Larimer County High Utilizers Study



Final Report



For the Health District of Northern Larimer County

April 20, 2015



4450 Arapahoe Avenue, Suite 100, Boulder, CO 80303

Contents

[I. High Utilizers Analysis: Summary of Findings 1](#_Toc417041166)

[II. Technical Report Introduction and Overview 21](#_Toc417041167)

[III. Base Group and the Cost of Jails Services 23](#_Toc417041168)

[IV. Police Encounters 30](#_Toc417041169)

[V. Emergency Department and Inpatient Hospitalization Use 35](#_Toc417041170)

[VI. Primary Care Use 52](#_Toc417041171)

[VII. Homelessness 54](#_Toc417041172)

[VIII. Estimation of Total Service Use and Cost through Microsimulation 56](#_Toc417041173)

[IX. Conclusion 66](#_Toc417041174)

[Attachment A: Data Sets Utilized in the Study 74](#_Toc417041175)

# I. High Utilizers Analysis: Summary of Findings

Background and Introduction

The Community Mental Health and Substance Abuse (MHSA) Partnership, consisting of Larimer County healthcare, human services, justice and law enforcement, city, county, school systems, and consumer leaders and representatives, has been working collaboratively to create improvements in the system of care for people with mental health and substance use disorders in Larimer County.

Over the years, interest among partners has grown concerning the needs, patterns of use, and challenges of the most frequent utilizers of acute and crisis services in the community. Various initiatives have worked to address aspects of these individuals’ needs, including the Interagency Group, which coordinates efforts between law enforcement agencies and a variety of other system partners, and the Medicaid Accountable Care Collaborative (MACC), which seeks – among many goals – to reduce potentially preventable utilization of high-cost health care services, such as emergency rooms, by coordinating the care of certain health care consumers enrolled in Medicaid.

A sub-group of the MHSA Partnership consisting of behavioral healthcare, criminal justice, and housing leaders has recently come together to identify ways of responding to the needs of people with serious mental health and substance use problems who frequent the county’s jail, emergency rooms, and other restrictive and high-cost settings, and to develop means of using data to create a more coordinated and effective system of care.

One of the potential opportunities identified by this group to support system-level changes (such as more widespread implementation of intensive evidence-based practices) that would address the needs of this population included the use of social impact bonds and other “Pay for Success” solutions. These approaches seek to support the creation of cost savings within a system or community through implementation of best practice interventions. However, in order to successfully consider Pay for Success opportunities, more understanding of the actual levels and associated costs of service utilization by frequent utilizers became necessary.

In support of these efforts, the Health District of Northern Larimer County (the Health District) asked TriWest Group (TriWest) to conduct a study of high utilizers of acute and crisis services in northern Larimer County. The requested study would include development of a database of frequent users of acute services and criminal justice systems, and analysis of their utilization of services and the associated costs of that utilization.

In the summer and fall of 2014, TriWest worked with law enforcement and criminal justice agencies, behavioral health providers, healthcare providers, and agencies serving people experiencing homelessness to gather data on frequent users. TriWest started with a sample of frequent users of the adult detention center, gathered additional data on their use of other systems as well as data on high utilizers of other systems, examined the overlap in use of systems, and estimated the associated costs.

Methods

TriWest and the Health District agreed to begin the study by identifying a robust sample of people who were high utilizers of the Larimer County Detention Center (the jail). In the summer of 2014, TriWest worked with jail staff to identify high utilizers (defined as individuals with four or more bookings in a calendar year) andreceived a data set of all individuals with four or more bookings in calendar year 2013. This criterion yielded data for 125 individuals. Because we had a target group of approximately 200, we requested data for individuals with four or more bookings in 2012. This second data set contained 109 individuals. With eleven individuals overlapping between the two years, the total for the data set was 223 individuals. Among the total sample of 223, 155 individuals were found to reside within the Health District of northern Larimer County.

With the help of Health District staff, TriWest contacted other agencies in the county to obtain data that would help us to estimate the jail samples’ utilization of high-cost or restrictive services in other settings. We obtained data on emergency room use, inpatient hospital use, law enforcement contacts, and homeless services. Because identifying information on the jail sample (including even names) was a matter of public record, we were able to share identifying information from the jail sample with other agencies. Our sample’s health-related data (e.g., behavioral health conditions) was not attached to names, nor were other systems able to provide data at the individual level, in many cases. For this reason, we often had to use various matching strategies and could often only estimate our jail samples’ utilization and costs in other systems. In the main body of the report, we present in more detail our matching methodologies as well as various simulations that were used to estimate our samples’ utilization and costs across systems.

Findings

*Finding #1: Readiness for data sharing in Northern Larimer County is limited.*

Obtaining data from agencies that provide services to frequent utilizers was not always easy or, in some cases, even possible. Concerns about HIPAA rules and the sharing of personal health information data between agencies hampered our ability to obtain some data, as did the limited availability of patient permission for sharing information for care coordination and planning purposes. Additionally, many of the organizations involved had a limited ability to extract service utilization and associated costs data from their own internal systems in an agile and timely manner. (Please see the corresponding Recommendation #1a and Recommendation #1b presented below in the Recommendations section of this Summary of Findings.)

*Finding #2: Among frequent users of the jail, substance use disorders were nearly universal. Co-occurring mental illness and substance use disorders also are prevalent among this population.*

Roughly nine of every 10 people in our sample of frequent jail users were identified by jail staff as having substance use problems. While mental health disorders also were common, the extremely high prevalence of substance use disorders highlights a need to consider the system’s capacity for providing substance use disorder treatment as well as integrated care for co-occurring mental health and substance use disorders. (Please see the corresponding Recommendation #2 presented below in the Recommendations section of this Summary of Findings.)

The table below summarizes the number and percentage of high utilizers identified by detention center staff as having mental illness (MI), substance abuse (SA) or dual MI and SA disorders (DD) across the three years for which detention center staff made data available. In the Technical Report below, we also provide diagnostic and demographic information for the sample of frequent jail utilizers.

Diagnostic Categories of Frequent Jail Users (CJSD Report)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **MI** | **SA** | **DD** | **Total** |
| **2011** | 28 (43.8%) | 51 (79.7%) | 26 (40.6%) | 64 |
| **2012** | 57 (52.3%) | 96 (88.1%) | 52 (47.7%) | 109 |
| **2013** | 72 (57.6%) | 114 (91.2%) | 70 (56.0%) | 125 |

As can be seen in the table below, the types of charges among the jail sample are reflective of the fact that they collectively have a high prevalence of mental illness and, especially, substance use problems. For example, there were four different charges across the sample that were directly related to substance use issues, and a total of 161 charges associated with those four types of charges. The two most frequent charges, which together constitute 44% of all charges, involve harassment of police and a failure to appear (FTA), and these are often associated with substance use disorders or mental illness. Other frequent charges, such as domestic violence, also are often associated with alcohol or substance use.

Frequency of Charges Among Frequent Users of the Jail

| **CHARGE** | **CHG LITERAL** | **Count** |
| --- | --- | --- |
| 16-19-0103 | PD FORT COLLINS FTC HARASSMENT | 368 |
| FTA | FTA NATURAL AREAS VIOLATION | 237 |
| 18-06-0803.5 | VIOLATION OF A RESTRAINING ORDER | 92 |
| FTC | FTC 3 DEGREE ASSAULT | 78 |
| 18-06-0801 | DOMESTIC VIOLENCE ENHANCEMENT | 76 |
| 42-02-0138 | DROVE SUSP/REVOKED/DENIED/CANCELLED | 67 |
| 18-04-0401 | THEFT | 66 |
| 18-18-0403.5 | UNLAW POSS CONTROLLED SUBSTANCE | 66 |
| 18-08-0212 | VIOLATION OF BAIL BOND CONDITIONS | 54 |
| 18-18-0428 | DRUG PARAPH POSS | 42 |
| 18-03-0204 | 3 DEG ASSAULT | 41 |
| 18-09-0111 | HARASSMENT | 41 |
| 42-04-1409 | COMPULSORY INSURANCE VIOLATION | 33 |
| 42-04-1301 | DUI/DWAI-ALCOHOL OR DRUGS | 31 |
| 18-04-0501 | CRIMINAL MISCHIEF | 30 |
| 18-08-0103 | RESISTING ARREST | 30 |
| 18-18-0405 | CONTROL SUBS DIST/MANU/POSS W/INTEN | 23 |

*Finding #3: The costs associated with frequent use of the jail, the emergency department, inpatient facilities, and of other services for people with unmet needs are high.*

Because we had multiple years of data and incomplete overlap between the various domains (ER, inpatient, etc.) from which we obtained utilization and cost data, many of the assumptions used in calculating total cost could take a range of plausible values. In order to model this variability, we conducted economic simulations, varying the assumptions and parameters associated with utilization and costs, in order to identify likely ranges of total annual costs per high utilizer to the system as a whole. We did this for the entire jail high utilizer sample as a whole, and for various sub-groups, including, for example, only those with mental illnesses or only those who were known to have at least one emergency department visit. These simulations produced distributions of average per person costs, with the modal (most likely) estimate in each distribution providing a “best guess” concerning the annual per person costs to the system as a whole.

Our cost calculations and simulations revealed the following *estimations of* *total costs to all systems combined*:

* The estimated average annual cost per jail high utilizer was $12,300.
* The estimated average annual cost per jail high utilizer with mental illness was just under $14,000, about the same as an annual per person cost to provide Assertive Community Treatment.
* The estimated average annual cost per jail high utilizer with any emergency department use was just under $19,000, suggesting that a focus on better serving jail high utilizers who also have had ER visits would offer an excellent opportunity to achieve cost savings.

Our *estimations of monetary costs to specific systems* included the following:[[1]](#footnote-1)

* The estimated average annual *jail-related cost* per jail high utilizer was $7,520.
* The estimated average annual *cost of police time* to deal with incidents in the “base year” from which jail high utilizers were selected was a little over $1,000.
* The estimated average annual per person cost associated with *emergency department use* was just under $1,000.
* The estimated average annual per person cost associated with *inpatient utilization* was just over $2,500.

Below we provide more detail concerning the cost calculations just summarized:

*Jail Costs*

Our findings indicate that frequent users of the jail also have considerable costs incurred through the use of other systems that are overburdened when behavioral health disorders are inadequately treated. People with mental illnesses had high per-person costs and those with at least one emergency department (ED) visit in a year’s time had even higher average per-person costs.

For the 155 individuals in the sample who resided within the Health District (including those in both years), the 2012/13 combined jail-related costs are provided in the table below.

Jail Costs Incurred by High Utilizers Residing in the Health District

| **Year** | **# RO** | **Bookings** | **Jail Beds**  **(Days)** | **Total Costs** | **Days per Offender** | **Cost per Offender** |
| --- | --- | --- | --- | --- | --- | --- |
| **2012** | 71 | 339.0 | 5,961 | $522,660.00 | 84.0 | $7,361.42 |
| **2013** | 90 | 406.0 | 7,848 | $688,113.00 | 87.2 | $7,645.70 |

A weighted average of the Health District resident offenders (RO), with the weights corresponding to the number of offenders, averages to $7,520.33 per offender, per year. Because the number of people with behavioral health problems impinging on the jail appears to have steadily increased over the three-year period studied, it is highly likely that, without a system-level intervention among all potential collaborators from criminal justice, law enforcement, and behavioral health systems, the future costs will be even higher.

*Law Enforcement Costs*

We estimated the average monetary cost of police time per year per member of the jail high utilizer base group.[[2]](#footnote-2) We calculated the average cost per base group member separately for the 2012 and 2013 groups, using all 71 base group members from 2012 and 90 base group members from 2013. The average cost for each base group member in the year with four or more jail bookings is very similar: $1,158.00 for the 2012 group versus $1,212.00 for the 2013 group.

While the monetary cost associated with law enforcement contacts is not extremely high, law enforcement key informants who were interviewed for this study indicated that the number of incidents associated with behavioral health problems that they have to respond to represent a significant drain on time and energy. There is a certain “hassle factor” that does not figure in to the monetary costs but yet is very significant in the minds of law enforcement staff.

*Emergency Department Utilization and Costs*

In examining our sample’s emergency department (ED) visits in the county between September 2013 and August 2014, by patient and payer we were able to obtain data indicating at least 36 individuals had ED visits during that time period. Some people had an extremely high number of ED visits, with a high of 104, one person with 54, and three with nearly 20 visits in a year

Of the 406 total visits in our sample during the time period under study, 224 (55.0%) were listed with Colorado Medicaid as the payer. The figure below displays the ED visits per month broken out by Medicaid and all other payers. It is clear from the trend lines that non-Medicaid payers were responsible for the majority of ED visits at the beginning of the time period, but with the expansion of Medicaid starting January 1, 2014, Medicaid covered the majority of ED visits.

Number of ED Visits by Payer and Month, September 2013 to August 2014

Below is a summary of the adjusted emergency department utilization and costs. (An explanation of our adjustment methodology can be found in the Technical Report section.) As the table shows, the estimated annual per person cost associated with ED use among the 155 jail high utilizers residing in the Health District was just under $1,000. When the analysis is restricted to individuals that actually used the ED, the estimated average per person cost associated with ED use was $3,133.

Adjusted ED Utilization and Costs, Incorporating Non-Medicaid Payers

|  |  |
| --- | --- |
| 48.0 | Users of the ED After Adjustments |
| 366.0 | Annual ED Visits After Adjustments |
| 7.63 | Average Annual Visits per ED User |
| $150,202.00 | Annual ED Costs After Adjustments |
| $3,132.94 | Annual ED Costs *Per 48 ED Users* |
| **$969.05** | **Annual ED Costs *Per 155 Jail High Utilizers*** |

*Inpatient Utilization Costs*

We also estimated the annual costs associated with our sample’s inpatient (IP) utilization in the county. As the table below shows, the estimated average annual per person adjusted cost (again, see our methodology in the Technical Report section below) was $2,547, across all 155 jail high utilizers. When only those with IP utilization are included in the analysis, the estimated average annual cost per person was $20,269.

Adjusted Inpatient Stays and Costs, Based on Medicaid Data

|  |  |
| --- | --- |
| 19.0 | Users of IP Services After Adjustments |
| 29.0 | Annual Episodes After Adjustments |
| 1.47 | Average Annual Episode per IP User |
| $394,784.00 | Annual IP Costs After Adjustments |
| $20,269.46 | Annual IP Costs *Per 19 IP Users* |
| **$2,547.00** | **Annual IP Costs *Per 155 Jail High Utilizers*** |

*All Costs Combined*

We estimated the combined costs of all utilization for our sample of 155 jail high utilizers who resided in the Health District, and compared them to all other Larimer County Medicaid patients.[[3]](#footnote-3) Over a 16-month period, the jail high utilizer sample had 169% higher costs than other Larimer County Medicaid patients. The table which begins on the next page provides a detailed summary.

Comparison of Jail High Utilizers with All Larimer County Medicaid Patients

| **Dates Covered:** | **3/1/13-6/30/14**  **(16 Months)** | **5/1/13-8/1/14**  **(14 Months)** |
| --- | --- | --- |
| **Category** | **Average 16 Month Cost for Enrolled Members of Base Group** | **Average 14 Month Costs for All Larimer County Medicaid Patients** |
| Emergency Hospital | $1,207.00 | $217.00 |
| Inpatient Hospital | $3,173.00 | $376.00 |
| Outpatient Hospital | $1,686.00 | $526.00 |
| Pharmacy | $944.00 | $616.00 |
| Physician – Primary Care | $179.00 | $88.00 |
| Physician – Specialist Care | $867.00 | $532.00 |
| Other | $476.00 | $811.00 |
| **Total** | **$8,532.00** | **$3,166.00** |
| Sum of Emergency & Inpatient Hospital Average Costs | $4,380.00 | $593.00 |
| Number of Individuals in Group | 65 | 38,307 |
| Average Number of ED Visits | 2.94 | 0.48 |
| Average Number of IP Admits | 0.23 | 0.04 |

Given that there was missing data across agencies and systems, we used available data to estimate, through the use of simulations, the total amount of utilization and costs incurred in our jail high utilizer sample. First, we used simulations to estimate annual per person costs for the entire jail sample. As the figure below reveals, this resulted in a mean (average) per person estimate of approximately $12,300.

