Frequent Utilizers of Services in Allegheny County: Identifying and Understanding People with High Levels of Need

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This series of reports explores the group of people who use crisis services frequently. By looking more closely at this population of frequent utilizers, we hope to gain insight into their needs, identify key intervention points, and find ways to encourage long-term wellness while reducing the need for repeat intense service usage.

Frequent utilizer: For the purposes of this report series, frequent utilizers (also referred to as frequent users herein) are defined as those clients of a particular service system who accounted for roughly the top five percent of individuals using that service in the 2016–2017 period of analysis. See the **Methodology** section of this report for more information about how we chose this definition of frequent versus non-frequent utilizers.

EXECUTIVE SUMMARY

Like many jurisdictions, Allegheny County is invested in responding to people who are in active crisis while also finding ways to support residents in ways that lessen the need for crisis services. Most people who access crisis services (defined in this analysis as emergency department visits, stays in an emergency homeless shelter, accessing a mental health crisis service, or contact with the criminal justice system) use these supports infrequently during a year, and in many cases use only one type of crisis service.

In contrast, a small subset of individuals uses these services frequently throughout the year. Allegheny County Department of Human Services (DHS) wanted to learn more about those people:

- How do their profiles differ from people who have minimal use of crisis services?
- For people who use more than one type of crisis service, which crisis systems tend to overlap and to what degree?
- And what non-crisis services do these individuals tend to use?

Answers to these questions will help the County tailor interventions where they are effective and for the populations most in need.

There is no standard dividing line between frequent and non-frequent utilizers, so in addition to describing the two groups of users, we also describe our process of determining the cut-off point for frequent use. For this analysis, we've defined frequent utilizers as the roughly top five percent of users in each type of service

examined. There are of course other ways of defining these two groups, and researchers may change the dividing line between the groups depending on the goals of the analysis, such as reduction of programmatic costs, improvement of outcomes for specific populations, or better allocation of scarce resources.

To share our findings, and to help readers interested in frequent users of particular service systems, we have described our findings in this summary report plus four system-specific data briefs. This summary document describes our methodology, limitations and information about frequent users of crisis services across all four systems. The four subsequent data briefs each look at frequent use by clients in particular crisis services:

1. Hospital emergency department (ED) visits
2. Mental health (MH) crisis service uses
3. Criminal justice involvement (in the form of criminal filings and jail bookings)
4. Emergency shelter stays

With the frequent utilizer analysis summarized here and detailed in four data briefs we hope to provide a nuanced description of people in crisis that informs how we look at frequent utilizers and potential interventions going forward.

KEY FINDINGS

1. **From 2016 through 2017, there were 181,969 people who used at least one crisis service, including 120,327 people who used only the ED during this period.** The remaining people (61,642) used at least one MH crisis service, had an emergency shelter stay, or received a criminal filing or jail booking during this period. Of those using crisis services, 6% (10,655) met the definition of frequent user in at least one system. They accounted for 26% of all service episodes during this period.
2. **There is little overlap between frequent utilizers of one type of crisis service and another.** Just 9% (973) of the unique frequent utilizers in this study were frequent utilizers of more than one type of service. This does not mean they didn't use other services, just that they weren't frequent users of those systems.
3. **Frequent utilizers of mental health crisis services have a high degree of intersection with other systems** like emergency departments, the criminal justice system and the emergency shelter system.
    - Twenty-six percent (200) of frequent utilizers of mental health crisis services were also frequent users of hospital emergency departments, indicating that the ED may be a point of intervention for people in mental health crisis.

4. **There is evidence that emergency shelter staff and systems are connecting individuals to services to address broad needs, but for those frequent utilizers who continue to need emergency shelter, those services are not adequately addressing the reasons for continued shelter use.** All frequent utilizers of emergency shelter are using human service supports in the year after their first emergency shelter use in the analysis window (100% of frequent users and 84% of other users), however, the frequent users continue to utilize emergency shelter.
5. **Frequent users of the criminal justice system have high rates of involvement in support services, but they are less likely to be involved with crisis services than other frequent utilizers.** We found that in the year prior to their criminal filing, people who had frequent criminal filings received more voluntary services — such as mental health services, drug and alcohol services, and housing support — than crisis services. Twenty-seven percent received drug and alcohol services and 32% accessed mental health services; in comparison, 10% used crisis mental health services and 3% used emergency shelter. Most frequent users of the criminal justice system may not be in active crisis but do have high levels of interaction with the behavioral health system.

RELEVANCE TO NATIONAL RESEARCH

Researchers have cited several challenges with the study of frequent utilizers, including the absence of standardized definitions for "frequent" and the inability to see the impact that frequent utilizers have on multiple systems — like criminal justice and homelessness — without integrated data across these systems.[1] The healthcare system has utilized the concept of frequent utilizers, or high-need clients, for many years, but people are usually defined as high-need based solely on their healthcare utilization and/or healthcare costs.[2]

Allegheny County hopes to contribute to the field of study both in how it defines frequent utilization across systems and in creating a fuller picture of frequent utilizers through comparisons well beyond physical health, encompassing crisis-related services and human services such as housing assistance, child welfare, juvenile probation, and drug and alcohol treatment.

Allegheny County was able to conduct this analysis because it could assemble comparative data sets drawn from its integrated data warehouse. The County built this data warehouse over two decades through data-sharing agreements and investments in analytics and technology. Because of these investments, we can identify the population of frequent service utilizers and analyze how they interact with other systems, leading to more effective interventions and hopefully contributing to national dialogue on this population.

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1 Fuller, Doris A., Sinclair, Elizabeth & John Snook. "A Crisis in Search of Data: The Revolving Door of Serious Mental Illness in Super Utilization." Treatment Advocacy Center Office of Research and Public Affairs, April 2017. Available at https://www.treatmentadvocacycenter.org/storage/documents/smi-super-utilizers.pdf

2 Folz, B., Floyd, D. Community Behavioral Health Center King County MHCADSD. Peer Support Medical Integration Team. Accessed at: https://www.kingcounty.gov/-/media/depts/community-human-services/MIDD/MIDDBriefingPapers/CrisisDiversion/ES_12c_BP_83_86_High_Utilizer_Program.ashx?la=en

METHODOLOGY

The time period for this analysis is 2016 through 2017. We chose this two-year timeframe rather than a longer retrospective period in order to identify people who were in crisis during the time of the analysis. Studies have shown that people may "age-out" of crisis, so looking at the frequency of crisis service utilization over the lifetime of a person might include people who no longer need services.

We examined the characteristics and service involvement of people who were frequent utilizers during the period of study, looking at their use of crisis-related services, as well as their involvement with other human services, over the following time periods:

- Any time before their anchor date (the earliest date of the person's first crisis service during the time period)
- Twelve months prior to their anchor date
- Twelve months after their anchor date[3]

Data Sources

We used data from the Allegheny County Data Warehouse to build the models for this analysis. Of the more than 20 sources of information in this integrated data set, the most critical to this analysis were:

- **Emergency department visits:** This data comes from the State of Pennsylvania through the County's managed care entity for behavioral health. Due to data availability, this data source includes only people who used Medicaid as their health insurance. Data is for hospitals in Allegheny County.
- **Mental health crisis services:** Services are in the form of mobile outreach, walk-in and hotline responses and are available to anyone, regardless of insurance. This data comes from the County's managed care entity and is inclusive of all publicly funded mental health crisis service interactions. Mental health services paid for by private insurance or by patients is not included in this analysis.
- **Criminal justice system involvement**
    - **Criminal filings:** Criminal cases in which an individual is labeled as a defendant. A criminal filing occurs after an alleged crime is investigated, when the police initiate the criminal process by filing a complaint with a Magisterial District Judge or by making a warrantless arrest (referred to as an "on view" arrest) followed by the filing of a complaint. Criminal filing information was obtained from the Commonwealth of Pennsylvania's Magisterial District Judge System.

