

Supplemental Online Content

Overhage L, Hailu R, Busch AB, Mehrotra A, Michelson KA, Huskamp HA. Trends in acute care use for mental health conditions among youth during the COVID-19 pandemic. *JAMA Psychiatry*. Published online July 12, 2023. doi:10.1001/jamapsychiatry.2023.2195

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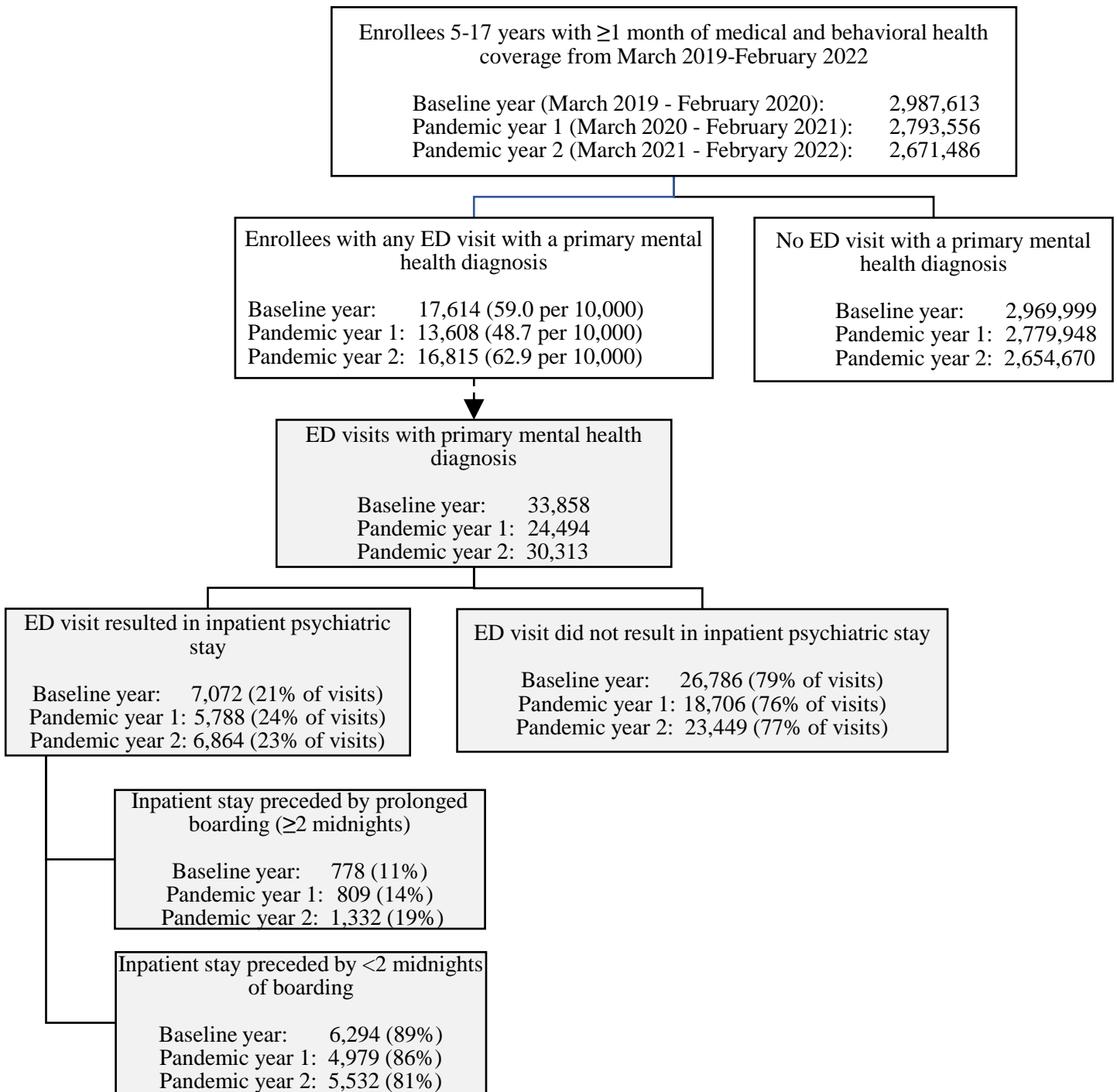
This supplemental material has been provided by the authors to give readers additional information about their work.

