

Supplementary Materials for

Did a placebo effect contribute to the rise in special education enrollment following the Flint, Michigan Water Crisis?

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Clinical Psychology in Europe

<https://doi.org/10.32872/cpe.9577>

This file includes:

Figs. S1 to S2

Tables S1 to S4

Texts S1 (including Fig. S3) to S2 (including Figs. S4 to S22 and Table S5)

References

Other Supplementary Materials for this manuscript include the following:

Data S1 to S2

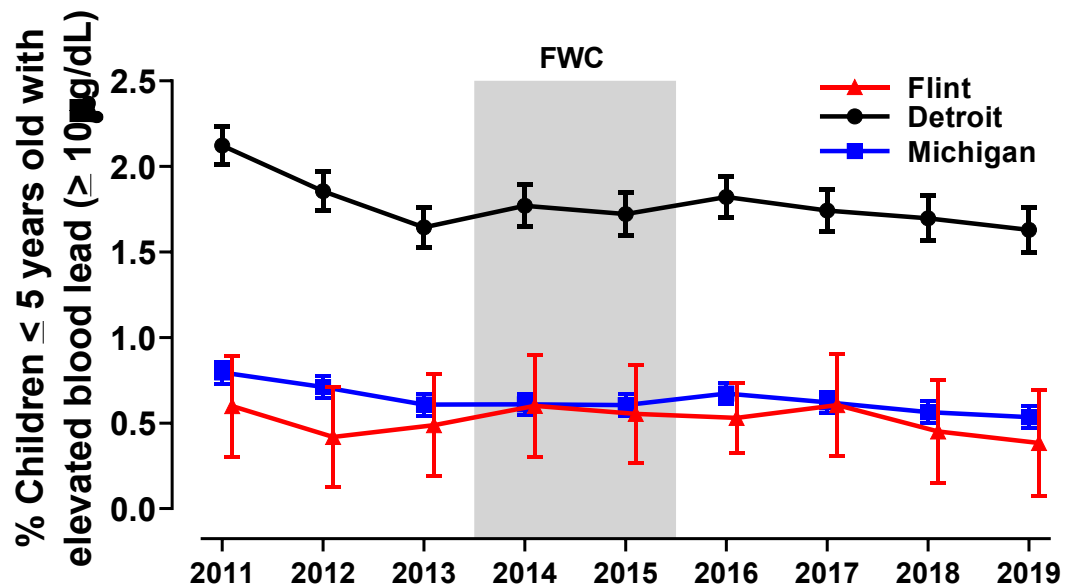


Fig. S1. Percentage of children ≤ 5 years of age with blood lead $\geq 10 \mu\text{g/dL}$ in Flint, Detroit, and Michigan, 2011-19. Error bars indicate 95% confidence intervals and maybe contained within symbols.

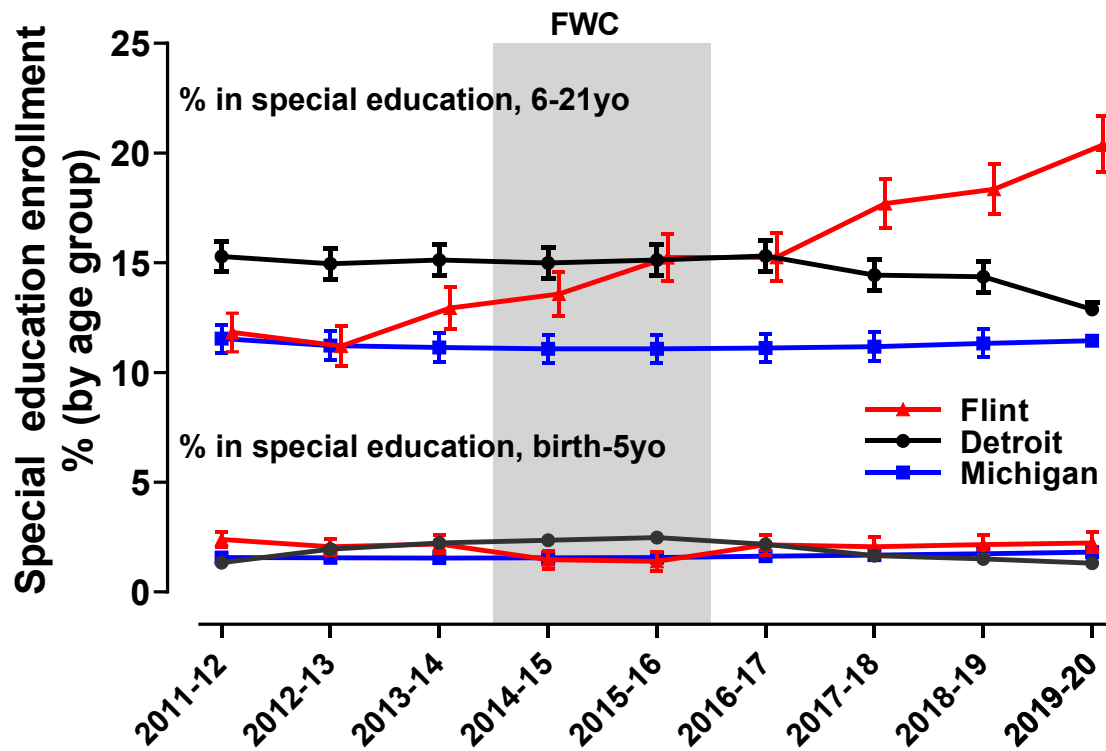


Fig. S2. Special education enrollment rate (by age groups) in Flint, Detroit, and Michigan, 2011-12 till 2019-20. Error bars indicate 95% confidence intervals and maybe contained within symbols.

Table S1. Representative national and local news headlines reporting lead poisoning in children or linking lead exposure to educational outcomes in Flint vs. Detroit, 2015-20.

Total resulting interactions and total followers receiving these headlines from public figures and groups on Facebook and sourced from CrowdTangle are also listed.

Month Year	Media outlet: Headline (Reference)	Total interactions	Total followers
FLINT			
Oct-15	The Guardian: 'We were paying to poison our kids': lead in Michigan city's water hits children (Felton, 2015)	5,450	236,093
Jan-16	TIME Magazine: (cover) "The Poisoning of an American City" (Sanburn, 2016)	31,034	11,531,720
Jan-16	Detroit Free Press: "Should Flint residents pay for lead-poisoned water?" (Egan, 2016)	4,246	345,045
Jan-16	The New York Times: "Flint Weighs Scope of Harm to Children Caused by Lead in Water" (Goodnough, 2016)	15,487	14,534,305
Jan-16	Al Jazeera: "Lead-Contaminated Water In Flint Probably Poisoned Thousands Of Children" (Al Jazeera, 2016)	216	0
Mar-16	Scientific American: "Flint's Lead-Tainted Water May Not Cause Permanent Brain Damage" (Shell, 2016a)	408	2,514,445
Jul-16	Scientific American: "The Brains of Flint's Children, Imperiled by Lead, Could Still Escape Damage" (Shell, 2016b)	181	2,607,589
Oct-16	Think Progress: "Families in Flint say there's a special education crisis that's about to get worse" Covert, 2016)	340	4,061
Feb-18	Detroit Free Press: "Sh-h-h. Snyder state update left out 75% drop in reading proficiency in Flint" (Riley, 2018)	3,168	208,228
Feb-18	The New Republic: "Did Flint's Water Crisis Damage Kids' Brains?" (Atkin, 2018)	1,221	510,702
Jul-18	The New York Times: "The Children of Flint Were Not 'Poisoned'" (Gomez and Dietrich, 2018)	7,861	2,915,046
Jul-18	The New York Times: "The Flint Children Were Indeed 'Poisoned'" (Clark and Filardo, 2018)	298	647,621
Aug-18	Michigan Radio: "Pediatrician says "poisoned" is an accurate description of what happened to Flint children" (Stateside Staff, 2018)	72	50,151
Jun-19	The Conversation: How the Flint water crisis set students back (Wood 2019)	550	69,786
Jul-19	The Washington Post: "The Flint water crisis set back thousands of students" (Strauss, 2019)	340	48,838