[3] For jail bookings, the anchor date for 12 months after was the release date from the first booking during 2016–2017, as individuals were unable to utilize other human services while incarcerated at the Allegheny County Jail.

- **Jail bookings:** Admissions into the Allegheny County Jail. People booked in the jail include individuals who are held by new charges, detained by local or other law enforcement jurisdictions, and/or are serving a jail sentence. Jail booking data was obtained from the Allegheny County Jail's Offender Management System.

- **Emergency shelters:** Facilities with overnight sleeping accommodations, the primary purpose of which is to provide temporary shelter. Shelters included in this dataset include those for adult-only households, family shelters and Winter Shelters. Data comes from the County's Homeless Management Information System (HMIS).

Data Limitations

We used service utilization as a proxy for need in much of this analysis. For example, we looked at visits to an emergency shelter as a proxy for people frequently homeless. However, some people may be experiencing frequent homeless incidents but only sometimes access services to address it (by staying with family or friends or staying on the street or in a car).

The frequency metric is the same for all cohorts: the total number of episodes in the two-year period from 2016 through 2017. This definition skews our results in one respect: for individuals whose first episode ever is in 2016 or 2017, the frequency metric counts the number of times they return to the system for a period of anywhere from zero days to two years following their first episode, depending on when their first episode is. For example, those whose first episode is January 1, 2016, are followed for two years. Those whose first episode is December 31, 2017, are followed for one day. The decision to explore service usage for 2016–2017 gave us the opportunity to look at service usage for a full year after the timeframe of the cohort. This method also reflects what the world would look like if we looked at the most recent two years of an individual's history on intake: some individuals would be entering the system for the first time, and others might have had episodes as much as two years earlier. Future analysis will benefit from exploring a full two-year timeframe for each client, as measured from their first enrollment.

As a result of the two-year cohort methodology, the differences between the frequent and non-frequent utilizer groups are somewhat compressed: The non-frequent utilizer group as we define it is likely to contain some individuals who (1) would qualify as frequent utilizers if we followed them for two years, and (2) are demographically similar to the frequent utilizer group, so any demographic differences between the groups appear to be smaller than they actually are. This should be borne in mind in interpretating our results.

The same thing is likely to be true of cross-program involvement: the differences that we report between frequent and non-frequent utilizers are likely to be somewhat smaller than the differences we would find if we followed each individual for the same amount of time after their initial episode.

Physical health data is limited to people who have Medicaid insurance. Therefore, this analysis will undercount a person's involvement in physical health services (ED or inpatient) if they paid for care outside of publicly funded insurance, such as private insurance or self-pay. For all systems, our data is limited to Allegheny County involvement, so criminal filings or emergency department services outside of the county are not included.

There are broader limitations to this analysis and how it can be used to design interventions. We intentionally looked at a two-year window of service usage as a way to describe people interacting with our systems right now. However, this methodology limits our ability to answer some important policy and program–related questions. Questions we did not seek to answer with this initial analysis include:

- What does a frequent user look like when they first interact with our systems?
- What does service utilization for a frequent user look like over time (is there a pattern; when does it begin and end)?
- What is the impact of reducing frequent utilization across other systems?
- What types of interventions would make the most impact (and for whom)?

The following sections describe some of the trade-offs and considerations for jurisdictions when determining a definition of a frequent utilizer.

Definition of Frequent Utilizer

Defining a frequent utilizer is an inexact science. The dividing line between the two groups can be placed at a certain percentage of the cohort, a percentage of service visits, number of people, or number of service visits, for example. Jurisdictions may use different definitions depending on the population or goal of the analysis (e.g., are we seeking to reduce costs in an ED or working to intervene with people who frequent both the ED and shelters?), the resources available (e.g., we can only serve 1,000 people with a specific intervention) or identifying the top x% of people using a defined group of services. Examples of how different parameters change the make-up of the focus group is are the next section.

We chose to define frequent utilizers as the individuals whose service usage put them in approximately the top five percent of users of a particular service or system. Because this analysis was meant to be descriptive and is not informing a specific intervention, we did not have resource constraint considerations. In addition, the choice of roughly five percent allowed us to create a consistent methodology across all crisis services, which allows us to compare the demographics and service utilization of these groups.

The following sections describe more about how we arrived at this definition.

Exploring the definition of a frequent utilizer: cut-off points in frequency of jail bookings

Allegheny County created a tool to help explore the trade-offs between various choices. The tool allows an individual to pick a cut-off level by crisis service area and examine the demographics and service utilization rates for each frequent user population. Below are examples of the choices a jurisdiction might make (and their implications).

If an individual chose to define frequent users of the jail as people who had three or more jail bookings within a two-year period, this would include 2,335 people (12% of the total cohort and 28% of all bookings). Reducing the jail bookings for this population would have a large impact on the total number of bookings but would require a lot of resources given the size of the population. However, increasing the cut-off level to four jail bookings would reduce the population in scope to 863 people, which is 4% of the cohort and encompasses 13% of the population.

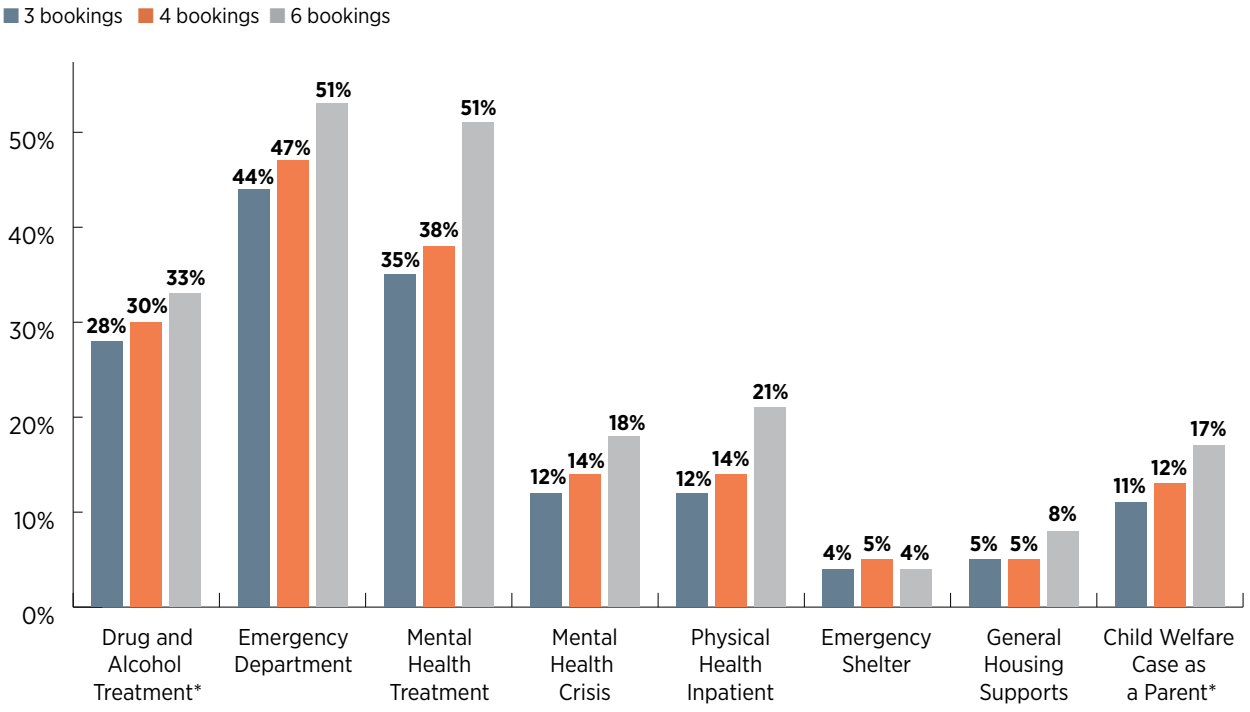
This might be a more manageable number of people to intervene with but also might have a smaller impact on reducing the number of bookings into the jail.

