



COVID-19 Labor Market Shocks and Pediatric Mental Health: Evidence from Primary Care

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American Family Cohort (AFC) Data Core

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Youth mental health: “in need of immediate attention”

- Widespread increases in common mental health conditions among pediatric populations *prior to COVID-19*^{1,2}
- The pandemic and associated societal disruptions accelerated these trends
- Despite **overall reductions in use of primary care** in 2020, studies have found:
 - Increases in diagnoses for depression and anxiety³
 - Increases in positive suicide risk-screen results and suicide attempts⁴
 - Increases in eating and sleep disorders⁵
 - Decreases in new ADHD diagnoses⁶

¹CDC 2019, YRBS Data Summary and Trends Report; ²Office of the Surgeon General, 2021; ³Mayne et al. 2021, *Pediatrics*.; ⁴Hill et al. 2021, *Pediatrics*.; ⁵Bittner Gould et al. 2022, *Pediatrics*.; ⁶Freedman et al. 2023, *NBER WP*.

Motivation for *labor market focus*

- US economy lost 21 million jobs in the initial months of the pandemic; unemployment tripled from 3.6% to 13%¹
- Adults with children were more likely to experience job-loss²
- In April 2020, nearly 1 in 5 children had an unemployed parent³
- Parental unemployment is a risk factor for adverse mental health outcomes among children^{4,5}
 - Job loss is one of several mechanisms likely to increase psychological distress among children during economic contractions⁶
- Some evidence of increased sadness and psychological distress among children living with unemployed caregivers during COVID⁷

¹Dey & Loewenstein 2020, *Mon Labor Rev.*; ²Montenovo et al. 2022, *Demography.*; ³Parolin 2020, *Poverty & Social Policy Brief.*; ⁴Schaller & Zerpa 2019, *Am J Health Econ.*; ⁵Powdthavee & Vernoit 2013, *Labour Econ.*; ⁶ Golberstein et al. 2019, *Health Econ.*; ⁷ Xiao et al. 2023; *JAMA Net Open*

Overview of current study

1. Estimate the aggregate effect of the pandemic on visit frequency for mental health conditions in the context of primary care

- Cohort-based DiD model that compares trends in monthly frequency of pediatric mental health visits^{1,2}
- Main finding: 7% *decrease* in probability of any primary care utilization in first 6 months of pandemic; 7% *increase* in a qualifying mental health diagnosis conditional on visit

2. How was youth and adolescent mental health impacted by the pandemic-induced economic recession?

- Event study approach that leverages sudden onset of pandemic with geographic variation in degree of local labor market contraction³

The American Family Cohort

- Research derivative of the American Board of Family Medicine (ABFM) PRIME Registry
- Data come from > 3,000 active clinicians in all 50 states as of January 1, 2023
- Electronic health records (EHR) for ≈ 8 M unique patients
 - Racially and ethnically diverse, large share of clinics serving rural and semi-rural populations
- Encounter-specific clinical data including diagnoses, procedures, medications, patient history, demographics, physician notes, and more

Analytic sample

- Construct balanced sample of patient-month observations using visit-level data from October 2018 to September 2020
- N = 376,364 unique patients aged 5-17
- Patients come from 1,639 counties in 47 states
- Use ICD-9/ICD-10 codes to identify patients with diagnoses of:
 - **anxiety, ADHD, affective mood disorder, trauma and stress-related disorder, conduct and behavior problems, and eating disorders**
- Define binary outcome for any visit with each mental health diagnosis and log of total visits per month per patient