eMethods

ICD-10 codes for mental health diagnoses:

| Dx category | ICD10 |
|---|--|
| Suicide attempt | T14.91XA |
| Suicidal ideation | R45.85 (ideation) |
| Intentional self-harm | X71-X83 (intentional self harm) T36-T65, T71 when 6th character of code =2. Except for T36.9, T37.9, T39.9, T41.4, T42.7, T43.9, T45.9, T47.9, and T49.9, T51.9, T52.9, T53.9, T54.9, T56.9, T57.9, T58.0, T58.1, T58.9, T59.9, T60.9, T61.0, T61.1, T61.9, T62.9, T63.9, T64.0, T64.8, T65.9, which are included if the 5th character of the code=2). |
| Depressive disorder | F32.xx, F33.xx, F34.1x |
| Bipolar disorder | F30.xx-F31.xx, F34.0x |
| Schizophrenia/psychotic disorders | F20.xx, F22.xx-F29.xx |
| Anxiety disorders | F40.xx- F42.xx, F93.0x-F93.2x, F94.0x |
| Adjustment disorders | F43.2x |
| Trauma disorders | F43.0x, F43.1x, F43.8x, F43.9x, F94.1x, F94.2x |
| Conduct/impulse control disorders | F63.xx, F91.xx, F92.xx |
| ADHD | F90.xx |
| Autism spectrum disorder | F84.xx |
| Eating Disorders | F50.xx, F98.2x |
| Conversion/neurotic disorders | F44.xx, F45.xx, F48.xx, F68.xx |
| Other MH disorders: | |
| Personality disorders | F69.xx |
| Other/unspecified mood disorders | F34.8, F34.9x, F38.xx, F39.xx |
| Gender dysphoria | F64.xx-F66.xx |
| Sexual disorders | F52.xx-F54.xx |
| Tic and movement disorders | F95.xx, F98.4x |
| Other | F59.xx, F93.3x-F93.9x, F94.8x, F94.9x, F98.8x, F98.9x, F99.xx |
| Substance use disorder (as co-occurring condition only) | F10-F16, F18-F19 |

eFigure 1. Flow chart of acute mental health care utilization over 2 years of COVID-19



Study included youth 5-17 years who were enrolled in health insurance (medical and behavioral coverage) from a large national insurer between March 2019 and February 2022. Baseline year is March 2019 to February 2020; pandemic year 1 is March 2020 to February 2021; and pandemic year 2 is March 2021 to February 2022. ED visits with a primary diagnosis of substance use disorder were not counted as mental health emergency department visits.

eTable 1. Characteristics of youth in analyzed commercial claims dataset compared to United States population of youth age 5-17 years

| | Youth in sample, year averages | Youth in the United States |
|---|---------------------------------------|-----------------------------------|
| Total | 2.8 million | 53.7 million |
| Documented Sex | | |
| Male | 51% | 51% |
| Female | 49% | 49% |
| Age | | |
| 5-12 years | 59% | 61% |
| 13-17 years | 41% | 39% |
| Rurality | | |
| Non-Rural | 96% | 94.6% |
| Rural | 4% | 5.4% |
| County quartile: Income | | |
| Highest | 34% | 25% |
| Percentile 50-75 | 26% | 25% |
| Percentile 25-50 | 25% | 25% |
| Lowest | 15% | 25% |
| County quartile: Percent non-White | | |
| Highest | 20% | 25% |
| Percentile 50-75 | 29% | 25% |
| Percentile 25-50 | 27% | 25% |
| Lowest | 24% | 25% |

This table compares demographics of youth enrolled in the commercial insurer whose data we used for this analysis to the United States population of youth age 5-17 years. United States population estimates by age and sex were calculated from come from the United States American Community Survey 2021 estimates. Rurality prevalence based on 2018 estimates.⁵⁶ Approximately 62% of youth have commercial insurance,¹⁶ so we estimate that our sample includes 8.4% of commercially insured youth in the United States (2.8 million / (62%*53.7million)).

eTable 2. Number of mental health ED visits per youth among youth with at least one mental health ED visit per year

| | 1 mental health ED visit in year | | 2 mental health ED visits in year | | 3+ mental health ED visits in year | |
|---|----------------------------------|---------|-----------------------------------|---------|------------------------------------|---------|
| | Number | Percent | Number | Percent | Number | Percent |
| Baseline Year (Mar 2019-Feb 2020) | 13,731 | 78% | 2,055 | 11.7% | 1,828 | 10.4% |
| Pandemic Year 1 (Mar 2020-Feb 2021) | 10,738 | 79% | 1,514 | 11.1% | 1,356 | 10.0% |
| Pandemic Year 2 (Mar 2021-Feb 2022) | 13,174 | 78% | 1,994 | 11.9% | 1,647 | 9.8% |