TABLE 1: Examples of frequent utilizer cohorts by jail booking frequency

CUT-OFF LEVEL	NUMBER OF PEOPLE	% OF COHORT	% OF BOOKINGS
Three jail bookings	2,335	12%	28%
Four jail bookings	863	4%	13%
Six jail bookings	120	1%	3%

In addition to the percentage of frequent utilizers changing at different cut-off points, the service needs of the population change at different cut-off levels (but not equally). **Figure 1** shows usage of other services in the year leading up to a jail booking. As the cut-off level of jail frequent utilizers increases, the rate of mental health treatment also increases (from 35% of the frequent utilizers with 3 bookings to 51% of the frequent users with 6 bookings). Rates of drug and alcohol treatment also increase, but to a lesser degree, and the rate at which people access emergency shelters does not increase at all. So, if we decided to define the frequent user population as people with six or more jail bookings, we would be identifying a population with high rates of mental health needs (and interventions would be designed to meet those needs).

FIGURE 1: Service usage by jail frequent utilizers at different cut-off points, one year prior to crisis event



**Denotes a service category that is limited by age eligibility.*

Implications of choosing users of multiple systems

There are many jurisdictions and models that seek to address frequent users of multiple systems through a variety of interventions. There are implications to this choice and, naturally, people who would not be served. In addition, the demographic make-up of the population cohort will also change. By choosing only frequent users of specific crisis services who have used other services, the demographic make-up of the population cohort can change.

Table 2 shows the demographic composition of three different cohorts: 1) people who were frequent users of mental health crisis services but had no jail booking during this period (2016–2017), 2) people who were frequent users of mental health crisis and also had a jail booking and 3) all frequent users of mental health crisis services during this period. Thirty-five percent (232) of frequent users of mental health crisis services also had a jail booking during this period.[4] The cohort with the booking is more likely to be Black (67% compared to 53%), male (73% versus 63%) and younger than 34 years old (47% compared to 34%) compared to the cohort without a booking. By choosing the interaction of mental health crisis services and jail bookings, the result is fewer (proportionately) females and older adults experiencing crisis who will be served. Depending on the desired outcome of the program (e.g., reducing the number of people in crisis, reducing the jail population, reducing costs), the choice of the cohort might impact its success.

4 Because almost all people booked into the Allegheny County Jail are age 18+ at the time of their booking, we reduced the cohort of frequent users of mental health crisis to only include adults (18+) (N=656).

TABLE 2: **Frequent utilizers of mental health crisis services and jail bookings, 2016 through 2017**

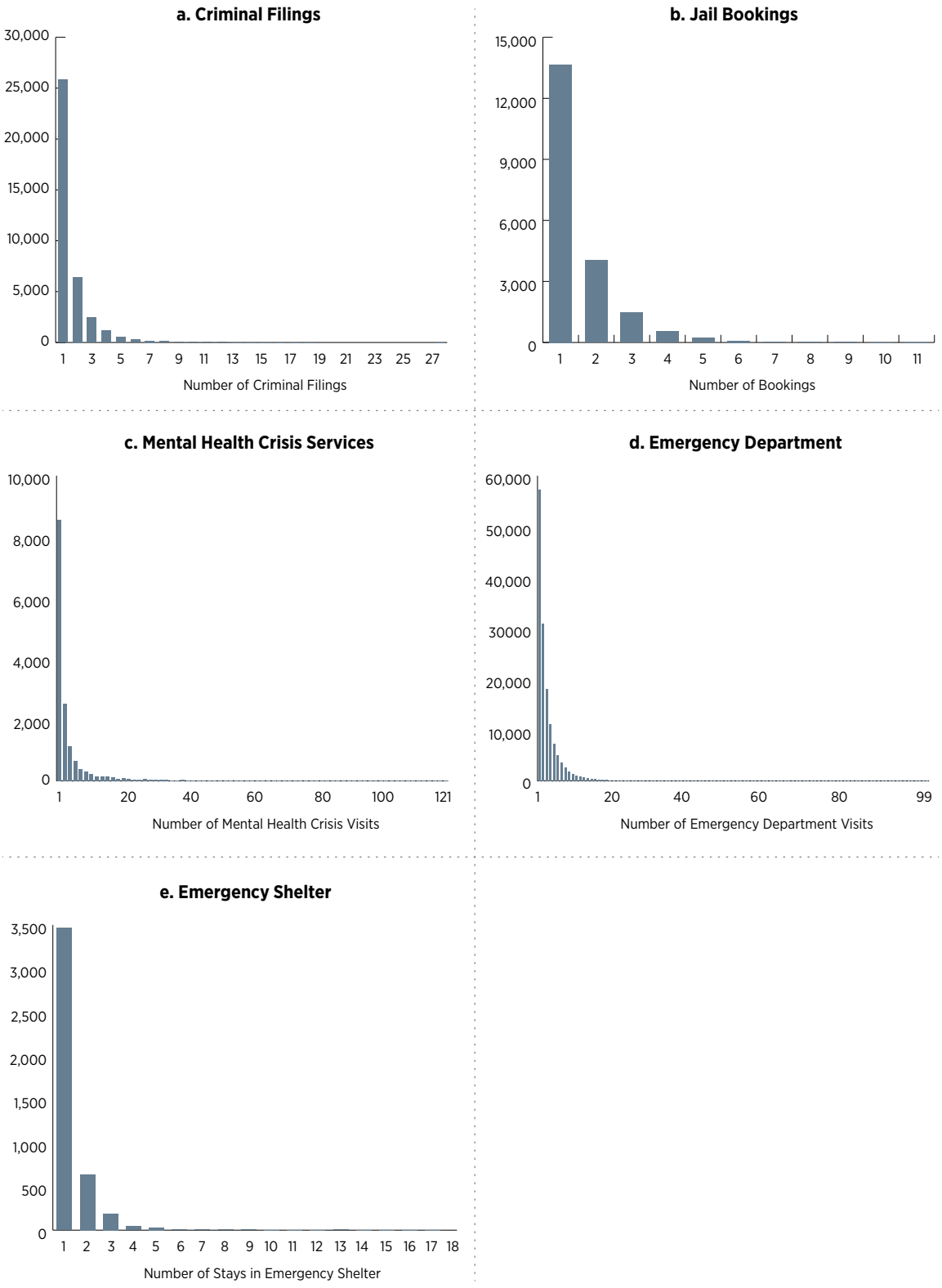
	13+ MENTAL HEALTH CRISIS EPISODES WITH NO JAIL BOOKING		13+ MENTAL HEALTH CRISIS EPISODES AND 1 JAIL BOOKING		13+ MENTAL HEALTH CRISIS EPISODES	
	N	% OF GROUP	N	% OF GROUP	N	% OF GROUP
Race						
Black	224	53%	156	67%	380	58%
White	193	46%	75	32%	268	41%
Other	7	2%	1	0%	8	1%
Legal Sex						
Female	159	38%	63	27%	222	34%
Male	265	63%	169	73%	434	66%
Age Group						
18–24	53	13%	39	17%	92	14%
25–34	88	21%	69	30%	157	24%
35–44	90	21%	51	22%	141	21%
45–54	107	25%	49	21%	156	24%
55–64	76	18%	21	9%	97	15%
>64	10	2%	3	1%	13	2%
Total	424	100%	232	100%	656	100%

