

## Reducing class size

Low impact for very high cost based on very limited evidence

Reducing class size is an approach to managing the ratio between pupils and teachers

### Implementation cost



### Evidence strength



### Impact (months)



### Subject breakdown

reading: 32  
science: 1  
toolkit: 41

### School phase breakdown

primary: 30  
secondary: 11  
toolkit: 41

## Technical Appendix

The criteria used to judge the inclusion of studies in the Toolkit are:

- The population sampled involved early years and school age learners from 3-18 learning in their first language.
- The intervention or approach being tested was educational in nature, including named or clearly defined programmes and recognisable approaches classifiable according to the Toolkit strand definitions (e.g. peer tutoring or small group teaching). The intervention or approach is undertaken in a normal educational setting or environment for the learners involved, such as a nursery or school or a typical setting (e.g. an outdoor field centre or museum).
- A valid comparison was made between those receiving the educational intervention or approach and those not receiving it.
- Outcomes include the assessment of educational or cognitive achievement which reports quantitative results from testing of attainment or learning outcomes, such as by standardised tests or other appropriate curriculum assessments or school examinations or appropriate cognitive measures.
- The study design provided a quantitative estimate of the impact of the intervention or approach on the educational attainment of the sample, calculated or estimated in the form of an effect size (standardised mean difference) based on a counterfactual comparison.

Standardised mean differences and confidence intervals for the most appropriate estimates of the impact of the intervention or approach for the Toolkit were extracted from each included study, along with other study variables. These effect sizes were further synthesised into a single pooled effect using a random effects meta-analysis adopting a restricted maximum likelihood (REML) estimation methods. For the full details of the methodology see the [Protocol and Analysis Plan \(https://educationendowmentfoundation.org.uk/public/files/Toolkit/EEF\\_Evidence\\_Database\\_Protocol\\_and\\_Analysis\\_Plan\\_June2019.pdf\)](https://educationendowmentfoundation.org.uk/public/files/Toolkit/EEF_Evidence_Database_Protocol_and_Analysis_Plan_June2019.pdf).

## References (41)

The forest plot below is a graphical representation of the results of all included studies in this Toolkit strand. It shows the effect size and confidence interval of each study, and whether the particular intervention in that study was more or less effective than standard practice or other alternative interventions that the study looked at.

Studies that show an effect size result on the right-hand side of the red vertical red indicate that the particular intervention studied was more effective than standard practice. Studies that show an effect size on the left-hand side of the red vertical indicate that the particular intervention studied was less effective than standard practice.

Author	Title	Effect Size	Effect Size (Graph)
Wasson (1929) 1_1	A controlled experiment in the size of classes ( <i>A controlled experiment in the size of classes</i> )	<b>Effect Size:</b> 0.656 <b>LCI:</b> 0.127 <b>UCI:</b> 1.185 <b>Weight:</b> 1.174 <b>Standard error:</b> 0.27	
Davis (1930)	A study of class size in junior high school history ( <i>The School Review</i> )	<b>Effect Size:</b> 0.512 <b>LCI:</b> 0.175 <b>UCI:</b> 0.849 <b>Weight:</b> 1.932 <b>Standard error:</b> 0.172	
Butler (1989)	Differences in achievement for first and second graders associated with reduction in class size ( <i>18th Mid-south Educational Research Association A Conference</i> )	<b>Effect Size:</b> 0.51 <b>LCI:</b> 0.401 <b>UCI:</b> 0.619 <b>Weight:</b> 3.195 <b>Standard error:</b> 0.056	
Wilsberg (1968)	The reduction of pupil-teacher ratios in grades 1 and 2 and the provision of additional materials: A program to strengthen early childhood education in poverty schools ( <i>New York: Center for Urban Education</i> )	<b>Effect Size:</b> 0.475 <b>LCI:</b> 0.369 <b>UCI:</b> 0.58 <b>Weight:</b> 3.209 <b>Standard error:</b> 0.054	
Wilsberg (1968)	The Reduction of Pupil-Teacher Ratios in Grades 1 and 2 ( <i>NA</i> )	<b>Effect Size:</b> 0.475 <b>LCI:</b> 0.369 <b>UCI:</b> 0.58 <b>Weight:</b> 3.209 <b>Standard error:</b> 0.054	
Scudder (2002) 1_2	An evaluation of the federal class size reduction program in Wake County, North Carolina ( <i>Paper presented at the annual meeting of the American Educational Research Association</i> )	<b>Effect Size:</b> 0.469 <b>LCI:</b> 0.361 <b>UCI:</b> 0.577 <b>Weight:</b> 3.199 <b>Standard error:</b> 0.055	

