

## ONLINE APPENDIX

### To What Extent are Trends in Teen Mental Health Driven by Changes in Reporting?

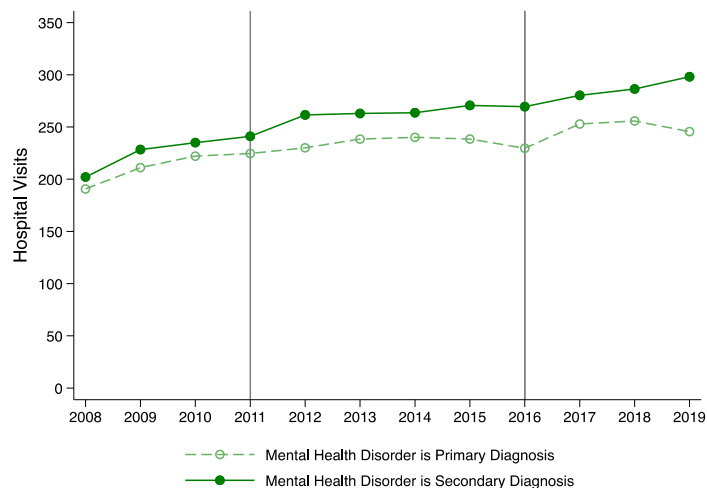
#### The Example of Suicide-Related Hospital Visits

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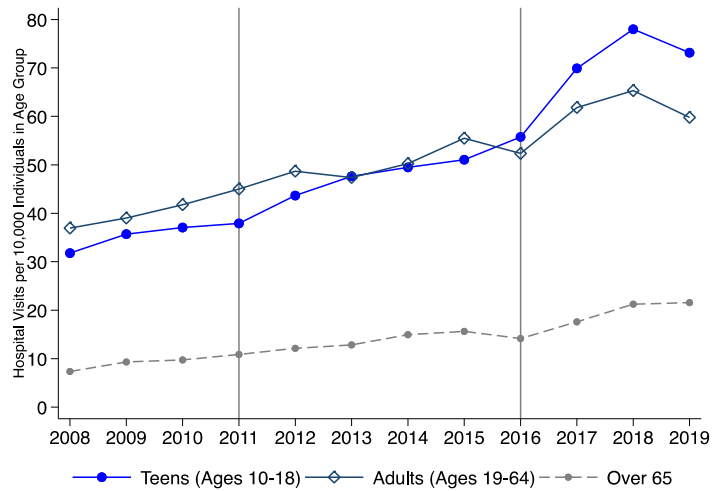
January 2023, updated June 2023

**Figure A1:** Trends in Teens' Mental Health Disorders Hospital Visits per 10,000 Teens



Note: These figures plot trends in mental health disorders hospital visits in New Jersey (NJ). The vertical line represents the implementation of ICD-10 in NJ. The vertical lines at 2011 and 2016 help to visualize the changes related to the implementation of the Women's Preventive Services Guidelines in 2012, and the difference between 2015 and 2016 (implementation of ICD-10) and between 2016 and 2017 (implementation of the "include SP" guidance).

**Figure A2:** Trends in Suicide Related Hospital Visits in NJ by Age



Note: These figures plot trends in mental health disorders hospital visits in New Jersey (NJ). The vertical line represents the implementation of ICD-10 in NJ. The vertical lines at 2011 and 2016 help to visualize the changes related to the implementation of the Women’s Preventive Services Guidelines in 2012, and the difference between 2015 and 2016 (implementation of ICD-10) and between 2016 and 2017 (implementation of the “include SI” guidance).

**Table A1: Clinical Guidelines and Government Regulation Related to Children's Mental Health**

Effective	Expert Medical Body	Government Agency	Recommendation	Law	Source
2008	The Bright Future/ American Academy of Pediatrics (AAP)		AAP does not include recommendations for mental health screening.		<a href="https://ewscripps.brightspotcdn.com/0c/91/11fa2d9042a19090103467afdf8f/bright-futures-pocket-guide-3rd-edition-1.pdf">https://ewscripps.brightspotcdn.com/0c/91/11fa2d9042a19090103467afdf8f/bright-futures-pocket-guide-3rd-edition-1.pdf</a>
2009	U.S. Preventive Services Task Force (USPSTF)		USPSTF assigns a grade B to screening for depression in adolescents, 12-18 years of age when systems are in place to ensure accurate diagnosis, psychotherapy (cognitive-behavioral or interpersonal), and follow-up. A grade A or B means the USPSTF recommends providers offer or provide this service.		<a href="https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/depression-in-children-and-adolescents-screening-2009">https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/depression-in-children-and-adolescents-screening-2009</a>
2011 Announced in 2010		Federal government		The 2010 Affordable Care Act requires insurance plans to cover preventive services without patient cost-sharing as of 2011. The law recognizes preventive services as those with an A or B rating from the USPSTF; immunizations recommended by the CDC, and services recommended by Bright Futures/AAP. In addition, it commissions the Department of Health and Human Services to develop additional guidelines for women.	<a href="https://www.law.cornell.edu/uscode/text/42/300gg-13">https://www.law.cornell.edu/uscode/text/42/300gg-13</a>

**Table A1 continues.**

Effective	Expert Medical Body	Government Agency	Recommendation	Law	Source
2012 Announced in 2011		Department of Health and Human Services (HHS)	Annual depression screening for women and girls aged 12 and older.	Beginning in plan years starting on or after August 1, 2012, health insurance plans must cover services in the Women's Preventive Services Guidelines (WPSI) without patient cost-sharing.	<a href="https://nap.nationalacademies.org/catalog/13181/clinical-preventive-services-for-women-closing-the-gaps">https://nap.nationalacademies.org/catalog/13181/clinical-preventive-services-for-women-closing-the-gaps</a>
2015 Announced in 2014		HHS		Compliance date for the International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) set to October 1, 2015. The new coding system adds diagnosis codes for suicide attempts and intentional self-harm.	<a href="https://www.federalregister.gov/documents/2014/08/04/2014-18347/administrative-simplification-change-to-the-compliance-date-for-the-international-classification-of">https://www.federalregister.gov/documents/2014/08/04/2014-18347/administrative-simplification-change-to-the-compliance-date-for-the-international-classification-of</a>
2015	The Bright Future/ AAP		Recommends screening for depression from age 11 as a preventive pediatric service.		<a href="https://publications.aap.org/view-large/figure/6579049/peds_2015-2009fig01.jpeg?autologincheck=redirected">https://publications.aap.org/view-large/figure/6579049/peds_2015-2009fig01.jpeg?autologincheck=redirected</a>
2016	USPSTF		Keeps a grade B for screening for depression in adolescents but changes the requirement on systems that should be in place to be less specific.		<a href="https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/depression-in-children-and-adolescents-screening">https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/depression-in-children-and-adolescents-screening</a>

**Table A1 continues.**

Effective	Expert Medical Body	Government Agency	Recommendation	Law	Source
2016		CMS		Changes ICD-10 coding guidelines to include symptoms and signs codes (R40-R46) as an Exclusion 2 note for mental disorder codes (F01-F99). Implies that SI should be coded as a secondary disorder when other mental health disorders are primary.	<a href="https://www.cdc.gov/nchs/data/icd/interim_advice_updated_final.pdf">https://www.cdc.gov/nchs/data/icd/interim_advice_updated_final.pdf</a>
2018	AAP		Recommends universal depression screening of adolescent patients ages 12 and older at health maintenance visits.		<a href="https://publications.aap.org/pediatrics/article/141/3/e20174081/37626/Guidelines-for-Adolescent-Depression-in-Primary">https://publications.aap.org/pediatrics/article/141/3/e20174081/37626/Guidelines-for-Adolescent-Depression-in-Primary</a>

**Table A2:** Teens with Primary Diagnoses of Mental Health Disorders and Secondary Diagnosis of Suicidal Ideation by Gender, Race, Insurance Status, and Hospital Type

	Suicidal Ideation is Secondary Diagnosis		
	2009-2010	2014-2015	2018-2019
Mental Health is Primary	2093	3005	5096
Girls	1205	2000	3262
Boys	889	1006	1834
Black	365	459	797
White	1448	1877	2734
Other Race	246	561	1229
Hospital With a Psychiatric Unit	1228	1865	3544
Hospital Without a Psychiatric Unit	866	1141	1553
Medicaid	598	1149	1961
Private Insurance	1302	1674	2813

Note: The table reports the average of number of visits.

**Table A3: ICD-10 Coding Changes and Mental Health Disorder Visits with Suicidal Ideation Diagnosis for Teens.**

a) By Sex

Dependent Variable: Suicidal Ideation is Secondary Diagnosis		
	(1)	(2)
2019 x Female	0.0440 (0.0131)	0.0434 (0.0128)
2018 x Female	0.0443 (0.0101)	0.0435 (0.0094)
2017 x Female	0.0304 (0.0111)	0.0316 (0.0093)
2016 x Female	0.0298 (0.0097)	0.0297 (0.0091)
2015 x Female	0.0220 (0.0091)	0.0204 (0.0082)
2014 x Female	0.0252 (0.0089)	0.0235 (0.0084)
2013 x Female	0.0275 (0.0097)	0.0260 (0.0088)
2012 x Female	0.0188 (0.0079)	0.0176 (0.0069)
Female	0.0201 (0.0028)	0.0187 (0.0025)
Baseline mean <sup>a</sup>	0.0761	0.0761
Hospital FE	N	Y
Sample	2008-2019	2008-2019
R-squared	0.0288	0.0914
Joint F-statistic: F(8, 882)	6.21	7.14
Joint F-test p -value	0.000	0.000

Note: The table reports coefficients from linear regression models. The dependent variable for each column is one if the hospital record for a visit includes the condition and zero otherwise. All regressions include fixed effects for year, month, single year of child's age, race (Black, white, other race), gender, and insurance (Medicaid, private, self-pay). In addition, the models include zip-code-level characteristics such as median income, and the shares of poor, renters, college educated, non-Hispanic Black, non-Hispanic White, Hispanics, Asians, and age bins. Standard errors are clustered by hospital-year. The sample corresponds to teens' mental-health visits from 2008 to 2019.