Exploring the definition of a frequent utilizer: statistical modeling

Empirical distributions can be categorized in terms of the type of ideal mathematical probability distribution that best approximates them. In the case of human service use, the practical question we are asking is, "in a given population, what fraction of the population will use the service exactly once during a given time period? What fraction will use the service twice? Three times?" That question can be transformed into a question about the shape of the probability distribution that best models a graph of the number of clients who use a service once, twice, etc.

The largest number of clients have only one service use, and in general the greater the number of visits or episodes, the smaller the number of people with that number of episodes. With the exception of bookings in the Allegheny County Jail, the numbers decrease monotonically until some point far out in the tail, where the numbers are much smaller and there is some up and down before the final point representing the greatest number of episodes or visits by any single individual in the population. As can be seen from the charts below, there is a large difference between the number of clients who use each service one or two times and those who fall into the frequent utilizer subset in the tail. Additional detail of this methodology and analysis can be found in **Appendix B**.

FIGURE 2: Number of crisis service uses by number of clients, 2016 through 2017



Exploring the definition of frequent utilizers: disproportionate service use

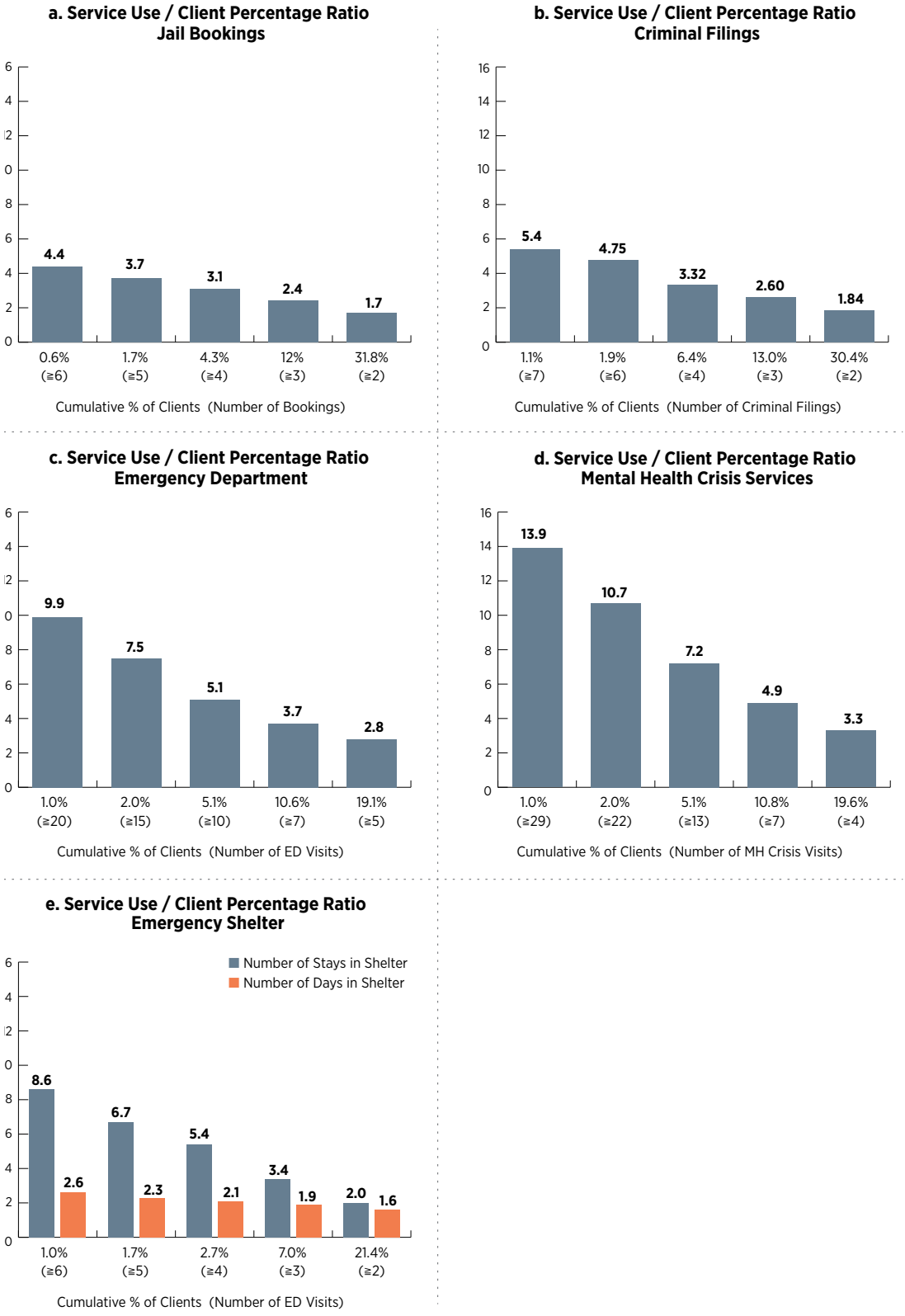
For each group of people using crisis services, we looked at percentage of services used by approximately one-, two-, five-, ten-, and 20 percent of clients.[5] **Figure 3** below show these ratios. The height of the columns in each chart shows the ratio between the percentage of services used and the percentage of clients who used the services. For example, in the emergency department chart (**Figure 3(c)**), one percent of clients in the emergency department cohort visited the emergency department 20 or more times each and accounted for 9.9 times as many visits as the average for that many clients. Mental health crisis, emergency departments and emergency shelter have high ratios of service use to percentage of users. The ratio of episodes (bookings or filings) to people for the criminal justice system is much lower than the other systems.

The chart for emergency shelter (**Figure 3(e)**) shows two sets of ratios — one for the number of *stays* in shelter, and one for the total number of *days* spent in shelter. A notable characteristic of emergency shelter frequent utilizers is that their stays are much shorter on average than non-frequent utilizers. Thus, the total number of shelter days for frequent utilizers is, on average, a little more than the total number of days spent by non-frequent utilizers. This contrasts with the total number of stays, where, by definition, frequent utilizers have more. By comparing the number of days during which the shelter was used, it is clear that frequent utilizers are not using a large proportion of resources, as compared to the non-frequent utilizers; there is much less disproportionality for the total number of days in shelter, which suggests that overuse of shelter resources is not the primary issue for those we have defined as frequent utilizers of shelter.[6]

5 As the set of clients and number of visits are discrete, not continuous variables, there are no cutoffs at exactly each percentage threshold of clients, so we chose the number of clients closest to each, as shown by the x-axis labels in the charts below.

6 Service use ratios are calculated for regular emergency shelters only, as we do not have accurate data for length of stay in the Severe Weather/Winter shelters.

FIGURE 3: Ratio of service use to percentage of users



Definition of frequent utilizers for this analysis

As noted above, for the purposes of the analysis presented in these reports, frequent utilizers are roughly the top five percent of individuals who used crisis-related services within the 2016–2017 time period. Using this rough definition, DHS identified the number of episodes in each system that indicate a person is a frequent utilizer. **Table 3**, below, shows these cut-off points, as well as the number of unique frequent utilizers within each category.

TABLE 3: **Unique frequent utilizers and cut-off points, by crisis service type**

	CUT-OFF POINT	NUMBER OF FREQUENT UTILIZERS	% FREQUENT UTILIZERS IN COHORT	TOTAL SERVICE EVENTS	% OF SERVICE EVENTS THAT WERE FREQUENT UTILIZERS
ED Visits	10 or more ED visits	7,363	5%	122,282	26%
MH Crisis Service Visits	13 or more crisis visits	781	5%	18,347	37%
Criminal Filings	4 or more criminal filings	2,648	6%	13,875	21%
Jail Bookings	4 or more jail bookings	863	4%	3,970	13%
Emergency Shelter Stays	4 or more distinct shelter stays	117	3%	741	12%

FINDINGS

Who is using crisis services?

From 2016 through 2017, there were 181,969 people who used at least one crisis service, including 120,327 people who used only the ED during this period. The remaining people (61,642) had at least one MH crisis service, emergency shelter stay, criminal filing or jail booking during this period.

Of those using crisis services, 6% (10,655) met the definition of a frequent user in at least one system. Frequent utilizers accounted for 26% of all service episodes during this period. Compared to non-frequent users of crisis systems, frequent users were more likely to be Black (49% compared to 42%) and older (45% were over 35 compared to 37% of any crisis user). It should be noted that, though only 13% of Allegheny County residents are Black, 43% of crisis users during this period were Black. Black residents are disproportionately using crisis services and the disproportionality is more pronounced when looking at frequent utilizers. This results from decades of structural racisim in our service systems, in particular in the housing and health systems and in the criminal justice system.

TABLE 4: **Demographic description for users of any crisis service in 2016–2017, by frequent user status**

	FREQUENT USERS OF ANY SYSTEM		NON-FREQUENT USERS OF CRISIS SYSTEMS		ANY USER OF CRISIS SYSTEMS	
	N	% OF GROUP	N	% OF GROUP	N	% OF GROUP
Race						
Black	5,269	49%	72,556	42%	77,825	43%
White	5,114	48%	89,018	52%	94,132	52%
Other	272	3%	9,740	6%	10,012	6%
Legal Sex						
Female	5,483	51%	85,417	50%	90,900	50%
Male	5,096	48%	84,258	49%	89,354	49%
Age Group						
<18	944	9%	49,871	29%	50,815	28%
18–24	2,003	19%	23,077	13%	25,080	14%
25–34	2,789	26%	33,257	19%	36,046	20%
35–44	1,810	17%	21,205	12%	2,3015	13%
45–54	1,728	16%	18,935	11%	20,663	11%
55–64	1,036	10%	15,504	9%	16,540	9%
>64	270	3%	7,816	5%	8,086	4%
Total	**10,655**	**100%**	**171,314**	**100%**	**181,969**	**100%**

No group of people uses all four crisis-related services frequently. In other words, one group is not getting booked into the jail and using shelter and receiving mental health crisis services and getting treated at the ED frequently (as is defined in this analysis). In fact, there is little overlap among frequent utilizer cohorts as we've defined them; just 9% (973) of the unique frequent utilizers in this study were frequent utilizers of more than one type of service. This is important for service planning as it shows that interventions to stabilize frequent utilizers may need to be different for people in different service areas; we cannot assume that an intervention for frequent users of one type of crisis service will carry over to frequent utilizers of other types of services due to the low percentage of overlap.

While frequent utilizers of a particular crisis service did not tend to use other crisis services at a level that would be considered frequent, they did tend to use other non-crisis services more than non-frequent utilizers (see **Table 5**, **Appendix C** and discussion below).

Frequent utilizers' average demographic profiles also vary by type of crisis-related service. **Table 5** presents the median age of frequent utilizers and the percent of users by race and legal sex. Frequent users are older on average than non-frequent crisis users. This differs by crisis service, with users of emergency shelters having the oldest median age (49). The youngest are those with multiple criminal filings during the year, consistent with the literature that people tend to age out of crime.

Users of any crisis system are disproportionately Black. (About 13% of the Allegheny County population identifies as Black/African American and 43% of users of the crisis system during this period were Black.) The disparity widens when looking at frequent users (50% of frequent users are Black) and even more so in specific services like shelter (56% Black) and mental health crisis services (59% Black).

Females are more likely to frequently use the emergency department than males, while males are more likely to frequently use any of the other crisis services. This is particularly pronounced in the criminal justice system and in emergency shelters (76% of people booked in the Jail were male and 88% of people in emergency shelters were male).

TABLE 5: **Percentage of race and legal sex and median age of frequent utilizers by crisis service type**

SERVICE TYPE	MEDIAN AGE	RACE	LEGAL SEX
ED Visits	34	48% white 50% Black	36% male 64% female
MH Crisis Services	35	40% white 59% Black	66% male 34% female
Criminal Filings	29	52% white 45% Black	74% male 26% female
Jail Bookings	31	51% white 49% Black	76% male 24% female
Emergency Shelter Stays	49	40% white 56% Black	88% male 12% female

How frequent utilizers differ from non-frequent utilizers

Though people who are using these crisis services frequently during this period often do not have time to be frequent users of multiple systems, this does not mean they are not involved in other systems. All analysis in this section examines any service utilization in the year prior to a person's first episode during the study period.

Frequent users compared to other crisis system users

When we compared frequent and non-frequent utilizers of the same category of crisis service, we found some differences in demographics and in their involvement with services (both the four crisis-related services and other human services and systems).

Table 7 in **Appendix C** displays the percentage of frequent and non-frequent utilizers who were involved in various services one year prior to their first crisis episode. When looking at utilization across service types, frequent utilizers were more likely than non-frequent utilizers in each of the crisis service categories to be involved with almost every service category. Some notable findings:

- Frequent users of emergency departments were four times more likely than non-frequent users to access mental health crisis services in the prior year (12% of frequent users compared to 3% of non-frequent users).
- Frequent users of mental health crisis services were 4.3 times more likely to use emergency shelter in the prior year (13% of frequent users compared to 3% of non-frequent users).

Frequent users of each specific crisis service were also more likely to have used that crisis service in the year prior to their anchor date. This means these are not people who are new to these systems. Another methodology to examine frequent users might be to try and identify frequent users at the start of their involvement in these services with a goal of intervening at the earliest possible date.

Service utilization for frequent users of crisis systems

Figure 4 shows the percent of frequent users of each crisis system that had a criminal filing or jail booking in the year prior to this period. About a quarter of all frequent users of mental health crisis services and a fifth of frequent users of shelter had a filing or booking in the year prior to this period. The high rates of frequent users of the jail with a booking in the previous year is not surprising and points to both the reason they are in the jail and that most frequent users of the jail have prior criminal histories.

