Mental Health and the Justice System in Durham County

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Introduction

Individuals living with mental illness are overrepresented throughout the criminal justice system, including at the local level where they can be repeatedly booked and detained, often for misdemeanor crimes. The Durham County Detention Facility (DCDF) is the focal point for criminal justice contact in Durham. In recent years, the community has taken steps to decrease the number of people who pass through the facility, including the implementation of a Crisis Intervention Team (CIT), the work of the Criminal Justice Resource Center (CJRC), and the establishment of a mental health court. Coexisting in Durham is Duke Health, which serves as the major health care provider in the county and region, seeing 69,000 inpatient and 2.3 million outpatient visits in 2018. Another Durham provider is the Lincoln Community Health Center which specializes in providing health care services to the medically underserved.

From January 2014 to June 2015, a "Mental Health" (MH) tag was added to the records of individuals booked into the DCDF. This tag was applied by mental health professionals affiliated with the detention facility and was applied to alert staff of the specialized needs of the individuals. The tagging was discontinued due to HIPAA concerns; however, the tag remains a potentially useful indicator of the presence of individuals who experience serious mental illness and who have been incarcerated.

The objective of our Data+ Team this summer was to take data provided by the DCDF and health care centers and analyze trends across these institutions, specifically in regards to individuals living with mental illness.

Methods

We completed thorough training and received IRB approval before beginning this project. Using a matched dataset provided by the Durham County Detention Facility (DCDF) and the Duke Health Analytics Center of Excellence (ACE), securely transferred to us through the Protected Analytics and Computing Environment (PACE) workspaces, we conducted descriptive statistical analysis of the population of interest for this project.

Sample
- Full DCDF population (2014-2018): 23,608
- Matched dataset between DCDF and health care providers: 17,588
- Released from DCDF and saw provider: 14,673
- Subset confined during time period when Mental Health tag was reliably applied in DCDF: 6,637
  - No Mental Health tag: 6,405
  - Mental Health tag: 232

Descriptive Statistics and Data Analysis
We created a table to show demographic characteristics (Table 2), booking, incarceration, and health care details (Table 3), and mental health and substance use diagnoses information (Figure 1). We cleaned the datasets and arrived at the population sample sizes after discussing and addressing the challenges of dealing with duplicate entries, conflicting race records, and conflicting Mental Health tag records. The breakdown of these challenges are shown in Table 1.

With the cleaned datasets, we took on individual exploration with data. We used R Software, specifically ggplot2, dplyr, tidyverse, knitr, splitstackshape, and xtable to visualize our data and conduct exploratory and descriptive statistical analysis.

Table 1: Summary of dataset conflicts

Dataset	Variable	Number of Conflicts
Demographics	Race	224 (1.3%)
DCDF, demographics	MH/Non MH Tag	6 (0.1%)
DCDF, demographics	Sex	99 (0.5%)

Table 2: Demographic characteristics of the population

|	Released from DCDF and saw provider 2014-2018 (n = 14673)		Subset confined during reliable DCDF MH-alert tagging period; Jan. 2014 - June 2015 (n = 6637)		No MH alert tag (n = 6405)		MH alert tag (n = 232)	
	n	%	n	%	n	%	n	%
Race								
Black or African American	10487	(71.5)	5042	(76.0)	4868	(76.0)	174	(75.0)
Caucasian/White	2989	(20.4)	1168	(17.6)	1119	(17.5)	49	(21.1)
Other/Multiple/DK	1197	(8.2)	427	(6.4)	418	(6.5)	<10	(3.9)
Ethnicity								
Latinx	800	(5.5)	262	(3.9)	260	(4.1)	<10	(0.9)
Not Latinx/Other	13873	(94.5)	6375	(96.1)	6145	(95.9)	230	(99.1)
Sex								
Female	4620	(31.5)	1919	(28.9)	1864	(29.1)	55	(23.7)
Male	10049	(68.5)	4716	(71.1)	4539	(70.9)	177	(76.3)
Age in 2020 (Mean, SD)	(38.0,	12.4)	(38.9,	12.0)	(38.8,	12.0)	(41.3,	12.3)

Black or African American, non-Latinx, male individuals comprise the majority of the population. The demographic characteristics of the reliable tagging period subset, the no MH tag subset, and MH tag subset mirror the full population, however, individuals with a MH tag were slightly older than the individuals without a MH tag, on average (Table 2).