Author	Title	Effect Size	Effect Size (Graph)
Wagner (1981)	The effects of reduced class size upon the acquisition of reading skills in grade two (NA)	<b>Effect Size:</b> 0.385 <b>LCI:</b> 0.011 <b>UCI:</b> 0.759 <b>Weight:</b> 1.753 <b>Standard error:</b> 0.191	
Boozer (2001)	Intraschool variation in class size: Patterns and implications ( <i>Journal of Urban Economics</i> )	<b>Effect Size:</b> 0.374 <b>LCI:</b> 0.17 <b>UCI:</b> 0.579 <b>Weight:</b> 2.679 <b>Standard error:</b> 0.104	
Wasson (1929) 1_2	A controlled experiment in the size of classes ( <i>A controlled experiment in the size of classes</i> )	<b>Effect Size:</b> 0.347 <b>LCI:</b> -0.187 <b>UCI:</b> 0.882 <b>Weight:</b> 1.158 <b>Standard error:</b> 0.273	
Frymier (1964)	The effect of class size upon reading achievement in first grade ( <i>The Reading Teacher</i> )	<b>Effect Size:</b> 0.329 <b>LCI:</b> 0.136 <b>UCI:</b> 0.522 <b>Weight:</b> 2.748 <b>Standard error:</b> 0.098	
Scudder (2002) 1_1	An evaluation of the federal class size reduction program in Wake County, North Carolina ( <i>Paper presented at the annual meeting of the American Educational Research Association</i> )	<b>Effect Size:</b> 0.327 <b>LCI:</b> 0.086 <b>UCI:</b> 0.569 <b>Weight:</b> 2.46 <b>Standard error:</b> 0.123	
Averill (1925)	Size Of Class and Reading Efficiency ( <i>The Elementary School Journal</i> )	<b>Effect Size:</b> 0.308 <b>LCI:</b> -0.13 <b>UCI:</b> 0.746 <b>Weight:</b> 1.481 <b>Standard error:</b> 0.224	
Doss (1982) 1_1	A Cause for National Pause: Title I Schoolwide Projects (NA)	<b>Effect Size:</b> 0.289 <b>LCI:</b> 0.072 <b>UCI:</b> 0.507 <b>Weight:</b> 2.6 <b>Standard error:</b> 0.111	
Haenn (2002) 1_1	Class size and student success: Comparing the results of five elementary schools using small class sizes ( <i>Paper presented at the annual meeting of the American Educational Research Association</i> )	<b>Effect Size:</b> 0.273 <b>LCI:</b> 0.027 <b>UCI:</b> 0.519 <b>Weight:</b> 2.433 <b>Standard error:</b> 0.126	
Anderson (1963)	A report of an experiment at Camelback High School ( <i>The Mathematics Teacher</i> )	<b>Effect Size:</b> 0.269 <b>LCI:</b> -0.151 <b>UCI:</b> 0.689 <b>Weight:</b> 1.554 <b>Standard error:</b> 0.214	