Sample characteristics

	All: 5-17 (N=12,820,164)	
	Mean	SD
Log total visit counts: All primary care	0.0700	0.2228
1 if any visit: All primary care	0.0938	0.2915
Log total visit counts: All mental health	0.0070	0.0716
1 if any visit: All mental health	0.0097	0.0982
Log total visit counts: Anxiety	0.0013	0.0314
1 if any visit: Anxiety	0.0018	0.0422
Log total visit counts: Affective mood disorders	0.0011	0.0286
1 if any visit: Affective mood disorders	0.0014	0.0380
Log total visit counts: Conduct and behavior problems	0.0003	0.0135
1 if any visit: Conduct and behavior problems	0.0003	0.0187
Log total visit counts: Trauma and stress-related	0.0002	0.0136
1 if any visit: Trauma and stress-related	0.0003	0.0170
Log total visit counts: ADHD	0.0046	0.0574
1 if any visit: ADHD	0.0065	0.0804
Log total visit counts: Eating disorder	0.0000	0.0064
1 if any visit: Eating disorder	0.0001	0.0079
Age	11.4981	3.6218
1 if having any mental health diagnosis pre-COVID	0.0986	0.2981
1 if female	0.4992	0.5000
1 if non-white	0.3315	0.4707
1 if not covered by private insurance	0.1397	0.3467

- About 10% of all primary care visits involve a mental health diagnosis
- The average probability of a mental health visit in a given month is about 1%
 - ADHD: 0.65%
 - Anxiety: 0.14%
 - Affective mood: 0.14%
- About 10% of patients had pre-COVID mental health diagnosis

Overview of empirical strategy

- Following Hill et al. (2021)¹, leverage variation from sudden onset of pandemic with pre-determined characteristics of local labor markets
- Define county labor market vulnerability index based on *pre-COVID share of employment in heavily impacted sectors*
- Event study model to estimate changes in visit frequencies for common mental health diagnoses in areas with low versus high *vulnerability*
- Key assumptions:
 - County vulnerability is a predictive of changes in employment after (but not before) the onset of the pandemic
 - Main outcomes have common pre-trends before pandemic

¹Hill, A., Musse, I., Ben-Shalom, Y., and Shaw, W. (2021a). The Impact of Local Labor Market Conditions on Opioid Transactions: Evidence from the COVID-19 Pandemic. Technical report, Mathematica.