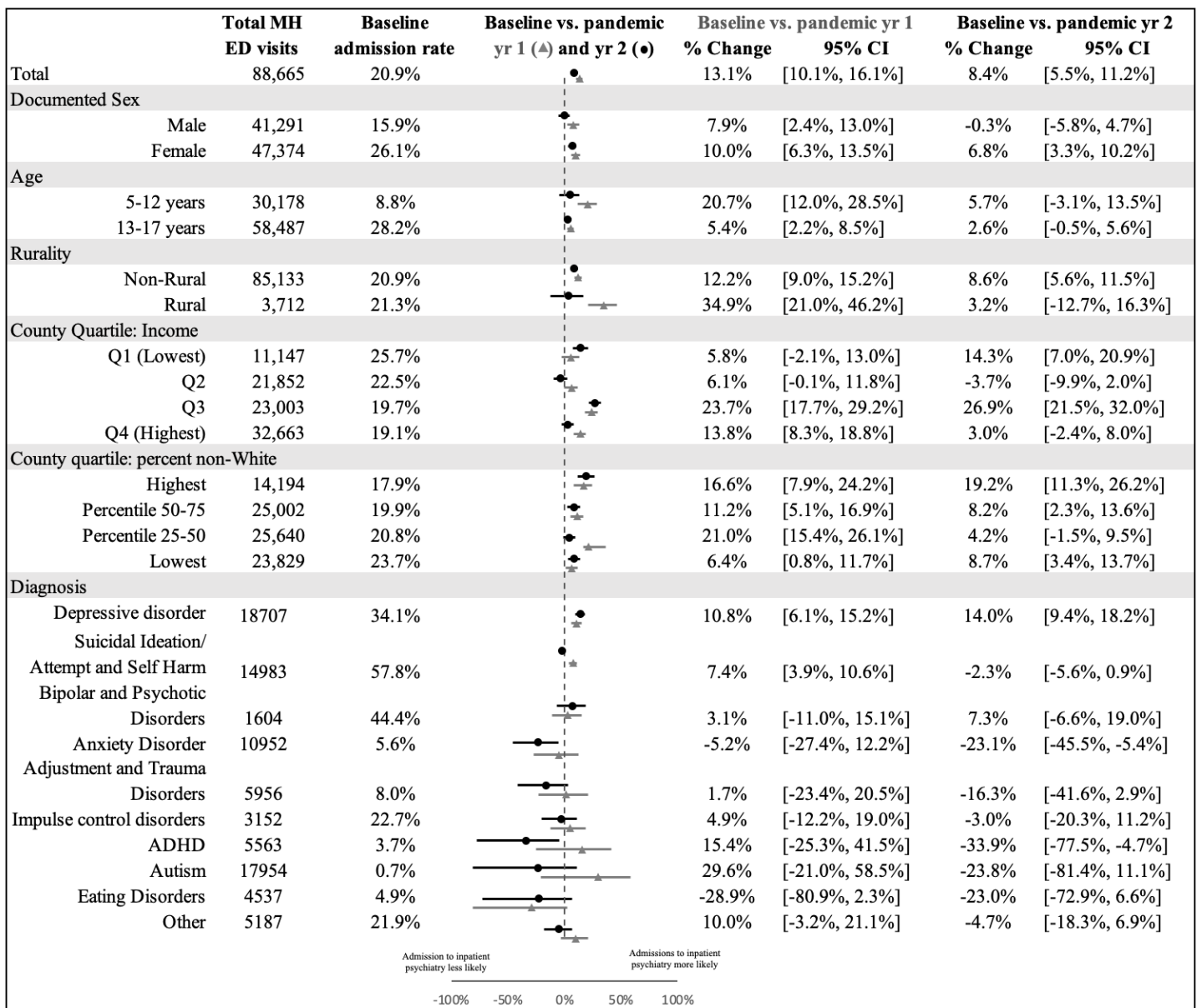
Distribution of number of ED visits per youth per year, restricting to youth who have at least one mental health ED visit in the given year. We do not require continuous enrollment in this table.

eTable 3. Enrollment and outpatient mental health diagnoses 30 days prior to mental health ED visits

| | Total mental health ED visits (Number) | ED visits for which child had any outpatient visit with a primary mental health diagnosis in 30 days prior to visit (Percent) |
|---|---|--|
| Baseline Year (Mar 2019-Feb 2020) | 33,858 | 78.1% |
| Pandemic Year 1 (Mar 2020-Feb 2021) | 24,494 | 76.3% |
| Pandemic Year 2 (Mar 2021-Feb 2022) | 30,313 | 72.2% |