Table 3: DCDF Bookings and Health care Service Area

	Released from DCDF and saw provider 2014-2018 (n=14673)		Subset confined when DCDF MH-alert tagging was reliably done (n=6637)		No MH alert tag (n=6405)		MH alert tag (n=232)	
	n	%	n	%	n	%	n	%
Incarcerations and DCDF tag								
Number of bookings (Mean, SD)	(2.5,	2.7)	(3.3,	3.4)	(3.2,	3.3)	(5.9,	4.9)
Mean days of incarceration (per booking per individual) (Mean, SD)	(13.2,	51.8)	(15.0,	52.6)	(13.5,	44.0)	(55.6,	155.2)
Median days of incarceration (per booking per individual) (Mean, SD)	(10.2,	50.0)	(10.1,	49.6)	(8.9,	40.6)	(41.3,	155.0)
Longest observed incarceration (per individual) (Mean, SD)	(27.5,	82.5)	(37.6,	96.2)	(34.5,	89.2)	(122.2,	195.3)
DCDF MH alert tag								
No	14364	(97.9)	6405	(96.5)	6405	(100.0)	0	(0.0)
Yes	309	(2.1)	232	(3.5)	0	(0.0)	232	(100.0)
Healthcare utilization								
Ever seen at Lincoln 2014-2018								
No/missing	10822	(73.8)	4881	(73.5)	4755	(74.2)	126	(54.3)
Yes	3851	(26.2)	1757	(26.5)	1651	(25.8)	106	(45.7)
Ever seen in Duke ED 2014-2018								
No/missing	2534	(17.3)	984	(14.8)	975	(15.2)	<10	(3.9)
Yes	12139	(82.7)	5654	(85.2)	5431	(84.8)	223	(96.1)

Results

Figure 1: Mental Health and Substance Use Diagnoses by MH tag

Summary: Co-Occurring Mental Health and Alcohol or Drug Diagnoses
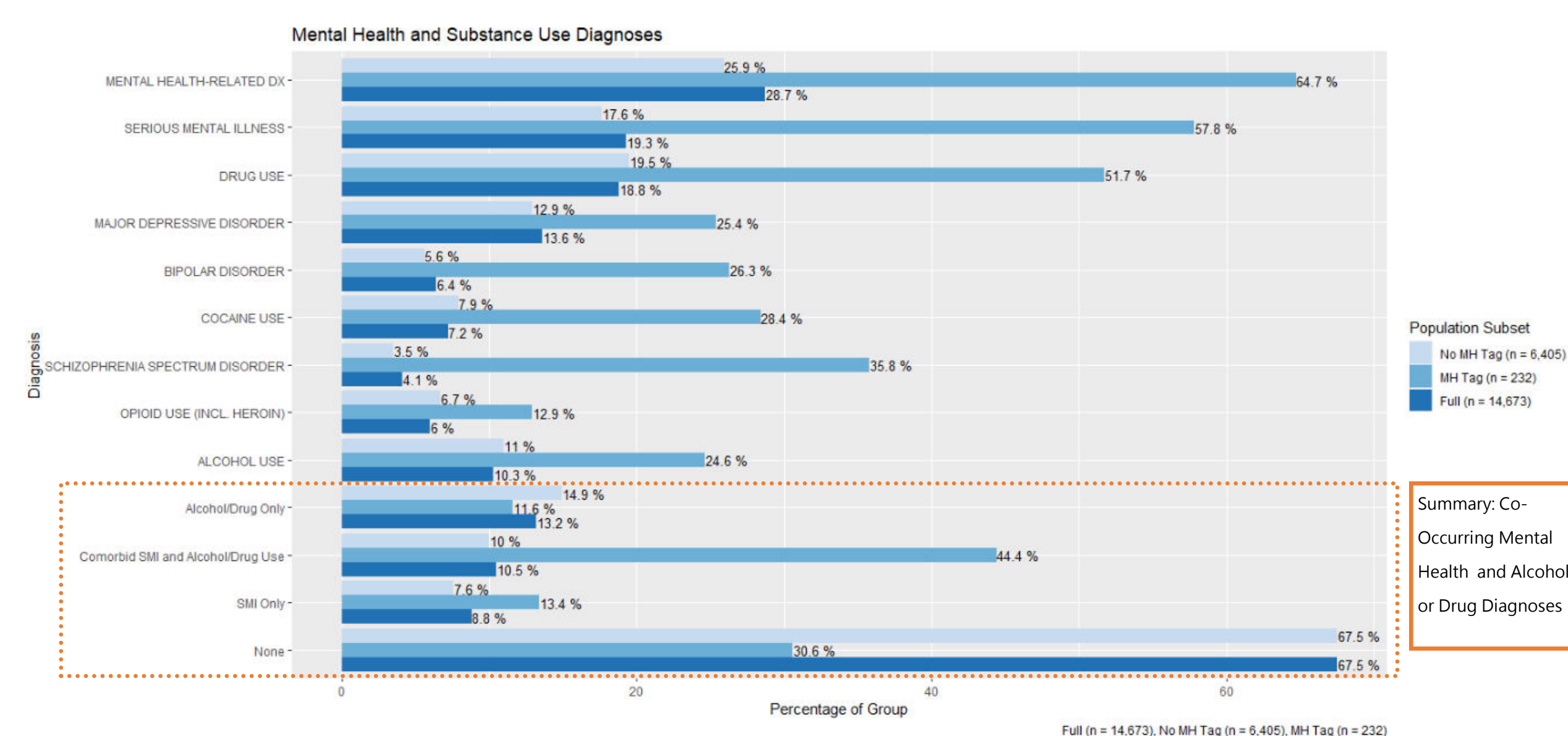
These diagnoses reflect the assessment of Duke Health, as the MH tag is applied according to the expertise of health professionals at the DCDF with diagnostic guidelines pertaining to serious mental illness. All mental health and substance use diagnoses were more prevalent among individuals with a MH tag than both those without a MH tag and the full population (Figure 1). The gap is wide, as the prevalence of all mental health and substance use diagnoses are at least twice as large among individuals with a MH tag than the other two groups. Some of the diagnoses that show the widest MH tag difference are serious mental illness (30%), schizophrenia (32.3%), and drug use (32.2%).