Author	Title	Effect Size	Effect Size (Graph)
Spitzer (1954)	Class size and pupil achievement in elementary schools ( <i>Elementary School Journal</i> )	<b>Effect Size:</b> 0.216 <b>LCI:</b> 0.126 <b>UCI:</b> 0.306 <b>Weight:</b> 3.272 <b>Standard error:</b> 0.046	
Doss (1982) 1_4	A Cause for National Pause: Title I Schoolwide Projects ( <i>NA</i> )	<b>Effect Size:</b> 0.211 <b>LCI:</b> 0.065 <b>UCI:</b> 0.357 <b>Weight:</b> 3.011 <b>Standard error:</b> 0.074	
Word (1990)	The state of Tennessee's student/teacher achievement ratio (STAR) project. Technical report 1985-90 ( <i>NA</i> )	<b>Effect Size:</b> 0.21 <b>LCI:</b> 0.05 <b>UCI:</b> 0.37 <b>Weight:</b> 2.938 <b>Standard error:</b> 0.081	
Doss (1982) 1_2	A Cause for National Pause: Title I Schoolwide Projects ( <i>NA</i> )	<b>Effect Size:</b> 0.192 <b>LCI:</b> 0.097 <b>UCI:</b> 0.287 <b>Weight:</b> 3.255 <b>Standard error:</b> 0.048	
Duflo (2012)	School governance, teacher incentives, and pupil-teacher ratios: Experimental evidence from Kenyan primary schools (Working Paper 17939) ( <i>NA</i> )	<b>Effect Size:</b> 0.166 <b>LCI:</b> -0.05 <b>UCI:</b> 0.382 <b>Weight:</b> 2.613 <b>Standard error:</b> 0.11	
Cook (1970)	Class size and teacher aides as factors in the achievement of the educable low attainers. ( <i>NA</i> )	<b>Effect Size:</b> 0.166 <b>LCI:</b> -0.046 <b>UCI:</b> 0.377 <b>Weight:</b> 2.639 <b>Standard error:</b> 0.108	
Monlar (1999)	Evaluating the SAGE program: A pilot program in targeted pupil-teacher reduction in Wisconsin ( <i>Educational Evaluation and Policy Analysis</i> )	<b>Effect Size:</b> 0.16 <b>LCI:</b> 0.101 <b>UCI:</b> 0.218 <b>Weight:</b> 3.376 <b>Standard error:</b> 0.03	
Haenn (2002) 1_3	Class size and student success: Comparing the results of five elementary schools using small class sizes ( <i>Paper presented at the annual meeting of the American Educational Research Association</i> )	<b>Effect Size:</b> 0.125 <b>LCI:</b> -0.135 <b>UCI:</b> 0.384 <b>Weight:</b> 2.353 <b>Standard error:</b> 0.133	
Doss (1982) 1_3	A Cause for National Pause: Title I Schoolwide Projects ( <i>NA</i> )	<b>Effect Size:</b> 0.114 <b>LCI:</b> -0.031 <b>UCI:</b> 0.259 <b>Weight:</b> 3.017 <b>Standard error:</b> 0.074	

