



The impact of Universal Free School Meal schemes on children's bodyweight outcomes

Angus Holford and Birgitta Rabe – University of Essex

NIHR ARC Inequalities and Prevention Symposium

The Railway Museum, York, 17th November 2022





Background

- ❑ Child overweight and obesity is a serious and growing worldwide public health problem. In England in 2020/21:
 - 27.7 % children overweight or obese at age 4/5 [up from 23.0 in 2019/20]
 - 40.9% aged 10/11 overweight or obese [up from 25.2 in 2019/20]
- ❑ Children consume a large fraction of their food energy at school
- ❑ School meal provision an obvious policy lever to increase rates of healthy weight among children



School food policy (England)

- ❑ Universal **Infant** Free School Meal (UIFSM) Policy introduced from Sep 2014
 - ❑ All Reception, Year 1, Year 2 entitled to free school lunch every day in term-time.
 - ❑ Funded by Department for Education. Proposed to be cut for 2020 Spending Review, but not implemented.
 - ❑ Politically live: Removing, retaining, extending UIFSM by age, or extending means-tested entitlement to higher income groups are all possible within next electoral cycle.
- ❑ Means-tested Free School Meals for school years 3+
 - ❑ Free School Meal (FSM) available to eligible pupils whose parents receive qualifying benefits (~18%)
 - ❑ All other children can purchase same meal at cost (about £2.30).
- ❑ Children not taking a school meal must bring a packed lunch.



School food policy (England)

- ❑ Since 2008: School Food Standards, meaning high nutritional standards and limits on portion sizes.
 - ❑ Budget for (UI)FSM has not increased in line with inflation – quality may be squeezed.
 - ❑ But definitely more nutritious, appropriate, than packed lunches on average. (Parnham et al 2022a, 2022b, Evans et al., 2020)



Previous findings

- ❑ Holford and Rabe, 2022, Journal of Public Economics Plus:
<https://doi.org/10.1016/j.pubecp.2022.100016> .
- ❑ UIFSM increases healthy weight prevalence (1%pt) and reduces obesity (0.7%pt) and BMI (5% s.d.) among Reception children
 - ❑ Short term effects, can say little about persistence, long-term effects, impacts on older children

LA UFSM schemes

Duration of continuous exposure to UFSM at end of Year 6

Year-ending:	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
England													
Newham													
Islington													
Southwark													
Tower Hamlets													
Key													
Year 6 students currently receiving UFSM and have received for													
Year 6 students previously received UFSM													

- ❑ This project: fill gaps in evidence from other, Local Authority-run, UFSM schemes, in four London Boroughs (Newham, Islington, Southwark, Tower Hamlets).
- ❑ Rollout across year-groups at different times creates variation in **cumulative duration of exposure** when outcomes are measured in Year 6.



Bodyweight outcomes: Data

- **Bodyweight outcomes:** National Child Measurement Programme (school-level).
 - From annual nurse visits to schools to measure Reception and Year 6 children.
 - Provided by NHS Digital
 - ‘Small number suppressed dataset’ with a limited control variable set.
 - Timing of measurement, prop. Black ethnicity and girls, quintiles of school FSM registration and deprivation.



Outcome variables

Unweighted descriptive statistics on pre-treated period (2007-2009)

Thresholds/BMI z-score defined with respect to age- and sex-adjusted UK 1990 growth tables

		Reception		Year 6	
	<i>1990 ref</i>	Treated	Never-treated	Treated	Never-treated
Overweight or obese, %	<i>15.0</i>	25.9***	22.8	39.5***	32.2
<i>N school-years</i>		<i>693</i>	<i>39,610</i>	<i>695</i>	<i>36,853</i>
Obese, %	<i>5.0</i>	13.9***	9.7	24.9***	17.9
<i>N school-years</i>		<i>691</i>	<i>39,134</i>	<i>695</i>	<i>36,766</i>
Mean BMI z-score	<i>0.0</i>	0.370	0.354	0.648***	0.471
<i>N school-years</i>		<i>693</i>	<i>39,612</i>	<i>695</i>	<i>36,856</i>

