

Kiran Thapa, MPH, Janani Rajbhandari-Thapa, PhD, Daniel Salinas, MD, Emily Anne Vall, PhD

## BACKGROUND

The COVID-19 pandemic affected the daily lives of children and adolescents, in part due to the school closures and limitation of outdoor activities. Several studies have shown increased proportion of children and adolescents suffering from mental health problems such as anxiety and depression as a result of the pandemic or the related measures. We examine the impact of COVID-19 pandemic on diagnoses of major depressive disorder (MDD) and anxiety disorders (AD) among children and adolescents served by a large care management organization in the state of Georgia.

## METHODS

- Design:** Before-after interrupted time series design
- Data:** Medicaid claims data (service date 1/1/2019 to 12/31/2020) with at least one inpatient or outpatient encounter for Mental, Behavioral and Neurodevelopmental Disorders from a Care Management Organization serving Georgia, US.
- Population:** 3-17-year-olds at the time of the encounter
- Outcome:** Monthly counts of patients with clinically diagnosed major depressive disorder and anxiety disorders
- Basic ITS model:**  $Y = b_0 + b_1T + b_2D + b_3P + e$ , Y- outcome; T - continuous time variable; D - dummy variable indication of the COVID-19 pandemic/school closures (April 1, 2020); P - continuous time variable since the interruption.

The coefficients were estimated using negative binomial regression. Other covariates included 3-month lag of outcome and log of monthly total patient members in the CMO plan as an offset term.

Separate models were run for three government benefits programs the participants were enrolled in: (i) CHIP Standard, (ii) TANF Foster Care, and (iii) TANF Standard. And for each category, two separate models were run based on age group: (i) 3-11 years (childhood), and (ii) 12-17 years (adolescence).

## RESULTS

Table 1: Children and adolescents with MDD and AD by calendar quarters

	MDD cases per 100,000 enrollees	AD cases per 100,000 enrollees
2019 Jan-Mar	918	1063
2019 Apr-Jun	920	1066
2019 Jul-Sep	842	1081
2019 Oct-Dec	901	1081
2020 Jan-Mar	961	1176
2020 Apr-Jun	800	998
2020 Jul-Sep	764	974
2020 Oct-Dec	774	969