Table 4: Person-level diagnoses for Self-harm/Suicidal and Nicotine use

|	Released from DCDF and saw provider 2014-2018 (n = 14672)		Subset confined when DCDF MH alert tagging was reliably done (n = 6631)		No MH alert tag (n = 6400)		MH alert tag (n = 231)	
	n	%	n	%	n	%	n	%
Self-harm/Suicidal								
No	13841	94.3	6292	94.8	6120	95.5	173	74.6
Yes	831	5.7	345	5.2	286	4.5	59	25.4
Nicotine use								
No	12004	81.8	5394	81.3	5230	81.6	164	70.7
Yes	2668	18.2	1243	18.7	1176	18.4	68	29.3

There is a higher frequency of nicotine use as well as diagnoses relating to self-harm/suicidal in the MH tag population (Table 4). Diagnoses relating to self-harm and suicidal includes both ideations (having thoughts of suicidal/self-harm) and actions to carry out the suicidal/self-harm ideations.

Table 5: Bookings and length of incarceration by sex

|	Subset confined during reliable DCDF MH-alert tagging period; Jan. 2014 - June 2015 (n = 6635)				No MH-alert Tag (n = 6403)				MH-alert Tag (n = 232)			
	Female		Male		Female		Male		Female		Male	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
Number of bookings	1.5	(1.2)	1.8	(1.5)	1.5	(1.2)	1.7	(1.4)	2.7	(1.8)	2.6	(1.8)
Median days of incarceration (per booking per individual)	5.5	(30.5)	15.6	(60.6)	4.3	(22.5)	14.1	(51.4)	47.9	(117.0)	53.6	(170.2)
Longest observed incarceration (per individual)	8.4	(33.8)	25.6	(77.2)	6.5	(24.9)	22.8	(65.9)	75.7	(121.0)	96.9	(206.5)

Individuals with a MH tag, regardless of sex, had more bookings, on average, than those without a MH tag, meaning that they were more likely to be rearrested. In the three population subsets shown, males have longer lengths of incarceration than females, on average, even more than two-times the difference for the median days of incarceration and the longest observed incarceration for the full subset and the no MH tag population (Table 5).