FIGURE 4: **Percent of frequent users with criminal justice involvement in the year prior to their first episode in this period, by crisis system**

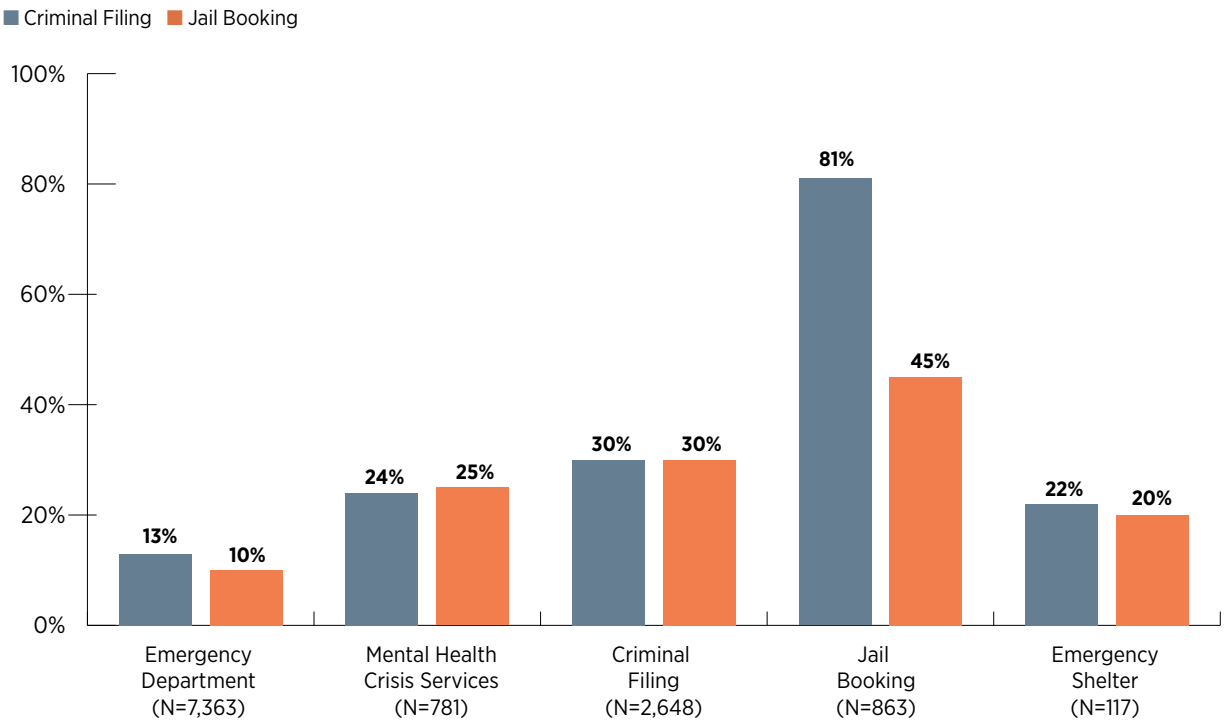


Figure 5 shows the percent of frequent users of each crisis system that had a physical- or behavioral-health-related service in the year prior to this period. There are high rates of involvement in the ED and mental health treatment for frequent users of mental health crisis services and of shelter. Sixty-one percent of frequent users of mental health crisis services and 45% of frequent users of emergency shelter had an ED visit in the prior year. Seventy-two percent of frequent users of mental health crisis services and half of frequent users of emergency shelter were involved in mental health treatment in the prior year. There are two implications to this — one, that the ED is a potential good place of intervention for someone experiencing a mental health crisis and two, that people experiencing these crises are not new to our treatment systems and are often already engaged with services.

Frequent users of the criminal justice system also have the highest rates of involvement in drug and alcohol services than any of the other frequent users. In addition, about a third of this group is using mental health treatment services but only 10% of people with frequent filings and 14% of people with frequent bookings used any mental health crisis service. Frequent users of the criminal justice system are potentially not in active crisis, but have longer term behavioral health issues that may contribute to this frequency.

FIGURE 5: Percent of frequent users with health-related service involvement in the year prior to their first episode in this period, by crisis system

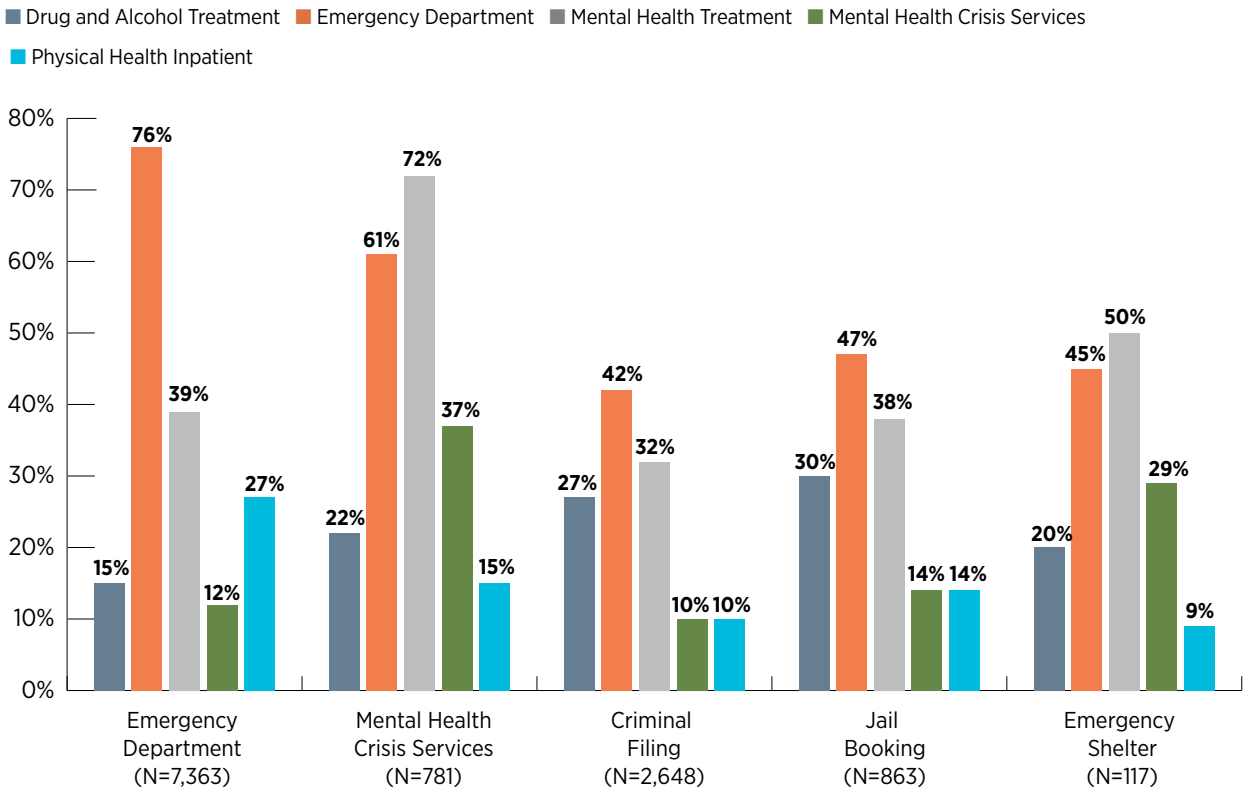
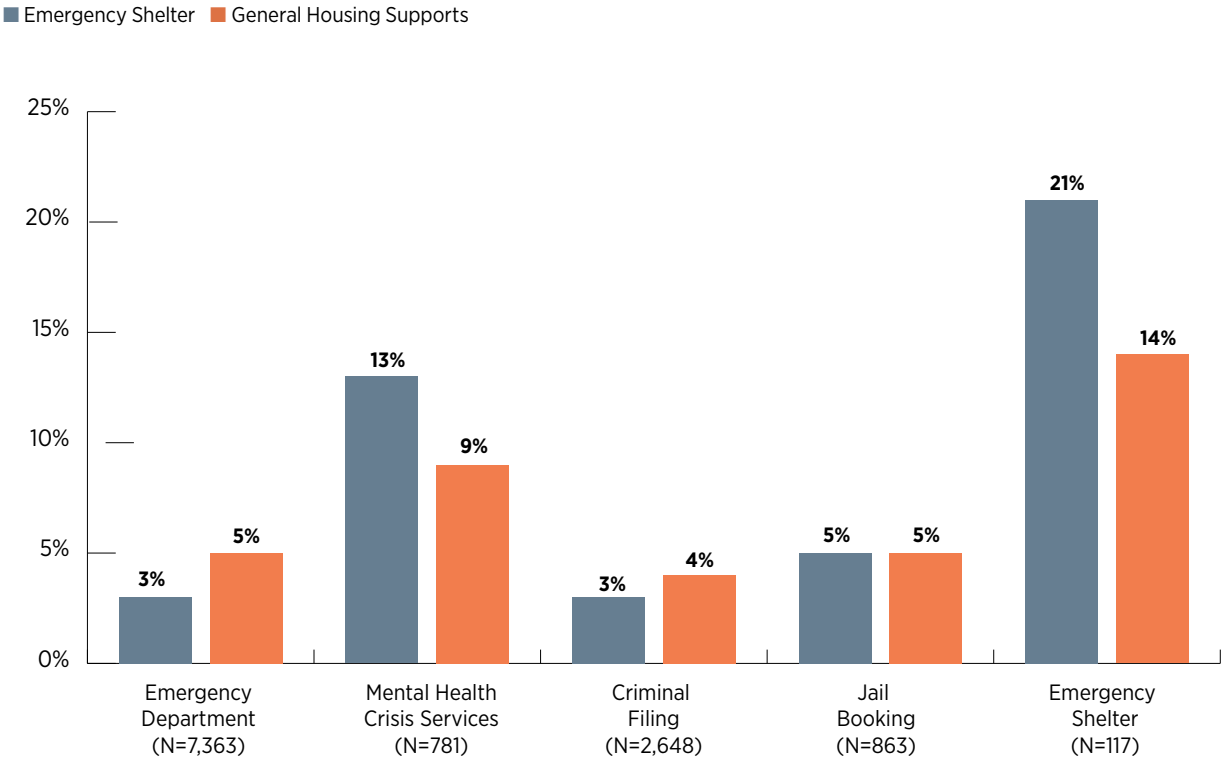