We also examined sub-samples of the larger jail high utilizers group of 155 people. The distribution in the figure below indicates the range of possible annual per person costs across all systems for jail high utilizers *with mental illnesses*. As can be seen in the figure, the average annual per person cost is just under $14,000.

When the analysis is limited to *people who used the emergency department*, regardless of behavioral health status, the estimated average cost is considerably higher – just under $19,000 per person.

The data indicated that, if an effort to reduce utilization and costs of the very highest utilizers first focused on jail high utilizers who also have used the ED at least once per year – an estimated 48 people residing in the Health District, per year – the potential cost savings could be significant. This could be especially true if current resources (e.g., ACT, IDDT teams) were to be directed to this priority population, or if collaborative efforts to identify and support the transition of this priority sub-group to community-based services were developed by jail, ED, and community-based behavioral health providers. Please see further comments in the Recommendations section below.

*Finding #4: Homelessness and unemployment were prevalent in the sample of people who frequently were held at the jail.*

Data from the jail indicated that over half of our high utilizer sample was unemployed and nearly one in four were homeless. For our base group, we had two independent sources of information on homelessness. First, the jail data set included a variable indicating if, at the time of booking, the individual possessed housing or was homeless. Thirty-five out of the 155 individuals (23.0%) were listed as homeless, with two missing homelessness data. (For reasons we state in the Technical Report section below, this 23% indicates a lower bound to estimates of the percentage in the sample that has ever experienced homelessness.) Of those listed as employed, nine out of 69 (13.0%) were homeless. Of those listed as unemployed – 84 or over half of the sample – 30.0% of them (n=25) were identified as being homeless.

However, only a small percentage of those identified at the jail as homeless were in the Homeward 2020 data set, indicating that developing programmatic solutions to homelessness based solely on the needs of people who frequently use the jail will not be sufficient.

*Finding #5: The average number of days served in jail was high, as was the number of contacts with police.*

The inclusion criterion for the study guaranteed that the sample would have a high number of visits to the jail. However, the average length of stay in jail (86 days) also was long, with many persons staying longer than six months. The length of stay further suggests the potential benefit of a strengthened diversion program. That is, not only does this sample represent a burden to the criminal justice system because of its frequent return visits to the jail, but it also spends a lot of time in the jail, taking up bed space and staff time. Successful attention to behavioral health problems, bolstered by effective interventions to address criminogenic issues (i.e., factors most strongly associated with reoffending), could significantly reduce demands on the detention center and allow it to expend more effort on criminal conduct that is unrelated to behavioral health problems.

Number of Days in Jail among Frequent Users

The Fort Collins Police Department reviewed their incident logs from 2010 to 2014 and extracted data on police responses involving the targeted 155 individuals, including data on time officers spent responding to each call. Given the frequency of bookings into the county jail, it is not surprising that the base jail group also included high utilizers of police resources.

The table below lists the number of individuals with Fort Collins police contact from each base group, with the six individuals who are in both base groups excluded and listed separately.

Individuals with Police Contact by Year and Group

| **Count of Individuals with Police Contact by Year of Contact and Base Group** | | | | |
| --- | --- | --- | --- | --- |
| **Year** | **2012 Base Group (71)** | **2013 Base Group (90)** | **Individuals in Both Base Groups** | **Total** |
| **2010** | 40 | 42 | 3 | 85 |
| **2011** | 56 | 35 | 5 | 96 |
| **2012** | 64 | 60 | 6 | 130 |
| **2013** | 48 | 82 | 6 | 136 |
| **2014** | 11 | 35 | 3 | 49 |

Reports of the number of incidents (instead of individuals) can be found in the table below, which shows that, in both 2012 and 2013, there were seven incidents of police contact per person among all unduplicated individuals included in the study – among all those who met the criteria for high utilization in either 2012 or 2013 (or both).[[4]](#footnote-4)

**Incidents of Police Contact by Year and Group**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Count of Incidents by Year of Incident and Base Group** | | | | | |
| **Year** | **2012 Base Group** | **2013 Base Group** | **Individuals in Both Base Groups** | **Total** | **Average per Person[[5]](#footnote-5)** |
| **2010** | 157 | 144 | 14 | 315 | 2.0 |
| **2011** | 273 | 142 | 45 | 460 | 3.0 |
| **2012** | 664 | 277 | 93 | 1034 | 6.7 |
| **2013** | 249 | 738 | 94 | 1081 | 7.0 |

In examining data in the table above, it is interesting to focus on the 2012 base group, because we also have data for them in the subsequent year (2013): Among the 71 Health District-residing individuals who were high utilizers in 2012, there were 757 police contact incidents in that same year (664 + 93), or 10.7 incidents per person.[[6]](#footnote-6) In 2013, that same 2012 base group of 71 persons had 343 incidents (249+94), or 4.8 per person. While the 343 incidents in 2013 represent a significant decrease of more than half from 2012, and while the decrease *might* indicate some people were helped to avoid excessive law enforcement and criminal justice system involvement in 2013, it also indicates that many high utilizers in 2012 were not successfully helped to avoid such involvement in 2013.

Recommendations

TriWest’s recommendations for enhancing behavioral health services to better meet the needs of high utilizers in Northern Larimer County are organized by the numbered findings reported above.

*Recommendation #1a: Increase the system’s capacity for data sharing through the use of Business Associate Agreements and Organized Health Care Arrangements.*

The perceived prohibitions for health-related data sharing can be addressed through the development of Business Associate Agreements and Organized Health Care Arrangements. Attorneys with whom the Health District has consulted in the past are familiar with these tools for data sharing and should be considered as resources for engaging provider and system partners in a review of the available options and implementation of the most appropriate and powerful tools that will both protect individuals’ privacy rights and allow for better system collaboration.

Increased, systematic implementation of patient consent may also need to be considered in order to comply with 42 CFR Part 2 regulations in Colorado related to the sharing of substance use disorder-related information.

*Recommendation #1b: Utilize shared information to identify frequent utilizers with the greatest need for intervention, select those interventions, help guide the implementation of interventions, and monitor the number of frequent utilizers in the system, as well as their service utilization and associated costs over time****.***

Consider expanding upon the existing Interagency Group’s purpose, scope, and abilities to create specific and formal community care coordination activities driven by the application of shared data collection on frequent utilizers.

**Collaborating agencies in Larimer County must utilize the best of available contemporary tools for overcoming the barriers to data sharing. These include, for example, Business Associate Agreements and Organized Health Care Arrangements, as well as concerted efforts to obtain patient consent for the sharing of health data.**

*Recommendation #2: Work with system partners to assess the current county resources for providing substance use disorder treatment and integrated co-occurring services, and consider bolstering evidence-based, intensive, and integrated community-based treatment programs.*

People with substance use disorders who spend significant time in jail often inadvertently begin to reduce their use of harmful substances, because those substances are often less available. When they leave the jail, there is a propitious opportunity for them to engage in substance use disorder (SUD) treatment, including medically assisted maintenance treatment, to capitalize on their diminished substance use. Intensive transition services, such as Critical Time Intervention, or community outreach from intensive programs, such as Assertive Community Treatment, should make it a priority to connect people to SUD treatment and co-occurring disorders treatment.

The assessment of current resources should focus on identifying the extent to which intensive case management and intensive outpatient SUD treatment are available for persons with substance use disorders and who are at risk for or already have a history of involvement with the criminal justice system. To the degree that these behavioral health services are available, providers’ current involvement in working with law enforcement and criminal justice system personnel should be ascertained. In addition, the availability of intensive, community-based co-occurring mental health / substance use disorder treatment services should be assessed.

Larimer County currently has a small evidence-based Integrated Dual Disorders Treatment (IDDT) team, which is much like an Assertive Community Treatment team but more intensively focused on SUD treatment needs and includes the provision of a continuum of SUD treatment services that are integrated with treatment for mental illness. An ACT Team was added in early 2014, and these teams now work side by side. Reports from key informants in Larimer County indicate that, like similar teams nationwide, neither of these teams has been able to implement all aspects of full fidelity to their model, and both are limited in the number of individuals they can serve.

Expansion of the fidelity and capacity of these programs could be indicated. The extent to which this option should be pursued will be somewhat dependent on the degree to which overlapping services, which could perhaps be expanded to meet the needs of frequent users of the jail, already exist in the county. The fact that over half of the jail sample was assessed by jail staff to have both mental illness and substance use disorders, and given that among those with mental illness, nearly all had co-occurring substance use disorders, expansion or intensification of the existing IDDT team could be a core component of a system solution to meeting the needs of high utilizers in northern Larimer County.

Given that the recommended focused studies of current resources have not yet been completed, and given that our knowledge of currently existing intensive, integrated community services in Larimer County is limited, we must emphasize that our recommendations should be considered preliminary. However, our tentative specific recommendation is to add or expand three evidence-based programs to the continuum of care in the county. We have listed them in order of our tentative estimate of their importance. *However, it should be noted that if expanded or redirected services focusing on jail high utilizers are to be effective, they must also adequately assess and respond with appropriate treatment to their criminogenic issues.*

* An Integrated Dual Disorders Treatment (IDDT) team that is fidelity-based and led by a multi-disciplinary team, including a Team Leader, Case Manager(s), Nurse, Psychiatrist, Mental Health Therapist, Substance Abuse Counselor, Criminal Justice Specialist, Supported Employment Specialist, Housing Specialist, and Peer Specialist. The typical staff to client ratio is approximately 1:10 or even 1:8. An IDDT team is well-equipped to provide stage-of-change based interventions, motivational interviewing, harm reduction approaches, and mental illness treatment that is integrated with substance use disorder treatment and counseling. Like Assertive Community Treatment, IDDT staff provide outreach, case management, and recovery-oriented employment and peer-led interventions.
* An Intensive Outpatient Program (IOP) for people with substance use disorders, but not serious mental illness, staffed by counselors and other providers who are trained in responding to the needs of justice-involved clients, and who are prepared to engage in outreach (for example, to the detention center) and case management. If an IOP already exists in the county, the focus could be on retooling this program, if necessary, to focus on the justice-involved population. Alternatively, the IOP might need to be expanded to meet more of the need, either through increasing staff and/or increasing the outreach, case management, and criminal justice liaison components of the program.
* Implementation of an evidence-based Critical Time Intervention program to serve people with behavioral health conditions who are not eligible for, or currently served by, the recommended IDDT team or other, currently-existing evidence-based intensive community programs that already have staff to serve clients who end up in the adult detention center, come to the attention of law enforcement, or utilize emergency rooms and hospitals.

Regardless of which providers implement these programs, system leaders should ensure that they are sufficiently trained in the evidence-based models, that they collect and track data on utilization and outcomes, and that they coordinate their efforts through regular meetings, perhaps hosted under the auspices of the MACC and/or the Health District.

**In particular, it will be important that there is an appropriate, timely flow of individuals through the IDDT and IOP programs so that these expensive resources are sufficiently capable of responding to the full need for intensive community-based programming among frequent users of the jail and other restrictive and expensive community institutions and agencies**. The best fidelity model for ACT, for example, specifies that the program efficiently transfers people to lower levels of care when they are ready. The very same methods can be applied to IDDT without difficulty. The processes for accomplishing this are not mysterious and teams can readily learn them, especially if they understand and believe in recovery from mental illness and substance use disorders.

**In particular, it will be important that there is appropriate, timely flow of individuals through the IDDT and IOP programs so that these expensive resources are sufficiently capable of responding to the full need for intensive community-based programming among frequent users of the jail and other restrictive and expensive community institutions and agencies**.

*Recommendation #3: Use this study’s estimates of the cost or burden of inadequately treated behavioral health disorders to obtain funding support for recommended evidence-based community programs.*

Implementation of evidence-based, intensive community-based treatment is expensive. However, the potential for pooling of funding, perhaps made more likely through the existence of the Mental Health and Substance Abuse Partnership, the MACC, and the Interagency Group, is significant in Larimer County. And, of course, the possibility of utilizing Pay for Success measures such as social impact bonds could provide additional funding support as well.

Efforts to obtain funding could be supported by our analysis of costs. While the annual cost per person in implementing an ACT or IDDT team is approximately $14,000 (depending on local salary dynamics and other factors), the annual per person costs associated with our sample’s use of the jail, with emergency department visits and inpatient admissions, also was high. It was conservatively estimated to be between $10,300.00 and $14,500.00, with the most likely estimate at $12,300.00. For people with mental illnesses, the estimated average per person costs of incarceration was even higher – about $14,000.00. However, this estimate is somewhat constrained by missing data and by the fact that people with mental health problems tend to have longer lengths of stay in jail (and our jail costs estimates are diluted by the presence of people without mental health or other behavioral health problems).

If sub-groups of the jail high user population (e.g., those who also have either emergency room use or inpatient use) are examined, then the average annual cost associated with jail and either emergency department or inpatient use (or both) is estimated to exceed the annual per person cost of an ACT team.

The number of people who are high utilizers of jail and/or other systems, whose annual costs exceed those of an IDDT team and who are not already being served by an intensive community-based program, may not reach the typical number of people served by an ACT or IDDT team (100). Therefore, we recommend that the IDDT team drawn not only on high utilizers identified at the jail (which will be able to provide a large portion of the clients needed to fill an IDDT team), but also on those identified through analyses of the highest utilizers of emergency department and inpatient settings, not unlike the analyses we conducted for this study. For this reason, it is critical that data from both law enforcement and crisis medical providers be available for use in the selection of participants.

For the program to be cost-effective, the highest utilizers, with the highest costs, need to be identified and enrolled in the ACT or IDDT team. Once that is accomplished, annual fidelity assessments should be conducted to ensure the team has not “drifted” from its mandates both to enroll the highest utilizers and to ensure a steady, appropriate flow of people through the team and into lower levels of care, once they have achieved significant recovery from their co-occurring conditions. Ongoing data collection on service utilization levels and associated costs should be maintained in order to determine associated impacts on system costs.

Finally, another potentially important cost-effective approach to serving high utilizers is to identify those with high physical health care costs and direct them into a behavioral health (BH) home, which should include care coordination, disease management, and wellness interventions. When they focus on high utilizers, BH homes (which can be housed with an ACT team) have the potential to yield reasonably quick reductions in overall health care costs, in addition to increasing health and wellness in those they serve.

**It is imperative that system partners, perhaps led by the Health District, develop ongoing methods for identifying the highest utilizers of restrictive, high-cost settings, so that the cost-effectiveness of any intensive, integrated community programming can be maximized as well as examined over time.**

*Recommendation #4: Work with system partners to ensure that any efforts to enhance treatment services incorporate either close coordination with vocational rehabilitation and housing programs, and/or include vocational and housing specialists on the treatment teams implemented.*

While inadequately treated substance use disorders and mental illness may be associated with detention center recidivism, it is quite possible that functional problems in the areas of employment and housing also are putting people at risk for repeated jail use. Any intensive teams that the county decides to implement or expand in order to meet the needs of this population should include housing and employment specialists. Evidence-based ACT and IDDT models assume employment specialists will be integral members of their teams, and many IDDT and ACT teams also include a housing specialist. However, not all IDDT and ACT programs implement full fidelity in these areas. The existing IDDT and/or ACT programs in Larimer County should consider whether they have sufficient levels of these services to meet full fidelity and be successful in impacting functional limitations of their clients.

