Signals of Distress:
High Utilization of Criminal Legal and Urgent and Emergent Health Services in San Francisco

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1. Executive summary

People with multiple, complex health and housing needs frequently receive fragmented care because the providing systems operate independently. Typically, individuals who come into frequent contact with the emergency medical system (e.g., emergency departments; emergency medical services) also interact with other health services and public systems such as psychiatric facilities, substance use treatment centers, shelters, and jails. Cross-sector care coordination is limited, in part, because data systems are not linked across physical health, behavioral health (mental health and substance use), housing, and criminal legal systems.

To help San Francisco better serve this high need population, the California Policy Lab at UC Berkeley and the UCSF Benioff Homelessness and Housing Initiative worked with our partners in San Francisco's public health and criminal legal systems to link together ten years of data from the physical health, behavioral health, housing, and criminal legal sectors. Using these linked data, we identify individuals with high utilization of the criminal legal system and the medical and behavioral health systems in a single year. High criminal legal utilization is defined as at least three jail bookings in a year, while high healthcare utilization is seven or more urgent/emergent healthcare contacts in a year.

To understand trends before and after a year of high utilization, we analyze two cohorts. The 2011 cohort includes 211 people with high utilization of both systems in fiscal year 2011, while the 2020 cohort includes 161 individuals with high utilization of both systems in fiscal year 2020. This allows us to observe patterns of system use before and after years of high utilization. We find:

- Almost all the individuals in both cohorts experienced homelessness (98–99%)

- High utilization is linked to premature death: more than one quarter of the 2011 cohort is deceased within 10 years

- Between 80–90% of individuals in both cohorts have substance use disorders, and many also have co-occurring mental health and physical health disorders

- More than 90% of the individuals in both cohorts have been booked into jail for a felony and a misdemeanor

- Many of the individuals in the 2020 cohort were in San Francisco and had contact with at least one of these systems in the prior 10 years. For example, 30% of the 2020 cohort was booked into jail in 2011.

These findings highlight the need for coordinated, evidence-based interventions to address these individuals' complex needs, stabilize housing, and prevent poor health outcomes including untimely death.

2. Introduction

A small number of highly vulnerable individuals frequently cycle through jails, emergency departments, and homeless shelters. This rapid cycling — driven by structural factors like poverty and racism, and by individual factors including mental illness and substance use disorder — is frequently met with fragmented systems of care that do little to break these cycles and may actually perpetuate them. Neither jails nor emergency departments are equipped to address the full set of needs of this population, and even a short period of incarceration or hospitalization can be disruptive and lead to recurring contact with crisis health services and law enforcement upon release.

The concept of "high utilization" originated in the medical literature. High utilization of emergency medical services is often defined as having four or more emergency department (ED) visits per year (Billings & Raven, 2013; Kanzaria et al., 2019). Typically, individuals who come into frequent contact with the acute care system also interact with psychiatric facilities and substance use treatment centers, as well as other public systems such as shelters and jails (Raven, Carrier, Lee, Billings, Marr, & Gourevitch, 2010). Despite past research on the prevalence of homelessness (Raven, Kushel, Ko, Penko, & Bindman, 2016; Raven, Tieu, Lee, Ponath, Guzman, & Kushel, 2017) and behavioral health diagnoses among this population (Billings & Raven, 2013), few studies have examined frequent acute care users' contacts with other public systems. Furthermore, service clinicians often work in silos, limiting their ability to understand the complete health and social service needs of individuals experiencing multi-system high utilization. Siloed agency systems also make it difficult for clinicians to coordinate care and successfully address complex needs. Although individuals with high utilization are a relatively small proportion of medical patients, their acute needs mean they account for a disproportionately high amount of care (and costs) across these multiple sectors of care (Billings & Raven, 2013; Kanzaria et al., 2019).

The California Policy Lab at UC Berkeley and the UCSF Benioff Homelessness and Housing Initiative worked closely with our partners in San Francisco's public health and criminal legal systems to link records across the health and legal sectors to identify opportunities to better serve this high need population. We aim to identify factors that contribute to frequent contact with the criminal legal system and gaps in current policies, with the ultimate goal of improving patients' health, housing, and legal outcomes.

3. Data & measures

This report uses linked healthcare and criminal legal system data from the City and County of San Francisco from fiscal year 2011 (July 1, 2010–June 30, 2011) to fiscal year 2020 (July 1, 2019–June 30, 2020). The criminal legal system data are from the San Francisco Sheriff's Office (SFSO) and San Francisco District Attorney's Office (SFDA). The data consists of all bookings into the county jail (length of stay, date and time of booking) and information on all crime referred to the SFDA's office for prosecution (date of arrest, type of crime arrested for, whether or not a charge was filed, whether or not that charge led to a conviction). Data from both sources include general demographic information for each individual and are linked via a common identifier and anonymized for analysis (Appendix A.1).

The healthcare data are from the San Francisco Department of Public Health Coordinated Care Management System (CCMS). The data comprise records of nine urgent and emergent physical health, mental health, and substance use disorder services provided by San Francisco healthcare centers, including emergency services, medical inpatient hospitalization, medical urgent care, psychiatric emergency services, psychiatric inpatient hospitalization, psychiatric urgent care, sobering center, medical detoxification, and social detoxification. For individuals with at least one contact for a specific year with these urgent or emergent services, we observe the system used, medical condition (if any), housing status, length of stay in residential program or hospital (if applicable), and date of death (if applicable or available) (Appendix A.2).

Notably, while CCMS does not record an individual's full housing history, the system does collect a significant amount of data on housing status at the time of service receipt. Specifically, CCMS captures homelessness episodes that are both observed (e.g., someone accesses homeless services, such as a shelter) and reported (e.g., someone reports being unhoused during an encounter with health services). CCMS also incorporates data from the San Francisco Department of Homelessness and Supportive Housing, including the date of any completed assessments for Adult Coordinated Entry, the county's system for permanent supportive housing prioritization (see Appendix A.3 for details on the housing status definition).

The two datasets (criminal legal and healthcare) were linked together through supervised machine learning that is based on the first name, last name, and date of birth for each individual (Appendix A.4). There were more than 278,000 individuals in the linked criminal legal — healthcare dataset, with more than 30,700 individuals having contact with both systems over the ten-year period (Figure 1). On average, 3,979 individuals appeared in both datasets at least once each fiscal year.

Total individuals	278,828
Contact with both systems	30,755
HU of at least one system	24,811
HU of both systems in same year	1,566
Persistent HU	342

Note: HU = High utilization. Both systems refer to criminal legal system (jail bookings) and CCMS. Persistent HU is when individuals have high utilization of both systems for two consecutive years.

We define high utilization based on how often individuals come into contact with the criminal legal and the urgent/emergent health systems. Contact with the housing system, while present in the CCMS data, was not a factor in the definition of high utilization of health services. The threshold for high utilization was the lowest number of contacts an individual could have in any given year that would put them into the top 5% of individuals. During the analysis period, the threshold for criminal legal system high utilization was three jail bookings in a year, and for healthcare it was seven urgent/emergent service contacts in a year (Appendix A.5). An individual with four jail bookings and six urgent/emergent contacts would be considered to have high utilization of just the criminal legal system, while an individual with three bookings and eight urgent/emergent contacts in the same year would have high utilization of both, which we call "high, dual-system utilization." The definition of high utilization is constant across years. In San Francisco, there were 1,566 individuals with high, dual-system utilization between FY 2011 and 2020 (Figure 1). Of those, 342 (22%) experienced persistent high utilization across at least two consecutive years.

4. Patterns of high, dual-system utilization over time

Individuals with frequent dual system contact have complex physical health, behavioral health (mental health and substance use), and housing needs. In the remainder of this report, we explore patterns of system contact that lead up to, and follow, a year of high, dual-system contact for two cohorts of individuals. The goal is to identify patterns of contact before high utilization, and how individuals fare after a year of high utilization, in hopes of stimulating action around points of potential intervention and coordination in service delivery.

Looking forward: High utilization of both systems in FY 2011

In this section, we focus on the earliest cohort in the data, which we call the 2011 cohort, and observe what happens for these 211 individuals following a year of high, dual-system utilization.