Figure 2:
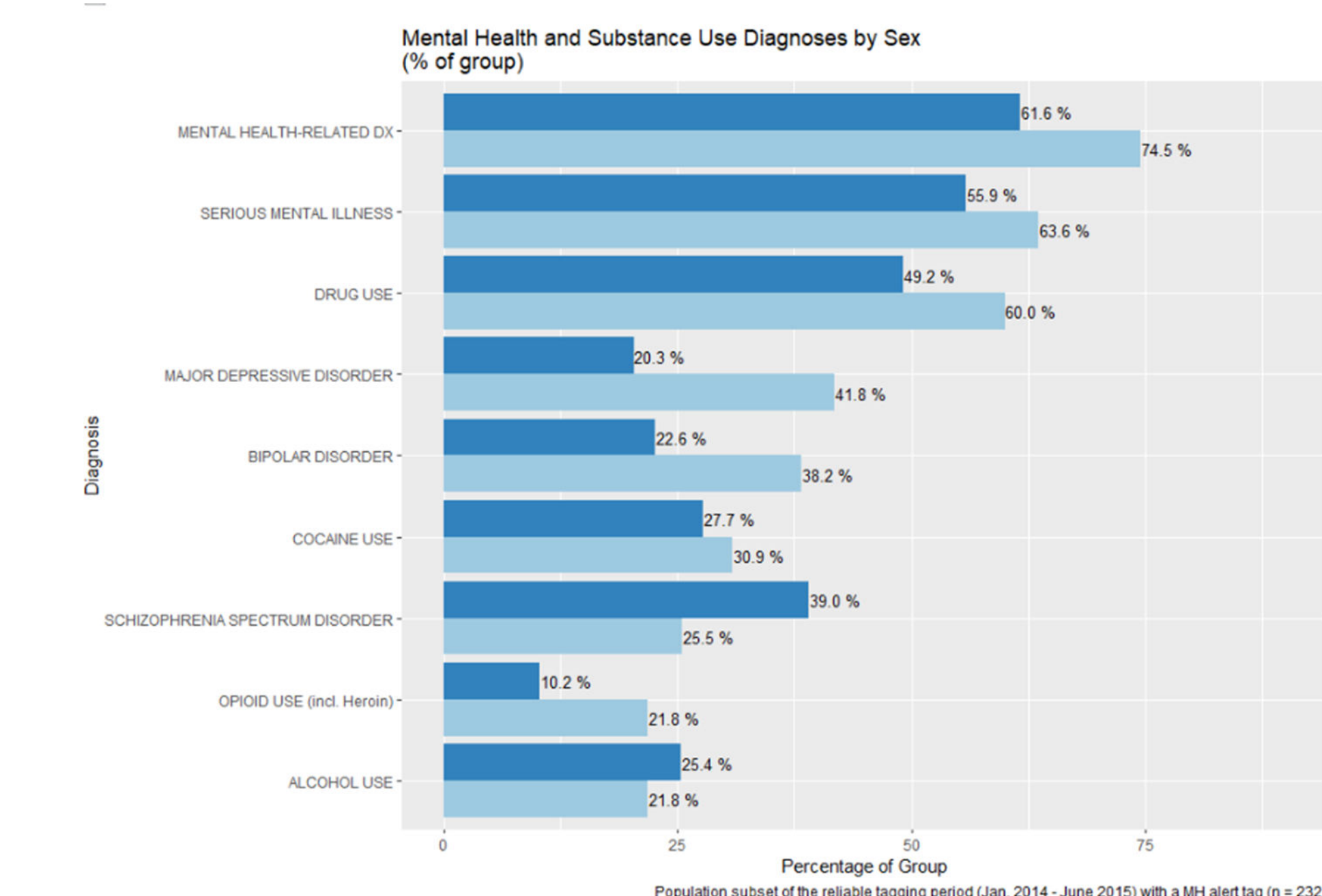
All mental health and substance use diagnoses except for schizophrenia spectrum disorder and alcohol use are more prevalent among females than males in the population subset with a MH tag (Figure 2).

