

Health Care Use Among Latinx Children After 2017 Executive Actions on Immigration

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abstract

BACKGROUND: US immigration policy changes may affect health care use among Latinx children. We hypothesized that January 2017 restrictive immigration executive actions would lead to decreased health care use among Latinx children.

METHODS: We used controlled interrupted time series to estimate the effect of executive actions on outpatient cancellation or no-show rates from October 2016 to March 2017 (“immigration action period”) among Latinx children in 4 health care systems in North Carolina. We included control groups of (1) non-Latinx children and (2) Latinx children from the same period in the previous year (“control period”) to account for natural trends such as seasonality.

RESULTS: In the immigration action period, 114 627 children contributed 314 092 appointments. In the control period, 107 657 children contributed 295 993 appointments. Relative to the control period, there was an immediate 5.7% (95% confidence interval [CI]: 0.40%–10.9%) decrease in cancellation rates among all Latinx children, but no sustained change in trend of cancellations and no change in no-show rates after executive immigration actions. Among uninsured Latinx children, there was an immediate 12.7% (95% CI: 2.3%–23.1%) decrease in cancellations; however, cancellations then increased by 2.4% (95% CI: 0.89%–3.9%) per week after immigration actions, an absolute increase of 15.5 cancellations per 100 appointments made.

CONCLUSIONS: There was a sustained increase in cancellations among uninsured Latinx children after immigration actions, suggesting decreased health care use among uninsured Latinx children. Continued monitoring of effects of immigration policy on child health is needed, along with measures to ensure that all children receive necessary health care.



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Dr Cholera conceptualized and designed the study, coordinated data acquisition, conducted the data analysis, and drafted the initial manuscript; Drs Linton and Flower conceptualized and designed the study and reviewed and revised the manuscript; Dr Ranapurwala designed the study, conducted the data analysis, and reviewed and revised the manuscript; Dr Shmuel conducted the data analysis and reviewed and revised the manuscript; Drs Miller-Fitzwater, Best, and Simha contributed to data acquisition and revised the manuscript critically for important intellectual content; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

WHAT'S KNOWN ON THIS SUBJECT: Restrictive immigration policy can lead to decreased health care access and use by immigrant children and families. Reports suggest that appointment attendance decreased among Latinx children after the 2017 executive actions on immigration, but this has not been examined quantitatively.

WHAT THIS STUDY ADDS: In this study, we show that restrictive immigration executive actions were associated with an increased trend in outpatient appointment cancellations among uninsured Latinx children, potentially reducing access to health care for a highly vulnerable population of children.

To cite: Cholera R, Ranapurwala SI, Linton J, et al. Health Care Use Among Latinx Children After 2017 Executive Actions on Immigration. *Pediatrics*. 2021;147(2):e20200272

Latinx children constitute 25.4% of the US pediatric population.¹ Most Latinx children in the United States are citizens, but 10.4 million live in immigrant families, meaning that the child or ≥ 1 parent was born outside of the United States,² and 4.5 million live with an adult without legal documentation.³ Restrictive immigration policy can be harmful to Latinx children's health because of stressors around immigration enforcement and risks associated with detention⁴ or family separation.⁵

Since the 2016 presidential election, emerging immigration policies have been increasingly exclusionary. Multiple executive immigration actions were enacted in January 2017, including increased cooperation on immigration enforcement between local law officers and federal authorities via the 287(g) program. Restrictive immigration policies have previously led to mistrust and avoidance of health care among Latinx patients because of fears of immigration enforcement.⁶⁻¹¹ Although immigrant parents report prioritizing children's medical care despite heightened fear since the 2016 election, reports from the media and health care providers suggest a "chilling effect" of decreased health care use by Latinx families during this period.¹²⁻¹⁷

We examined the impact of national immigration policy changes on health care use among children in North Carolina, a state with one of the fastest-growing Latinx populations in the United States. We used a controlled interrupted time series (CITS) design to estimate changes in outpatient appointment attendance rates among Latinx children in the months after the immigration actions were enacted while controlling for seasonality and underlying trends. We hypothesized that all forms of visit nonattendance (no-shows and cancellations) would increase among Latinx children after the immigration actions. With the assumption that

uninsured Latinx children are a proxy for undocumented children, we hypothesized that the policies would impact uninsured Latinx children more significantly than children with insurance. Finally, we hypothesized that preventive appointments would be more likely to be missed than acute visits.

