



# Analysis of Allegheny County's Involuntary Hospitalization (302) Program

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## OVERVIEW

In this study we analyze the involuntary hospitalization program in Allegheny County, which under Pennsylvania state law permits individuals deemed to be at risk to themselves or others to be committed to inpatient hospitalization. Involuntary hospitalizations are common, affecting over 3,700 individuals each year in Allegheny County. We find that individuals who are evaluated for hospitalization have elevated mortality risks upon release—within 5 years of their first evaluation, fully 20% of the population has died, a rate that is higher than that for clients exiting jail, enrolling in homeless shelters, or receiving food assistance (SNAP) as well as the rate for individuals with severe mental illness (SMI) diagnoses. Mortality rates for individuals involuntarily hospitalized are elevated in the first two years with especially high mortality in the 12 months following involuntary hospitalization, producing a “crisis window” where adverse outcomes are especially likely to occur. We find worse outcomes among 302 individuals with a pre-existing substance use disorder (SUD)—5% of those with SUD 18–50 years of age die within two years of intake, compared to 2.5% of the 18–50-year-olds without SUD. Of those with SUD, sixty percent (60%) of the mortality rate is attributable to drug overdose.

Expanding the analysis beyond mortality, we found similarly elevated risks for other adverse outcomes. Over 23% were charged with a crime within 5 years of release, and 60% used an emergency department (ED) within one year of release. Not only are base rates high among the population, but statistical methods can distinguish between riskier and less risky clients with high accuracy, indicating that it is possible to target step down programs to high acuity populations.

Individuals who are involuntarily hospitalized are well known to the medical system before their first hospitalization. Approximately 50% of those enrolled in Medicaid accessed behavioral health services in the month before their hospitalization; 72% did so in the year prior. Eight in 10 had pre-existing SMI diagnoses. After their hospitalization, they are frequent users of services. This cohort accounts for 23% of behavioral health Medicaid spending in Allegheny County, despite accounting for 8% of clients who received behavioral health services through Medicaid and 1.5% of all Medicaid enrollees.

Those petitioned for involuntary commitment were disproportionately Black, although petition-upheld rates are similar across race. A similar picture emerges for gender;<sup>1</sup> men were more likely to be petitioned, but upheld rates at the point of exam were similar for men and women.

This analysis establishes the scope and scale of the problem. We will pursue two further lines of inquiry as follow-on analyses. The first will use statistical methods to leverage randomness in the physician assignment

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<sup>1</sup> In an effort to accurately present the data as it is recorded in the data source, we have chosen to use the term “gender” and the categories “woman” and “man,” with the acknowledgement that more nuanced data collection is vital for understanding the identities of people involved.

process to investigate a causal effect of an involuntary commitment on outcomes such as mortality and criminal justice involvement. While the information in this report paints a picture of negative outcomes among the involuntarily committed, this subsequent analysis will help us understand whether these commitments are impacting people's lives on measurable outcomes relative to not receiving involuntary inpatient hospitalization. The second will be a policy assessment which will synthesize information from this report as well as the causal analysis and input from clinicians and community members to determine opportunities to improve care for this vulnerable population.

## **BACKGROUND ON INVOLUNTARY COMMITMENTS**

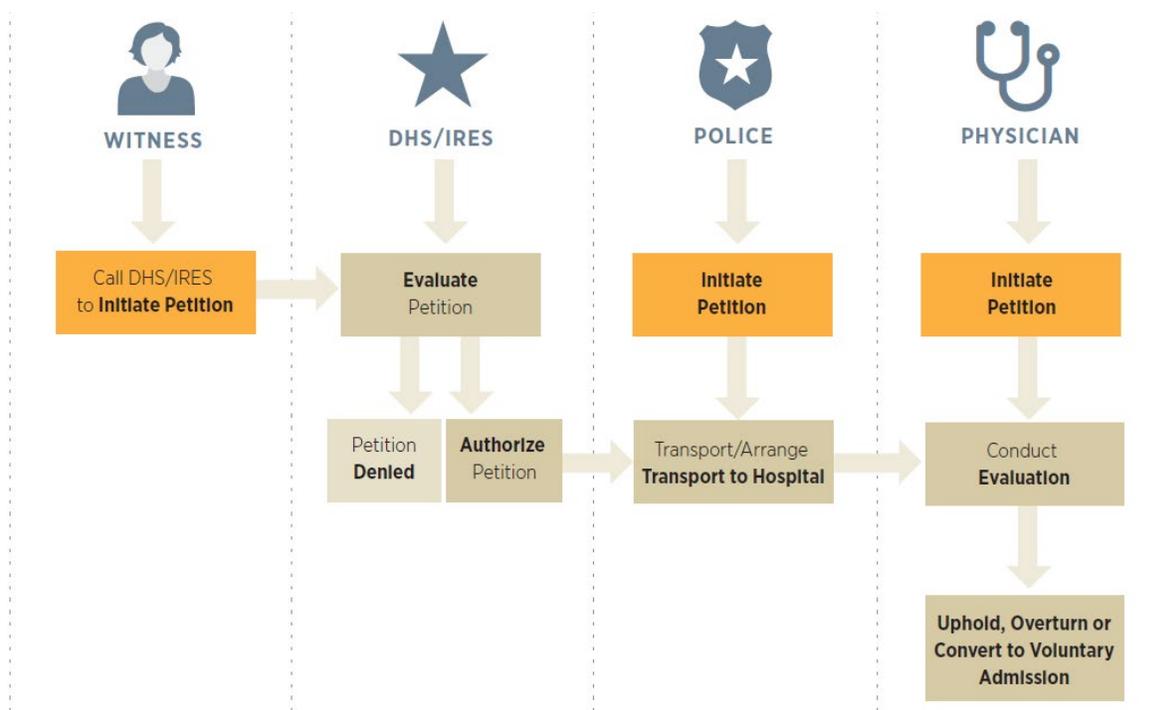
In Pennsylvania, as in every state, there is a provision to involuntarily hold individuals experiencing a psychiatric episode in inpatient psychiatric care. This process is governed under a PA law called the Mental Health Procedures Act (MHPA). The specific section that governs the intake process of an individual is Section 302, and for that reason the entire program is sometimes called the 302 program. Involuntary hospitalizations are common, affecting over 3,700 individuals each year at a rate of 305 per 100,000 Allegheny County residents.