Individuals in this group more commonly identified as male (80%), as Black/African American (41%) or as White (41%), and more than half were in their late thirties to mid-fifties (Table 1). Individuals who identified as African American/Black were singularly overrepresented among this population, making up almost seven times the share of Black adults in San Francisco in FY 2011 (6%).[1] By comparison, the share of the cohort who identified as White and Latino/a was comparable to that of the San Francisco adult population at the time. Although Asian or Pacific Islander populations comprised one-third of San Francisco adults in 2010, they were a small share of the 2011 cohort and too small to report as an individual group.

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1. Source: San Francisco County/City Population from the U.S. Census Bureau 2010 Decennial Census. Table P4. Hispanic/Latino, and Not Hispanic/Latino by Race for the Population 18 Years and Over.

TABLE 1. Characteristics of 2011 cohort

| CHARACTERISTICS	2011 COHORT
Observations	211
Male	80%
Female	18%
Unknown	2%
African American/Black	41%
Latino/a	13%
White	41%
Other race or ethnicity	5%
Age in cohort year	
18–25	6%
26–35	22%
36–45	28%
46–55	36%
56+	7%
Mean age in cohort year	42.3

Note. Due to small sample sizes, race and ethnicity categories of Asian, Pacific Islander, Native American, Multi-ethnic, Other, and unknown/not stated are combined in this table in the "other" category. Race/ethnicity data is predominately self-reported in CCMS.

Do patterns change after a year of high utilization?

One quarter of the 2011 cohort continued their dual-system high frequency contact the following year (Figure 2, blue bar). Another quarter of the cohort was present in the data in FY 2012 but did not interact with either system at the same frequency (Figure 2, green bar). Thirty percent continued to receive high frequency urgent and emergent health services in the subsequent year but did not continue their high frequency interaction with the criminal legal system (Figure 2, yellow bar). This could reflect services for substance use disorder, mental illness, or physical health needs that are unlikely to resolve quickly. A smaller share (13%) was booked into jail with high frequency in the subsequent year but did not have high frequency health system use (Figure 2, orange bar). This decline may in part be a function of age — as people grow older, they tend to have less contact with the criminal legal system — or may be due to stabilizing health services use. Overall, the 2011 cohort had a startling death rate: by the end of the ten-year period, at least one quarter of the cohort was deceased (26%). These deaths

were premature: the average age in the year of death was 51.5 years old. Given limitations of the data, this is likely to be an underestimate of deaths over this period. Therefore, some of the individuals who we do not observe in the SF data (36% of the cohort in FY 2020) are likely deceased at that point.

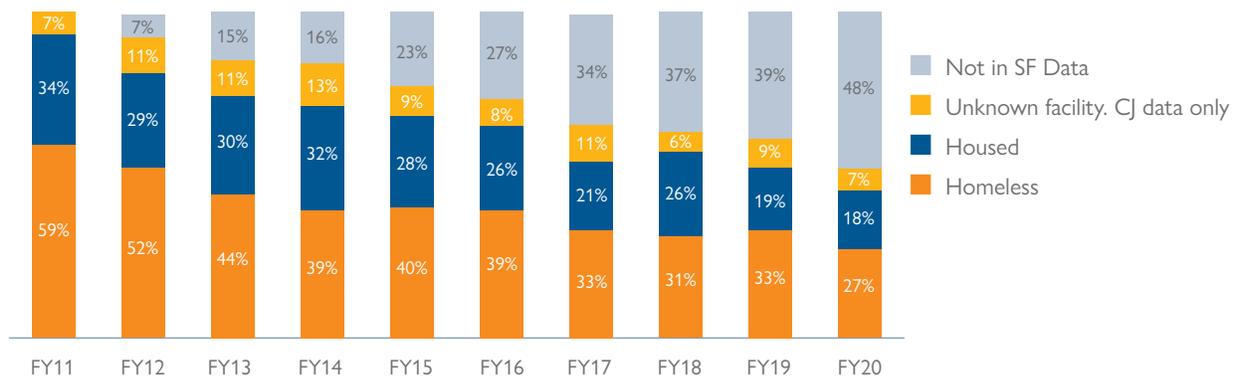FIGURE 2. Patterns of system contact (2011 cohort)
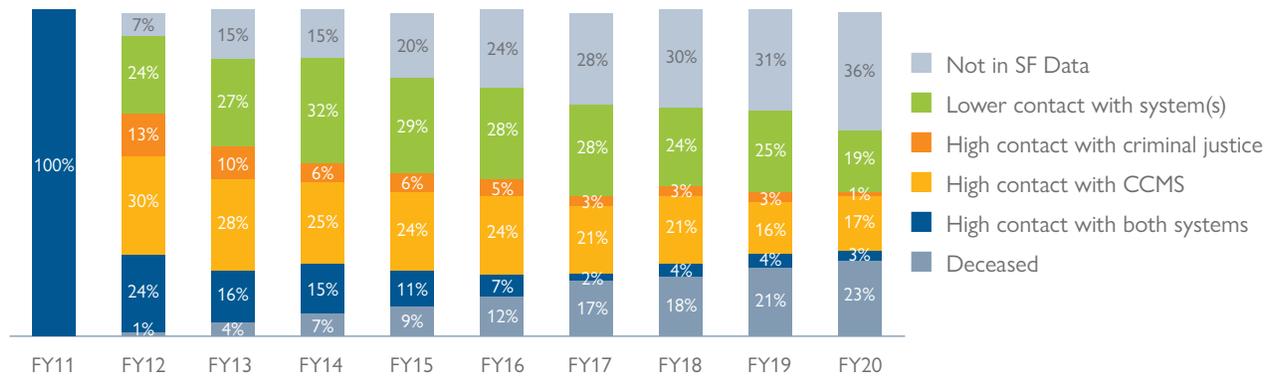
Note. Individuals who are "not in SF data" include the following: those who reside in the county but have no contact with the criminal justice or urgent/emergent care system in that year; those who are incarcerated in state prison or a county jail outside of San Francisco (estimated to be a very small share); or those who have moved to another county. "Deceased" reflects the share of the cohort who were deceased at the start of the fiscal year. By the end of FY 2020, 55 individuals from the 2011 cohort were deceased (26%).
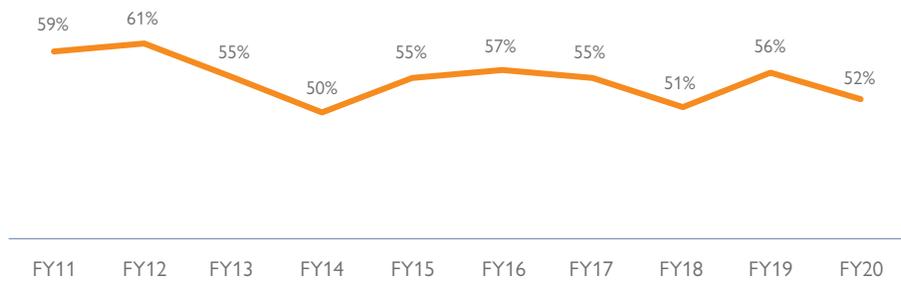
Housing status

Homelessness is a critical issue for individuals who are in frequent contact with the criminal legal and urgent/emergent healthcare systems. Almost the entire cohort (99%) experienced homelessness at some point during the 10-year study period. In FY 2011, the year of high, dual-system utilization, 59% of the cohort was homeless, 34% was housed, and 7% either resided in a treatment facility or had an unknown housing status (Figure 3). The share experiencing homelessness persisted into the following year, with more than half of the cohort reported as still homeless. Over the next eight years, the proportion of the 2011 cohort experiencing homelessness among those who remained in the data (e.g., individuals who received urgent/emergent care at least one time in a given year) remained relatively stable, only slightly dropping from 59% to 52%. (Figure 4). Of the individuals from the 2011 cohort who are known to have died during the 10-year period, 69% were homeless in FY 2011 (Figure 5).