METHODS

Data and Study Population

Data from outpatient clinics affiliated with 4 health systems in North Carolina (Cone Health, Duke Health, UNC Health Care, and Wake Forest Baptist Health) were included. These systems provide care to children from all 100 counties in North Carolina. The institutional review boards at all institutions approved this study.

We used electronic medical record data from ≥ 1 clinic per health care system for pediatric appointments scheduled during the 6-month immigration action period (October 2016 to March 2017) and a 6-month control period (October 2015 to March 2016) (Fig 1). Primary care and specialty appointments for children (0–18 years) residing in North Carolina were included. Emergency department, urgent care,

perinatal visits, and hospitalizations were excluded.

Statistical Analyses

A CITS analysis was used to test the hypothesis that visit no-shows and cancellations increased among Latinx children after the implementation of the immigration policies.

Appointment outcomes included (1) completion, (2) cancellation, and (3) no-show, defined as the proportion of appointments completed, canceled, and no-showed out of all scheduled appointments in a given week. Standardized volume rates were calculated by summing the total scheduled weekly appointments and dividing by the estimated population of children in North Carolina.¹⁸ The policy intervention was the executive immigration actions enacted on January 25, 2017. We included data from October 1, 2016, to March 2017 for the immigration action period and October 2015 to March 2016 for the control period. Participants were defined as Latinx if their self-reported ethnicity was Hispanic or Latinx or their preferred language was Spanish.

In a single-series interrupted time series, a single population is followed longitudinally, and the outcome is compared before and after a given

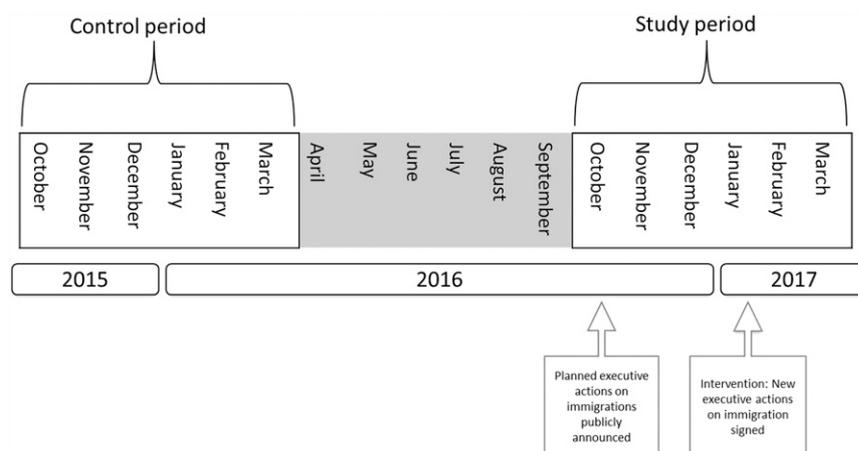


FIGURE 1

Study timeline depicting 26-week immigration action period (October 2016 to March 2017) and control period (October 2015 to March 2016). Executive actions (intervention) were enacted on January 25, 2017 (week 17). The intervention was simulated in the control period.

intervention while adjusting for underlying trends in the outcome variable. The major threats to the validity of interrupted time series designs are cointerventions and seasonal trends that may affect the outcome but are not accounted for in the underlying preintervention patterns. In CITS, the control group limits this threat and increase confidence in interpreting effects due to policy change. We included 2 control groups: (1) non-Latinx children during the immigration action period, whose visit attendance would not be impacted by the immigration policies, and (2) Latinx children from the same 6 month period in the previous year to account for seasonal or other temporal trends that might affect visit attendance.

