Modelling the impact of active travel school interventions in Scotland

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Introduction

Active travel delivery partners in Scotland deliver a number of interventions in schools with the aim of promoting cycling, walking and other forms of active and sustainable travel among the pupils.

This report looks to answer the questions:

- What would travel to school rates be, had no school interventions been delivered in the five academic years between 2016-17 and 2020-21?
- What could we expect in the next five years?

Through this, the analysis aims to demonstrate the impact of active travel interventions on school travel and show the scale of potential impact when interventions are withheld or increased at a national level. This is against a backdrop of increasing car travel across the UK[1].

The analysis covers primary schools in Scotland. It includes data on typical mode of travel sourced from the Hands Up Scotland Survey (HUSS)[2] between 2016 and 2021. HUSS, delivered by Sustrans in September each year, is an Official Statistic in Scotland, designed to provide reliable and up to date information on mode of travel to school. HUSS covers about 80% of primary schools in Scotland, collecting data from around 285,000 pupils each year[3], making it the largest survey of its kind in the UK.

The analysis also includes data on the delivery of the following interventions in primary schools: I Bike, Bikeability, Big Pedal (now called Big Walk and Wheel), WOW – the walking to school challenge, and the installation of scooter parking and cycle parking. This data has been made available by Sustrans, Cycling Scotland and Living Streets.

For this analysis, we calculated the actual observed changes, year by year, in the way pupils travelled to school in schools that had active travel interventions and those that did not. We then used these change values to estimate the intervention rates in three **hypothetical** scenarios:

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[1] Source: Departnment for Transport Traffic Statistics: https://roadtraffic.dft.gov.uk/summary

[2] https://www.sustrans.org.uk/our-blog/projects/uk-wide/scotland/hands-up-scotland-survey

[3] Source: Hands Up Scotland Survey '2022 National Results' document. Accessible from: https://www.sustrans.org.uk/our-blog/projects/uk-wide/scotland/hands-up-scotland-survey

- **Scenario A**: no schools had interventions between 2016 and 2021
- **Scenario B**: all schools had at least one intervention, some had more
- **Scenario C:** all schools had at least two interventions, some had more

Finally, we have estimated what the mode share could look like over the next 5 years in each of these three scenarios, using a linear regression based forecast model to take us to 2026. This approach identifies the underlying trend in the data between 2016 and 2021 and extends this to the following five years.

Key findings

Scenario A: No interventions delivered

In any given year about half of all primary schools in Scotland receive one or more of the active travel interventions delivered by Sustrans, Cycling Scotland and Living Streets.[4] We estimate that if Sustrans and other active travel delivery partners had **not** been working in schools in Scotland over the past five years, the proportion of primary school children travelling actively would **be 1.9 percentage points** lower than it is today.

Over ten years the difference would continue to increase and by 2026 the proportion of those travelling actively could **be 4 percentage points lower** than in the case of 'business-as-usual' delivery[5], at 48.6%. This would mean that **on an average day 15,800 fewer children would be travelling by active modes**, such as walking and cycling.

At the same time, the proportion of those travelling by car[6] would be 4.2 percentage points higher by 2026, leading to **an additional 16,300 children travelling by car** on a typical day. Over the course of a year, this could lead to

[4] On average, 53% of primaries had interventions between 2016-17 and 2020-21 academic years.
[5] By business-as-usual, we mean continuing the with the actual current rate of intervention delivery in schools.
[6] Throughout this report, 'car' rates include travel by taxi.

around 6.8 million additional car journeys[7] or 17.5 million additional car kilometres each academic year[8], resulting in an additional **2.9 thousand tonnes of CO_{2e} emissions**[9].

If no active travel interventions were delivered over the previous 10-year period, then by 2025-26 this could result in

15,800 fewer primary pupils travelling actively on a typical day

up to **17.5 million** additional car kilometres over a school year
(6.8 million additional car journeys)

2,900 tonnes additional CO_{2e} emissions per year

Scenario B: All schools had at least one intervention delivered

On the other hand, if all schools were to have received at least one intervention starting from 2016. In this scenario, an additional 1.3 percentage points, or over 5,200 additional pupils, would be travelling actively in 2025-26, compared to the business-as-usual forecast.

[7] Assuming an average of 1.7 children in a car, adjusting for school absences, and assuming four car journeys per day. See the *Technical report* for more info.

[8] Assuming 2.6 km average travel distance to school. See the *Technical report* for more info.

[9] CO2e (Carbon Dioxide Equivalent) is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO2e signifies the amount of CO2 which would have the equivalent global warming impact.
The estimate presented here has been calculated using the UK Government carbon conversion rates. See the *Technical report* for more info.

Scenario C: All schools had at least two interventions

Furthermore, if intervention delivery had been increased, so that all primary schools in the country received two active travel interventions starting from 2016, then by 2026 the proportion of primary school children travelling actively would be **4.6 percentage points** higher than in the case of business-as-usual at the current delivery levels. This would mean an additional **18,000 pupils travelling actively** on a typical day, resulting in over **6.4 million additional active travel trips** in a year.

At the same time, we estimate that car travel rates would **be 7.3 percentage points lower**. This could mean around **28,600 fewer pupils travelling by car** on a typical day, around **12 million car trips or close to 31 million car kilometres avoided** over the course of a school year, and more than **5.1 thousand tonnes of CO_{2e} saved** each year.

If two active travel interventions were delivered in each primary school in Scotland over the previous 10-year period, then by 2025-26 this could result in

18,000 more primary pupils travelling actively on a typical day

up to **31 million** car kilometres avoided over a school year
(12 million fewer car journeys)

5,100 tonnes lower CO_{2e} emissions per year

Detailed findings

The figures and tables below show the actual and modelled active travel and car travel rates for the following scenarios:

- Actual active travel and car travel rates from 2016 to 2021 and forecasting for 2022 to 2026, assuming business-as-usual[10];
- Scenario A, modelling active travel and car travel rates based on a hypothetical situation where **no interventions** have been delivered since 2016, and forecasting these rates for 2022 to 2026;
- Scenario B, modelling active travel and car travel rates based on a hypothetical situation where every primary school in Scotland received **at least one intervention** every year, starting in 2016, and forecasting these rates up to 2026;
- Scenario C, as Scenario B, but based on a hypothetical situation where every primary school had **at least 2 interventions** every year.

From these results we can conclude that if no interventions were delivered starting from 2016, in the five-year period to 2021 (Scenario A) we would have seen consistently lower rates of active travel than the actual observed rates. These rates would continue to decline in the following five years, reaching 48.6% in 2026. In comparison, the business-as-usual scenario predicts active travel to be at 52.6% by 2026[11], a difference of 4 percentage points.

In Scenario B, where all schools received at least one intervention starting from 2016, the difference to the current rates and business-as-usual predictions, based on around half of schools receiving interventions, is less pronounced. However, a difference of 1.3 percentage points by 2026 can still be observed, meaning that a slightly higher proportion of pupils would be travelling actively if all schools received at least one intervention.

Notably, however, in Scenario C, where all schools would have received at least two interventions, the predicted active travel rates in 2026 would be 4.6 percentage points higher than in the current business-as-usual scenario and 8.7 percentage points higher than the no intervention scenario (Scenario A), at 57.2%. (Figure 1, Table 1)

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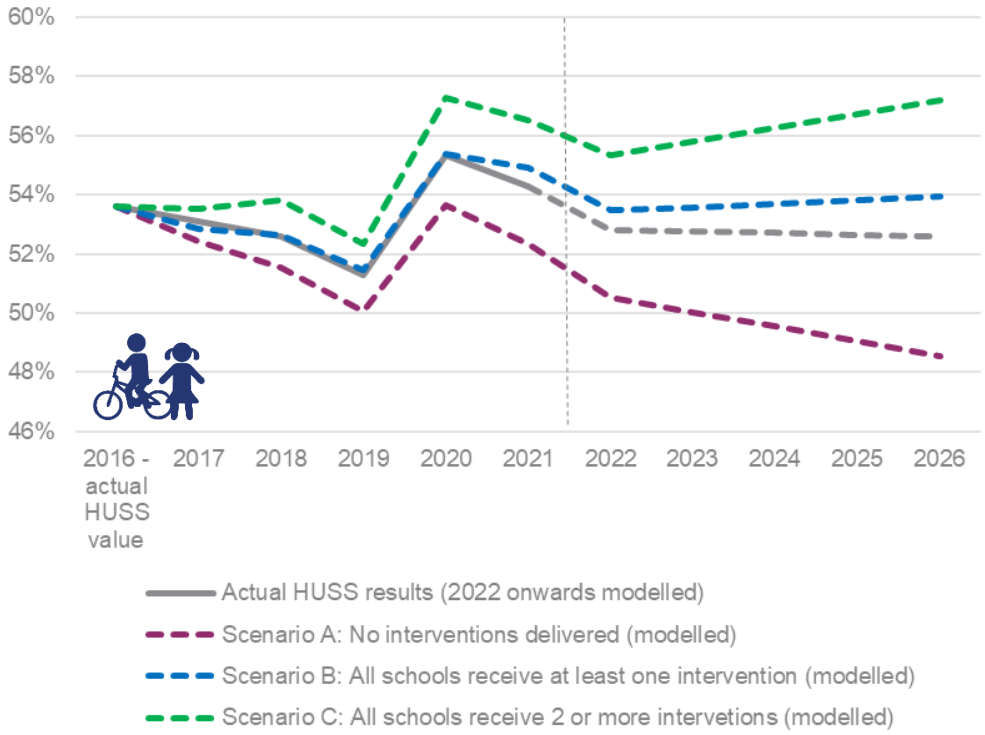
[10] By business-as-usual we mean continuing the with the actual current rate of intervention delivery in schools.

[11] See the limitations section in the *Technical report* for notes on the exact forecasting values.

Figure 2 and Table 2 show corresponding findings for car travel rates[12], which, as expected, would reduce when active travel rates are higher and increase when active travel rates are lower.

Figure 1: Active travel rates (%) modelled for business-as-usual and hypothetical scenarios of intervention delivery, including future forecasts



[12] Including travel by taxi.

Figure 2: Car travel rates (%) modelled for business-as-usual and hypothetical scenarios of intervention delivery, including future forecasts

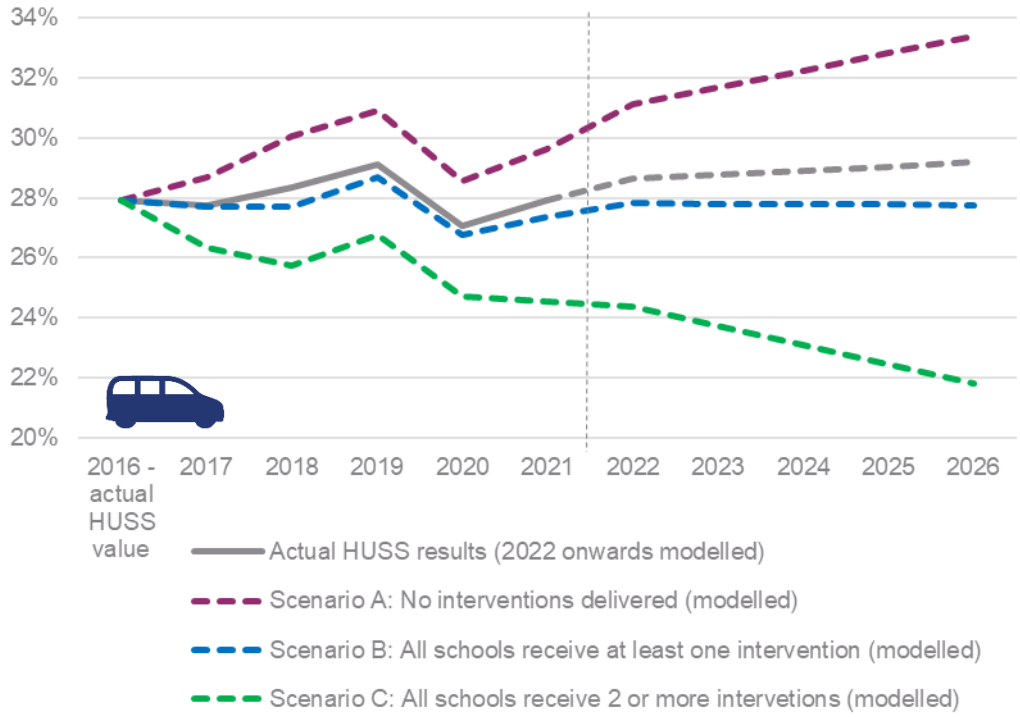


Table 1: **Active travel rates modelled for business-as-usual and hypothetical scenarios of intervention delivery, including future forecasts**

Scenarios	2016 - actual HUSS value	2017	2018	2019	2020	2021	2022[13]	2023	2024	2025	2026
Scenario A: No interventions delivered (modelled)	53.63%	52.44%	51.52%	50.06%	53.66%	52.36%	50.52%	50.03%	49.54%	49.05%	48.55%
Actual HUSS results and business-as-usual forecast	53.63%	53.10%	52.58%	51.30%	55.33%	54.26%	52.81%	52.76%	52.71%	52.65%	52.60%
Scenario B: All schools receive at least one intervention (modelled)	53.63%	52.86%	52.62%	51.47%	55.38%	54.93%	53.46%	53.59%	53.71%	53.83%	53.95%
Scenario C: All schools receive 2 or more interventions (modelled)	53.63%	53.53%	53.82%	52.34%	57.26%	56.53%	55.36%	55.82%	56.28%	56.74%	57.21%

[13] 2022 to 2026 values are forecasted, including for the 'Actual HUSS results' line.