However, these team members cannot be successful without other resources available in the environment. For example, the efforts of housing specialists are limited in the absence of an active Housing First/Permanent Supportive Housing (PSH) program. Communities that embrace Housing First and PSH models ensure that “wet housing” and “damp housing” options are available to people, and they make rental assistance available to those in need. Similarly, successful Supported Employment programs, like the one at the Mental Health Center of Denver, as well as successful employment specialists on ACT teams, often draw on the resources available through a business advisory group that makes competitive employment positions available to people with mental illnesses and that, in turn, benefits from the availability of a steady employment pool that tends to have lower turnover than younger people who typically obtain these entry-level employment positions .

The combination of comprehensive housing and employment supports, along with funding and/or collaborative relationships dedicated to ensure adequate housing units and employment slots are available, will go a long way toward reducing risk for re-entry into the jail among people with mental illness and substance use disorders, especially if their behavioral health and criminogenic needs are also thoroughly addressed.

***Recommendation #5: Work with system partners to implement universal screening for behavioral health problems and conduct a flow study to find sub-groups of people who could be included in diversion programs but are currently being overlooked****.*

Larimer County already has drug and mental health courts, and the possibilities for expanding diversion could be explored further.

We recommend that system partners consider the possibilities for implementing universal pretrial screening. This is a best practice that currently is being implemented in Bexar County (San Antonio) Texas by the Justice Center of the Council on State Governments and the Meadows Mental Health Policy Institute for Texas. Behavioral health screening tools and reliable and valid instruments that assess the degree of criminogenic risk are available as resources for Larimer County. The latter instruments decrease the amount of error in determinations concerning who is and who is not high risk for release through diversion programs. They also tend to reduce the number and percentage of people with mental illness who are deemed by adult detention center staff and judges to be too high risk for diversion.

# Larimer County High Utilizers Study: Technical Report

# II. Technical Report Introduction and Overview

The Community Mental Health and Substance Abuse (MHSA) Partnership, consisting of Larimer County healthcare, human services, justice and law enforcement, city, county, school systems and consumer leaders and representatives, has been working collaboratively to create improvements in the system of care for people with mental health and substance use disorders in Larimer County.

Over the years, interest among partners has grown concerning the needs, patterns of use, and challenges of the most frequent utilizers of acute and crisis services in the community. Various initiatives have worked to address aspects of these individuals’ needs, including the Interagency Group, which coordinates efforts between law enforcement agencies and a variety of other system partners, and the Medicaid Accountable Care Collaborative (MACC), which seeks – among many goals – to reduce potentially preventable utilization of high-cost health care services, such as emergency rooms, by coordinating the care of certain health care consumers enrolled in Medicaid.

A sub-group of the MHSA Partnership consisting of behavioral healthcare, criminal justice, and housing leaders recently has come together to identify ways of responding to the needs of people with serious mental health and substance use problems who frequent the county’s jail, emergency rooms, and other restrictive and high-cost settings, and to develop means of using data to create a more coordinated and effective system of care.

One of the potential opportunities identified by this group to support system-level changes (such as more widespread implementation of intensive evidence-based practices) that would address the needs of this population included the use of social impact bonds and other “Pay for Success” solutions. These approaches seek to support the creation of cost savings within a system or community through implementation of best practice interventions. However, in order to successfully consider Pay for Success opportunities, more understanding of the actual levels and associated costs of service utilization by frequent utilizers became necessary.

In support of these efforts, the Health District of Northern Larimer County (the Health District) asked TriWest Group (TriWest) to conduct a study of high utilizers of acute and crisis services in northern Larimer County. The requested study would include development of a database of frequent users of acute services and criminal justice systems, and analysis of their utilization of services and the associated costs of that utilization.

In the summer and fall of 2014, TriWest worked with law enforcement and criminal justice agencies, behavioral health providers, healthcare providers, and agencies serving people experiencing homelessness to gather data on frequent users. TriWest started with a sample of frequent users of the adult detention center, gathered additional data on their use of other systems as well as data on high utilizers of those other systems, examined the overlap in use of systems, and estimated the associated costs.

In the pages that follow, TriWest describes this study’s methodology and results. While data were not always available for certain types of utilization in particular settings, TriWest was able to develop simulation models of utilization and costs that provide various estimates that should be useful for system analysis and planning.

# III. Base Group and the Cost of Jails Services

The Larimer County Detention Center provided us with a data set of all individuals with four or more bookings in calendar year 2013, which corresponds to our definition of “high utilizers” of county jail resources. This criterion yielded data for 125 individuals. Because we had a target group of approximately 200, we requested data for individuals with four or more bookings in 2012. This second data set contained 109 individuals. With eleven individuals overlapping between the two years, the total for the data set was 223 individuals.

A number of individuals were not residents of the Health District of Northern Larimer County. Because we were concerned that these individuals would receive most of their services from Loveland, which is out of the district, we elected to drop all individuals with a residence outside of the district’s boundaries. A small number of individuals for whom no residence was provided were included in the data set. The resulting data set included 71 individuals from 2012, 90 individuals from 2013, and six who overlapped the two years, for a total of 155 unique individuals. We focused our analysis on the 155 individuals who either did not have a residence listed or resided within the boundaries of the Health District, and refer to this as our “base group.” Some of the statistics provided by the county correspond to the broader group of 223 individuals, however.

Data and information on the individuals in our sample was available for the following variables:

* Name
* Date of birth
* Gender
* Race
* Ethnicity
* Years of school completed
* Employment status
* Housing status
* Booking number
* Booking date
* Release date
* Days in jail
* Charge

The data set included one record per charge, but multiple charges per booking were often recorded. Because it was important to maintain confidentiality concerning individual’s mental health and substance use disorder diagnoses, we did not receive this type of health information at the individual level. However, we were provided important mental health and substance abuse (MH/SA) summary statistics in the form of a June 2, 2014 report, “Repeating Offenders in Larimer County: Prevalence of Mental Illness & Substance Abuse Issues,” authored by Derik Stalls, a Senior Business Analyst at the Criminal Justice Services Division (CJSD). Note that these summary statistics include all high utilizers, not just those residing within the Health District.

Table Five of the Stalls’ report, copied directly from that report, provides the following summary data on diagnosis of mental illness (MI), substance abuse (SA), or dual diagnosis MI/SA (DD) by year for inmates with four or more bookings in that year.

Diagnostic Categories of Frequent Jail Users (CJSD Report)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **MI** | **SA** | **DD** | **Total** |
| **2011** | 28 (43.8%) | 51 (79.7%) | 26 (40.6%) | 64 |
| **2012** | 57 (52.3%) | 96 (88.1%) | 52 (47.7%) | 109 |
| **2013** | 72 (57.6%) | 114 (91.2%) | 70 (56.0%) | 125 |

Note that for both 2012 and 2013, approximately ninety percent of the high utilizers were diagnosed with a substance abuse history. Also note that the vast majority of inmates with a mental illness diagnosis are categorized as having a dual diagnosis, which indicates that they also have a substance abuse history. The trend in these variables, both in terms of absolute numbers and percentages, is important. The number of jail high utilizers increased over the three-year period, as did the absolute number of jail high utilizers with mental illness, substance abuse, or dual diagnosis. But the increase in individuals with MI/SA/DD was not proportionate; all three made up increasing percentages of the total.

The proportion of high utilizers with mental illness and/or substance abuse disorders will play an important role in subsequent sections of this report. We use the minimum and maximum values from Table Five (above) as our minimum and maximum when conducting sensitivity analysis. Because they appear to be trending upward, we use the maximum as our modal value. This remains a conservative estimate; if the trend continues, the actual 2014 and 2015 values are likely to exceed those of 2013.

Table Six of the Stalls’ report, which is reproduced below, provides information on the range and frequency of mental health diagnoses. “Co-morbid” refers to two or more mental health (not substance abuse) conditions; “RO” referred to in the far right column header is the repeat offender group we reference as high utilizers.

Specific Diagnoses of Frequent Jail Users (CJSD Report)

| **Year** | **2011**  **(n=28)** | **2012**  **(n=57)** | **2013**  **(n=72)** | **2013**  **(% of MI)** | **2013**  **(% RO)** |
| --- | --- | --- | --- | --- | --- |
| **Anxiety** | 1 | 7 | 5 | 6.90% | 4.00% |
| **Bipolar** | 6 | 3 | 6 | 8.30% | 4.80% |
| **Co-morbid** | 18 | 32 | 51 | 70.8% | 40.8% |
| **Depression** | 1 | 10 | 6 | 8.30% | 4.80% |
| **Other** | 0 | 1 | 2 | 2.80% | 1.60% |
| **Personality Disorder** | 0 | 0 | 1 | 1.40% | 0.80% |
| **PTSD** | 1 | 2 | 0 | 0% | 0% |
| **Schizophrenia** | 1 | 2 | 1 | 1.40% | 0.80% |
| **None** | 29 | 49 | 48 | NA | 38.4% |
| **Not Assessed** | 7 | 3 | 5 | NA | 4.00% |

In addition to the mental illness and substance abuse characteristics of this population, the raw data provided by the detention center included variables allowing us to describe other important characteristics of the group. Seventy-six percent of the individuals were male, 97.0% were Caucasian, and 77.0% were non-Hispanic. Fifty-four percent reported that they were unemployed and 23.0% were homeless.

Frequent Jail Users’ Years of Education (CJSD Report)

As can be seen in the figure above, the majority of individuals had 12 or more years of education. This distribution matches approximately the distribution of the U.S. population of males over 18 years of age.

By selection, all individuals had four or more bookings in calendar years 2012 or 2013. The range varied from four to eleven. Sixty-five percent had exactly four, 21.0% had five, 8.0% had six, and 5.0% had seven.

For each booking, multiple charges are possible. The 155 individuals in the sample were charged with 1,765 separate offenses; the most common offenses (more than 20 occurrences) are listed in the table below. The most frequent charges, 16-19-0103 and FTA, are both failure to appear (FTA). When we look at the descriptions that accompany these two charges, we observe multiple variations, only one each of which we included in the table below; the two charges included under “CHG LITERAL” are representative. Other common charges are related to petty crime: theft, disorderly conduct, and drug possession. These charges are consistent with a population with high levels of substance use disorders and mental illness.

Frequency of Charges Among Frequent Users of the Jail

| **CHARGE** | **CHG LITERAL** | **Count** |
| --- | --- | --- |
| 16-19-0103 | PD FORT COLLINS FTC HARASSMENT | 368 |
| FTA | FTA NATURAL AREAS VIOLATION | 237 |
| 18-06-0803.5 | VIOLATION OF A RESTRAINING ORDER | 92 |
| FTC | FTC 3 DEGREE ASSAULT | 78 |
| 18-06-0801 | DOMESTIC VIOLENCE ENHANCEMENT | 76 |
| 42-02-0138 | DROVE SUSP/REVOKED/DENIED/CANCELLED | 67 |
| 18-04-0401 | THEFT | 66 |
| 18-18-0403.5 | UNLAW POSS CONTROLLED SUBSTANCE | 66 |
| 18-08-0212 | VIOLATION OF BAIL BOND CONDITIONS | 54 |
| 18-18-0428 | DRUG PARAPH POSS | 42 |
| 18-03-0204 | 3 DEG ASSAULT | 41 |
| 18-09-0111 | HARASSMENT | 41 |
| 42-04-1409 | COMPULSORY INSURANCE VIOLATION | 33 |
| 42-04-1301 | DUI/DWAI-ALCOHOL OR DRUGS | 31 |
| 18-04-0501 | CRIMINAL MISCHIEF | 30 |
| 18-08-0103 | RESISTING ARREST | 30 |
| 18-18-0405 | CONTROL SUBS DIST/MANU/POSS W/INTEN | 23 |

Number of Days in Jail among Frequent Users

The distribution of the number of days served in jail for the combined 2012/13 high utilizer group with residence within the Health District is displayed in the figure above. The mean number of days served is 86, with a standard deviation of 92.

Returning to the full group of jail high utilizers (not just those with residence in the Health District), and drawing again from the CJSD 2014 report (Table Four from that report; reproduced below), we found that the high utilizer group incurred a total jail cost of $1.72 million during 2012/13.

Jail Costs Incurred (from CJSD Report)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **# RO** | **Bookings** | **Jail Beds**  **(Days)** | **Total Cost** | **Days per Offender** | **Cost per Offender** |
| **2011** | 64 | 287 | 5,995 | $ 525,701.55 | 93.67 | $ 8,214.09 |
| **2012** | 109 | 511 | 8,936 | $ 783,597.84 | 81.98 | $ 7,188.23 |
| **2013** | 125 | 569 | 10,751 | $ 942,755.19 | 86.01 | $ 7,542.04 |

For the specific 155 individuals with residence within the district (including those in both years), the 2012/13 combined results are provided in the table below.

Jail Costs Incurred by High Utilizers Residing in the Health District

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **# RO** | **Bookings** | **Jail Beds**  **(Days)** | **Total Costs** | **Days per Offender** | **Cost per Offender** |
| **2012** | 71 | 339.0 | 5,961 | $522,660.00 | 84.0 | $7,361.42 |
| **2013** | 90 | 406.0 | 7,848 | $688,113.00 | 87.2 | $7,645.70 |

The data provided in the two preceding tables (three years of data for all high utilizers and two years of data for high utilizers residing in the Health District) provide five estimates of the average jail cost per year, per high utilizer. A weighted average of the Health District resident offenders, with the weights corresponding to the number of offenders, averages to $7,520.33 per offender, per year. Later in the report, when we estimate the average total cost per high utilizer, we used $7,520.33 as the modal value, $7,188.23 as the minimum value, and $8,214.09 as the maximum value.

It is important to note that these figures are likely to underestimate the costs per offender with mental illness. In a detailed 2005 study of jail records from Harris County, Texas, Dr. Tuan D. Nguyen concluded that regular offenders (those without a mental health diagnosis) experienced an average sentence per jail episode of 28.75 days, while offenders with a mental health diagnosis experienced 40.73 days per episode, which is 42% longer.[[7]](#footnote-7) Since the cost per offender results reported above included a mix of 52.68% inmates with mental health diagnosis, an average involving only inmates with mental illness would likely be higher.

For purposes of sensitivity analysis, we assumed for both minimum and modal values that the average costs do not need to be inflated to make up an “all mental health” cohort. However, for the maximum value we inflated these costs by 1.16. This represents the assumption that the above costs per offender were calculated based on 52.68% of the individuals with mental illness, and that offenders with mental illness received 42% longer sentences.

While we know the number of jail high utilizers residing within the Health District for both 2012 and 2013, we must estimate the number in any future year. It is apparent that the number has increased in recent years, as has the proportion of jail high utilizers with mental illness. In order to estimate the number for future years, we assumed a minimum value of 71 and a maximum and modal value of 90. Given the large increase per year in 2011-2013, these assumptions are likely conservative.

Utilization Data from Other Systems

Using the data set from the jail as a starting point, TriWest requested data from a number of other systems, including behavioral health providers. In our data request we included the name, date of birth, gender, and race/ethnicity for each member of high jail utilizer group. This enabled us to match our jail sample with data from other systems and among behavioral health providers (only at the group level in some cases). As the figure below shows, we were often able to obtain multiple years’ worth of data from various sources.

**Years for Which Data Were Obtained from Other Systems and Provider Agencies**

# IV. Police Encounters

Given the frequency of bookings into the county jail, it is not surprising that the base jail group also included high utilizers of police resources. The Fort Collins Police Department reviewed their incident logs from 2010 to 2014 and extracted data on police responses involving the targeted 155 individuals, including data on time officers spent responding to each call. Using this data and the average hourly wage of patrol officers, we were able to estimate the average cost per year in police costs of a base group member. In interpreting this data, it is important to note that the jail is a county resource, while police contacts are a city resource only from Fort Collins. Law enforcement contacts by the county sheriff’s department or other police forces within the county were not included.

The Fort Collins police data was our only data set that allowed us to track, by name, the use of crisis resources by specific individuals over an extended time period. Analysis of the use of police resources suggested that personal crises resulting in four or more arrests in 2012 (or 2013) also led to high utilization of crisis resources in previous and subsequent years. It would be appropriate to describe this group as having a persistent condition. This is important, for some of our other data sets covered somewhat different time periods from calendar year 2012 or 2013, and if the use of crisis resources was dramatically different in the year before and after the year with four or more bookings, our application of these other data sets might be problematic.

The table below lists the number of individuals with Fort Collins police contact from each base group, with the six individuals who are in both base groups excluded and listed separately. The 2012 base group was composed of 71 individuals in total, 65 exclusively to the 2012 group. The 2013 base group had 90 individuals in total, 84 exclusive to the 2013 group. The total number of individuals for each group with police contact in any given year is the sum of the individuals unique to a base group and the individuals in both base groups. For example, in 2012, 64 plus six of the 2012 base group members have police contact; that is 70 of the 71 base group members from 2012.

Not surprisingly, the 2012 base group had the most police contact in 2012, with slightly lower contacts in the year before and after. The 2014 data covered only three months (through March); projected annually, the 2013 group would have had the most contacts in 2014.

Individuals with Police Contact by Year and Group

| **Count of Individuals with Police Contact by Year of Contact and Base Group** | | | | |
| --- | --- | --- | --- | --- |
| **Year** | **2012 Base Group (71)** | **2013 Base Group (90)** | **Individuals in Both Base Groups** | **Total** |
| **2010** | 40 | 42 | 3 | 85 |
| **2011** | 56 | 35 | 5 | 96 |
| **2012** | 64 | 60 | 6 | 130 |
| **2013** | 48 | 82 | 6 | 136 |
| **2014** | 11 | 35 | 3 | 49 |

Given the high utilization of police resources in the years before and after having four or more jail bookings, we would anticipate that other crisis services, such as emergency department (ED) usage, would follow a similar pattern. It is apparent that these individuals are *not* short-term residents of the community using resources in one year only.

Reports of the number of incidents (instead of individuals) can be found in the table below. Once again, each base group had the most incidents in the year in which they had four or more arrests, with high numbers of incidents (for the 2012 group) in the year before and after.

**Incidents of Police Contact by Year and Group**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Count of Incidents by Year of Incident and Base Group** | | | | |
| **Year** | **2012 Base Group** | **2013 Base Group** | **Individuals in Both Base Groups** | **Total** |
| **2010** | 157 | 144 | 14 | 315 |
| **2011** | 273 | 142 | 45 | 460 |
| **2012** | 664 | 277 | 93 | 1034 |
| **2013** | 249 | 738 | 94 | 1081 |
| **2014** | 20 | 77 | 10 | 107 |

The table below provides the costs associated with the incidents summarized above. The original data included a field listing the total police time spent on each incident. Using the average police wage of $47.00 per hour, we calculated the total expenditure on police services for each base group. The hourly wage did not include overtime compensation, which probably occurred in many of these cases. Our estimates were therefore biased downward. We also do not know that the base group members were the cause of each incident; they could have been victims and would still have been mentioned in the incident database. However, more active case management has the potential of reducing incidents in which the individual is either the perpetrator or the victim of a crime, and it is therefore reasonable to include such costs.

**Cost of Police Contact by Year and Group**

| **Costs (Dollars) in Police Time by Year of Incident and Base Group** | | | | |
| --- | --- | --- | --- | --- |
| **Year** | **2012 Base Group** | **2013 Base Group** | **Individuals in Both Base Groups** | **Total** |
| **2010** | $10,148.00 | $12,924.00 | $393.00 | $23,465.00 |
| **2011** | $26,074.00 | $12,785.00 | $1,826.00 | $40,685.00 |
| **2012** | $78,259.00 | $31,349.00 | $3,925.00 | $113,533.00 |
| **2013** | $39,723.00 | $101,924.00 | $7,122.00 | $148,769.00 |
| **2014** | $1,677.00 | $4,478.00 | $480.00 | $6,635.00 |

We were also interested in estimating the average cost of police time per year per member of the jail high utilizer base group. We calculated the average cost per base group member separately for the 2012 and 2013 groups, using all 71 base group members from 2012 and 90 base group members from 2013. In calculating these average cost per person measures, we divided by all members of the base group in each year – not just by those that had police contact. For example, if we take all of the expenditures in 2010 by the 2012 base group ($10,148.00+$393.00=$10,542.00) and divide by the number of individuals with police contact (40+3=43), the average cost per person with contact is $245.00 per year. In the table below, we report the average cost for all 71 members of the base group, which is $10,542.00 divided by 71, or $148.00 per person per year. Since we only had one quarter of data for 2014, the average costs are based on multiplying the three-month average cost by four.

**Average Cost of Police Contact by Year and Group**

| **Average Cost of Police Time** | | |
| --- | --- | --- |
| **Year** | **2012 Base Group** | **2013 Base Group** |
| **2010** | $148.00 | $148.00 |
| **2011** | $393.00 | $162.00 |
| **2012** | $1,158.00 | $392.00 |
| **2013** | $660.00 | $1,212.00 |
| **2014** | $122.00 | $220.00 |

Note that the average cost for each base group in the year with four or more jail bookings is similar: $1,158.00 versus $1,212.00. The prior year average costs ($393.00 versus $392.00) are also similar.

For our cost simulation later in this report, we pooled the 2012 data for the 2012 high utilizer group with the 2013 data for the 2013 high utilizer group, and calculated the pooled average and standard error of the sample average. In doing so, we included the one 2012 base group member without police contact in 2012 (as $0.00), as well as the two 2013 members who did not have police contact. Calculated in this manner, the pooled average was $1,187.76, with a standard error of the average of $85.92. We then modeled the average cost as normally distributed, with the pooled sample average as the mean and standard error of the average as the standard deviation. It is important to note that this distribution only represents costs to the Fort Collins Police Department and not total police costs within the Health District.

The Fort Collins Police Department provided a separate data set composed of the individuals with the most frequent police involvement. Selection criteria included:

* All dates with police contact going back in time until 1994;
* Involvement includes all types, except: Parent or Guardian and Owner;
* Involvements must be greater than or equal to 30.

These criteria resulted in a by-name list of 103 individuals, with the sample statistics represented in the table below. Twelve individuals overlapped between the police and jail high utilizer groups. This relatively small number suggests that it is possible to have very frequent contact with the police over an extended time, yet not be booked into the county jail four or more times.

Statistics Related to Police Contacts Among Those with Most Frequent Contact

|  |  |
| --- | --- |
| Mean | 42.7 |
| Standard Error | 1.8 |
| Median | 39.0 |
| Mode | 30.0 |
| Standard Deviation | 18.7 |
| Sample Variance | 348.2 |
| Kurtosis | 14.7 |
| Skewness | 3.56 |
| Range | 120.0 |
| Minimum | 30.0 |
| Maximum | 150.0 |
| Sum | 4,402.0 |
| Count | 103.0 |

We also asked for a list of individuals who had contact with the police 20 or more times during the combined years of 2012 and 2013. Our intent was to determine the proportion of such individuals that would be included in the jail high utilizer base group, and also to compare police utilization between these highest utilizers and the jail base group. The following table provides summary statistics for this group. The mean number of police contacts corresponds to more than 15 per year. By way of comparison, the 2012 base group had 758 police contacts in 2012 by 70 individuals, or approximately 11 contacts per year.

Statistics Related to Police Contacts Among Those with 30 or More Contacts

|  |  |
| --- | --- |
| Mean | 30.9 |
| Standard Error | 3.08 |
| Median | 25.5 |
| Mode | 21.0 |
| Standard Deviation | 14.4 |
| Sample Variance | 208.6 |
| Kurtosis | 3.45 |
| Skewness | 1.94 |
| Range | 55.0 |
| Minimum | 20.0 |
| Maximum | 75.0 |
| Sum | 679.0 |
| Count | 22.0 |

Six of these 22 individuals (27.0%) were also jail high utilizers. This suggests that it is possible to be a very high utilizer of police services, yet not have four or more bookings in the county jail.

# V. Emergency Department and Inpatient Hospitalization Use

Given the base group’s high frequency of mental illness, substance use disorders, and homelessness, it is also likely that they are frequent users of crisis medical systems. In order to estimate the cost of this hospital use, we requested data specific to our base group from two sources: the Medicaid Accountable Care Collaborative (MACC), and the University of Colorado’s Poudre Valley Hospital (PVH). Each organization provided de-identified data on jail high utilizers; we know the records provided are for individuals in our base group, but we do not know which specific individuals are included.

In using the two hospital data sets, it must be noted that the jail high utilizers are based on 2012 or 2013 data, while the hospital data sets cover March 2013 through October 2014. The data on police encounters in the previous section demonstrates that most base group members continued to have contact with local Fort Collins police at high rates in the year after the year of their four or more jail bookings. For the 2012 year base group, 70 out of the 71 members had police contact in 2012. In 2013, 54 out of 71 members from the 2012 base group had police contact.

It is certainly possible that some 2012 members left the community by 2013 or 2014 and did not use hospital services, or used them for only a portion of the time period covered by the hospital data sets. If this is the case (and since our estimate of hospital utilization for 2012 is based on a 2013-14 time period), our estimates are conservative; the true values for 2012 are likely to be larger. Another confounding factor was the limited ability for 2012 jail high utilizers to gain access to the emergency department (ED) in 2012, since they spent much of their time in jail.

The figure below displays the number of ED visits by the base group per month at PVH from September 2013 to August 2014. While the trend line is downward sloping, the reduction in the use of the ED is slight. The highest average monthly use of the ED is in May 2014. This supports the use of 2013-14 data in estimating the ED use of the 2012 and 2013 base groups.

Number of PVH Emergency Department Visits by the Base Group, Per Month

After providing an overview of the information available from each data set, we will describe how we used components of each to model average utilization and cost of ED or inpatient (IP) services, both for base group members that use them and for the entire group of 155 jail high utilizers.

PVH Emergency Department Utilization Data

The PVH data covers multiple payers – Medicaid, Medicare, Colorado Indigent Care Program (CICP), private insurance, and self-pay – but it includes two significant restrictions. First, it only covers ED visits, recording the data, diagnosis and payer for each visit. It does not cover inpatient or outpatient hospitalization, which are significant expenditures. Next, it only covers ED visits for individuals with three or more ED visits from August 27, 2013 through August 26, 2014. The selection of this time period was based on data availability; PVH changed data systems in August 2013, and accessing client level data from previous time periods proved too costly. The data only covers individuals with three or more ED visits because PVH staff used an existing data extract tool (their own high utilizer reports) and applied a filter that limited the report to only individuals in our high jail utilizer group. Individuals from the jail high utilizer group that had one or two ED visits during the time period are not included.

The data set includes replacement names (e.g. High Utilizer A, High Utilizer B) of 36 unique individuals. One individual has two ED visits; the remaining 35 have three or more. In the following table, we display the distribution of ED visits for these 36 individuals.

Person-by-Person Counts of PVH ED Visits for the Highest Utilizers

| **Patient Name** | **Count of ED Visits** |  | **Patient Name** | **Count of ED Visits** |
| --- | --- | --- | --- | --- |
| High Utilizer AA | 104 |  | High Utilizer H | 5 |
| High Utilizer GG | 54 | High Utilizer B | 4 |
| High Utilizer U | 20 | High Utilizer CC | 4 |
| High Utilizer C | 19 | High Utilizer I | 4 |
| High Utilizer E | 19 | High Utilizer O | 4 |
| High Utilizer D | 16 | High Utilizer Q | 4 |
| High Utilizer S | 16 | High Utilizer W | 4 |
| High Utilizer HH | 15 | High Utilizer DD | 3 |
| High Utilizer JJ | 14 | High Utilizer II | 3 |
| High Utilizer T | 10 | High Utilizer L | 3 |
| High Utilizer G | 8 | High Utilizer M | 3 |
| High Utilizer K | 8 | High Utilizer N | 3 |
| High Utilizer Y | 8 | High Utilizer P | 3 |
| High Utilizer F | 7 | High Utilizer R | 3 |
| High Utilizer A | 6 | High Utilizer V | 3 |
| High Utilizer BB | 6 | High Utilizer X | 3 |
| High Utilizer FF | 6 | High Utilizer EE | 2 |
| High Utilizer J | 6 | **Total ED Visits** | **406** |
| High Utilizer Z | 6 | **Average ED Visits** | **11.3** |

Medicaid Data

In Colorado, Medicaid is administered through Regional Care Collaborative Organizations (RCCOs), which coordinate care for Medicaid beneficiaries. Larimer County is part of RCCO 1, which is administered by Rocky Mountain Health Plans (RMHP). We requested medical utilization and cost information from RMHP. The Medicaid data is advantageous because it covers all providers and all costs paid for by Colorado Medicaid. It also covers the time period of March 1, 2013 through June 30, 2014, matching the jail dates somewhat more closely. However, this data is disadvantageous in that not all individuals in the base group were Medicaid eligible during the study period, and, because of Colorado’s Medicaid expansion, many individuals achieved coverage during only a portion of the period included. Also, it only includes individuals that were in enrolled in July, 2014. Because of “churning” in eligibility, some jail high utilizers may have had coverage in previous months, but because they lost eligibility in July 2014, they were not included in the data set.

While able-bodied adults without dependent children historically have been ineligible for Medicaid, starting January 1, 2014 Colorado expanded coverage to adults with incomes up to 138% of the federal poverty level. Of the 155 individuals in our base group, 65 were identified with enrollment in Medicaid. With Colorado’s Medicaid expansion, this number increased significantly after 2014, and it is likely to be substantially higher in future years. The graph below provides the cumulative number of enrollees by date based on the date of first service. Twenty of the 65 were not enrolled sufficiently long enough to have utilized any services, which is an important consideration when we calculate utilization and cost per year using this data.

**Cumulative Number of RMHP Medicaid Enrollees**

Combining the Two Data Sets to Estimate Missing Data

The table below summarizes the data availability for the base group members by Medicaid enrollment and ED and inpatient (IP) usage. The overlap between data sets is for use of the PVH ED by base group members with three or more (3+) ED visits. While only the Medicaid data includes both cost and inpatient information, the PVH data set is useful for estimating missing information on non-Medicaid enrollees. We began our analysis by examining the overlap of the two data sets, and then estimated cost and utilization of ED and inpatient services.

Availability and Overlap of Medicaid and PVH Data for Base Group Members

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Data Set** | **3+ ED Users with Medicaid** | **0-2 ED Users with Medicaid** | **3+ ED Users w/out Medicaid** | **0-2 ED Users w/out Medicaid** | **IP Users with Medicaid** | **IP Users w/out Medicaid** | **Cost Data** |
| **Medicaid Data** | Yes | Yes | No | No | Yes | No | Yes |
| **PVH Data** | Yes | No | Yes | No | No | No | No |

We identified overlapping ED visits by filtering each data set. Criteria included:

* August 27, 2013 to June 30, 2014; this excludes Medicaid records before August 2013 and PVH records after June 2014.
* Colorado Medicaid as the payer.
* PVH as the ED.

We then performed a count of individuals and their number of ED visits. Each data set included the age of the patient, the date of service, and diagnostic code. Using this information, we were able to match patients in each set, identify patients in only one of the two sets, and compare the recorded number of PVH ED visits. Twenty-two of the base group members were in both data sets during the overlapping time period. Six patients were in the PVH data set but not in the Medicaid data set. An additional seven patients with one or two PVH ED visits were in the Medicaid data set. Information from each of these groups will prove important in estimating total ED usage.