The process through which an involuntary commitment is executed depends on who initiates it. If the petitioner is a family member or other interested party (which is most common), they must first call the Information, Referral and Emergency Services (IRES) department housed within the Allegheny County Department of Human Services (DHS). There they speak with a delegate, who either "authorizes" or "denies" the petition based on whether the episode seems to meet the criteria in the MHPA. If a petitioner is a physician or a police officer, they can "self-authorize" and have the person brought in for an exam without calling IRES and seeking separate authorization.

Once the petition is authorized, a warrant is issued and a police officer is dispatched to take the individual to a hospital for an exam, which must occur within two hours of arrival at the facility. During the exam, a physician, often with the help of a social worker or aide, determines if the person is a clear and present danger to themselves or others around them. Based on this criterion, they can "uphold" or "deny / overturn" the petition. If the petition is upheld, the person is transferred from the ED to an inpatient psychiatric facility where they can be held involuntarily for up to 120 hours (5 days).

After 72 hours, if a physician believes the individual still meets the criteria for clear and present danger, continuations can be filed (303s, 304s, 305s). Each of these extend the length of the commitment and must be approved through the Court of Common Pleas rather than upheld solely by a physician. The longest stay, a 305, authorizes the inpatient facility to detain an individual for up to 6 months.

FIGURE 1: 302 Process



**UPHELD RATES – DIFFERENCES BY REFERRAL SOURCE**

As described above, an individual subject to an involuntary commitment petition is examined by a physician, who can either “uphold” or “deny” the petition. If a petition is upheld, the individual is committed to involuntary inpatient treatment; if it is denied, they are released.

Involuntary hospitalizations are relatively common. Annually, there have been an average of approximately 4,800 petitions and 3,700 upheld petitions in Allegheny County. This puts the rate of upheld petitions at 305 per 100,000 residents. The national rate is not known, but one study puts it at 357 per 100,000 residents.<sup>2</sup> For reference, this is near the national rate of prison sentencing at 350 per 100,000, although prison stays average much longer than involuntary hospitalizations.

<sup>2</sup> Lee, G., & Cohen, D. (2021). Incidences of involuntary psychiatric detentions in 25 US states. *Psychiatric services*, 72(1), 61-68.

On average, petitions filed from 2015 through 2022 were upheld at a rate of 80%, although this number was closer to 85% in 2015 and 74% in 2022. Upheld rates varied by petitioner—the 302s called in by physicians or hospital staff were upheld at very high rates (over 93%), while 302s called in by police or other crisis personnel had lower upheld rates.

**TABLE 1: Upheld Rates by Petitioner**

	UPHELD RATE	FRACTION OF CASES
Physician	93.2%	13.9%
Hospital Staff	88.2%	3.6%
Family Member / Relative / Friend / Acquaintance	79.6%	43.2%
Other — Please Specify	78.1%	5.0%
School / Other Social Service	75.5%	8.5%
Crisis / Clinician / Other Medical	71.6%	7.2%
Police Officer	65.7%	18.6%

**SERVICE USAGE**

About half of the 302 population<sup>3</sup> is regularly enrolled in Medicaid. Among the Medicaid 302 population, it is possible to monitor behavioral health service utilization (through billing) before and after the 302 event.

A large fraction of Medicaid spending is concentrated among the 302 population. In Allegheny County the number of people enrolled in Medicaid was above 330,000 and nearly 57,000 unique individuals had an active claim in publicly funded behavioral health services. As seen in **Table 2**, total spending on behavioral health services is near \$290 million per year. Spending among people who have had a 302 event in the past 3 years is approximately \$65 million per year, accounting for 23% of total Medicaid behavioral health spending despite only making up 8% of active Medicaid users and -1.5% of all Medicaid enrollees.

<sup>3</sup> Throughout this report, the term '302 population' refers to all individuals brought in with a petition whether their petition is upheld or denied. Since the upheld rate is 80%, this is mostly individuals who were hospitalized.

**TABLE 2: Spend Comparison Between 302 Population and Medicaid Population**

YEAR	TOTAL SPENDING	CRISIS SPENDING	INDIVIDUALS SERVED	CRISIS INDIVIDUALS SERVED	CRISIS PERCENT OF ACTIVE MEDICAID POPULATION	CRISIS PERCENT OF TOTAL SPENDING	RATIO OF CRISIS SPENDING TO NON-CRISIS SPENDING PER PERSON
2017	\$274,488,280	\$58,500,171	55,629	4,267	7.7%	21.3%	3.26
2018	\$291,022,800	\$64,082,670	57,506	4,829	8.4%	22.0%	3.08
2019	\$288,413,138	\$68,060,540	58,229	4,893	8.4%	23.6%	3.37
2020	\$266,812,306	\$60,969,263	55,593	4,696	8.4%	22.9%	3.21
2021	\$283,265,318	\$65,461,233	57,329	4,904	8.6%	23.1%	3.21
2022	\$323,902,487	\$77,268,091	57,564	4,710	8.2%	23.9%	3.52
2017-2022 Average	\$287,984,055	\$65,723,661	56,975	4,717	8.3%	22.8%	3.28

The 302 population is well known to the behavioral health system before ever being involuntarily hospitalized. **Table 3** shows the percentage of Medicaid enrollees who used behavioral health services before their first 302. In the month prior to the 302, half of the population sought behavioral health services, a figure that rises to 72% within the year of the 302 and 79% within two years.

**TABLE 3: Rate of Behavioral Health Service Use Among Medicaid 302 Population**

TIME WINDOW BEFORE FIRST 302 EVENT	10 DAYS	1 MONTH	3 MONTHS	6 MONTHS	1 YEAR	2 YEARS
Percent of medicaid 302 population using behavioral health services in window	40%	50%	59%	65%	72%	79%

Taken together, this indicates that among the Medicaid-enrolled cohort there is high usage of services before and after hospitalization, both across the population and in total dollars.