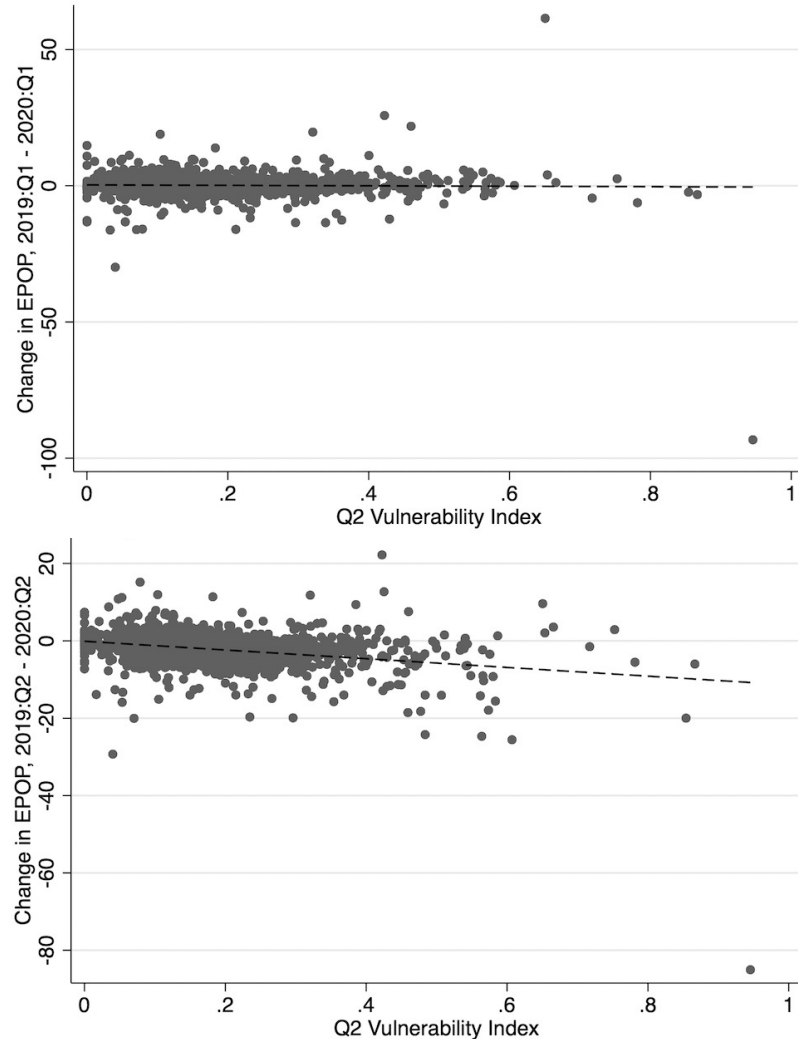
Labor market vulnerability index

- Draw on 2019-2020 county-quarter employment count data from the Quarterly Workforce Indicators (QWI)
- Identify sectors with largest absolute changes in employment between 2019(Q2) and 2020(Q2) at the national-level, and select top quartile
- Define index V_c as share of total county employment in vulnerable sectors j in quarter 2 of 2019:

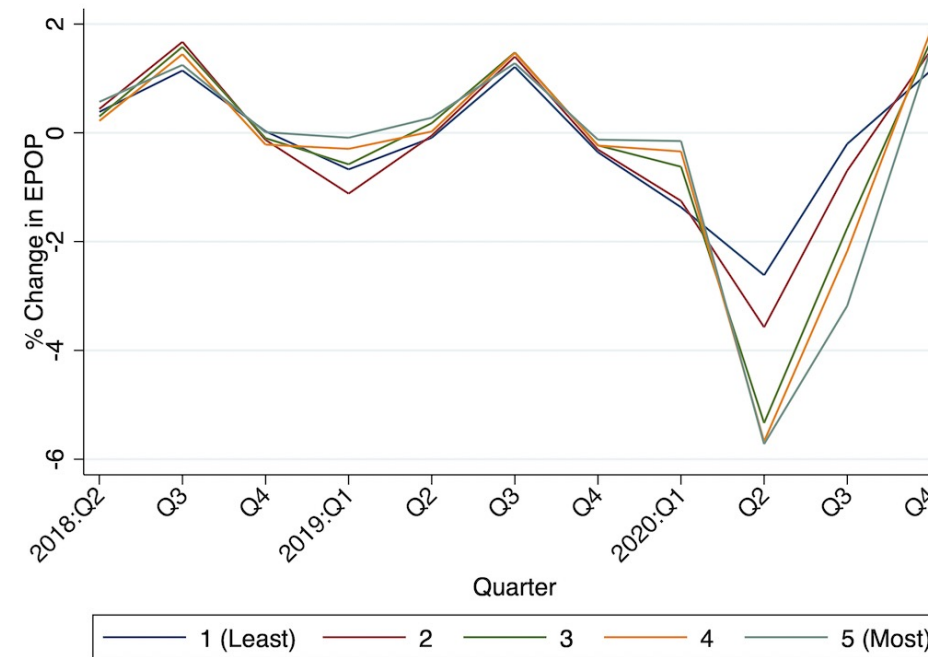
$$V_c = \frac{\sum emp_{cj(2019q2)}}{\sum emp_{c(2019q2)}}$$

