 2021 and July 3, 2021. Azacus.io delivered the results of pentesting to the EPI-CAL team on July 12, 2021. All issues of vulnerability that were identified in the testing were addressed by the developers. On September 10, 2021, Azacus.io completed a retest of the application that proved all identified vulnerabilities had been fixed.

User feedback has also contributed to the development of Beehive. For example, Beehive users at EP programs noted that the process to determine survey progress for an individual consumer using the weblink solution to answer surveys was cumbersome. The EPI-CAL team gathered feedback on this issue and designed a "Survey Status" page in the application which allows the user to view the gestalt of survey completion for both consumers and primary support persons (Figure 15). It also allows the user to drill down into the survey completion for each survey and quickly review survey results by simply clicking on the name of the completed survey. The "survey status" page is a tool for Beehive users at EP programs to monitor survey completion more easily and thus support consumers and support persons to complete both the EPI-CAL battery and any additional program-specific surveys.

Figure 15: Survey Status Screen

Beehive users at beta programs also provided feedback that it was not easy to tell when a consumer had new data to review or to monitor an individual consumer's survey completion. The EPI-CAL team designed two solutions for this which have since been implemented in Beehive. The first solution was to add an icon to the consumer list on the dashboard which indicates when there is data which has not been reviewed by the consumer's treatment team lead (green dot on Data icon in Figure 16). The second solution was to make

survey names in dropdowns bolded when they have not yet been reviewed (Figure 17). These features aim to facilitate a clinician's review of their consumers' data by highlighting what remains to be reviewed. Thus far, user feedback from our beta sites has proved invaluable to improving the usability of Beehive in a clinical setting, and we hope to continue to elicit user feedback at non-pilot sites to examine if these changes are sufficient to address previous usability concerns.

Figure 16 : New Data Icon (green dot) on Consumer List, shown in Test Clinic

CLIENT NAME	CLIENT GUID	LAST VISIT DATE	DOB	TX TEAM LEAD	MD/ PRESCRIBER	LENGTH IN PROGRAM	SURVEY STATUS	SURVEY DUE DATE	DATA	EDIT
Melona Shi	74b83c28-70a8...	Oct 15, 2021	Mar 22, 2000	Tessa Groupo	Mark Sark	1 Month	Completed	N/A		
Nik Sharma	E6af6946-609a-...	N/A	Oct 29, 1986	Tessa Groupo	Mark Sark	1 Month	Completed	N/A		
Samin Nosrat	382039a0-95f2...	N/A	Aug 7, 2000	Tessa Groupo	N/A	2 Months	Completed	N/A		
Thomas Barrow	63a7f24f-529e-...	N/A	Jan 23, 2000	Tessa Groupo	N/A	2 Months	Completed	N/A		

Figure 17 : Newly answered surveys in bold in dropdowns

The Beehive dashboard was also redesigned with input from programs. The goal of the dashboard is to provide users with the information that is of the highest priority for them when using Beehive. However, feedback from beta users indicated that they weren't sure what was most important, and the dashboard seemed busy. With this in mind, the dashboard was redesigned to reduce visual noise. The color scheme was simplified, with red being used sparingly for the most important information. The widgets above the fold of the web page are those that would require the user to act (e.g., urgent clinical issues and action items). Other widgets which are more informational in nature (e.g., benchmarks, clinic summary, and aggregate data widgets) were moved lower. Designs and mock-ups were presented to community partners across programs, including non-pilot programs, for their feedback and approval before implementing in Beehive. EP program community partners said that they liked the placement of the urgent clinical issues widget. They also said they

liked the curved progress bars in the Enrollment widget as they are more visually appealing, compared to straight-bar options that we presented as alternatives. In general, community partners said they thought the information on the new dashboard was easy to digest and their direct feedback was used to update specific design choices in the current dashboard (Figure 18).

Figure 18: Updated Beehive Dashboard
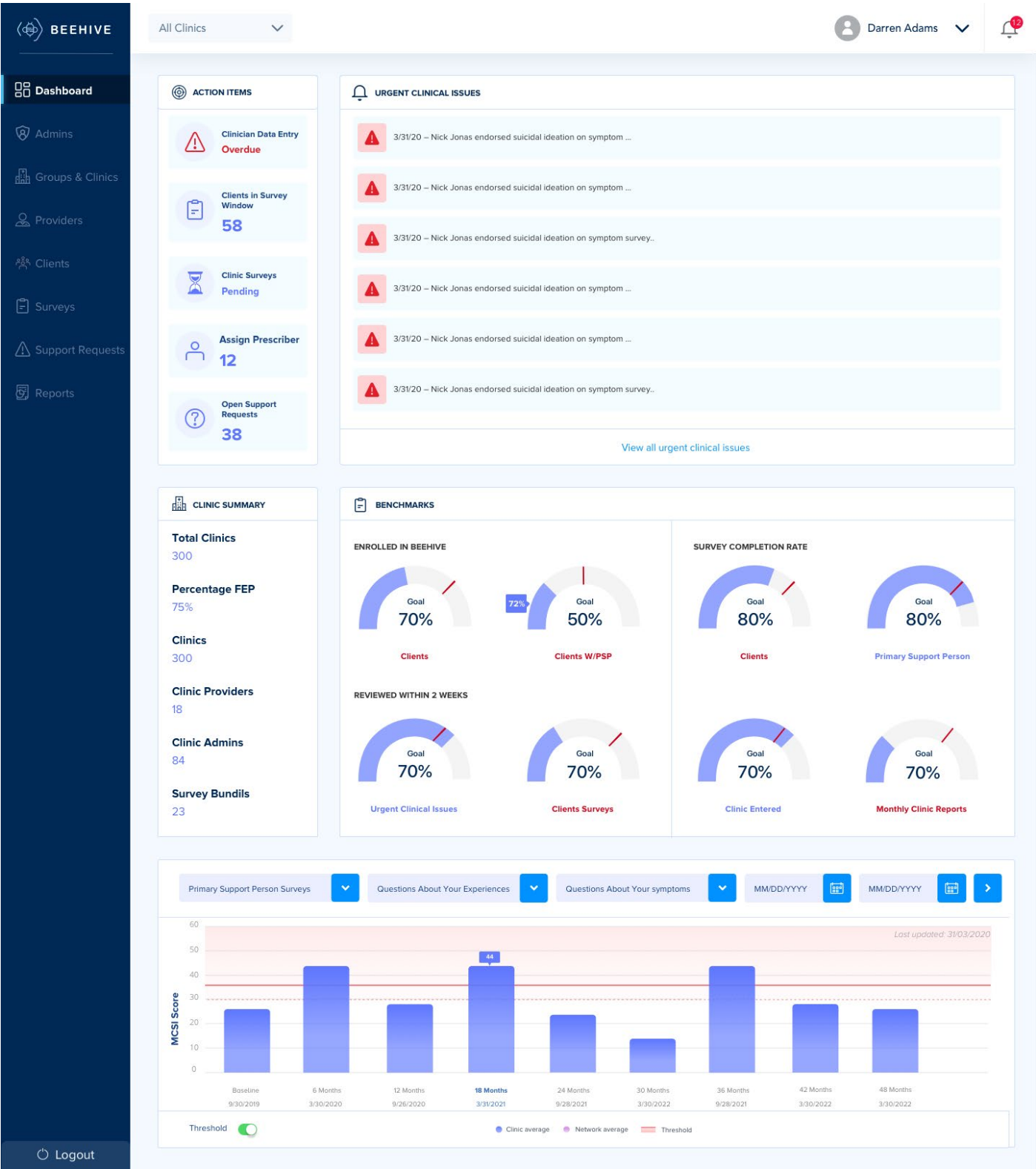
Another common theme of feedback from beta users was that the clinician data-entry was burdensome because it only included one question per page. This design of one question per page was intended to reduce the amount of information presented to consumers completing surveys in Beehive, but clinic users did not have the same needs. Due to the design of Beehive, it is not feasible from a resource perspective to allow more than one question per page. If future modifications in Beehive allow multiple questions to be presented in the clinic user view, we will work to incorporate this change. In the meantime, a new question type, matrix tables, was designed in Beehive so that EP program users could enter multiple data fields per page.

To prioritize community partner preferences and needs, the EPI-CAL team has implemented a system of formally gathering user feedback before planning each sprint series with the developers. A survey was sent out to all beta sites to solicit their feedback to prioritize the issues and ideas they had reported over the beta testing period. Respondents were asked if they were willing to participate in discussions with the Beehive project manager to provide qualitative information to help determine the best method of implementation for prioritized features. The issue prioritized by all respondents who had been using Beehive in their clinic was that survey windows were too short. The Beehive project manager met with individuals from each beta site to discuss their previous workflow around data collection and present possible Beehive solutions around this issue. EPI-CAL staff then used this information to determine the best length for Beehive survey windows moving forward.

Another feature that was adjusted based on community partner feedback is the availability of the EULA video. Several programs have indicated it would be helpful to be able to complete the Beehive EULA process prior to the consumer's intake. We changed Beehive so that the EULA process can be completed up to 15 days in advance of the intake date entered in Beehive.

Moving forward, we will continue to implement this method of gathering community partner feedback before each sprint series. Any program who has completed Beehive core training and begun to use Beehive in their program will be given the opportunity to contribute to the process of prioritizing changes and development to Beehive.

9. Gather feedback from interviews with EP community partners about experience in EP treatment programs.

This section includes the preliminary findings from our interviews with EP community partners about the barriers and facilitators to implementing a Learning Health Care Network into EP treatment programs.

The interview guide was developed by the qualitative lead, with input from the rest of the research team. Once a first draft was completed the interview was submitted to the LHCN advisory group and further modified based on community partner feedback. The interview guide is structured to explore provider experiences related to each component of Beehive implementation, including enrolling consumers into the application, consenting and other steps prior to consumers inputting data, the data inputting process itself, and then incorporating Beehive and the data in care. Finally, provider experiences of training and ongoing support were explored. The aim of the interviews was to understand potential barriers to effective implementation of Beehive at each step of the process, potential solutions either considered or implemented to address these challenges, and facilitators to effective implementation. In keeping with the principles of a Learning Health Care Network, the aim was to disseminate these experiences across the EPI-CAL clinical to encourage cross program learning. Prior to recruitment, the interview guides were reviewed and approved by the UC Davis IRB.

Potential participants were identified through the help of our EPI-CAL clinic point persons. Following identification, the point person would introduce the potential participant to the interviewer via email so that the

interviewer could introduce the study. If the potential participant agreed to take part, a time would be scheduled to go through the consent process, payment form, and if the participant consents, complete the interview all via a zoom call. Interviews lasted one hour, and participants received a $30 gift card or check for participating.

All interviews took place between March 10, 2022 and March 29, 2022 with the exception of one interview that took place on May 3, 2022. Participants were clinical staff at the four specified clinics and identified as having the following roles: Clinical Supervisor, Clinician, Peer, Case Manager, Clinic Coordinator, Bilingual program coordinator, and Director. Nine providers across four clinics (Solano, EDAPT, SacEDAPT, and OC CREW) were interviewed. These sites were selected based on the relatively high degree of engagement with the Beehive platform, as evidenced by Figure 19. The rationale for this selection process was two-fold: 1) at programs in the earlier stage of Beehive implementation, there was a concern that providers may have insufficient exposure to the platform to be able to provide a detailed account of using the tool, and 2) the plan was to initially explore Beehive implementation in sites that have most successfully implemented the platform, allowing for the collection of data that may be helpful to other programs. Going forwards, we aim to expand recruitment of providers across all sites to develop a more comprehensive experience of Beehive implementation across the whole EPI-CAL network.

Figure 19: Proportion of Data Sharing with UCD for Research by Site
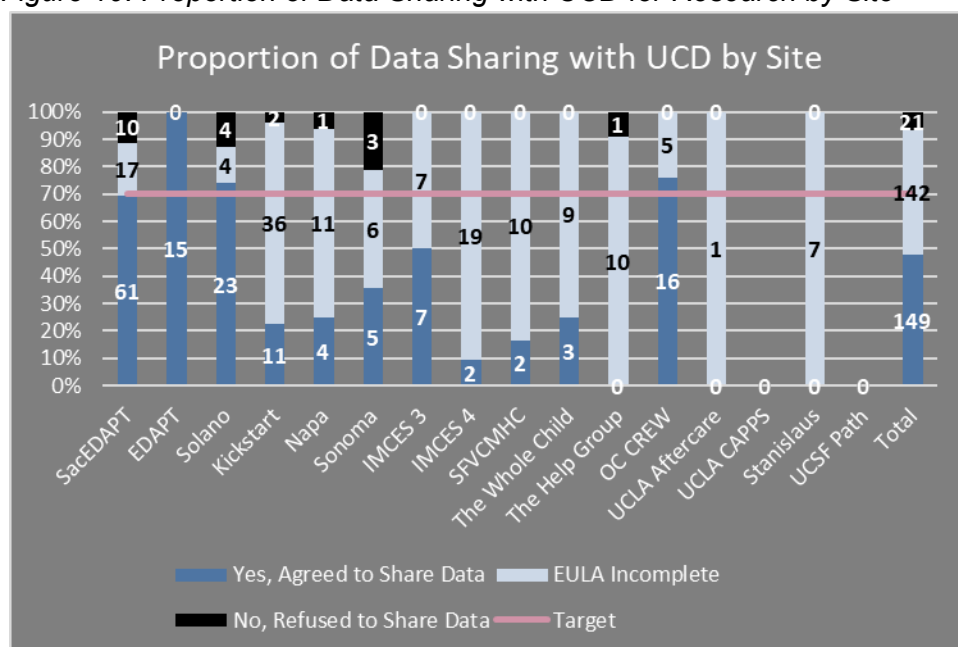
Preliminary findings centered on five prominent domains: training, enrollment workflow, clinical utility, the learning curve, and consumer engagement in surveys. Regarding training, preliminary results suggest clinics would like more trainings and refreshers, especially for new hires and when changes to the system happen. Additionally, participants highlighted the importance of hands-on and practice-oriented trainings. Next, participants discussed challenges with the flow of the initial meetings and procedures surrounding enrolling consumers into beehive, consenting, completing the EULA, completing initial surveys and the intake assessment. The most cited problems were technical challenges with the EULA video that were exacerbated by the remote set up due to the COVID-19 pandemic, and not having enough time for consumers to complete initial surveys before their intake assessment. More interviews are needed to understand if recent changes to the application have resolved these issues, and if it is experienced network wide. Some participants elicited concern regarding the current lack of clinical utility in beehive, attributable in part due to the inconsistency of data collection. Next, we have been looking into the learning curve to understanding beehive, which seems to

differ for more experienced clinicians and staff to newer team members. More data is needed to reach saturation for this topic and will be updated in a later report. Lastly, participants have been sharing innovative ways to improve consumer engagement in surveys, such as gift card incentives, making completing a survey a game, and having a case manager or other staff sit with consumers as they complete surveys.