Note: *, **, ***, Treated mean/proportion significantly different from never-treated at 10%, 5%, 1% levels

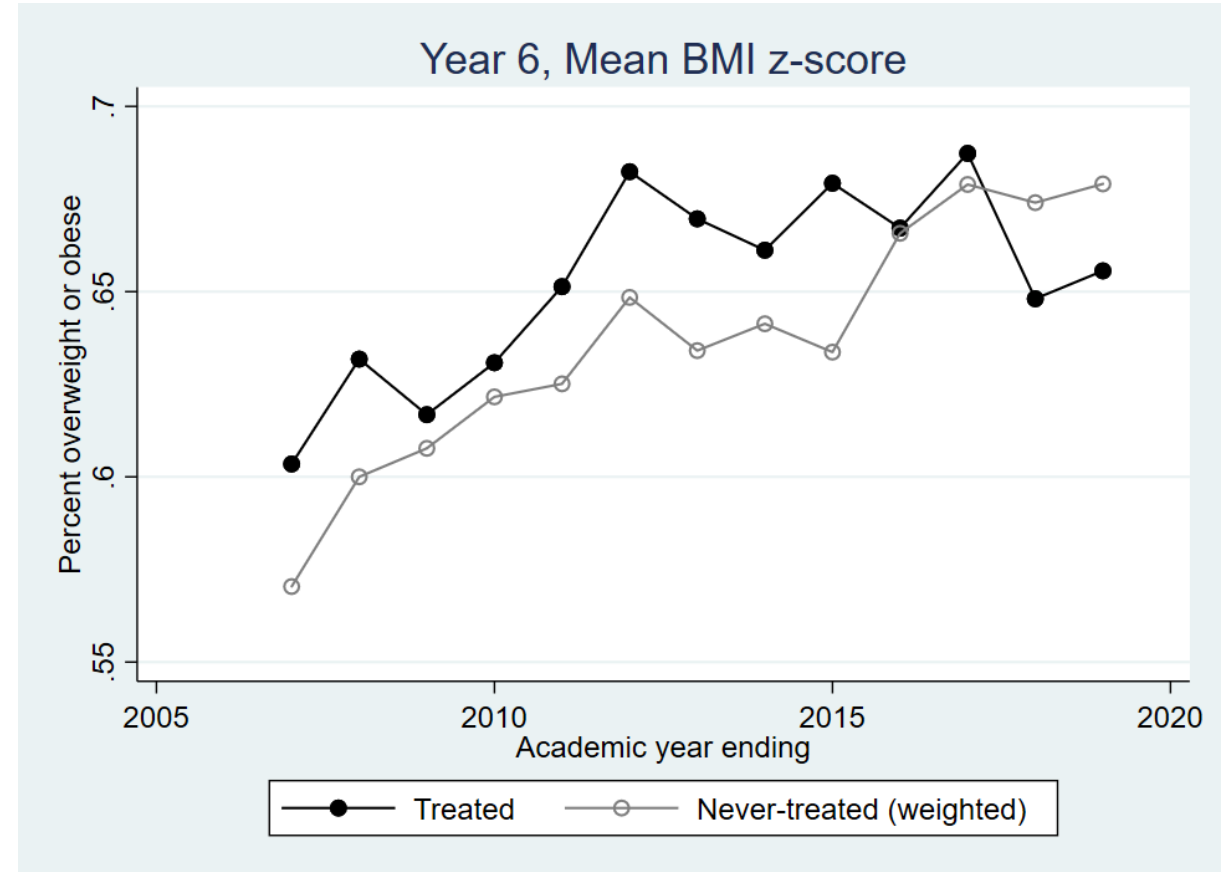
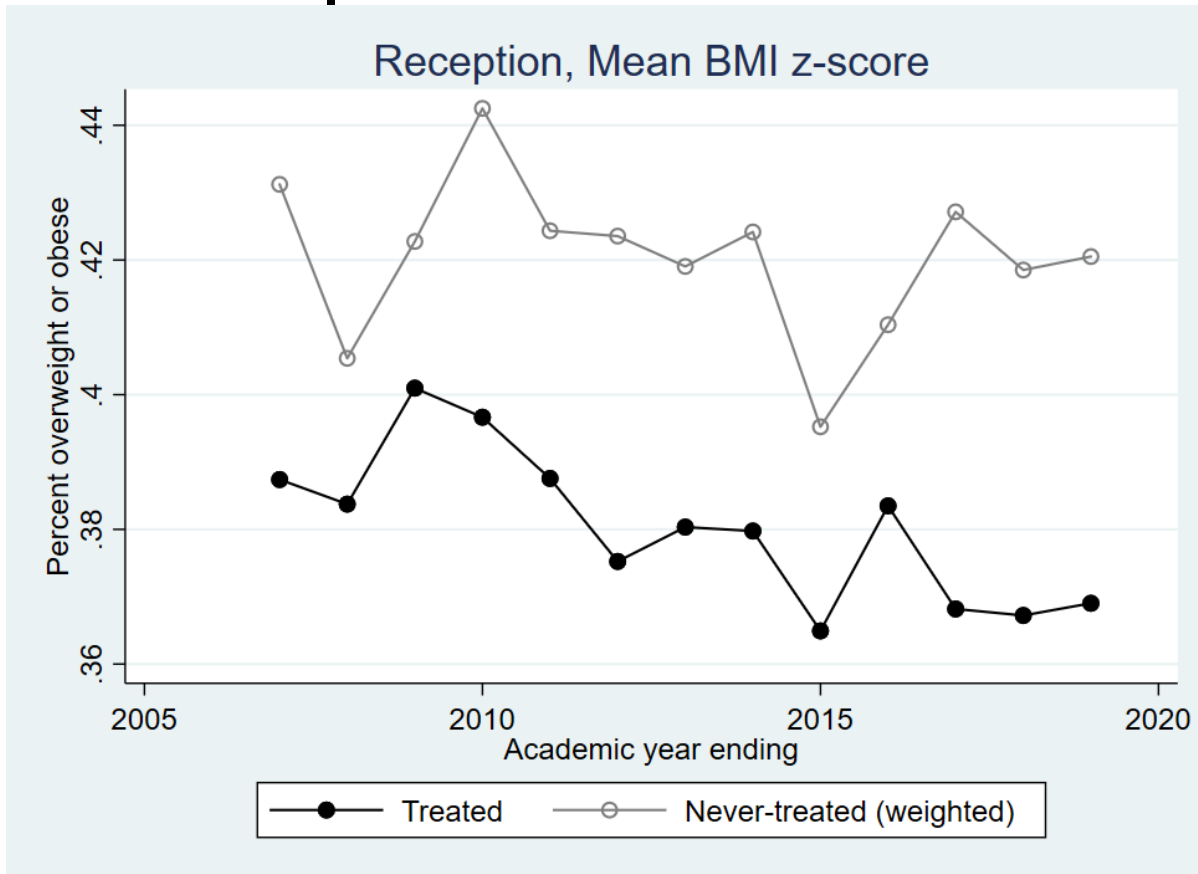