**OUTCOMES**

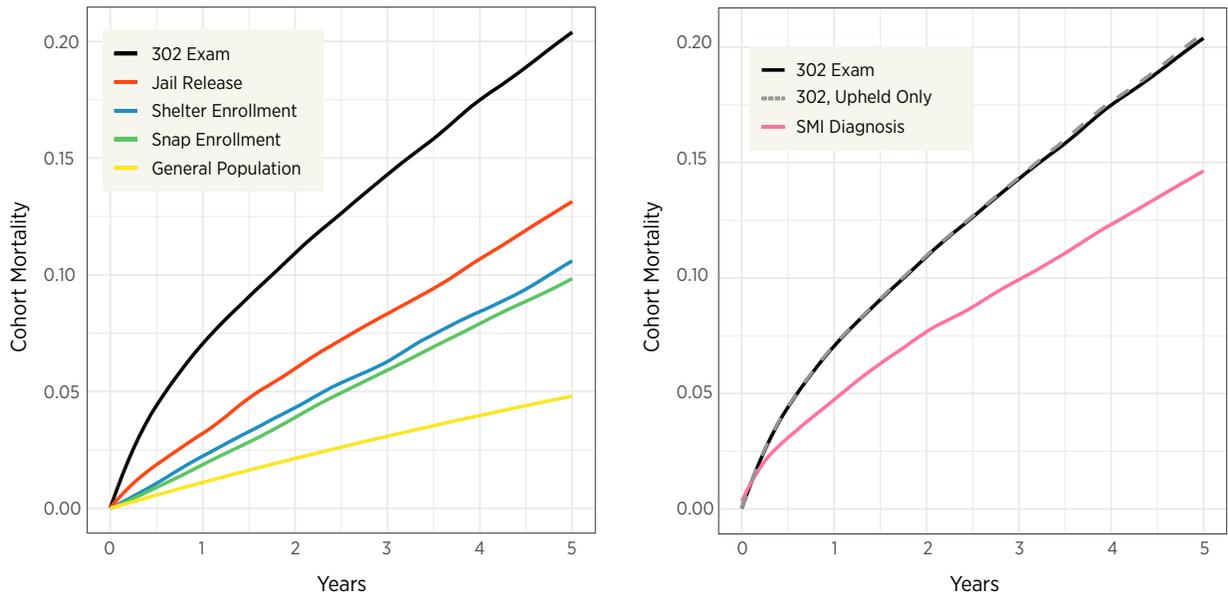
In this section, we analyze life outcomes among the 302 population and compare them to other baseline populations. The outcomes we studied are mortality, being charged with a criminal offense and rates of ED usage. We chose these variables because they are unambiguous—higher mortality, contact with the criminal legal system and usage of the ED are all clearly defined negative outcomes.

### Mortality

**Figure 2** demonstrates that mortality risk is highly elevated among the 302 population. In the first 90 days following a 302 physician exam, we find that 3% (1 in 30) of the population dies. This figure grows to 7% (1 in 15) over the first year and to 20% (1 in 5) over five years. This is a substantially higher mortality rate than that observed for other commonly studied, vulnerable populations such as jail exiters, shelter enrollees, SNAP recipients and the general population. People diagnosed with SMI are known to have elevated mortality risk, but even here the 5-year mortality risk of the 302 population is worse by approximately 33%. All individuals with a 302 petition are similarly at risk whether that petition was upheld or denied.

All estimates in **Figure 2** are age adjusted to the age profile of the 302 population, ensuring these differences do not simply indicate that one population is older than another.

**FIGURE 2: Mortality Among 302 and Related Baseline Populations**

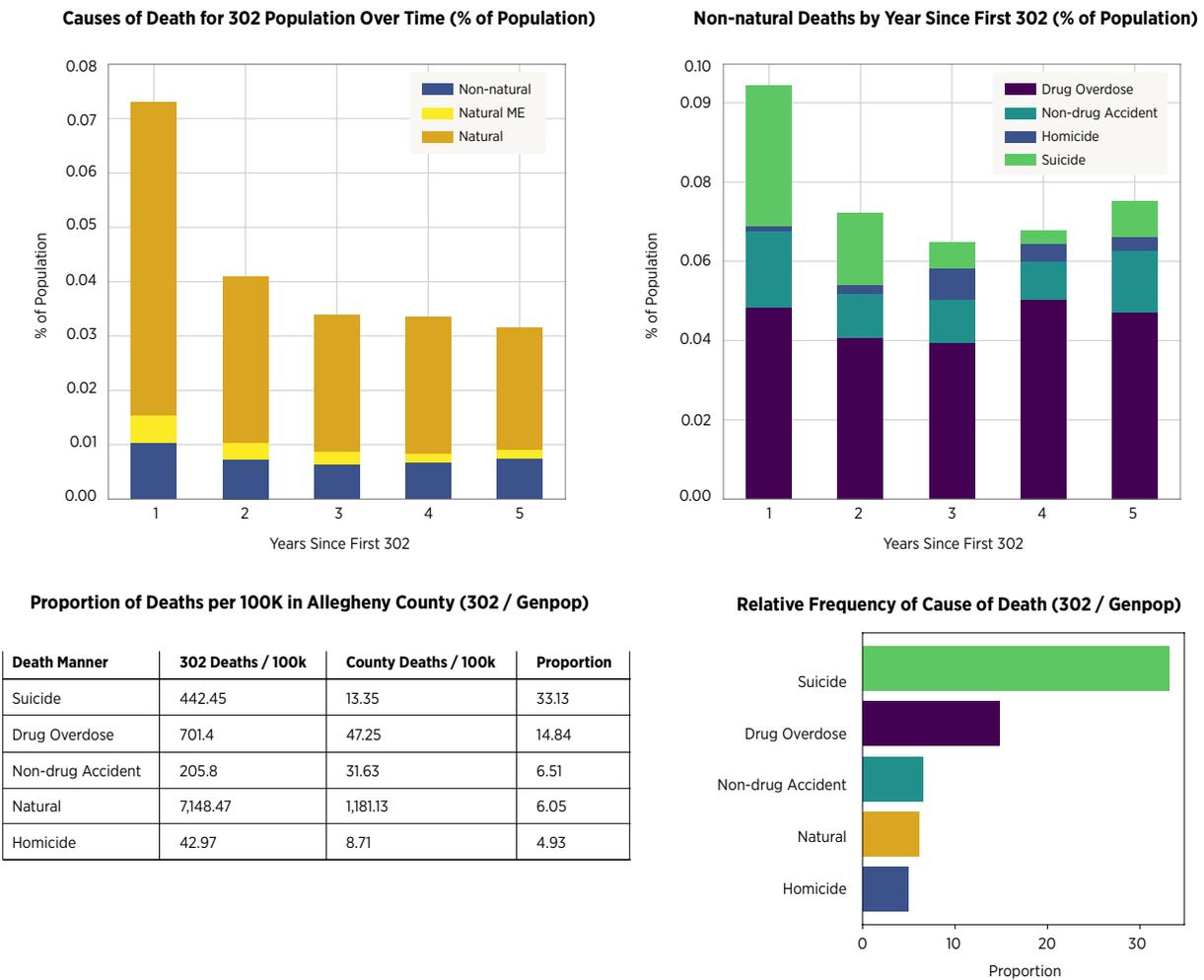


**Figure 3** displays the evolution of death rates and cause of death in the years following an individual's first involuntary commitment. The left panel shows all deaths, both natural and non-natural. The mortality rate is elevated for this population immediately following their 302 exam (referred to as the "crisis window").