Aug-19	Detroit Metro Times: The number of Flint's students with special needs has increased by 56% since the water crisis, according to report (DeVito, 2019)	180,541	3,959,099
Aug-19	NBC Flint: "Learning disabilities, developmental problems increase amid Flint Water Crisis" (Spence, 2019)	201	23,180
Oct-19	Insider: 5 years into Flint's water crisis, a record number of local kids are struggling with learning disabilities — here are their stories (Ignaczak, 2019)	1,622	46,607,993
Nov-19	The New York Times: (front-page) "A Legacy of Poisoned Water: 'Damaged Kids' Fill Flint's Schools" and (online) "Flint's Children Suffer in Class After Years of Drinking the Lead-Poisoned Water" (Green, 2019)	92,095	26,274,554
Nov-19	The Detroit News: Flint weighs school closures as it grapples with special ed costs (Chambers, 2019)	669	248,684
Dec-19	Michigan Radio: "Exposed to lead in infancy, now Flint's youngest students face challenges in school" (Wells, 2019)	4,814	247,796
Dec-19	Detroit Free Press: Flint boy was suspended, sent home from school 50+ times. His mom blames water crisis. (Riley, 2019)	1,815	561,910
Dec-19	Michigan Radio: After 3 years, lawsuit over Flint schools' special needs crisis moving to trial (Wells, 2019)	702	63,736
Feb-20	WBUR: After Flint Water Crisis, Number Of Students With Special Education Needs Spikes (Mosley, 2020)	40,688	8,488,371
Mar-20	CBS 60 Minutes: "Early results from 174 Flint children exposed to lead during water crisis shows 80% of them will require special education services" (Alfonsi, 2020; TV Series Finale, 2020)	27,119; TV broadcast audience: 10,443,000	9,959,623
Mar-20	MLive: 80% of Flint kids tested need special services (Fonger, 2020)	8,899	806,234
Oct-20	MLive: Flint children exposed to lead suffer from dental problems, learning disabilities, other issues (Simpson-Mersha, 2020)	2,390	846,764
DETROIT			
Nov-17	Detroit News: Detroit kids' lead poisoning rates higher than Flint (MacDonald, 2017)	15,726	217,517
Nov-20	Detroit Metro Times: Lead poisoning endangers generations of Detroit children, with no end in sight (Neavling, 2020)	6,521	475,711

Table S2. Representative negative expectation commentaries of community leaders, teachers, parents and schoolchildren about lead exposure during the Flint Water Crisis period and educational difficulties for Flint and Detroit (arranged chronologically), 2015-21.

No.	Negative Expectation Commentary (Reference)
FLINT COMMUNITY LEADERS ON FLINT SCHOOLCHILDREN	
1	The FWC would “result in learning disabilities and the need for special education and mental health services and an increase in the juvenile justice system” – Flint Mayor (Office of Flint Mayor, 2015)
2	“In five years, these kids are going to have problems with special education. They're going to have cognition problems. Seven to 10 years, they're going to have behavioral problems” – Flint pediatrician (Monahan et al., 2016)
3	"There's real danger that the injury is going to be permanent and lifelong in them" [...] "Even low levels of lead -- especially if exposure to low levels continues over many months -- is going to cause some degree of brain damage to at least some of the children who have been exposed -- that's a big deal." – World-leading pediatrician and lead expert (Lapook, 2016)
4	“If you were going to put something in a population to keep them down for generations to come, it would be lead” – Flint pediatrician (Goodnough, 2016)
5	An “evolving, educational emergency,” [...] “Threat of significant disability” to “Flint's youngest students -- those not yet in school or the unborn” – Flint’s former public schools superintendent (House Democrats, 2016)
7	“When we see all over the TV about our toxic water in our hometown, it does something to you. It makes you fearful. What are they going to do to us next?” – Flint resident (The New Yorker, 2016)
8	“You know how hard it was to retrain own children, that they can’t turn on a faucet?” – Flint resident (The New Yorker, 2016)
6	“We know that this lead in our system, the amount of effects it’s going to have, is generational” – Director of local university’s early childhood development center (Felton, 2016)
9	“The crisis is also mentally damaging [...] The poisoned water supply is causing anxiety for residents who can't do basic, everyday water-related tasks without feeling paranoid.” – Flint resident (Counts, 2016)
10	“Water, has become the most lethal thing that they could...besides a bullet, these kids, and families, and seniors [could be] subjected to” – Flint resident (Flint Rising, 2016)

11	Flint [is] as a city “poisoned by lead” and recounted visiting a pastor who had hand wipes for congregants because they feared using their showers – Michigan’s then Attorney General (Livengood and Oosting, 2016)
12	Flint children, following their “prolonged exposure to lead” during the FWC, are “at risk of developing a disability, or already have a disability” and “face an unprecedented educational and civil rights disaster” – Class action lawsuit initial filing (D.R. v. Michigan Department of Education, 2016)
13	“There’s a special education crisis that’s about to get worse [due to the Flint Water Crisis]” – Complaint filed on behalf of Flint families (Covert, 2016)
14	“Many [individuals, especially children and youth] are interpreting the increased [national and worldwide] attention as an indicator that something much worse is unfolding that they have no power over” – Flint resident (Cuthbertson et al., 2016)
15	“They’ve already poisoned two generations of our family. What more can they take from us?” – Flint mother (Described and Captioned Media Program, 2017)
16	“The full effects of lead poisoning aren’t seen for five years. I’m waiting to see with my kids.” – Flint mother (Described and Captioned Media Program, 2017)
17	“What I see is hopelessness. [I am worried] that local kids would give up when lead’s symptoms surfaced, or even before” – Flint activist and former Mayoral candidate (Stillman, 2017)
18	“These kids are internalizing the messages about how the lead is affecting them” – Flint resident and director at a local university (Stillman, 2017)
19	“People are getting poisoned because you are not treating the water right” – Flint water researcher and first author of this article in documentary “Poisoned Water” (PBS NOVA, 2017)
20	“Lead poisoning = learning disabilities. It’s happening. A GENERATION is screwed because of incompetence.” – Flint resident and comic (Diener, 2018)
21	“They are killing us ... they killed us. We are an invisible people ... and we don’t matter.” – Senior Flint resident (Taylor, 2018)
22	“[Flint’s youngest children] are psychologically and emotionally built and equipped now to only drink bottled water” – Flint activist and former Mayoral candidate (Fonger et al., 2019)
23	“[My young nephews have] been taught to fear the water their whole lives” – Flint resident (Fonger et al., 2019)