Table 2: Car travel rates modelled for business-as-usual and hypothetical scenarios of intervention delivery, including future forecasts

Scenarios	2016 - actual HUSS value	2017	2018	2019	2020	2021	2022[14]	2023	2024	2025	2026
Scenario A: No interventions delivered (modelled)	27.92%	28.67%	30.04%	30.89%	28.53%	29.62%	31.11%	31.67%	32.23%	32.80%	33.36%
Actual HUSS results and business-as-usual forecast	27.92%	27.75%	28.34%	29.13%	27.07%	27.92%	28.63%	28.76%	28.90%	29.04%	29.18%
Scenario B: All schools receive at least one intervention (modelled)	27.92%	27.72%	27.68%	28.68%	26.76%	27.35%	27.82%	27.80%	27.79%	27.77%	27.75%
Scenario C: All schools receive 2 or more interventions (modelled)	27.92%	26.35%	25.72%	26.76%	24.73%	24.56%	24.37%	23.74%	23.10%	22.47%	21.84%

[14] 2022 to 2026 values are forecasted, including for the 'Actual HUSS results' line.

Methodology

First, we calculated the actual observed yearly changes in travel to primary school between the 2016-17 academic year and the 2020-21 academic year in three groups of schools:

- schools that had no interventions in a particular school year
- schools that had at least one intervention
- schools that had two or more interventions

Schools with interventions included primary schools that delivered any one or more of the five interventions considered in a particular school year. Similarly, schools with two or more interventions would have had two or more of these in a particular year. (Note that this group overlaps with the previous one.)

In the next steps, we modelled three hypothetical scenarios by applying the change rates calculated above to all the primary schools in Scotland:

- **Scenario A**: no schools had interventions between 2016 and 2021
- **Scenario B**: all schools had at least one intervention, some had more
- **Scenario C:** all schools had at least two interventions, some had more.

We used the actual national mode share values from 2016, as per the HUSS published findings, as the starting value for these calculations.

Finally, we have estimated what the mode share would look like over the following five years in each of these three scenarios using a linear regression model.

We have excluded the school data collected in 2020 from the forecast model used to estimate these future values, on account of the atypical travel patterns observed during the Covid-19.

Further details on the methodology, the limitations of the analysis, breakdown of findings by mode and alternative findings with the 2020 data *included* in the model are available in the separate *Technical report*.

Conclusion

This report examined the impact and potential impact that school interventions delivered by Scottish active travel delivery partners can have on the way children travel to school. We investigated what travel to school would look like in the absence of such interventions over a period of ten years. We also looked at the potential impact that increasing intervention delivery could have.

Modelling the mode share of travel to school in the absence of interventions showed that the proportion of primary pupils walking or cycling to school in Scotland would be *notably smaller* without any interventions promoting active travel: by 2025-26, *15,800 fewer* primary pupils would travel actively to school on a typical day if no active travel interventions had been delivered over the previous 10 years.

This indicates that the interventions delivered currently are successful in promoting mode shift towards active modes, and in turn can have a direct impact on reducing car use on the school run.

At the same time, modelling also showed that if at least one intervention had been delivered in *all primary schools* in Scotland in that same period, by 2025-26, *5,200 additional pupils* could be travelling actively to school each day; and if delivery was increased to *at least two interventions* in each school, *18,000 additional primary pupils* could be travelling actively to school by 2025-26.

These findings show that expanding the reach of school interventions to all primary schools, and ideally ensuring that schools benefit from more than one intervention at a time could have the potential to significantly increase these positive outcomes.

Appendix

Actual active travel rates in schools with and without interventions

The table below shows the actual measured active travel rates in primary schools in Scotland between the 2016-17 and the 2020-21 academic years. The findings in this table are based on all primary schools that have taken part in HUSS each academic year.[15]

Table 3: Actual active travel rates in schools with and without interventions

Intervention participation	2016-17	2017-18	2018-19	2019-20	2020-21	5-year average
Without intervention	51.4%	50.0%	48.3%	54.4%	53.2%	51.5%
With one or more intervention	53.5%	53.9%	52.5%	56.2%	55.4%	54.3%
With two or more interventions	58.8%	57.5%	55.8%	57.5%	59.8%	57.9%
Overall (all schools in the sample)	52.8%	52.5%	51.2%	55.1%	54.5%	53.2%
Number of schools (overall)	*1,386*	*1,415*	*1,407*	*1,315*	*1,289*	*6,812*

[15] Excluding schools in Clackmannanshire, see the methodology notes in the Technical report.