NAICS sector	Description	%Δ 2019Q2-2020Q2
72	Accommodation and food services	-26.3
71	Arts, entertainment and recreation	-26.0
81	Other services (except Public Administration)	-15.5
21	Mining, quarrying, and oil/gas extraction	-13.9
56	Administrative and support	-9.8
44-45	Retail trade	-5.2
61	Educational services	-4.9
51	Information	-4.1
31-33	Manufacturing	-2.6
53	Real estate and rental and leasing	-2.4
42	Wholesale trade	-2.4
23	Construction	-1.9
11	Agriculture, forestry, fishing and hunting	-1.3
62	Healthcare and social assistance	-1.0
22	Utilities	-0.9
92	Public administration	-0.9
55	Management	-0.8
54	Professional, scientific, and technical services	0.0
52	Finance and insurance	0.5
48-49	Transportation and warehousing	0.7

Correlation between 2020(Q1) and 2020(Q2) employment changes relative to 2019 and V_c



Quarter-over-quarter employment change, by quintile of V_c



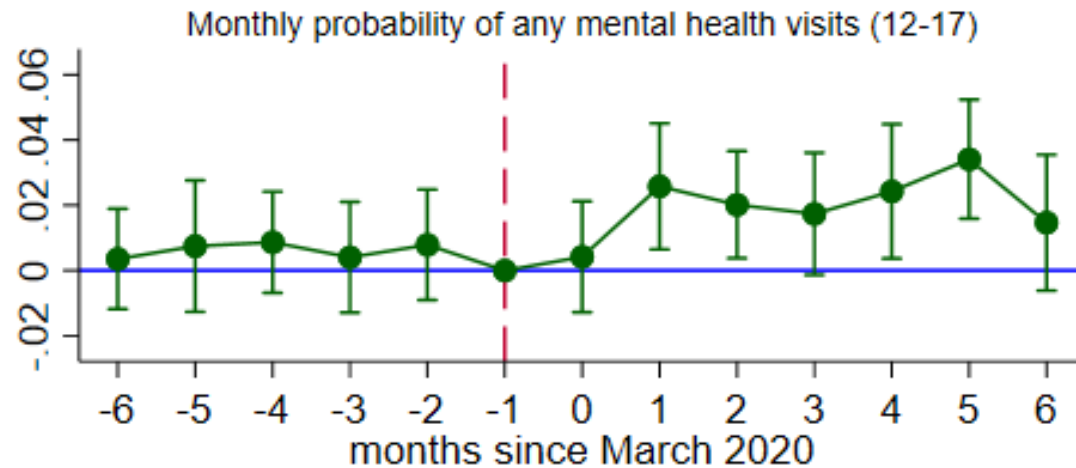
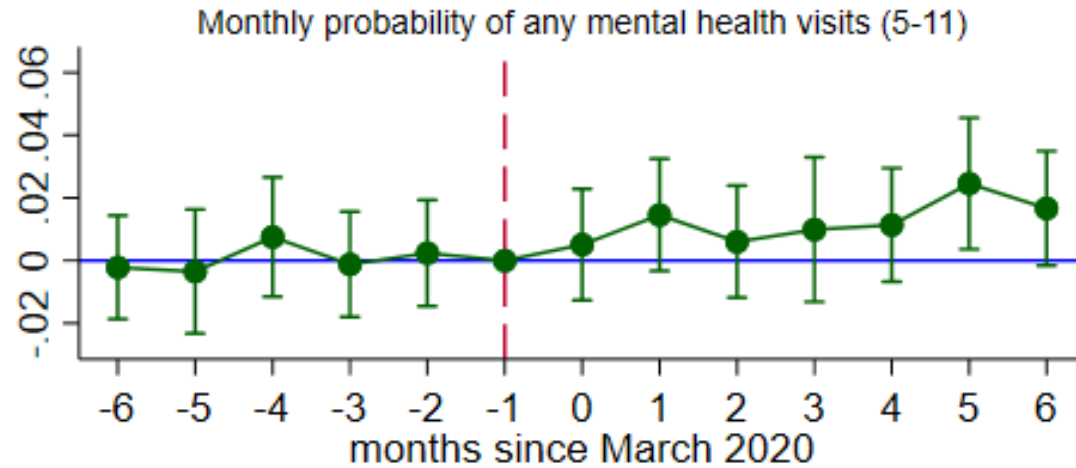
- Balance tests show no association between share of existing patients with mental health Dx, and most county-level characteristics