Autoregressive integrated moving average regression was used to account for underlying patterns in weekly visit attendance in the immigration action (2016–2017) and control periods (2015–2016). We assessed both the immediate and gradual effects of the policy changes on visit attendance among Latinx children. In comparisons in which we saw a change in sustained appointment outcome trends after the intervention, we calculated the predicted values of visit attendance for the postintervention period as if the immigration actions were never passed. The predicted appointment outcomes were calculated as if the population followed the preintervention trend but then followed the control group's postintervention trend. This hypothetical scenario was compared with the observed values of postintervention visit attendance to examine whether actual visit attendance among Latinx children differed from expected values. We report the absolute and relative change in visit attendance associated with immigration actions.

An example of the CITS model is shown below:

$$\begin{aligned} \text{No-show}_{\text{intervention}(i) \times \text{group} \times \text{time}(t)} \\ X \text{ time}(t) = \beta_0 + \beta_1 * \text{time}_t \\ + \beta_2 * \text{level}_i + \beta_3 * \text{posttrend}_{i:t} \\ + \beta_4 * \text{group} + \beta_5 * \text{time}_t * \text{group} \\ + \beta_6 * \text{level}_i * \text{group} \\ + \beta_7 * \text{posttrend}_{i:t} * \text{group} + e \end{aligned}$$

Here, time (t) is a continuous variable during the 26 week immigration action and control periods (52 observed outcome time points [weeks]); level is an indicator variable that represents the immigration action (postimmigration action enactment value is 1) or a simulated intervention in the control period; posttrend is an indicator variable that represents the time after the immigration actions (postimmigration action value is 1); and group distinguishes the groups being compared (eg, Latinx children compared with non-Latinx children in the immigration action period). The difference in level change (β_6) and difference in trend change (β_7) show the immediate and sustained impact of the executive actions, respectively.

We examined potential confounding and effect measure modification due to insurance status and appointment type. Primary care appointments were defined as acute (sick or same day), preventive (well child, physicals, immunizations), or chronic care (follow-up or return) visits. Insurance status, dichotomized as insured or uninsured, was a time-varying confounder and was included in the autoregressive integrated moving average models, except in comparisons among uninsured groups in which insurance status is accounted for as a time-fixed effect by using restriction. After inclusion of the aforementioned variables, addition of further first-order autoregressive ($P = 1$) and autoregressive moving average ($q = 1$) components to the model did not change the results substantively and reduced model fit. Therefore, these

components were left out of final models.

In exploratory analyses, data were skewed at week 17 in the control period because of a winter storm causing clinic closure across North Carolina. Therefore, we censored week 17 from the final analyses. Additionally, the no-show outcome had an outlier at week 26, so this time point was censored in both time periods when analyzing the no-show outcome.

RESULTS

We included 610 085 appointments for 222 284 children (Table 1). Population characteristics in the immigration action period (314 092 appointments; 114 627 children) and control period (295 993 appointments; 107 657 children) were similar. The percentage of appointments scheduled by Latinx children was similar in the immigration action period (17%) and control period (18%). About 95% of children in each period contributed 1 appointment on a given day, ~4% contributed 2, and <1% contributed ≥ 3 . In both periods, ~80% of appointments for Latinx children were covered by public insurance, 8% were covered by private insurance, and 10% were uninsured. Among the appointments by non-Latinx children, ~45% had private insurance, nearly half had public insurance, and the remaining 7% were uninsured. In both periods, more than two-thirds of appointments were primary care visits for Latinx children, compared with 55% of encounters for non-Latinx children. Among primary care appointments, there was no change in the percentage of acute appointments or preventive appointments scheduled between the 2 periods, with acute appointments accounting for about a third of scheduled primary care appointments among Latinxs and a quarter of primary care appointments among non-Latinxs.