FIGURE 3. Housing status by year (2011 cohort)

Legend:
- Not in SF Data
- Unknown facility. CJ data only
- Housed
- Homeless

|	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Not in SF Data		7%	15%	16%	23%	27%	34%	37%	39%	48%
Unknown facility. CJ data only	7%	11%	11%	13%	9%	8%	11%	6%	9%	7%
Housed	34%	29%	30%	32%	28%	26%	21%	26%	19%	18%
Homeless	59%	52%	44%	39%	40%	39%	33%	31%	33%	27%

Note. The figure reflects last known housing status in the fiscal year for individuals who were not deceased in that year. Individuals who are "not in SF data" include the following: those who reside in the county but have no contact with the criminal legal or urgent/emergent care system in that year, and those who are incarcerated or have moved to another county. "CJ only in FY" refers to individuals who only appear in the criminal justice data in a given fiscal year, so we are unable to observe their housing status. "Unknown/facility" indicates that the individual's housing status was not noted during the fiscal year. Individuals who are housed in a facility are combined with unknown and CJ data only due to small sample sizes.

FIGURE 4. Share homeless of those present in the data (2011 cohort)

FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
59%	61%	55%	50%	55%	57%	55%	51%	56%	52%

Note. Figure reflects the share of the cohort we observe in the CCMS data in a given year whose last recorded housing status in that year is "homeless." Individuals who are deceased, not observed in either dataset, or only observed in the criminal legal system data in a given year are excluded.

FIGURE 5. Housing status in FY11 for individuals who are deceased by FY20

Homeless	69%
Housed	25%
Treatment facility, unknown	5%
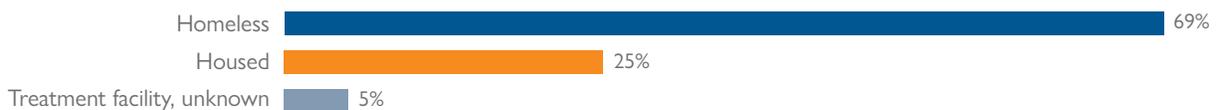
Note. "Treatment facility" and "unknown" are combined due to small sample sizes. "Treatment facility" includes individuals whose last recorded housing status was a medical or criminal legal system treatment unit. "Unknown" indicates that the individual's housing status was not noted during the fiscal year.

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Health conditions

Patients with frequent ED visits tend to have multiple disorders or illnesses known as comorbidities (Raven, Niedzwiecki, & Kushel, 2020). The individuals in the 2011 cohort faced serious health issues over the 10-year period: 90% had at least one diagnosed substance use disorder condition, 74% had a physical health condition, and 69% had a mental health condition. In fact, more than half of the cohort (53%) had conditions of all three types over the 10-year period (Figure 6). In addition, 18% had both physical health and substance use conditions over the 10 year period, and 14% had substance use disorders and mental health conditions. A single condition type was less common: 5% had a substance use disorder alone, and less than that had just a physical health or mental health condition. This categorization of physical health and behavioral health conditions was based on the Elixhauser Comorbidity Index (Elixhauser, Steiner, Harris, and Coffey, 1998). The conditions included in the index are associated with early death, but the classification system is not inclusive of all health conditions. Therefore, we are likely undercounting overall conditions, and in particular, mental health conditions not included in the Elixhauser Comorbidity Index.

FIGURE 6. Diagnoses and comorbidities over the 10 year period (2011 cohort)
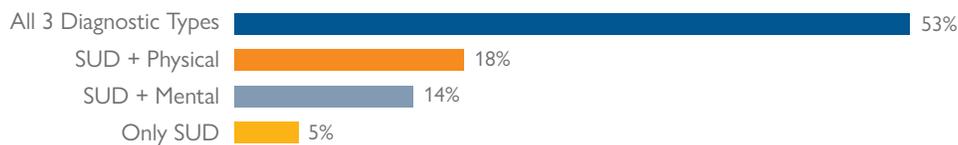
Note. SUD=substance use disorder. See Appendix A.2 for the diagnosis methodology using the Elixhauser Comorbidity Index (Elixhauser, Steiner, Harris, and Coffey, 1998). The following categories are omitted due to small samples: Only Physical, Only Mental, Mental + Physical.

The most common substance use disorder conditions were: alcohol use disorder (70%), other drug use disorder (59%), methamphetamines and other stimulants use disorder (42%), and cocaine use disorder (37%). Approximately half of the cohort had a diagnosis of depression (52%) and/or psychoses (45%) at some point during the 10-year period. The most common physical health conditions were liver disease (36%), chronic pulmonary disease (24%), and diabetes (13%).

Criminal legal system contact

Table 2 shows individuals in the cohort had high levels of contact with the criminal legal system in San Francisco, averaging 7.8 felony arrests (median = 5) and 6.9 misdemeanor arrests (median = 6) over the 10-year period. On average, individuals had 3.5 filed felony cases, and 2.7 felony filings that resulted in a conviction. Situations where an arrest did not lead to a filling or a conviction may include when the case is not filed due to lack of evidence; the individual was currently on probation or parole, and the court revoked probation/parole in lieu of a new charge; or the judge chose to divert the individual to a treatment court or other diversion program. Individuals in the 2011 cohort spent an average of 296 days (median of 110 days) in San Francisco County jail over the 10-year period.

TABLE 2. Criminal legal system contact over the 10-year period (2011 cohort)

| LEGAL SYSTEM CONTACT		MOST SERIOUS ARREST OFFENSE	
Average # felony arrests	7.8	Felony person	47%
Average # felony cases filed	3.5	Felony property	52%
Average # felony convictions	2.7	Felony drug sales	18%
		Felony drug possession	35%
Average # misdemeanor arrests	6.9	Felony other	47%
Average # misdemeanor cases filed	2.6	Misdemeanor person	37%
Average # misdemeanor convictions	1.2	Misdemeanor property	25%
		Misdemeanor drug	27%
Average # jail days	296	Misdemeanor other	82%

Note. For each type of arrest (felony or misdemeanor) we observe whether charges were filed, and whether there was a conviction. We do not observe whether charges were filed or a conviction occurred for the same charge type (felony or misdemeanor). Felony person includes robbery, assault, and kidnapping. Felony property includes burglary, motor vehicle theft, arson, and larceny. Homicide and sex offenses are not reported due to restrictions on small cell sizes. Felony other is predominately technical/administrative violations (such as parole/probation violation or out-of-county felony warrants), though it also includes a small number of weapons possession offenses. Misdemeanor person includes many crime types, but nearly all are simple assault. Misdemeanor property includes many crime types, but nearly 90% are theft. Misdemeanor other includes violation of court orders, out-of-county warrants, administrative holds to release when sober, trespassing, and disorderly conduct among other offenses.

The vast majority of the 2011 cohort had at least one booking for a felony and one for a misdemeanor charge during the 10-year period. During this time, almost half of the cohort members were booked on a felony person charge (such as robbery or assault), and half were booked on a felony property charge (such as burglary or larceny). Almost half were booked on a felony charge for an administrative or out-of-county transfer (including warrants for arrests in

other jurisdictions, probation or parole violations), and one-third for felony drug possession. The most common misdemeanor booking offenses were violation of court orders, misdemeanor warrants, or trespassing ("other") (82%), person (37%), property (25%), and drug (27%).

The share of individuals in the 2011 cohort who had frequent criminal justice system contact declined over time, however many continued to be arrested and booked into jail after FY 2011. Of the individuals alive in each fiscal year, 75% of the cohort were booked into jail (at least once) in San Francisco in FY 2012, and 10 years later, 19% were booked at least once in 2020 (Figure 7).

FIGURE 7. Share of 2011 Cohort who had a Jail Booking in San Francisco
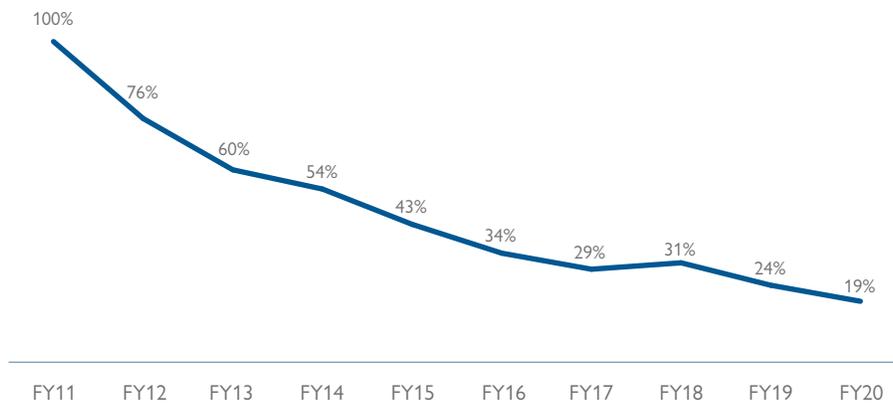
Note. Figure includes the share of all individuals in the 2011 cohort who were not deceased in each FY who were booked into jail.