24	“We don’t have quantitative data with respect to that yet, but we do know there will likely be some adverse effects based upon the water crisis on the educational outcomes of our youngsters” – Flint’s then school superintendent (Fonger et al., 2019)
25	“We have a school district where all that’s left are damaged kids who are being exposed to other damaged kids, and it’s causing more damage” - Flint school teacher for over 23 years (Green, 2019)
26	“The behavior issues, they’re way up. We never dealt with these behaviors.... [Previously] you might have one, two explosive kids in a couple years span. Now it’s widespread.” – Flint school teacher for over 20 years (Wells, 2019)
27	“We have just altered the life course trajectory of an entire generation of Flint children.” – Flint pediatrician (Smith, 2020)
28	“One out of five children in Flint schools require special education services, largely as a result of the crisis. ... The kids were very young when the water crisis occurred and who will carry with them for a lifetime some of the impact” – US Congressman, Flint (Fonger, 2020)
29	“We see a lot of anger in the younger ones” – Flint parent (Bosman and Greeson, 2020)
30	“It’s kind of to the point where I feel like my family is traumatized. We’re so screwed up in the head” – Flint parent (Bosman and Greeson, 2020)
31	“It’s been an upheaval in all aspects of life for me; and then, most people are like me ... Their houses are destroyed, their bodies are destroyed, their emotions, their mental health, their ability to learn, remember, retain.” – Flint resident and lead plaintiff on water lead lawsuits (Pierret, 2020)
32	“The emotional and mental toll from the crisis is something money can’t fix ... It’s almost like we got PTSD with the water because we don’t really drink it comfortably. Like, you know what I’m saying. When people actually lost their lives to it” – Flint resident (Sochocki and Owczarzak, 2020)
33	“The exposure to elevated lead is a tragic crisis that poses lifelong challenges and learning disadvantages for Flint families” – Flint pediatrician (Wisely, 2020)
34	“There needs to be something flagged, so say if my 9-year-old drank the water growing up has behavior issues...the cops have to remember the kids had behavior issues because of lead ... it’s really unfair” – Flint resident and director at a local university (Diaz, 2020)
35	“[A new \$20 million] juvenile detention center is going to make money off the fact that they poisoned these kids ... It’s gonna be bad.” – Flint activist (Diaz, 2020)
36	“[Special education] statistics have changed the way [our university’s] instructors train rising educators ... they must be prepared for classrooms where high numbers of

	students have special learning needs arising from lead exposure” – Chair of education department chair at local university that trains Flint school teachers (House, 2021)
37	“Because what Flint was, by and large, was this population-level trauma.” – Flint pediatrician (NPR, 2021)
38	“There may be no amount of money that would fully recognize the harm the residents of Flint have experienced, including their anxiety, fear, distrust, and anger over the events of last seven years.” - US federal judge approving \$641 million settlement in 2021 (Travis, 2021)
FLINT SCHOOLCHILDREN	
1	“Am I going to die?” - Flint 6th grader (Garcia, 2016)
2	The principal said, don’t wash your hand if you have a cut. – Flint child (The New Yorker, 2017)
3	“It’s depressing. I don’t think [the lead in Flint water situation] is ever going to change” – Flint 15 year old (May, 2016)
4	“Well, they said I’m not going to be smart anyway” – Flint boy “acting out” in school (Stillman, 2017)
5	“I think [official statements on the causes of the crisis are] all a lie. I think it’s genocide.” – Flint 11 th grader (Muhammad et al., 2018)
DETROIT COMMUNITY LEADERS ON DETROIT SCHOOL CHILDREN	
<i>Note: We could only find commentary on lead exposure in Detroit schoolchildren primarily during 2018-19, three years after the FWC was exposed, when Detroit tested their schools for lead and copper, found high levels, and switched to bottled water for one year until water filtration systems were installed.</i>	
1	“Although we have no evidence that there are elevated levels of copper or lead in our other schools where we are awaiting test results, out of an abundance of caution and concern for the safety of our students and employees, I am turning off all drinking water in our schools until a deeper and broader analysis can be conducted to determine the long-term solutions for all schools” – Detroit schools’ superintendent in August 2018 (Perkins, 2018)
2	“We have no reason to believe that any children have been harmed” – Detroit schools’ spokesperson in August 2018 (Reuters Staff, 2018)
3	“We completed our community meeting, and we’ve taken down recommendations [to switch to bottled water until water filtration systems are installed] and suggestions to make certain our kids are safe” – Detroit schools’ board member in September 2018 (Chambers, 2018)

4	“We are a baby Flint — or a Flint coming” – Detroit artist and parent in November 2018 (Nir, 2018)
5	“Up in Flint, Mich., the water is really poison. I hope it doesn’t get to that point in Detroit” – Detroit grandparent in November 2018 (Nir, 2018)
6	“The drinking water will be cold, it’ll be refreshing, [the students] can fill up a bottle and move it with them throughout the day” – Detroit schools’ superintendent in August 2019 after \$3 million in donations were used to install 500 filtration stations in all schools (Higgins, 2019)
DETROIT SCHOOLCHILDREN	
	No examples found.

Table S3. Geometric Mean (and 95% Confidence Interval, when available) of Blood Lead Levels in Flint, US, Canada, France, and Poland.

Location	Geometric Mean	Year and age group	Reference
Flint	1.87	2011; ≤ 5 years old	Gómez et al., 2018
Flint	1.19	2014 (worst FWC year); ≤ 5 years old	Gómez et al., 2018
US	0.81 (95% C.I.: 0.77-0.86)	2011-14; 1-5 years old	Tsoi et al., 2016
Canada	0.8	2012-13; 3-5 years old	Statistics Canada, 2015
France	1.49 (95% C.I.: 1.45-1.54)	2008-09; 1-6 years old	Rudnai, 2019
Poland	2.47 \pm 1.75	2013; 3-6 years old	Rudnai, 2019

Table S4. Raw values downloaded from CrowdTangle and used to plot network maps in Figure 5. (A) Total number of posts/weblinks shared on public Facebook pages of Michigan media with the keywords “lead poisoning”. (B) Total interactions (reactions, comments, and shares) on all such posts/weblinks for every media.

(A)	
News Media	Total number of posts/links shared
ABC12 (Flint)	9
WNEM (Flint)	9
The Flint Journal	8
Detroit Free Press	8
The Detroit News	7
Mlive	6
FOX17	6
WKZO	6
(B)	
News Media	Total Facebook interactions
Detroit Free Press	15,064
The Detroit news	9,677
MLive	9,069
ABC12 (Flint)	1,283
FOX17	1,090
The Flint Journal	1,011
WNEM (Flint)	691

Text S1

Potential FWC covariates that could explain rising special education enrollment

Waterborne contaminants besides lead

Besides lead, *Escherichia coli* bacteria, *Legionella pneumophila* bacteria, total trihalomethane chemicals, and iron were elevated at different time periods during the FWC causing boil water advisories (*E. coli*), discolored and smelly water (iron and possibly organic matter), and a Legionnaire's Disease outbreak (*Legionella pneumophila*) (Masten et al., 2016; Rhoads et al., 2017; Roy & Edwards, 2019a; Roy & Edwards, 2019b). However, none of these chemicals are associated with learning difficulties in the literature. No other regulated contaminants that are routinely monitored were at or above Safe Drinking Water Act regulations in our suite of inorganic and organic contaminant analytes collected citywide in August-September 2015 (Roy & Edwards, 2019b).

Poverty and nutrition

Poverty and poor nutrition were suggested as possible contributors to learning disabilities in Flint children affected by the FWC (Simpson-Mersha, 2020). Poverty rates (Figure S3a) were stable and similar in Flint and Detroit during the FWC years (range = 39.8-41.6%) before declining in both cities. The rate of households with children ages 0-18 years on food assistance (i.e., on US Supplemental Nutrition Assistance Program) in Flint, Detroit and Michigan decreased overall during 2011-19 (Figure 3b) and overlapped during the FWC years (range = 46.2-48.6%). The food assistance rates dropped thereafter for Detroit and Michigan, but increased slightly in Flint during 2016-18, likely due to the expanded state and federal assistance as part of the FWC emergency response (Golzynski, 2017; USDA, 2016).