TABLE 1 Characteristics of the Study Population by Latinx Ethnicity and Time Period

Characteristic	All Encounters	Latinx	Not Latinx
Immigration action time period (October 2016–March 2017) (<i>n</i> = 314 092 encounters, <i>n</i> = 114 627 individuals)			
Encounters		52 235	261 857
Individuals (<i>n</i>)	114 627	20 055	94 572
Years of age, mean (SD)	7.6 (5.9)	7.3 (5.5)	7.7 (5.9)
Insurance status, <i>n</i> (%)			
Private insurance	122 459 (39.0)	4631 (8.9)	117 828 (45.0)
Public insurance	171 875 (54.8)	42 993 (82.3)	128 882 (49.2)
Uninsured	19 576 (6.2)	4585 (8.8)	14 991 (5.7)
Clinic setting, <i>n</i> (%)			
Primary care	178 621 (50.6)	34 556 (66.2)	144 065 (55.0)
Referral	135 471 (49.4)	17 679 (33.8)	117 792 (45.0)
Primary care visit type, <i>n</i> (%) ^a			
Acute	42 906 (13.7)	8893 (17.0)	34 013 (13.0)
Preventive	67 806 (21.6)	13 487 (25.8)	54 319 (20.7)
Chronic disease	48 207 (15.3)	8498 (16.3)	39 709 (15.2)
Control time period (October 2015–March 2016) (<i>n</i> = 295 993 encounters, <i>n</i> = 107 657 individuals)			
Encounters		53 683	242 310
Individuals, <i>n</i>	107 657	19 988	87 669
Years of age, mean (SD)	7.4 (5.9)	6.8 (5.4)	7.5 (5.9)
Insurance status, <i>n</i> (%) ^b			
Private insurance	109 564 (37.1)	4455 (8.3)	105 109 (43.4)
Public insurance	163 248 (55.2)	43 803 (81.6)	119 445 (49.4)
Uninsured	22 859 (7.7)	5398 (10.1)	17 461 (7.2)
Clinic setting, <i>n</i> (%)			
Primary care	172 630 (58.3)	37 217 (69.3)	135 413 (55.9)
Referral	123 363 (41.7)	16 466 (30.7)	106 897 (44.1)
Primary care visit type, <i>n</i> (%) ^a			
Acute	41 315 (14.0)	10 182 (19.0)	31 133 (12.8)
Preventive	64 796 (21.9)	14 656 (27.3)	50 140 (20.7)
Chronic disease	49 861 (16.8)	9333 (17.4)	40 528 (16.7)

^a Only specified for visits in the primary care setting (*n* = 178 621 in immigration action period and 172 630 in control period) that could be categorized as acute (same day or sick), preventive (well child, physicals, immunizations), or chronic (follow-up or return).

^b Missing insurance status: *n* = 322 (*n* = 27 Latinx, 295 non-Latinx).

After adjusting for the population size of Latinx children in North Carolina, the rate of appointments scheduled by Latinx children in the immigration action period (537 weekly scheduled visits per 100 000 Latinx children, 95% confidence interval [CI]: 504–570) was similar to the previous year (568 weekly scheduled visits per 100 000 Latinx children, 95% CI: 537–600), (*P* = 16).

Impact of Immigration Actions on Latinx Appointments

There was no difference in immediate or sustained no-show rates after the enactment of executive immigration actions among Latinx children in the immigration action period compared with Latinx children in the control period (Table 2).

There was an immediate 5.7% (95% CI: 0.40%–10.9%) decrease in cancellation rates after the immigration actions among all Latinx children in the immigration action period compared with cancellations among all Latinx children in the control period (Table 2). There was no sustained difference in cancellation rates between the 2 periods.

Impact of Immigration Actions on Uninsured Latinx Appointments

Among uninsured Latinx children in the immigration action period, there was no immediate change in no-show rates after the immigration actions compared with uninsured Latinx children in the control period. The sustained trend in no-show rates

decreased by 1.4% (95% CI: 0.10%–2.7%) per week after immigration actions.

There was an immediate 12.7% (95% CI: 2.3%–23.1%) decrease in cancellations after immigration actions compared with uninsured Latinx children in the control period. However, the sustained trend in cancellations among Latinx uninsured children then increased by 2.4% (95% CI: 0.89%–3.9%) per week after immigration actions (Table 2, Fig 2). The observed rate of cancellations for the Latinx uninsured at week 26 in 2017 was higher (33.33%) than predicted (17.79%). By week 26, there was an absolute increase in cancellation of 15.54 visits per 100

TABLE 2 Appointment Status Among Encounters for Latinx Children After Immigration Actions Were Passed in January 2017 Compared With Encounters for Latinx Children in the Previous Year

	Immediate Change After Immigration Actions, % (SE)	P	Sustained Trend Change After Immigration Actions, % (SE)	P
No-show rate ^a	1.6 (1.6)	.30	-0.27 (0.25)	.29
Cancellation rate ^a	-5.7 (2.7)	.04	0.37 (0.39)	.35
Uninsured no-show rate	4.6 (4.3)	.29	-1.4 (0.67)	.04
Uninsured cancellation rate	-12.7 (5.3)	.02	2.4 (0.77)	.003
Insured no-show rate	1.6 (1.6)	.34	-0.16 (0.25)	.53
Insured cancellation rate	-5.1 (2.6)	.06	0.17 (0.38)	.67
Acute visit no-show rate ^a	1.7 (2.7)	.54	-1.0 (0.43)	.02
Acute visit cancellation rate ^a	-3.3 (2.1)	.13	0.36 (0.33)	.28
Chronic visit no-show rate ^a	3.6 (2.4)	.14	0.38 (0.38)	.33
Chronic visit cancellation rate ^a	-5.4 (3.6)	.14	0.42 (0.52)	.43
Preventive visit no-show rate ^a	0.72 (2.5)	.80	0.18 (0.44)	.69
Preventive visit cancellation rate ^a	-4.8 (3.7)	.19	0.87 (0.53)	.11

^a Adjusted for insurance status.

appointments made (relative increase of 87%).

Impact of Immigration Action on Insured Latinx Appointments

There was no difference in immediate or sustained no-shows or cancellations among insured Latinx children in the immigration action period compared with insured Latinx children in the control period (Table 2, Fig 3).

Impact of Immigration Action on Appointments in Latinx Versus Non-Latinx Children

There was no difference in immediate or sustained no-show or cancellation rates among all Latinx children compared with all non-Latinx children after the immigration actions enactment (Table 3). There was also no difference in attendance rates when comparing uninsured Latinx children to uninsured non-Latinx

children after the immigration action enactment (Table 3).

Primary Care Visit Type

In analyses in which appointment type was considered as an effect measure modifier, compared with no-shows for acute visits among Latinx children in the control period, there was a sustained 1% (95% CI: 0.16%–1.8%) per week decrease in no-show rates for acute appointments among all Latinx children after immigration actions passage in the immigration action period (Table 2).

There was also a sustained 0.57% (95% CI: 0.02%–1.1%) per week increase in no-shows for chronic care appointments among all Latinx children compared with non-Latinx children after the immigration actions (Table 3).

In other analyses in which appointment type was considered, we found no difference in appointment outcomes.

DISCUSSION

In this analysis of health care use among Latinx children, we found a sustained increase in visit cancellation trends after the 2017 immigration actions among uninsured Latinx children, a unique population that serves as a proxy for undocumented children.¹⁹ We did not find a difference in appointment

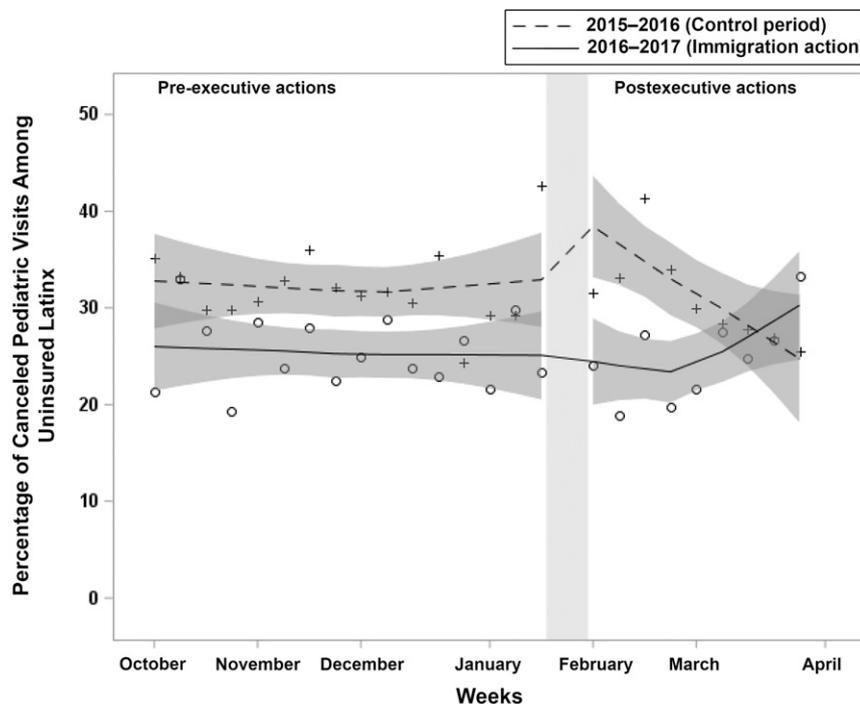


FIGURE 2 Percentage of canceled visits among uninsured Latinx patients (0–18 years) in the immigration action period versus control period.

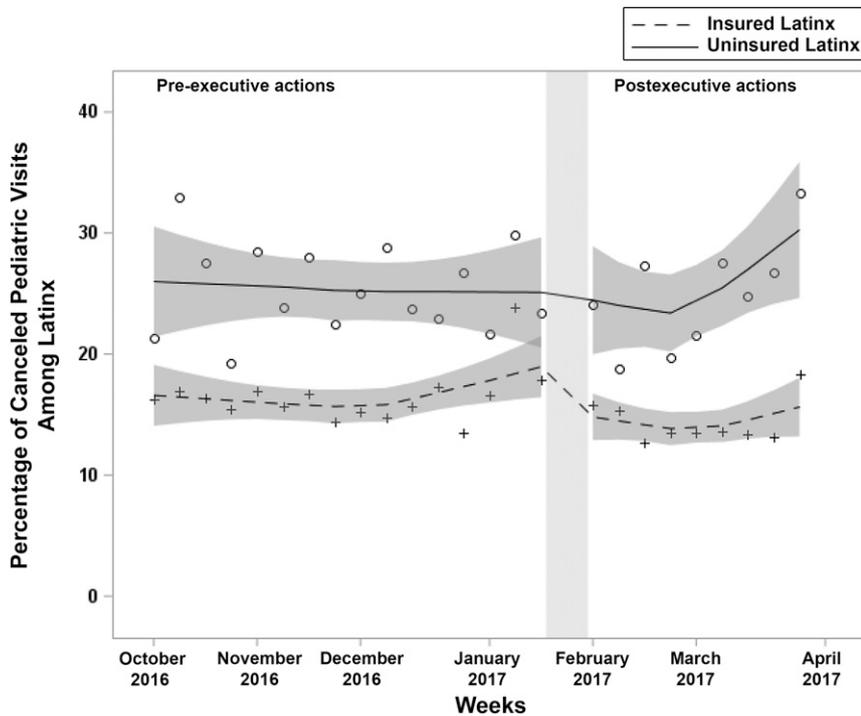


FIGURE 3 Percentage of canceled visits among uninsured Latinx patients (0–18 years) compared with insured Latinx patients in the immigration action period.

outcomes for insured Latinx children or for non-Latinx children. Our findings suggest that health care use may have decreased among uninsured Latinx children, who may be at greatest risk of immigration enforcement actions because of lack of legal documentation.

The threat of immigration enforcement and restrictive state-level immigration policies has many adverse effects on health care outcomes, including decreased birth weight, poorer mental health, higher rates of emergency care, food insecurity, and cardiovascular risk.^{20–26} Few researchers have examined the impact of the 2017 federal immigration policy changes on the health of children. Researchers in 2 studies described an increase in preterm births among Latina women after the 2016 presidential election.^{27,28} Additionally, 400 US-born Latinx adolescents experienced increases in anxiety symptoms in the year after the presidential election.²⁹

Our results add to this evidence, describing the negative effects of restrictive federal immigration policies on Latinx children and particularly those lacking legal documentation. Because undocumented immigrants are already at higher risk for worse health outcomes,^{30,31} these policy changes may magnify existing health disparities.

Appointment attendance for insured Latinx children was unchanged after immigration actions were passed, suggesting that Latinx families with presumably US-born citizen children continued to overcome potential barriers to attend scheduled visits. This is consistent with qualitative data suggesting that immigrant families prioritize children’s medical care despite heightened fear and deportation risk.¹⁶ Families may selectively curtail nonessential activities while prioritizing medical appointments^{9,10} and may exhibit “cautious citizenship” by reducing

risk while interacting with institutions.^{32,33} However, families may perceive the risk as too high when children are not documented, explaining why results differ among uninsured Latinx children. Additionally, because immigration enforcement and anti-immigrant rhetoric have continued to heighten since the study period, stressors such as deportation or detention of family members may eventually spill over to affect US-born insured children in mixed-status families in which parents or caregivers may be undocumented. Previous analyses after similar state-level immigration actions have demonstrated decreased Medicaid use for Latinx patients over time^{34–36} and reduced Special Supplemental Nutrition Program for Women, Infants, and Children participation with perceived deportation risk.³⁷ Importantly, Medicaid enrollment for children in immigrant families had been increasing; however, these gains could be jeopardized by an adverse policy climate, especially as additional federal policy changes further limit access for immigrant families.^{38,39}

We found an unexpected gradual decrease in no-shows among uninsured Latinx children after immigration actions compared with the previous year. We also found immediate decreases in cancellation rates in the overall Latinx population after immigration actions compared with the previous year but higher immediate cancellation rates specifically in the uninsured Latinx. These findings taken together may be due to complex differences in the behavioral pathways that result in no-shows versus cancellations. Although these pathways are not well studied because most studies of visit attendance focus on no-shows, in a cohort of >40 000 pediatric patients, no-shows and cancellations were found to have distinct predictors.⁴⁰ In our study,

TABLE 3 Appointment Status Among Encounters for Latinx Compared With Non-Latinx Children During the Immigration Action Period (October 2016–March 2017)

	Immediate Change After Immigration Actions, % (SE)	<i>P</i>	Sustained Trend Change After Immigration Actions, % (SE)	<i>P</i>
No-show rate ^a	1.3 (1.1)	.27	0.029 (0.18)	.87
Cancellation rate ^a	−1.0 (3.0)	.74	0.036 (0.43)	.93
Uninsured no-show rate	2.0 (4.0)	.61	−0.029 (0.63)	.96
Uninsured cancellation rate	−6.3 (5.2)	.23	1.3 (0.75)	.08
Insured no-show rate	0.81 (1.2)	.51	0.076 (0.19)	.69
Insured cancellation rate	−0.71 (2.9)	.81	−0.11 (0.42)	.80
Acute visit no-show rate ^a	1.7 (2.3)	.47	−0.36 (0.36)	.33
Acute visit cancellation rate ^a	−0.81 (2.0)	.69	0.19 (0.29)	.52
Chronic visit no-show rate ^a	1.0 (1.8)	.57	0.57 (0.28)	.05
Chronic visit cancellation rate ^a	4.6 (3.1)	.15	−0.27 (0.45)	.55
Preventive visit no-show rate ^a	1.07 (2.4)	.66	0.24 (0.38)	.54
Preventive visit cancellation rate ^a	−0.97 (3.3)	.77	−0.041 (0.48)	.93

^a Adjusted for insurance status.

cancellations may have transiently decreased because of concern that canceled appointments might attract negative attention to families in the immediate aftermath of the passage of the executive actions. The gradually increasing cancellation rates could be attributable to rising fear in the face of increasing anti-immigration rhetoric and immigration raids, prompting undocumented families to gradually limit their activities.

No-shows did not increase during the immigration action period and, in fact, slowly decreased among uninsured Latinx children compared with the previous year. Families might have been more fearful of calling attention to themselves by deviating from scheduled appointments. Although cancelling scheduled appointments may be perceived as a low-risk way to curtail activities over time, no-shows may be perceived as riskier for undocumented families. Future work, particularly qualitative research, is needed to unravel the differences in health care use pathways in the face of restrictive immigration policy.

The rate of total appointments scheduled among Latinx children in the immigration action period was unchanged compared with the previous year. This may be in part because the included health systems

had undertaken measures to facilitate health care access for children in immigrant families,²² including public reaffirmations of nondiscrimination policy and extensive services for refugees. Such measures may have helped to identify these health systems as safer spaces, partially mitigating families' fears when scheduling appointments. Additionally, our methods may underestimate changes in appointment rate, because standard rates were calculated by using state population estimates in the denominator rather than Latinx children within the clinics' catchment area. We also do not have population estimates of subgroups such as uninsured Latinx children, which would have allowed for evaluation of appointment rates in particular groups of interest. Given these potential estimation biases, we might not have captured all changes in scheduled appointment rates.

We used uninsured status of Latinx children as a proxy for undocumented children because most uninsured children in North Carolina would meet income eligibility for public insurance but are unable to enroll if they lack legal documentation status.^{19,41,42} The inclusion of uninsured children is unique because most population-level studies use administrative databases, which do not include undocumented patients.

However, this proxy has limitations. For example, US citizen Latinx children may be uninsured if undocumented parents are fearful of engaging with safety net programs. The uninsured population impacted by immigration policies could therefore include a mix of undocumented children and US-born Latinx children in mixed-status families.

We used a rigorous quasiexperimental study design with robust control groups, which increase certainty that effects on visit attendance were due to immigration policy change rather than other co-occurring events. Although CITS is the gold standard for analyzing the impact of policy change at the population level,^{43,44} results cannot be used to infer changes in attendance for an individual Latinx child. Additionally, we recognize that the Latinx population includes heterogeneous subgroups who have been in the United States for varying lengths of time. Using electronic medical record data alone, we were not able to consider differential impacts on these subgroups. We had a limited number of weekly data points (26 weeks) in each time period, which may have limited our power to detect changes in visit attendance. The included time period also limits the ability to draw conclusions about trends in health

care use beyond the 3 months after the immigration policies were implemented.

CONCLUSIONS

With our findings, we suggest a potential decrease in health care use among uninsured Latinx children after the 2017 immigration actions. Although immigration policy changes

can have harmful effects on children's health, policies have the potential to be beneficial, as demonstrated by the favorable effect of Deferred Action for Childhood Arrivals benefits for mothers on the well-being of their children.⁴⁵ Continued rigorous evaluation of health care access and health outcomes of Latinx children is necessary to ensure that the health

and well-being of children is integrated into rapidly evolving immigration policy.^{46,47}

ABBREVIATIONS

CITS: controlled interrupted time series
CI: confidence interval

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DOI: <https://doi.org/10.1542/peds.2020-0272>

Accepted for publication Oct 6, 2020

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

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Pediatrics 2021;147;

DOI: 10.1542/peds.2020-0272 originally published online October 23, 2020;

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