Services

Individuals in the cohort received services for physical health, behavioral health, and housing needs. We categorized services into three groups — acute, transitional, and routine to differentiate emergency-level services (e.g. visits to the emergency department) from transitional services which indicate progress toward stability, such as medical respite stays and routine services that are positive indicators of stability (e.g. medical checkups for non-urgent issues, routine mental health appointments, etc.). Appendix A.6 describes each category in detail.

The cohort received varying levels of medical and behavioral healthcare ranging from routine healthcare to acute care. Nearly two-thirds (64%) saw a clinician for primary care visits about once (1.4) per year. This share omits primary care and preventative services provided by jail health services or from nontraditional primary care sources such as street service teams because we do not observe those interactions in the data. Nearly half of the cohort (46%) used transitional behavioral health services which include mental health crisis visits and residential treatment stays. Services addressing transitional behavioral health needs were

used more commonly than those for transitional physical health needs (e.g., medical respite stays; 29%). By definition, the cohort had high utilization of ED services: nearly the entire cohort accessed acute physical health (99%) or acute behavioral health (91%) health services. This includes ED visits, hospital stays, substance use disorder detoxification stays, and sobering center visits. On average, the cohort members had about 7.3 acute medical visits per year and 5.1 acute behavioral health visits per year.

Stable housing was challenging for this population: seven in 10 individuals used transitional housing services including shelters and navigational centers (long-stay shelters with intensive services) during the 10-year period. They accessed these services an average of 11.6 times per year.

The permanent supportive housing model provides subsidized housing with supportive services to people who are chronically homeless and have serious behavioral health needs (Raven, Niedzwiecki, & Kushel, 2020). In 2018, the San Francisco Department for Homelessness and Supportive Housing started a centralized process for assessing and prioritizing individuals for permanent supportive housing.[2] The data show that in 2018 or later, more than half (56%) of individuals in the 2011 cohort who were eligible (e.g., observed as homeless in 2018 or after) were assessed for permanent supportive housing, and 39% of those assessed were prioritized for a permanent supportive housing unit.[3] Housing priority status is based on three categories: chronicity of homelessness, health vulnerabilities, and barriers to housing (which includes history with the criminal legal system). These criteria are designed to preference individuals who face challenges accessing other housing supports, such as Housing Choice Vouchers or public housing. Being prioritized for a unit does not ensure that an individual will move into a permanent supportive housing unit.

2. We observe information about participation in the adult coordinated entry process. Individuals may also participate in the family coordinated entry process, but those contacts do not appear in the CCMS data.

3. A version of this report that circulated prior to 10/11/22 incorrectly stated that 11% of those assessed were prioritized for a permanent supportive housing unit. That statistic has been updated to 39%.

Looking Backward: High utilization of both systems in FY 2020

What are the experiences of people in the years leading up to a year of high, dual-system utilization? To answer that question, we look at the 2020 cohort. In fiscal year 2020, 161 individuals were high utilizers of both urgent/emergent services and the criminal legal system, a smaller number than in the 2011 cohort (Table 3). The reduction in high, dual-system utilization in 2020 was driven by a decrease in the number of people coming into frequent contact with the criminal legal system. The number of jail bookings in this period was lower than in 2011: a trend that is likely explained by local and statewide polices to reduce pretrial incarceration following the COVID-19 shelter-in-place order that took effect in March 2020. More than 80% of the 2020 cohort was male, 42% was Black/African American, 34% was White, and 12% was Latino/a. The average age of the cohort at the time of high utilization was 33.1, and the age distribution was younger than the 2011 cohort. A little more than half of the 2011 cohort was between the ages of 26–45 in the cohort year, but in the 2020 cohort, almost 70% was in that age bracket. Several of the 2020 cohort members were deceased by the end of the fiscal year.

TABLE 3. Characteristics of 2020 cohort

CHARACTERISTICS	2020 COHORT
Observations	161
Male	87%
Female	12%
Unknown	1%
African American/Black	42%
Latino/a	12%
White	36%
Other race or ethnicity	10%
Age in cohort year	
18–25	6%
26–35	30%
36–45	39%
46–55	19%
56+	6%
Mean age in cohort year	33.1

Note. Due to small sample sizes, race and ethnicity categories of Asian, Pacific Islander, Native American, Multi-ethnic, Other, and unknown/not stated are combined in this table in the "other" category.

What precedes a year of high, dual-system utilization?

Looking at previous system contact for the FY 2020 cohort provides several insights. First, many of the individuals with high utilization of both systems in FY 2020 were in contact with San Francisco's social systems in the years prior. In fact, 42% of the FY 2020 cohort was present in San Francisco and received urgent/emergent services or were booked into jail in the 10 years prior to their year of high utilization (Figure 8). This includes 26% who were in contact with one of the systems, but not at high frequency in FY 2011; 8% who had frequent contact with the justice system; and 3% who had frequent contact with the urgent/emergent care system. Four percent had high frequency of contact with both systems in FY 2011.

FIGURE 8. Patterns of system contact (2020 cohort)
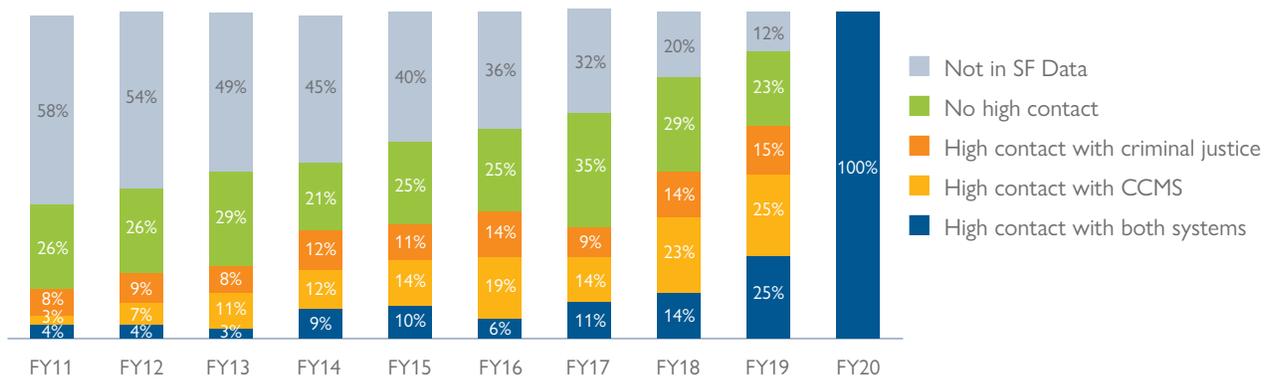
Note. Individuals who are "not in SF data" include the following: those who reside in the county but have no contact with the criminal justice or urgent/emergent care system in that year, and those who are incarcerated in state prison or a county jail outside of San Francisco; or have moved to another county, or individuals who were 17 or younger in the fiscal year.

Second, many individuals in the 2020 cohort were frequently using services well before their year of high, dual-system utilization. By FY 2014, more than one third of the cohort had high utilization of at least one system, and by FY 2018, over half had high utilization of one or both systems.

Third, the share of the cohort interacting with both systems at high frequency grew over time — from 4% in FY 2011, to 9% in FY 2014, and 14% in FY 2018 — before jumping to 25% in FY 2019. Contact with both systems increased sharply in the year before high utilization. In fact, 65% of the cohort had high utilization of one or more systems in FY 2019.