<sup>a</sup> Baseline mean corresponds to the boys' means before 2012.

**Table A3**

## b) By Race

Dependent Variable: Suicidal Ideation is Secondary Diagnosis		
	(1)	(2)
2019 x Black	-0.0051 (0.0284)	-0.0126 (0.0224)
2018 x Black	-0.0384 (0.0252)	-0.0433 (0.0190)
2017 x Black	-0.0277 (0.0162)	-0.0316 (0.0108)
2016 x Black	-0.0246 (0.0152)	-0.0285 (0.0125)
2015 x Black	-0.0201 (0.0121)	-0.0243 (0.0089)
2014 x Black	-0.0104 (0.0145)	-0.0130 (0.0128)
2013 x Black	-0.0057 (0.0152)	-0.0093 (0.0116)
2012 x Black	-0.0042 (0.0141)	-0.0090 (0.0123)
Black	-0.0020 (0.0058)	-0.0020 (0.0050)
Baseline mean <sup>a</sup>	0.1048	0.1048
Hospital FE	N	Y
R-squared	0.0288	0.0903
Sample	2008-2019	2008-2019
Joint F-statistic: F(8, 882)	1.00	2.20
Joint F-test p -value	0.437	0.025

<sup>a</sup> Baseline mean corresponds to the white teens' mean before 2012.



**Table A3**  
c) By Insurance

Dependent Variable: Suicidal Ideation is Secondary Diagnosis		
	(1)	(2)
2019 x Medicaid	-0.0239 (0.0403)	-0.0312 (0.0348)
2018 x Medicaid	-0.0152 (0.0203)	-0.0210 (0.0169)
2017 x Medicaid	0.0021 (0.0129)	0.0033 (0.0094)
2016 x Medicaid	-0.0007 (0.0128)	0.0016 (0.0103)
2015 x Medicaid	-0.0025 (0.0097)	0.0001 (0.0084)
2014 x Medicaid	-0.0173 (0.0119)	-0.0160 (0.0125)
2013 x Medicaid	0.0017 (0.0117)	0.0027 (0.0107)
2012 x Medicaid	-0.0021 (0.0108)	-0.0018 (0.0117)
2019 x Self-Pay	-0.0434 (0.0381)	-0.0605 (0.0356)
2018 x Self-Pay	-0.0130 (0.0219)	-0.0275 (0.0201)
2017 x Self-Pay	-0.0220 (0.0158)	-0.0264 (0.0148)
2016 x Self-Pay	-0.0058 (0.0147)	-0.0122 (0.0145)
2015 x Self-Pay	-0.0132 (0.0132)	-0.0198 (0.0130)
2014 x Self-Pay	-0.0336 (0.0132)	-0.0386 (0.0124)

**Table A3**  
**c) by insurance, continued**

Dependent Variable: Suicidal Ideation is Secondary Diagnosis		
	(1)	(2)
2013 x Self-Pay	0.0042 (0.0148)	-0.0012 (0.0159)
2012 x Self-Pay	0.0070 (0.0161)	-0.0007 (0.0167)
Medicaid	0.0012 (0.0041)	0.0020 (0.0045)
Self-Pay	-0.0056 (0.0055)	-0.0020 (0.0062)
Baseline mean	0.1001	0.1001
Hospital FE	N	Y
Sample	2008-2019	2008-2019
R-squared	0.0283	0.0912
Medicaid		
Joint F-statistic: F(8, 882)	0.38	0.62
Joint F-test p -value	0.929	0.764
Self-Pay		
Joint F-statistic: F(8, 882)	1.29	1.70
Joint F-test p -value	0.244	0.093

<sup>a</sup>Baseline mean corresponds to the mean for private insurance before 2012.

**Table A3**

d) By whether hospital had a psychiatric unit in 2014

	(1)	(2)
2019 x Psychiatric Unit	0.0645 (0.0544)	0.0497 (0.0402)
2018 x Psychiatric Unit	0.0889 (0.0479)	0.0701 (0.0315)
2017 x Psychiatric Unit	0.0756 (0.0415)	0.0605 (0.0230)
2016 x Psychiatric Unit	0.0385 (0.0329)	0.0276 (0.0206)
2015 x Psychiatric Unit	0.0173 (0.0281)	0.0094 (0.0169)
2014 x Psychiatric Unit	0.0164 (0.0284)	0.0098 (0.0200)
2013 x Psychiatric Unit	0.0132 (0.0298)	0.0089 (0.0198)
2012 x Psychiatric Unit	0.0099 (0.0296)	0.0059 (0.0192)
Psychiatric Unit 2014	0.0235 (0.0126)	0.0000 (.)
Baseline mean <sup>a</sup>	0.0865	0.0865
Hospital FE	N	Y
Sample	2008-2019	2008-2019
R-squared	0.0357	0.0923
Joint F-statistic: F(8, 882)	0.98	1.49
Joint F-test p -value	0.446	0.157

<sup>a</sup> Baseline mean corresponds to the non-psychiatric-unit hospitals' mean before 2012.