Figure 6 shows the percent of frequent users of each crisis system that had a homeless or housing support service in the year prior to this period. More than one-fifth of frequent users of shelter had accessed it in the year prior to this period. Thirteen percent of frequent users of the mental health crisis system also used an emergency shelter in the year prior to this period. In addition, this group received other housing supports (homeless prevention, rapid rehousing, etc.) at higher rates than the other crisis service users.

FIGURE 6: **Percent of frequent users with homeless or housing support service involvement in the year prior to their first episode in this period, by crisis system**



Youth Services

When looking at the prior years' involvement in youth services (a child involved with an open child welfare case and juvenile probation), a frequent user had to be "age eligible" to receive that service. Thirteen percent of frequent users of the jail were involved in child welfare as a parent in the year prior to this period.

Almost a third of age-eligible frequent users of mental health crisis services and of jail bookings were involved in child welfare as a child. Thirty-seven percent of frequent users of mental health crisis servicess and 60% of people with frequent criminal filings were involved with juvenile probation in the year prior to their first crisis service.

TABLE 6: Frequent utilizers' involvement with child welfare and juvenile probation in the year prior to their first episode in this period, by crisis system

	CHILD WELFARE (AS PARENT)		CHILD WELFARE (AS CHILD)		JUVENILE PROBATION	
	ELIGIBLE[a]	%	ELIGIBLE[b]	%	ELIGIBLE [c]	%
Emergency Department	6,778	6%	937	15%	483	19%
Mental Health Crisis Services	728	7%	131	32%	107	37%
Criminal Filing	2,601	10%	121	17%	121	60%
Jail Booking	863	13%	19	32%	19	89%
Emergency Shelter	117	3%	<5	—	<5	—

[a] *Based on age eligibility. Though parents can be under 18, it is not common. Therefore, this table examines people who were at least 18 one year prior to their first episode and who were frequent users of these systems. For this group, it looks at the % who were involved in child welfare as a parent.*

[b] *Based on age eligibility. Though some youth remain involved in child welfare after they are 18, we examined people who were 0-18 one year prior to their first episode and who were frequent users of these systems. For this group, it looks at the % who were involved in child welfare as a child.*

[c] *Based on age eligibility. Though some youth remain involved in juvenile probation after they are 18, we chose to examine only youth aged 10-18. This table examines people who were 10-18 one year prior to their first episode and who were frequent users of these systems. For this group, it looks at the % who were involved in juvenile probation.*

CONCLUSION

Nationally, jurisdictions are seeking to identify people who frequently use multiple systems. By intervening with these groups, we hope to both see outsized cost savings and improve overall outcomes. However, there are no common definitions of what it means to be a frequent user. People frequently using these systems are not homogeneous, a finding that has implications for what types of interventions should be designed and delivered.

The analysis presented here is descriptive in nature and aims to provide information about the frequent utilizers of four systems where we seek to reduce involvement. We have found that these groups are heterogeneous in terms of both demographics and service involvement. However, there are some commonalities. Frequent users of all these systems have higher service involvement than non-frequent users. In particular, frequent users have between two and four times the rate of involvement in mental health crisis services and emergency shelter services in the year prior to their anchor dates.

This analysis has implications for local and national work around policing and people in crisis. If we can better identify people who are in crisis, identify the best intervention points, and determine what interventions will help, we can reduce the contact that police have with people in crisis. This can improve outcomes for these individuals.

Allegheny County's Data Warehouse makes it possible for us to take steps beyond simply responding to frequent utilizers when crises arise. We are creating models that seek to prevent people from becoming frequent utilizers in the first place. By identifying the combination of factors that predicts future distress and a high likelihood of suffering multiple crises, we can act to prevent people from experiencing those negative circumstances. One such example is a predictive risk model (PRM) that helps identify those people calling in for housing services that are most at-risk for future involvement in crisis services (jail bookings, ED visits and inpatient mental health services). Those most at risk are prioritized for scarce supportive housing beds.[7]

By using both descriptive analysis of frequent utilizers and more statistically robust analyses to produce PRMs, we can better understand those clients most at risk for adverse outcomes (and where and for whom interventions may be most beneficial).

ANALYSIS

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7 For more information about Allegheny County's homelessness predictive risk model, see Improving Prioritization of Housing Services: Implementation of the Allegheny Housing Assessment.