Most deaths in the crisis window are natural, meaning they are not sent to the medical examiner for autopsy. Natural deaths in this framing include disease, for example, but exclude causes of death such as suicide, drug overdose, homicide and vehicular accidents.

Among the deaths investigated by the medical examiner's office that are ultimately deemed non-natural (top right panel), there are high rates of drug overdose (701 per 100,000 in the first year) and suicide (442 per 100,000 in the first year), with suicides being especially concentrated in the first two years after the 302 event. The final panels emphasize the death risk disparity between the 302 population and the general population. They show that the 302 population is more than 30 times as likely to die by suicide and more than 14 times as likely to die from a drug overdose than people in the county overall. As with mortality, all estimates are age adjusted to the age distribution of the 302 population.

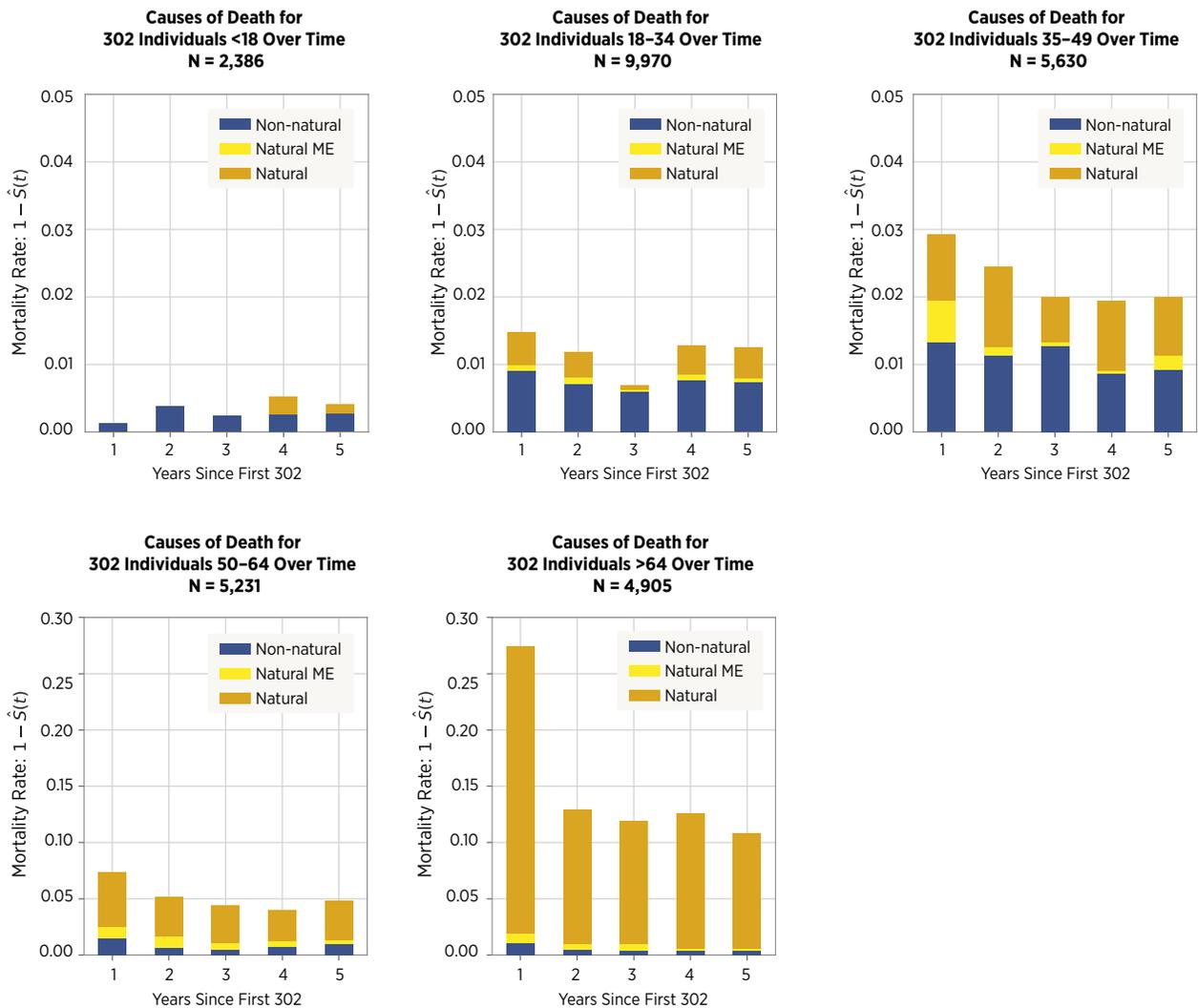
**FIGURE 3: Cause of Death Among 302 Population**



The high rate of natural death in the crisis window highlights the complex interplay between mental and physical health, especially among the elderly population. An episode of poor physical health may trigger a severe mental health episode, or the reverse.

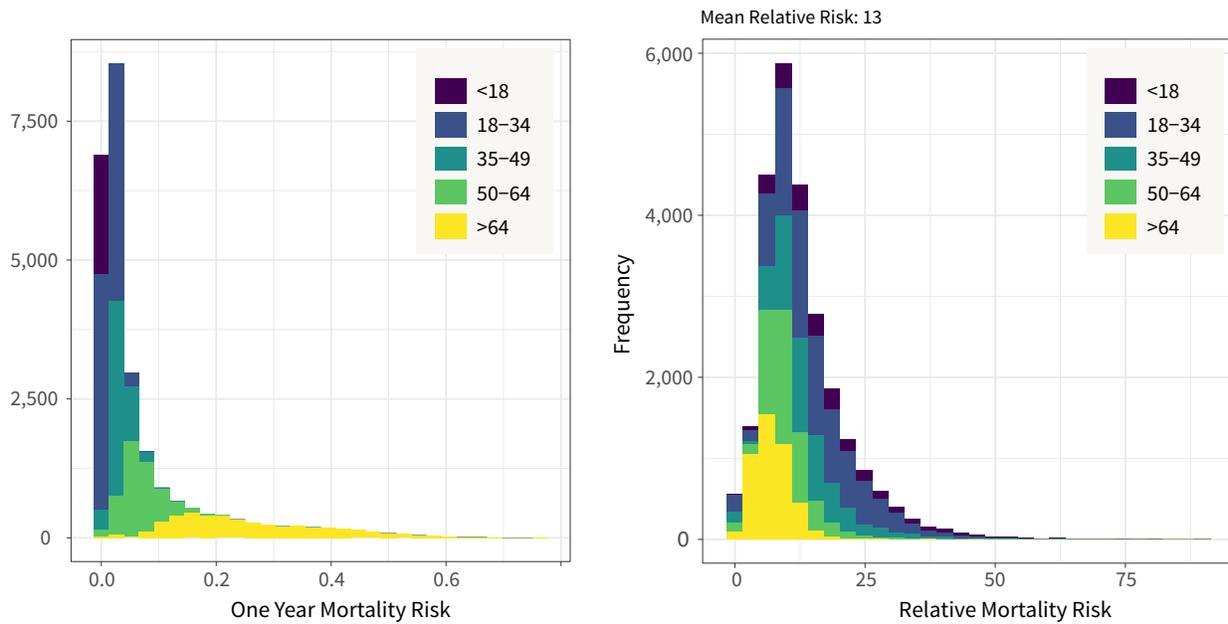
**Figure 4** shows death by age category. There is a strong age trend, as older adults are much more likely to die than younger people in both the general population and among those involuntarily hospitalized. Over 25% (1 in 4) of people aged 64 and older who are involuntarily hospitalized die within the year, mostly of natural causes. Death is concentrated in the older population, but non-natural deaths (which are the deaths that are more likely to be preventable) are much more common among the younger population. Most deaths among individuals under 50 years of age are non-natural.