More interviews with staff at additional clinics as well as consumer interviews are needed to fully understand the barriers and facilitators to implementing a LHCN into EP programs. Additionally, it is important to note that Beehive is continuously evolving through feedback, and challenges expressed in March may not be reflective of current progress. These preliminary findings highlight a brief snapshot of experiences for a small group of staff at a particular stage of implementation. We will continue to collect data to get a more cohesive picture.

10. Finalize methods for multi-county-integrated evaluation of costs and utilization data

The proposed analysis is based on pilot work conducted in Sacramento County, scaled to multiple counties (Niendam et al., 2016). It focuses on consumer-level data related to program service utilization, other outpatient services utilization, crisis/ED utilization, and psychiatric hospitalization and costs associated with these utilization domains during two time periods: 1) the three years prior to implementation of project tablet in the Early Psychosis (EP) programs (e.g., Jan 2017 – Dec 2019), to harmonize data across counties and account for potential historical trends, and 2) for the 2.5 year period contemporaneous with the prospective EP program level data collection via the tablet (Jan 2020 - June 2022). Below, we describe the data extraction and analysis plans for the first time period.

Early Psychosis (EP) sample
First, all individuals entering the EP programs January 1, 2017 – December 31, 2019 will be identified using County Electronic Health Record (EHR) data. This list will be cross-referenced with the County EP program(s) to identify those individuals who received treatment versus only eligibility assessment and referral to another service. *We will restrict the comparison to individuals diagnosed with first-episode psychosis (FEP), and not include those at Clinical High-Risk (CHR) for psychosis, due to an inability to reliably identify individuals with CHR in the comparator group.*

Comparator Group (CG) sample
We will compare the utilization and costs of the FEP participants in EP programs to utilization and cost among a group of FEP individuals with similar demographic and clinical characteristics who do not receive care in the EP program during the same timeframe in the same County. FEP individuals meeting the same eligibility criteria for the EP program (e.g., FEP diagnoses, within the same age group) who enter standard care outpatient programs in the County during that same time period will be identified as part of the comparator group (CG). First, we will identify all FEP individuals meeting these criteria receiving any outpatient services who are not served in the EP program. The Comparator Group (CG) was defined as 1) any individual seen in outpatient mental health services between January 1st, 2017 - December 31st, 2019; 2) age as of first date of service during this period: 12 years 0 days – Less than 26 years 0 days; and 3) any primary psychosis diagnosis during this period. We also requested that the counties submit a dataset of prior diagnoses and service utilization for the period of January 1, 2013 – December 31, 2017. This will allow us to correctly identify individuals with "first episode psychosis" (FEP) for our sample. This is defined as individuals who received a psychotic disorder diagnosis within two years of their index service date. The index service date is the first outpatient service associated with a primary psychotic disorder diagnosis in the study period.

Service Utilization

Next, data will be requested from the County EHR on all services received by individuals in the EP programs and all services for members of both groups including 1) any non-EP outpatient services; 2) inpatient services and 3) crisis/ED services. As possible, we will also work with other systems identified by EP programs as having service use data not otherwise captured in the County EHR (e.g., databases of other EP program services; private inpatient hospitalizations not billed to the County; non-billable services, etc.). We have identified these potential additional sources of data in expert interviews with program directors and senior program staff to date and will investigate their availability once groups are defined.

Costs

Costs per unit of service will be assigned to each type of service. We will work with county staff to identify the most accurate source of cost data. This may include internal financial accounting systems, contracts, cost reports, or published rates. We will determine whether to apply a single cost across all services (by type of service) or to apply costs that are county or provider specific. We will include billable and non-billable services. Outcomes will be calculated per month to account for varying lengths of time receiving services during the active study period. Additional details on outcomes and cost data sources are described in Table 5 below.

Table 5. Outcomes, Sources of Outcome Data, and Methods to Determine Costs Associated with Outcomes

Potential Outcomes of Interest	Sources of Data on Relevant Outcomes	Levels of Analysis	Sources of Cost Data associated with Outcomes
COUNTY LEVEL DATA VARIABLES			
Inpatient hospitalization for mental health concerns	• County hospitalization records	• Number/proportion of individuals hospitalized per group • Number of hospitalizations per consumer • Duration of each hospitalization (days) • Total duration of hospitalizations (days) per consumer	• Daily rate paid by County • Daily rate Medi-Cal reimbursement
Emergency Department or Crisis stabilization	• County crisis stabilization unit records	• Number/proportion of individuals with crisis visits per group • Number of visits, per consumer • Duration of each visit (hours) • Total duration (hours) of all visits, per consumer	• Hourly rate paid by County
Outpatient service utilization	• Service unit records by outpatient program from County *Examples:* • Assessment • Case management • Group Rehab • Group Therapy • Individual Rehab • Individual Therapy	• Service type • Number of service units (minutes)	• Contract service unit rates

	• Family Therapy • Plan Development • Medication management • Collateral Services • Crisis Intervention		

Multi-County Analysis
The data will be harmonized on demographics, diagnoses, and service types across all participating LHCN counties, for EP and CG groups, then merged into a single dataset for our primary analyses. This combined, multi-county dataset will provide increased statistical power, allowing for a richer set of controls and error structure without compromising efficiency.

Analysis of Sample Characteristics
Student T-tests and Pearson Chi-square (or Fisher's exact) tests will be used to compare unadjusted group differences in demographic characteristics (e.g., age, sex, race, ethnicity, etc.) between the individuals in the EP and CG groups. Both unadjusted and adjusted analyses will be used to examine group differences in clinical characteristics at time of index service such as primary diagnosis, as well as the duration of enrollment.

Analysis of Outpatient Service, Day Service/Crisis Stabilization, and 24-Hour/ Inpatient Psychiatric Hospitalization Data
All service data outcomes will be analyzed with a simple empirical equation: the independent variable is regressed on a county-specific fixed effect, an epoch-specific fixed effect, an indicator taking 1 for the EP group and 0 otherwise, a set of interactions between the EP group indicator and each epoch allowing the effect of the EP program to vary over time, and a set of individual-specific controls - measured at intake - consisting of sex, ethnicity, race, and primary language. We will use all demographic variables that were available and harmonized across all counties in time for this preliminary analysis. Standard errors will be always clustered at the individual-level because repeated measures of the same outcome for the same individual are correlated, and we are interested in describing individual-level differences. Further processing of the data will allow the addition of other individual-specific controls and clinic-specific effects to the empirical equation to account for other sources of confounding variation. These will be included in future analyses.

Total outpatient service time (in minutes) of all outpatient services and total minutes of each service type (e.g., medication management, individual therapy, group therapy, rehab services), and time per month will be analyzed by estimating the empirical equation described above with negative binomial regression for count data to determine if outpatient service use differs between the EP and CG samples.

Data related to individuals' use of Day Service/Crisis Stabilization, and 24-Hour/ Inpatient Psychiatric Hospitalization Data usage will be examined using multiple measurements based on the study period: 1) a binary indicator for whether the individual had ever been hospitalized; 2) a binary indicator for whether the individual had ever utilized crisis services; 3) number of hospitalizations per month; 4) number of crisis visits per month; and 5) mean duration of hospitalizations (i.e., length of stay [LOS]) in days; 6) mean LOS for Day/Crisis services (hours); 7) total duration of hospitalizations per month; and 8) total duration of Day/crisis services per month. Data for (1) and (2) will be analyzed by estimating the empirical equation described above with multiple logistic regression. Data for (3), (4), (7), and (8) will be analyzed by estimating the empirical equation described above with negative binomial regression for count data. Data for (5) and (6) will be

analyzed by estimating the empirical equation described above with linear regression. These various methods will allow us to determine whether each respective outcome differed between the EP and CG samples.

Data transfer methods
While data transferred between EP program staff and County data analysts within the same County may be identifiable, all information will be de-identified and provided with a unique numeric ID before being submitted to the UCD evaluation team. Data will be shared through an encrypted and password protected SFTP server, which is housed on UCD secure servers. Counties will not have access to any identifiable data from the other counties. Counties receive instructions for uploading their data to the secure SFTP server. Each county is given a unique login and is able to securely login into the SFTP portal and upload their data directly to the UCD servers. Once we receive the data, we confirm with the county that all the information was received.

11. Identification of county-level available data and data transfer methods, and statistical methods selected for integrated county-level data evaluation

One component of the LHCN project is to identify and describe the services and related costs for individuals served by the EP programs in each county. We will also examine services and costs associated with similar individuals served elsewhere in each county. We will harmonize and integrate data across all LHCN counties in order to perform these analyses.

Specifically, in each county we will identify an early psychosis (EP) group consisting of individuals served by the early psychosis program. We will also identify a comparator group (CG), consisting of individuals with EP diagnoses, within the same age group, who enter standard care outpatient programs during that same time period. This analysis focuses on data from Los Angeles, San Diego, Orange, Napa, Stanislaus, and Solano counties. For this component of the project, the evaluation has two phases: 1) the three years prior to the start of this project (e.g., January 1, 2017 – December 31, 2019) to harmonize data across counties and to account for potential historical trends and 2) for the 2.5-year period contemporaneous with the prospective EP program level data collection (January 1, 2020 – June 30, 2022).

For each county, our team held meetings with the EP program managers and the county data analysts. The meeting with the program managers discussed services provided by the EP program, description of consumers served, staffing specifics and billings codes for each service. A follow-up meeting was held with each county to review details of funding sources, staffing levels during certain time-periods and other types of services provided for specific types of consumers (i.e., foster care). Meetings were held with the county data analysts to discuss details about the data the county will be pulling for the LHCN team during the next annual period. The discussion included time-periods for which the LHCN team will request data, description of the consumers from EP programs and how similar consumers served elsewhere in the county will be identified, services provided by each program, other services provided in the county to the EP consumers (i.e., hospitalization, crisis stabilization and substance use treatment), and data transfer methods. We have met with the program managers and data analysts from all LHCN counties with active contracts and have scheduled follow-up meetings with the data analysts as necessary. Our research team has gathered all of the information from each program/county and summarized it in meeting notes and a multicounty data table. For the purposes of this report, we have provided a sample of the data collected from each county (see Table 6).

Table 6. Multicounty Program Services and Billing Information

County	San Diego	Orange	Solano	Napa	Stanislaus
Program Name	Kickstart	OC CREW	Aldea SOAR	Aldea SOAR	LIFE Path

County	San Diego	Orange	Solano	Napa	Stanislaus
Consumers Served	FEP, CHR	FEP	FEP, CHR	FEP, CHR	FEP, CHR
Census	140-160	42	26	10-15	Current 10-15, cap 40
Length of Services	(+/-) 2 yrs	2 - 4 yrs	(+/-) 2 yrs	(+/-) 2 yrs	2 yrs
Inclusion - Ages	Ages 10-25	Ages 12-25	Ages 12-30	Ages 8-30	Ages 14 - 25
Inclusion - Diagnoses	Any type of psychoses (NOS) but not required, SIPs score of 6	FEP	CHR diagnosis or FEP within 2 yrs	All Psychotic D/Os (within 2 yrs of meeting dx criteria) & CHR diagnosis	Psychotic d/os within 1 year of meeting dx criteria including affective, & CHR diagnosis
Inclusion - Insurance	Medi-Cal, Uninsured	None	Medi-Cal, Uninsured	Medi-Cal, Private, Uninsured	Medi-Cal, Private, Uninsured
Inclusion - Duration of Psychosis	First psychotic symptoms within 2 yrs	First psychosis within 2 yrs	First psychosis within 2 yrs	First psychotic episode within 2 years; Attenuated psychosis of any duration	First episode within 2 years;
Exclusion - Cognition	IQ < 70 - Case by case discretion	IQ < 70	IQ < 70	IQ < 70	IQ < 70, Substance induced psychosis, psychosis due to medical conditions including TBI
Exclusion - Diagnoses	Case by case discretion: Medical diagnosis that better explains symptoms; substance use	No substance use or medical condition that better explains symptoms	Substance dependence would not allow to participate in treatment – refer to substance abuse treatment, Head injury or medical condition	Substance dependence would not allow to participate in treatment – refer to substance abuse treatment, Head injury or medical condition	
Exclusion - Other	Qualitative Judgement call: Physically aggressive, sexually inappropriate, safety issues	Not received counseling prior for psychotic disorder in the last 24 months	Qualitative Judgement call: Physically aggressive, sexually inappropriate, safety issues	Qualitative Judgement call: Physically aggressive, sexually inappropriate, safety issues	Qualitative: requires 24 hour care/higher level; staff/peer safety issues

County	San Diego	Orange	Solano	Napa	Stanislaus
Assessments - Billing Codes	10	90899-6 (H2015)	90791	10	10
Assessments - Provider type	Clinicians	Clinician: master's level BHCI, BHCII, psychiatrist	Therapist; clinical supervisor	Therapist	LPHA
Assessments - Notes	Behavioral Health assessment and HRA (high risk assessment)	Code 90899-6 for each of multiple sessions leading up to intake completion; Same code for psychiatrist completing conservatorship evaluation, disability assessment, or eval for med services by telephone		Initial, Annual/ Periodic	Initial, periodic
Targeted case management - Billing Codes	50	90899-1 (T1017)	T1017	50	50
Targeted Case Management - Provider Type	All direct service staff: clinical team, OT, Peer Support or EES. As well as medical team (NP, Psychiatrist, or LVN)	BHCI, BHCII, psychiatrist, Mental Health Specialist, Psychiatrist, Behavioral Health Nurse, Mental Health Worker	Therapist, family partner; Medical director or PNP	Therapist, Family Partner/ Peer Case Manager	Clinician, Behavioral Health specialist
Targeted Case Management - Notes	Monitoring progress toward goals - information gathered from schools and parents	A variety of services can be billed under case management as long as they referred to coordination of care, monitor service delivery and linkage access to community services.	Examples: Therapist discusses consumer with PNP or Family Partner; Therapist or Family Partner discusses consumer need for housing with Caminar; Therapist facilitates consumer's transition to a new service upon	Linkage to Resources; SEE support	Linkages, evaluate other program/resource progress; verify progress

County	San Diego	Orange	Solano	Napa	Stanislaus
			completion of program		
Group Psychotherapy - Billing Codes	35	90849 (H2015)	H2017	31 or 35 (Peer & MFG); Non-Bill (FSG)	38, 36
Group Psychotherapy - Provider Type	Clinician, Peer Support Specialist, Education Employment Specialist, OT	BHCI, BHCII, Mental Health Specialist, Behavioral Health Nurse	Therapist, Family Partner	Therapist, Family Partner/ Peer Case Manager	Clinician, Behavioral Health Specialist, Family Advocate
Group Psychotherapy - Notes	10 different groups offered. Collateral services billed 8-15 to capture other support specialist for any group with multiple facilitators	Group Psych-multifamily	Group rehab	Multi-Family Group, Family Support Group, Peer Group(s) for Adolescents & Adults	Multi-Family Group, Social Skills/Life Skills Group

12. Deliver a plan and timeline for working with counties to support infrastructure to access final round of county-level cost and utilization data for EP and CG programs

Overview

The County Data evaluation of the LHCN project examines the services and costs associated with individuals treated in Early Psychosis (EP) programs across several California counties in comparison to the services and associated costs for a comparator group (CG) of similar individuals treated in other outpatient clinics representing "standard care," during a concurrent time frame in the same community. The primary goal of this component, submitted December 2021 to the counties in the last report, was to provide a preliminary demonstration of the proposed method for accessing data regarding EP programs and CG groups across California. The secondary goal was to analyze service utilization and costs associated with those services across counties.