Records for the 22 overlapping members are reported in the table below. Differences in the reported ages resulted from calculating the age on different dates. Note that in every case, the number of ED visits reported by PVH was equal to or greater than the number of visits recorded in the Medicaid data. In some cases, the missing ED visits occurred at the beginning of the enrollment period. In other cases, the missing visits were in the midst of the enrollment period. The magnitude of the underreporting of ED visits in the Medicaid data is 17.0%. When estimating ED usage with the Medicaid data, we inflated the Medicaid estimates by 17.0% to reflect this underreporting. It is important to note that this does not necessarily represent underpayment by Medicaid to PVH; these are ED visits for which PVH lists Colorado Medicaid as the payer, but are not included in the Medicaid data set. Because individuals gain and lose Medicaid coverage with some frequency, it is likely these visits occurred during gaps in coverage.

ED Visits for Overlapping Medicaid Enrolled Members – Medicaid and PVH

| **Medicaid Data** | | |  | **PVH Data** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Member** | **Age** | **Number of PVH Visits Paid by RMHP** |  | **Member** | **Age** | **Number of PVH Visits Listed as Colorado Medicaid** | **Difference in visits** |
| Member 47 | 57 | 21 | High Utilizer GG | 57 | 26 | 5 |
| Member 14 | 42 | 13 | High Utilizer HH | 41 | 14 | 1 |
| Member 59 | 52 | 9 | High Utilizer JJ | 52 | 9 | 0 |
| Member 53 | 59 | 8 | High Utilizer T | 59 | 10 | 2 |
| Member 34 | 23 | 6 | High Utilizer F | 23 | 7 | 1 |
| Member 36 | 35 | 6 | High Utilizer D | 34 | 8 | 2 |
| Member 39 | 26 | 6 | High Utilizer BB | 26 | 6 | 0 |
| Member 45 | 30 | 6 | High Utilizer Z | 30 | 6 | 0 |
| Member 16 | 50 | 4 | High Utilizer FF | 50 | 6 | 2 |
| Member 7 | 58 | 4 | High Utilizer O | 57 | 4 | 0 |
| Member 22 | 39 | 3 | High Utilizer W | 39 | 3 | 0 |
| Member 30 | 53 | 3 | High Utilizer G | 53 | 5 | 2 |
| Member 42 | 26 | 3 | High Utilizer II | 26 | 3 | 0 |
| Member 8 | 30 | 3 | High Utilizer K | 30 | 3 | 0 |
| Member 17 | 51 | 2 | High Utilizer N | 53 | 3 | 1 |
| Member 12 | 51 | 2 | High Utilizer A | 51 | 2 | 0 |
| Member 65 | 49 | 1 | High Utilizer I | 49 | 1 | 0 |
| Member 37 | 22 | 2 | High Utilizer DD | 22 | 2 | 0 |
| Member 5 | 26 | 2 | High Utilizer P | 26 | 2 | 0 |
| Member 28 | 28 | 1 | High Utilizer L | 28 | 1 | 0 |
| Member 43 | 20 | 2 | High Utilizer X | 19 | 2 | 0 |
| Member 3 | Unknown | 1 | High Utilizer V | 26 | 3 | 2 |
| **Total** |  | **108** | **Total** |  | **126** | **18** |

We also inflated Medicaid estimates to reflect the six patients recorded in the PVH data who were missing in the Medicaid data. Once again, we do not have any information on why PVH recorded Colorado Medicaid as the payer, yet Medicaid did not include them in the data. These may represent individuals who lost coverage during the month of July 2014 and were therefore not included in the Medicaid data set. It is also conceivable that the process used by PVH and Medicaid to match the names of individuals in the jail high utilizer data to their own patients was different and resulted in some matches occurring for PVH that did not occur for Medicaid. The six patients and their recorded number of ED visits can be found in the following table.

Data for Six PVH Patients Missing from Medicaid

| **PVH Data** | | |
| --- | --- | --- |
| **Member** | **Age** | **Number of PVH Visits Listed as Colorado Medicaid** |
| High Utilizer AA | 53 | 50 |
| High Utilizer U | 29 | 20 |
| High Utilizer M | 27 | 3 |
| High Utilizer EE | 33 | 2 |
| High Utilizer R | 27 | 1 |
| High Utilizer Y | 21 | 1 |

The missing number of ED visits by this group, 77, reflects ED users with both very high and very low numbers of visits. In modeling these missing observations, we increased the number of ED users in the Medicaid data by six of the 29 patients (21.0%) and assume that the rate of ED usage for these individuals matches the average for those in the Medicaid data. This is a conservative estimate; for the 22 overlapping patients, the average number of ED visits is 5.70, but for the missing individuals, the average number of ED visits is 12.8.

The overlapping data also provides information on base group members enrolled in Colorado Medicaid who used the PVH ED but were not included in the PVH data set because they only used the ED once or twice. The table below lists seven such individuals. These seven represent 25.0% of the 28 Medicaid individuals within the PVH data set. We assumed that for the entire data set (Medicaid and non-Medicaid), limiting the data to those with three or more ED visits screens out a number of users equal to 25.0% of those remaining. Since for all payers/all dates, the PVH data lists 36 individuals with three or more ED visits, we estimated that the total number of PVH ED users from the base group is 45 – an addition of 25.0% of the 36.

Medicaid Enrolled Individuals Not Included in PVH Data Set

|  |  |  |
| --- | --- | --- |
| **Member** | **Age** | **Number of PVH Visits Paid by RMHP** |
| Member 64 | 55 | 2 |
| Member 1 | 49 | 2 |
| Member 10 | 45 | 2 |
| Member 41 | 43 | 1 |
| Member 27 | 30 | 1 |
| Member 35 | 26 | 1 |
| Member 21 | 25 | 1 |

While only the Medicaid data set has both inpatient and cost information, it does not have information on other payers. We modeled inpatient and costs for non-Medicaid base group members through analysis of the PVH ED data, which includes all payers, but is limited to ED visits.

The table below provides the distribution of these ED visits by patient and payer. Colorado Indigent Care Program (CICP) provides discounted health services to Colorado residents with incomes below 250% of the federal poverty level. With expansion of Medicaid, many Colorado residents lost eligibility for CICP. Self-pay is a category used by PVH to indicate that the patient does not have health insurance. While it is possible some patients might pay for some of their ED treatments, in general, self-pay refers to cases in which the hospital receives no compensation for the services provided.

Distribution of PVH ED Visits by Patient and Payer

| **Patient Name** | **CICP** | **Colorado Medicaid** | **Medicare** | **Out of State Medicaid** | **Self-Pay** | **Commercial Insurance** | **TOTAL** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| High Utilizer AA | 43 | 50 |  |  | 11 |  | 104 |
| High Utilizer GG | 21 | 26 |  |  | 7 |  | 54 |
| High Utilizer U |  | 20 |  |  |  |  | 20 |
| High Utilizer C |  |  | 19 |  |  |  | 19 |
| High Utilizer E |  |  |  |  |  | 19 | 19 |
| High Utilizer D | 3 | 13 |  |  |  |  | 16 |
| High Utilizer S | 11 |  |  |  | 5 |  | 16 |
| High Utilizer HH |  | 15 |  |  |  |  | 15 |
| High Utilizer JJ |  | 14 |  |  |  |  | 14 |
| High Utilizer T |  | 10 |  |  |  |  | 10 |
| High Utilizer G |  | 6 |  |  | 2 |  | 8 |
| High Utilizer K | 5 | 3 |  |  |  |  | 8 |
| High Utilizer Y | 6 | 1 |  |  | 1 |  | 8 |
| High Utilizer F |  | 7 |  |  |  |  | 7 |
| High Utilizer A | 1 | 4 |  |  | 1 |  | 6 |
| High Utilizer BB |  | 6 |  |  |  |  | 6 |
| High Utilizer FF |  | 6 |  |  |  |  | 6 |
| High Utilizer J |  |  |  |  |  | 6 | 6 |
| High Utilizer Z |  | 6 |  |  |  |  | 6 |
| High Utilizer H |  | 4 |  |  | 1 |  | 5 |
| High Utilizer B |  |  | 4 |  |  |  | 4 |
| High Utilizer CC |  |  |  | 3 | 1 |  | 4 |
| High Utilizer I | 2 | 2 |  |  |  |  | 4 |
| High Utilizer O |  | 4 |  |  |  |  | 4 |
| High Utilizer Q | 4 |  |  |  |  |  | 4 |
| High Utilizer W |  | 4 |  |  |  |  | 4 |
| High Utilizer DD |  | 3 |  |  |  |  | 3 |
| High Utilizer II |  | 3 |  |  |  |  | 3 |
| High Utilizer L | 2 | 1 |  |  |  |  | 3 |
| High Utilizer M |  | 3 |  |  |  |  | 3 |
| High Utilizer N |  | 3 |  |  |  |  | 3 |
| High Utilizer P |  | 2 |  |  | 1 |  | 3 |
| High Utilizer R |  | 1 |  |  | 2 |  | 3 |
| High Utilizer V |  | 3 |  |  |  |  | 3 |
| High Utilizer X |  | 2 |  |  | 1 |  | 3 |
| High Utilizer EE |  | 2 |  |  |  |  | 2 |
| **Total** | **98** | **224** | **23** | **3** | **33** | **25** | **406** |

The payer data also includes the date of ED visits, which allows the discernment of the changing patterns of coverage in the data. For patients with CICP coverage at the beginning of the time period (ten total), all but two transitioned to Colorado Medicaid. Of the two patients who did not switch from CICP to Colorado Medicaid, one continued to use CICP as late as mid-2014. The second stopped using CICP toward the end of the covered time period but used four additional ED visits with no payer after that point.

Only a small number of individuals had other forms of non-Medicaid coverage, yet the pattern of ED usage was similar between the Medicaid and non-Medicaid patients. The average number of ED visits per year for the entire group was 11.3. The two Medicare patients had four or nineteen visits (average 11.5), and the two private insurance patients had six or nineteen visits (average 12.5). The two patients who retained CICP coverage had sixteen or four visits (average 10.0). In this sense, the ED usage pattern of Medicaid enrollees closely matches that for non-Medicaid high ED users and, in our estimation of ED use and cost, we assumed that non-Medicaid patients follow the same patterns of Medicaid patients.

Twenty-nine patients claimed Colorado Medicaid during some of the covered time period, one of which did not have any ED visits during the period in which the two data sets overlapped. Sixteen had all ED visits covered by Medicaid, including ten with visits before January 1, 2014. Four had ED visits without a payer before the start of Medicaid coverage. Three listed no payer for some visits subsequent to the start of Medicaid coverage, suggesting loss of coverage.

Twenty-nine of 36 (80.6%) of the high ED and jail users enrolled in Medicaid at some point during the year. We consider this a minimum value; given more time, the remaining CICP members have the potential of also switching to Medicaid. Note that no individuals exited Medicaid to any other insurance option, except the three who appear to have lost coverage at some point during the year and became self-pay.

Of the 406 total visits, 224 (55.0%) were listed with Colorado Medicaid as the payer. This proportion was not constant; the figure below displays the ED visits per month broken out by Medicaid and all other payers. It is clear from the trend lines that non-Medicaid payers were responsible for the majority of ED visits at the beginning of the time period. With the expansion of Medicaid starting January 1, 2014, Medicaid covered the majority of ED visits.

Number of ED Visits by Payer and Month, September 2013 to August 2014

Estimating Annual ED Average Usage and Cost

As of July 2014, 65 base group members were reported as enrolled in Colorado Medicaid, 32 of whom used the ED. These 32 utilized 191 ED visits for a total cost of $78,473.00. This corresponds to an average ED visit cost of $411.00 per visit. However, based on the overlap between the PVH and the Medicaid data sets, we know that the Medicaid data was missing six (21%) of the individuals who reported Colorado Medicaid as the payer and had ED visits at PVH. We therefore inflated the number of utilizers by 21.0%, with corresponding increases in the number of visits and the total costs. We also know that the Medicaid data was missing 17.0% of the PVH visits for patients included in the data. We made a second increase in the number of visits and total cost by this amount. Since the Medicaid data covers 16 months, we multiplied all usage and costs by 12/16 (or 0.75) in order to convert to an annual basis. This resulted in our estimate of usage and costs for individuals enrolled in Colorado Medicaid.

The PVH data makes clear that using the Medicaid data alone without additional adjustment will significantly underestimate ED costs for the base group, since the Medicaid data excludes ED visits paid by non-Medicaid sources. We adjusted the Medicaid cost data to reflect other payers by using the proportion of ED visits in the PVH data that are attributable to Medicaid versus other payers. Since the proportion was 224 of 406, multiplying the number of Medicaid ED visits by 1.81 gives the total number of ED visits for both Medicaid and other payers. We inflated the number of ED users by 1.24 to reflect that in the PVH data, only 29 of the 36 ED users were enrolled in Medicaid. The following table reports the estimated values after adjustments:

Adjusted ED Utilization and Costs, Incorporating Non-Medicaid Payers

|  |  |
| --- | --- |
| 48.0 | Users of the ED After Adjustments |
| 366.0 | Annual ED Visits After Adjustments |
| 7.63 | Average Annual Visits per ED User |
| 0.95 | Estimated Standard Error of Average |
| $150,202.00 | Annual ED Costs After Adjustments |
| $3,132.94 | Annual ED Costs Per 48 ED Users |
| $364.07 | Estimated Standard Error of Average |
| $969.05 | Annual ED Costs Per 155 Jail High Utilizers |

There is no straightforward method of estimating the standard errors of these adjusted averages. In order to model this variability, we calculated the standard deviation of ED visits and ED costs from the Medicaid data set for those individuals who had ED visits. We inflated this amount to reflect underreporting of ED visits and used it to calculate the standard error of the average ED visits and ED costs, corresponding to 0.95 ED visits per year and $364.00 for ED costs. We used these amounts in our microsimulation.

Estimating Annual Inpatient Utilization and Costs

The Medicaid data set also includes data on inpatient stays and costs for the 65 base group members. We do not have equivalent data from PVH for inpatient stays, but we expect the same factors that led us to inflate the Medicaid ED data – particularly missing individuals because of a loss in coverage during July 2014 – are also likely to occur in the inpatient data. We therefore used the same inflation factors derived from the ED data to make adjustments to the Medicaid inpatient data. This is reflected in the table below.

Adjusted Inpatient Stays and Costs, Based on Medicaid Data

|  |  |
| --- | --- |
| 19.0 | Users of IP Services After Adjustments |
| 29.0 | Annual Episodes After Adjustments |
| 1.47 | Average Annual Episode per IP User |
| 0.17 | Estimated Standard Error of Average |
| $394,784.00 | Annual IP Costs After Adjustments |
| $20,269.46 | Annual IP Costs Per 19 IP Users |
| $5,010.94 | Estimated Standard Error of Average |
| $2,547.00 | Annual IP Costs Per 155 Jail High Utilizers |

Annual Inpatient Utilization and Costs for Individuals with Mental Illness

We also segmented the 65 enrolled members into those with and without mental illness diagnoses, and repeated our counts of ED use, visits, and costs for the group of individuals who were (1) high jail utilizers, (2) enrolled in Medicaid, and (3) diagnosed with a mental illness. We made the same adjustments to the data as previously described. Twenty-three of the 65 enrolled members had a mental health diagnosis; this likely underestimates the proportion with mental illness, for it was apparent from the data that diagnostic assessment for mental illness was a process that took some time to complete and would not have necessarily been included in enrollment data. Some individuals had treatment for mental illness but did not have a mental health diagnosis.