Figure 3:
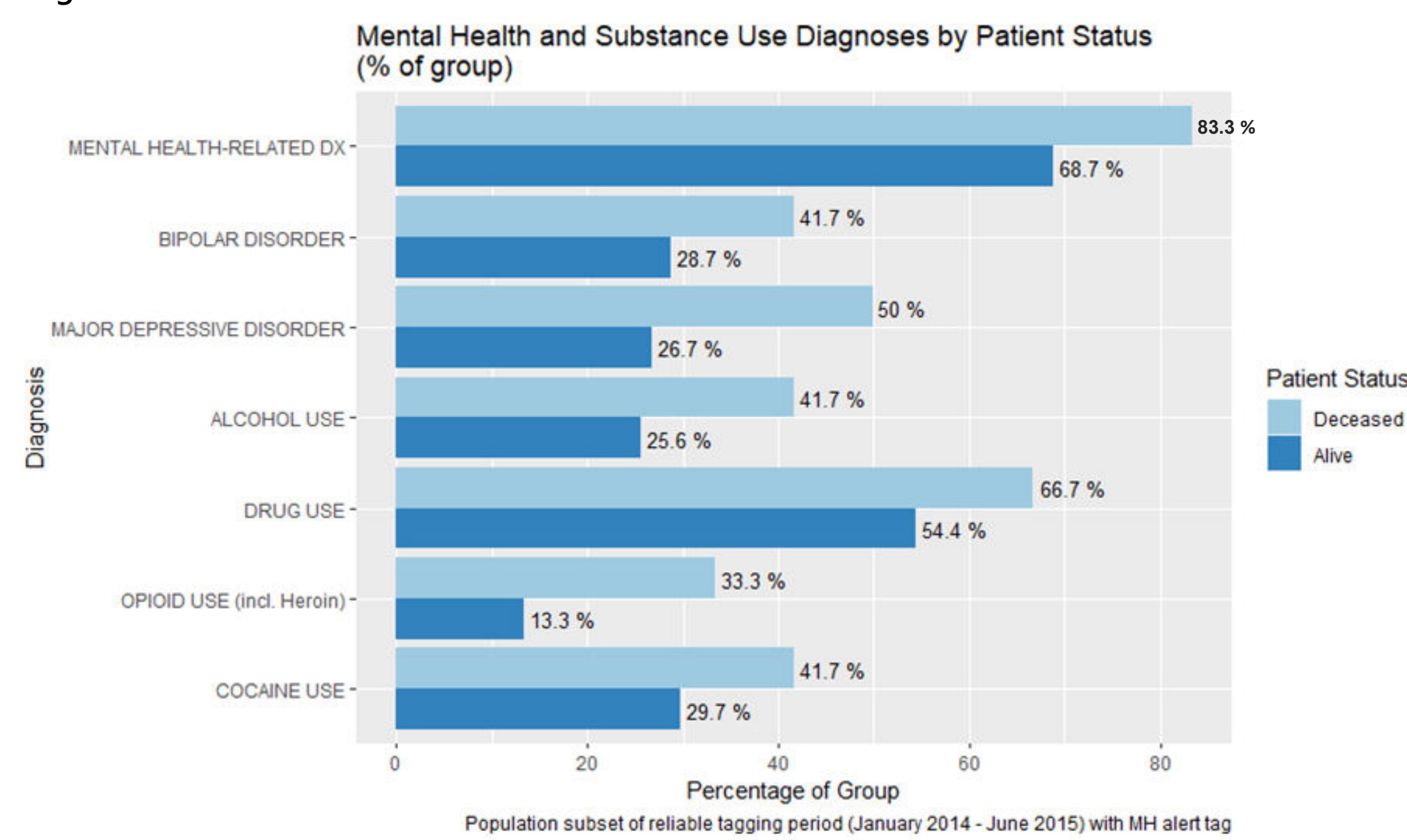
The prevalence of mental health-related diagnoses, bipolar disorder, major depressive disorder and various sub-stance use disorders is higher among individuals who died during our study observation window (n = 379 individu-als) than those who were alive during our study observation window (n = 14,294 individuals). The widest gap can be observed in major depressive disorder, opioid use, and alcohol use, indicating that these diagnoses may correlate with death in our population. (Figure 3)