Author	Title	Effect Size	Effect Size (Graph)
Doss (1982) 1_5	A Cause for National Pause: Title I Schoolwide Projects (NA)	<b>Effect Size:</b> 0.085 <b>LCI:</b> -0.027 <b>UCI:</b> 0.197 <b>Weight:</b> 3.182 <b>Standard error:</b> 0.057	
Haenn (2002) 1_5	Class size and student success: Comparing the results of five elementary schools using small class sizes (Paper presented at the annual meeting of the American Educational Research Association)	<b>Effect Size:</b> 0.082 <b>LCI:</b> -0.178 <b>UCI:</b> 0.342 <b>Weight:</b> 2.354 <b>Standard error:</b> 0.132	
Thomas (1969) 1_2	The effect of class size on the development of several abilities involved in critical thinking (NA)	<b>Effect Size:</b> 0.061 <b>LCI:</b> -0.397 <b>UCI:</b> 0.518 <b>Weight:</b> 1.408 <b>Standard error:</b> 0.234	
Johnson (1967)	Class size and achievement gains in seventh and eighth grade English and Mathematics (The School Review)	<b>Effect Size:</b> 0.055 <b>LCI:</b> -0.01 <b>UCI:</b> 0.12 <b>Weight:</b> 3.359 <b>Standard error:</b> 0.033	
Cram (1968)	An investigation of the influence of class size upon academic attainment and student satisfaction. (NA)	<b>Effect Size:</b> 0.047 <b>LCI:</b> -0.427 <b>UCI:</b> 0.521 <b>Weight:</b> 1.35 <b>Standard error:</b> 0.242	
Smith (1974) RedC	Effects of class size and individualized instruction on the writing of high school juniors (NA)	<b>Effect Size:</b> 0.043 <b>LCI:</b> -0.241 <b>UCI:</b> 0.326 <b>Weight:</b> 2.219 <b>Standard error:</b> 0.145	
Wright (1977) 1_3	Effects of Class Size in the Junior Grades (NA)	<b>Effect Size:</b> 0.037 <b>LCI:</b> -0.186 <b>UCI:</b> 0.26 <b>Weight:</b> 2.569 <b>Standard error:</b> 0.114	
Shapson (1980)	An experimental study of the effects of class size (American Education Research)	<b>Effect Size:</b> 0.031 <b>LCI:</b> -0.12 <b>UCI:</b> 0.182 <b>Weight:</b> 2.985 <b>Standard error:</b> 0.077	
Haenn (2002) 1_2	Class size and student success: Comparing the results of five elementary schools using small class sizes (Paper presented at the annual meeting of the American Educational Research Association)	<b>Effect Size:</b> 0.016 <b>LCI:</b> -0.19 <b>UCI:</b> 0.223 <b>Weight:</b> 2.666 <b>Standard error:</b> 0.105	

Author	Title	Effect Size	Effect Size (Graph)
Wright (1977) 1_2	Effects of Class Size in the Junior Grades (NA)	<b>Effect Size:</b> 0.004 <b>LCI:</b> -0.227 <b>UCI:</b> 0.236 <b>Weight:</b> 2.52 <b>Standard error:</b> 0.118	
Haskell (1964)	Some observations on the effects of class size upon pupil achievement in geometrical drawing ( <i>Journal of Educational Research</i> )	<b>Effect Size:</b> -0.054 <b>LCI:</b> -0.467 <b>UCI:</b> 0.359 <b>Weight:</b> 1.582 <b>Standard error:</b> 0.211	
Milesi (2006)	Effects of Class Size and Instruction on Kindergarten Achievement ( <i>Educational Evaluation and Policy Analysis</i> )	<b>Effect Size:</b> -0.102 <b>LCI:</b> -0.584 <b>UCI:</b> 0.38 <b>Weight:</b> 1.322 <b>Standard error:</b> 0.246	
Davis (2000)	The effect of class size reduction on student achievement and teacher attitude in first grade (NA)	<b>Effect Size:</b> -0.106 <b>LCI:</b> -0.29 <b>UCI:</b> 0.078 <b>Weight:</b> 2.797 <b>Standard error:</b> 0.094	
Mazareas (1981)	Effects of class size on the achievement of first grade pupils (NA)	<b>Effect Size:</b> -0.124 <b>LCI:</b> -0.617 <b>UCI:</b> 0.37 <b>Weight:</b> 1.284 <b>Standard error:</b> 0.252	
Peake (2001)	The effect of class size: A study of second and third grade student achievement in the school district of Greenville county, South Carolina. (NA)	<b>Effect Size:</b> -0.251 <b>LCI:</b> -0.432 <b>UCI:</b> -0.07 <b>Weight:</b> 2.815 <b>Standard error:</b> 0.092	
Lapsely (2002)	Teacher aides, class size and student achievement: A preliminary evaluation of Indiana's prime time ( <i>Paper presented at the annual meeting of the American Educational Research Association</i> )	<b>Effect Size:</b> -0.258 <b>LCI:</b> -0.372 <b>UCI:</b> -0.145 <b>Weight:</b> 3.174 <b>Standard error:</b> 0.058	
Thomas (1969) 1_1	The effect of class size on the development of several abilities involved in critical thinking (NA)	<b>Effect Size:</b> -0.853 <b>LCI:</b> -1.387 <b>UCI:</b> -0.318 <b>Weight:</b> 1.157 <b>Standard error:</b> 0.273	