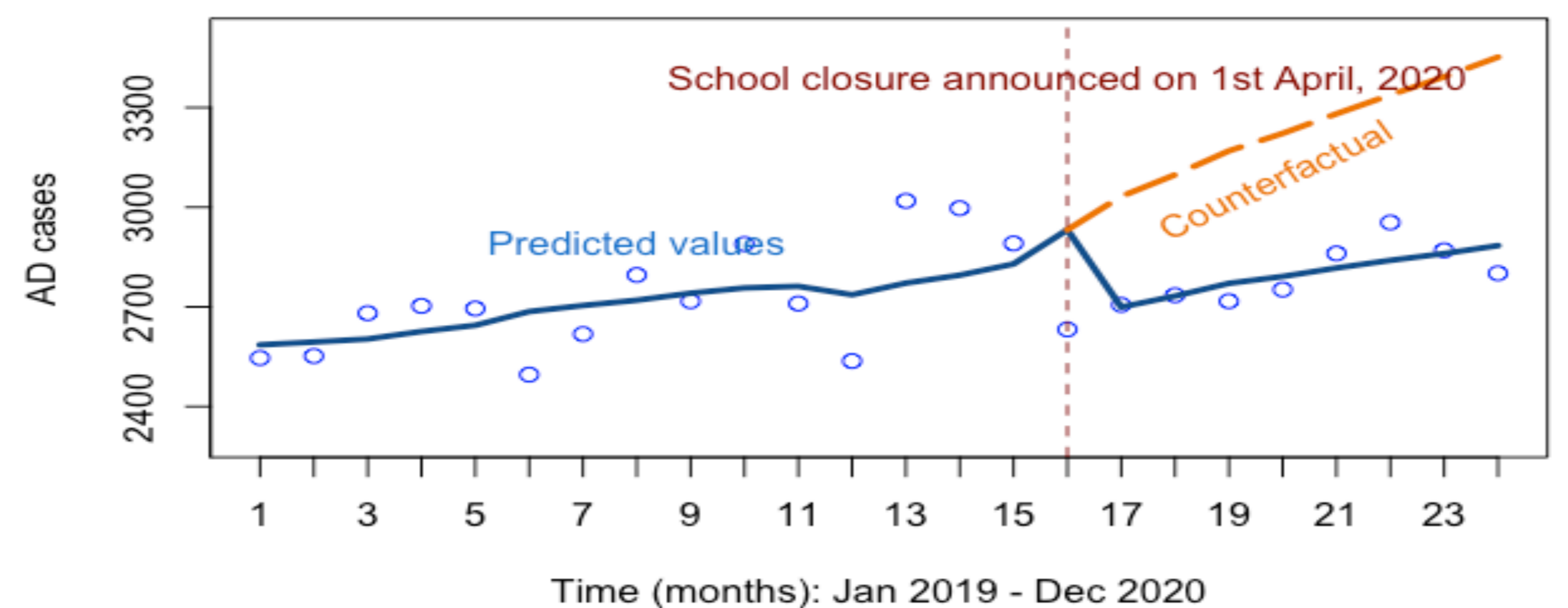
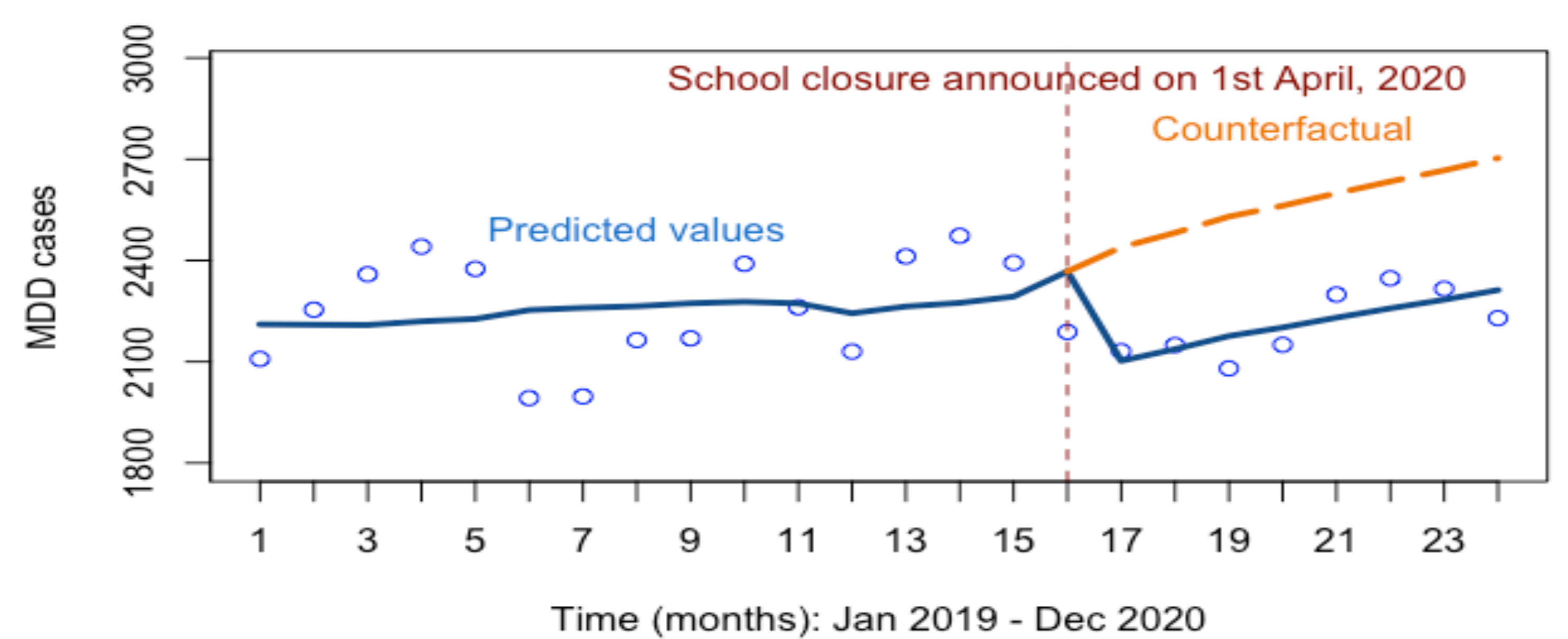