**FIGURE 4: Cause of Death by Age**



While mortality rates are highest among the elderly, we find that younger clients are at higher risk relative to their same-age peers. The ratio of an individual's predicted probability of death (based on age, race, gender and past service usage) to the probability based on the mortality risks published by the Social Security Administration generates a measure of relative risk (i.e., how much riskier you are than a counterpart in the general population with the same age and gender). **Figure 5** shows that while older adults have a higher absolute risk of mortality, younger individuals are the most at risk in this comparative sense.

**FIGURE 5: Absolute and Relative Risk by Age**

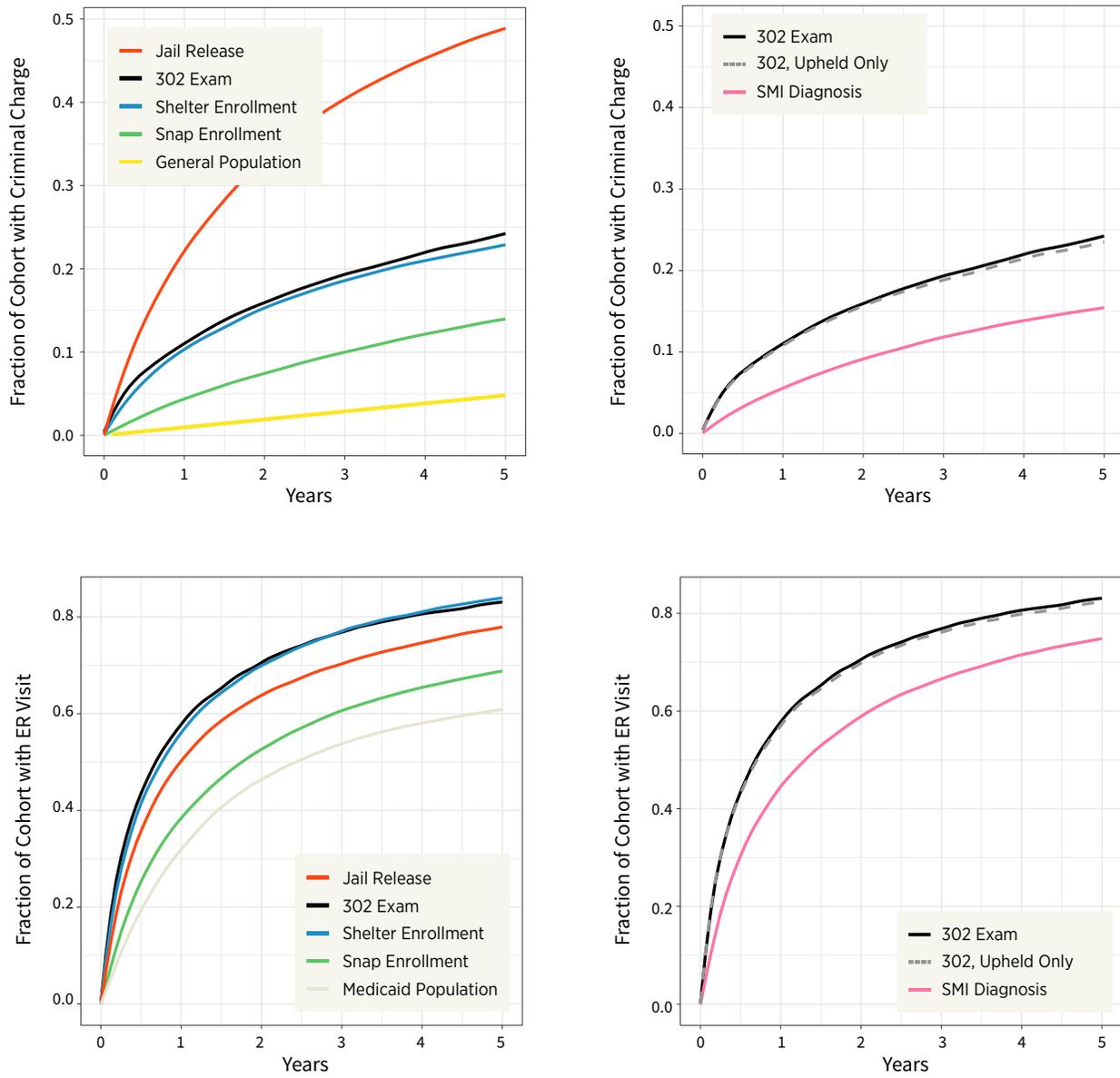


**Criminal Legal and Emergency Room Outcomes**

We also considered criminal justice outcomes and ED visits among the 302 population. We find that as with mortality, the 302 population experiences these negative outcomes at a high rate, although not the highest among comparison populations served by DHS.

Over a five-year period, 23% of the 302 population was charged with a criminal offense, a rate that is on par with the shelter population but lower than that of jail exiters. Among the Medicaid population (where we have access to data on ED usage), the five-year ED usage rate was 85% and the one-year usage rate was 60%. This is comparable to the usage rate of the shelter population and greater than the jail exiter or SNAP recipient populations. The 302 population had higher rates of criminal charges and ED utilization than the SMI population overall. The gap was especially large on criminal legal outcomes—the SMI population had a usage rate of 15% across 5 years, while the 302 population was at 23%.

FIGURE 6: Criminal Charges and ED Usage



## Predictability of Outcomes

Throughout this analysis we have shown that average base rates of adverse outcomes in the 302 population were high. In this section we investigate whether there is a subset of this cohort at particularly high risk among the mortality, criminal justice and ED outcomes.

To explore this question, we fit relatively simple statistical models which use demographics, characteristics from the physician exam, and past criminal justice and ED usage as features. We find that these models predict these outcomes accurately, meaning that among the 302 population it is relatively distinguishable who will suffer poor outcomes. One common measure of predictive accuracy is area under the receiver-operator curve (AUC), which measures how often a statistical model assigns a higher risk to an individual with the worse outcome (an AUC of 0.5 indicates predictions no better than random and 1 is perfect). The AUCs for the death, criminal justice and ED visit models are 0.86, 0.82, and 0.75, respectively.

We use this model to produce estimates of the most at-risk populations one year following the 302 exam. We define three cohorts: (1) the 302 population overall, (2) the top decile at-risk population according to the single outcome variable under consideration, and (3) the top decile at-risk population according to all three outcome variables combined into a composite score.<sup>4</sup>

The first panel of **Figure 7** shows, as before, that the 302 population has an overall rate of criminal charges equal to 10% over a one-year period. The model can identify a cohort of individuals with much higher risk, however. The top at-risk population interacts with the legal system at a rate of 37% and the top at-risk composite population does so at a rate of 33%. Indeed, the one-year outcomes for the riskiest populations are worse than the five-year outcomes for the entire 302 population.

We observe a similar trend when analyzing ED outcomes. While the 302 population overall has elevated ED usage (52% over one year), the top decile by risk score has 82% usage and the top decile by composite risk score has 75%. We frame mortality as before in a relative risk context. We find that one year following the 302 exam, the 302 population is 13 times riskier than the general population. The top decile by risk score is 28 times riskier and the top by composite of risk scores is 25 times riskier.<sup>5</sup>

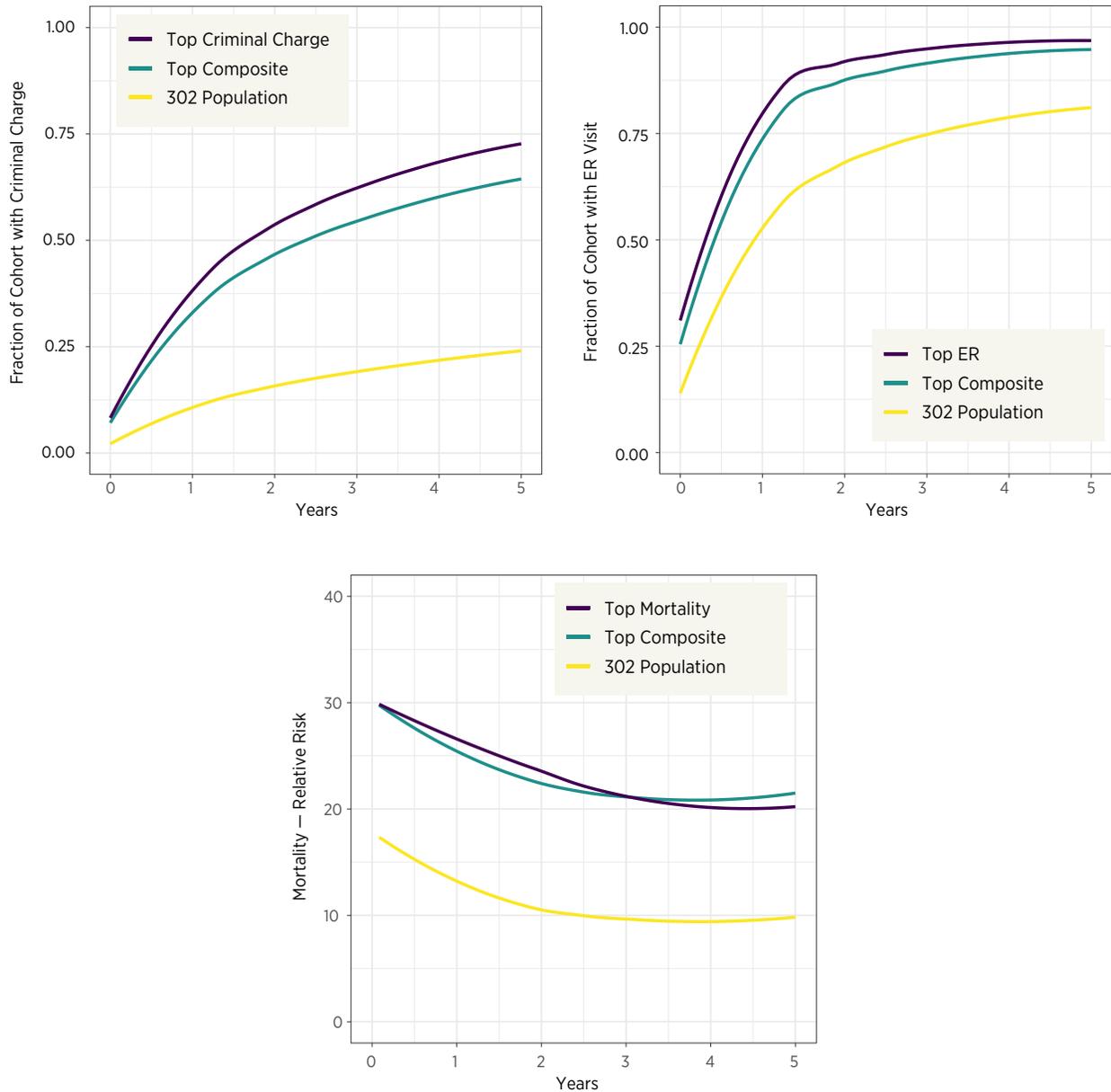
Taken together, this indicates that there is a subset of individuals whose outcomes predictably lag the overall, highly at-risk 302 population. The models that identify these individuals only use information at or before the 302 exam, meaning that this high-risk subset is identifiable at the time of the 302 exam itself. Furthermore, the high-risk cohort is risky across all outcomes. Individuals in the top decile of composite score have similar risk levels to those in the top decile of the outcome-specific score.