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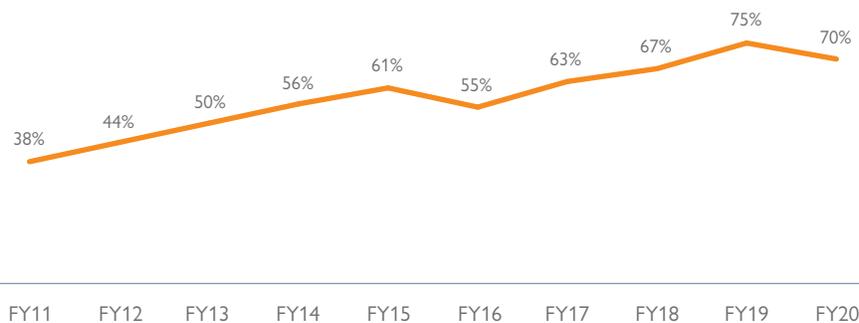
Housing status

Many individuals in the cohort experienced homelessness during their year of high utilization and in the years prior. In FY 2020, 70% of the cohort was homeless, 8% lived in a facility, and 22% were housed (Figure 9). In the preceding years, the share housed was relatively stable, while the share experiencing homelessness increased from 12% in FY 2011 to 63% in FY 2019. It is important to note that we are unable to observe the housing status of individuals who do not appear in the urgent/emergent services data in a given year, which in FY 2011 is almost 70% of the cohort. When we consider only those individuals for whom we observe a housing status, the share homeless ranges from 38% in FY 2011 to 75% in FY 2019 (Figure 10).

FIGURE 9. Housing status (2020 cohort)
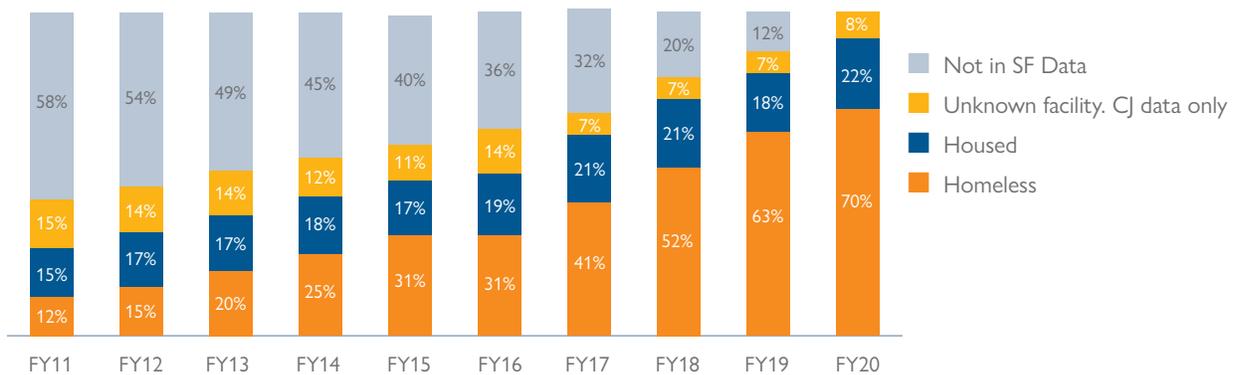
Note. The figure reflects last known housing status in the fiscal year. Individuals who are "not in SF data" include the following: those who reside in the county but have no contact with the criminal justice or urgent/emergent care system in that year, those who are incarcerated or have moved to another county, or individuals who were 17 or younger in the fiscal year. "CJ data only" refers to individuals who only appear in the criminal justice data in a given fiscal year, so we are unable to observe their housing status. "Unknown/facility" indicates that the individual appears in the CCMS data, but their housing status was not noted during that fiscal year.

FIGURE 10. Share homeless of those present in the data (2020 cohort)

Note. The figure reflects the share of the cohort we observe in the CCMS data in a given year whose last recorded housing status in that year is "homeless." Individuals who are not observed in either dataset or only observed in the criminal legal system data in a given year are excluded.

Health conditions

Over the 10-year period, the majority of the cohort experienced each of the comorbid Elixhauser conditions (mental health, medical, and substance use disorders). Half of the cohort (50%) were diagnosed with illnesses of all three types during the course of 10 years. Smaller shares of the cohort had bimodal comorbidities: 19% had an SUD and mental health condition, and 7% had an SUD and physical health condition (Figure 11). The most frequent conditions were psychoses (59%), depression (51%), other stimulant use disorder (e.g., methamphetamines) (50%), alcohol use disorder (45%), other drug use (39%), and opiate use disorder (33%). Notably, a larger share of the FY 2020 cohort had psychoses conditions compared to the FY 2011 cohort (59% compared to 45%). Recorded medical conditions were less common than mental health and SUD conditions, but the most frequently occurring are liver disease (22%) and chronic pulmonary disease (19%). Very few cohort members had physical health conditions alone.

FIGURE 11. Diagnoses and comorbidities (2020 cohort)
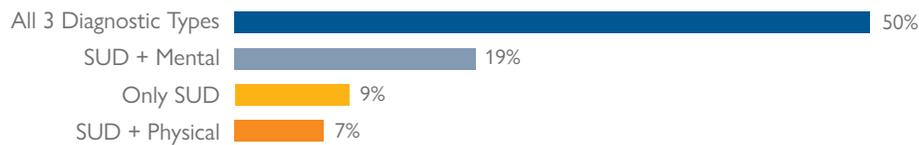
All 3 Diagnostic Types	50%
SUD + Mental	19%
Only SUD	9%
SUD + Physical	7%

Note. SUD=substance use disorder. See Appendix A.2 for the diagnosis methodology using the Elixhauser Comorbidity Index (Elixhauser, Steiner, Harris, and Coffey, 1998). The categories of "only Physical", "only Mental", and "Mental and Physical" were omitted due to small sample sizes.

Smaller shares of the FY 2020 cohort had SUD or medical conditions compared to the FY 2011 cohort, likely because we observe conditions in the years leading up to high utilization for FY 2020, not the years following high utilization. While the share with a SUD diagnosis was still high — 84% — it was less common than the FY 2011 cohort (90%). There was also a marked difference in the share with a physical health diagnosis: in FY 2011, 74% had a diagnosis for a physical health issue, and in FY 2020, the share was 60%. A similar share of each cohort had mental health diagnosis (69% in FY 2011, 71% in FY 2020). Such differences likely represent higher illness burden, on average, in the years immediately following high-use (FY2011 cohort), compared to observations made leading up to high use (FY 2020 cohort).

Criminal legal system contact

Individuals in the 2020 cohort had higher average arrests, filed charges, and convictions for felony offenses than for misdemeanor offenses. Over the 10-year period, cohort members averaged 11.1 felony arrests, 4.9 felony cases filed, and 3.8 felony filings resulting in conviction (Table 4). Misdemeanor arrests, cases filed, and convictions were less frequent. These interactions resulted in considerable jail time: cohort members spent an average of 407 days (median of 198 days) in jail over the 10-year period.

Most individuals in the 2020 cohort had at least one booking for both a felony and a misdemeanor during the 10 year period, only 4% had only misdemeanor bookings and only 9% had only felony bookings. Three-quarters of the cohort were booked on a felony person charge, 59% were booked on a felony property charge, and one-quarter were booked on a felony drug possession charge. Seventy-one percent were booked on administrative or out-of-county transfer charges (felony other). The most common misdemeanor booking offenses were violations of court orders (misdemeanor other) (78%), person (45%), property (37%), and drug (31%).

Ten years prior to FY 2020, 30% of the cohort had at least one booking into the San Francisco County jail (Figure 12). The share increased over time, reaching 58% in FY 2018 and 69% in FY 2019. This is an undercount of all arrest and booking activity among the cohort, as we only observe jail bookings occurring in San Francisco County, and not in neighboring counties like Alameda, Santa Clara, or Contra Costa, or elsewhere in the state.