Bodyweight outcomes: Methods

- ❑ Based on **difference-in-difference method**.
 - ❑ Key assumption: Change in bodyweight outcomes in (a set of) never-treated areas is a good **guide to what would have happened** in the treated areas, if UFSM had never been introduced.
 - ❑ “Parallel trends”
- ❑ Control group = all never-treated schools.
 - ❑ Inverse Propensity Weighting applied.
 - ❑ Schools more similar to those in treated areas (based on 2007-2009 characteristics) get given a higher weight.

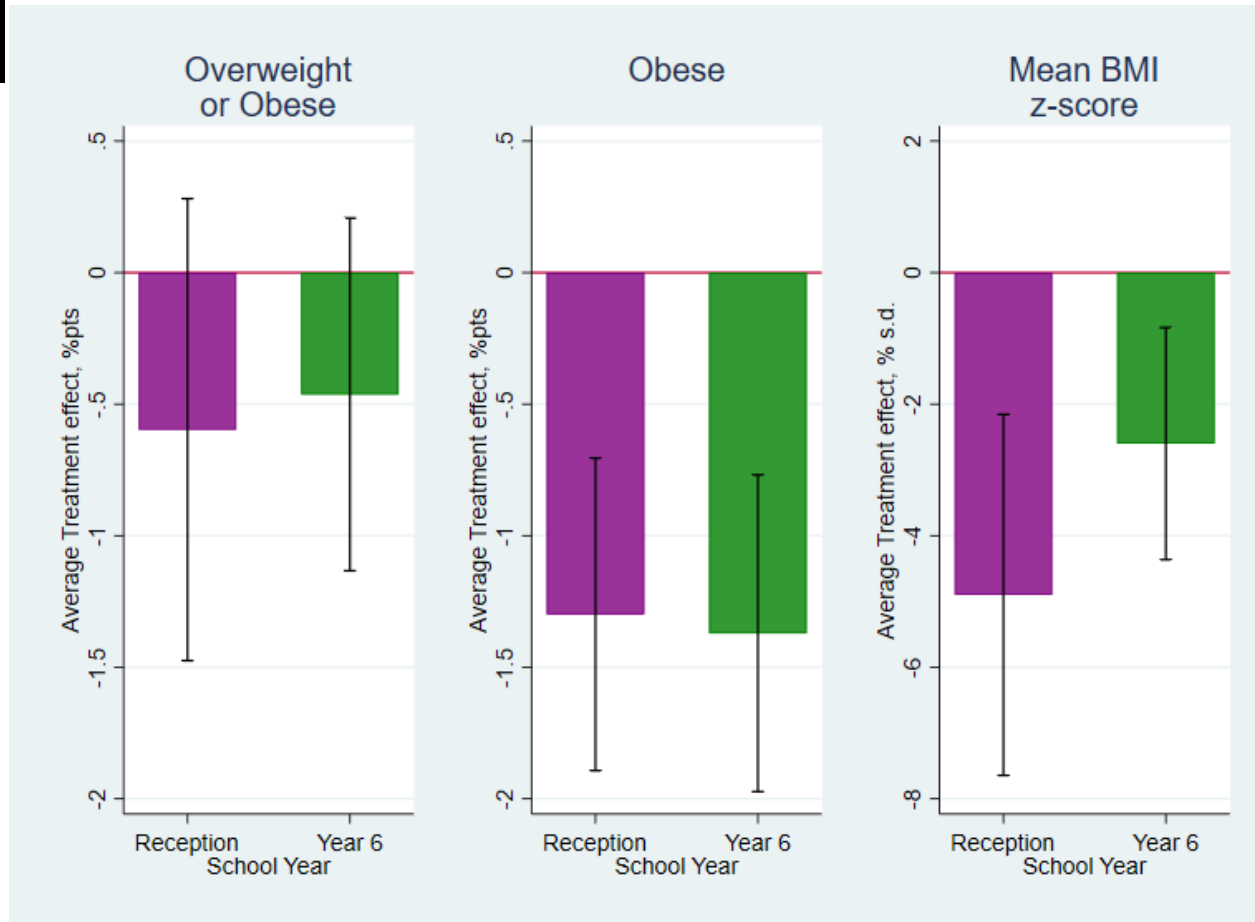
Bodyweight outcomes: Raw data

Schools in treated Local Authorities, and those in non-treated Local Authorities with non-missing propensity score. Vertical lines represent timing of introduction for Reception children in first and last treated local authorities



- Not obvious that gaps have widened or narrowed over this period, but looking at the raw data does not account for changes in timing of measurement or demographic characteristics.

Average Treatment effects on the Treated



UFSM makes children's bodyweights healthier:

- Reduces obesity by 1.3 percentage points in both Reception and Year 6.
- Proportionally larger effect for Reception (baseline prevalence 14% v. 25%).
- Significant effect on average BMI is larger in absolute terms for Reception.