Figure 4:
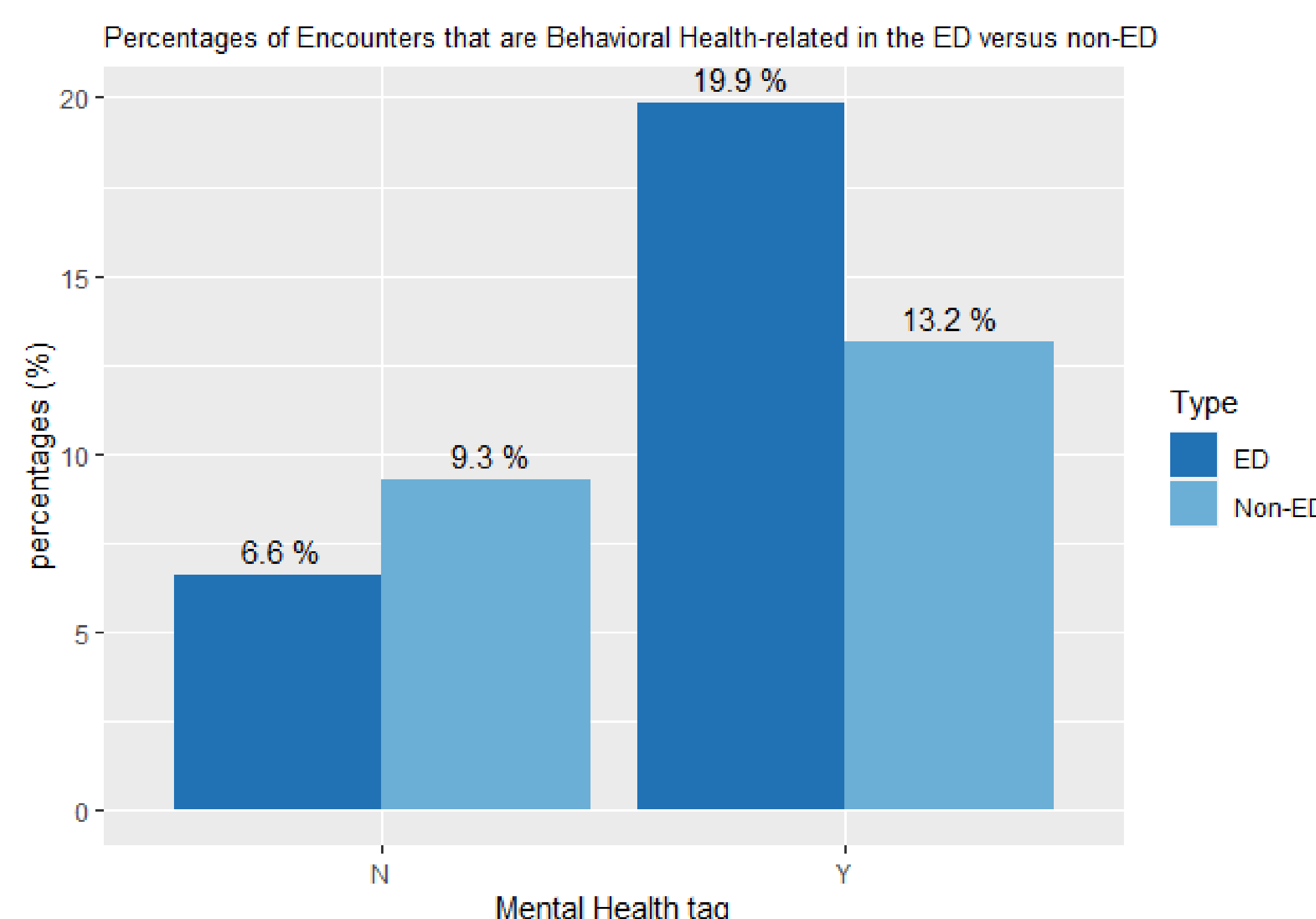
An encounter is labeled as a behavioral health-related encounter if the encounter has at least 1 behavioral health diagnosis (alcohol use, drug use, or mental illness)**. The percentages shown in the graph represent the fraction of encounters from the total number of each type of encounters (ie. 8.4% of all encounters are behavioral health-related). For the MH tag pop-ulation, the percentages of behavioral health-related encounters are higher than in the no MH tag population in all three categories: all encounters, ED encounters, and non-ED encounters. Upon closer examination, in the no MH tag population, the percentages of behavioral health-related encounters in the ED is lower compared to non-ED encounters. Contrastingly, the percentages of behavioral health-related encounters is higher in the ED compared to non-ED encounters in the no MH tag population (Figure 4).

**It is worth noting that a mental health diagnosis could be input by healthcare providers based on clinical impression. This means that the patient could go to the ER for an unrelated visit and still receive a mental health-related diagnosis.

Table 6: Summary Statistics for Encounters between MH tag versus no MH tag

|	No MH alert tag	MH alert tag
	n	n
Median		
ED encounters	3.0	7.0
Non-ED encounters	6.0	7.0
Total		
ED encounters	34208	3354
Non-ED encounters	71518	2760
Number of individuals		
Who have at least 1 ED encounter	5431	223
Who have at least 1 non-ED encounter	4714	180

Looking at the breakdown, the MH tag population has the same median number of encounters for non-ED encounters compared to the no MH tag population, but the MH tag population has a much higher median number of encounters in the ED compared to the no MH tag population (Table 6).