Over the last fiscal year, we successfully completed our primary goal and the first part of our secondary goal (service utilization comparison). We were unable to complete the cost comparison analysis due to the complexity of the data required to be harmonized across counties and the variety of data sources. Nearly all programs and counties, as well as our central team, have been impacted by staff shortages due to unfilled positions and redeployment of staff during the COVID-19 pandemic, which has delayed project coordination and data extraction.

Over the last fiscal year, we have continued to meet with counties to clarify questions about received cost and utilization data, and to troubleshoot issues related to incomplete or unclear data elements. In these meetings, we requested that each county provide us with contracts and budgets for their EP programs as a way to account for non-billable activities and other unaccounted-for costs of running the program. Further, we worked with counties to obtain actual costs per service, per consumer, rather than reimbursement amounts or fixed costs per unit of service, as these have differed. In our efforts to thoroughly balance EP and CG groups, we decided to request historical data for the EP group from each county and have worked to modify data use agreements as necessary. Finally, we asked each county to provide us with consumers' episode of care end dates for those consumers who may have ended their services since the data was originally extracted.

Summary of preliminary analysis of service utilization data
During the fiscal year, the County Data evaluation team focused on addressing the limitations of the preliminary analysis of service utilization data. This effort is composed of three main activities: 1) improving the harmonization of variables across counties and the detection of episodes of care, 2) addressing missingness in county data, and 3) addressing selection bias into EP programs.

The County Data evaluation team is reviewing CG and EP group data to identify ways to improve the harmonization of data across the counties in the evaluation. This exercise will allow us to fully leverage the diversity of our service-level data. Additionally, we are working closely with county staff to improve how we detect consumer episodes of care in the data. Accurate identification of episodes of care are crucial to accurately measuring service utilization in both the CG and EP groups, improving the credibility and rigor of our estimates of the effects of EP programs.

Subsequent descriptive analyses of county-level service data after the previous analysis revealed substantial variation in the number of variables with missing values across counties, as well as the degree to which data is missing within each county's data. The county data evaluation team is exploring the extent of missingness in the data from each group in each county, as well as the extent to which missingness is correlated with a consumer belonging to the CG group. Once the team has a clear understanding of missing data in our sample, we will explore solutions and determine the extent to which missingness is a limitation of the evaluation.

The preliminary analysis of service utilization data provided comparisons between the CG and EP group adjusted for a small initial set of observable consumer-level characteristics. However, we know consumers are not randomly assigned to the EP group, so even adjusted analyses still suffer from selection bias. This selection bias arises from the likelihood that consumers in the EP group differ systematically from those in the CG group such that they were a priori more likely to have been members of the EP group. For example, many EP programs exclude serious substance use disorders (SUD) on a case-by-case basis, but SUD severity is difficult to discern from the diagnostic data obtained for the comparator group. Hence, a rigorous comparison of the EP and CG groups should correct for this selection bias. To address selection bias, the county data evaluation team is implementing a generalized version of propensity score weighting, using augmented inverse probability weighting (AIPW) with Lasso covariate selection. The principal idea behind this method is to leverage historical data from each consumer to predict the probability we later observe them in the EP group during the study period by modeling selection into the EP group. Each consumer is then "weighted" by the

inverse of this predicted probability, which statistically approximates random assignment of EP care. While powerful, the propensity score weighting method is dependent on the evaluation team's ability to accurately predict the "true" probability a person is observed in the EP group. Lasso, a machine learning technique, allows us to find the best selection model within the available data. The combination of these methods will allow the evaluation team to correct for selection bias to the best of the data's ability. Correcting for selection bias makes the comparison of the EP and CG groups as close to "apples-to-apples" as possible.

In addition to methodological improvements, the county data evaluation team is working with county staff to extract additional data required for the analytic methods. We requested historical data for consumers in our county EP groups to be used in the weighting methodology described above. LA county staff were able to identify previously unavailable service data for 24-hour service categories for all consumers. We are also working closely with Solano county to obtain inpatient service utilization data for the specific CG consumers selected for our comparison. We are also working with two new counties that will contribute data to these combined utilization analyses, Napa and Stanislaus. We have met with both county and program staff to discuss the process for this element of the project and will submit our formal data requests to them shortly.

<u>*Cost Analysis*</u>
In this report, we present a preliminary analysis comparing the EP and CG groups in San Diego County on service utilization and related costs data. Due to the challenges outlined above, we were not yet able to integrate or analyze cost data from Solano County, Orange County, and Los Angeles County. We are confident that the cost comparison analysis, along with a finalized comparison analysis of service utilization, will be completed for the next deliverable, due December 2022.

Sample and Methods
We identified consumers who initiated services in the San Diego EP program, "Kickstart," from January 1, 2017 to December 31, 2019, and a comparison group of consumers who were using outpatient services during the same time period. We identified Kickstart consumers who first enrolled in the programs between January 1, 2017 and December 31, 2019. We limited the sample to consumers ages 12-25 who did not have a diagnosis of psychosis (ICD-10 codes F20, F22, F23, F25, F28, F29, F31.2, F31.5, F31.64, F32.3 F33.3) greater than two years before enrollment (through October, 2008). We excluded consumers with private insurance, due to an inability to capture all of their services in the public claims system, and consumers who received a diagnosis of intellectual disability (ICD-10 codes F70-F79, ICD-9 codes 317-319), to harmonize the sample with our other counties' exclusion criteria.

We shared a list of Kickstart consumers with program staff who confirmed that these were past or current consumers who had enrolled in services, and were identified as either First Episode Psychosis (FEP) or Clinical High Risk (CHR). FEP consumers have threshold psychosis symptoms defined as having a Psychosis Syndrome on the Structured Interview for Prodromal Syndromes (SIPS), roughly corresponding to a score of 6 for Positive Symptoms on the Scale of Prodromal Symptoms (SOPS). CHR consumers have subthreshold symptoms, defined roughly as having a SOPS score of 3-5.

We identified a comparison group (CG) of consumers with likely FEP ages 12-25 who received an outpatient mental health service in San Diego County between January 1, 2017 and December 31, 2019, and who had a first diagnosis of psychosis (same diagnoses as above) within two years prior to their first service during this time period. We defined the first outpatient service during January 1, 2017 to December 31, 2019 as the index outpatient visit. We similarly excluded consumers with private insurance, consumers who received a diagnosis of intellectual disability, and consumers with a diagnosis of psychosis greater than two years before the index outpatient visit.

We summarized service use over 365 days prior and 365 days following enrollment in Kickstart or the index outpatient visit. Outpatient services included case management, crisis intervention, medication management, and mental health services including rehabilitation and therapy. We defined a visit as a unique day receiving services. We summarized psychiatric admissions including admissions to psychiatric hospitals, admissions to psychiatric units of acute care hospitals, and admissions to crisis residential facilities; and psychiatric emergency services including the emergency psychiatric unit and mobile psychiatric emergency response teams. We also summarized costs of outpatient mental health services covered by Medi-Cal, California's Medicaid program.

We estimated the numbers of services and visits during the year using negative binomial regression models. We estimated the probabilities of having a psychiatric inpatient admission and of using psychiatric emergency services using logistic regression models. We estimated costs using a generalized linear model with a gamma distribution and a log link function. In each model, we included covariates for age, gender, and race/ethnicity (included as indicator variables for Black and Latino), along with indicator variables for FEP and CHR. We calculated standardized estimates for each outcome using the estimated coefficients to generate predicted values for each consumer in the sample as if they were alternately assigned to each group: FEP, CHR, and CG. The standardized mean is the mean of the predicted values across the sample. We calculated standard errors using the non-parametric bootstrap, and significance values using non-parametric permutation.

Results
We identified 301 consumers in the Kickstart program, of whom 104 were FEP and 197 were CHR, and 687 likely FEP consumers in the CG (Table 7). Mean age in the FEP group was 18.3 years (SD=2.8) and the largest percentage of consumers was 15-17 years (N=51, 49%). Mean age was lower among the CHR group (16.5 years, SD=2.8), due to a large percentage of consumers under age 15 (N=63, 32%). Mean age was highest among the CG (19.5 years, SD=4.0), due to a large percentage of consumers ages 21 and over (N=294, 43%). The FEP group had the largest percentage of consumers who were male (N=73, 70%). The distribution of race/ethnicity was similar across the groups.

Table 8 shows the mean number of services in the year prior and year post enrollment for Kickstart consumers and in the year prior and year post the index outpatient visits for CG consumers, as well as the difference in services from pre to post. Service use was highest for the FEP group in both the pre and post periods, followed by CHR and CG. The FEP group also had the greatest increase in services from pre to post (45.7, SE=6.6), followed by CHR (24.0, SE=3.1) and CG (12.3, SE=1.8).

Table 9 shows the mean number of visits in the year prior and year post enrollment or index outpatient visit and the difference between years. Visits were highest for the FEP group in both the pre and post periods, followed by CHR and CG. The FEP group also had the greatest increase in visits from pre to post (32.5 SE=4.2), followed by CHR (17.5, SE=1.9) and CG (8.9, SE=1.1).

Table 10 shows probabilities of psychiatric admission in the pre and post periods and the change in probability of admission from the pre to post period. The CG had the highest probability of admission in the pre period, when 14.4% (SE=1.3) of consumers had admissions. The rate of psychiatric admission was similar among FEP and CG, but slightly lower among the CHR group in the post period. As a result, the FEP group had the greatest increase in probability of admission with an 18.1 (SE=4.7) percentage point increase from pre to post.

Table 11 shows the probabilities of using psychiatric emergency services. The CG had the highest probability of emergency service use in the pre period, when 12.4% (SE=1.5) of consumers used services. The rate of emergency service use was similar among FEP and CG, but slightly lower among the CHR groups in the post

period. As a result, the FEP group had the greatest increase in emergency service use with a 25.3 (SE=4.5) percentage point increase from pre to post.

Table 12 shows Medi-Cal reimbursed outpatient mental health services. Outpatient costs were similar in the year prior to enrollment or index outpatient visit. In the post period, costs were greatest among FEP ($9,711, SE=$910) followed by CHR ($6,334, SE=$451) and CG ($4,620, SE=$272). As a result, outpatient costs increased the most among FEP, followed by CHR and CG.

Summary

Youth consumers enrolled in Kickstart had higher outpatient service use, visits, and costs than a comparable group of adolescent and young adult consumers who were receiving services in standard outpatient programs. Services, visits, and costs were greater for consumers with FEP than consumers who were CHR. We did not find significant differences in psychiatric inpatient or emergency services use in the year following enrollment. However, since Kickstart consumers had lower use of these services in the pre period, they appear to have greater increases in use from the pre to post period.

Table 7: Demographic Characteristics of Youth Consumers of Kickstart and a Comparison Group

	First Episode Psychosis	**Clinical High Risk**	**Comparison Group**	**P-value for difference across groups**
N	104	197	687	
Age N (%)				P<.001
Age <15	9 (9%)	63 (32%)	113 (16%)	
Age 15-17	51 (49%)	88 (45%)	161 (23%)	
Age 18-20	25 (24%)	30 (15%)	119 (17%)	
Age 21- 25	19 (18%)	16 (8%)	294 (43%)	
Gender N (%)				P=.006
Male	73 (70%)	108 (55%)	368 (54%)	
Female	31 (30%)	89 (45%)	319 (46%)	
Race/Ethnicity N (%)				P=.002
Non-Latino White	23 (22%)	39 (20%)	158 (23%)	
Black	14 (13%)	19 (10%)	66 (10%)	
Latino	57 (55%)	118 (60%)	325 (47%)	
Other	4 (4%)	16 (8%)	60 (9%)	
Unknown	6 (6%)	5 (3%)	78 (11%)	

Table 8: Mean Annual Services Use (Individual Visits, Even if Received on the Same Day), Standardized by Demographic Characteristics, in the Year Prior and Year Post Enrollment

	First Episode Psychosis	Clinical High Risk	Comparison Group	P-value for difference across groups
Pre	19.4 (3.9)	17.8 (2.5)	15.3 (1.4)	<.0001
Post	65.1 (5.5)	41.8 (2.7)	27.6 (1.5)	<.0001
Difference	45.7 (6.6)	24.0 (3.1)	12.3 (1.8)	<.0001

Table 9: Mean Annual Visits, Standardized by Demographic Characteristics, in the Year Prior and Year Post Enrollment

	First Episode Psychosis	Clinical High Risk	Comparison Group	P-value for difference across groups
Pre	12.4 (2.2)	11.5 (1.4)	10.6 (.9)	<.0001
Post	44.9 (3.5)	29.0 (1.7)	19.5 (.9)	<.0001
Difference	32.5 (4.2)	17.5 (1.9)	8.9 (1.1)	<.0001

Table 10: Mean Annual Probability of Psychiatric Inpatient Admission, Standardized by Demographic Characteristics, in the Year Prior and Year Post Enrollment

	First Episode Psychosis	Clinical High Risk	Comparison Group	P-value for difference across groups
Pre	5.4 (2.2)	3.8 (1.4)	14.4 (1.3)	.0002
Post	23.4 (4.3)	17.1 (2.8)	24.8 (1.6)	.095
Difference	18.1 (4.7)	13.3 (3.1)	10.3 (2.1)	<.001

Table 11: Mean Annual Probability of Use of Psychiatric Emergency Services, Standardized by Demographic Characteristics, in the Year Prior and Year Post Enrollment

	First Episode Psychosis	Clinical High Risk	Comparison Group	P-value for difference across groups
Pre	4.4 (1.9)	6.6 (1.8)	12.4 (1.5)	.011
Post	29.7 (4.3)	18.3 (2.7)	23.1 (1.6)	.075
Difference	25.3 (4.5)	11.7 (3.1)	10.8 (2.0)	.010

Table 12: Mean Annual Costs of Outpatient Services (in USD), Standardized by Demographic Characteristics, in the Year Prior and Year Post Enrollment

	First Episode Psychosis	Clinical High Risk	Comparison Group	P-value for difference across groups
Pre	3606 (785)	3264 (484)	2915 (316)	.490
Post	9711 (910)	6334 (451)	4620 (272)	.001
Difference	6105 (1186)	3070 (640)	1704 (420)	.041

Future Analyses

During the next deliverable period, we will examine service utilization across the entire retrospective period (January 1, 2017 – December 31, 2019) rather than comparing services received during the year prior and the year post program enrollment. In addition, outcomes will be calculated as unique outpatient services accounting for varying durations of active treatment. We will also expand the scope of the cost analysis. Currently, costs are limited to the amounts paid for Medi-Cal reimbursable mental health outpatient services. In the next period, we will consider the costs incurred to the County for all outpatient services, including those services that are not reimbursable by Medi-Cal. We will also consider additional service types including inpatient and crisis residential, and the emergency psychiatric unit and the psychiatric emergency response team.