Fig: Observed vs predicted monthly diagnoses of MDD and AD among children and adolescents following school closure

Table 2: Incidence Rate Ratios [95% CI] for pre-pandemic trend, step-change, and post-pandemic trend for MDD and AD estimated from negative binomial regression

Characteristics	Major Depressive Disorder			Anxiety Disorders		
	Pre-pandemic trend, IRR (95% CI)	Step-change, IRR (95% CI)	Post-pandemic trend, IRR (95% CI)	Pre-pandemic trend, IRR (95% CI)	Step-change, IRR (95% CI)	Post-pandemic trend, IRR (95% CI)
OVERALL	1.001 [0.993, 1.009]	<b>0.879 [0.790, 0.977]</b>	0.991 [0.972, 1.011]	1.005 [0.998, 1.012]	<b>0.904 [0.834, 0.981]</b>	0.987 [0.971, 1.003]
CHIP Standard Overall	1.003 [0.990, 1.017]	<b>0.808 [0.682, 0.956]</b>	1.025 [0.995, 1.056]	0.994 [0.984, 1.004]	0.880 [0.770, 1.004]	1.008 [0.985, 1.032]
3-11 years	<b>1.040 [1.012, 1.069]</b>	0.879 [0.647, 1.192]	1.009 [0.947, 1.075]	<b>0.977 [0.961, 0.994]</b>	0.839 [0.658, 1.068]	<b>1.059 [1.018, 1.101]</b>
12-17 years	0.997 [0.984, 1.010]	<b>0.783 [0.659, 0.930]</b>	1.012 [0.982, 1.044]	1.004 [0.991, 1.017]	0.905 [0.768, 1.064]	0.975 [0.947, 1.005]
TANF Foster Care Overall	1.004 [0.999, 1.010]	0.991 [0.914, 1.075]	<b>0.979 [0.963, 0.996]</b>	<b>1.006 [1.001, 1.012]</b>	1.028 [0.959, 1.102]	0.988 [0.975, 1.000]
3-11 years	1.015 [0.997, 1.032]	<b>0.862 [0.749, 0.991]</b>	0.997 [0.960, 1.035]	<b>1.013 [1.004, 1.021]</b>	1.016 [0.947, 1.090]	0.987 [0.974, 1.001]
12-17 years	1.000 [0.993, 1.006]	1.028 [0.937, 1.129]	<b>0.977 [0.961, 0.995]</b>	0.999 [0.992, 1.005]	1.033 [0.939, 1.135]	0.989 [0.974, 1.004]
TANF Standard Overall	1.000 [0.989, 1.010]	<b>0.847 [0.742, 0.967]</b>	1.001 [0.977, 1.026]	1.009 [0.998, 1.019]	<b>0.828 [0.740, 0.926]</b>	0.994 [0.973, 1.016]
3-11 years	<b>1.019 [1.004, 1.034]</b>	<b>0.819 [0.697, 0.963]</b>	0.984 [0.954, 1.015]	1.014 [1.001, 1.027]	<b>0.845 [0.734, 0.974]</b>	0.983 [0.956, 1.012]
12-17 years	0.992 [0.982, 1.002]	<b>0.850 [0.748, 0.966]</b>	1.007 [0.984, 1.031]	1.002 [0.993, 1.011]	<b>0.806 [0.726, 0.894]</b>	1.006 [0.987, 1.024]

## CONCLUSIONS

- We observe small decrease in the number of children and adolescents diagnosed with depression and anxiety immediately following school closure.
- This may signal an increase in barriers to access services for depression and anxiety for children and adolescents during the pandemic.
- Study limitations include lack of control group, short duration of the observational period