City administration and emergency management decisions

Flint had four state-appointed emergency managers in 2011-15 (Goodin-Smith, 2018) when the decision was made to switch its water source. However, we cannot find any evidence that the managers made any financial or policy decisions affecting special education in Flint schools.

Flint public schools' policies and funding

The special education policies, procedures and programs in Flint Community Schools (FCS) have not changed for at least a decade, but the school district has operated at a severe budget deficit (e.g., \$67 million in 2011) since the Great Recession (Zinnes et al., 2020), and has "closed schools, fired teachers, outsourced employees and sold buildings" to erase the deficit (Adams, 2015). A 2016 class lawsuit alleged FCS schools, Genesee Intermediate School District, and Michigan Department of Education "committed ongoing and systemic violations" of federal and state special education laws and "failed to provide required special education [...] services to qualifying students" pre-FWC, which the agencies denied before settling for \$626.25 million (Brown, 2020; D.R. v. Michigan Department of Education, 2016; LeBlanc, 2020). FCS is currently offsetting its funding shortfall with, among other sources, \$9 million for special education from the class action settlement (LeBlanc, 2020), doubling of routine special education

funding to \$114 million by successfully arguing the special education funding calculation formula was unfair to Flint and highlighting their rising special education enrollment (East Village Magazine, 2020; Flint Community Schools, 2020), and \$114 million from a COVID-19 relief bill (Keefer, 2021).

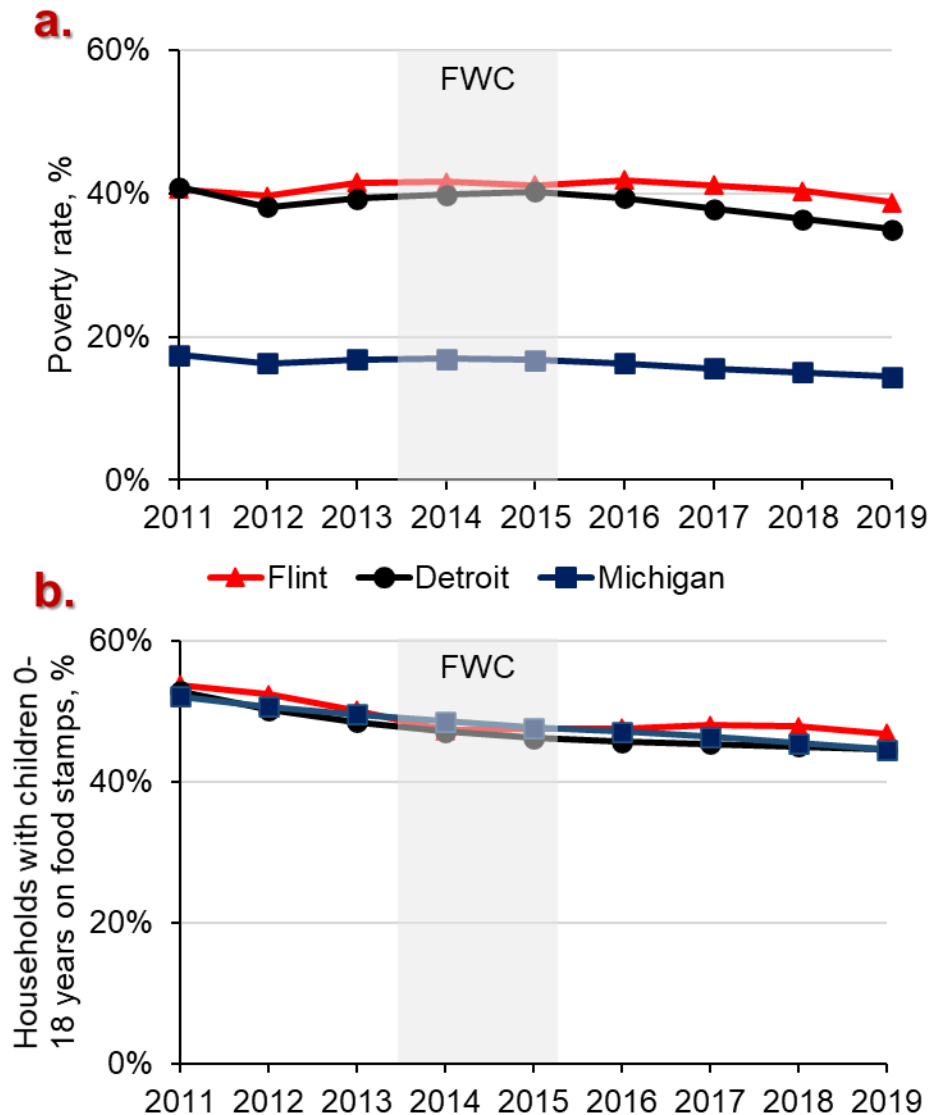


Fig. S3. (A) Poverty Rate and (B) Households with children ages 0-18 years receiving food assistance (Supplemental Nutritional Assistance Program) in Flint, Detroit and Michigan, 2011-19 (or latest available). Data from American Community Survey 5-Year Estimates Data Profiles (US Census, 2022).

Text S2

Analysis of special education outcomes covered under the Individuals with Disabilities Educational Improvement Act (IDEA) in Flint, Detroit, and Michigan

Of 29 special education indicators (30 indicators, including special education enrollment) measured annually under the Individuals with Disabilities Educational Improvement Act (Part B) in the 2011-2020 time period of study, there are 23 indicators with data available for Flint, Detroit, and Michigan at www.mischooldata.org (Table S5). The definitions for each educational outcome are available elsewhere (Michigan Department of Education, 2016; Michigan Department of Education, 2021).

Herein we defined “worsened” as a change in a manner that might superficially suggest brain damage to children from water lead exposure pre-FWC versus post-FWC, whereas “improved” is a change in the opposing direction. Visual examination of all 23 indicators (see Figures S4-S22) in Flint before versus after the Flint Water Crisis indicates that 9 improved, 5 stayed roughly the same ($\pm 1\%$ change), and another 9 worsened.

After considering simple control comparisons between trends in Flint versus the control City of Detroit, 3 of the 9 parameters related to student performance were worse post-FWC versus pre-FWC. Those 3 included special education enrollment rate, dropout rate, and suspension/expulsion rate. Likewise, 3 of 23 indicators (graduation rate, percentage of 3-5 year preschoolers receiving majority of services in a regular early childhood program, and percentage of 3-5 year preschoolers receiving majority of services in separate facilities) improved in Flint after the crisis relative to Detroit.

Thus, overall, an equal number of special education outcomes improved or worsened post-FWC versus pre-FWC, when considering trends in Flint alone, and Flint relative to the control city of Detroit.

The three parameters that we identified as worsening in Flint relative to the control City of Detroit are the same three parameters emphasized in the ACLU lawsuit (D.R. v. Michigan Department of Education, 2016). Media coverage has emphasized those same three parameters, plus the change in 3rd grade reading proficiency which did worsen in Flint but also worsened in the control city of Detroit. We can find no mention of any educational parameters that did not worsen in Flint in either the lawsuit or in media coverage.

Our paper more closely examines the 4 educational outcome changes that have been emphasized as worsening in Flint by the media, to imply evidence of brain damage that arose from water lead exposure.

Table S5. Crude comparison of special education outcomes before and after the FWC (roughly, 2014-15 to 2015-16 academic year). Indicators in Flint that were worse post-FWC than pre-FWC and worse than Detroit are underlined; conversely, indicators that improved on both criteria are italicized.

No.	Serial*	Special Education Outcome	Flint Post-FWC vis-à-vis Pre-FWC	Flint vis-à-vis Detroit Post-FWC	Figure/Notes
1	N/A	<u>Special Education Enrollment</u>	<u>Worsened</u>	<u>Worsened</u>	In manuscript: Figure 1a
2	1	<i>Graduation Rate</i>	<i>Improved</i>	<i>Improved</i>	Figure S4
3	2	<u>Dropout Rate</u>	<u>Worsened</u>	<u>Worsened</u>	Figure S4 (in manuscript: Figure 1f)
4	3B	Participation Rate for Math	No change	Improved	Figure S5
5	3B	Participation Rate for English Language Arts	No change	Improved	Figure S5
6	3C	Proficiency Rate of Math	Worsened ^{&}	Improved	Figure S6
7	3C	Proficiency Rate for English Language Arts	Worsened ^{&}	Improved	Figure S6
8	4A	<u>Suspension/Expulsion</u>	<u>Worsened</u>	<u>Worsened</u>	In manuscript: Figure 1e
9	4B	Suspension/Expulsion by Ethnicity	Not enough data [#]	Not enough data [#]	--
10	5A	Educational Environment: In regular class 80% or more of the day	Worsened	Improved	Figure S7
11	5B	Educational Environment: In regular class 40% or less of the day	Improved	No change	Figure S8
12	5C	Educational Environment: Served in separate facilities	Worsened (but within compliance)	Improved	Figure S9
13	6A	<i>Preschool Educational Environment: % age 3-5 receiving majority of services in a regular early childhood program</i>	<i>Improved</i>	<i>Improved</i>	Figure S10
14	6B	<i>Preschool Educational Environment: % age 3-5 with an IEP in a separate special</i>	<i>Improved</i>	<i>Improved</i>	Figure S11

		<i>education class, separate school or residential facility</i>			
15	7A1	Preschool Positive Social-Emotional Skills: Of those who entered or exited below age expectations, % who substantially increased rate of growth by age 6 or exit	Improved	No change	Figure S12
16	7A2	Preschool Positive Social-Emotional Skills: % functioning within age expectations by age 6 or exit	Improved	Worsened (but in compliance)	Figure S13
17	7B1	Preschool Acquisition and Use of Knowledge and Skills: Of those who entered or exited below age expectations, % who substantially increased rate of growth by age 6 or exit	Improved	No change	Figure S14
18	7B2	Preschool Acquisition and Use of Knowledge and Skills: % functioning within age expectations by age 6 or exit	No change	Worsened	Figure S15
19	7C1	Preschool Use of Appropriate Behaviors to Meet Their Needs: Of those who entered or exited below age expectations, % who substantially increased rate of growth by age 6 or exit	Improved	No change	Figure S16
20	7C2	Preschool Use of Appropriate Behaviors to Meet Their Needs: % functioning within age expectations by age 6 or exit	Improved	Worsened (but in compliance)	Figure S17
21	8	<u>Facilitated Parent Involvement (ages 3-5) (unrelated to student performance)</u>	<u>Worsened</u>	<u>Worsened</u>	Figure S18
22	8	Facilitated Parent Involvement (ages 6-21)	Not enough data [#]	Not enough data [#]	Figure S19
23	9	Disproportionate Representation – Child with a Disability	Not enough data [#]	Not enough data [#]	--
24	10	Disproportionate Representation – Eligibility Categories	Not enough data [#]	Not enough data [#]	--
25	11	Child Find	No change	No change	Figure S20
26	12	Early Childhood Transition	Worsened	Improved	Figure S21

27	13	Secondary Transition	No change	Improved	Figure S22
28-30	14A-14C	Postsecondary Outcomes	Not enough data [#]	Not enough data [#]	--

* Official indicator number as categorized under Individuals with Disabilities Educational Improvement Act & Introduction of a new policy that caps the proportion of children counted as proficient at 1% (Michigan Department of Education, 2016).

[#] on the web portal <https://mischooldata.org/selected-indicator-reports/>

Note: The Post-FWC vs. Pre-FWC comparison is made between the last and first academic years for which data is available. Similarly, the Flint vs. Detroit comparison post-FWC is made for the latest academic year for which data is available for both cities.

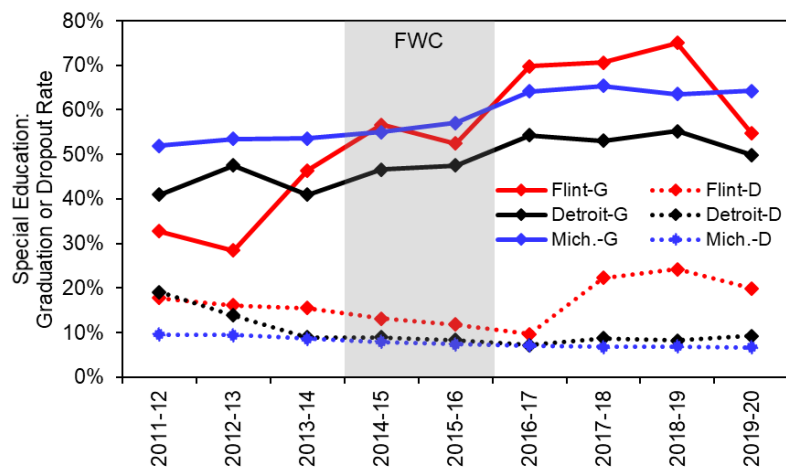


Fig. S4. Graduation and Dropout Rate. State targets: Graduation $\geq 80\%$; Dropout $\leq 8.0-9.5\%$.

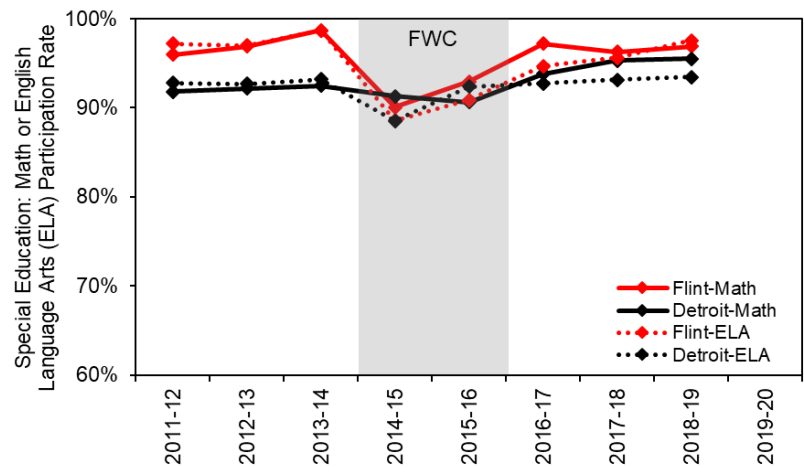


Fig. S5. Participation Rate for Math and English Language Arts. State target: $\geq 95\%$.

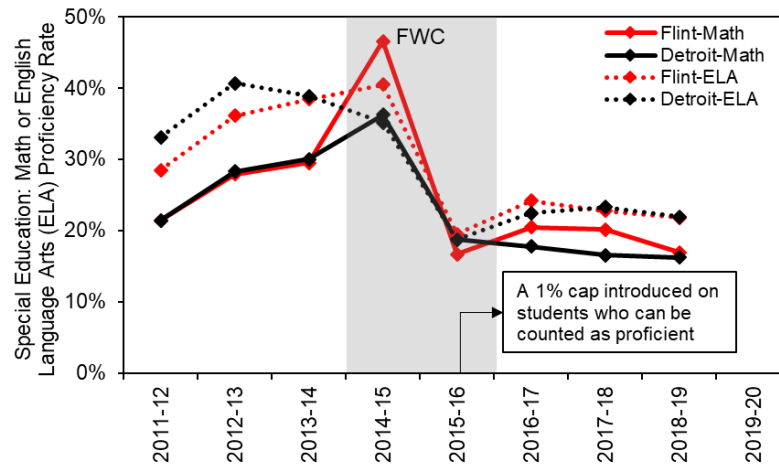


Fig. S6. Proficiency Rate for Math and English Language Arts. State assessments were suspended after Michigan public schools closed in March 2020 due to Covid-19. Thus, assessment data are not available for 2019-20.

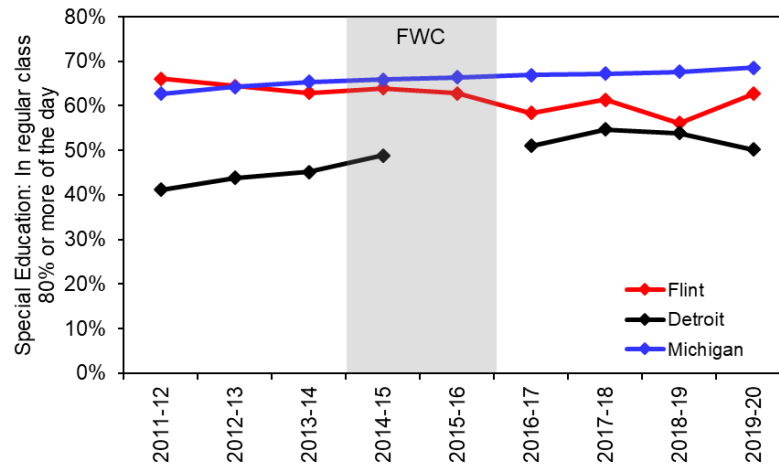


Fig. S7. Special education students spending time in general education classes 80% or more each day. State target: ≥ 63 -64.25%.

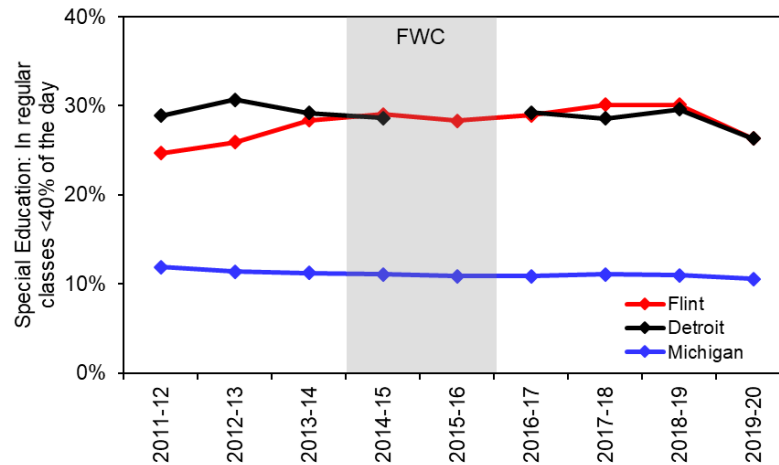


Fig. S8. Special education students spending time in general education classes less than 40% of the day. State target: ≤ 11.4 -11.9%.

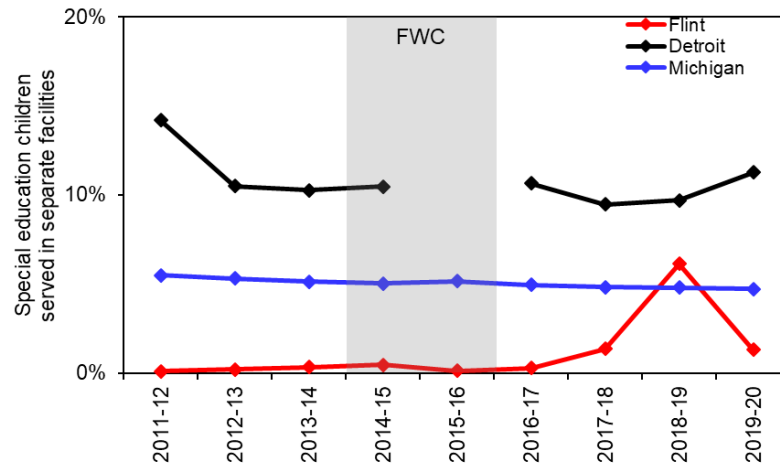


Fig. S9. Special education students being served in separate facilities. State target: $\leq 4.8-5.5\%$. Flint met this target for all years except 2018-19.

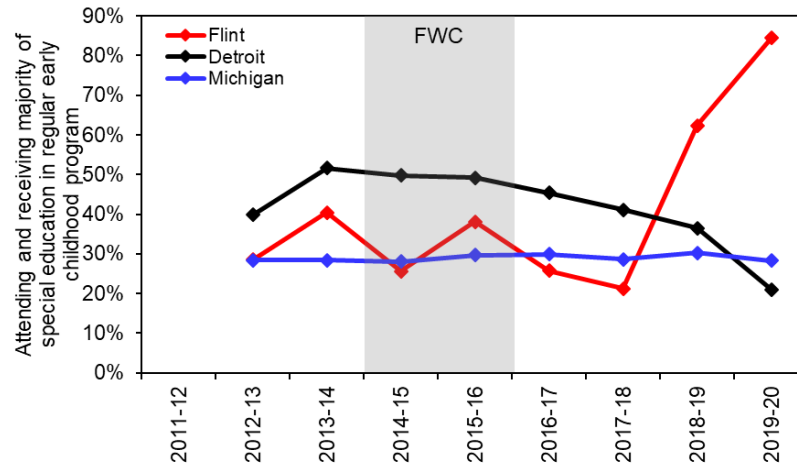


Fig. S10. Preschool Educational Environment: % age 3-5 receiving majority of services in a regular early childhood program. State target: ≥ 28.2 -28.8%.

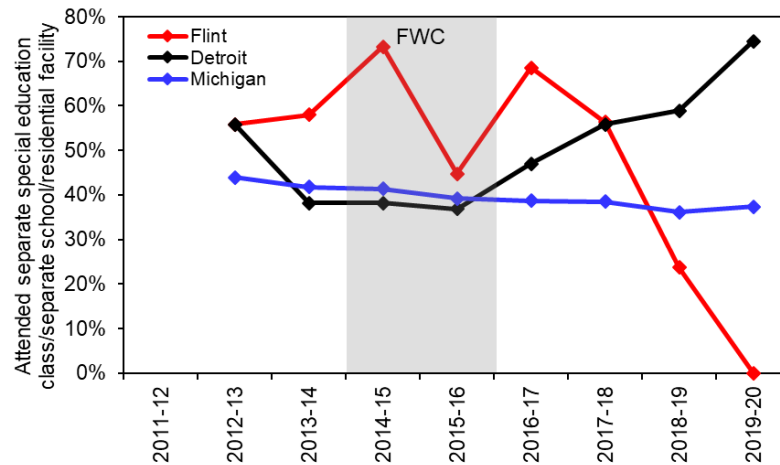


Fig. S11. Preschool Educational Environment: % age 3-5 with an IEP in a separate special education class, separate school or residential facility. State target: $\leq 41-43.2\%$.