ED and IP data for individuals with mental illness is reported below. Surprisingly, there was little difference between patients with a mental health diagnosis and the broader group of ED and IP users. This is driven, in large part, by the high proportion of ED and IP users who had a mental health diagnosis. There were very few additional users to change the averages when we moved from the mental health only group to the broader population.

ED Costs for Individuals with Mental Illness

|  |  |
| --- | --- |
| 31.0 | Users of the ED After Adjustments |
| 247.0 | Annual ED Visits After Adjustments |
| 7.85 | Average Annual Visits per ED User |
| 1.10 | Estimated Standard Error of Average |
| $96,765.00 | Annual ED Costs After Adjustments |
| $3,075.57 | Annual ED Costs Per 31 ED Users |
| $417.33 | Estimated Standard Error of Average |

Inpatient Costs for Individuals with Mental Illness

|  |  |
| --- | --- |
| 12.0 | Users of IP Services After Adjustments |
| 15.0 | Annual Episodes After Adjustments |
| 1.28 | Average Annual Episode per IP User |
| 0.31 | Estimated Standard Error of Average |
| $312,533.00 | Annual IP Costs After Adjustments |
| $26,075.42 | Annual IP Costs Per 12 IP Users |
| $9,144.42 | Estimated Standard Error of Average |

Using the Medicaid data filtered for the 23 individuals with mental health diagnoses, we reviewed all of the diagnostic codes and descriptions for ED or IP claims. Many did not include a specific ICD code; for those that did include an ICD code and description, we counted every ED and IP claim related to a mental health diagnosis. Examples included manic-depressive, anxiety, and depressive episodes. Of the 23 individuals, five had ED visits with mental health descriptions. These five individuals had a total of eight such ED visits. The entire group of 23 individuals with mental health diagnoses had an (unadjusted) total of 129 ED visits, therefore eight (8) out of 129 or 6.20% of ED visits by individuals with mental health diagnoses had ICD coding indicating a mental health crisis. None of the (unadjusted) eight inpatient episodes included an ICD code indicating a mental health or substance abuse crisis.

We performed a similar analysis using the PVH ED data. This data set does not have a variable indicating existence of a mental health condition, but it does contain *Encounter Reason* and *Diagnosis* as two separate text fields. On the basis of the descriptions within these fields, we categorized each of the 406 visits as related to mental illness, substance abuse, neither, or both. The following table provides a by-user distribution of these 406 visits.

ED Visits Related to Mental Illness or Substance Abuse

| **Visit** | **Mental Illness Related** | **Substance Abuse Related** |
| --- | --- | --- |
| High Utilizer A |  | 4 |
| High Utilizer AA |  | 100 |
| High Utilizer B |  | 2 |
| High Utilizer BB |  |  |
| High Utilizer C | 8 | 2 |
| High Utilizer CC | 2 | 1 |
| High Utilizer D | 1 | 14 |
| High Utilizer DD |  |  |
| High Utilizer E | 1 | 18 |
| High Utilizer EE |  | 1 |
| High Utilizer F | 1 | 1 |
| High Utilizer FF | 1 |  |
| High Utilizer G |  |  |
| High Utilizer GG |  | 49 |
| High Utilizer H |  |  |
| High Utilizer HH |  | 12 |
| High Utilizer I |  | 2 |
| High Utilizer II |  |  |
| High Utilizer J | 2 | 4 |
| High Utilizer JJ |  | 8 |
| High Utilizer K |  |  |
| High Utilizer L |  |  |
| High Utilizer M | 2 |  |
| High Utilizer N |  | 1 |
| High Utilizer O |  |  |
| High Utilizer P |  |  |
| High Utilizer Q | 1 | 2 |
| High Utilizer R |  |  |
| High Utilizer S |  | 15 |
| High Utilizer T | 1 | 10 |
| High Utilizer U | 4 | 17 |
| High Utilizer V | 2 |  |
| High Utilizer W |  | 1 |
| High Utilizer X |  | 1 |
| High Utilizer Y | 3 |  |
| High Utilizer Z |  |  |
| **Total** | **29** | **265** |

Sixty five percent of the visits were related to substance abuse, primarily involving alcohol. These visits involved 21 of the 36 individuals (58.0%). Seven percent of the visits were related to mental illness, including depression, manic behavior, and suicidal idealization. These visits involved 13 (33.0%) of the individuals. The percentage of ED visits involving mental illness closely matches the equivalent Medicaid data. The Medicaid data does not include alcohol or other drug abuse as a diagnosis, which may explain the ED visits without an ICD code.

In order to provide context for these estimates, we also calculated average usage and average costs without any adjustments to the data. The next table uses all Medicaid data to calculate averages for both the 65 base group member included in the Medicaid data and also for all Larimer County Medicaid patients. The time period for these two data sets is overlapping but not identical. Based on these unadjusted averages, it is clear that the base group members use all medical resources at significantly higher rates than the typical Medicaid member.

Comparison of Jail High Utilizers with All Larimer County Medicaid Patients

| **Dates Covered:** | **3/1/13-6/30/14**  **(16 Months)** | **5/1/13-8/1/14**  **(14 Months)** |
| --- | --- | --- |
| **Category** | **Average 16 Month Cost for Enrolled Members of Base Group** | **Average 14 Month Costs for All Larimer County Medicaid Patients** |
| Emergency Hospital | $1,207.00 | $217.00 |
| Inpatient Hospital | $3,173.00 | $376.00 |
| Outpatient Hospital | $1,686.00 | $526.00 |
| Pharmacy | $944.00 | $616.00 |
| Physician – Primary Care | $179.00 | $88.00 |
| Physician – Specialist Care | $867.00 | $532.00 |
| Other | $476.00 | $811.00 |
| **Total** | **$8,532.00** | **$3,166.00** |
| Sum of Emergency & Inpatient Hospital Average Costs | $4,380.00 | $593.00 |
| Number of Individuals in Group | 65.0 | 38,307.0 |
| Average Number of ED Visits | 2.94 | 0.48 |
| Average Number of IP Admits | 0.23 | 0.04 |

Potentially Preventable Expenses

The Medicaid data set also includes estimates of potentially preventable medical expenses. Out of the average cost (unadjusted) of $8,532.00 per member for the jail high utilizer group, $832.00 (9.75%) is categorized as potentially preventable. By way of comparison, for those Larimer County Medicaid members that have a health home (a subgroup of all Larimer County residents), the average cost is $4,066.00 per member, of which $336.00 (8.27%) is listed as potentially preventable.

The categorization of events as potentially preventable is based on analysis by the statewide data analytics contractor (SDAC), which is Treo Solutions (now part of 3M Health Information Systems). See the attached link for more details on 3M’s preventable event software.[[8]](#footnote-8) The nature of the preventable classification methodology does not appear (based on information provided by Medicaid) to involve reductions in service utilization resulting from interventions such as ACT or Housing First, but rather procedural changes that occur within ED or inpatient settings. These estimates should therefore not be used in evaluating the potential for reductions in crisis service utilization that may result from more active management of the high utilizer population.

# VI. Primary Care Use

A health home or primary care doctor can be a critical resource in providing preventative care and avoiding crisis service. We had two sources of information on primary care: the RMHP Medicaid data set that recorded the health home of the participant and records of enrollment at the Fort Collins Salud Family Health Center.

Of the 65 individuals in the Medicaid data set, 32 were assigned to health homes with the following distribution:

Distribution of Jail High Utilizers to Health Homes by Provider

|  |  |
| --- | --- |
| 2 | AFM – South, Horsetooth, Windsor |
| 1 | COLO Coalition for the Homeless |
| 1 | Milestone Medical Group |
| 12 | Poudre Valley FMC |
| 4 | Poudre Valley Medical Group LLC |
| 12 | Salud – Fort Collins |

Separately, Salud compared the entire base group of 155 to their own records and reported the number of current patients in 2012, 2013 or 2014. Of the 155, six were patients in all three years, eleven were patients in two of the years, and eleven were patients in one year only. By year, 16 were patients in 2012, 21 were patients in 2013, and 14 were patients in calendar year 2014 through October 2nd. Reported in another manner, of the 155 jail high utilizers in either 2012 or 2013, 28 individuals (18.0%) of the base group were patients at Salud in 2012, 2013, or 2014.

High Jail Utilizers with Receiving Primary Care at Salud, by Year

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **2012** | **2013** | **2014** | **Total** |
| **Total Individuals Using Primary Care** | 16 | 21 | 14 |  |
| **Unique Individuals** |  |  |  | 28 |
| **% of Jail High Utilizer Base Group** |  |  |  | 18.06% |

This leads to the conclusion that only a small proportion of the base group had a primary care doctor. Of the 65 Medicaid eligible members, no more than 32 (49%) had an assigned health home during the period of March 1, 2013 to July 30, 2014.; no more than 18% of the 155 were patients at Salud.[[9]](#footnote-9) While it is possible members of the base group received primary care through other insurance and from other providers, given the high rate of incarceration and unemployment, it is unlikely many had such options. All of this suggests there is a greater potential role of community care coordination and/or the MACC team in helping these individuals obtain a primary care provider or, preferably (given their high utilization costs and various risk factors), enroll in a health home, which would allow for more assertive care management and assistance in health system navigation.

# VII. Homelessness

One frequent consequence of untreated mental illness is homelessness. Individuals with mental illness often are unable to maintain either employment or supportive relationships with family members. Each of these problems increases the risk of homelessness.

For our base group, we had two independent sources of information on homelessness. First, the jail data set included a variable indicating if, at the time of booking, the individual possessed housing or was homeless. Thirty-five out of the 155 individuals (23.0%) were listed as homeless, with two missing homelessness data. Of those listed as employed, nine out of 69 (13.0%) were homeless. Of those listed as unemployed, 25 out of 84 (30.0%) were listed as homeless.

Our second source of data on homelessness was provided by Vanessa Fenley, Project Director of Homeward 2020. Homeward 2020 gathers data on the characteristics of homeless people through a Vulnerability Index and Service Prioritization Decision Assistance Tool (VI-SPDAT). Additionally, similar information is gathered during point-in-time counts of people who are homeless. Homeward 2020 completed nine interviews of individuals in our base group using the VI-SPDAT. Four were completed in 2010, one in 2013, and four in 2014.

Homeward 2020 had information from an additional three interviews taken during the most recent Summer 2014 point-in-time count of people who are homeless. Combining these data sources, Homeward 2020 had information on 12 of the 155 individuals in our base group, while 35 reported being homeless at the time of arrest.

The two measures of homelessness – self-reporting at the time of arrest and inclusion in the recent Homeward 2020 survey – are likely to have incomplete overlap. For most people, homelessness is an intermittent and often short-lived event. For example, in Homeward 2020’s 2013 point-in-time survey, 47 out of 250 (19.0%) individuals surveyed were chronically homeless, which Homeward 2020 (following the US Department of Housing and Urban Development) defines as having been homeless for a year or more or having had four or more bouts of homelessness in the past three years as well as a disability. The remaining 81.0% experienced non-chronic homelessness.

Since homelessness is of short duration for most individuals, the 35 out of 155 individuals reporting a homeless status underrepresents how many of the 155 have experienced recent homelessness. Some of the 155 reporting having a home at the time of arrest were likely homeless in previous periods. And some of the 35 reporting homelessness at the time of arrest were not homeless during times when Homeward 2020 was likely to capture data – either during a point-in-time survey or at a time when shelters or other care providers were entering information into the VI-SPDAT system.

For the 12 individuals in our base group that Homeward 2020 had previously surveyed, seven reported sufficient duration of homelessness to meet the chronic homeless definition. Seven out of 155 (4.50%) would then serve as the lower bound on an estimate of the number of chronically homeless individuals within our base group. An upper bound estimate for chronic homelessness would be 23.0%, assuming that every individual who reports homelessness at the time of arrest is experiencing chronic homelessness. For total (not limited to chronic) homelessness within the base group, 23.0% represents a lower bound estimate, assuming arrests only occurred during periods of homelessness.

Characteristics of Individuals in Base Group Identified in the Homeward 2020 Data

The VI-SPDAT survey instruments ask information about crisis system use, but the format of the questions varies by year. The point-in-time survey does not ask about hospital, jail, or police interaction, but does include one question about factors contributing to homelessness.

For the five individuals responding to the 2010/13 VI-SPDAT, two indicated ED use and two indicated hospitalization. This version of VI-SPDAT does not ask about police interactions. For the four users of the 2014 VI-SPDAT, all four reported no use of the ED or hospital, while all four reported interaction with the police. The lack of reported ED or hospital use is somewhat perplexing, for one reported being the victim of attack, another reported involuntary transport to the hospital as well as brain injury, and a third reported kidney disease.

Of the twelve individuals within the data set, 10 reported substance abuse and four reported mental illness. This included the three respondents to the point-in-time study, which only allows this information to be reported as a factor contributing to homelessness.

# VIII. Estimation of Total Service Use and Cost through Microsimulation

In order to estimate the cost of acute services for the population of jail high utilizers, we combined police costs, jail costs, and emergency department/inpatient (ED/IP) costs. For reasons previously described, our analysis of homelessness and primary care services is primarily descriptive. Substance use disorder and mental health direct treatment costs are not currently included in our summary pending receipt of data from Touchstone/North Range.

Many of the estimates of cost and utilization of crisis services we have discussed come with some uncertainty. For example, the number of individuals in the base group of high utilizers varies; in 2012 there were 71 individuals with residence within the Health District boundaries, while in 2013 there were 90 individuals. In estimating the cost of high utilizers of the county jail, should we use 71, 90, or some other figure? A traditional approach in cost estimation is to use averages, however averages do not provide the reader with information on the range of likely values that may occur.

This becomes a significant problem as the cost model becomes more complex. The average cost per high utilizer of all crisis services will depend on the mix of individuals with and without mental illness, the number of police contacts, and the proportion that use ED and IP services. The total of these, the average cost per high utilizer, will vary substantially with the values selected. A single value for average cost may represent the estimate that we consider most likely, but it does not provide information on the range of outcomes that will occur as other plausible values are used. In order to describe this variability in final outcomes, we used a micro-simulation approach that displays outcomes as the estimated components that vary randomly within specific probability distributions.

We used two probability distributions in this analysis. For any component variable that is based on an average computed from a sample of individuals, we used the normal distribution. For example, in estimating the annual cost of police services for jail high utilizers, we have the police costs during 2012 for the 71 jail high utilizers from 2012, and the 2013 police costs for the 90 jail high utilizers from 2013. We pooled these 161 observations (six of which are for the same individual, but in separate years) and calculated the sample average. If we view these 161 observations as a single random draw from a population of high utilizers, we know from probability theory that a different random draw would have yielded a different sample average (e.g., in 2014, jail high utilizers were likely to have had a different average police usage, as did 2011 jail high utilizers).

The Central Limit Theorem from probability theory tells us that while each random draw will result in a different sample average, the distribution of these averages will follow the normal distribution. We therefore modeled the distribution of average police costs as normally distributed, with the mean and standard deviation estimated from the sample mean and standard error of the sample mean. Each time we ran our simulation, we randomly drew an estimate of the average police cost for jail high utilizers from this distribution.

In the case of estimates for which we did not have the underlying data, we could not use the normal distribution, since we lacked any estimate of the standard deviation of the estimate. For example, in estimating the proportion of jail high utilizers who have mental illness, limitations on data sharing prevented us from receiving the mental health diagnoses of the individuals within our samples. We were dependent on the summary statistics reported by Mr. Stalls: the proportion of high utilizers with mental illness was 0.44 in 2011, 0.52 in 2012, and 0.58 in 2013. We had these three proportion estimates but could not calculate the underlying standard deviation, since we did not have the underlying data.