Although CHR consumers enrolled in the EP program were included as a comparison group in the current analysis, these consumers will be excluded from future planned analyses as they cannot be reliably identified for the comparator group using standard diagnostic codes. We will also refine the exclusion criteria for the CG group based on diagnostic and service utilization history of the EP group as well as utilizing a weighting strategy for included consumers in both groups, as described previously. This will ensure that the CG group only contains consumers most likely to have a first episode of psychosis, allowing for a more accurate comparison between FEP consumers in the EP and CG groups on service utilization and related costs data.

Finally, future analyses will harmonize and integrate service utilization and related cost data from Orange County, Los Angeles County, Solano County, Stanislaus, and Napa counties.

Prospective Data Analysis

Over the last FY, we held a series of meetings with each county (Los Angeles, Orange, San Diego and Solano) to review the prospective data request. In these meetings, we discussed when claims data would become available for service utilization and estimating costs, as well as time needed for data extraction. Data availability ranged from 4-11 months after the service was billed. We also conferred with other LHCN team members about the timelines for program fidelity assessments to be completed and Beehive implementation to obtain consumer-level outcomes. We had originally planned for a prospective 3.5 year period contemporaneous to the EP program-level data collection; however, based on the projected time estimates to receive from the counties, we determined that the 2.5 year period January 1, 2020 – June 30th, 2022 would be best aligned with the goals of this analysis. This period will allow us to obtain service and cost data for all counties Jan 2020 - June 2022, then finish cleaning, harmonizing and integrating data for a preliminary analysis to be completed by December 2023. This aligns with the original preliminary analysis due dates for San Diego, Orange, Los Angeles, Napa, and Stanislaus counties, and is slightly delayed for Solano County, which had a due date for the preliminary analysis of June 2023. We will obtain community partner feedback and complete a final analysis by June 2024 (see Table 13). This aligns with the original plan for Los Angeles, Napa, and Stanislaus Counties, and is slightly delayed for Orange, San Diego, and Solano Counties which had a due date for the final analysis of December 2023. The process of harmonizing and integrating data for the

initial retrospective period has been incredibly useful and will allow us to do the same for the new service period much more quickly. This prospective period would include almost all program fidelity assessments, with the last assessment scheduled for September 2022.

Table 13. Proposed Timeline for Prospective Data Pull

County	Preliminary analysis due date	Length of time required for County to receive data	Data available by this date
Solano	June 2023	3 months	**Sept 2022**
Orange	September 2023	10 – 11 months for charge data	**May 2023**
LA	June 2024	3 months for charge data DHS Hospital data - 6 months other hospitals - 30 days	**Jan 2023**
San Diego	June 2023	3 months - for annual report, so that there will be enough time for clinic to input all data	CCBH data available end of **Oct 2022**, Optum data available December 2023

Due to Covid-related delays in Beehive implementation (e.g., staffing shortages in county programs, leadership and staff turnover, additional efforts associated with engaging consumers remotely), we expect to conduct pilot analyses integrating consumer-level data from Beehive. As described above, enrollment in Beehive has been delayed, providing insufficient statistical power by the end of the award period to conduct comprehensive integrated analyses of consumer-level outcomes with utilization and cost data. However, we plan to discuss the data needs for this analysis in detail with the counties during the next project period in order to complete these analyses in the post award period.

Further, in our meetings with program and county staff, we discussed any changes to the county EHR or billing and claims systems, changes in data elements collected during the new time period, or any other relevant changes to data availability. We met with Solano County on June 2, 2022; Los Angeles County on May 23, 2022; Orange County on May 19, 2022; and held conversations with San Diego County on May 23, 2022.

13. Provide findings on cost and utilization data from preliminary multi-county integrated evaluation, identification of problems and solutions for county-level data analysis

Overview of Deliverable
The County Data evaluation of the LHCN project examines the services and costs associated with individuals treated in Early Psychosis (EP) programs across several California counties in comparison to the services and associated costs for a comparator group (CG) of similar individuals treated in other outpatient clinics representing "standard care," during a concurrent time frame in the same community. The primary goal of this component was to provide a preliminary demonstration of the proposed method for accessing data regarding EP programs and CG groups across California. The secondary goal was to analyze service utilization and costs associated with those services across counties.

For this report, we were able to successfully complete our primary goal and the first part of our secondary goal (service utilization comparison). We were unable to complete the cost comparison analysis due to the complexity of the data required to be harmonized across counties and the variety of data sources. Nearly all programs and counties have been impacted by staff shortages due to unfilled positions and redeployment of staff during the COVID-19 pandemic, which has delayed project coordination and data extraction. In this deliverable, we describe the cost data we have obtained to date, the cost data still needed, and the challenges and solutions relevant to this endeavor.

Description of Early Psychosis Programs Evaluated

Los Angeles County

The Los Angeles Center for Assessment and Prevention of Prodromal States (CAPPS) program is an early psychosis program serving consumers at clinical high risk for psychosis and consumers who have experienced a first episode of psychosis. The majority of assessment and treatment services offered at CAPPS are free of charge to the consumers. There were 6 CAPPS clinics in operation during the study period, January 1, 2017 – December 31, 2019.

Orange County

The Orange County Center for Resiliency, Education, and Wellness (OC CREW) is an early psychosis program serving consumers who have experienced a first episode of psychosis in the last 2 years. OC CREW provides screening and needs assessments, clinical case management, individual counseling and family services, psychiatric care, psychoeducational groups, referrals and linkages to community resources, and community education on "The First Onset of Psychosis."

San Diego County

San Diego Kickstart is an early psychosis program serving consumers who are at clinical high risk for psychosis and those who have experienced a first episode of psychosis in the last 2 years. Kickstart aims to educate the community, treat youth, and assist families in preventing psychosis.

Solano County

Solano County Aldea provides early psychosis services through the Supportive Outreach and Access to Resources (SOAR) program. They serve consumers who are at clinical high risk for psychosis and those who have experienced a first episode of psychosis in the last 2 years. SOAR provides services based on the model of the UC Davis Early Diagnosis and Preventative Treatment Clinic. Components include community outreach and education, psychiatric medication management, individualized clinical case management, weekly psychoeducation and support groups, bi-monthly family and multi-family support groups, peer advocate support, and employment and education support.

Characteristics of each county program are detailed below in Table 14.

Table 14. EP Program Characteristics

County	Age Range Served	Duration of Services	Excluded Diagnoses
Los Angeles	Prior to March 2019: 16 – 25 March 2019 – present: 12 – 30	2 years	• medication-induced psychosis • psychosis due to a medical condition • intellectual disability
Orange	12 - 25	2 – 4 years	• delusional disorders • affective disorders

			• post-partum psychosis • substance-induced psychosis • substance use disorder • psychosis due to a medical condition • intellectual disability / IQ below 70
San Diego	10 - 25	1.5 years	• psychosis due to a medical condition • intellectual disability
Solano	Prior to June 2017: 12 – 25 June 2017 – present: 12 – 30	2 years	• psychosis due to a medical condition • intellectual disability • substance dependence.

Analytic Approach

This report presents: 1) descriptive analysis of the EP groups in San Diego, Los Angeles, Orange and Solano counties; 2) a preliminary comparison of the service utilization associated with individuals with first-episode psychosis (FEP) treated at the participating EP programs versus service utilization of a comparable group (CG) of individuals seen for usual outpatient care in the same counties, during the same time period; and 3) a description of cost data available to date from each county. The data were harmonized across counties for analysis, in order to obtain a larger sample size than any one county could contribute alone, allowing for more complex and robust statistical modeling with sufficient to detect even small differences between EP and CG groups.

EP Sample Description

All individuals entering the EP programs January 1, 2017 – December 31, 2019 were identified using county EHR data. County data analysts excluded individuals who received services from the EP program prior to January 1, 2017. This list was cross-referenced with the county EP program(s) to identify 1) those individuals who enrolled in the EP program and received treatment, and 2) those who received only eligibility assessment and referral to another service.

The EP programs also identified which consumers were diagnosed with a first episode of psychosis (FEP) and which were diagnosed with a clinical-high-risk for psychosis (CHR) syndrome. Programs differ in whether they serve one or both groups. If the designation was unknown, typically due to lack of program data, individuals were classified as FEP if they had documented psychotic disorder diagnoses (see Appendix IV). For the comparison analysis, the LHCN research team then applied the following additional inclusion criteria to harmonize EP samples across counties: 1) age 12-25, 2) FEP, 3) enrolled in the EP program (not assessed and referred out). None of the EP consumers had a diagnosed intellectual disability. We did not exclude any consumers based on substance use disorders.

Comparator Group (CG) Sample Description

The CG group was defined as individuals served in outpatient behavioral health treatment in each county for a first episode of psychosis during the period January 1, 2017 – December 31, 2019. County data analysts identified individuals from the EHR based on the following inclusion criteria: 1) seen in any mental health service between January 1, 2017 – December 31, 2019; 2) age as of first date of service during the study period from January 1, 2017 – December 31, 2019: 12 yrs 0 days – 25 years 355 days; 3) psychotic disorder diagnosis documented January 1, 2017 – December 31, 2019. The eligible diagnoses were based on the psychotic disorder diagnoses accepted by the EP programs, standardized across counties (diagnosis list in Appendix IV). We requested service data for an extended period of time (January 1, 2013 – December 31,

2019) in order to determine that there was no psychotic disorder diagnosis more than two years prior to their index outpatient service during the active study period. The "index service date" was defined as the first outpatient (non-FSP, when possible) service associated with an eligible diagnosis during the active study period (January 1, 2017 – December 31, 2019)

The LHCN research team then applied the following exclusion criteria to the CG group, in accordance with EP program criteria, to identify a cohort most likely experiencing FEP: 1) diagnosis of intellectual disability; 2) psychotic disorder diagnosis more than 2 years prior to the index service date during the active study period (January 1, 2017 – December 31, 2019); 3) first outpatient service during the active study period was a Full Service Partnership (FSP) OR consumer received FSP service in the two years prior to study period.

Data Sources Included in Analysis
Prior reports described a proposed set of outcomes of interest as well as potential data sources for those outcomes and their associated costs. However, as anticipated, limitations in data availability and data quality resulted in modification of the previously described analytic approach in some areas. Table 4 represents the final set of outcomes used in this analysis. All outcomes and data sources included from the methodology proposed in prior reports, as well as any differences between the proposed analysis and current analysis, are described in this section. Descriptions apply to all counties, except as noted.

Table 15. Outcomes

Finalized Outcomes of Interest	Levels of Analysis
Outpatient Services	• Service type • Number of service units (minutes)
Day Services/Crisis Stabilization	• Number/proportion of individuals with crisis visits per group • Number of visits, per consumer, per month • Duration of visit (hours) • Total duration (hours) of all visits, per consumer, per month
24-hour Services: **Psychiatric inpatient hospitalization, Residential**	• Number/proportion of individuals hospitalized per group • Number of hospitalizations per consumer, per month • Duration of hospitalization (days) • Total duration of hospitalizations (days) per consumer, per month

<u>*Description of Included Data Sources*</u>

Demographic Data
Consumer demographics were obtained from the EHR system from each county, based on the date of the first EP program or outpatient CG program service, when possible. Table 5 shows dates of demographic data used, by county. Demographic data obtained for the analysis includes age, zip code, race and/or ethnicity, sex, gender identity, sexual orientation, language, education level, currently enrolled in school, employment status, marital status, living arrangement, military service/veteran status, and insurance status. In order to account for differences in how these demographics were coded across counties, we harmonized the variables before integrating them into a single dataset. For example, each county had variations in the way they collected race data for consumers, with some counties having collected more detailed information than others. To

accommodate for the varying levels of data collected and enable analysis across counties, a harmonized race variable was created with six main race categories: White, Black/African American, Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, and Other. Race data from each county was then re-coded to fit into one of these high-level categories (e.g. 'Korean' would be re-coded as 'Asian') to account for the counties with more limited race data. Details regarding when the demographic variables were originally entered into each county EHR system are shown in Table 16 (below), and which variables were available for each county are described in Table 17.

For this analysis, we required "baseline" demographic data, that is, demographics as of the index service date. Due to differences between counties in collection date of demographic data, as well as likelihood of that particular variable changing over time, the final demographic variables used in this analysis were age, sex, and race/ethnicity.

Table 16: Demographic Data – Dates Used

County	Date used for Demographic Data	
	EP	CG
Los Angeles County	Demographics at first date of service in the program	Demographics at first service during study period (Jan 1, 2017 - Dec 31, 2019)
San Diego County	Demographics collected at first date of service in the program	Demographics at first service during study period (Jan 1, 2017 - Dec 31, 2019)
Orange County	Demographics collected at first date of service in the program	Demographics at first service during study period (Jan 1, 2017 - Dec 31, 2019)
Solano County	Demographics at first date of service in the program but can be updated at any time	Demographics at first service during study period (Jan 1, 2017 - Dec 31, 2019)

Table 17: Demographic Data – Availability by County

Data Element	Availability by County	Additional Details
Year and month of birth (not date)	SD - yes	
	OC - yes	
	Solano - yes	
	LA - yes	Year and month of birth was not available in the LA CG dataset, but rather, age at first service during the active study period.
Zip code	SD - yes	
	OC - yes	
	Solano - yes	
	LA - yes	LA provided 9-digit zip code; last 4 digits were removed to be consistent with 5-digit format of other counties.
Race	SD - yes	
	OC - yes	
	Solano - yes	
	LA - yes	LA collects race and ethnicity data as a combined variable and had to be re-coded into separate variables for harmonization across counties; endorsements of ethnicity only were re-coded as "unknown" for the harmonized race variable. "Multi" category for LA has been rolled up into "other" for harmonized race variable.