4 The top score is created by taking the top decile of scores from a single outcome model (e.g., for criminal justice we produce a one-year criminal justice probability and take the top 10% of those probabilities). The top composite score is calculated by normalizing

to a standard normal the probabilities from the three outcome models, discarding anything below 0 in standardized space and then calculating a three-way product.

5 The relative risk is decreasing in the mortality chart because the 302 population is riskiest relative to the baseline population closer to exam. This is the "crisis window." So while absolute risk of mortality increases over time, the relative risk compared to the baseline population decreases.

**FIGURE 7: Comparing Top Decile to Baseline 302 Population**



**DIAGNOSES**

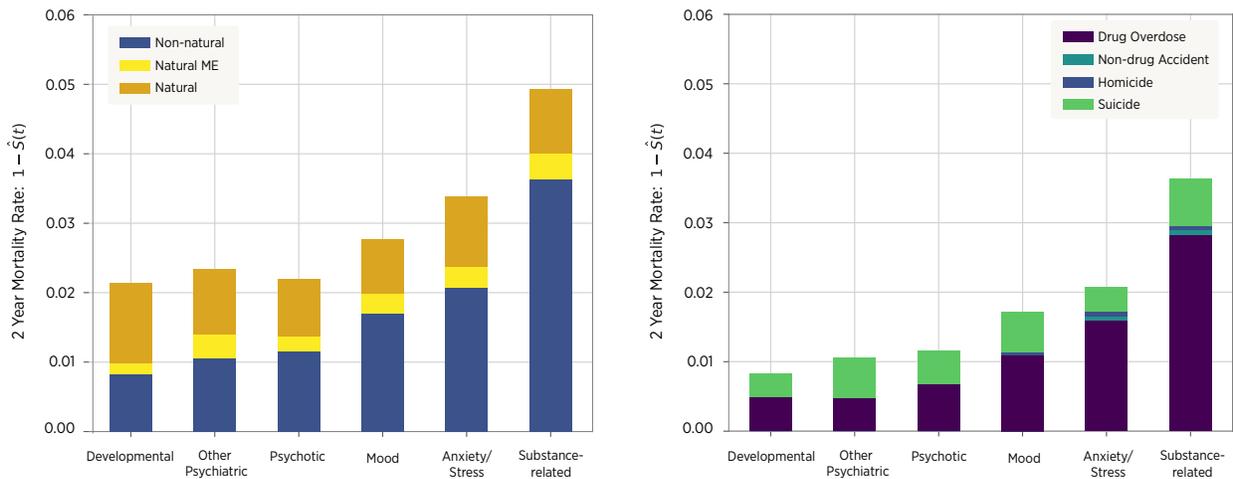
The 302 population is diverse; it contains people of all ages, races and genders. While every person in this cohort has experienced or is experiencing mental health difficulties, the specifics of their mental health condition vary widely. A 70-year-old with dementia has different outcomes and treatment needs than a 20-year-old with schizophrenia experiencing their first episode of psychosis.

For the half of the 302 population enrolled in the public insurance program, Medicaid claims give insight into pre-existing mental health diagnoses before their first 302 event. We divide these into five categories—developmental (autism, developmental delay), psychotic (schizophrenia, other psychosis), substance related (opioid use disorder), anxiety/stress (anxiety disorder, adjustment disorder), mood (depression, bipolar) and other (borderline personality, oppositional defiant).

We find the population most at risk of mortality are those with SUDs. In **Figure 8** we show the 2-year mortality rate among 18 through 50-year-olds for each diagnosis category. Those with an SUD have a 5% 2-year mortality rate, with a 3.8% non-natural death rate. The second panel breaks this non-natural rate into drug overdose, non-drug accident, homicide and suicide. Most deaths of individuals with an SUD in the 2-year crisis window are due to drug overdoses.

In the third panel we compare the relative frequency of diagnoses among the 302 population in comparison to Medicaid users of outpatient mental health. Both populations have many individuals with mood disorders, but the 302 population has a higher share of individuals with a diagnosis of psychosis and a lower share of individuals with anxiety/stress disorders. SUD diagnoses are overrepresented in the 302 population, at a ratio of 1.2.

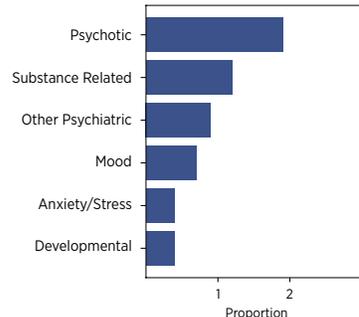
**FIGURE 8: Cause of Death by Diagnosis**



**Mental Health Diagnosis Frequencies**

Diagnosis Categories	302 Medicaid	OPMH Medicaid	Relative Frequency
Psychotic	18.6%	9.6%	1.9
Substance Related	31.3%	25.5%	1.2
Other Psychiatric	10.1%	11.7%	0.9
Mood	43.7%	63.6%	0.7
Developmental	26.5%	70.0%	0.4
Anxiety/Stress	8.7%	20.1%	0.4

**Relative Frequency of Diagnosis (302/OPMH)**



**DIFFERENCES BY PATIENT DEMOGRAPHIC**

In analyzing patient demographics, we find that there are no substantial differences in the likelihood of upholding an involuntary commitment by gender or race, although men and Black individuals are disproportionately likely to be subjected to an evaluation for involuntary commitment.

TABLE 4 displays the upheld rates, involuntary commitment population composition and overall county gender composition. We find that the upheld rate between men and women is similar (78.6% vs 77.8%). The 302 population contains a higher proportion of males than females, while the county has slightly more females, implying that the 302 population skews male by a modest margin.

**TABLE 4: Upheld Rate by Gender**

	UPHELD RATE	302 FRACTION	POPULATION FRACTION	DIFFERENCE	TOTAL CASES
Male	78.6%	53.9%	48.7%	5.2%	20,689
Female	77.8%	46.1%	51.3%	-5.2%	17,685

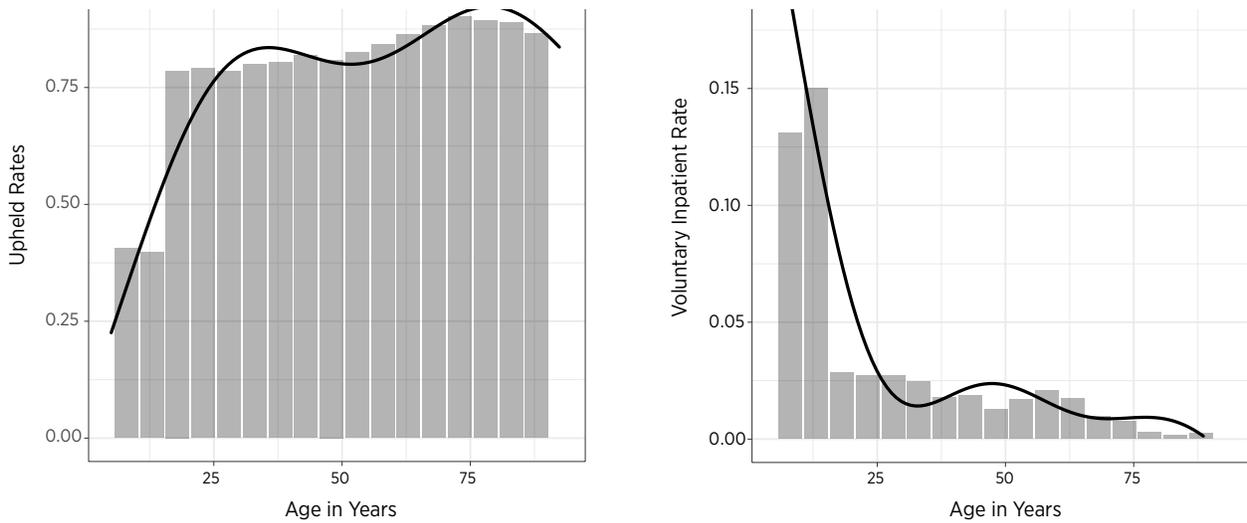
We repeat this analysis for race in Table 5. Over 97% of the 302 petitions are for White and Black individuals, which comprise 91% of the county population. White individuals have a higher upheld rate than Black individuals (79.8% vs. 75.2%), while Black individuals are overrepresented in the 302 population, representing 32% of the 302 population but only 13% of the county population.

**TABLE 5: Upheld Rate by Race**

	UPHELD RATE	302 FRACTION	POPULATION FRACTION	DIFFERENCE	TOTAL CASES
White	79.8%	65.2%	77.5%	-12.3%	24,695
Black	75.2%	32.1%	13.5%	18.6%	12,146
Asian	81.0%	1.3%	4.4%	-3.1%	500
Hispanic/Latinx	69.5%	1.0%	2.4%	-1.4%	387
Two or More Races	61.7%	0.1%	2.5%	-2.4%	47

The trend with age is sharper with upheld rates tending to increase with age. There is a sharp discontinuity at 18 with upheld rates being much lower among this age cohort, which is attributable to younger individuals' parents or guardians choosing to convert an involuntary commitment to a voluntary commitment, known as a 201. There are high rates of 201 usage among minors, as evidenced in Figure 9.

**FIGURE 9: Upheld Rate by Age**

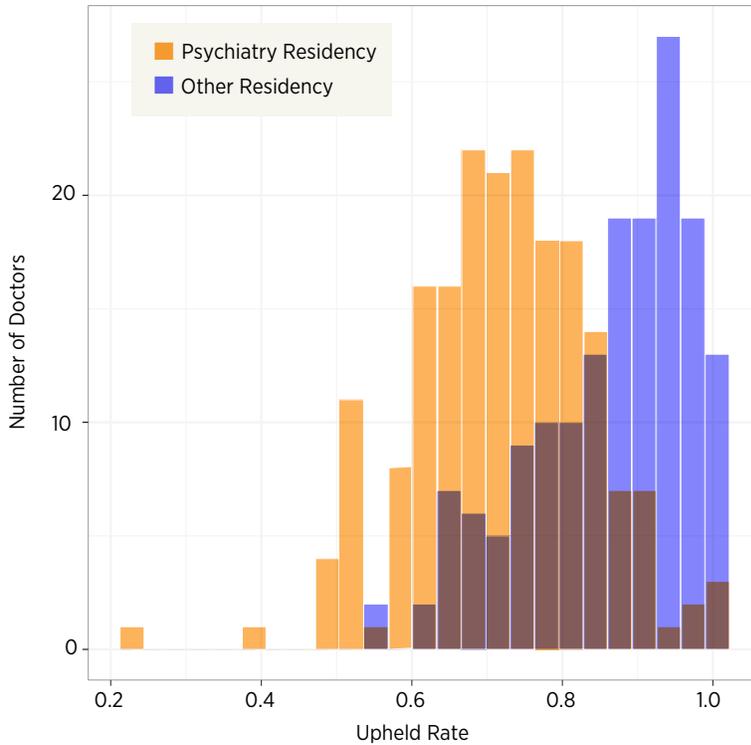


**DIFFERENCES BY PHYSICIAN CREDENTIALS**

The physicians conducting exams can be psychiatrists or non-psychiatrists, with the two groups displaying different tendencies. **Figure 10** shows the percentage of petitions upheld by physicians who have conducted more than 30 involuntary commitment exams by training. Orange represents psychiatrists, blue represents non-psychiatrists, and the maroon color shows where the two distributions overlap. A doctor with an upheld rate of 1.0 means that individual doctor upheld every petition they reviewed (there are 13 such doctors in our dataset).

Psychiatrists have an average upheld rate of 0.70 (70%), while non-psychiatrists have an upheld rate of 0.86 (86%). Psychiatrists conduct 59% of all exams. In future work, we will explore explanations of this gap and whether it can be used to help identify the impact of involuntary commitments for marginal cases (i.e., cases where assignment to more or less lenient clinicians could influence upheld rates).

**FIGURE 10: Upheld Rate by Physician**



**CONCLUSION / NEXT STEPS**

In this document, we report outcomes among individuals subjected under the MHPA to a 302 exam. We find high service usage and poor outcomes, even when compared to other risky populations. We also find that the riskiest subpopulations are predictable at the time of the 302 exam.

We will conduct two follow-up analyses with the goal of influencing system design and investments. The first is a causal analysis that will estimate the impact of 302s on future patient outcomes, as well as the impact of various treatments. The causal analysis will leverage the fact that the physician a client sees when arriving at an ED is plausibly random and physicians behave very differently than one another. We can pair these facts to estimate whether the 302 event itself is improving or worsening outcomes among this cohort. We anticipate this work to be published on [www.AlleghenyCountyAnalytics.US](http://www.AlleghenyCountyAnalytics.US) in Q4 2023.

The second is a policy analysis which will analyze changes to the system most likely to achieve positive outcomes. We seek to analyze the effectiveness of specific downstream programs, as well as their available capacity, to drive changes and investments to support those exiting a 302 and dampen the high frequency of poor outcomes. We will post the department’s plans by the end of Q1 2024.