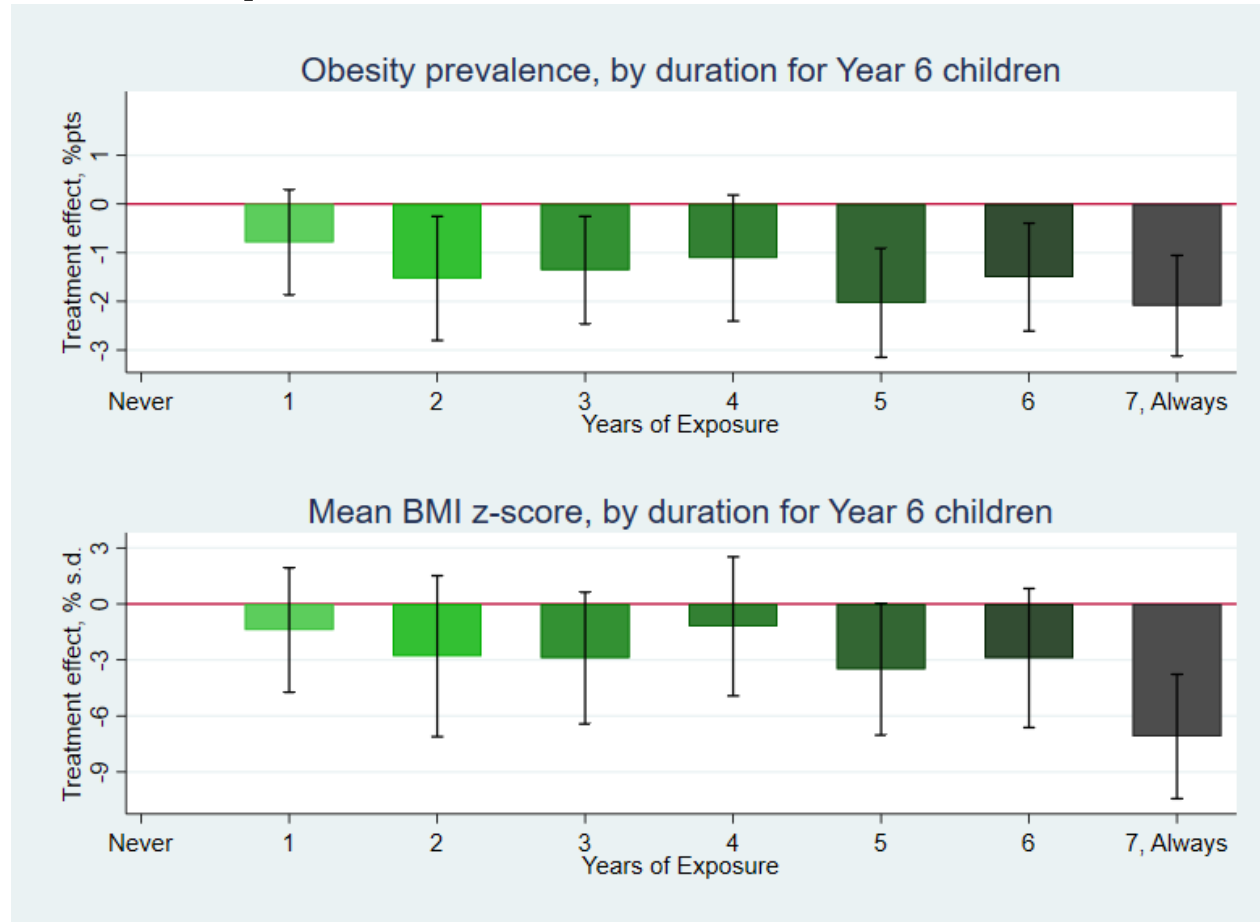
Note: Source: National Child Measurement Programme, Borusyak, Jaravel & Spiess imputation method applied separately to each distinct population. Reception analysis excludes academic years-ending 2015 onwards due to national UFSM. Capped bars indicate 95% confidence intervals. N = 76,283 Reception school-years in underlying regression, 679 treated school-years. N= 113,587 Year 7 school-years in underlying regression, N=1695 treated school-years.