	SD - yes	
Ethnicity	OC - yes	2 items - Hispanic ethnicity and self-reported primary and secondary ethnicity
	Solano - yes	
	LA - yes	LA collects race and ethnicity data as a combined variable and had to be re-coded into separate variables for harmonization across counties.
Education level (highest level obtained)	SD - yes	
	OC - **no**	
	Solano - yes	
	LA - yes	
Education level (currently enrolled)	SD – yes	No "current education" variable across counties so variable was created using employment status variable (those who endorsed 'student' were coded as being currently enrolled in education)
	OC – no	
	Solano – yes	No "current education" variable across counties so variable was created using employment status variable (those who endorsed student were coded as being currently enrolled in education)
	LA – yes	No "current education" variable across counties so variable was created using employment status variable (those who endorsed student were coded as being currently enrolled in education)
Marital status	SD - yes	
	OC - **no**	
	Solano - yes	
	LA - yes	
Primary language	SD - yes	
	OC - yes	
	Solano - yes	
	LA - yes	
Insurance status (i.e., insurance type)	SD - yes	Three separate harmonized insurance variables were created: 1) Medi-Cal, 2) Medicare, 3) Private insurance.
	OC - yes	Three separate harmonized insurance variables were created: 1) Medi-Cal, 2) Medicare, 3) Private insurance.
	Solano - yes	Three separate harmonized insurance variables were created: 1) Medi-Cal, 2) Medicare, 3) Private insurance.
	LA - yes	Three separate harmonized insurance variables were created: 1) Medi-Cal, 2) Medicare, 3) Private insurance. We used the Medi-Cal claim variable from the LA EP services; this was not available for the LA CG datasets.
Employment status	SD - yes	
	OC - **no**	
	Solano - yes	
	LA - yes	
	SD - yes	

Living arrangement (housing status)	OC - yes	
	Solano - yes	
	LA - no	Data not available for EP group, included in CG data only.
Sex	SD - yes	
	OC - **no**	
	Solano - yes	
	LA - yes	
Gender identity	SD - yes	
	OC - yes	Variable for gender only, not gender identity. No trans category; only Male and Female. Therefore, some individuals in Male or Female category may be Transgender.
	Solano - yes	
	LA - **no**	
Sexual orientation	SD - yes	Intersex and transgender have been placed in the 'unknown' category as these are not sexual orientations. Deferred has been placed in prefer not to answer.
	OC - yes	
	Solano - yes	
	LA - **no**	
Military service / Veteran status	SD - yes	Indicates some affiliation with the military, does not necessarily indicate military status (e.g. Consumer self-reports that they or an immediate family member have served in the US Military).
	OC - yes	Indicates some affiliation with the military, does not necessarily indicate military status (e.g. Consumer self-reports that they or an immediate family member have served in the US Military).
	Solano - yes	Indicates some affiliation with the military, does not necessarily indicate military status (e.g. Consumer self-reports that they or an immediate family member have served in the US Military).
	LA - **no**	

Psychiatric Diagnoses

Baseline psychiatric diagnoses were obtained from the EHR systems for each county. They were selected as either the first diagnoses within the first 90 days a consumer was served after the index service date or the latest diagnosis before the index service date if no post-90-day diagnosis was found. Index diagnoses for FEP consumers in EP groups, and all CG group consumers were defined as either a primary psychotic disorder diagnosis or mood disorder with psychotic features, with other diagnoses possible for CHR consumers in EP groups (e.g. PTSD, anxiety disorders, autism), using an algorithm described in Appendix IV. As noted previously, classification of FEP and CHR were obtained from the EP programs. Service Dates

As described previously, we defined the index service date for individuals in the EP group as the first date of service at the EP program within the study period (January 1, 2017 – December 31, 2019). The index service date for individuals in the CG group was defined as the first date of outpatient service (non-FSP, when possible) associated with an eligible diagnosis within the study period (January 1, 2017 – December 31, 2019). The "last service date" was defined as the end of the episode of care related to the index service date. If the

episode of care start or end date was outside the active study period, the first or last service within the study period was used, respectively. The "duration of enrollment" was calculated as months between index and last service dates.

A unique feature of EP programs is their limited duration: most programs offer services for a maximum period of approximately 2 years. This focus on early intervention supports transitioning consumers to other services after a specific period of time and/or after treatment goals are met. It also allows new consumers to enter the program as others leave. General outpatient services have no limits on duration of treatment. Therefore, our analyses focus on the first 24 months of treatment for both groups. To account for variation in intensity of services and attrition over time, we defined service periods as index service date to 6 months, 7-12 months, 13-18 months, 19-24 months and 25 months+ (until last service date).

Outpatient Service Data
All contacts related to outpatient mental health services are recorded as part of the reimbursement process via service billing in each county. Clinical staff input all billable and non-billable services into the EHR systems through an electronic progress note that includes the date of service, type of service provided (defined by each county), and the time spent providing the service.

Billable service types examined include: Assessment, Case Management, Collateral, Crisis Intervention, Group Therapy, Individual Therapy, Medication Management, Plan Development, Rehabilitation, Supported Education and Employment services, Therapeutic Behavioral Services, Occupational Therapy, Peer Support, Administrative, Outreach, and Forensic, Lock Out, and Travel/Transportation.

Non-billable services were also compared as work conducted and no-show rates as indicators of engagement (see descriptions of all services in Appendix VI). Availability of service categories by county are detailed in Table 18.

Day Services/Crisis Stabilization Data
Individuals experiencing mental health exacerbation often receive treatment in mental health urgent care or crisis stabilization facilities, which are intended to resolve the mental health crisis and attempt to prevent hospitalization. All Day Services (under 24 hours) and Crisis Stabilization data utilized in the analysis includes: Crisis Stabilization, Day Treatment, and Day Rehabilitation. Data elements used in the analysis include: number of visits per individual in the sample, date of visit, and length of stay (hours).

24-Hour Services/Inpatient Psychiatric Hospitalization Data
Individuals experiencing more severe mental health exacerbation often receive treatment in inpatient psychiatric hospital settings. This includes California Welfare and Institutions Code §5150/§5585 72-hour involuntary psychiatric holds for adults and minors, respectively, and §5250 14-day involuntary psychiatric holds, the duration of which can vary depending on the severity of the individual's needs, as well as all voluntary stays. All 24-hour services used in this analysis include: Inpatient Hospitalization, Residential Other, and Crisis Residential. We were able to obtain non-comprehensive services data from some private hospitals that bill the county, with the exception of Orange County, which submitted cost data for regional inpatient hospitalization. For 24-hour service data, data elements include number of visits per individual in the sample, dates of hospitalization, and length of stay.

Details regarding which services were available by county are shown in Table 7 below.

Table 18: Availability of services data by county

Broad Service Category	Service Subcategory	Los Angeles	San Diego	Orange	Solano

Outpatient Services (Mode 15)	Assessment	yes	yes	yes	yes
	Case Management	yes	yes	yes	yes
	Collateral	yes	yes	yes	yes
	Crisis Intervention	yes	yes	yes	yes
	Group Therapy	yes	yes	yes	yes
	Individual Therapy	yes	yes	yes	yes
	Medication Management	yes	yes	yes	yes
	Plan Development	yes	yes	**no**	yes
	Rehabilitation	yes	yes	yes	yes
	Supported Education and Employment	yes	**no**	**no**	**no**
	Therapeutic Behavioral Services	yes	**no**	yes	yes
	Occupational Therapy	**no**	**no**	**no**	**no**
	Peer Support	**no**	**no**	**no**	**no**
	Administrative	**no**	yes	yes	yes
	Outreach	**no**	yes	**no**	**no**
	Forensic Services	**no**	yes	**no**	**no**
	No Show	**no**	**no**	**no**	yes
	Lock Out Code	**no**	**no**	**no**	yes
	Transportation	**no**	yes	yes	yes
	Intensive Home-Based Services	yes	yes	yes	yes
	ECT	**no**	yes	**no**	**no**
	Outpatient – other	yes	**no**	**no**	**no**
Day Services (Mode 10)	Crisis Stabilization	**no**	yes	yes	yes
	Urgent Care	**no**	**no**	**no**	**no**
	Day Treatment	yes	yes	**no**	yes
	Day Rehabilitation	**no**	yes	**no**	**no**
	Day Services - other	yes	**no**	**no**	**no**
24-hour Services (Mode 5)	Inpatient Hospital	yes	yes	yes	**no**
	Residential Other	**no**	**no**	yes	yes
	Residential Rehabilitation	**no**	**no**	**no**	**no**
	Skilled Nursing Facility (SNF)	**no**	**no**	**no**	**no**
	Crisis Residential	**no**	yes	yes	yes

Other Mental Health Services

Other mental health services include Substance Use Services for Orange County, and any services that had insufficient information to classify into one of the other three categories. For example, some outpatient services provided by private organizations used codes indicating "Other mental health service" and a provider name. However, there were very few of these, and their impact on the analyses would be negligible. We will explore further during the next project period to see if we can resolve and services in this category.

Description of Unavailable Data Sources

Justice system and Regional Center services were unavailable for all counties. With the exception of Orange County, substance use services could not be obtained, as these records are kept separately from mental health services for privacy protection and require additional data use permissions.

Many consumers have hospital stays in private psychiatric hospitals both within and outside of their county of residence. Some counties track this data in separate databases, but we were unable to obtain and integrate this separate data for the current analysis. Furthermore, due to lack of available psychiatric inpatient beds across California, particularly for children, many consumers are placed out of county and require transportation over extensive distances that may not be adequately captured in our data.

Although the majority of EP consumers are publicly insured (e.g., Medi-Cal), San Diego Kickstart and Solano Aldea SOAR utilize MHSA, insurance contracts, and/or philanthropic funds to serve privately insured consumers. Some of these services are not billed to county systems, therefore, they are not represented in our data. Furthermore, services provided to privately insured consumers by other private providers (e.g., Kaiser Psychiatry) are not represented.

Table 7 summarizes individual subcategories of services that were unavailable for specific counties. This was due to either 1) lack of a specific type of service in that county; 2) service data being unable to specifically denote that service; 3) data for those services needing to be obtained separately and we could not yet do so, or 4) certain non-billed services not being tracked.

Statistical Methods

Multi-County Analysis
After harmonizing the demographics, diagnoses, and service types across all four counties, as well as EP and CG groups, the data were merged into a single dataset for our primary analyses. This combined, multi-county dataset provided increased statistical power, allowing for a richer set of controls and error structure without compromising efficiency.

Analysis of Sample Characteristics
Student T-tests and Pearson Chi-square (or Fisher's exact) tests were used to compare unadjusted group differences in demographic characteristics (e.g., age, sex, race, ethnicity, etc.) between the individuals in the EP and CG groups. Both unadjusted and adjusted analyses were used to examine group differences in clinical characteristics at time of index service such as primary diagnosis, as well as the duration of enrollment.

Analysis of Outpatient Service, Day Service/Crisis Stabilization, and 24-Hour/ Inpatient Psychiatric Hospitalization Data
All service data outcomes were analyzed with a simple empirical equation: the independent variable is regressed on a county-specific fixed effect, an epoch-specific fixed effect, an indicator taking 1 for the EP group and 0 otherwise, a set of interactions between the EP group indicator and each epoch allowing the effect of the EP program to vary over time, and a set of individual-specific controls - measured at intake - consisting of sex, ethnicity, race, and primary language. We used all demographic variables that were available and harmonized across all counties in time for this preliminary analysis. Standard errors were always clustered at the individual-level because repeated measures of the same outcome for the same individual are correlated, and we are interested in describing individual-level differences. Further processing of the data will allow the addition of other individual-specific controls and clinic-specific effects to the empirical equation to account for other sources of confounding variation. These will be included in future analyses.

Total outpatient service time (in minutes) of all outpatient services and total minutes of each service type (e.g., medication management, individual therapy, group therapy, rehab services) were analyzed by estimating the

empirical equation described above with negative binomial regression for count data to determine if outpatient service use differs between the EP and CG samples.

Data related to individuals' use of Day Service/Crisis Stabilization, and 24-Hour/ Inpatient Psychiatric Hospitalization Data usage were examined using multiple measurements based on the study period: 1) a binary indicator for whether the individual had ever been hospitalized; 2) a binary indicator for whether the individual had ever utilized crisis services; 3) number of hospitalizations per month; 4) number of crisis visits per month; and 5) mean duration of hospitalizations (i.e., length of stay [LOS]) in days; 6) mean LOS for Day/Crisis services (hours); 7) total duration of hospitalizations per month; and 8) total duration of Day/crisis services per month. Data for (1) and (2) were analyzed by estimating the empirical equation described above with multiple logistic regression. Data for (3), (4), (7), and (8) were analyzed by estimating the empirical equation described above with negative binomial regression for count data. Data for (5) and (6) were analyzed by estimating the empirical equation described above with linear regression. These various methods allowed us to determine whether each respective outcome differed between the EP and CG samples.

Results
The final cohort includes a sample of 506 individuals served by EP programs and 17,092 individuals from the CG group.

Clinical and Demographic Characteristics
Table 10 (Appendix V) summarizes baseline diagnostic and demographic information for the individuals from the EP and CG cohorts.

The EP sample had an average age of 17.0 years (standard deviation [SD] = 3.1 years), 59% of whom identified as male. Of those receiving treatment in the CG group, the mean age was 20.1 (SD=3.8 years), and 61% of them identified as male. The average age of CG individuals was significantly older than the average age of EP individuals in this sample ($p<.001$). No statistical difference in the distribution of sex was found.

The EP group included a significantly higher number of individuals who identified as Hispanic/Latino (56%) compared to the proportion of individuals from the CG clinics (44%, $p<.001$). In addition, a higher percentage of EP individuals identified as Caucasian (27%) compared to CG individuals (17%). However, a majority of CG individuals reported Unknown race (54%).

A higher proportion of individuals in the EP group had a Psychosis Spectrum disorder as the primary index diagnostic category compared to the CG group (EP Group: 80%; CG Group: 61%, $p<.001$). For both groups, Mood Spectrum disorders represented a smaller proportion of the primary diagnoses (EP Group: 6%; CG Group: 21%).

Service Utilization Characteristics
Duration of Enrollment

On average, individuals receiving treatment in both groups tended to remain in treatment for roughly one year (EP group: 11.1 months [SD=9.1], CG group: 12.2 months [SD=12.3]), but average duration of treatment was significantly higher for CG individuals ($p<.05$).