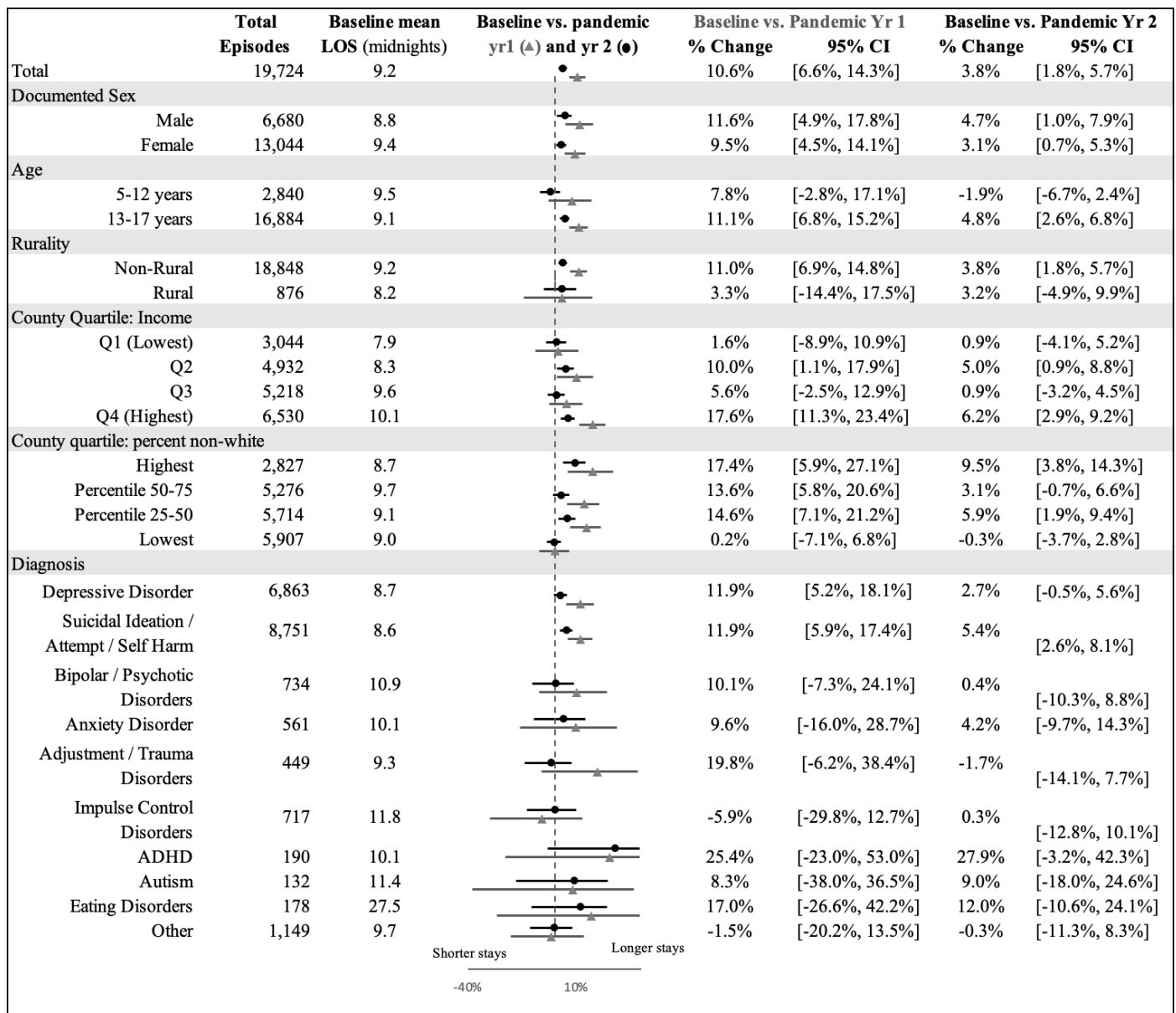
Episode-level analysis of enrollment and outpatient visits before a mental health ED visit, by year. The percentage of ED visits preceded by an outpatient visit with a mental health diagnosis excludes youth who were not enrolled 30 days prior to ED visit (0.7% of ED visits in the baseline year, 0.6% in pandemic year 1, and 0.8% in pandemic year 2).

eFigure 2. Changes in the percentage of mental health ED visits that result in an inpatient psychiatric stay



Change in the percentage of ED visits with a mental health diagnosis that resulted in admission to inpatient psychiatry between baseline year (March 2019 to February 2020), pandemic year 1 (March 2020 to February 2021), and pandemic year 2 (March 2021-February 2022) among youth 5-17 years enrolled in a large national commercial insurer. Confidence intervals were calculated using clustered standard errors at the individual level. Mental health ED visits were identified by a primary mental health diagnosis on the first ED claim. ICD-10 codes are available in the eMethods.

eFigure 3: Change in mean length of inpatient psychiatric stay following emergency department visit



Mean length of inpatient psychiatric stay in number of midnights for youth 5-17 years admitted to inpatient psychiatry after an emergency department visit with a primary mental health diagnosis. Mean length of stay is shown for baseline year (March 2019-February 2021), and then percent change in mean length of stay is shown from baseline to pandemic year 1(March 2020 to February 2021) and baseline to pandemic year 2 (March 2021 to February 2022).

LOS – length of stay.