Figure 5:
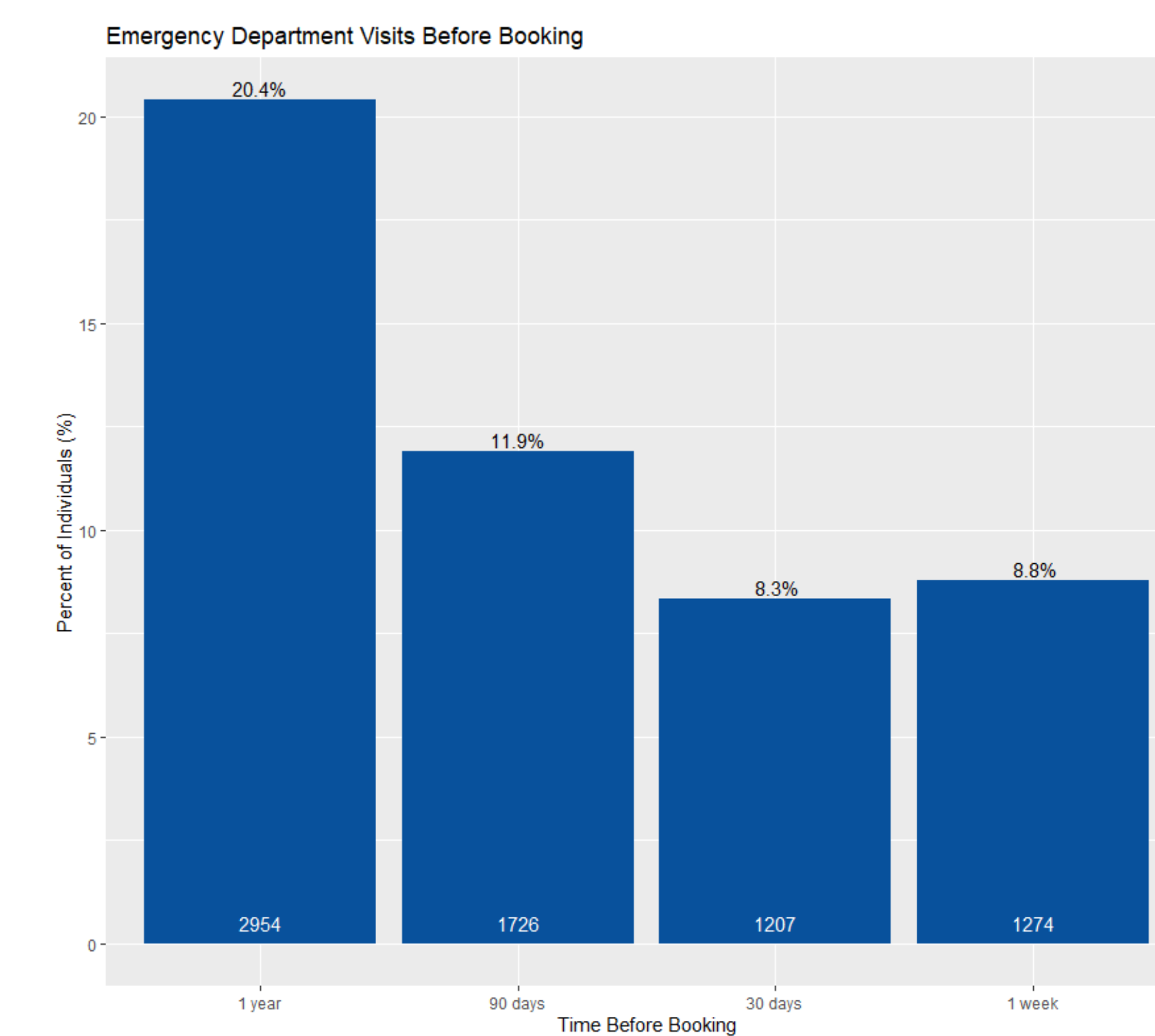
The percentages (and counts) of individuals who had a Duke Health emergency department (ED) visit within 1 year to 90 days, 90 days to 30 days, 30 days to 1 week, and 1 week to 0 days of any of their bookings, in the time period from Jan 2015 to Jan 2019 (14,482 individuals) (Figure 5).