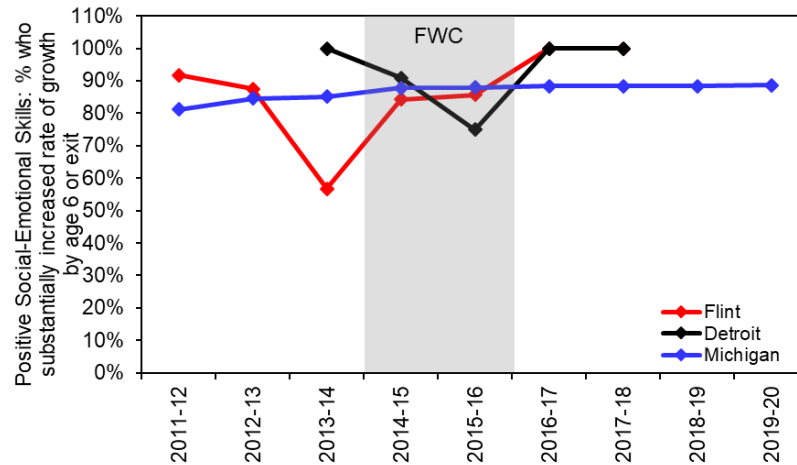


Fig. S12. Positive Social-Emotional Skills (incl. social relationships): Of those who entered or exited below age expectations, % who substantially increased rate of growth by age 6 or exit. State target $\geq 86-88\%$.

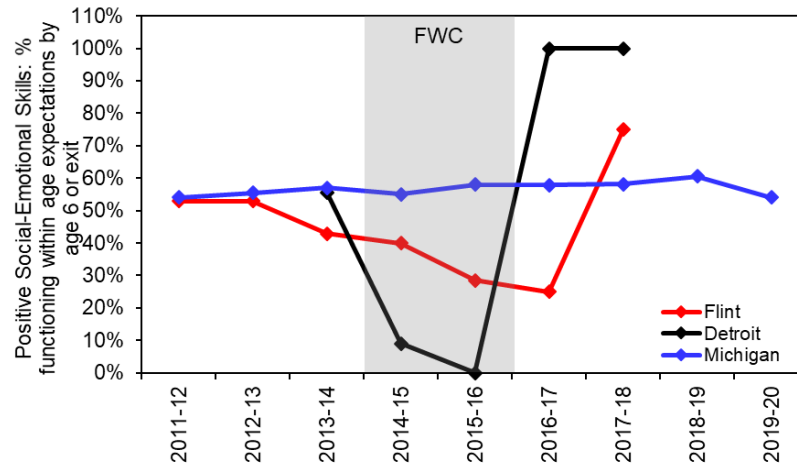


Fig. S13. Positive Social-Emotional Skills (including social relationships): % functioning within age expectations by age 6 or exit. State target: ≥ 54.9 -61%.

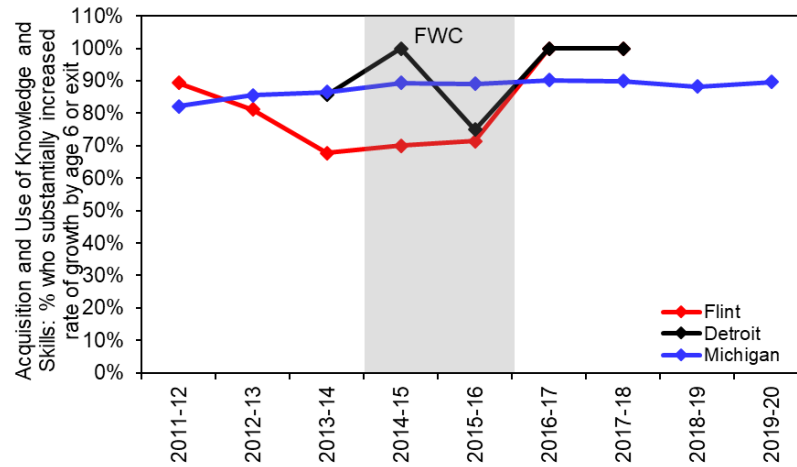


Fig. S14. Acquisition and Use of Knowledge and Skills: % who substantially increased rate of growth by age 6 or exit. State target: >87-89%.

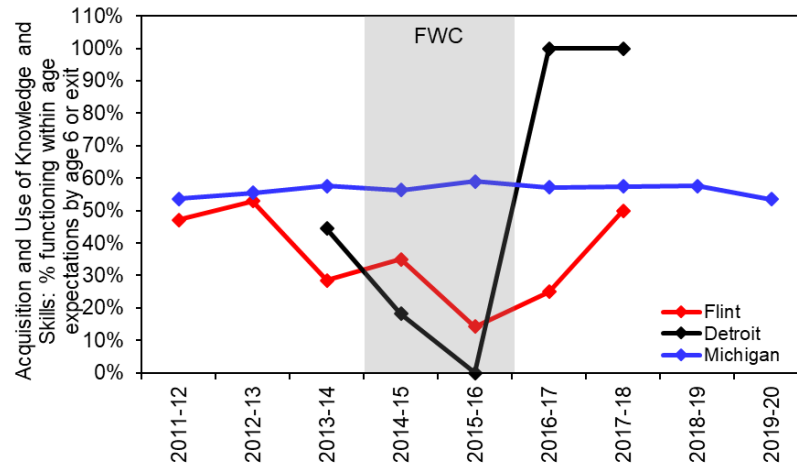


Fig. S15. Acquisition and Use of Knowledge and Skills: % functioning within age expectations by age 6 or exit. State target: $\geq 56-59\%$.

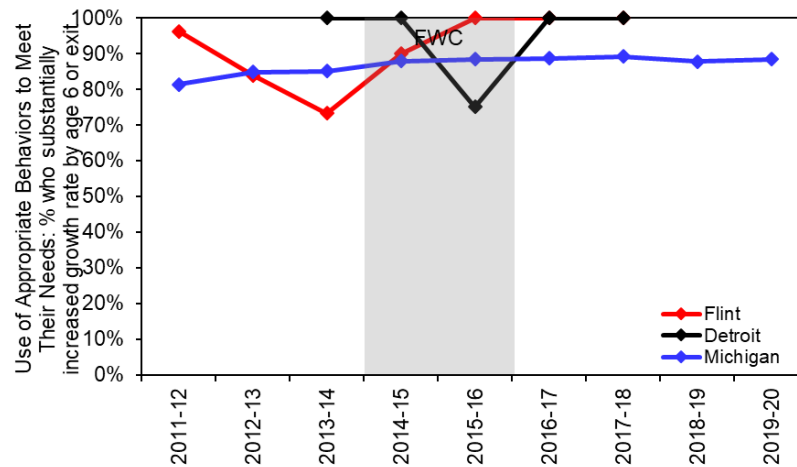


Fig. S16. Use of Appropriate Behaviors to Meet Their Needs: % who substantially increased rate of growth by age 6 or exit. State target: $\geq 86-89\%$.