Figure 20. Percentage of consumers ending treatment within each time period

Bar chart with x-axis "1-6", "7-12", "13-18", "19-24", "25+" and y-axis "Percent". CG group values: 43.8, 13.0, 10.3, 9.4, 23.5. EP group values: 43.3, 27.7, 14.4, 9.9, 4.7. Legend: CG group, EP group.
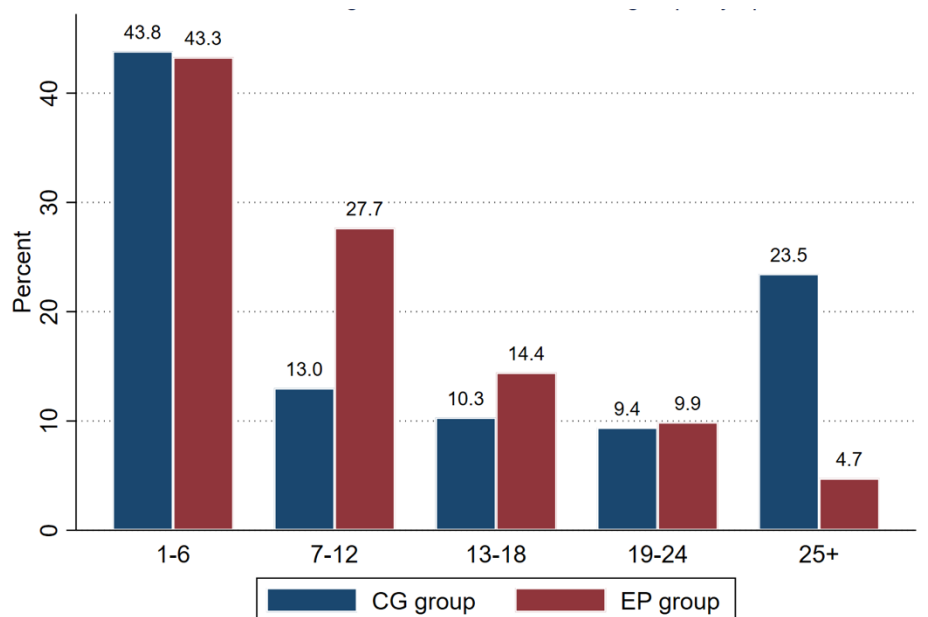
As shown in Figure 20, a roughly equal proportion of EP and CG individuals ended treatment within the first 6 months (43% and 44%, respectively). A greater proportion of EP individuals ended treatment between 7 and 12 months compared to CG consumers (28% vs. 13%, respectively). However, compared to EP individuals, a larger proportion of CG individuals ended treatment after they had received over 25 months of services (5% vs. 24%, respectively). For more information on differences in enrollment, see Appendix V – Table 20.

Outpatient Service Use
The EP and CG clinics offered similar types of outpatient services, including assessment, case management, collateral, crisis intervention, group therapy, individual therapy, medication support, plan development, and rehabilitation (see Appendix VI Service Code Definitions for descriptions of these services).

In examining the total minutes of outpatient services provided to individuals per month, those served in the EP group received significantly more minutes of service across all time points compared to the CG group ($p<.001$, see Appendix V – Tables 21A and 21B). When specific services are examined individually, the greatest difference is observed between groups in minutes of collateral, per person, per month (EP group: 140 minutes; CG group: 66 minutes) and individual therapy (EP group: 239 minutes; CG group: 188 minutes) per person.

Day Services
The use of day services was rare for both groups, as only 2.0% of EP and 4.7% of CG individuals received these services while enrolled in EP or general outpatient treatment (see Appendix V – Table 22). Calculated as the proportion of individuals with one or more visits, use of day services was greater in the CG group across all time points ($p<.001$). Further, the rate of day service visits was the highest among individuals that had been enrolled in treatment for 25 months or more (EP group: 3.3%; CG group: 5.7%, see Figure 21).

Figure 21. Proportion of consumers with at least one day service visit by time period by county
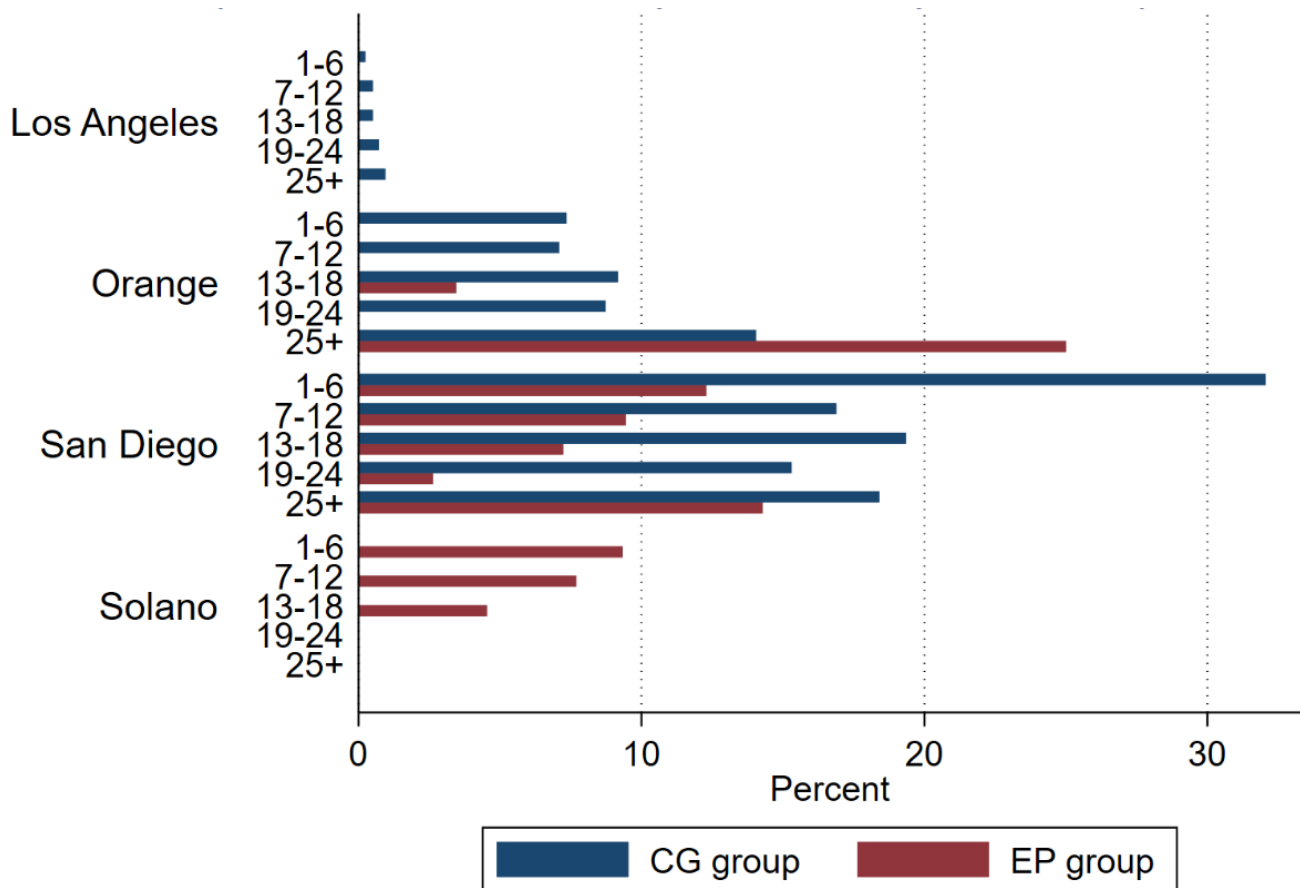
24-Hour Services/Inpatient Psychiatric Hospitalization Data

A significantly greater proportion of CG individuals experienced at least one 24-hour service or inpatient hospitalization during their enrollment compared to EP individuals (22.4% vs. 8.9%, $p<.001$; see Appendix V – Table 23). As shown in Figure 12, 24-hour services occurred most frequently during the first 6 months of treatment (EP group: 9.4%; CG group: 24.8%) and after 25 months of treatment (EP group: 17.0%; CG group: 23.7%), although we did not test these differences statistically. As noted previously, this data was unavailable for Solano County.

Figure 22. Proportion of consumers with at least one 24-hour service by time period by county
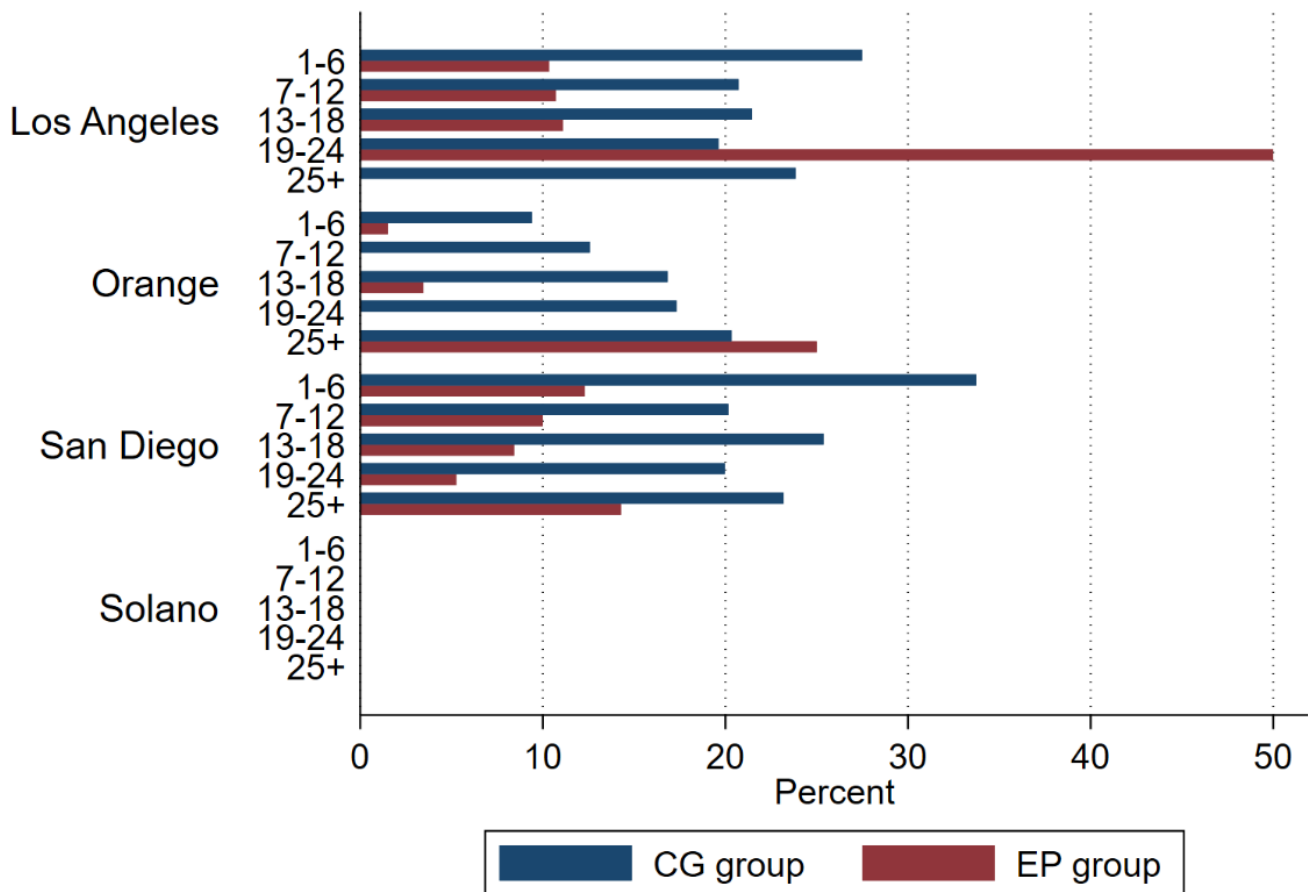
NOTE: Data not available for Solano County

Summary

Across all time periods, the total minutes of outpatient services per month was higher among EP individuals compared to CG individuals. However, the proportion of individuals in the EP group with one or more day services and/or 24-hour services/ inpatient hospitalizations was lower compared to the CG group.

Interpretations

Regarding duration of enrollment in treatment, the EP and CG groups are generally similar, with more EP consumers receiving 7-12 months of service, and the CG group having a substantial proportion of consumers who received longer-term treatment (25+ months), past the standard end-point of EP treatment at 24 months. In both groups, nearly half of the consumers received services for less than 6 months, which may represent challenges in engagement with this population, as well as the mobility of TAY youth, who may also have received services elsewhere.

The groups were both predominantly male, as is often typical in early psychosis clinical samples. There was a slightly older average age in the CG group, and more Hispanic/Latino consumers and Caucasian consumers in the EP group. This may reflect the focus of programs on outreach and staffing availability predominantly in English and Spanish. They identified as predominantly heterosexual across both groups. The results of this preliminary analysis are consistent with the intent of EP programs- to offer more intensive and evidence-based outpatient services in order to reduce the need for higher levels of care and to promote recovery. This is evident in the higher overall outpatient minutes for the EP group. Greater time spent in individual therapy likely

reflects the treatment models of the EP programs, which focus on CBT for psychosis or other similar forms of therapy. EP programs make a concerted effort to involve families of these transition age youth, reflected in the results of more collateral services than the CG group.

Similarly, the significantly greater proportion of CG individuals who had inpatient hospitalizations during the study period may demonstrate the effectiveness of early intervention in reducing hospitalization rates. Day services were so rare in both groups that we only analyzed the proportion of individuals with at least one service. Overall, these group differences are quite promising, although at this time, we cannot rule out differences in severity and needs between the EP and CG groups at baseline that could partly or fully explain the service utilization differences. As noted previously, access to hospitalization data may have been limited (e.g., by treatment outside county); however, these issues should have affected the EP and CG groups in a county similarly.

Limitations and Future Analyses
The primary goal of the current deliverable was to demonstrate the availability of service utilization and cost data that can be accessed and integrated across counties. Through this process, we identified a number of issues that require additional clarification for the final analysis. We will focus on these issues during the next project period:

Defining CG consumers
Identifying an equivalent comparison group relies upon identifying similar individuals to EP consumers. Given the lack of the CHR syndrome as a formal DSM or ICD diagnosis, we are unable to identify CHRs for comparison. Restricting our analysis to "first episode" psychosis, we were able to exclude CG individuals with recorded psychotic disorder diagnoses for more than 2 years prior to out active service period (the most common eligibility requirement for the EP programs). However, this does not rule out individuals who had psychosis but were not accurately diagnosed as such in health records. Due to factors such as the complexity of early psychosis diagnoses, lack of information about symptoms over time, and provider hesitance related to stigma about psychosis and serious mental illness, FEP consumers are often only diagnosed with a psychotic disorder in records after a substantial period of time with psychosis. Less stigmatizing disorders such as bipolar disorder, or those that represent only current symptoms, such as substance-induced psychosis are often used instead. Further, consumers who recently entered the county system, but were treated for psychosis outside the county prior to the service period, may not be appropriately excluded. Finally, as we explore comparisons of baseline characteristics of EP and CG consumers, we may use propensity score matching or a similar method in our final analysis.

Defining CG services
We attempted to compare services in specialized EP programs to usual outpatient care, or "treatment as usual." These services vary greatly across counties and across child and adult systems of care, so that we may have inadvertently included other specialized programs that offer more intensive services as well. Finally, consumers were not randomized to treatment, so there may be systematic biases that influence whether consumers received services at the EP program or elsewhere that we cannot see in the data we obtained. We excluded CG consumers who were treated in FSPs for this reason, but we were only able to accurately identify all FSP programs in our data in San Diego and Orange Counties. This will be a focus of our work during the next project period.