In order to capture the range of plausible values for some future group of jail high utilizers, we modeled this proportion as a random draw from the triangular distribution. This distribution has a density function that is triangular, with the three parameters of minimum, maximum, and mode, or most likely value. In this case we selected 0.44 as the minimum, 0.58 as the maximum, and 0.52 as the modal value. The distribution of values then would appear in a density function or histogram as:

In this case, values below 0.44 or greater than 0.58 could not be drawn. The likelihood of a value increases between 0.44 and 0.52 then decreases between 0.52 and 0.58. In another example, we inflated the annual jail cost for individuals with mental illness by a proportion drawn from a triangular distribution. We viewed no inflation – a factor of 1.0 – as both the minimum and modal value. Other values are possible but become less likely as they move farther from 1.0.

In order to combine the distributions of parameters in our model, we used a microsimulation. This involved randomly drawing a parameter value from each of the component distributions, and combining these values into one cost or outcome estimate. This was one run of the model. We then repeated this process ten thousand times, creating ten thousand estimates of total or average cost. The advantage of repeating the calculation with this frequency is that every possible combination of the parameters will be used in the model, in proportion to the underlying probability distributions. The distribution of cost is then represented graphically, and the graph shows the different combinations of final outcomes as we use alternative parameters in the calculation.

All Jail High Utilizers

Our first microsimulation estimated total cost of police, jail, ED, and IP services for all high utilizers of the jail in a single year. Each run of the model randomly drew a number of jail high utilizers, then calculated the cost for that number of jail high utilizers based on random draws of police, jail, ED, and IP costs per person. The average costs of ED and IP services are based on average costs for all jail high utilizers that used the service, adjusted to reflect the proportion of base group members who actually used the service. For example, as previously reported, the average cost per user of the ED was $3,132.94; but this is an average for the 48 users of ED, not the sample of 155. By our estimate, 107 of the 155 did not use the ED, and when we calculated average ED costs using these 107 having zero costs, the average cost fell to $969.05. In our simulation we estimated ED costs by multiplying the number of jail high utilizers times the proportion who use the ED (48/155) times the average cost per user of the ED. For police average costs, we based the average cost estimate on all base group members, so the proportion was 1.0.

The table below lists the variables used in the simulation, their probability distributions, the total cost for all jail high utilizers, and the average cost per jail utilizer, each calculated at the modal parameter values. The subsequent histograms display the distributions of total costs and average total cost of ten thousand runs of the model. Because the distribution of the number of jail high utilizers is not symmetric around the mean, the histograms are not perfectly centered on the total or average costs estimated at the modal parameter values. The mean number of high utilizers, based on this triangular distribution, is 86.7.

Simulation Variables and Their Probability Distributions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Min** | **Max** | **Standard Error** | **Modal or Mean** | **Distribution** | **Variable** |
| 71.00 | 90.00 |  | 90 | Triangular | Number of Health District Jail High Utilizers per Year |
|  |  | $86.00 | $1,188.00 | Normal | Average Police Costs During Year of High Jail Use |
| $7,188.23 | $8,214.09 |  | $7,520.33 | Triangular | Jail Costs per Year per Jail High Utilizer |
|  |  | $364.00 | $3,132.94 | Normal | ED Average Costs for Base Group Members that Use the ED |
|  |  |  | 0.31 |  | Proportion of the Base Group that Uses the ED |
|  |  | $5,010.94 | $20,269.46 | Normal | Inpatient Average Costs for Base Group Members that are Admitted |
|  |  |  | 0.12 |  | Proportion of the Base Group that Uses IP services |
|  |  |  | $1,094,664.08 |  | Total Cost Estimated at the Modal or Mean Parameter Values |
|  |  |  | $12,162.93 |  | Average Total Cost at the Modal or Mean Values |

Based on this distribution, the most likely total cost of acute services for jail high utilizers ranges from $800,000.00 to $1,260,000.00, with almost no combinations of parameters yielding higher or lower amounts.

The cost per person ranges from about $10,300.00 to $14,500.00, with the most likely value at approximately $12,300.00 per person per year.

Costs for Jail High Utilizers that Also Utilize the ED

In our second simulation, we estimated the total cost of acute services for only those jail high utilizers that also used the ED. We estimated that 31.0% of jail high utilizers use the ED one or more times per year. Since the average number of jail high utilizers is 86.7, the average number of jail high utilizers that also use the ED is about 26. Based on the sample proportion in the Medicaid data, 34.0%, or on average nine of these individuals, also had inpatient admissions. We assumed that average jail and police costs were the same for this subgroup as the larger jail high utilizer group.

Parameter values, total annual costs for the group, and average cost per individual (each calculated at the modal value) are presented in the following table. As with the previous simulation, we present the distribution of total and average costs.

Parameter Values of Jail High Utilizers that also Use the ED

| **Min** | **Max** | **Standard Error** | **Modal or Mean** | **Distribution** | **Variable** |
| --- | --- | --- | --- | --- | --- |
| 71.00 | 90.00 |  | 90 | Triangular | Number of Health District Jail High Utilizers per Year |
|  |  | $86.00 | $1,188.00 | Normal | Average Police Costs During Year of High Jail Use |
| $7,188.23 | $8,214.09 |  | $7,520.33 | Triangular | Jail Costs / Year / Jail High Utilizer |
|  |  | $364.00 | $3,132.94 | Normal | ED Average Costs for Base Group Members that Use the ED |
|  |  |  | 0.31 |  | Proportion of the Base Group that Uses the ED |
|  |  | $5,010.94 | $20,269.46 | Normal | Inpatient Average Costs for Base Group Members that are Admitted |
|  |  |  | 0.34 |  | Proportion of the ED Users that Use IP services |
|  |  |  | $524,215.47 |  | Total Cost Estimated at the Modal or Mean Parameter Values |
|  |  |  | $18,808.66 |  | Average Total Cost at the Modal or Mean Values of the Parameters |

Limiting the analysis in this way results in a smaller group of individuals (approximately one-third, or 30) who have about one-half of the total expenditures of acute services as the entire base group. Because of higher rates of ED and IP use, average costs increase from approximately $12,500.00 per year to $19,000.00.

Costs for Jail High Utilizers with Mental Illness Diagnoses

Calculated as a weighted average of the mental illness (MI) proportions in the Stalls report, 55.3% of the 2012/13 jail high utilizer group had mental illness. This corresponds to 86 of the 155 individuals. We estimated that 31 of these individuals used the ED and 12 were admitted. Using these sample proportions and the average costs and sample proportions previously reported, we estimated total and per person costs for jail high utilizers who also have a mental illness diagnosis. Since the police data did not include information on mental health status, we assumed the same average police cost as the broader jail high utilizer group. The following table lists our assumed parameter values, distributions, and the total and average per person estimated costs.

**Parameter Values of High Jail Utilizers with Mental Illness**

| **Min** | **Max** | **Standard Error** | **Modal or Mean** | **Distribution** | **Variable** |
| --- | --- | --- | --- | --- | --- |
| 71.00 | 90.00 |  | 90 | Triangular | Number of Health District Jail High Utilizers per Year |
| 0.44 | 0.58 |  | 0.58 | Triangular | Proportion with Mental Illness (MI) |
|  |  | $86.00 | $1,188.00 | Normal | Average Police Costs During Year of High Jail Use |
| $7,188.23 | $9,528.34 |  | $7,520.33 | Triangular | Jail Costs per Year per Jail High Utilizer with MI |
|  |  | $364.00 | $3,075.57 | Normal | ED Average Costs for Base Group Members with MI |
|  |  |  | 0.36 |  | Proportion of the MI Group that Uses the ED |
|  |  | $5,010.94 | $26,075 | Normal | Inpatient Average Costs for Base Group Members with MI |
|  |  |  | 0.14 |  | Proportion of the MI Group that Uses IP Services |
|  |  |  | $697,515 |  | Total Cost Estimated at the Modal or Mean Parameter Values |
|  |  |  | $13,455.16 |  | Average Total Cost at the Modal or Mean Values of the Parameters |

Limiting the high utilizers of the jail to those with mental illness diagnoses resulted in estimates of total and average cost that lie between the previous two estimates. When measured at the modal values of our estimated parameters, base group members with mental illness use ED services at above average rates, which increases average costs compared to the broader group. But since it is only a portion of the base group, total costs are lower.

While base group members with mental illness use the ED at higher rates than the entire group, they do not use the ED at the same rate as members of our previous simulation, who by definition all use the ED. This results in lower average costs for the mental illness group.

# IX. Conclusion

In this final section of the report, we will review the most important findings from the study and provide recommendations concerning how northern Larimer County collaborators might best respond to their implications.

Study Findings and Recommendations

*Finding #1: Readiness for data sharing in Northern Larimer County is somewhat limited.*

Obtaining data from agencies that provide services to frequent utilizers was not always easy or, in some cases, even possible. Concerns about HIPAA rules and the sharing of personal health information data between agencies hampered our ability to obtain some data, as did the limited availability of patient permission for sharing of information for care coordination and planning purposes.[[10]](#footnote-10) Additionally, many of the organizations involved had a limited ability to extract service utilization and associated costs data from their own internal systems in an agile and timely manner.

While each component of the system (health, criminal justice, etc.) has its own set of unique frequent utilizers, this study and others highlight the fact that a significant portion of an organization’s highest utilizers also are likely to be high utilizers of other components of the system. Additionally, mental illness and/or substance use disorders are often key elements that contribute to frequent service utilization across systems. No one organization, therefore, can successfully address the frequent utilization of their services without working with other organizations in the system to address the root causes of that utilization. This cannot be done adequately without the ability to share information across systems on frequent utilizers, and to use this information to target interventions to individuals incurring the greatest average costs. Doing this successfully will require sharing of personal health data related to inpatient, emergency department, and mental health treatments. While a significant portion of the jail high utilizers consume these services at high rates, selection of individuals for intervention based solely on jail or law enforcement involvement and associated costs will result in a pool of individuals that does not necessarily have the highest crisis medical costs.

*Recommendation #1a: Increase the system’s capacity for data sharing through the use of Business Associate Agreements and Organized Health Care Arrangements.*

The perceived prohibitions for health-related data sharing can be addressed through the development of Business Associate Agreements and Organized Health Care Arrangements. Attorneys with whom the Health District has consulted in the past are familiar with these tools for data sharing and should be considered as resources for engaging provider and system partners in a review of the available options and implementation of the most appropriate and powerful tools that will both protect individuals’ privacy rights and allow for better system collaboration.

Increased, systematic implementation of patient consent may also need to be considered in order to comply with 42 CFR Part 2 regulations in Colorado related to the sharing of substance use disorder related information.

*Recommendation #1b: Utilize shared information to identify frequent utilizers with the greatest need for intervention, select appropriate interventions, help guide the implementation of interventions, and monitor the numbers of frequent utilizers, as well as their service utilization and associated costs over time.*

Consider expanding upon the existing Interagency Group’s purpose, scope, and abilities to create specific and formal community care coordination activities driven by the application of shared data collection on frequent service utilizers.

*Finding #2: Among frequent users of the jail, substance use disorders were nearly universal. Co-occurring mental illness and substance use disorders also are prevalent among this population.*

Roughly nine of every 10 people in our sample of frequent jail users were identified by jail staff as having substance use problems. While mental health disorders also were common, the extremely high prevalence of substance use disorders highlights a need to consider the system’s capacity for providing substance use disorder treatment as well as integrated care for co-occurring mental health and substance use disorders.

*Recommendation #2: Work with system partners to assess the current county resources for providing substance use disorder treatment and integrated co-occurring services, and consider bolstering evidence-based, intensive and integrated community-based treatment programs.*

When people with substance use disorders spend significant time in jail, they often inadvertently begin to reduce the use of their substances of choice. When they leave the jail, there is a particularly propitious opportunity for them to engage in substance use disorder (SUD) treatment, including medically assisted maintenance treatment, to capitalize on their diminished substance use. Critical Time Intervention services, or community outreach from intensive programs such as Assertive Community Treatment, should make it a priority to connect people to SUD treatment and co-occurring disorders treatment.

The assessment of current resources should focus on identifying the extent to which intensive case management and intensive outpatient SUD treatment are available for persons with substance use disorders and who are at risk for or have a history of involvement with the criminal justice system. To the degree that services are available, their current involvement in working with law enforcement and criminal justice system personnel should be ascertained. In addition, the availability of intensive, community-based co-occurring mental health / substance use disorder treatment services should be assessed.

Larimer County currently has a small evidence-based Integrated Dual Disorders Treatment (IDDT) team, which is much like an Assertive Community Treatment team but more intensively focused on SUD treatment needs and includes the provision of a continuum of SUD treatment services that are integrated with treatment for mental illness.[[11]](#footnote-11) An ACT Team was added in early 2014, and these teams now work side by side. Reports from Health District leaders indicate that neither of these teams has been able to implement all aspects of full fidelity to their model, and both are limited in the number of individuals they can serve.

Expansion of the fidelity and the capacity of these programs could be indicated. The extent to which this option should be pursued will be somewhat dependent on the degree to which overlapping services, which could perhaps be expanded to meet the needs of frequent users of the jail, already exist in the county. The fact that over half of the jail sample was assessed by jail staff to have both mental illness and substance use disorders, and given that among those with mental illness nearly all had co-occurring substance use disorders, expansion or intensification of the existing IDDT team could be a core component of a system solution to meeting the needs of high utilizers in northern Larimer County.

Given that the recommended focused studies of current resources have not yet been completed, and given that our knowledge of currently existing intensive, integrated community services in Larimer County is limited, we must emphasize that our recommendations should be considered preliminary. However, our tentative specific recommendation is to add or expand three evidence-based programs to the continuum of care in the county. We have listed them in order of our tentative estimate of their importance:

* An Integrated Dual Disorders Treatment (IDDT) team that is fidelity-based and led by a multi-disciplinary team, including a Team Leader, Case Manager(s), Nurse, Psychiatrist, Mental Health Therapist, Substance Abuse Counselor, Criminal Justice Specialist, Supported Employment Specialist, Housing Specialist, and Peer Specialist. The typical staff to client ratio is approximately 1:10 or even 1:8. An IDDT team is well-equipped to provide stage-of-change based interventions, motivational interviewing, harm reduction approaches, and mental illness treatment that is integrated with substance use disorder treatment and counseling. Like Assertive Community Treatment, IDDT staff provide outreach, case management, and recovery-oriented employment and peer-led interventions.[[12]](#footnote-12)
* An Intensive Outpatient Program (IOP) for people with substance use disorders, but not serious mental illness, staffed by counselors and other providers who are trained in responding to the needs of justice-involved clients, and who are prepared to engage in outreach (for example, to the detention center) and case management. If an IOP already exists in the county, the focus could be on retooling this program, if necessary, to focus on the justice-involved population. Alternatively, the IOP might need to be expanded to meet more of the need, either through increasing staff and/or increasing the outreach, case management, and criminal justice liaison components of the program.
* Implementation of an evidence-based Critical Time Intervention program to serve people with behavioral health conditions who are not eligible for, or currently served by, the recommended IDDT team or other, currently-existing evidence-based intensive community programs that already have staff to serve clients who end up in the adult detention center, come to the attention of law enforcement, or utilize emergency rooms and hospitals.[[13]](#footnote-13)

Regardless of which providers implement these programs, system leaders should ensure that they are sufficiently trained in the evidence-based models, that they collect and track data on utilization and outcomes, and that they coordinate their efforts through regular meetings, perhaps hosted under the auspices of the MACC and/or the Health District.

**In particular, it will be important that there is an appropriate, timely flow of individuals through the IDDT and IOP programs so that these expensive resources are sufficiently capable of responding to the full need for intensive community-based programming among frequent users of the jail and other restrictive and expensive community institutions and agencies**. The best fidelity model for ACT, for example, specifies that the program efficiently transfers people to lower levels of care when they are ready.[[14]](#footnote-14) The very same methods can be applied to IDDT without difficulty. The processes for accomplishing this are not mysterious and teams can readily learn them, especially if they understand and believe in recovery from mental illness and substance use disorders.