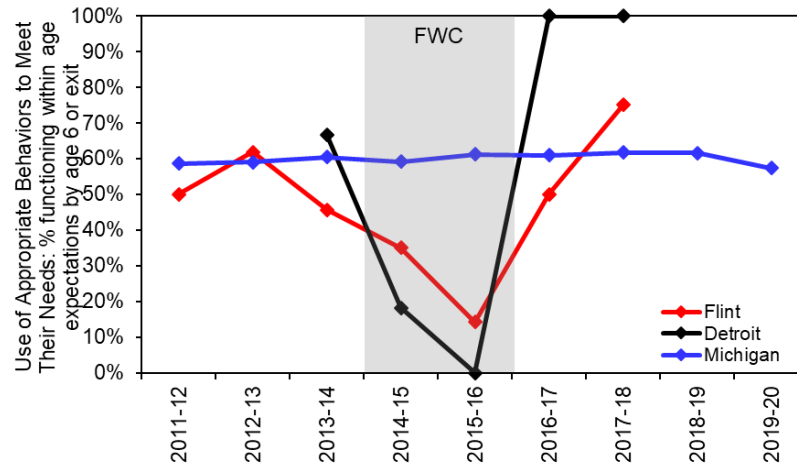


Fig. S17. Use of Appropriate Behaviors to Meet Their Needs: % functioning within age expectations by age 6 or exit. State target: >59.1-73%.

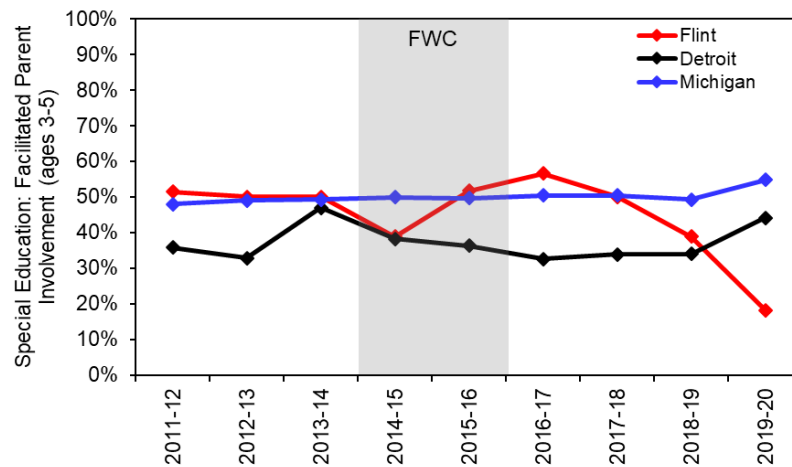


Fig. S18. Facilitated Parent Involvement for ages 3-5. State target: ≥ 35.5 -47.5%.

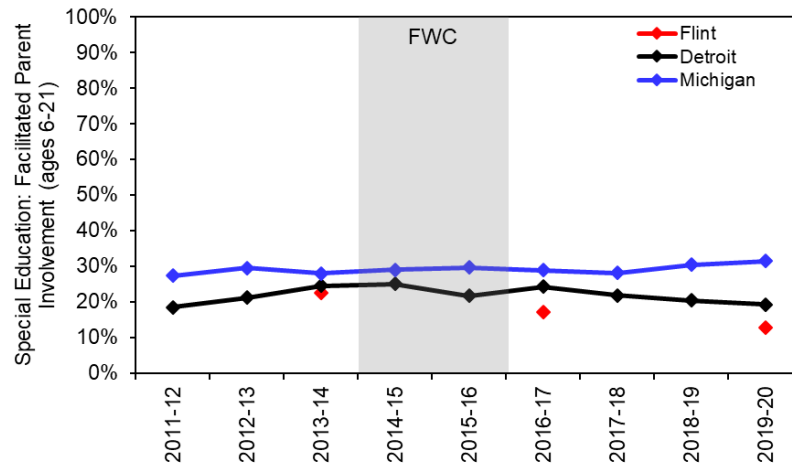


Fig. S19. Facilitated Parent Involvement for ages 6-21. State target: $\geq 22-26.8\%$.

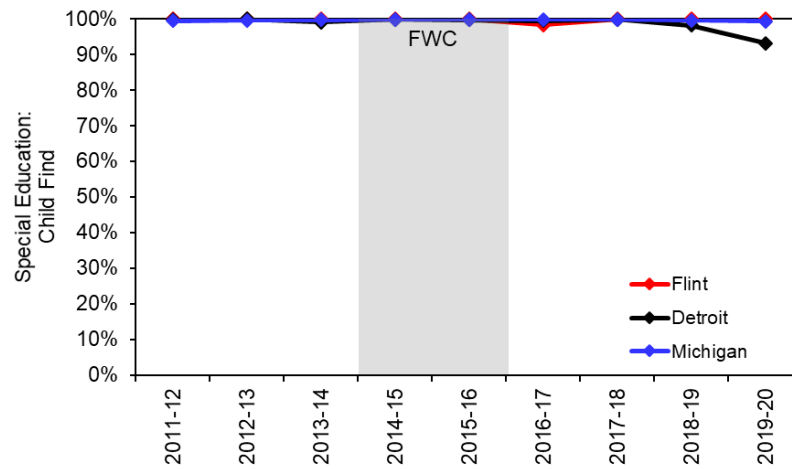


Fig. S20. Child Find. State target: 100%.

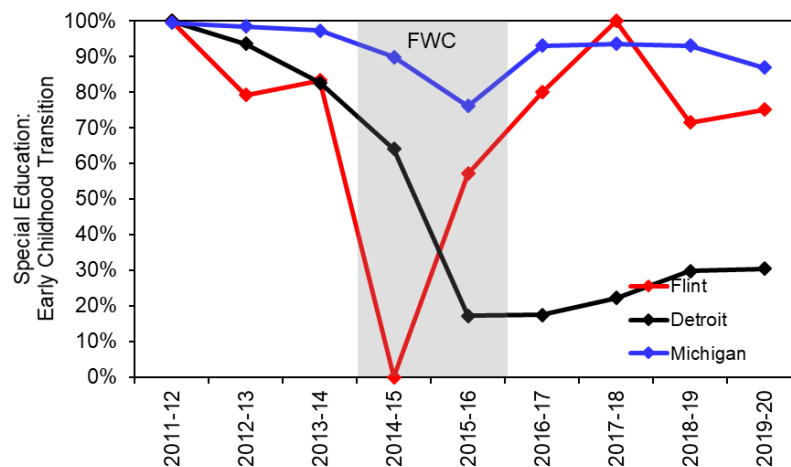


Fig. S21. Early Childhood Transition. State target: 100%.

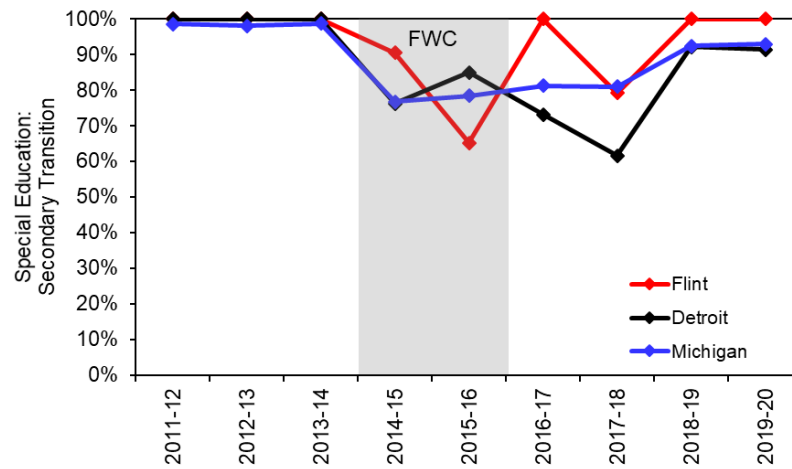


Fig. S22. Secondary Transition. State target: 100%.

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