APPENDIX A: SERVICE DEFINITIONS

Child welfare involvement: Services provided to families to ensure safety of child(ren) and to prevent abuse and neglect. Analysis includes two types of child welfare involvement: 1) individuals who were involved with an active child welfare case as a child age 18 or younger, and 2) individuals listed as a parent on a child welfare allegation, investigation or case.

Criminal filing: After an alleged crime is investigated, the police initiate the criminal process by filing a complaint with the appropriate Magisterial District Judge or by making a warrantless arrest (referred to as an "on view" arrest) followed by the filing of a complaint. The filing identifies the defendant, lists the crimes charged and contains a brief factual summary upon which the charges are based.

Drug and alcohol treatment: Publicly funded substance use disorder (i.e., drug and alcohol) services that are paid for by the County or HealthChoices (i.e., Medicaid managed care). Includes both clinical services, such as individual and group therapy, and non-clinical services, such as case management and peer recovery support.

Emergency department (ED) visit: an ED visit for which services were billed to Medicaid.

Emergency shelter stay: A stay in a facility with overnight sleeping accommodations, the primary purpose of which is to provide temporary shelter. Shelters included in this analysis include those for adult-only households, family shelters and Winter Shelters.

Housing support: Prevention services, support services and/or housing for individuals and families who are homeless or at risk of becoming homeless. Services include housing assistance, case management, prevention and outreach.

Jail booking: A booking happens when a person is officially admitted and housed in Allegheny County Jail by formal legal document and the authority of the courts or some other official agency. People booked in the jail include individuals who are held by new charges, detained by local or other law enforcement jurisdictions, and/or are serving a jail sentence.

Juvenile probation: Allegheny County's justice system for children and youth ages 10 through 18. Juveniles involved with juvenile probation are those receiving juvenile justice system services or who are under supervision in their own home or in placement in a detention facility.

Mental health crisis service: Mental health services that help mitigate/resolve crises — mobile outreach, walk-in and hotline responses to people who are in crisis. These are available to anyone, regardless of insurance.

Mental health treatment: Clinical services, such as individual and group therapy, and non-clinical services, such as case management, paid for by the County or HealthChoices (i.e., Medicaid managed care).

APPENDIX B: EXPONENTIAL DISTRIBUTIONS

Power Law Distributions, Best-fitting Curves and their Practical Meaning for Populations of Frequent Utilizers

It has been observed that in some types of human service use, a small number of clients at the far end of the tail—those with the most intensive service use (or most frequent, in the terminology of this report), use a disproportionately large percentage of services or resources. In modeling service use this is represented by a heavier and longer tail than it would be in an exponential distribution. Roughly speaking, in exponentially decreasing distributions, each successive number is cut by approximately the same fraction—for example, each successive number might be half or a third of the previous number. In what are called 'power-law' distributions, the earlier part of the distribution might look similar to an exponential distribution, but after a certain point the numbers stop decreasing as quickly and the tail extends out to much higher values (number of episodes of service use) than we would see in an exponential distribution. The practical consequence is that distributions best modeled by an exponential function decrease very fast; they have few, if any, values that are much greater than the average; and those few clients with the greatest service use account for a small percentage of total service use. On the other hand, where a power-law function is the best fit, small percentages of clients at the far end of the curve account for large, disproportionate amounts of service use.

The fit of a curve to a data set is measured by a value R^2, which is a measure of how well the curve predicts variance in the data set. R^2 ranges from 0 to 1, where 1 indicates a better fit in terms of predicting how many values are far from the average, and how far from the average they tend to be. In our study, only one of the curves (number of bookings) is clearly exponential, in the sense that the R^2 value for the best-fit exponential function is significantly higher than the R^2 value for the best-fit power-law function. The number of jail bookings per client, which ranges from 1 to 11, decreases monotonically from 1 to 11 and is well modeled by an exponential function (R^2=0.98). The number of criminal filings per client is equally modeled by power-law and exponential distributions (R^2=0.95 and 0.96 for power-law and exponential best-fit functions, respectively). It is common for power-law functions to be a better fit for empirical distributions if the first few values are excluded, and indeed for criminal filings this is the case: for x>=4, the R^2 value for the best-fit power-law is 0.9708 compared to 0.959 for the best-fit exponential function.

The remaining three cohorts—mental health crisis visits, emergency department visits, and emergency shelter stays—are all better modeled by power-law functions. The R^2 values for the best-fit power-law and exponential functions for each dataset are shown below.

R^2 Values of best-fit functions for individual cohorts

COHORT	R2 VALUES FOR BEST-FIT FUNCTIONS	
	POWER-LAW	EXPONENTIAL
Criminal Filings	0.9531	0.9576
Bookings	0.9362	0.9821
Emergency Department	0.9339	0.4629
Crisis Mental Health	0.9577	0.8943
Emergency Shelter	0.9490	0.7427

APPENDIX C: SERVICE INVOLVEMENT IN THE YEAR PRIOR TO CRISIS SERVICE, FREQUENT USERS VS. NON-FREQUENT USERS

TABLE 7: The percentage of people involved in service one year prior to first episode in timeframe, frequent users compared to non-frequent users

	EMERGENCY DEPARTMENT		MENTAL HEALTH CRISIS		CRIMINAL FILING		JAIL BOOKING		EMERGENCY SHELTER	
	FREQUENT UTILIZER	NON-FREQUENT UTILIZER	FREQUENT UTILIZER	NON-FREQUENT UTILIZER	FREQUENT UTILIZER	NON-FREQUENT UTILIZER	FREQUENT UTILIZER	NON-FREQUENT UTILIZER	FREQUENT UTILIZER	NON-FREQUENT UTILIZER
Criminal Justice System Involvement										
Criminal Filing	13%	5%	24%	11%	30%	7%	81%	62%	22%	15%
Jail Booking	10%	6%	25%	10%	30%	9%	45%	16%	20%	16%
Health-related										
Drug and Alcohol Treatment[a,b]	15%	8%	22%	14%	27%	11%	30%	18%	20%	15%
Emergency Department	76%	24%	61%	42%	42%	26%	47%	32%	45%	44%
Mental Health Treatment[b]	39%	20%	72%	46%	32%	15%	38%	23%	50%	32%
Mental Health Crisis Services	12%	3%	37%	9%	10%	4%	14%	7%	29%	18%
Physical Health Inpatient	27%	10%	15%	10%	10%	6%	14%	8%	9%	13%
Housing										
Emergency Shelter	3%	1%	13%	3%	3%	1%	5%	2%	21%	6%
General Housing Supports[b]	5%	2%	9%	4%	4%	2%	5%	3%	14%	10%
Youth Services										
Child Welfare (as child)[a]	—	7%	32%	15%	17%	10%	32%	18%	—	28%
Child Welfare (as parent)[a]	—	3%	7%	4%	10%	5%	13%	7%	3%	8%
Juvenile Probation[a]	19%	9%	37%	17%	60%	34%	89%	61%	—	10%
Any service	87%	50%	90%	67%	72%	42%	94%	78%	75%	65%

[a] *Only includes youth who were age-eligible for services one year prior to first crisis episode. For child welfare as child, anyone who was 0-18 in the period, and for JPO, anyone who was 10-18 in the period.*

[b] *Denotes a service considered to be voluntary.*

[c] *There were fewer than five people in the denominator, so data is not shown.*