*Finding #3: The costs associated with frequent use of the jail, the emergency department, inpatient facilities, and other services for people with unmet needs are high.*

Our findings indicate that frequent users of the jail also have considerable costs incurred through the use of other systems that are over-burdened when behavioral health disorders are inadequately treated. People with mental illnesses had particularly high per-person costs.

*Recommendation #3: Use this study’s estimates of the cost or burden of inadequately treated behavioral health disorders to obtain funding support for recommended evidence-based community programs.*

Implementation of evidence-based, intensive community-based treatment is expensive. However, the potential for pooling of funding, perhaps made more likely through the existence of the Mental Health and Substance Abuse Partnership, the MACC, and the Interagency Group, is significant in Larimer County. And, of course, the possibility of utilizing Pay for Success measures such as social impact bonds could provide additional funding support as well.

Efforts to obtain funding could be supported by our analysis of costs. While the annual cost per person in implementing an ACT or IDDT team is approximately $14,000.00 (depending on local salary dynamics and other factors), the annual per person costs associated with our sample’s use of the jail, with emergency department visits and inpatient admissions, also was high. It was conservatively estimated to be between $10,300.00 and $14,500.00, with the most likely estimate at $12,300.00. For people with mental illnesses, the estimated average per person costs of incarceration was even higher – about $14,000.00. However, this estimate is somewhat constrained by missing data and by the fact that people with mental health problems tend to have longer lengths of stay in jail (and our jail costs estimates are diluted by the presence of people without mental health or other behavioral health problems).

If sub-groups of the jail high user population (e.g., those who also have either emergency room use or inpatient use) are examined, then the average annual cost associated with jail and either emergency department or inpatient use (or both) is estimated to exceed the annual per person cost of an ACT team.

The number of people who are high utilizers of jail and/or other systems, whose annual costs exceed those of an IDDT team and who are not already being served by an intensive community-based program, may not reach the typical number of people served by an ACT or IDDT team (100). Therefore, we recommend that the IDDT team drawn not only on high utilizers identified at the jail (which will be able to provide a large portion of the clients needed to fill an IDDT team), but also on those identified through analyses of the highest utilizers of emergency department and inpatient settings, not unlike the analyses we conducted for this study. For this reason it is critical that data from both law enforcement and crisis medical providers be available for use in the selection of participants.

For the program to be cost-effective, the highest utilizers, with the highest costs, need to be identified and enrolled in the ACT or IDDT team. Once that is accomplished, annual fidelity assessments should be conducted to ensure the team has not “drifted” from its mandates both to enroll the highest utilizers and to ensure a steady, appropriate flow of people through the team and into lower levels of care once they have achieved significant levels of recovery from their co-occurring conditions. Ongoing data collection on service utilization levels and associated costs should be maintained in order to determine associated impacts on system costs.

**It is imperative that system partners, perhaps led by the Health District, develop ongoing methods for identifying the highest utilizers of restrictive, high-cost settings, so that the cost-effectiveness of any intensive, integrated community programming can be maximized as well as examined over time.**

*Finding #4: Homelessness and unemployment were prevalent in the sample of people who frequently were held at the jail.*

Data from the jail indicated that over half of our high utilizer sample was unemployed and nearly one in four were homeless. However, only a small percentage were in the Homeward 2020 data set, indicating that developing programmatic solutions based solely on the needs of people who frequently use the jail will not be sufficient.

*Recommendation #4: Work with system partners to ensure that any efforts to enhance treatment services incorporate either close coordination with vocational rehabilitation and housing programs, and/or include vocational and housing specialists on the treatment teams implemented.*

While inadequately treated substance use disorders and mental illness may be associated with detention center recidivism, it is quite possible that functional problems in the areas of employment and housing also are putting people at risk for repeated jail use. Any intensive teams that the county decides to implement or expand in order to meet the needs of this population should include housing and employment specialists. Evidence-based ACT and IDDT models assume employment specialists will be integral members of their teams, and many IDDT and ACT teams also include a housing specialist. However, not all IDDT and ACT programs implement full fidelity in these areas. The existing IDDT and/or ACT programs in Larimer County should consider whether they have sufficient levels of these services to meet full fidelity and be successful in impacting functional limitations of their clients.

However, these team members cannot be successful without other resources available in the environment. For example, the efforts of housing specialists are limited in the absence of an active Housing First/Permanent Supportive Housing (PSH) program. Communities that embrace Housing First and PSH models ensure that “wet housing” and “damp housing” options are available to people, and they make rental assistance available to those in need. Similarly, successful Supported Employment programs, like the one at the Mental Health Center of Denver, as well as successful employment specialists on ACT teams, often draw on the resources available through a business advisory group that makes competitive employment positions available to people with mental illnesses and that, in turn, benefits from the availability of a steady employment pool that tends to have lower turnover than younger people who typically obtain the entry-level employment positions.

The combination of comprehensive housing and employment supports, along with funding and/or collaborative relationships dedicated to ensure adequate housing units and employment slots are available, will go a long way toward reducing risk for re-entry into the jail among people with mental illness and substance use disorders.

*Finding #5: The average number of days served in jail was high, as was the number of contacts with police.*

The average length of stay in jail was 86 days, with many persons staying longer than six months. The length of stay suggests the potential benefit of a strengthened diversion program.

*Recommendation #5: Work with system partners to implement universal screening for behavioral health problems and conduct a flow study to find sub-groups of people who could be included in diversion programs but are currently being overlooked****.***

Larimer County already has drug and mental health courts, and the possibilities for expanding diversion could be explored further.

We recommend that system partners consider the possibilities for implementing universal pretrial screening. This is a best practice that currently is being implemented in Bexar County (San Antonio) Texas by the Justice Center of the Council on State Governments and the Meadows Mental Health Policy Institute for Texas. Behavioral health screening tools and reliable and valid instruments that assess the degree of criminogenic risk are available as resources for Larimer County.[[15]](#footnote-15) The latter instruments decrease the amount of error in determinations concerning who is and who is not high risk for release through diversion programs. They also tend to reduce the number and percentage of people with mental illness who are deemed by adult detention center staff and judges to be too high risk for diversion.

Final Comments

A useful place to begin considering the above recommendations is in the ongoing meetings of the MACC and the Interagency Group. The Health District could use this TriWest study report as a basis for developing a more data-based, shared understanding among the partners in these groups for developing solutions to the pressing problems they face.

The recommendations provided above do not automatically follow from the data, but represent our best attempts to identify the programmatic implications of the data. Other potential solutions, informed by greater knowledge of the existing and potential programming in the Health District, could be alternatively presented by the MACC and the Interagency Group. However, the above recommendations do provide a good starting place.

# Attachment A: Data Sets Utilized in the Study

Larimer County Jail Data

*Jail Data All Locations*

We received from Larimer County two Excel files of all 2012 or 2013 jail high utilizers used in Mr. Stall’s report. Each row in each file corresponded to a single booking. After considerable manipulation and consolidation of this data, we requested the individual’s city of residence, which allowed us to remove those jail high utilizers with residences outside of the Health District boundaries. The *All Locations* Excel file contained both the 2012 and 2013 data and the separate tabs used in its consolidation.

*Jail Data North Larimer Only*

This data file resulted from the same manipulations of the *All Locations* file, which were made after non-health district residents were removed from the data set. After considerable manipulation, the file contains the following tabs of data:

* 2012 data – the raw data for the 2012 jail high utilizers, with one row per charge. The same booking often had multiple charges.
* 2012 individuals – each row contains demographic and other information on a single individual.
* 2012 bookings – a consolidation of charges into bookings.
* 2012 jail days – a consolidation of bookings into total days served.
* 2013 – tabs corresponding to the 2012 tabs.
* Other tabs used to consolidate the 2012 and 2013 data for use in the analysis.

Fort Collins Police Data

We received a series of Excel files from the Fort Collins Police Department, with the first file including data on jail high utilizers with last names beginning with A to B, the second file with last names beginning with C to D, etc. Each individual jail high utilizer had information on a single tab, including the date of each police interaction, the number of officers involved, and the number of total minutes all officers spent on that interaction. We combined these separate tabs into a single Excel file, *Fort Collins Police Interactions Consolidated Data*, with the following tabs:

* Data – the data combined from the separate files we received.
* 2010 – the number of interactions and minutes of police contact by individual that occurred in 2010.
* Tabs 2011 to 2014 – the same information for the years 2011 to 2014, broken out by year.

All of the actual analysis of this data was done in the statistics package R. We have not included the R files, but will provide them on request.

The Fort Collins Police Department also provided a data set of all individuals with 20 or more police interactions in the 2012/13 time period. We have added this as a separate tab to the *Police Interactions Consolidated Data* file, with the tab name *Police Frequent Contacts.*

PVH ED Data

Poudre Valley Hospital provided encounter data for those of our jail high utilizers who also had three or more PVH ED visits. The included data tabs are:

* Data – the raw data, including a substitute patient name, date of ED visit, and supporting details.
* Summary – information generated by PVH.
* Three tabs in which we consolidated and counted visits by patient or payer.

Rocky Mountain Health Plan Medicaid data

We received two files of Colorado Medicaid data. The first was encounter and billing information for those jail high utilizers that were enrolled in Medicaid. Individual names were replaced with unconnected identifiers. The second file of de-identified data covers all Medicaid enrolled members with residence in Larimer County.

Each is an Excel file that includes programming in visual basic. The first tab, “Practice Summary,” provides summary information for all of the individuals within the data set. The programming appears to be designed to allow a single medical practice to view information on their own patients and make aggregate comparisons to all Rocky Mountain Health Plan members. Included within this tab are “attributed” and “unattributed” classifications. In the case of the jail high utilizer file, attributed members are the jail high utilizers. In the case of the all-Larimer file, attributed members are assigned to any health home, while unattributed members are enrolled but without a health home.

The second tab, “Patient Summary,” lists each patient as a separate row and provides information on the total expenses, number of ED visits, number of IP admissions and readmissions, prescriptions, and potentially preventable expenditures. By selecting a cell, the entire row is highlighted in yellow. When this is done, the detailed information for this individual becomes available in the next tab.

The third tab, “Patient Detail,” contains encounter information for the individual highlighted in the patient summary tab. It includes ED, IP, outpatient, and office visit claims details. It also includes information on prescriptions and mental health events. Total costs by category are also provided.

It is possible to use each of these files to develop sub-groups of the data. At the bottom of the “Patient Summary” tab is a series of filtering options. By clearing the current filter and imposing new selection criteria, a subgrouping of patients will appear in the main section of the “Patient Summary” tab. For the all Larimer file, there is an error in the programming for this feature. Directions for selecting a subgrouping of patients are:

* Right click down at the bottom on the “Patient summary” tab name and select “view code,” which will lead to the code for “hidequeryrows.” Within that change are the four references of AQ to AR. Save, close the visual basic screen, and try again.

The advantage of the visual basic programming of the Medicaid data file is convenience in identifying and summarizing the information on a single or select group of patients. But this convenience comes at a cost; it is inconvenient to organize the individual patient encounter data in another format. For much of the jail high utilizer data analysis, we were forced to copy and paste encounter data on a patient-by-patient basis into another Excel file.

Homeward 2020 Data

This includes nine PDFs of individual IV-SPDAT records and one Excel file with data on three individuals identified through a point-in-time study.

The specific data fields are not identical in the IV-SPDAT files, nor do they exactly match the fields in the Excel file. We consolidated all of the data into a single Excel file titled *Homeless Data.*

Salud Data

We received an Excel file with counts of individuals from the jail high utilizer group that received treatment in 2012, 2013, or 2014. While there is no identifying information in this file, it is possible to determine how many individual received care in each year and in multiple years.

1. We also calculated estimates of the rate of homelessness and physical health care utilization. See the Technical Report for more detail. [↑](#footnote-ref-1)
2. “Base group” refers to a group of high jail utilizers whose frequent use of the jail (meeting our criterion of at least four visits) occurred in the same year. [↑](#footnote-ref-2)
3. Please see the Technical Report section below for more detail on pharmacy, primary care, and specialty care costs. [↑](#footnote-ref-3)
4. Average number of contacts in earlier years was much lower because the inclusion criteria focused on those who were high utilizers of the jail in 2012 or 2013. [↑](#footnote-ref-4)
5. Recall that there were 155 unduplicated Health District-residing individuals in the 2012 and 2013 base groups combined. [↑](#footnote-ref-5)
6. Please note that the average for 2012 in the table above (6.7) includes high utilizers from the 2013 base group. Although the 2013 base group had some incidents in 2012, their per person average was much lower in 2012 than was the 2012 base group’s average. [↑](#footnote-ref-6)
7. Nguyen, T (2004) “CRIMINAL OFFENDING AND MENTAL DISABILITY IN HARRIS COUNTY: A ONE-YEAR COMPARISON OF REGULAR OFFENDERS WITH OFFENDERS WITH MENTAL ILLNESS AND/OR MENTAL DISABILITY” Mental Health and Mental Retardation Authority of Harris County. [↑](#footnote-ref-7)
8. <http://multimedia.3m.com/mws/media/855236O/fact-sheet-solutions-for-potentially-preventable-events-2-13.pdf?fn=3m_ppe_solutions_fact_sheet.pdf> [↑](#footnote-ref-8)
9. The assignment of a health home within Medicaid may be an administrative assignment only, without corresponding primary care services. These estimates then represent the highest possible use of primary care services. [↑](#footnote-ref-9)
10. Please note that no agency was asked to share individually identifiable protected health information with TriWest. [↑](#footnote-ref-10)
11. See the clinical description of an IDDT provided by the Center for Evidence Based Practices at Case Western Reserve University: <http://www.centerforebp.case.edu/client-files/pdf/iddtclinicalguide.pdf> [↑](#footnote-ref-11)
12. From 2003 to 2007 TriWest worked with a grantee in SAMHSA’s Treatment for the Homeless program, Heritage Behavioral Health in Decatur, Illinois, which implemented IDDT very successfully with a population of people experiencing homelessness in addition to co-morbid serious mental illness and substance use disorders. Many of the clients served had frequent contact with jails and other restrictive settings. While all were homeless at baseline, none were homeless after 12 months in the program. Reductions in hospitalizations and emergency room use were significant, as well. TriWest implemented onsite fidelity assessment methods and developed fidelity tracking instruments that the Team Leader and other clinicians used on a monthly basis with each client on the team. [↑](#footnote-ref-12)
13. People already served by intensive teams such as an ACT or IDDT should receive outreach to the jail and assistance in making transitions to community residences from the ACT or IDDT. CTI would not be needed for these individuals. For an introduction to Critical Time Intervention see: Chen, F. (2014). Developing community support for homeless people with mental illness in transition. *Community Mental Health Journal, 50*, 520-530. [↑](#footnote-ref-13)
14. Monroe-DeVita, M., Teague, G., & Moser, L. (2011). The TMACT: A new tool for measuring fidelity to Assertive Community Treatment, *Journal of the American Psychiatric Nurses Association, 17*(1), 17-29. [↑](#footnote-ref-14)
15. See an introduction to risk assessment, including criminogenic risk at: <http://csgjusticecenter.org/reentry/posts/risk-assessment-what-you-need-to-know/> for a review of valid and reliable instruments see: Desmarais, S.L., & Singh, J.P. (2013, May). Risk assessment instruments validated and implemented in correctional settings in the Unites States. Austin TX: Justice Center of the Council on State Governments. Retrieved at: <http://csgjusticecenter.org/reentry/publications/risk-assessment-instruments-validated-and-implemented-in-correctional-settings-in-the-united-states/> [↑](#footnote-ref-15)