TABLE 4. Criminal legal system contact over the 10-year period (2020 cohort)

JUSTICE SYSTEM CONTACT		MOST SERIOUS ARREST OFFENSE	
Average # felony arrests	11.1	Felony person	73%
Average # felony cases filed	4.9	Felony property	59%
Average # felony filings with convictions	3.8	Felony drug sales	10%
		Felony drug possession	26%
Average # misdemeanor arrests	5.5	Felony other	71%
Average # misdemeanor cases filed	2.8	Misdemeanor person	45%
Average # misdemeanor filings with convictions	1.2	Misdemeanor property	37%
		Misdemeanor drug	31%
Average # jail days	407	Misdemeanor other	78%

Note. For each type of arrest (felony or misdemeanor) we observe whether charges were filed, and whether there was a conviction. We do not observe whether charges were filed or a conviction occurred for the same charge type (felony or misdemeanor). We report the most serious offense on a given booking (a booking on both a felony and misdemeanor person charge will appear as a felony person in the table). Individuals have multiple bookings, which is why the total exceeds 100%. Felony person includes robbery, assault, and kidnapping. Felony property includes burglary, motor vehicle theft, arson, and larceny. Felony other includes administrative holds from other jurisdictions, parole/probation violations, and a small number of weapons possession offenses. Homicide and sex offenses are not reported due to restrictions on small cell sizes. Misdemeanor person includes many crime types, but 95% are simple assault. Misdemeanor property includes many crime types, but 95% are theft. Misdemeanor other includes violation of court orders, administrative holds to release when sober, trespassing among other offenses.

FIGURE 12. Share of 2020 Cohort who had at least one jail booking in San Francisco
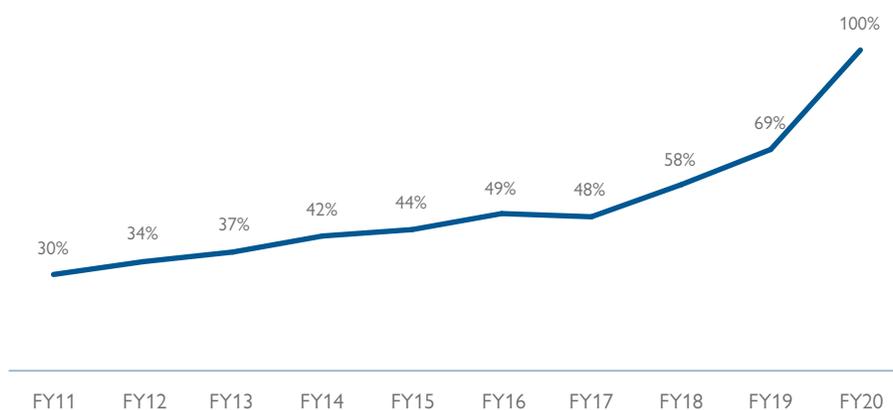

Note. Figure includes the share of all individuals in the 2011 cohort who were booked into jail at least one time in each FY.

Services

By definition, individuals in the cohort had frequent contacts with the urgent/emergent care and criminal legal systems in FY 2020. But what types of urgent/emergent and housing services did they receive over the prior decade? The most frequent were acute services for physical health and behavioral health needs. In FY 2011, average service contacts were quite low — cohort members who were present in the data had fewer than 2 contacts with the urgent/emergent care system (Figure 13). Over time, the frequency of contact of routine medical visits and transitional health and behavioral health services remained steady, while contacts with acute services increased. Acute physical health contacts include emergency department visits and medical hospital stays, and acute behavioral health services include psychiatric emergency services visits, detoxification stays, and mental health hospitalizations (Appendix A.6). In particular, acute medical service contacts grew from fewer than 2 per year on average in FY 2011, to more than 12 per year in FY 2020. The growth in acute behavioral health contacts was driven by an increase in acute services for mental health needs leading up to FY 2020, while the average contacts for acute substance use services remained stable over time.

FIGURE 13. Average urgent/emergent service contacts per year (2020 cohort)
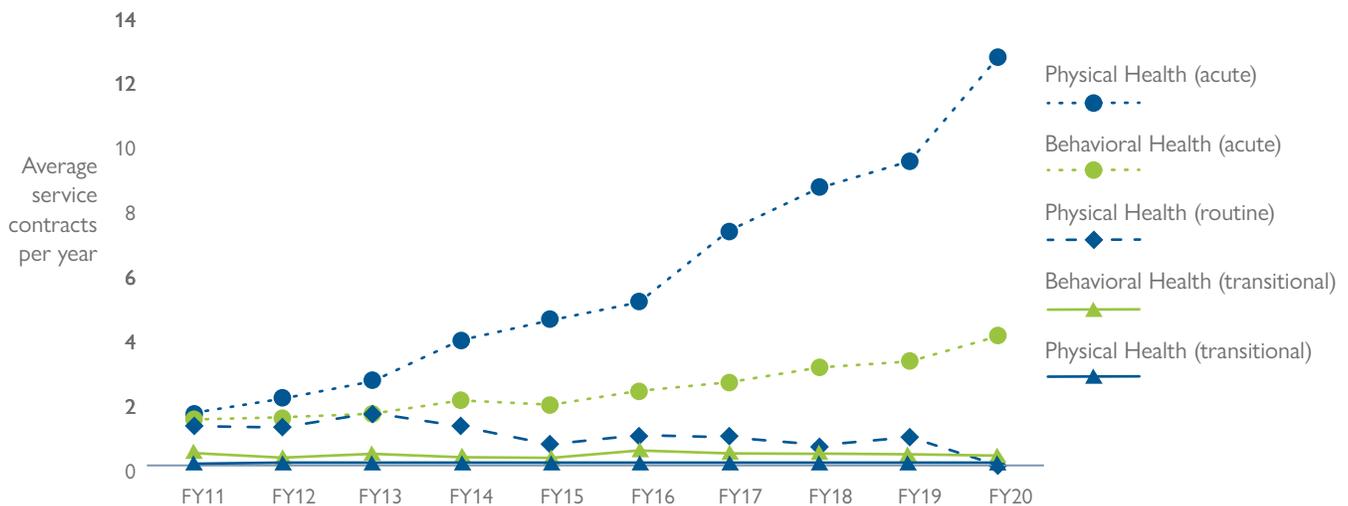
As expected, patterns of service usage varied in the years *before* FY 2020 for the 2020 cohort, compared to service usage patterns for the 2011 cohort *after* their year of high utilization (2011). A smaller share of the FY 2020 cohort accessed routine physical health services such as primary care visits over the 10-year period (40%, compared to 64% in FY 2011), and transitional medical services (9%, compared to 29% in FY 2011). The FY 2020 cohort also used fewer acute services. The average number of acute physical health services was 7.3 visits for the 2011 cohort, and 6.6 visits for the 2020 cohort. The average number of acute behavioral health services was 5.1 for the 2011 cohort and 2.5 for the 2020 cohort.

Over the 10-year period, 71% of the FY 2020 cohort accessed transitional housing services — including emergency shelters and navigational centers. The share accessing these housing services varied over time: in FY 2011, the cohort averaged 8 transitional housing stays, and in FY 2020, the cohort averaged 15 stays (Figure 14). Since assessments for permanent supportive housing began in 2018, two-thirds of the eligible individuals in the cohort were assessed for housing (66%), and 39% of those assessed were prioritized for a permanent supportive housing unit.[4]

FIGURE 14. Average transitional housing stays per year (2020 cohort)

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4. A version of this report that circulated prior to 10/11/22 incorrectly stated that 14% of those assessed were prioritized for a permanent supportive housing unit. That statistic has been updated to 39%.

5. Conclusion

The individuals described in this study face multiple, serious physical health and behavioral health challenges, are in frequent contact with the criminal legal system, and almost all have experienced homelessness. Despite years of contact with various systems in San Francisco, many remain homeless. This may reflect any number of causes, including a lack of supply of appropriate housing options for individuals assessed with complex needs, or a lack of care coordination for these individuals. When evaluating cohorts over time, increasing rates of homelessness coincide with increasing use of urgent and emergent services, with most individuals cycling in and out of jail and emergency medical facilities. Consistent with other research on this population (Raven, Niedzwiecki, & Kushel, 2020; Kanzaria, Niedzwicki, Montoy, Raven, & Hsia, 2017), the mortality rate is high.

The study also highlights the association between substance use disorders, in particular, the use of methamphetamine, and other social and medical problems. Specifically, methamphetamine use is associated with increases in property and violent crime (McKetin et al., 2020). While we cannot determine from this analysis whether the physical health and mental health diagnoses observed among cohort members are due to substance use, many of those diagnoses are common for individuals with substance use disorders.