Inpatient services
Our preliminary analysis only includes inpatient data for county hospitals and some private hospitals that bill the counties. Some counties maintain separate databases of inpatient hospitalizations, which we expect to receive in time for the final analysis.

Private insurance services
Some EP programs serve all residents of the county, regardless of insurance. This may include individuals who have private insurance, and therefore services outside the EP program would be within a private insurance or HMO network, which cannot be included in these data. We will work with programs and counties to make sure we are accurately identifying these individuals and may need to exclude them form the final analysis.

Non-billable services
In future analyses, we plan to analyze no-show and cancellation rates as measures of treatment engagement.

Missing service categories
Although there were very few services that could not be categorized, we will follow up to obtain additional information about either subcategories for which we have no services in a county or specific services that lack sufficient detail. We will also investigate additional sources of data to determine whether more day services and 24 hour services can be integrated into our dataset. We may limit the analysis where there remain discrepancies in availability of specific service types by county or by group.

Demographic factors
Due to time constraints, we were only able to fully harmonize and analyze a subset of demographic variables. For the next deliverable, we will examine the relationship of more demographic factors to our outcomes, including: sexual orientation, language, education level, employment status, marital status, housing status, military service/veteran status, foster care status, insurance status and zip code. We will also determine which values represent true "baseline" characteristics, and which may be outcomes, recorded at later time points in treatment.

Fiscal year
In the next period we will explore fiscal year as a factor impacting outcomes, given changes over time in both service categorization and reimbursement.

<u>Description of Sources of Cost Data</u>
The costs associated with each service type were requested from each county. For the purposes of this report, we will describe the cost data obtained thus far. Comparison of costs associated with service utilization in the EP and CG groups will be analyzed once all cost data have been received by the study team. Potential sources of cost data were identified for specific service types, as described in Table 9, below.

Table 9. Sources of Cost Data by Service Type

Service Type	Included Sources of Cost Data
Outpatient	Contract service unit rates
Day/Crisis Stabilization	Hourly rate paid by County
24-hour: Inpatient, Residential	Daily rate paid by County Daily rate Medi-Cal reimbursement Harmonized Average Statewide Rate

Los Angeles and Orange County were able to submit their cost data to the study team prior to the completion of this report. San Diego County provided several tables of cost rates for services; however, after review of the

submitted data, a revised cost data request was sent to the county seeking final costs attached to each service. Because final cost data from San Diego County are still pending, the present report describes the data sources that were received. Solano County also experienced delays in obtaining and submitting their cost data. Delays included more complex data sources and lack of IT support staff available to the county data analysts to be able to pull the requested data. Final details of specific cost data sources for San Diego and Solano County will also be included in the next deliverable.

Los Angeles County
Outpatient Service Use: Los Angeles County costs rates were attached to each service and included all service types. For outpatient services each cost rate was the total cost of the service and the service unit (recorded in minutes).

Day Services/Crisis Stabilization Data: Costs related to day services included total cost of the service and the service unit (recorded in minutes).

24-Hour Services/Inpatient Psychiatric Hospitalization Data: Costs related to 24-hour services include inpatient county hospitals, Fee-for-Service hospitals and County contracted providers. These costs include total cost of the service and cost per service unit (recorded in days).

Orange County

Outpatient Service Use: Costs related to outpatient service use were based on contract service rates. Each outpatient service included a service unit rate and number of service units (in minutes).

Day Services/Crisis Stabilization Data: Costs related to day services/crisis stabilization were based on contract service rates which included a service unit rate and number of service units (in minutes).

24-Hour Services/Inpatient Psychiatric Hospitalization Data: Costs related to 24-hour services were day rates which varied by contract. Inpatient/hospital stays include negotiated bed day rate for each HCA contracted acute inpatient facility. These rates are different from the general regional rates set by DHCS. Skilled Nursing Facility (SNF)/IMD rates were averaged and include a bed day rate. Crisis Residential rates include a day rate and charge for the medical services by the minute.

San Diego County
Outpatient Service Use: County interim cost rates for outpatient services per service unit (15 minutes, bill in one-minute increments). Published reimbursable cost rates and actual reimbursable cost rates for EP community services, including case management, mental health services, medication support, and crisis intervention.

Day Services/Crisis Stabilization Data: County interim rates for day services/crisis stabilization per service unit (in hours).

24-Hour Services/Inpatient Psychiatric Hospitalization Data: County interim rates per service unit (in days) for inpatient/hospital stays, crisis residential, and therapeutic foster care. Contracted inpatient hospital rates for adult and adolescent services, effective February 1, 2020. Regional rate, effective July 1, 2021, for non-contracted inpatient hospitals.

<u>Statewide Sources of Cost Data</u>
Across California, psychiatric inpatient beds are often unavailable, particularly for minors. Patients are placed at both county-run and private hospitals, in or out of county. Each county negotiates different day rates with each hospital. Due to this variability, we will use multiple sources of data to develop averaged rates statewide.

We will apply these cost rates to inpatient service utilization for both the EP and CG groups, across counties. Once we are able to review the day rates for residential services in each county, we may use the same harmonization method.

Discussion and Next Steps

Discussion

Over this last FY, the team has continued to work hard to meet each of the goals that were set to out for the project period. It should be noted that the LHCN represents one of the first collaborative university-county partnerships between the University of California, Davis, San Diego and San Francisco with multiple California counties to implement and expand an integrated Innovation project. Through this endeavor, all parties hope to have a larger impact on mental health services than any one county can create on their own. While the project has experienced some delays and many barriers due to the global COVID-19 pandemic, we are confident that we are making excellent progress at meeting our goals and catching up with the original planned timeline.

We have completed Beehive training with all of the original LHCN counties and are in the midst of training our newest LHCN county program, Stanislaus LIFE Path. We are continuing to collect data on the core outcomes battery for the EPI-CAL project with 18 programs. Based on feedback from users in these programs, we have continued to work with Beehive developers to make modifications to the application, such as extending survey windows, as well as modify our training approach based on constructive feedback from programs.

We have completed several fidelity assessments, and plan to complete those for all of our programs within the next few months. The next annual report will summarize the results from all participating programs.

As noted previously, we were able to successfully complete our primary goal for the retrospective county data analysis, to provide a preliminary demonstration of the proposed method for accessing data regarding EP programs and CG groups across California, and the first part of our secondary goal, to analyze service utilization and costs associated with those services across counties. However, we are still gathering additional data to inform a final analysis of the 2017-2019 period, which we expect to complete by December 2022.

While we were not able to integrate the cost data for all counties, we have described our cost analysis for San Diego County in section 9 above. We have obtained some cost data and are working with our county partners to obtain the remaining information. We are confident that the cost comparison analysis will be completed for the December 2022 deliverable.

Next Steps

In the next project period, we will continue to conduct fidelity assessments with EPI-CAL programs and meet with county and program leadership to provide detailed feedback on fidelity results. We will also continue and complete training of EP programs from both the LHCN and larger EPI-CAL network, especially as new programs join. As implementation of Beehive continues, we will elicit feedback from EP programs how to improve both the training process and Beehive itself via feedback surveys, regular check-ins from point people, and qualitative interviews. Our goal is to continue to improve Beehive in an iterative process and to incorporate community partner feedback so that Beehive be a useful data collection and visualization tool for the programs using it. We are also working with sites to understand why enrollments are not matching the original projections and to support them to increase the degree to which they are integrating Beehive into their standard practice.

Over the next project period, the LHCN team expects to receive and review data for both EP program and CG consumers and their service utilization data from Napa and Stanislaus counties for the retrospective data period January 1st, 2017 – December 31st, 2019. Upon receiving the data, we will review the submitted datasets and problem-solve with counties regarding any missing data elements, particularly other mental

health services received by EP program consumers, which may need to be retrieved from different sources. We will harmonize these data with the prior counties' and integrate them into the final dataset. We will also be requesting all related cost data for the services received by consumers in the EP programs and CG groups from Napa and Stanislaus counties.

In addition, for all counties participating in the county data component of the LHCN, meetings will be scheduled over the next several months with each county to review the details of the EP and CG retrospective data pulls, the cost data, and to problem-solve any issues that arise. We will then conduct the statistical analyses for individual counties and across the integrated dataset. In anticipation of the prospective data analysis, we have met with each county to discuss the timeline for obtaining their data and details of what will be included in the data pull. We will submit the formal data extraction requests in writing in July 2022, after we complete meetings with all relevant parties.

Another major goal of the next project period is to develop the final analysis plan for all LHCN data, with a particular focus on the consumer outcomes data collected via Beehive. This will integrate results from the fidelity assessments.

Appendix I: Intake Workflow Meeting Template

Our goal for this meeting: understand your intake workflow to help make transition to using Beehive at intakes smoother. Today we are focusing on how to integrate Beehive into your workflow, but remember (once Beehive is approved for use), you can also register existing consumers.

Questions

a. Current Intake process
   i. What is program's general intake workflow?
      1. Do you do phone screenings before scheduling an intake? (review template of phone screen to compare with Beehive registration fields)
      2. Do you currently have consumers complete surveys/paperwork with the intake appointment?
         i. Treatment consent, research consent, ROIs?
         ii. How are surveys administered?
         iii. When surveys they sent (e.g., prior to intake date, morning of intake date)?
      3. At what stage in the process do you register consumers into the Electronic Health Record
      4. How do you complete assessments or other paperwork for people who are in need of interpretive services?
b. Integration of Beehive
   i. At what stage in the workflow would Beehive registration fit best?/When would you register consumers into Beehive (takes about 15 minutes)
      1. In advance (Web app)? Is all of the information in registration already gathered? (see phone screen)
      2. Day of (tablet)?
   ii. Which staff member(s) will complete registration?
   iii. When would consumer complete the intake surveys (EPI-CAL battery takes about 45 minutes)?
      1. Do clinicians plan to use survey data as part of their intake assessment?
      2. Consider prioritization of surveys required for intake assessment
   iv. Which staff member(s) will orient consumer to EULA/surveys on intake day?

(As needed) demonstration of registration process

Appendix II: Data-Entry Workflow Meeting

1. **Questions to Understand Current Clinic Data** *(can skip if already asked at Intake Workflow meeting)*

   2. Is clinic already using a data-entry platform?
       i.   If so what? (excel, EMR, redcap, in-house platform (ex. MHOMS)
       ii. Who designs the surveys on that platform?
       iii. Do you first enter data on a CRF prior to entry in this system?
   3. What roles on team currently complete data-entry? (QM, Clinic Coordinator, Clinicians)
   4. How do you access/view data after it is entered?
   5. Does your program have dedicated staff to analyze data?

2. **Questions about Integration of Beehive for Survey Completion**

   a. Who will be responsible for each of these items (one person? Each clinician for their caseload? Leadership?):
       i.   Following up with consumers about completing their surveys?
       ii. Entering clinician-entered data for each consumer?
       iii. Monitoring urgent clinical issues? (our recommendation is that each clinician monitors their caseload)
   b. What level of support do you want with tracking survey completion (consumers & clinicians) and urgent clinical issues?
   c. Are there other surveys that your clinic wants to collect through Beehive?
       i.   Standardized measures that are already built in: PSC-35, CATS-Guardian report
       ii. Other measures can also be entered-- our team needs to review first to ensure that we can design the surveys in Beehive
   d. Who is assessing COMPASS & GFS/GFR? Who is monitoring ACES to determine if additional survey should be assigned?
       i.   We will want to make sure that they have completed the trainings for these trainings

Demonstration on how to access clinician-entered data, view survey status page (for consumer & PSP) as necessary

Appendix III: Beehive Part 3 Training Small-Group Worksheet

<u>Beehive Part 3 Training Small Group</u>

Identify a group note-taker and a person who will report back to the larger group

Survey 1 *(Identify a member of your group to screen share survey 1)*

1. Find one of the 3 measures we have introduced to you in trainings: **Modified Colorado Symptom Index** (MCSI), **Questionnaire on the Process of Recovery** (QPR), or **SCORE Index of Family Functioning and Change** (SCORE-15). Next answer the following questions about that survey:
    a. What is the global score?
    b. Is there a clinical threshold?
    c. Is there score severity shading? In which direction? What does that mean?
    d. Is the global score above or below the threshold? What does that mean?
    e. Which is the highest rated individual item(s)? What does that mean?
    f. Which is the lowest rated individual item(s)? What does that mean?

-
2. Discussion Questions
    a. How might you use this information in care?
    b. Are the survey responses consistent with your knowledge of the consumer's experiences?
    c. What questions do you have after viewing these surveys?

Survey 2-3 *(Identify a new member of your group to screen share survey(s) 2-3)*

3. Reference the Table of Contents for the EPI-CAL battery (next page). Find one to two additional surveys that you are interested in or that might answer the questions you have from the first survey.
    a. Is there a global score? (i.e. is this survey visualized?). If yes,
        i. Is there a clinical threshold?
        ii. Is there score severity shading? In which direction? What does that mean?
        iii. Is the global score above or below the threshold? What does that mean?
        iv. Which is the highest rated individual item(s)? What does that mean?
        v. Which is the lowest rated individual item(s)? What does that mean?
    b. If there is no visualization, remember you can view the survey responses by clicking the "survey results" button at the top left of the page

-
4. Discussion Questions
    a. How might you use this information in care?
    b. Are the survey responses consistent with your knowledge of the consumer's experiences?

-
- Additional Discussion Questions
5. Does either survey help you understand the other survey better?
6. Think about the different roles in the clinic and how they might use this data differently
    a. How might a family advocate or peer partner use this information compared to a clinician?
    b. How might a prescriber use this information compared to a case manager?