Figure 6:
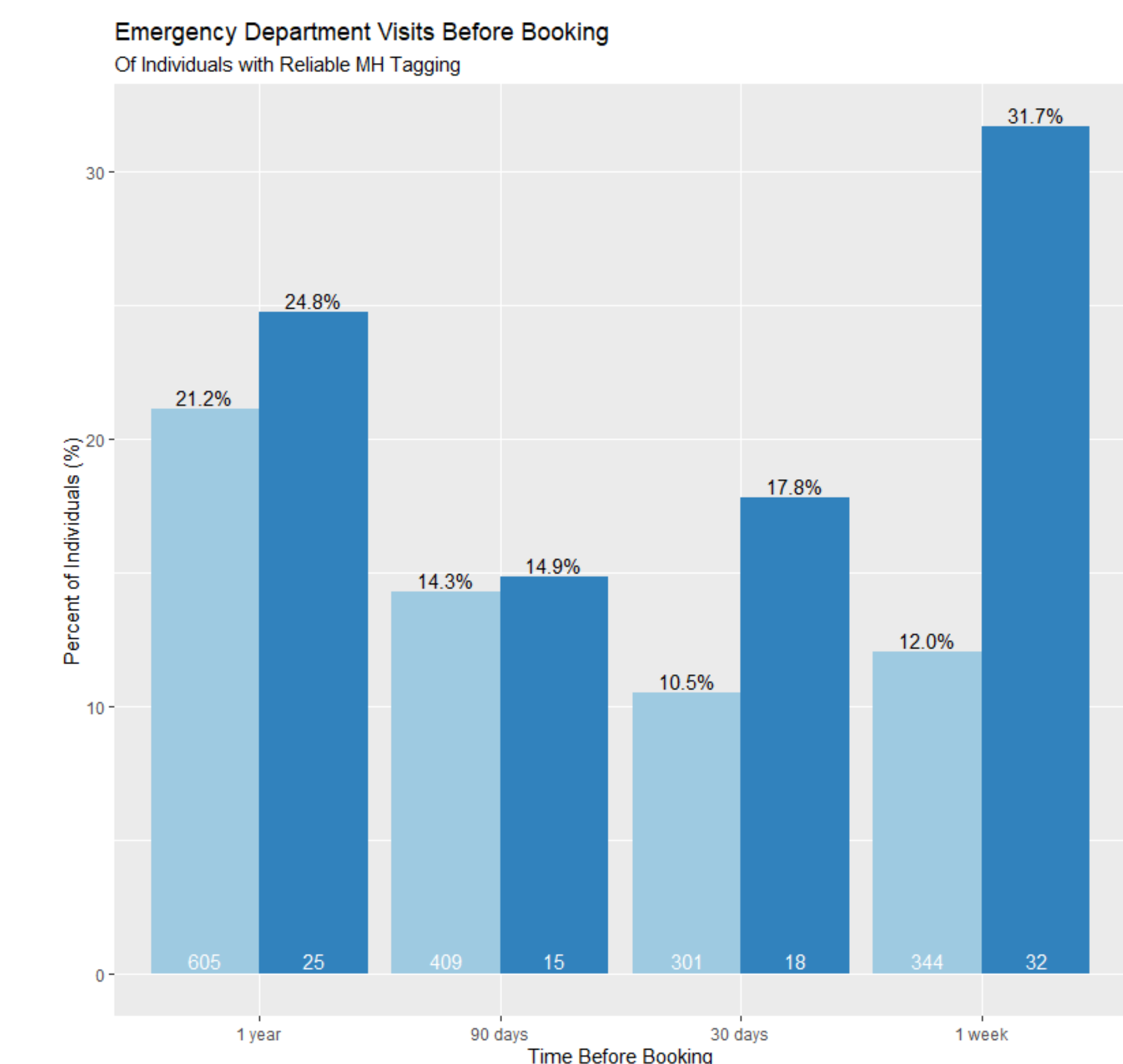
The percentages (and counts) of individuals with reliable Mental Health tagging who had a Duke Health emergency department (ED) visit within the same time intervals/period as Figure 5 (2,960 individuals). The two bars for each time period correspond to either a Mental Health tag of Y(es) or N(o), and show the negatively tagged group following the trend in Figure 5 while the positively tagged group has higher proportions at each time interval, but especially within 30 days and 1 week before booking (Figure 6).

Discussion

Consistent with prior years' findings, individuals who are released from DCDF and saw providers are composed mainly of Black or African American, non-Latinx, males. The MH tag population reflects the demographic of the larger subset, and a larger percentage of MH tag individuals have mental health-related diagnoses for drug use, alcohol use, or mental illness disorders. Added categories for self-harm or suicidal diagnoses and nicotine usage diagnoses also show higher numbers in the MH tag population (Table 4).

Figure 3 indicates that individuals who died during the study window had a higher frequency of having a record of a substance use disorder diagnosis than those who were alive during our study window, perhaps reflecting a risk of death by overdose. Figure 2 shows that except for schizophrenia spectrum disorder and alcohol use diagnoses, females have higher frequencies of diagnoses in mental health-related and substance use diagnoses. These findings prompt future explorations into DCDF and Duke Health activities broken down by sex and whether the individual died during the study window.

Through Figure 5 and Figure 6, there is a high percentage of ED encounters within 1 year before the date of incarceration in the general population. This finding suggests a link between ED encounters and potential DCDF encounters. Figure 6 also shows a large number of individuals with a MH tag have at least one ED encounter within one year of the date of incarceration (89.1%). This finding is coupled with the summary statistics shown in Figure 4 and Table 6 that suggest that the MH tag population, on average, uses the ED more than the no MH tag population.

From these initial findings, the team plans on conducting significance tests and performing various predictive modeling and survival analyses to examine treatment utilization by individuals once released from the DCDF and what impact these have on rates of recidivism, trajectories in and out of both the DCDF and health care providers, and further illuminate incarceration and health care utilization of individuals tagged with mental illness by the DCDF.

Acknowledgements