This research focuses on a small number of individuals who come into frequent contact with multiple city and county services in a given year. Specific, individualized services are needed to ensure that the most vulnerable members of our community have safe places to live and receive care, where they are not at personal risk of harm and are not causing harm to others. It may be that systems of care coordination could be strengthened at specific moments, such as points of release from jail and the ED, where these individuals can be directly connected to housing and care options.

It is unlikely that individuals with high, dual-system utilization such as those in this study can improve their health without the benefit of stable housing and appropriate services. The permanent supportive housing model may not address high utilization of emergency medical services, or blunt the likelihood of death, but it does show promise as a strategy to help stabilize peoples' lives as a first step (Raven, Niedzwiecki, & Kushel, 2020). In fact, frequent urgent/emergent care and criminal legal system users experiencing chronic homelessness and advanced medical illness can be housed and retained in permanent supportive housing at high rates (Raven, Niedzwiecki, & Kushel, 2020).

The effectiveness and ethics of other approaches, such as conservatorship, are currently at the center of public debate. And beyond this small number of individuals with high utilization, there are many more individuals in San Francisco and elsewhere in California who face similar challenges, but have yet to reach the highest levels of utilization of the type we outline here. Ideally, interventions and appropriately targeted, evidence-based, low-barrier resources should be available for individuals when they reach a threshold of contact with a given system, to prevent the escalation of need and cycling that we observe in this study.

Acknowledgments

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7.   Technical appendix

A.1: Criminal legal system data

The crimes and arrests included in this dataset are not a complete population of all the crimes committed in San Francisco County. This dataset comprises all bookings into the county jail and incidents referred to the SFDA for prosecution. Less serious incidents resulting in a cite and release by the San Francisco Police Department are not present in the data.

Classifying and Categorizing Criminal Offenses

In the criminal justice reporting, we classify arrests and filings by the most serious offense. We use the California Department of Justice's Bureau of Crime Statistics (BCS) hierarchy to identify the most severe offense on a given arrest or filing. We use this hierarchy to limit subjectivity in identifying the most serious offense. Under this hierarchy, felonies will be categorized as more serious than misdemeanors and crimes against a person will be categorized as more serious than property crimes. The crimes that are put into the "other" category for both misdemeanors and felonies are considered the least serious in general. The arrest or charging event is then described by the most serious offense: for example, an arrest on charges of burglary and trespassing will be represented as a burglary arrest.

The BCS summary codes categorize all the California penal codes into approximately 70 categories, which CPL aggregates into 11 different categories. These are: felony person, felony property, felony other, felony drug sale, felony drug possession, felony sexual assault, homicide, misdemeanor person, misdemeanor property, misdemeanor other, and misdemeanor drug. We use these classifications for our "most serious offense" statistics.

A.2: Urgent/Emergent care data

Diagnoses and Comorbidities

There are some limitations to the CCMS diagnosis data. The data is specific to Elixhauser co-morbidities which are predictors of premature mortality, but do not include, for example, undiagnosed conditions that are either misdiagnosed or not seen or noticed by a professional. Therefore, information presented here should not be considered an exhaustive health history.

For this analysis, to be classified as ever having been diagnosed with a particular disease, an individual must have at least two related International Classification of Diseases, Revision 9 or 10 (ICD-9/10) codes on record during the 10-year analysis period. This approach avoids one-time misdiagnoses based on a cursory examination or documentation. For example, an individual might receive a one-time diagnosis of psychosis in the emergency department, when the proper diagnosis would be substance use disorder due to methamphetamine use. Thus, for the purposes of this analysis, an individual must have a relevant ICD-9/10 code present on two separate occasions over the 10-year period.

TABLE A2.A. Medical, Mental Health, and Substance Use Disorder Elixhauser Comorbidities

ELIXHAUSER COMORBIDITY INDEX	
Medical	AIDS/HIV, blood loss anemia, cardiac arrhythmias, chronic pulmonary disease, coagulopathy, congestive heart failure, deficiency anemia, complicated diabetes, uncomplicated diabetes, fluid and electrolyte disorders, complicated hypertension, uncomplicated hypertension, hypothyroidism, liver disease, lymphoma, metastatic cancer, obesity, other neurological disorders, paralysis, peptic ulcer disease excluding bleeding, peripheral vascular disease, pulmonary circulation disorder, renal failure, rheumatic arthritis and collagen vascular disease, solid tumor without metastasis, valvular disease, weight loss
Mental Health	depression and psychoses
Substance Use Disorder	alcohol use disorder and drug use disorder

A.3: Homelessness Definition versus Housed definition (at FY end)

The housing situation of individuals in this dataset is based on both the administratively reported and self-reported data categories given from CCMS. These categories are reported as the last known living situation recorded at the last service encounter in the fiscal year. There are over 100 individual living situation types recorded in the data. We recoded them into four different categories:

- **Homeless.** We define individuals as "homeless" if their recorded living situation had the words "homeless", "encampment", "shelter", "navigation center", "outdoors", "vehicle", "temporary", "HSH", or had the code "zip = 99997" which was another code for homelessness.

- **Housed.** We define individuals as "housed" if they are recorded as housed, or in one of the following housing categories: living with family, single room occupancy, supportive housing, CRTS (Community Residential Treatment System), or Job Core. Additionally, the words "permanent", "board", "group", and "dependent" were also used to identify housed individuals.

- **Treatment facility.** Any individual who had the words "treatment", "facility", "institution", "hospital", "rehab", "abuse", "inpatient", or "stabilization" in their situation was classified as being in a treatment facility.

- **Unknown.** Any person who was in one of the following situations: unknown, not reported, not answered, other (or other at intake), and no entry was classified as having an unknown living situation.

A.4: Matching Process

The base dataset in this analysis links individual records from three data sets: the Sheriff's data of all jail bookings, the District Attorney's data of all cases brought to the DA to be potentially prosecuted, and the Department of Public Health (DPH) Coordinated Care Management System (CCMS). We used Python's Dedupe to match individuals first between the two criminal justice datasets and then to individuals in the DPH data. In the following section, we will explain how these matching processes worked and the criteria used to distinguish between "good" and "bad" matches. More documentation and explanation of Python's Dedupe can be found here: https://docs.dedupe.io.

Criminal Justice Matching

While the San Francisco criminal justice agencies assign a unique identifier (SF Number) to individuals that are arrested and/or booked, it is often missing from both datasets. Both agencies also collect name and date of birth, but there are often data entry errors or differences due to the use of aliases. Therefore, the creation of a new person-level unique identifier (UID) was necessary to link records across the datasets and time. The linked records enable CPL to measure an individual's criminal history as well as subsequent criminal justice involvement.

CPL used Python's Dedupe to match individuals within and across datasets using: SF Number, date of birth, first name, last name, and middle initial. In Dedupe, a confidence threshold for determining a match is calculated dynamically based on a weighting of recall vs. precision. At the time of writing, they are weighted equally.

After the matching is completed by Dedupe, we added an override rule that groups records with the same SF Number, even if Dedupe does not. A new "collapsed" UID is created by assigning all records with the same SF Number the same UID, using the minimum value of the group's existing collapsed UID.

After this override rule, we made one additional adjustment to ensure the UIDs remain constant with the addition of new data. To do this, we replaced each (collapsed) UID with a hash of the court number of the earliest record in the cluster (which is defined by the first arrest or booking date). We tiebreak by taking the minimum value of the court number. This will be static with the addition of new data in the future by virtue of the fact that the new data will have an arrest or booking date strictly later than those in the existing data, and that the addition of new records to the candidate matches should only add records to clusters and not split any existing clusters.

Matching Criminal Justice and CCMS

After the criminal justice data has been matched, we use a similar procedure to match individuals in the linked criminal justice dataset to the CCMS records using first name, last name and date of birth. The CCMS records have a reliable individual-level identifier, so we did not need to take the extra step of linking records within the CCMS dataset. As in the above procedure, we use Python's Dedupe to match, with an equal weighting on recall vs. precision. Once individuals have been matched, we use Dedupe's generated "match score" to take only those matches that meet a 0.5 cutoff point (out of 1). Any matches below this cutoff point are discarded as bad matches and coded as separate individuals in the two different datasets. We then generate a new "linked ID" for each matched individual.