Event study model specification

$$Y_{ict} = \beta_0 + \sum_{k=7, k \neq -1}^7 \beta_k V_c \mathbf{1}(t - \text{March}_{2020} = k) + \delta \mathbf{Z}_{ct} + \gamma \mathbf{X}_{it} + \theta_c + \varphi_t + \varepsilon_{ict}$$

- β_k traces change in probability of mental health visits in each month post-March 2020 relative to February 2020 at different levels of V_c
- Key assumption is that trends in Y_{ict} do not vary systematically by V_c for $k < 0$

Main effects of labor market shocks



Corresponding DiD regression estimates

(1)	
Any mental health Dx	
COVID months*Vulnerability index	0.0169*** (0.0020)
Observations	8,823,911
R-squared	0.0130
COVID months*Vulnerability index	-0.0007 (0.0023)
COVID months*Vulnerability index*Pre-exist	0.0935*** (0.0264)
Observations	8,823,911
R-squared	0.0848

Effects by type of diagnosis

Panel A: 5-11 years old

	<i>Anxiety</i>	<i>Mood</i>	<i>Behavior</i>	<i>Trauma</i>	<i>ADHD</i>	<i>Eating</i>
$post * V_c$	0.0029*** (0.0005)	0.0002 (0.0003)	0.0003 (0.0003)	0.0003 (0.0002)	0.0161*** (0.0018)	0.0000 (0.0001)
Observations	4,214,858	4,214,858	4,214,858	4,214,858	4,214,858	4,214,858
R-squared	0.0077	0.0105	0.0031	0.0021	0.0136	0.0084

Panel B: 12-17 years old

	<i>Anxiety</i>	<i>Mood</i>	<i>Behavior</i>	<i>Trauma</i>	<i>ADHD</i>	<i>Eating</i>
$post * V_c$	0.0055*** (0.0010)	0.0042*** (0.0009)	-0.0004 (0.0003)	0.0003 (0.0003)	0.0099*** (0.0017)	-0.0003 (0.0002)
Observations	4,609,023	4,609,023	4,609,023	4,609,023	4,609,023	4,609,023
R-squared	0.0075	0.0095	0.0031	0.0057	0.0163	0.0013

Notes: Models control for age fixed effect, an indicator for male, indicator for white, insurance type fixed effect, county level log monthly total number of primary care visits, county fixed effect, and month fixed effect. Standard errors are clustered at the state-month level. Significant level at ***p<0.01, **p<0.05, *p<0.1

- Larger increases in anxiety among older patients
- Larger increase in ADHD among younger patients
- No changes in mood diagnoses among younger patients

Heterogeneity

- No evidence of differential impact between boys and girls
- Significantly lower frequency of visits among non-White patients
- Significantly higher mental health visit frequency among patients with non-private insurance (mostly Medicaid)

Robustness

- No evidence that total primary care usage differs between patients in areas with high- versus low-labor market vulnerability
- Balance tests show no association between share of existing patients with mental health Dx, and most county-level characteristics
- Future robustness checks needed to rule out competing hypotheses:
 - Controlling for local-level social distancing policies
 - School closure measures were often county or district-level decisions

Limitations & next steps

- Models include measure of overall number of primary care visits in each county-month, but unable to address all pandemic-induced supply-side changes in delivery of care
- Many demand-side drivers currently unaccounted for in analysis
- Area-level vulnerability likely affected by more than pre-pandemic industry composition (e.g., educational attainment, family composition)
- Additional work with AFC to assess incident diagnoses, trends in screening, referrals to specialists, and new prescriptions
- Likely differential effects of employment shocks in male- versus female-dominated sectors