Appendix IV. Algorithm Used to Determine Index FEP Diagnoses

1. If present, the psychotic disorders listed below will always be the index diagnosis:

   - F20.0 Paranoid schizophrenia (ICD 9: 295.12)
   - F20.3 Undifferentiated schizophrenia (ICD 9: 295.15)
   - F20.81 Schizophreniform disorder (ICD 9: 295.21)
   - F20.9 Schizophrenia (ICD 9: 295.23)
   - F22 Delusional disorders (ICD 9: 295.25)
   - F23 Brief psychotic disorder (ICD 9: 295.30)
   - F25.0 Schizoaffective disorder, bipolar type (ICD 9: 295.32)
   - F25.1 Schizoaffective disorder (ICD 9: 295.33)
   - F25.9 Schizoaffective disorder, unspecified (ICD 9: 295.35)
   - F28 Other psychotic disorder not due to a substance or known physiological condition (ICD 9: 295.40)
   - F29 Unspecified psychosis not due to a substance or known physiological condition (ICD 9: 295.41)

   -
2. If no psychotic disorder is present, these mood disorders with psychotic features will be the index diagnosis

   - F31.64 Bipolar disorder, current episode mixed, severe, with psychotic features
     (ICD 9: 295.82)
   - F31.5 Bipolar disorder, current episode depressed, severe, with psychotic features
     (ICD 9: 295.73)
   - F31.2 Bipolar disorder, current episode manic severe with psychotic features
     (ICD 9: 295.64)
   - F33.3 Major depression with psychotic features
     (ICD 9: 296.20)
   - F32.3 Major depressive disorder, single episode, severe with psychotic features
     (ICD 9: 296.06)

Appendix V. Cost and Utilization Data From Preliminary Multi-County Integrated Evaluation

Demographic Characteristics

Table 18. Demographics of Individuals included in Analysis

	Early Psychosis (N=506)		Comparator Group (N=17,092)			
	n	%	n	%	X²	p-value
Sex						
Male	300	59%	10,345	61%	2.04	0.564
Female	206	41%	6,672	39%		
Other	-	0%	46	<1%		
Unknown	-	0%	7	<1%		
Gender Identity						
Male	288	57%	9,783	60%	407.99	<.001
Female	185	37%	6,391	39%		
Transgender	3	<1%	61	<1%		
Other	10	2%	33	<1%		
Prefer not to Answer	2	<1%	11	<1%		
Unknown	15	3%	6	<1%		
Sexual Orientation						
Heterosexual	232	69%	2,624	68%	51.40	<.001
Gay/ Lesbian	9	3%	86	2%		
Bisexual	31	9%	109	3%		
Other	16	5%	116	3%		
Prefer not to Answer	17	5%	324	8%		
Unknown	32	9%	577	15%		
Ethnicity						
No - Not Hispanic/Latino	205	41%	9,426	55%	62.57	<.001
Yes - Hispanic/Latino	285	56%	7,507	44%		
Unknown	16	3%	153	1%		
Race						
White	137	27%	2,894	17%	356.83	<.001
Black/African American	67	13%	2,791	16%		
Asian	32	6%	627	4%		
American Indian/Native Alaskan	4	1%	114	1%		
Native Hawaiian/Other Pacific Islander	4	1%	114	1%		
Other	140	28%	1,328	8%		
Unknown	122	24%	9,208	54%		
Language						
English	448	89%	14,361	89%	1.42	.702
Spanish	47	9%	1,463	9%		

Other	8	2%	292	2%		
Unknown	1	<1%	93	1%		
Education level						
Grade K-4	-	0%	739	9%	92.67	<.001
Grade 5 (completed elementary school)	41	12%	982	12%		
Grade 8 (completed middle school)	209	58%	3,027	38%		
Grade 12 (completed high school)	48	13%	856	11%		
Some college	32	9%	1,196	15%		
Completed college	2	1%	67	1%		
Graduate degree	2	1%	51	1%		
Prefer not to Answer	-	0%	14	<1%		
Unknown	24	7%	1,039	13%		
Employment Status						
Employed full time	8	2%	163	2%	51.83	<.001
Employed part time	30	7%	234	3%		
Student	280	65%	4,776	57%		
Unemployed, seeking employment	17	4%	311	4%		
Unemployed, not seeking employment	40	9%	1,551	18%		
Other	32	7%	596	7%		
Unknown	27	6%	782	9%		
Marital Status						
Single/ never married	396	97%	7,663	90%	22.39	<.001
Married	-	0%	95	1%		
Other	-	0%	46	1%		
Unknown	12	3%	698	8%		
Living Arrangement						
House/ apartment (No support required)	289	78%	3,634	63%	125.37	<.001
House/ apartment (Support required)	56	15%	346	6%		
Foster care	2	1%	91	2%		
Residential treatment	4	1%	271	5%		
Inpatient psychiatric hospital	-	0%	7	<1%		
Homeless	8	2%	785	14%		
Jail/ prison/ correctional facility/ juvenile hall	-	0%	198	3%		
Other	3	1%	134	2%		
Unknown	11	3%	325	6%		
Military Service/Veteran Status						
No	403	99%	4,612	99%	2.02	.155
Yes	5	1%	29	1%		
Diagnosis Category						
Psychosis Spectrum	405	80%	10,346	61%	84.47	<.001

Mood Spectrum	30	6%	3,618	21%		
Other	69	14%	2,646	16%		
Unknown	2	<1%	482	3%		

Table 19. Age of Individuals included in Analysis

	Early Psychosis		Comparator Group				
	Mean	**SD**	**Mean**	**SD**	***t***	***df***	**p-value**
Age	17.0	3.1	20.1	3.8	18.41	17596	<.001

Table 20. Proportion of Individuals Ending Treatment within each Time Period

	Early Psychosis		Comparator Group			
	n	**%**	**n**	**%**	**X²**	**p-value**
≤6 months	219	43%	7,493	44%	162.14	<.001
7 to 12 months	140	28%	2,221	13%		
13 to 18 months	73	14%	1,762	10%		
19 to 24 months	50	10%	1,606	9%		
>25 months	24	5%	4,010	24%		
Total	506	100%	17,092	100%		

<u>Service Utilization Characteristics</u>

Outpatient Service Use

Table 21A. Total Minutes of Outpatient Services per Individual per Month

	Early Psychosis		Comparator Group			
	Mean	**95% CI**	**Mean**	**95% CI**	***z***	***p*-value**
Total minutes of outpatient services (per month)	452	417 - 488	296	290 - 302	8.63	<.001

Table 21B. Total Minutes of Outpatient Services per Individual per Month by Time Period

	Early Psychosis		Comparator Group			
	Mean	95% CI	Mean	95% CI	z	p-value
≤6 months	537	493 - 582	287	281 - 292	11.11	<.001
7 to 12 months	455	403 - 508	305	297 - 314	5.58	<.001
13 to 18 months	433	375 - 491	313	302 - 323	4.02	<.001
19 to 24 months	321	261 - 380	299	288 - 309	0.71	.48
>25 months	297	218 - 377	285	274 - 297	0.29	.77

Table 21C. Total Minutes of Outpatient Services per Individual per Month by Service Type and Time Period

		Early Psychosis		Comparator Group			
		Total Minutes of Service per Individual per Month		Total Minutes of Service per Individual per Month			
		Mean	95% CI	Mean	95% CI	z	p-value
Service date from enrollment	Service Type						
<6 months	Assessment	90	82 - 97	69	68 - 70	5.51	<.01
	Case Management	89	72 - 106	81	77 - 84	0.93	.35
	Collateral	139	121 - 157	62	60 - 65	8.44	<.01
	Crisis Intervention	66	49 - 83	125	121 - 128	-6.79	<.01
	Group Therapy	75	60 - 89	95	84 - 106	-2.37	.02
	Individual Therapy	238	215 - 260	171	165 - 176	6.00	<.01
	Medication Support	73	67 - 79	64	62 - 65	3.08	<.01
	Plan Development	47	42 - 52	48	46 - 50	-0.30	.76
	Rehabilitation	98	84 - 113	66	59 - 73	4.14	<.01

7-12 months	**Assessment**	44	36 - 53	59	56 - 63	-3.55	<.01
	Case Management	93	68 - 119	100	95 - 106	-0.52	.61
	Collateral	157	132 - 182	72	68 - 75	6.64	<.01
	Crisis Intervention	64	35 - 93	92	86 - 98	-1.86	.06
	Group Therapy	64	51 - 78	110	96 - 124	-4.94	<.01
	Individual Therapy	258	225 - 291	201	193 - 209	3.39	<.01
	Medication Support	64	57 - 71	55	54 - 57	2.34	.02
	Plan Development	39	31 - 46	53	50 - 56	-3.56	<.01
	Rehabilitation	106	89 - 122	79	68 - 89	2.59	.01
13-18 months	**Assessment**	50	37 - 64	60	57 - 63	-1.40	.16
	Case Management	69	50 - 88	105	99 - 111	-3.60	<.01
	Collateral	137	110 - 164	70	66 - 74	4.82	<.01
	Crisis Intervention	89	34 - 144	92	86 - 98	-0.10	.92
	Group Therapy	63	40 - 86	129	106 - 152	-4.12	<.01
	Individual Therapy	232	199 - 264	202	193 - 211	1.79	.07
	Medication Support	63	52 - 74	59	57 - 61	0.67	.50
	Plan Development	50	32 - 68	54	51 - 57	-0.43	.67
	Rehabilitation	108	84 - 132	80	69 - 92	1.94	.05
>19-24 months	**Assessment**	52	33 - 70	58	55 - 61	-0.66	.51
	Case Management	40	29 - 52	105	98 - 111	-9.59	<.01
	Collateral	132	92 - 172	67	63 - 72	3.15	<.01
	Crisis Intervention	58	50 - 66	81	74 - 87	-4.53	<.01
	Group Therapy	85	33 - 137	141	114 - 168	-1.88	.06

	Individual Therapy	222	181 - 264	198	189 - 208	1.13	.26
	Medication Support	68	53 - 83	59	57 - 61	1.18	.24
	Plan Development	44	22 - 66	49	46 - 52	-0.46	.65
	Rehabilitation	68	46 - 91	68	58 - 78	0.02	.98
25+ months	Assessment	57	30 - 84	46	43 - 48	0.82	.41
	Case Management	62	37 - 87	91	85 - 97	-2.21	.03
	Collateral	118	70 - 166	59	55 - 64	2.42	.02
	Crisis Intervention	66	-9 - 140	65	59 - 71	0.01	.00
	Group Therapy	97	85 - 109	124	100 - 147	-1.87	.06
	Individual Therapy	232	177 - 288	184	174 - 193	1.70	.09
	Medication Support	64	40 - 87	57	54 - 60	0.57	.57
	Plan Development	95	14 - 177	43	40 - 46	1.26	.21
	Rehabilitation	47	13 - 80	52	44 - 60	-0.29	.77

Day Service Use

Table 22. Day Services – Proportion of Individuals with One or More Visits

Visit date from enrollment	Early Psychosis		Comparator Group			
	%	95% CI	%	95% CI	z	p-value
≤6 months	2.4%	0.017 - 0.032	5.0%	0.047 - 0.054	-6.24	<.001
7 to 12 months	1.8%	0.010 - 0.026	4.0%	0.036 - 0.044	-4.67	<.001
13 to 18 months	1.5%	0.004 - 0.025	4.7%	0.041 - 0.052	-5.43	<.001
19 to 24 months	0.4%	-0.003 - 0.011	4.2%	0.037 - 0.048	-8.33	<.001

	%	95% CI	%	95% CI	z	p-value
>25 months	3.3%	-0.006 - 0.071	5.7%	0.050 - 0.064	-1.22	.222
Across All Time Periods	2.0%	0.014 - 0.026	4.7%	0.044 - 0.050	-7.93	<.001

24-Hour Service/Inpatient Hospitalization

Table 23. 24-Hour/ Inpatient Hospitalization Services – Proportion of Individuals with One or More Visits

Visit date from enrollment	Early Psychosis		Comparator Group			
	%	95% CI	%	95% CI	z	p-value
≤6 months	9.4%	0.067 - 0.121	24.8%	0.242 - 0.255	-10.83	<.001
7 to 12 months	7.7%	0.044 - 0.109	19.5%	0.186 - 0.204	-7.00	<.001
13 to 18 months	7.1%	0.026 - 0.116	21.4%	0.204 - 0.225	-6.10	<.001
19 to 24 months	5.4%	-0.005 - 0.114	19.5%	0.184 - 0.207	-4.57	<.001
>25 months	17.0%	-0.014 - 0.353	23.7%	0.191 - 0.216	-0.72	.472
Across All Time Periods	8.9%	0.061 - 0.118	22.4%	0.224 - 0.250	-9.03	<.001

Appendix VI. Service Code Definitions

These definitions are based upon the Medi-Cal Billing Manual published in September 2019 by the State of California—Health and Human Services Agency Department of Health Care Services, Mental Health Services Division.

Medication Support
Psychiatric medication-related services provided by nurse or physician including obtaining informed consent linked to providing Medication Support Services activities; instructions in the use, risks and benefits of and alternatives for medication; and plan development related to Medication Support Services. This may include services to consumer, family and caregivers.

Assessment
A service activity designed to evaluate the current status of a consumer's mental, emotional, or behavioral health. Assessment includes but is not limited to the following: mental status determination, analysis of consumer's clinical history; analysis of relevant cultural issues and history and diagnosis. The Server may be gathering information from a variety of sources. Interactive complexity includes the need to manage high reactivity, emotions or behavior of participants that interferes/complicates implementation or delivery of treatment services. It also may include mandated reporting such as in situations involving abuse or neglect. May include the use of play equipment, other physical devices, and interpreter or translator services.

Collateral
A service activity to a significant support person in the consumer's life for the purpose of meeting the needs of the consumer in achieving the goals of the consumer plan. May include but is not limited to consultation and training of the significant support person(s) to assist in better understanding of mental illness. The consumer may or may not be present for this service activity.

Plan Development
A service activity that consists of development of consumer plans, approval of consumer plans, and/or monitoring of a consumer's progress. Includes team meetings for these purposes. Whenever possible, consumer should be present for these activities.

Rehabilitation
Individual: A service activity provided to a consumer and may include the following: counseling, assistance in improving, maintaining, or restoring an individual's functional skills, daily living skills, social and leisure skills, grooming and personal hygiene skills, meal preparation skills, and support resources; and/or medication education. If family or others are present, the focus of the session shall be on the consumer's individual goals.

Group
A service activity provided to a group of individuals and may include the following: counseling, assistance in improving, maintaining, or restoring an individual's functional skills, daily living skills, social and leisure skills, grooming and personal hygiene skills, meal preparation skills, and support resources; and/or medication education. This may include consumers with family (can be foster family) for example multi-family groups, consumers with consumers, or consumers with others.

Individual Therapy
Psychotherapy conducted with a consumer: includes insight-oriented, behavior modifying and/or supportive psychotherapy. If family or others are present, the focus of the session shall be on the consumer's individual goals.

Group Session/Group Therapy
Psychotherapy conducted with a group of individuals. Interactions among members are considered to be insight-oriented, behavior modifying and/or supportive. This may include consumers with family (can be foster family) for example multi-family groups, consumers with consumers, or consumers with others.

Case Management/Brokerage (CMB)
Case management services provided to assist the consumer to access needed housing, medical, educational, social, prevocational, vocational, rehabilitative, alcohol or drug treatment, or other needed community services. Includes targeted case management services of monitoring the beneficiary's progress toward consumer plan goals and placement services.

Crisis Intervention
Response to an unplanned event enabling consumer to cope with a crisis while maintaining his/her status as a functioning community member to the greatest extent possible. Includes related components such as assessment, evaluation, collateral contacts and therapy. Crisis Intervention is only provided to the consumer or the consumer with family present.

<u>Non-Billable Codes</u>
No-Show (Missed Visit)

Cancelled by Consumer

Cancelled by Program

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