Once all the matches are made, we also generate new identifiers for those individuals in either dataset who do not have a match in the other dataset. When there are matches where individuals in the CCMS data match to multiple observations (i.e. multiple unique identifiers, or "UIDs") in the criminal justice data, we tiebreak by taking the match that involved the highest number of matches and replace the other match with that match. When there are individuals in the criminal justice data who match to multiple CCMS observations, we simply drop the match and code the observations as different individuals in each dataset.
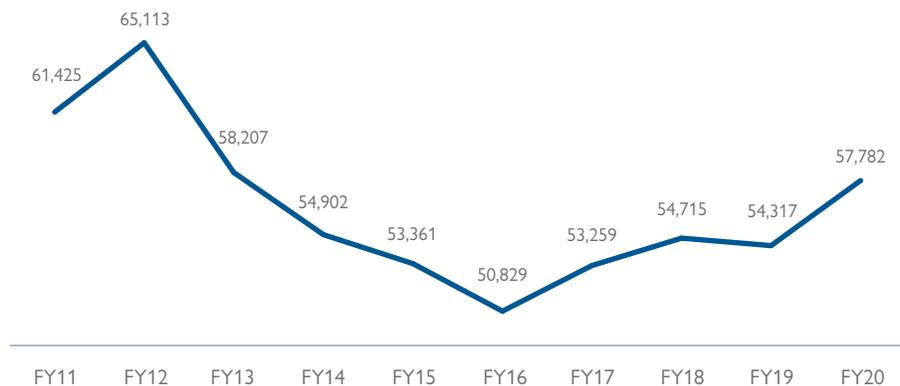
A.5: High Utilization Definition

The table below shows the bookings and urgent/emergent services cutoffs to be in the top five percent of users by fiscal year. This was used to determine where the cutoff for high utilization of either service should be. We took the lowest cutoff for each category and used that as the definition for high utilization, as outlined in the section describing the dataset. Both the lowest cutoffs for each category occurred in FY 2010–11, the first year of our data.

TABLE A.5.A. Top 5% Cutoffs by Year

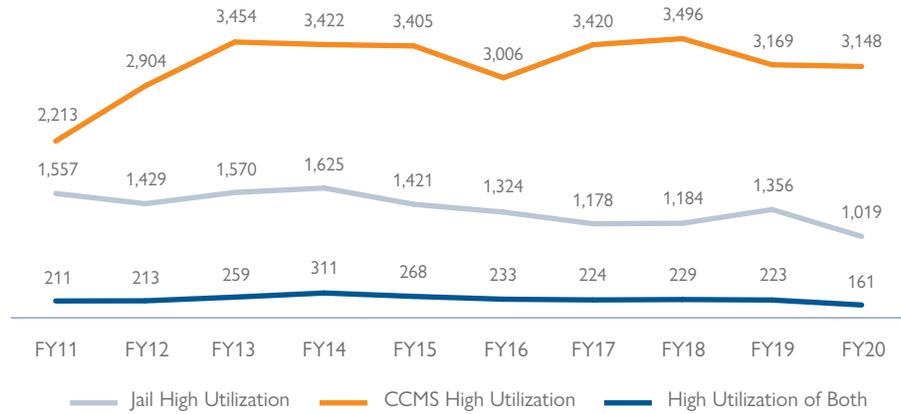| FISCAL YEAR	BOOKINGS CUTOFF	URGENT/EMERGENT SERVICES CUTOFF
FY 2010–11	3	7
FY 2011–12	4	8
FY 2012–13	4	10
FY 2013–14	4	10
FY 2014–15	4	10
FY 2015–16	4	10
FY 2016–17	4	10
FY 2017–18	4	10
FY 2018–19	4	9
FY 2019–20	4	9

The total number of observations in the linked data set remains fairly constant over time, ranging from approximately 65,000 in FY2012 to approximately 50,000 in FY2016.

FIGURE A.5.A. Total observations in the linked data (by year)

61,425
65,113
58,207
54,902
53,361
50,829
53,259
54,715
54,317
57,782

FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20

The urgent/emergent care system (CCMS) serves many more individuals per year than the jail system. The figure below shows that the single system and multi-system high utilization population is fairly constant over the 10-year period.

FIGURE A.5.B. Single and multi-system high utilization by year

	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
CCMS High Utilization	2,213	2,904	3,454	3,422	3,405	3,006	3,420	3,496	3,169	3,148
Jail High Utilization	1,557	1,429	1,570	1,625	1,421	1,324	1,178	1,184	1,356	1,019
High Utilization of Both	211	213	259	311	268	233	224	229	223	161

Jail High Utilization   CCMS High Utilization   High Utilization of Both

A.6: CCMS Service Type Categorization

The table below details the service type categories used in the analysis. We distinguish between routine, transitional, and acute services for medical, behavioral health (mental health and substance use), and housing services. Acute refers to emergency-level services such as visits to the emergency department or psychiatric emergency services, and detoxification stays. Transitional services indicate progress toward stability, such as medical respite stays, mental health day program visits, or days in a housing shelter or navigational center. Routine services are positive indicators of stability, including medical checkups for non-urgent issues, such as routine mental health appointments or participation in permanent supportive housing. For more details on the behavioral health interventions listed here, please see Kanzaria, H. K., Niedzwiecki, M., Cawley, C. L., Chapman, C., Sabbagh, S. H., Riggs, E., Chen, A. H., Martinez, M. X., & Raven, M. C. (2019). Frequent emergency department users: focusing solely on medical utilization misses the whole person. Health Affairs, 38(11), 1866–1875.

	MEDICAL	BEHAVIORAL HEALTH	HOUSING
Routine	Primary care visits	N/A	Permanent supportive housing*
Transitional	• Medical respite stays	• Crisis residential treatment program stays • Acute Diversion Unit stays • Mental Health day crisis visits	• Shelter days • Navigational Center days • Coordinated Entry assessment*
Acute	• Emergency department visits • Medical hospital stays	• Psychiatric Emergency Services visits • SUD Medical Detoxification stays • SUD Social Detoxification stays • MH Hospitalization stays • MH Urgent Care visits • Sobering center visits • Conserved*	N/A

Note. Services with an asterisk are indicators of a status or longer-term service, and are not included in time series graphs. Mental health day crisis visits are conducted by certified state license facilities, regulated by Substance Abuse and Mental Health Service Administration (SAMHSA), and meant to be a step down from psychiatric emergency services. Sobering centers aim to divert acutely intoxicated individuals from the emergency department, and provide a place safe from victimization and injury.

A.7: Race, Ethnicity and Sex

Race, ethnicity, and sex are recorded in both the CCMS data and the criminal justice data. To have a unified record of race, ethnicity, and sex we constructed each variable using the following procedure. We first used the CCMS versions of race, ethnicity, and sex as our base, then used the race, ethnicity, and sex from the criminal justice data to fill in any missing observations. The CCMS data is self-reported and, in this context, more likely to be more reliable. Thus, if there were any contradictions between CCMS and criminal justice in the same fiscal year, we took the race, ethnicity, or sex recorded for the CCMS observation. Additionally, any individuals who only appeared in the criminal justice data in a specific year would only have the criminal justice observations for race, ethnicity and sex.

When race, ethnicity, and sex conflicted across fiscal years (i.e., if one year an individual was coded as male and another year was coded as female), there were a couple ways that we resolved this. If the conflict was due to an individual declining to state, not being asked the question, or being coded as "unknown", we took the mode of the other observations for that individual and replaced the "declined" observation. If there was no other mode, we took the most recent non-"declined" observation and replaced "declined" with that. If there was a conflict between observations where both observations were non-unknown, then we left it as is in the data.

When counting the number of individuals of each race, ethnicity, and sex in the 2011 and 2020 cohorts, the procedure was a little different when there was a conflict. For race, if there was a conflict, the mode for race/ethnicity was used for the individual. There were around 6–8 individuals per cohort who were treated this way. For sex, the most recent observation was used, no matter the mode, to classify the individuals. There were 1–2 individuals per cohort who were treated this way.