Treatment Effects for Year 6 children by duration of exposure

Effects imprecise, so not statistically different from each other. But:

- Treatment effect is very small for those receiving UFSM for the first time in Year 6: Bodyweights of Year 6 children are much harder to shift in a short time period than Reception children.
- Largest effect is for children always exposed to UFSM

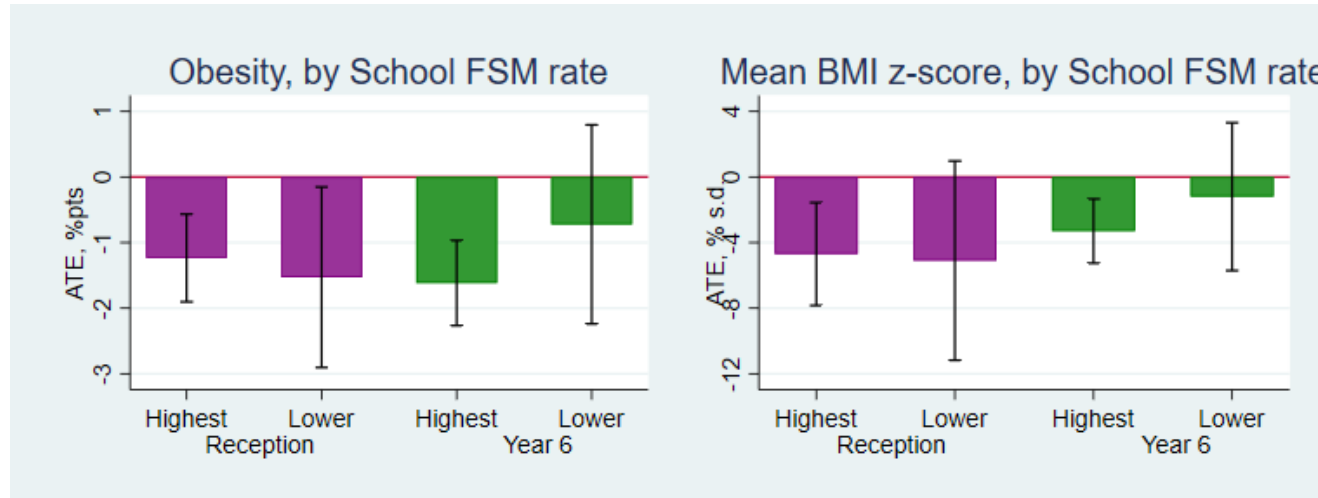
So: Best if provided from the beginning, throughout primary school



Note: Source: National Child Measurement Programme. Pooled school-and-year fixed-effect regression with separate treatment indicators for each duration of exposure. Capped bars indicate 95% confidence intervals. N = 115,325 (obesity) and 115,444 (BMI z-score)school-years

Treatment Effects by pre-existing school characteristics

Highest FSM registration quintile in 2009 v. all lower quintiles



Effects similar or bigger in the 'poorest' schools.