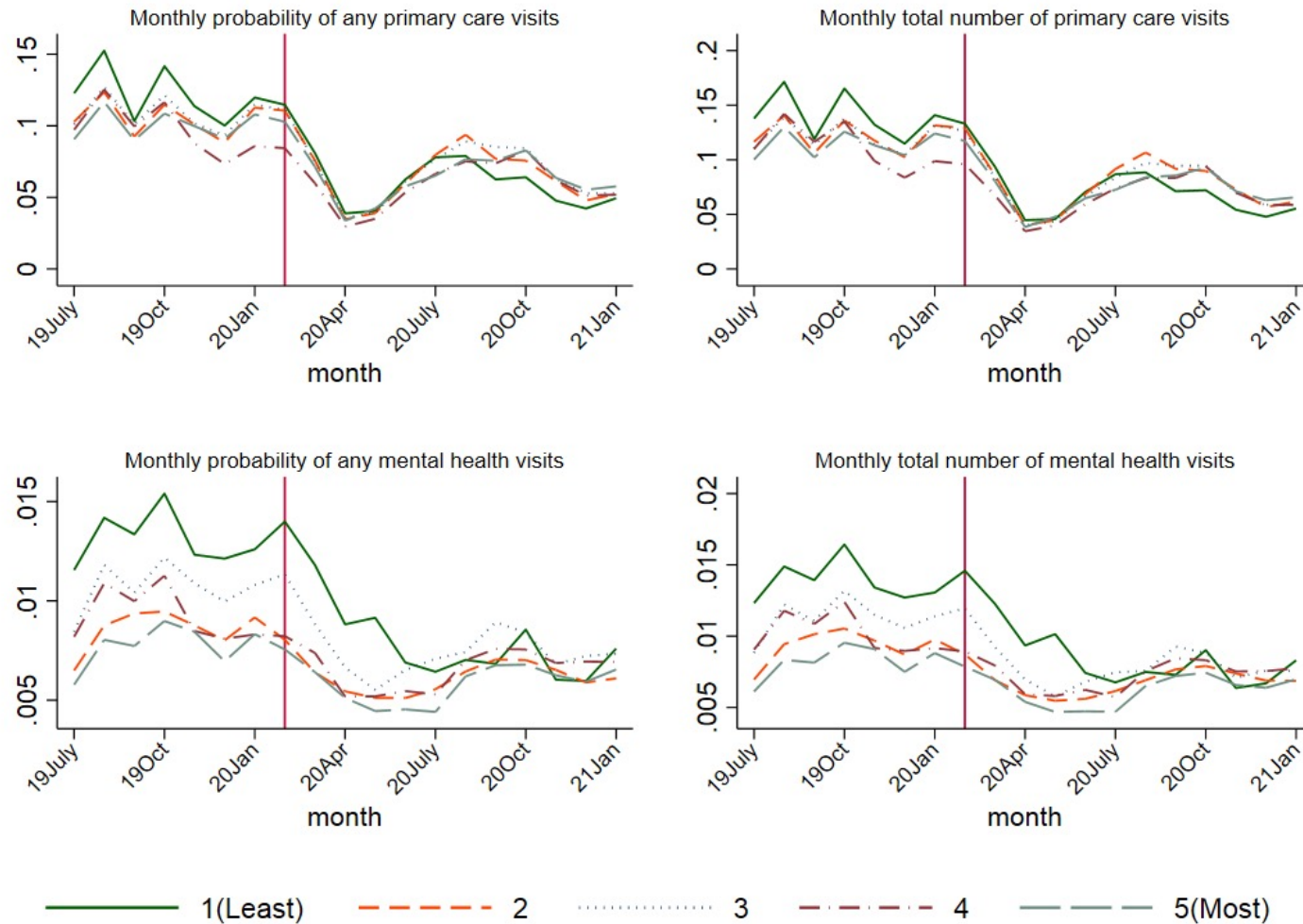
Thank you!

Comments welcome:

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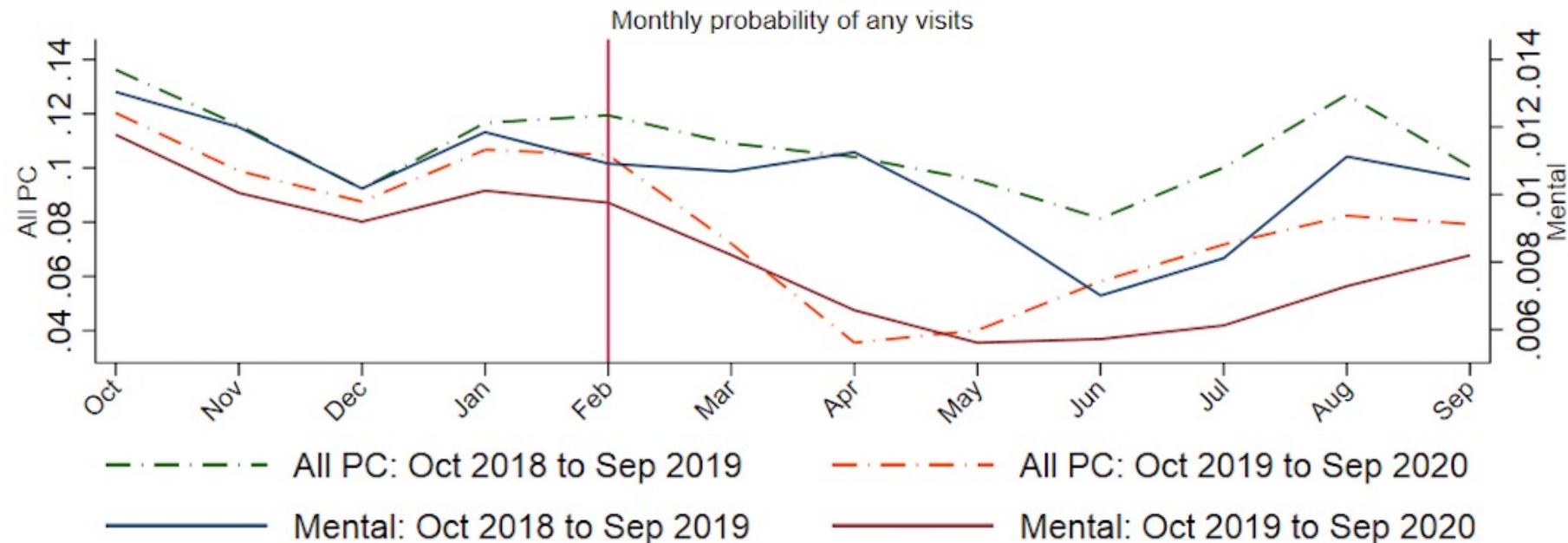
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Trends in utilization by quintile of vulnerability index

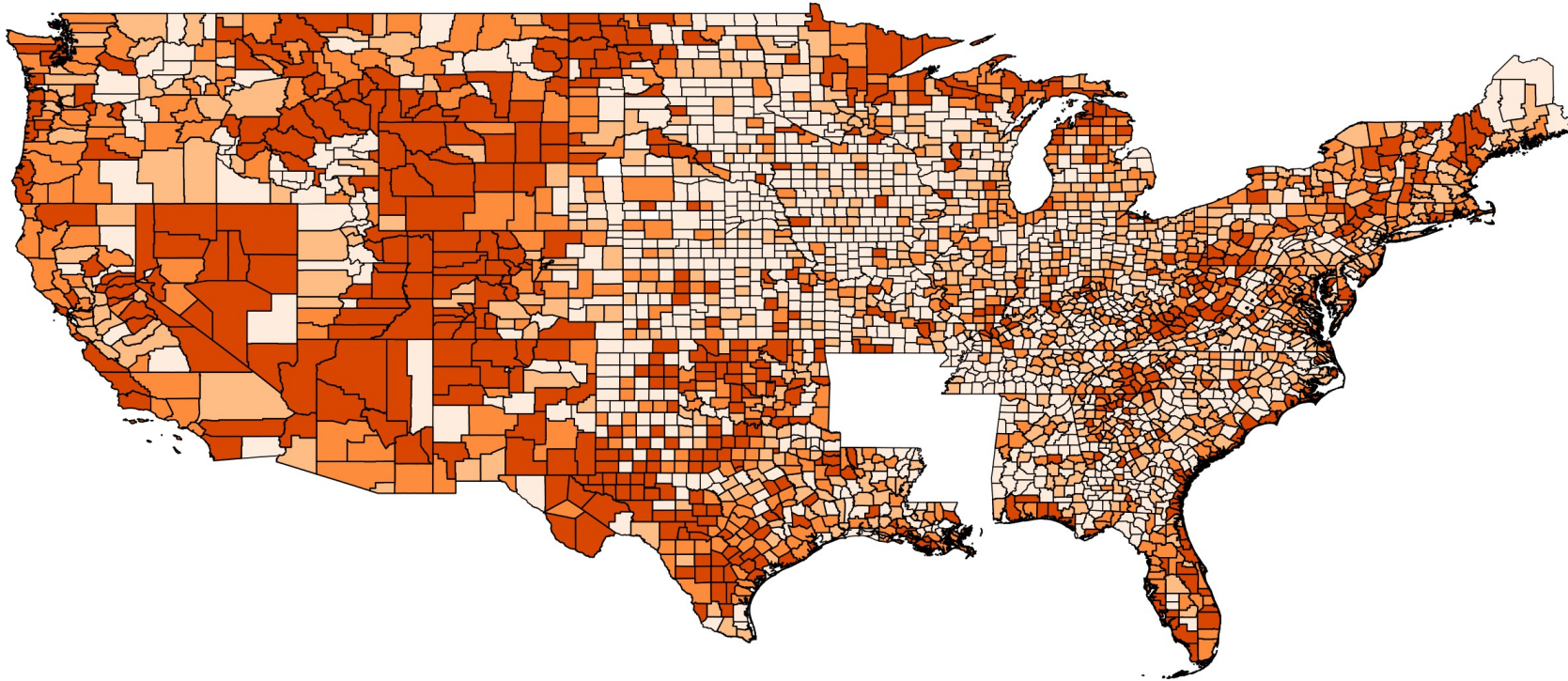


How were overall and mental health-specific primary care visits affected by the pandemic?

- Difference-in-difference estimates imply 1 ppt (7%) *decrease* in average monthly probability of *any primary care visit* between March 2020 and September 2020
- Meanwhile, average monthly probability of having *any mental health visit* increased by 0.06 ppt (7%)



County variation in labor market vulnerability index:



Cohort DiD – additional details

- To study overall effects of pandemic on mental health visit frequency:
 - **Pre-COVID cohort:** October 1, 2018 – September 30, 2019
 - **COVID-cohort:** October 1, 2019 – September 30, 2020

Pandemic job-loss and youth mental health

- Pandemic-induced job loss associated with adverse health outcomes among adults^{1,2}
- Limited research on effects of pandemic-induced job loss on children's mental health
- Some evidence of increased sadness and psychological distress among children living with unemployed caregivers³
- Household financial hardship early in pandemic associated with increased levels of children's behavior problems⁴
- 1 in 4 high school students reported experiencing economic severe distress during the pandemic⁵

¹Ganson et al. 2021, *J Adolescent Health*; ²Matthews et al. 2021, *J Occup Environ Med.*; ³ Xiao et al. 2023; *JAMA Net Open*; ⁴Shelleby et al. 2022, *J Fam Psychol.*; ⁵Krause et al. 2022, *MMWR Suppl.*