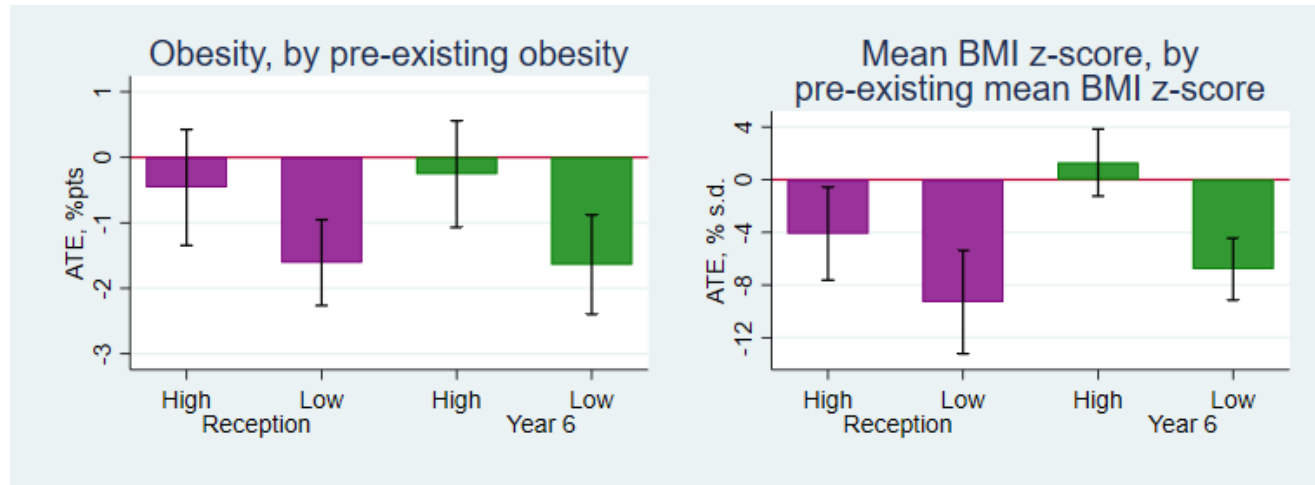
- Despite these having fewest children newly entitled to a free lunch.
- Points to benefits of universalism in settings with high deprivation / means-tested eligibility.

Note: Source: National Child Measurement Programme, Borusyak, Jaravel & Spiess imputation method applied separately to each distinct population. Reception analysis excludes academic years ending 2015 onwards due to national UIFSM. Populations: Reception: Highest FSM, 20,554 underlying, 532 treated. Lower FSM, 56,262 underlying, 146 treated. Year 6: Highest FSM, 30,840 underlying, 1,372 treated. Lower FSM, 82,743 underlying, 310 treated.

Treatment Effects by pre-existing school characteristics

Above treatment-area median obesity/BMI in 2007-2009 v. below median.

Effects smaller in schools with high pre-existing obesity/ BMI



- Obesogenic environment (re. exercise, food availability) makes bodyweights harder to shift?

Note: Source: National Child Measurement Programme, Borusyak, Jaravel & Spiess imputation method applied separately to each distinct population. Reception analysis excludes academic years ending 2015 onwards due to national UIFSM. Populations: Reception: High obesity, 15,516 underlying, 342 treated. Low obesity, 59,235 underlying, 333 treated. High BMI, 40,933 underlying, 356 treated. Low BMI, 36,275 underlying, 321 treated. High obesity, 15,686 underlying, 826 treated. Low obesity, 92,933 underlying, 869 treated. High BMI, 23,345 underlying, 839 treated. Low BMI, 89,605 underlying, 856 treated.



Conclusion

- ❑ UFSM has made significant contribution in stemming rise in children's obesity prevalence.
 - ❑ Based on schemes introduced in relatively deprived and high ethnic-minority urban areas.
 - ❑ Effects biggest if provided throughout primary school.
 - ❑ Effects smallest in schools with high pre-existing obesity, where additional support will be needed.
- ❑ Results and methodology in our Explainer:
 - ❑ <https://doi.org/10.5526/misoc-2022-003>



Angus Holford – ajholf@essex.ac.uk

Tweet @AngusHolford

Birgitta Rabe – brabe@essex.ac.uk

The paper uses data from the National Child Measurement Programme, supplied by NHS Digital, also known as the Health and Social Care Information Centre.

It also uses data from the Department for Education's National Pupil Database, provided through the ONS Secure Research Service.



The use of the ONS or NHS Digital statistical data in this work does not imply the endorsement or quality assurance of the ONS or NHS Digital in relation to the interpretation or analysis of the statistical data. Research datasets may not exactly reproduce National Statistics aggregates.





Angus Holford –
ajholf@essex.ac.uk
Tweet @AngusHolford

Birgitta Rabe – brabe@essex.ac.uk



The Nuffield Foundation has funded this project, but the views expressed are those of the authors and not necessarily those of the Foundation. More information is available at www.nuffieldfoundation.org

Additional support from:

