

Summary of Outcomes of the Cycling Demonstration Towns and Cycling City and Towns Programmes

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Report to the Department for Transport

April 2017


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The preferred citation for this paper is:

Sloman L, Cope A, Kennedy A, Crawford F, Cavill N and Parkin J (2017) *Summary of outcomes of the Cycling Demonstration Towns and Cycling City and Towns programmes*

This report was written by Transport for Quality of Life, based on analysis carried out by Sustrans Research and Monitoring Unit with Cavill Associates and University of the West of England, Bristol.

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Acknowledgements

The authors are grateful for the extensive assistance of officers in the six Cycling Demonstration Towns and 12 Cycling City and Towns in providing monitoring data for this research.

We are also grateful for additional support provided by Lisa Muller, Katie Pullen, George Macklon, Katie Thomson, James O'Hare, Richard Sanders, Alison Janes, Hannah Delaney, Laurence Bonner, Peter Stephenson, Charlotte Draycott and Jo Watson.

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Executive Summary

The Cycling Demonstration Towns (CDT) programme ran from October 2005 to March 2011, and involved six medium-sized towns, with populations of between 65,000 and 245,000 people. The partly concurrent Cycling City and Towns (CCT) programme ran from July 2008 to March 2011. It involved one substantially larger city (Greater Bristol), one significantly smaller town (Leighton Linlade) and a further ten towns of medium size, with populations ranging from 75,000 to 240,000.

In all 18 towns and cities, the focus of the programme was on encouraging more cycling for short 'everyday' urban trips – that is, those trips which when made by car contribute disproportionately to congestion. Taken overall, the annual expenditure per head of population was £17 for five-and-a-half years in the CDTs and £14 for just under three years in the CCTs. Expenditure comprised both capital (about 80% and 70% for the CCT and CDT programmes respectively) and revenue (20-30%).

Cycling trips increased across both programmes overall, and also individually in all 18 towns and cities, by different amounts. From automatic count data, there was an overall increase of 29% for the six CDTs in 5.5 years (range across towns: 6% - 59%); and an overall increase of 24% for the 12 CCTs over three years (range across towns: 9% - 62%).

The annual rate of growth for the CDT and CCT programmes overall (5.3% and 8.0% respectively) is comparable to rates of growth seen in international cities which have demonstrated sustained long-term commitment to cycling.

This growth in cycling trips was widespread, rather than being confined to a few locations, so that, overall, seven in every 10 automatic cycle counters recorded increases compared to around a quarter recording decreases. Manual count data indicate that the growth in cycling trips picked up by automatic counters was real, and not simply the result of a transfer of cycle activity from on-road locations to the off-road cycle paths where automatic counters are generally located.

From the longer time-series of data for the CDTs, we can say that it appeared possible to sustain growth in cycling throughout the programme period (that is, no 'glass ceiling' was reached), although special circumstances in some towns meant that they saw less growth in the latter part of the programme.

Towns with a range of characteristics and baseline levels of cycling were able to deliver increases in cycle trips. The similarity of the scale of effect in the CCT and CDT programmes gives us confidence that a similar effect might be expected if a comparable investment programme took place in similar areas – that is, we can say that the results of the programme appear to be replicable.

The results vary across the towns. The analysis has not identified a clear pattern of which factors determine the extent of impact, but obvious factors that differed between the towns included the nature and extent of delivery (including the capital and revenue split), the target groups, the profile and extent of support for the initiatives that were introduced, changes in political support at different stages of the programme, baseline levels of cycling and baseline levels of car dependence, amongst other factors.

The measured increases in cycle activity may be associated with more people taking up cycling (rather than being solely due to existing cyclists making more trips by bike or travelling further), but the evidence currently available is not conclusive on this question. Evidence collected in the CDTs suggests that there was an increase in the proportion of adults who cycled once a week or more, from about 24% to about 27% in the first half of the programme (the proportion was static in the second half). In Bristol, other evidence shows that the proportion of adults who sometimes cycled for longer trips (over 30 minutes) may have increased from about 13% at the start of the programme to about 20%. There was also an increase in the proportion of secondary school pupils who reported that they usually cycled to school, from about 4% to about 8% in the CCTs, with more modest but still positive changes in CDT secondary schools and both sets of primary schools.

Evidence from the CDTs shows that the increased participation in cycling amongst adults was spread across most age groups, both

genders, and most socioeconomic groups with the exception of group DE.

The rate of growth in cycling trips in the CDTs and CCTs appears to have been higher during the period of the CDT / CCT programme, when compared to the period immediately prior to the programme. Indicatively, this 'uplift' was of the order of 2 to 3%-points per year. Thus, the average growth rate during the programme period (about 6% per year using a subset of counters with both pre- and in-programme data) was roughly double the growth rate before the programme started (about 3% per year), although this conclusion should be treated with caution due to variations in the data.

Overall, we conclude that there is good evidence that the number of cycling trips has increased to varying degrees across the CDT and CCT programmes. Insufficient robust data is available to address the question of whether this increase is attributable to the investment programme, or simply reflects wider trends. Based on available evidence, we suggest that these programmes may have delivered greater uplift in cycling than would have happened without the investment, although we cannot say definitively that this is the case.

The CDT / CCT programmes took place in a context which was not ideal. Improvements in the towns were limited by political expediency; there were problems with funding uncertainty in the final year of the programme; and the programme was of short duration. Changing behavioural patterns is a long-term, difficult task and we should be realistic about what is possible within short timeframes and in a policy context which is not always fully supportive. Both the quality of cycling provision and the levels of cycling in the CDTs and CCTs remain modest in relation to that observed in much of continental Europe.

However, the monitoring data suggest that these towns are entitled to consider themselves as 'standard bearers' for the future growth of cycling in Britain. The data from the CDT / CCT programme also suggest that, with continued effort and investment, it should be possible to achieve significantly higher levels of cycling in the UK.

1. Introduction

This paper summarises key monitoring findings on changes in cycling trips in 18 English towns and cities during the Cycling England / Department for Transport Cycling Demonstration Towns programme, which ran from October 2005 to March 2011, and the partly concurrent Cycling City and Towns programme, which ran from July 2008 to March 2011¹. It is accompanied by two detailed technical reports on the monitoring of the programme, both of which have been prepared by Sustrans, Cavill Associates, London South Bank University and Transport for Quality of Life for the Department for Transport:

- *'Outcomes of the Cycling Demonstration Towns programme: monitoring project report'*
- *'Outcomes of the Cycling City and Towns programme: monitoring project report'*

The towns involved in the Cycling Demonstration Towns (CDT) programme were Aylesbury, Brighton and Hove, Darlington, Derby, Exeter and Lancaster with Morecambe, all of which are medium-sized towns with populations of between 65,000 and 245,000 people.

The Cycling City and Towns (CCT) programme involved one substantially larger city – Greater Bristol, with a population of 570,000 – and one significantly smaller town, Leighton Linlade, with a population of 38,000. The remaining ten towns were of medium size, with populations ranging from 75,000 to 240,000: these were Blackpool, Cambridge, Chester, Colchester, Shrewsbury, Southend, Southport, Stoke-on-Trent, Woking and York.

Taken together, the 18 towns and cities in the CDT and CCT programmes had a population of more than 2.5 million people.

In all 18 towns and cities, the focus of the programme was on encouraging more cycling for short 'everyday' urban trips – that is, those trips which when made by car contribute disproportionately to congestion.

This summary report and the two detailed monitoring reports focus principally on the *outcomes* of the programmes in the 18 towns and cities – that is, by how much did levels of cycling trips change during the course of the two programmes, and to what extent can any change be attributed to the investment programmes themselves. We briefly report the *inputs* to the programmes (in terms of capital and revenue expenditure), but we do not describe here the activities that resulted from this expenditure (i.e. the *outputs*²). Nor do we fully consider what the longer term *impacts* of the programmes may be, although we do look briefly at evidence of population level changes in physical activity.

¹ The programme was also supported by funding from the Department of Health, routed via DfT.

² More information on the outputs is available in the end-of-programme reports for all 18 towns and cities at <https://www.gov.uk/government/publications/cycling-england-cycling-city-and-towns-end-of-programme-reports>.

The principal sources of evidence on which our analysis is based are as follows:

- A comprehensive network of automatic cycle counters in each town, based on a monitoring plan drawn up by Sustrans Research and Monitoring Unit which was designed to give an accurate picture of any changes in cycle trips across the whole of each of the towns. These networks of between seven and 34 counters offer a more robust source of information on town-wide cycling levels than is available from the typically smaller number of count sites in most non-CDT/CCT towns.
- Manual counts, typically carried out on a quarterly basis across a screenline (e.g. a river) or on partial cordons around the centre of each town or city. Again, these offer more data than is available in most non-CDT/CCT towns.
- Surveys of cycling and physical activity in the CDTs only.

The detailed technical reports describe the approach that was taken to the analysis of these datasets³.

Analysis of the primary datasets was supplemented by analysis of various secondary sources of data: notably information on cycling and physical activity from the Sport England Active People Survey; and information on levels of cycling to school from the Pupil Level Annual School Census and from 'Bike It' hands-up surveys.

In addition, the detailed monitoring reports for each town (available separately) include an assessment of evidence from a variety of other surveys carried out in the towns, including counts of parked cycles; route user intercept surveys; attitudinal surveys; workplace travel surveys; travel surveys at universities and colleges; and cycle hire scheme monitoring data.

It should be noted that measurement of changes in cycling trip levels is a difficult task. Any underlying trends tend to be masked by month-to-month variation due to changes in weather and daylight hours; we are dealing with an activity which is undertaken by a limited proportion of people over an area that is geographically spread; and counting mechanisms are themselves imperfect and sometimes fail, giving data gaps. Determining the outcomes of a cycling investment programme over a short period of time is thus a far more difficult task than determining the outcomes

³ The approach taken to the analysis of the data from automatic cycle counters included use of a regression model to provide an estimate of year to year change in cycle trips at town level, using data from multiple count sites. Data for all counters were aggregated for each town, regardless of the duration and completeness of the time series for each individual site. This aggregated dataset was then modelled using negative binomial multiple regression. In the first instance, the year, time of year, day of week, calendar effects (for example, bank holidays) and the counter site reference were included as explanatory variables. A secondary analysis also included a factor for the periods of poor weather experienced nationwide in late 2009, early 2010 and late 2010. This model was then used to estimate counts, based on days with recorded counts in 2010, for the remainder of the time series to enable an expression of change over the entire project period. In cases where individual sites display particularly high growth or substantial decline over time, sensitivity testing was undertaken to examine the impact of these sites on the overall change in cycle trips recorded across a given town. In addition to regression analysis of data from multiple count sites, a seasonal slope estimator method was used for data from individual count sites. This is a non-parametric method suitable for time series displaying strong seasonality and missing data.

of an investment programme focussed on other travel modes. But notwithstanding these challenges, we believe that a picture begins to emerge from the following synthesis of the evidence.

2. Inputs to the CDT and CCT programmes

During both phases of the CDT programme, funding from Cycling England / DfT / DH was intended to be approximately £5 per head of population per year, matched by the local authorities with an equivalent amount. For the CCT programme, funding was intended to be approximately £8 per head of population per year, again matched by an equivalent amount by the local authorities. Matched funding was principally Local Transport Plan funding and development-related funding such as S106 contributions.

In practice, ‘outturn’ expenditure varied somewhat from town to town, and Table 1 summarises the average annual spend per head of population in each of the towns based on actual funding claimed from Cycling England / DfT and matched funding as reported by the local authorities in their end-of-programme reports⁴.

Expenditure was a mix of capital and revenue, with the ratio being approximately 81% capital:19% revenue over the two phases of the CDT programme, and 72% capital:28% revenue for the CCT programme. While revenue funding comprised a minority of the total expenditure, it was seen by the local authorities as an important part of the programme, because it was difficult to secure revenue funds from other sources⁵.

Taken overall, the annual expenditure per head of population was £17 for five-and-a-half years in the CDTs and £14 for just under three years in the CCTs. Further details of expenditure in each town are given in the full monitoring report, and in the towns’ end-of-programme reports.

Table 1: Indicative annual expenditure per head of population in the CDTs/CCTs

	Annual expenditure per head of population*
All CDTs	£17
Aylesbury	£16
Brighton and Hove	£12
Darlington	£11
Derby	£17
Exeter	£29
Lancaster w Morecambe	£13

⁴ End-of-programme reports are available for all 18 towns and cities at <https://www.gov.uk/government/publications/cycling-england-cycling-city-and-towns-end-of-programme-reports>

⁵ Personal communication between one of the authors and CDT / CCT programme managers over the course of the CDT/CCT programmes.

All CCTs	£14
Blackpool	£19
Cambridge	£17
Chester	£11
Colchester	£16
Greater Bristol	£12
Leighton	£23
Shrewsbury	£16
Southend	£14
Southport	£14
Stoke-on-Trent	£12
Woking	£16
York	£12

* Figures should be treated as indicative estimates of typical levels of investment, and comparisons between towns may not be valid. In particular, note that annual expenditure per head in Brighton is calculated with respect to the population of the western half of the city, where the programme was focussed; and annual expenditure per head in Derby is calculated with respect to the population of children and young people in the city, as this was the main focus of the Derby programme. However, for both Brighton and Derby, changes in cycling levels reported in Sections 3 to 5 are for the whole town. Annual expenditure estimates include capital and revenue, and matched funding for cycling-specific schemes as well as CE / DfT grant, over the 5.5 year period of the CDT programme (October 2005-March 2011) and the three year period of the CCT programme (July 2008-March 2011).

3. Overall change in cycling trips

There are two principal sources of information on actual changes in cycling trips in the CDTs and CCTs: a network of automatic cycle counters, and a series of manual counts. Automatic counts provide a powerful way of measuring cycle activity because they are continuous, giving data on 365 days per year; however, they are mainly used for monitoring activity on off-road cycle paths and cannot generally give a reliable measure of 'on road' cycling activity. Manual counts have the benefit that they can be carried out at 'on road' locations as well as off-road sites, but can only be conducted on a limited number of occasions for reasons of cost (in the CDTs and CCTs, manual counts were usually carried out on a quarterly basis i.e. four times in each year), and may give a less robust picture of overall cycling levels as a result of natural variation in weather. We outline below the headline results from both data sets.

3.1 Evidence from automatic cycle counters

Using data from automatic cycle counters, the mean increase in cycling trips across the six CDTs was **29%** in 2011, relative to a 2005 baseline (before the beginning of the CDT investment programme)⁶. Cycling trips increased in all six towns, with growth ranging from +6% to +59%.

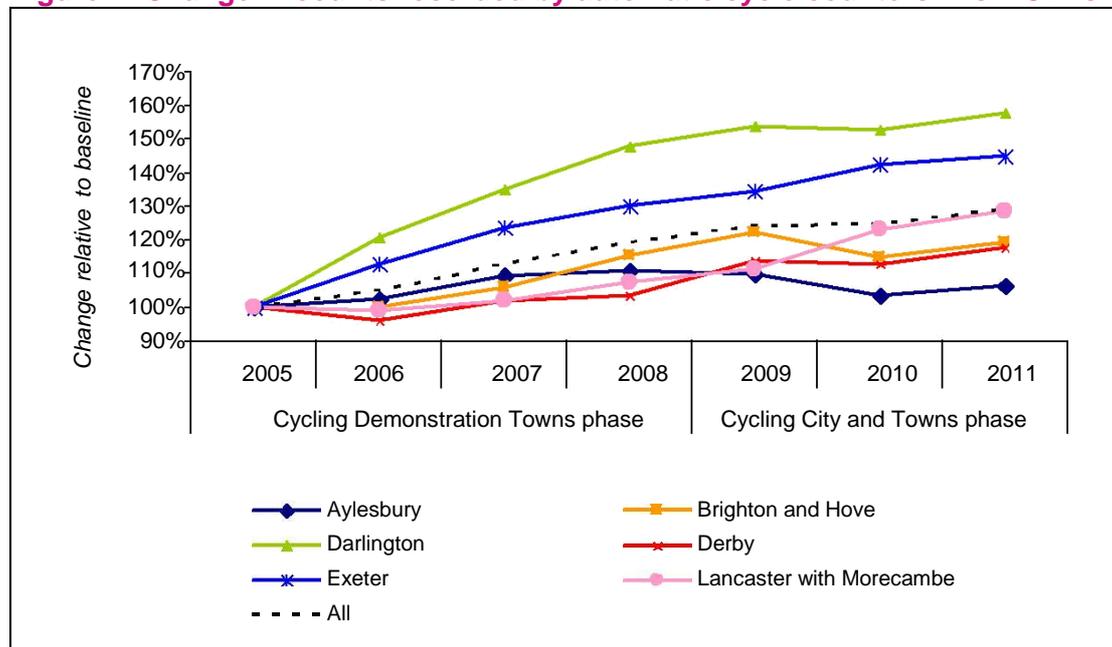
For the CCTs, automatic cycle counter data show a mean increase in cycling trips of **24%** in 2011, relative to a 2007 baseline (before the beginning of the CCT investment

⁶ This is calculated as the unweighted mean of the percentage change values for each town. The baseline year in Brighton and Hove was 2006.

programme)⁷. Again, all 12 towns and cities showed an increase in cycling levels, ranging from +6% to +62%. Thus, allowing for the fact that the CCT programme took place over a shorter period, the scale of effect in the CCTs and CDTs is similar.

Figures 1 and 2 illustrate how automatic cycle counter data changed over time in the CDTs and CCTs respectively, and Table 2 shows the total change relative to baseline for each town. It is worth noting that a high percentage increase does not necessarily imply greater 'success' than a low percentage increase, since towns started with rather different baseline levels of cycling. Thus, the *percentage* increase in cycling trips in, say, Stoke and Shrewsbury, was very different (62% and 15% respectively), but this was largely due to differences at baseline, and in fact the *absolute* increase in cycling trips in these towns (as measured by average daily count per count site) was rather similar. We return to this point in section 3.3.

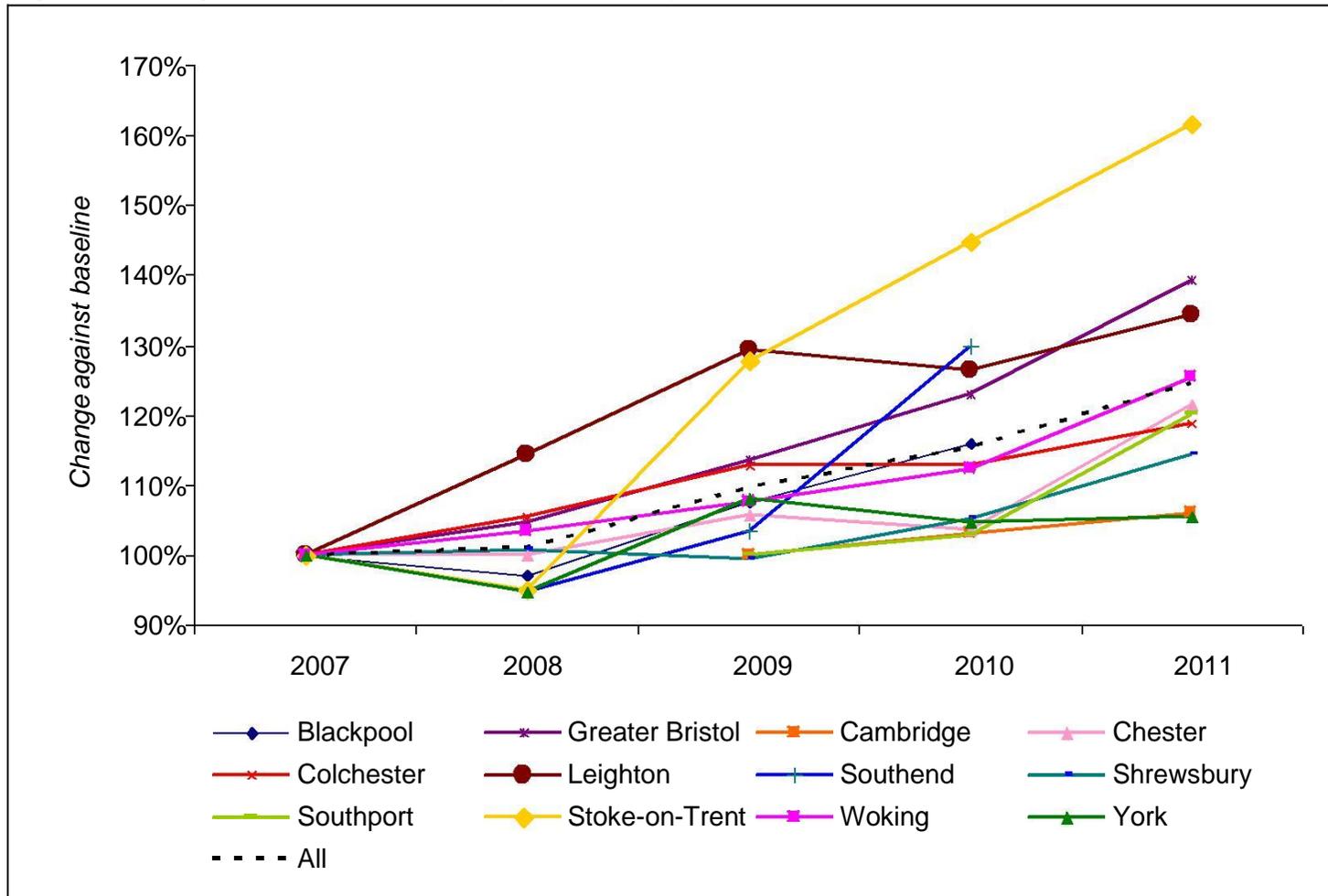
Figure 1: Change in counts recorded by automatic cycle counters in six CDTs



Note: Baseline year =2005, except for Brighton and Hove where baseline year=2006. Graph incorporates data up to September 2011. Analysis included the use of a factor for poor weather conditions in 2009 and 2010 (see full monitoring report for figures illustrating unadjusted data).

⁷ Again, calculated as the unweighted mean of the percentage change values for each town. Baseline year was 2009 in Cambridge and Southport. Final year of data for Blackpool and Southend was 2010.

Figure 2: Change in counts recorded by automatic cycle counters in 12 CCTs



Note: Baseline year =2007, except for Cambridge and Southport where baseline year=2009. Graph incorporates data available up to September 2011. Analysis included the use of a factor for poor weather conditions in 2009 and 2010 (see full monitoring report for figures illustrating unadjusted data).

Table 2: Total change in counts recorded by automatic cycle counters in six CDTs and 12 CCTs

	Count in final year compared to baseline ^{8*}	Absolute change in average daily count per counter between baseline and final year*	Number of automatic counters showing an increase in cycling ⁹
All CDTs~	129%		81 (of 118)
Aylesbury	106%	+4 (68 to 72)	9 (of 19)
Brighton and Hove	119%	+97 (503 to 600)	7 (of 13)
Darlington	159%	+29 (50 to 79)	12 (of 19)
Derby	117%	+15 (85 to 100)	10 (of 15)
Exeter	145%	+44 (99 to 143)	21 (of 26)
Lancaster w Morecambe	129%	+49 (170 to 220)	22 (of 26)
All CCTs~	124%		137 (of 193)
Blackpool	109%	+7 (87 to 95)	4 (of 9)
Cambridge	109%	+44 (495 to 540)	9 (of 17)
Chester	121%	+34 (163 to 197)	6 (of 10)
Colchester	119%	+21 (111 to 132)	9 (of 14)
Greater Bristol	140%	+104 (260 to 364)	29 (of 31)
Leighton	135%	+14 (40 to 55)	5 (of 13)
Shrewsbury	115%	+17 (118 to 135)	16 (of 21)
Southend	117%	+32 (185 to 217)	4 (of 7)
Southport	130%	+15 (50 to 65)	10 (of 10)
Stoke-on-Trent	162%	+19 (31 to 51)	13 (of 17)
Woking	126%	+26 (99 to 125)	8 (of 10)
York	106%	+13 (209 to 222)	24 (of 34)

* Baseline=2005 for all CDTs except Brighton and Hove, for which it is 2006; baseline=2007 for all CCTs except Cambridge and Southport, for which it is 2009. 'Final year'=2011 for all CDTs, and for all CCTs except Blackpool and Southend, for which it is 2010. For 'count in final year compared to baseline', baseline=100%. Change figures reported are from the analysis without the use of a factor for poor weather conditions (see full monitoring report for figures illustrating adjusted data).

~ Percentage changes for 'all CDTs' and 'all CCTs' are the unweighted mean of the percentage change values for each town.

For both groups of towns, it was generally the case that growth in cycling was widespread across the project area, with most (but not all) cycle counters recording increases. Thus, of the 117 automatic cycle counters in the six CDTs for which sufficient data were available to calculate change over time¹⁰, 81 (69%) showed growing cycling levels¹¹, while 26% showed decreases and 5% showed no change. Similarly, of the 189 automatic cycle counters in the 12 CCTs for which sufficient data were available to calculate change over time, 137 (72%) showed growing cycling levels, while 23% showed decreases and 5% showed no change.

⁸ For each of the 18 cities and towns the change between the levels of cycling in the baseline and final year was significant ($p < 0.05$) both with or without the factor for poor weather conditions.

⁹ At the individual counter level, none of the increases are statistically significant.

¹⁰ For both CDTs and CCTs, this is slightly fewer than the total number of counters reported in Table 2.

¹¹ That is, the median daily count showed an average annual change which was positive.

3.2 Changes in rate of growth over time for the CDTs

In our interim report on the effects of investment in the CDTs, we reported a mean increase in cycling trips based on automatic cycle counter data of 27% in 2009 against a 2005 baseline. On the face of it, this might suggest a substantially lower growth rate in the two years from 2009 to 2011 (given the mean increase in cycling of 29% between 2005 and 2011, reported above). However, these figures are not directly comparable as they rely on different sets of data¹². When using the entire time series of data across the two phases of the programme (2005 to 2011), the rate of growth in 2009 compared to the baseline year is lower, at 23%, and this figure (rather than our previously reported 27%) should be used in comparing the programme-level growth relative to baseline in 2009 and 2011.

Growth rates during the course of the CDT programme are visually easier to assess from a chart of absolute change in average daily count per counter for each town (as opposed to percentage changes), and these are illustrated in Figure 3. Brighton is presented separately because cycle counts there are substantially higher than in the other towns, but the vertical scale is the same in all cases.

Two of the CDTs (Derby and Exeter) show steady growth throughout the programme period; one (Lancaster) shows an increased rate of growth from 2009; two (Brighton and Darlington) show early growth but a levelling off from 2009; and one (Aylesbury) shows initial growth followed by a decline¹³.

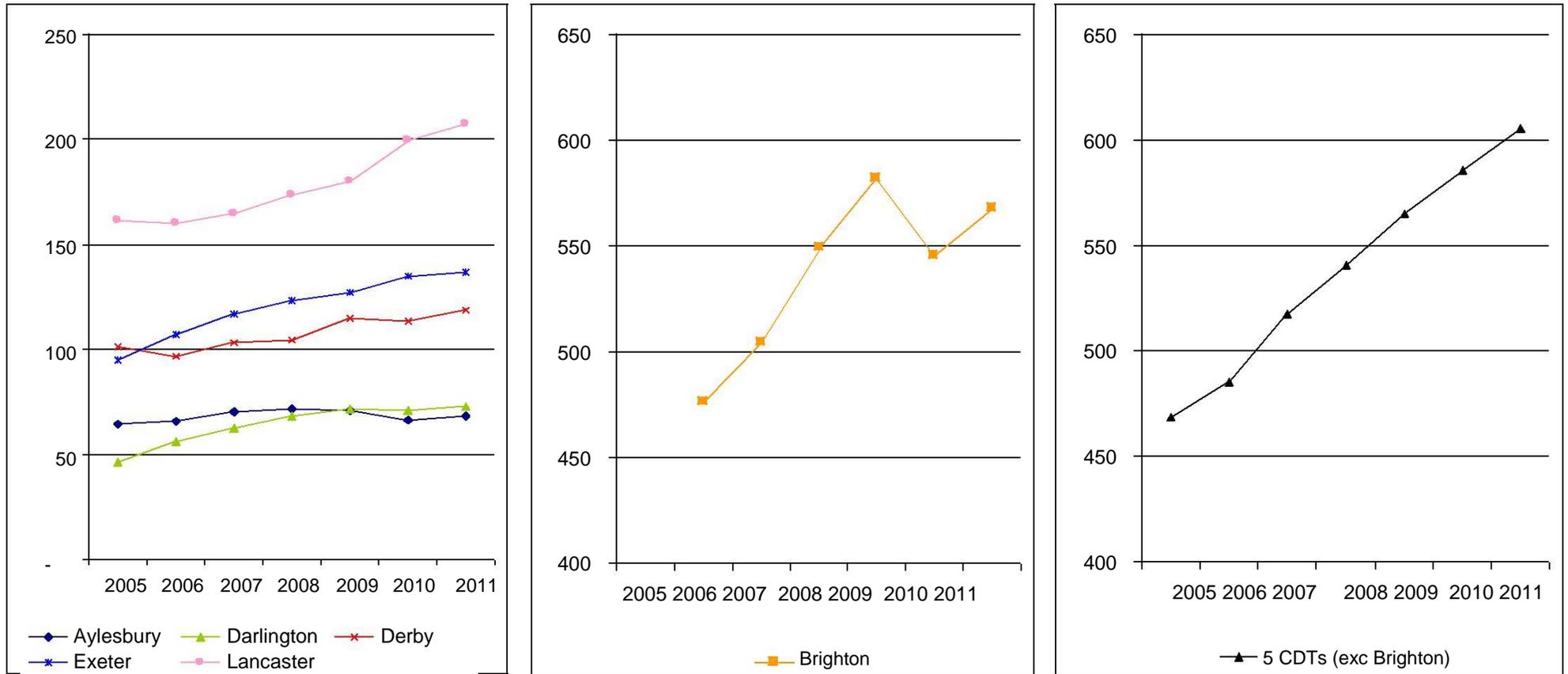
Looking at total counts across all five CDTs apart from Brighton, the growth rate is constant throughout the programme period. (Inclusion of the Brighton data would give a chart that looked like the Brighton-only graph, because it would be dominated by the much higher counts there.)

One concern that has been expressed in relation to the CDTs is that they may show evidence of a *generalised* levelling off in cycle trips in the second phase of the CDT programme, and that this might imply that there is some sort of 'glass ceiling' beyond which it is difficult to increase cycling levels. We do not believe that this is the case, based on the data presented here. While individual towns may experience changes in the rate of growth (for a variety of reasons, including loss of political support for cycling investment, or reduction in overall funding for cycling), the data from the CDTs suggests that it is possible to achieve sustained growth in cycling, in at least some towns, and at least over time periods of up to six years, with continued effort and investment.

¹²The interim analysis included data up to March 2009 only, and our current analysis includes more data for 2009. In addition, minor changes were made to the group of counters used in the current analysis, due to data collection ceasing at some sites; new sites being installed; and some data being excluded from the analysis because of issues of reliability.

¹³While we cannot say with certainty what might be the reasons for these different patterns, Brighton was felt by Cycling England to have suffered a setback in its programme from 2009 due to a change of political leadership, which resulted in a focus on arguments over removal of cycle lanes, rather than installation of new ones (Darnton 2012, personal communication with the authors). Darlington may have benefitted in the early phase of the programme from additional investment in behaviour change programmes as part of the Sustainable Travel Town initiative, which came to an end in 2009.

Figure 3: Change in absolute daily count per counter in the CDTs



Brighton is presented separately because cycle counts there are substantially higher than in the other towns; the vertical scale is the same in all cases. Analysis included the use of a factor for poor weather conditions in 2009 and 2010.

3.3 Relation between baseline level of cycling and rate of growth

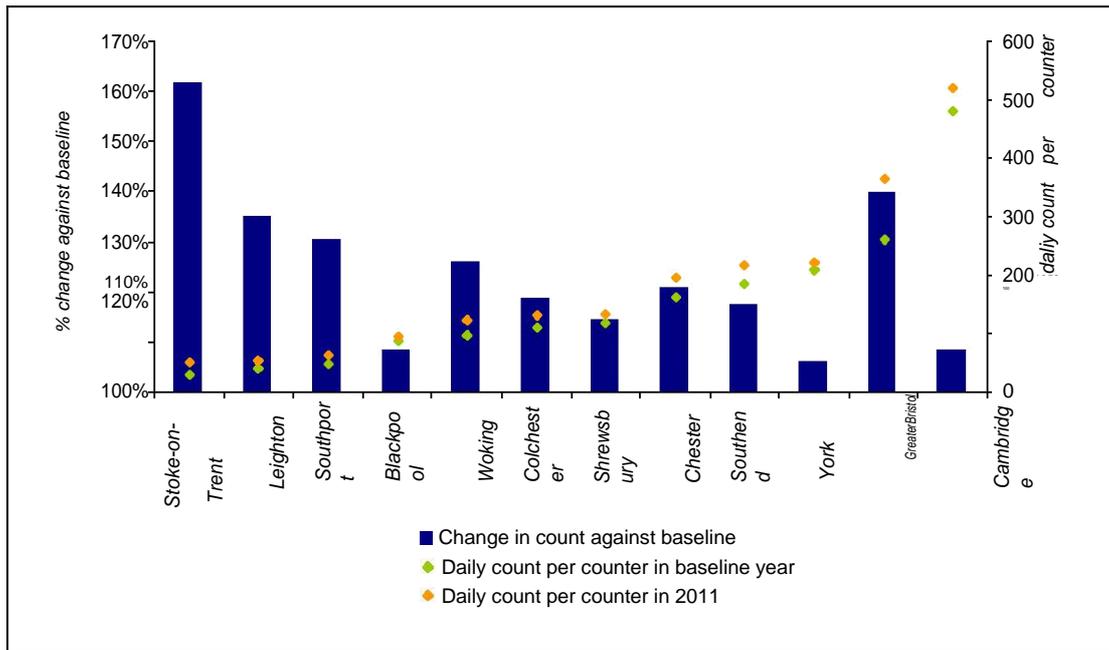
While the automatic count data demonstrates an increase in cycling trips in all 18 CDTs / CCTs, the absolute increases, and also the percentage increases, show considerable variation¹⁴. It is interesting to consider why this might be. On the face of it, the variation between the towns might appear slightly surprising: the level of investment in cycling in the different towns was broadly comparable (typically between £10 and £20 per head of population per year, albeit over a slightly longer period for the CDTs), and the nature of the programme, with abundant opportunities for towns to learn from one another, and with many elements delivered in a comparable way, might perhaps have been expected to yield more similar results.

Clearly, towns that start with a high baseline level of cycling might be expected to show a smaller increase in cycling in *percentage* terms than towns that start with a low level of cycling. This is apparent from Figure 4, which shows that those towns starting with the lowest baseline level of cycling (to the left of the chart), such as Stoke-on-Trent, Leighton and Southport, show some of the highest percentage increases in cycling levels, while towns starting with higher levels of cycling at baseline (to the right of the chart) tend to show smaller percentage increases. But the picture is somewhat unclear, and certain exceptions are evident: notably Blackpool and Greater Bristol. Examination of the CDT data shows no relationship between baseline level of cycling and percentage increase in cycling levels¹⁵.

Figure 4: Percentage change in counts recorded by automatic cycle counters relative to baseline, and average daily count per counter, for CCTs

¹⁴Looking at absolute change in average daily count per counter between baseline year and final year, the variation is by a factor of 26 (from +4 in Aylesbury to +104 in Greater Bristol). If these figures are adjusted to allow for the longer period of the programme in Aylesbury, the factor is even larger.

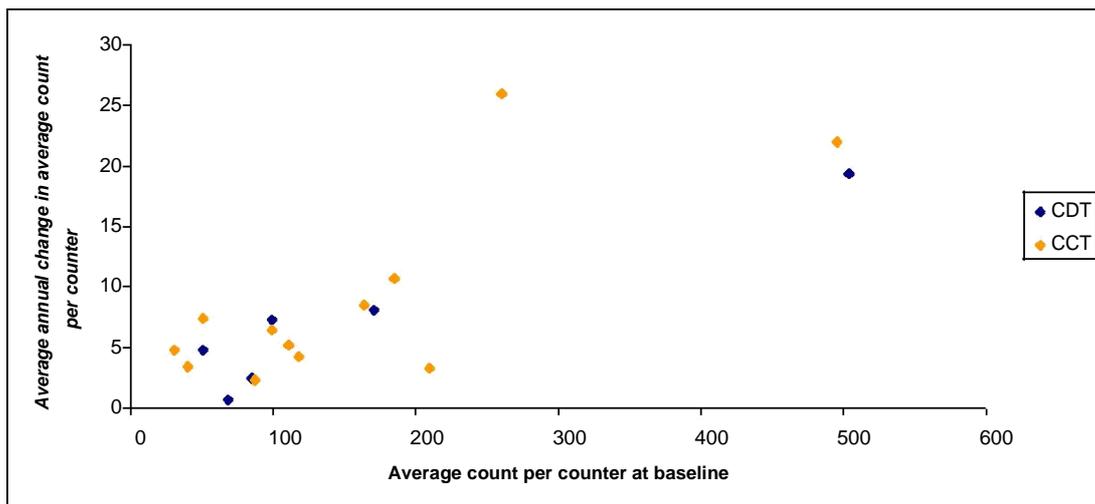
¹⁵A graph for the CDTs equivalent to Figure 4 is presented in the full report.



Baseline year=2007 for all towns except Cambridge and Southport, where it is 2009. End year= 2011 for all towns except Blackpool and Southend, where it is 2010. Towns are plotted in order of increasing average daily count per counter in the baseline year.

Figure 4 does not provide insights into why there is such a substantial variation in the *absolute* change in average counts per counter shown in Table 2. We therefore examined whether there was a relationship between baseline levels of cycling and the absolute increase in cycling levels, normalised to allow for the differing periods of time for which data were available in the different towns (this enables us to plot the CDTs and CCTs together, and to include towns with differing baseline and final years). This is illustrated in Figure 5.

Figure 5: Average count per counter at baseline, and annual change in average count per counter



Correlation coefficient = 0.803 for CDTs and CCTs; 0.946 for CDTs only; and 0.765 for CCTs only.

Figure 5 suggests that there is a correlation between the amount of cycling at baseline and the magnitude of increase in cycling that is achieved. The two towns with the highest level of cycling at baseline are Cambridge and Brighton (with average daily counts per counter of 495 and 503 respectively), and these have achieved some of the highest increases in absolute terms. Bristol also has a high average daily count at baseline (260), and has achieved the largest absolute increase. Towns with lower levels of cycling at baseline appear to have achieved rather smaller absolute increases. One plausible explanation for this correlation is that in places where cycling is more prevalent, it may be easier to encourage more cycling trips for an equivalent expenditure, because cycling is seen as a social norm. If this explanation is correct, it is encouraging that it seems not to be necessary for a town to have Cambridge-levels of cycling in order for a ‘social-norming’ effect to occur – the levels seen in Greater Bristol and Brighton appear to be sufficient. Another possible explanation might be that the towns with higher levels of cycling at baseline will also have better cycling infrastructure, and so individuals who take up cycling will have a better experience and are more likely to continue.

3.4 Evidence from manual counts

Manual counts were carried out at a total of eight partial cordons and screenlines in the CDTs, each including between four and 12 sites which were both 'on road' and 'off road'. Table 3 summarises the locations at which manual counts took place and the headline results. All eight sets of CDT manual counts show a small percentage growth in cycling levels (reported as an annual average percentage change), corroborating the evidence from the automatic cycle counts. This is important, because it suggests that the growth in automatic counts cannot simply have been due to existing cyclists switching route from 'on road' routes to 'off road' cycle paths that were being improved as a result of the CDT investment programme. Rather, it supports the hypothesis that the growth in cycle activity recorded by the automatic count data in the six CDTs was a result of more cycle trips being made.

Manual counts were also carried out in the 12 CCTs, but due to the shorter period of the CCT programme (with many towns only having data for two consecutive years e.g. 2010 and 2011) there are insufficient data to enable us to estimate an annual rate of change in volumes of cycling over the course of the investment programme. However, we are able to gain a sense of whether the manual counts indicate a broadly 'upward' trend in cycling or a broadly 'downward' trend by comparison of counts carried out at the same time of year in different years. Looking at the various sets of manual counts in the six CCTs where more than two-year's worth of data is available, we can say that:

- Manual counts in Greater Bristol, Cambridge, Shrewsbury and Stoke show a clearly upward trend
- Manual counts in Woking and York show a mixed picture
- No towns show a clear downward trend¹⁶.

¹⁶ Five towns with shorter data series (less than two years) also show changes in manual counts between equivalent quarters that are large enough to be 'significant' in the statistical sense. Taking all count sites together, there are significant changes upwards in the case of Blackpool, Southend and Southport; downwards in the case of Leighton; and both downwards and upwards for different quarters of data in Chester. However, these changes may not be significant in the non-technical sense i.e. we cannot assume that they tell us anything meaningful about the general trend in cycling levels in the towns concerned. In Colchester, the data series was also less than two years, and the change in overall manual counts was a decrease, but not statistically significant.

Table 3: Annual average change in cordon and screenline manual counts in CDTs

	Location of manual counts	Number of count sites*	Period over which data collected~	Median 12 hour count	Annual average percentage change ¹⁷
Aylesbury	Town centre partial cordon	9	Q3 2006 to Q1 2011	1033	+3%
Brighton and Hove	City centre cordon	12	Q3 2006 to Q2 2011	6769	+1%
Darlington	Town centre cordon	12	Q3 2006 to Q3 2010	894	+0.3%
Derby	City centre partial cordon	5	Q3 2006 to Q4 2010	1456	+9%
Exeter#	City centre cordon	4	Q3 2006 to Q2 2011	645	+0.1%
	River Exe screenline	6	Q3 2006 to Q2 2011	1851	+2%
Lancaster w Morecambe	Key entry points to Lancaster city centre	4	Q4 2006 to Q2 2011	1743	+6%
	Morecambe: road along coast and town centre	4	Q4 2006 to Q2 2011	702	+7%

* Some towns had additional count sites with incomplete data; these have been excluded from the number of sites reported here and from the calculation of average annual percentage change.

~ Some towns had small data gaps: no data were available for Aylesbury in Q1 2010; Brighton and Hove in Q2 2007; Derby in Q4 2009, Q2 and Q3 2010; Lancaster in Q2 2009 and Q1 2011; and Morecambe in Q1 2011.

In addition to quarterly counts around a city centre cordon and on the River Exe screenline, Exeter carried out annual counts on main traffic routes into the city centre. For the four locations with complete data between 2000 and 2011, these show significant increases in cycle flows between the pre-programme period (2000-2005) and the in-programme period (2006-2011).

¹⁷ When comparing the total count at each point in time with counts in the same quarter but different years, there are 32 possible comparisons in Aylesbury, 18 of which are significant differences (14 increases and four decreases). In Brighton and Hove there are 36 possible comparisons, 31 of which are significant differences (18 increases and 13 decreases). In Darlington there are 45 possible comparisons, 26 of which are significant differences (17 increases and nine decreases). In Derby there are 21 possible comparisons, 19 of which are significant differences (16 increases and three decreases). On the Exeter city centre cordon there are 40 possible comparisons, 31 of which are significant differences (10 increases and 21 decreases). On the River Exe screenline there are 40 possible comparisons, 29 of which are significant differences (15 increases and 14 decreases). In Lancaster there are 28 possible comparisons, 19 of which are significant differences (16 increases and three decreases). In Morecambe there are 32 possible comparisons, 24 of which are significant differences (16 increases and eight decreases).

4. Changes in behaviour amongst adults

In the CDTs, we have some evidence on levels of participation in cycling amongst adults from a survey of cycling and physical activity designed by Cavill Associates and carried out by ICM on behalf of Cycling England in all six towns in 2006, 2009 and 2011¹⁸. This survey found that the proportion of respondents doing any cycling in a typical week in the previous year rose from 24.3% to 27.7% between 2006 and 2009, but then levelled off, with 27.2%¹⁹ reporting that they cycled in a typical week in the 2011 survey. The pattern in each of the individual towns was similar.

The ICM survey enables us to draw some inferences about the extent to which there was a change in behaviour across different demographic and socioeconomic groups, or whether the change was concentrated within particular groups of people (Figure 6). The results of the 2006 and 2009 surveys have previously been reported²⁰, and in broad terms the pattern shown by the 2011 results is similar to that seen in the 2009 survey. Thus, looking at adult occasional cyclists (i.e. those who had done any cycling in a typical week in the previous year), we see that:

- Looking at the baseline survey in 2006, propensity to cycle generally decreased with age, as might be expected: from 37% amongst 16-24 year olds to 8% amongst those aged over 65. However, between 2006 and 2011, there was an increase in the propensity to cycle amongst most age groups, with the exception of young people (16-24 year olds), whose propensity to cycle remained static at around 36-37%²¹. The largest changes in behaviour appear to have come from people in the 'middle' and 'older' age groups (proportion of respondents reporting any cycling in a typical week in previous year increased from 31% to 34% for 25-34 year olds; from 33% to 37% for 35-44 year olds; from 25% to 30% for 45-54 year olds and from 15% to 19% for 55-64 year olds, comparing 2006 and 2011 results). This is encouraging because the health benefits derived from taking up cycling are likely to be pronounced for older age groups²².

¹⁸This survey comprised telephone interviews with 1,500 individuals aged over 16 in each town. ICM imposed quotas to ensure that the profile of the interviewed sample exactly matched that of the known population profile within each town (as per Census 2001). These same quota targets were also used to post-weight the data. This yields a representative sample by a host of demographic variables, including sex, age, work status, tenure and social class.

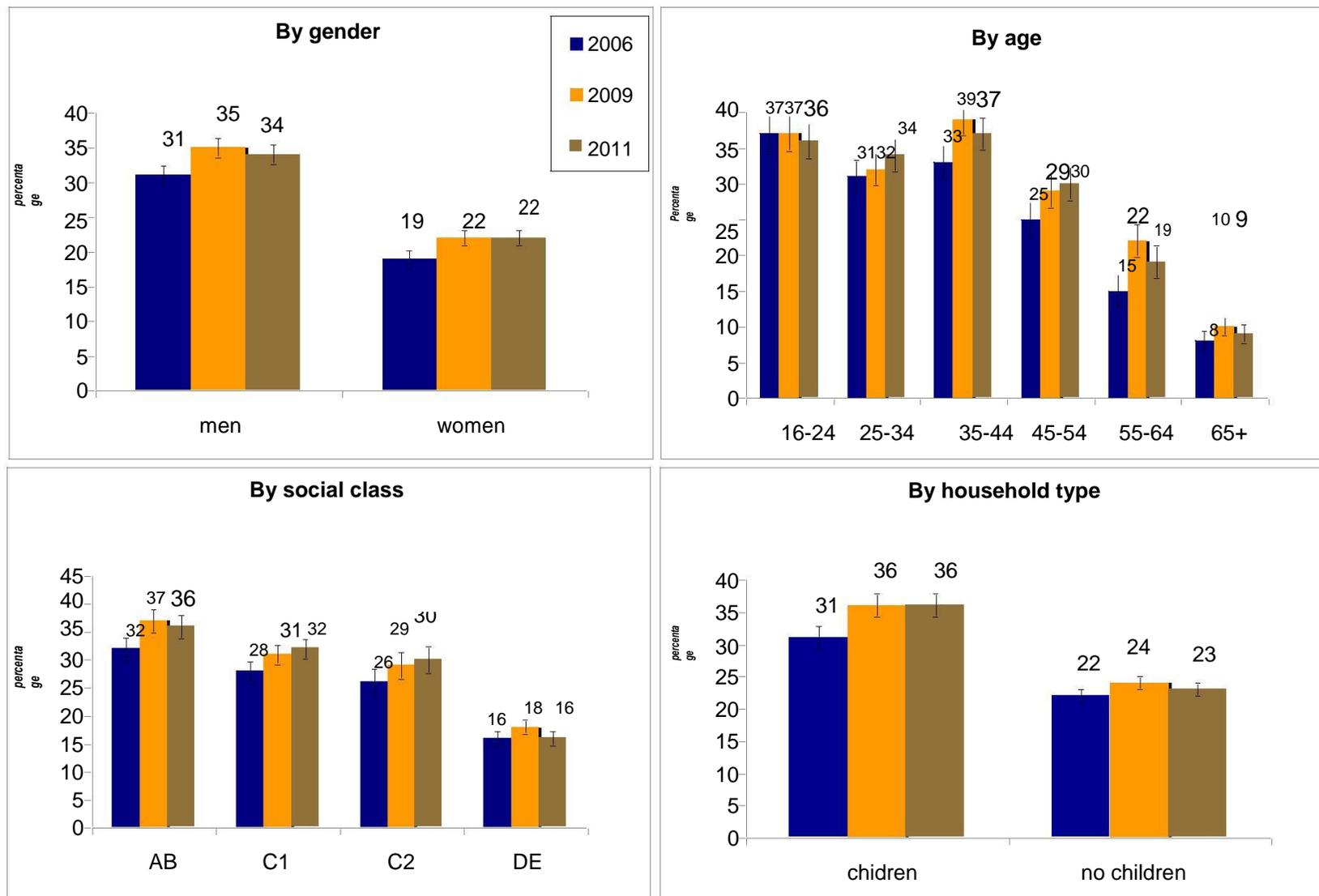
¹⁹Significant increase since 2006 ($p < 0.05$)

²⁰For full analysis, see Cavill N, Muller L, Mulhall C, Bauman A and Hillsdon M (2009) *Cycling Demonstration Towns: Surveys of cycling and physical activity 2006 to 2009*, report for Cycling England; for a summary see Sloman L, Cavill N, Cope A, Muller L and Kennedy A (2009) *Analysis and synthesis of evidence on the effects of investment in six Cycling Demonstration Towns* Report for Department for Transport and Cycling England. In a few instances there are some small differences (1%) in the 2006 figures reported here, compared to the figures reported in 2009, due to a change in methodology.

²¹Significant increase for all age groups with the exception of 16-24 year olds between 2006 and 2011 ($p < 0.05$)

²²Oja P, Titze S, Bauman A, de Geus B, Krenn P, Reger-Nash B and Kohlberger T (2011) *Health benefits of cycling: a systematic review* Scand J Med Sci Sports 21(4) 496-509

Figure 6: Proportion of respondents reporting any cycling in a typical week in the previous year, CDTs, ICM survey



- Male respondents were generally more likely to have cycled in the last year than female respondents, but cycling levels increased amongst both male and female respondents, by a similar number of percentage-points²³. Between 2006 and 2011, the proportion of male respondents doing any cycling in a typical week in the previous year increased from 31% to 34%; amongst female respondents, the increase was from 19% to 22%.
- Although respondents in higher social classes were generally more likely to have cycled in the last year, cycling levels increased amongst respondents in most social groups²⁴ (AB, C1 and C2, although importantly not DE) by a similar number of percentage-points. Thus, the proportion of respondents reporting any cycling in a typical week in previous year increased from 32% to 36% for respondents in AB social groups; from 28% to 32% for C1s; and from 26% to 30% for C2s, but remained static at 16% for DEs, comparing 2006 and 2011 results²⁵.
- In the baseline survey, adult respondents living in households with children were generally more likely to have cycled in the last year (31% of those in households with children; compared to 22% of those in households without children), presumably at least in part because the age profile of those living in households without children tends to be older²⁶. The change in propensity to cycle between survey waves was more marked amongst those living in households with children (+5%-points between 2006 and 2011) than in those living in households without children (+1%-point)²⁷. In our previous reporting of the 2006 and 2009 results, we commented that this finding may indicate that the school- and child-focussed cycling interventions in the CDTs also had some influence on parents.
- However, it should be noted that not all changes are statistically significant and the trend appears to fluctuate over time, with greater increases typically seen in the first half of the programme.

The ICM survey was designed to enable us to test whether any increase in cycling activity in the CDTs contributed to an increase in total physical activity, which is associated with health benefits. The survey used a validated measure of physical activity, EPIC²⁸, which considers cycling, other physical exercise, and activity at work. It found that the proportion of adults classed as 'inactive' (those at highest risk of mortality due to their inactivity) declined from 26.2% to 24.3% between 2006 and 2011²⁹. As with the findings in relation to participation in cycling discussed above, this decline appears to have taken place between 2006 and 2009 with no further change

²³The increase for both male and female respondents is significant between 2006 and 2011 ($p < 0.05$)

²⁴The increases for social groups AB, C1 and C2 were significant between 2006 and 2011 ($p < 0.05$)

²⁵Note that these results are not controlled for age, due to limitations of sample size, and this may be a confounding factor in the smaller change amongst people in social groups DE.

²⁶Again, results were not controlled for age, due to limitations of sample size.

²⁷The increase observed amongst adults living in households with children was significant but the increase amongst adults living in households with no children was not significant ($p < 0.05$).

²⁸The European Prospective Investigation into Cancer and Nutrition (EPIC) short physical activity questionnaire produces a simple 4-level index of self-reported physical activity based on time spent in a typical week in occupational physical activity, cycling, sport and active recreation. This index has been found to be associated with risk of all-cause mortality. For full details see Cavill N, Muller L, Mulhall C, Bauman A and Hillsdon M (2009) *Cycling Demonstration Towns: Surveys of cycling and physical activity 2006 to 2009*, report for Cycling England.

²⁹Significant decrease ($p < 0.05$)

from 2009 to 2011. Meanwhile, the proportion of adults classed as ‘moderately inactive’ increased (from 22.2% in 2006 to 24.4% in 2011)³⁰. This change is likely to be associated with health benefits, as the validation study for EPIC showed that people classed as ‘moderately inactive’ have a significantly reduced risk of all-cause mortality compared to those classed as ‘inactive’.

In our previous reporting of the 2006 and 2009 survey results, we noted that in the absence of panel data (i.e. repeat surveys with the same respondents), it is not possible to say that the fall in the proportion of inactive respondents is a direct result of inactive individuals taking up cycling, and this remains true. However, we *are* able to say that the increase in the proportion of adult respondents cycling was accompanied by a reduction in the proportion of respondents classed as inactive.

5. Changes in behaviour amongst children

The ICM Survey discussed in Section 4 included only residents aged 16 or over, and therefore tells us nothing about the extent to which cycling may have increased amongst children, who were a major focus of the interventions in the CDTs and CCTs. However, we have information about cycling by children and young people from two other sources: the Pupil Level Annual School Census (PLASC) and separate ‘hands up’ surveys at schools which had a ‘Bike It’ programme.

A word of caution is necessary before considering the evidence from these datasets, as both the PLASC data and the Bike It data suffer from limitations. We know from other research³¹ that PLASC data may be of dubious quality, with instances where pupils are asked their mode of travel when they start at a school and this stays ‘on the record’ and is unchanged until they leave the school. This raises a concern because it means that *changes* in levels of cycling to school may be under-reported. We believe that the ‘hands up’ surveys carried out in Bike It schools are likely to be a truer representation of children’s actual travel patterns at the time of each survey – but here the limitation is that the ‘before’ and ‘after’ surveys are carried out at different times of year (September and July respectively), potentially distorting the picture.

Bearing these caveats in mind, we turn now to examine the PLASC dataset. Data on pupils’ usual mode of travel to school are available from PLASC for the period 2007 to 2011 (covering the academic years 2006/07 to 2010/11). We are able to look at this for all primary schools and all secondary schools in each of the CDTs and CCTs, and for all primary and secondary schools in matched towns.

³⁰Significant increase (p<0.05)

³¹Sloman L, Cairns S, Newson C, Anable J, Pridmore A and Goodwin P (2010) *The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Research report*, Part III, Chapter 12, School travel, S 12.2.1.

Figure 7 shows the change in pupils' usual mode of travel to school in the CDTs and CCTs, for all primary and secondary schools, compared to the change in a set of 'matched towns'³².

For both the CDTs and the CCTs, there were modest increases in the proportion of primary school pupils usually travelling to school by bike (from 1.0% to 1.7% in the CDTs, and from 2.3% to 2.9% in the CCTs, between 2007 and 2011³³). The increase in cycling to primary school seen in the CDTs did not occur in a corresponding set of matched towns³⁴; however, in the case of the CCTs, the increase in cycling to primary schools is rather similar to that occurring in a set of matched towns³⁵ (+0.6%-points in both cases).

Looking at secondary schools, the proportion of pupils usually travelling to school by bike also increased in both the CDTs and CCTs (from 2.2% to 3.3% in the CDTs, and from 4.2% to 7.8% in the CCTs, between 2007 and 2011). The increase in the CDTs is somewhat greater than in their matched towns (+1.1%-points, compared to +0.7%-points), and the increase in the CCTs is substantially greater than in their matched towns (+3.6%-points, compared to -0.1%-points).

Thus, overall, we can say that there was an increase in the proportion of children who usually cycled to school across both the CDT and CCT programmes, and that this was generally greater than the increase seen in other similar towns. However, the picture is not entirely consistent, and caveats relating to the quality of the matching between towns should be borne in mind.

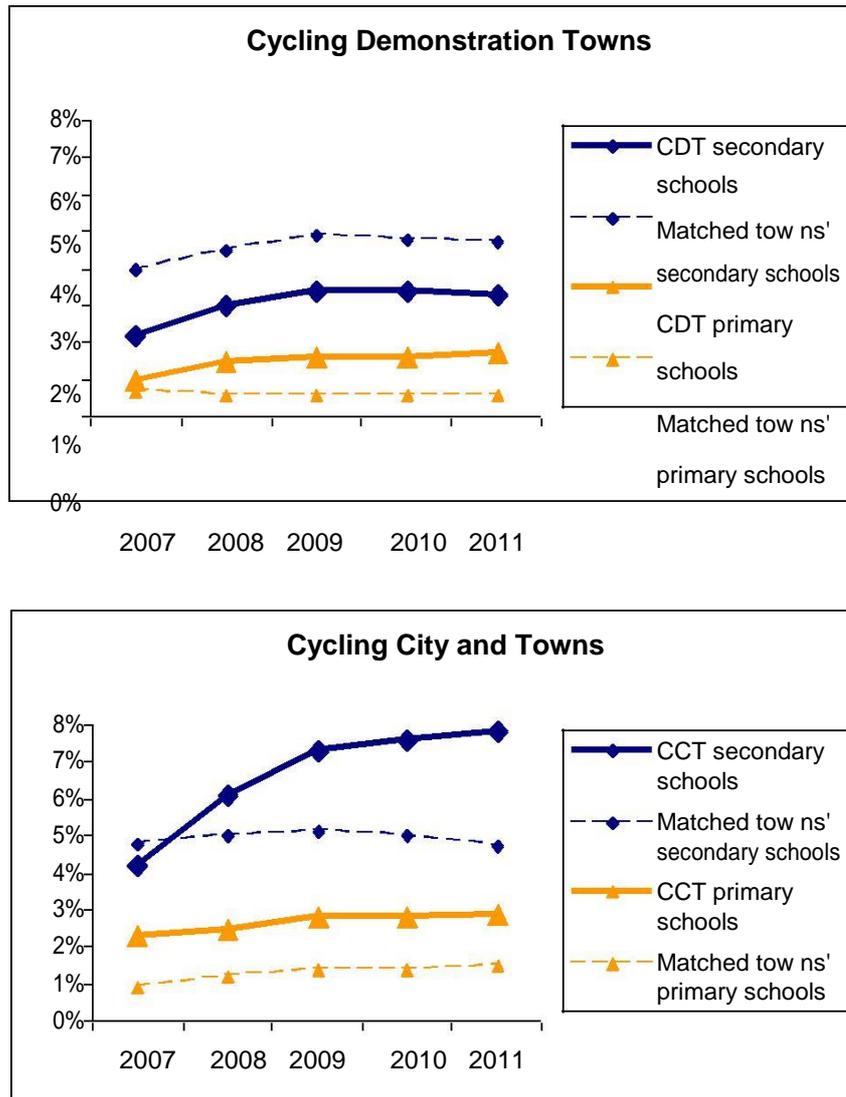
³²The 'matched towns' are based on the ONS 2001 Area Classification, which gives for each local authority area up to four corresponding local authorities classified as being extremely similar, very similar, similar or somewhat similar. The matched towns selected for this analysis were classified as extremely similar, very similar, or similar. Note that for the CDT secondary schools and the CCT primary schools, cycling levels at baseline are somewhat dissimilar to those seen in their matched towns, making these less robust comparators.

³³The increases in the proportion of children cycling to primary, secondary and all schools between 2007 and 2011 are significant for both the CDTs and the CCTs ($p < 0.05$)

³⁴The change in the proportion of children cycling to secondary schools in the CDT matched towns was significant ($p < 0.05$) but the decrease in children cycling to primary schools was not significant.

³⁵The change in the proportion of children cycling to primary schools in the CCT matched towns was significant ($p < 0.05$) but the decrease in children cycling to secondary schools was not significant.

Figure 7: Proportion of pupils who usually cycle to school, in primary and secondary schools in the CDTs and CCTs and their matched towns



Note: for the CDTs, the proportion of pupils cycling to school varied between 0.9% (Derby) and 3.4% (Exeter) in 2007, and between 1.5% (Brighton) and 5.5% (Exeter) in 2011. For the CCTs, the proportion of pupils cycling to school varied between 0.4% (Stoke) and 10.5% (Cambridge) in 2007, and between 1.5% (Stoke) and 20.5% (Cambridge) in 2011.

Across the six CDTs, a total of 139 schools were offered the intensive support of a 'Bike It' officer. In the CCTs, 219 schools received this support. These are the

*Summary of outcomes of the Cycling Demonstration Towns and Cycling City and
Towns programmes*

schools that could be said to have been most closely engaged via the CDT / CCT programme as it was run in most of the towns and cities³⁶.

Pre- and post-intervention survey data are available for 116 Bike It schools in the CDTs and 148 Bike It schools in the CCTs. Using pooled survey data, the proportion of pupils who said that they cycled to school 'every day' increased (from 4.1% to 9.7%³⁷) between pre- and post-intervention surveys in the CDTs, and there was also an increase in the proportion of pupils who sometimes cycled to school (from 23.7% to 44.2%³⁸). In the CCTs, the proportion of pupils cycling to school 'every day' also increased (from 4.7% to 10.2%³⁹) between pre- and post-intervention surveys, and again there was an increase in the proportion of pupils who sometimes cycled to school (from 34.1% to 52.9%⁴⁰). Even allowing for the possibility that levels of cycling may be 'naturally' higher at the time of the 'after' survey (July) than at the time of the 'before' survey (September), there appears to have been a sizeable increase in cycling to school at Bike It schools.

There is also evidence to suggest that this behaviour change was sustained beyond the initial engagement period⁴¹. For the 52 schools in the CDTs where an additional survey took place a year after the first post-intervention survey, the proportion of pupils cycling to school 'every day' increased from 3.7% (before intervention) to 9.6% (post-intervention) and remained at 8.6% (one year later)⁴². The proportion that sometimes cycled increased from 30.2% (pre-intervention) to 51.2% (post-intervention) and remained at 52.2% (one year later). In the CCTs, a similar picture is seen⁴³. For the 62 CCT schools with an additional survey a year after the first post-intervention survey, the proportion of pupils cycling 'every day' increased from 4.0% (pre-intervention) to 10.7% (post-intervention) and 8.0% (one year later). The proportion that sometimes cycled increased from 31.5% (pre-intervention) to 51.4% (post-intervention) and remained at 51.3% (one year later).

³⁶ 'Bike It' was just one of the interventions used to increase cycling amongst school pupils. Typically, one 'Bike It' officer works intensively with 12 schools over one academic year to increase uptake of cycling through events, projects and activities. Other interventions to increase cycling amongst school pupils included provision of cycle parking; Bikeability cycle training; after-school cycle clubs such as British Cycling's 'Go Ride'; activities delivered via youth organisations as part of the CTC-led 'Bike Club' programme; and activities that were specific to each of the 18 towns. It was not possible to analyse the impact of each of these interventions individually, as data on which schools participated in which activities was not collected in a comprehensive way. However, from our knowledge of the activities in the CDTs and CCTs, it would be fair to say that 'Bike It' schools probably received the most intensive and comprehensive support, and would have been likely to have benefitted from additional cycle parking and a programme of cycle training. 'Bike It' schools thus represent the schools that were most closely engaged as part of the CDT / CCT programme.

³⁷ A significant increase ($p < 0.05$)

³⁸ A significant increase ($p < 0.05$)

³⁹ A significant increase ($p < 0.05$)

⁴⁰ A significant increase ($p < 0.05$)

⁴¹ Although it should be noted that in some schools, there may also have been a degree of continued support of the school by the Bike It officer after the first year.

⁴² Both the post intervention survey and the survey one year later for schools in CDTs show a significant increase in the proportion of pupils cycling to school 'every day' when compared to the pre-intervention survey ($p < 0.05$). This is also true for pupils sometimes cycling to school.

⁴³ Both the post intervention survey and the survey one year later for schools in CCTs show a significant increase in the proportion of pupils cycling to school 'every day' when compared to the pre-intervention survey ($p < 0.05$). This is also true for pupils sometimes cycling to school.

6. Comparison with changes in cycling elsewhere, and before the start of the CDT / CCT programme

The evidence presented in section 3 suggests that there has been an increase in recorded levels of cycling trips, both at the 'programme' level (i.e. taking all six CDTs and all 12 CCTs together) and in all of the individual 18 towns and cities that were funded via the programme. We have also presented evidence that suggests that, in broad terms, there appears to have been an increase in the proportion of both adults and children who participated in cycling, although the data on this point are not conclusive.

We now consider whether or not we can say that this increase in cycling was attributable to the investment programme. That is, did cycling in the CDTs and CCTs increase *because* of the additional activity funded by DfT, DH, Cycling England, and the towns themselves, or was it simply a reflection of an underlying trend? In considering this question, we are able to look at six sets of data:

- Automatic cycle count data from 'matched' towns over the same period
- Pre-programme automatic cycle count data from the CDTs and CCTs
- National manual count data from the Annual Road Traffic Estimates (ARTE)
- Comparative data from the Active People Survey (both for matched towns and for all towns that were not CDTs or CCTs)
- Comparative data from the Pupil Level Annual School Census (both for matched towns and for all towns that were not CDTs or CCTs)
- Data on cycle trip stages and trip distances from the National Travel Survey.

Comparative data from the Pupil Level Annual School Census was reported in Section 5. Below, we report the evidence from the other sets of data.

6.1 Automatic cycle count data from 'matched' towns

For three of the CDTs (Darlington, Exeter and Lancaster) and three of the CCTs (Shrewsbury, Stoke and York) it was possible to identify comparison areas classified as 'extremely' or 'very' similar in the ONS 2001 Area Classification for which some automatic cycle count data were available from Sustrans' database of count material, as supplied to Sustrans by local authorities⁴⁴.

This matching exercise is hazardous for two reasons.

The first reason is that the number of count sites in the matched towns was small (between three and eight per town, except for the town matched to Darlington), compared to between 17 and 34 in the CDTs / CCTs. This means that we cannot be confident that the results from the counters in the matched towns are representative of changes in cycling in each town as a whole.

⁴⁴ It was not possible to perform this analysis for the other three CDTs and nine CCTs because the Sustrans database did not hold count material for suitable comparison areas.

The second reason is that towns which are a good match in terms of the ONS Area Classification may not be a good match in terms of a variety of other variables which could have a bearing on cycle use. These include the following: patterns of cycling and different starting points in volume of use; geography including, particularly, hilliness and climate; and impacts and changes in capacity and level of service offered by both cycling and other transport networks⁴⁵.

Further, and particularly in relation to the objective of assessing the impact of investment in cycling, the level of interest in cycling displayed by the political and technical leadership within an area is likely to be relevant in terms of manifest investment in cycling, and any consequential effects of that investment. It may be presumed that only areas with a leadership interested in promoting cycling took part in the CDT / CCT programme. The effect of this is that the counterfactual being considered is a mix of areas: none of them is taking part in the CDT / CCT programme, but some of them will have leaders who may be interested in cycling investment, and others of them will not. This then means that the comparison we are making is between CDT / CCT programme areas with 'pro-cycling' leaderships, and non-programme areas with a 'mixed' leadership. This weakens the comparisons we are able to make, particularly in view of the objective of assessing the impact of investment.

We recognise that regression modelling to control for the various measurable attributes as discussed above may be appropriate. Dichotomous variables to represent CDT / CCT areas would then provide a measure of the effect of the scheme. There will inevitably be complications with such a model for area based analysis, but most of these should be able to be controlled. It does however, remain an open question as to how such a model may be constructed specifically to address the rather less tangible issues of the degree of leadership interest in cycling.

These caveats should be borne in mind in examining Table 4, which summarises key figures for each CDT / CCT and its matched area. It is apparent that the selected CDTs / CCTs were not alone in experiencing increasing cycling levels over the period in question (2005-2011 for the CDTs and 2007-2011 for the CCTs), and that the counters for which we have data in the matched towns also show increases in cycling levels.

While we need to be careful in drawing conclusions from this evidence, we can say that *some* locations in the towns which were matched to the CDTs / CCTs have experienced increases in cycling which are of a similar order to those which occurred town-wide in the CDTs / CCTs themselves. This is perhaps to be expected, as we know that a number of the matched towns were themselves taking action to encourage cycling during the period in question. The area matched to Shrewsbury

⁴⁵ One of the authors has previously published a logistic regression model at ward level for England and Wales which relates the proportion of cycle journeys to work from 2001 census data to a range of socio-economic, geographical and transport system variables. Amongst other attributes, this model also estimated a saturation level for cycling to work. See Parkin J, Wardman M and Page M (2008) *Estimation of the determinants of bicycle mode share for the journey to work using census data* Transportation 35(1) pp93-109.

received Community Infrastructure Fund investment between 2008/09 and 2010/11 which was in part spent on dedicated cycle routes and links to the National Cycle Network. The area matched to York, which was also matched to Lancaster, is reported to have had a political leadership that was strongly supportive of cycling in the period in question, leading to the installation of cycle contraflows and improvements in the permeability of the town centre to cyclists.

Table 4: Comparison of three CDTs and three CCTs and matched areas

CDT / CCT	Number of count sites included in analysis		% cycling (2001 census, mode of travel to work)		Baseline counts per day per counter*		2011 counts per day per counter		Absolute change in counts per day per counter (between baseline year and 2011)		% change in cycling in 2011 against baseline	
	<i>Intervention</i>	<i>Matched</i>	<i>Intervention</i>	<i>Matched</i>	<i>Intervention</i>	<i>Matched</i>	<i>Intervention</i>	<i>Matched</i>	<i>Intervention</i>	<i>Matched</i>	<i>Intervention</i>	<i>Matched</i>
Darlington	19	15	1.4%	1.2%	50	46	79	69	29	23	159%#	150%#
Exeter	26	6	2.4%	1.6%	99	77	143	105	44	28	145%#	136%#
Lancaster w Morecambe	26	3	2.4%	1.7%	170	204	220	313	50	110	129%#	154%#
Shrewsbury	21	8	3.8%	3.7%	118	158	135	193	17	35	115%#	122%#
Stoke-on-Trent	17	8	1.0%	0.8%	31	87	51	112	19	24	162%#	128%#
York	34	3	7.8%	1.7%	209	258	222	310	13	52	106%#	120%#

* Baseline year = 2005 for CDTs (Darlington, Exeter and Lancaster with Morecambe) and 2007 for CCTs (Shrewsbury, Stoke-on-Trent and York)

significant change between baseline year and 2011 ($p < 0.05$)

6.2 Pre-programme automatic cycle count data in the CDTs and CCTs

In another group of three CDTs and three CCTs, we have sufficient long-term runs of data from a subset of automatic counters to look at the rate of change in cycle counts in the period before the beginning of the CDT / CCT programmes. Table 5 shows the rate of growth in cycling trips in the pre-programme period in each town (calculated as an average percentage change per year), compared to the rate of growth in the programme period, while Figure 8 presents the year-by-year change⁴⁶.

Again, some caution is needed in interpreting this evidence, because it uses data from a relatively small number of count sites in some towns. However, in broad terms, we can say that cycling trips appeared to have been growing in all of the towns apart from Aylesbury in the period before the CDT / CCT investment

⁴⁶ To allow a direct comparison to be made of growth in the pre- and in-programme periods, only data from counters where pre-programme data are available are included in the analysis; change against baseline is therefore not comparable to the earlier reported analysis using all counters regardless of the year in which data collection started. Due to variability in the duration of data available for each town in the pre-programme period, it is not possible to use a consistent baseline. Change in the pre-programme period is expressed against a 2001 baseline for Derby and Southend; 2002 for Exeter and Greater Bristol; and 2003 for Aylesbury and Blackpool. In analysing the 'in-programme' data, for Aylesbury, Exeter and Greater Bristol, change in 2011 is compared to the baseline year; for Derby, the majority of counters where data are available in the pre-programme period are sites where counting was discontinued before the end of the Cycling City and Towns phase of the programme, therefore year to year change relative to the baseline is included up to 2009 only; and for Southend and Blackpool, counter data were not available for 2011 so change is relative to a 2010 baseline.

programme, but that the rate of growth during the CDT / CCT programme appears to have been higher, by (very approximately) around 2 to 3%-points per year in four of the towns, with perhaps rather less in Blackpool and rather more in Southend. We can be most confident of the robustness of this conclusion in Greater Bristol and Exeter, where long-term data series are available from more counters. The average (unweighted) 'uplift' across all six towns is 2.8%-points per year, and across all six towns the annual growth rate during the programme period is approximately double the growth rate before the programme began (6.1% compared to 3.3%). It should be noted, though, that it is hard to be conclusive when some town-level trends demonstrate year-by-year fluctuation, with Derby and Southend recording a jump in counts in the final year using the subset of count sites with both pre- and in-programme data.

We know that all the towns will have been investing in cycling to some degree prior to the start of the CDT / CCT programme, but we do not have figures for the level of this investment. However, towns that were motivated to seek CDT / CCT status would already have regarded support for cycling as a priority (and indeed, this was a criterion for selection for the programme). From our knowledge of the towns, we think it is reasonable to assume that their investment level prior to the start of the CDT / CCT programme would have been broadly comparable to the 'matched' funding that they were able to identify during the programme period⁴⁷. Thus, we might cautiously postulate that the Department for Transport / Cycling England grant (i.e. investment excluding matched funding) was responsible for an 'uplift' in the rate of growth in cycling levels of around 2 to 3%-points per year across those CDT / CCT programmes for which we have data.

Table 5: Average percentage change in count per year before and during CDT / CCT programme

CDT / CCT	Number of count sites	Average change per year~	
		Pre-programme period*	In-programme period*
Aylesbury	5	-1.8%	+1.7%
Derby	6	+1.5%	+3.9%
Exeter	13	+6.9%	+8.5%
Blackpool	6	+3.4%	+3.9%
Greater Bristol	9	+7.7%	+10.3%
Southend	7	+2.2%	+8.1%
AVERAGE#		+3.3%	+6.1%

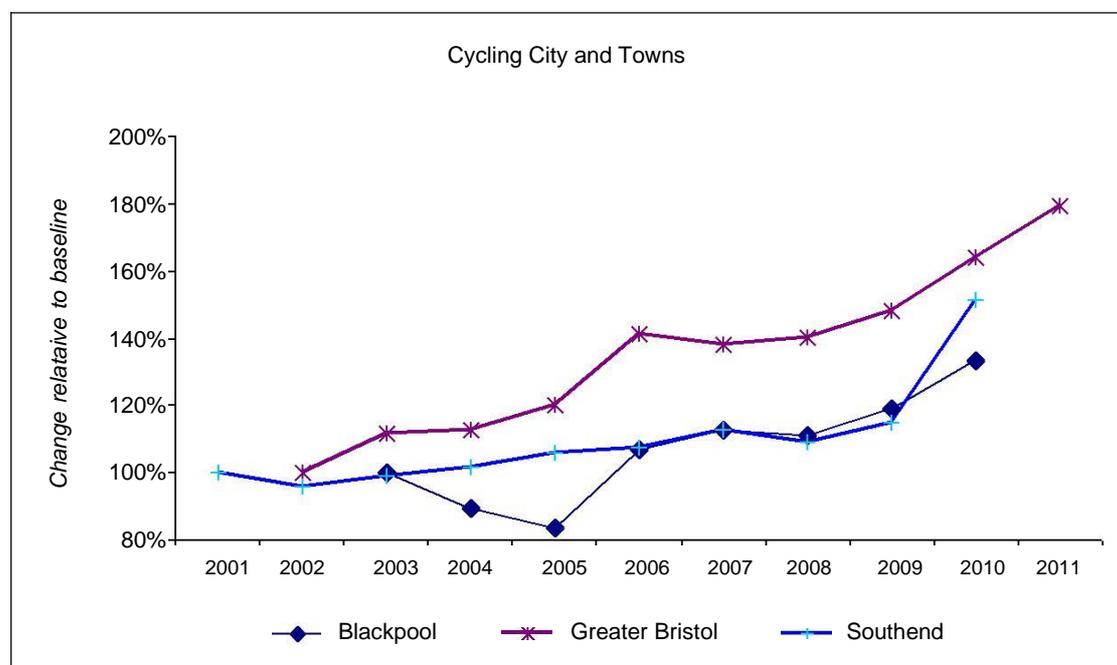
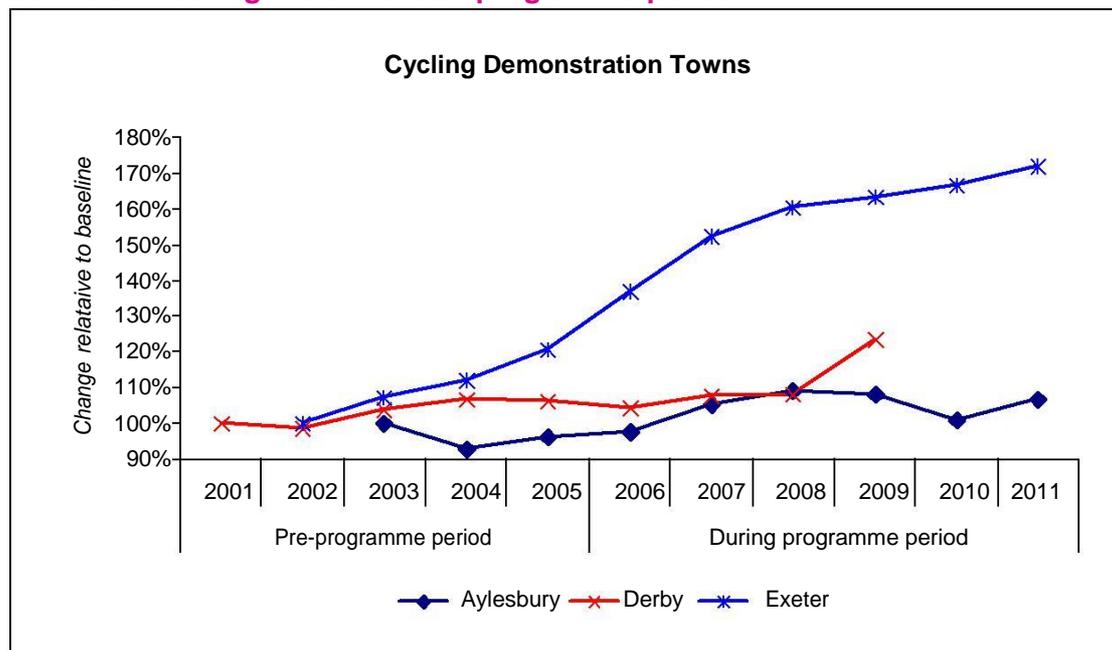
~ Change calculated without the use of a factor for poor weather conditions in 2009 and 2010

* Pre-programme and in-programme periods are as follows: Aylesbury: pre-programme= 2003-2005; in-programme=2005-2011; Derby: pre-programme= 2001-2005; in-programme=2005-2009; Exeter: pre-programme= 2002-2005; in-programme=2005-2011; Blackpool: pre-programme= 2003-2007; in-programme=2007-2010; Greater Bristol: pre-programme= 2002-2007; in-programme=2007-2011; Southend: pre-programme= 2001-2007; in-programme=2007-2010

Average is the mean unweighted average change per year for the six CDTs/ CCTs for which we have data.

⁴⁷ Although in some cases towns may have been able to secure higher levels of investment from other sources (e.g. underspend in other areas of the council), simply by merit of having an active and energetic cycling team in post, with 'worked up' projects that were ready to go if funds were identified.

Figure 8: Percentage change in counts recorded by automatic cycle counters before and during the CDT / CCT programme period

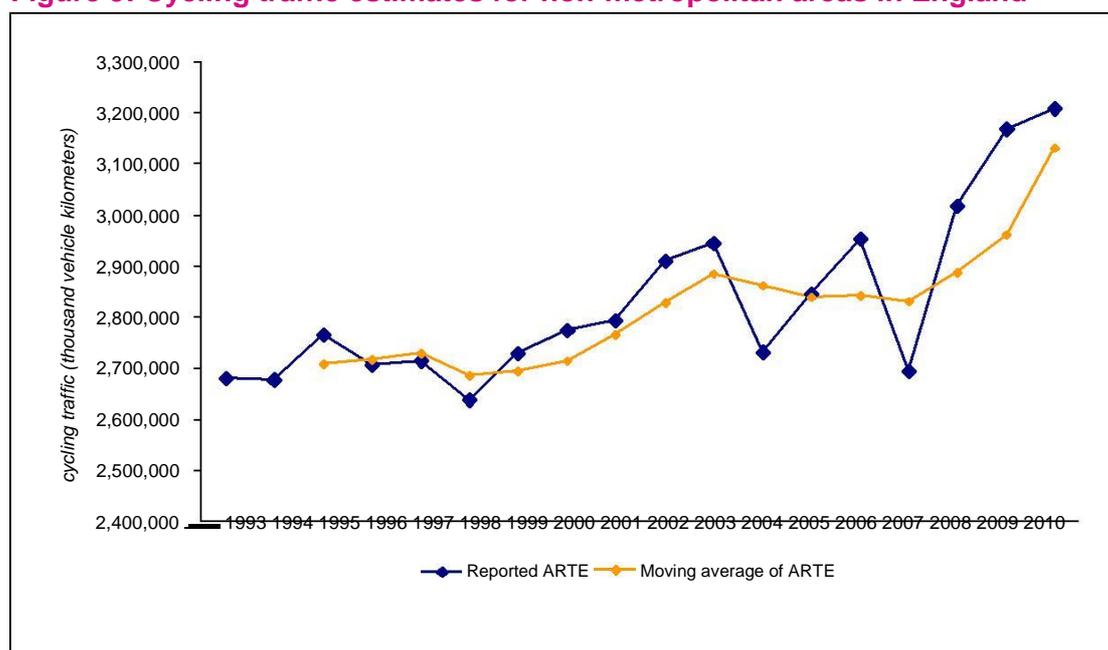


Note: Analysis included the use of a factor for poor weather conditions in 2009 and 2010. Trends shown here differ from those shown in Figures 1 and 2 because only a subset of counter data (from counters which were in place in the pre-programme period) can be used.

6.3 National manual count data from the Annual Road Traffic Estimates

The Department for Transport publishes Annual Road Traffic Estimates based on manual counts conducted at about 10,000 count sites on major and minor roads between March and October each year⁴⁸. Estimates of cycle traffic in non-metropolitan areas of England (i.e. excluding London and the metropolitan counties) between 1993 and 2010 are shown in Figure 9. The data show somewhat irregular fluctuations between 2003 and 2008, and an apparent increase in cycle traffic since about 2007. Based on a moving average, cycle traffic in these non-metropolitan areas shows a 10% increase between 2005 and 2010, with most of the growth occurring in the period from 2007 onwards.

Figure 9: Cycling traffic estimates for non-metropolitan areas in England



The non-metropolitan areas represent a rough approximation to the types of area represented by the CDTs and CCTs, although they include rural as well as urban roads. It should also be noted that ARTE manual counts are for on-road locations, which may have a very different usage pattern from the off-road locations where much of the automatic cycle count data for the CDTs and CCTs was collected.

⁴⁸ Department for Transport (2012) 'Annual Road Traffic Estimates 2012' Department for Transport (<http://assets.dft.gov.uk/statistics/releases/road-traffic-estimates-2011/road-traffic-estimates-2011.pdf>)

However, we can say that during the period of the CDT / CCT programme, Annual Road Traffic Estimates suggest that on-road cycling levels may have been increasing somewhat, such that the background picture against which our observed trends in the CDTs / CCTs should be considered was not necessarily static.

6.4 Comparative data from the Active People Survey

Sport England conducts an annual survey known as the Active People Survey⁴⁹ to assess levels of sport and physical activity in the population. Secondary analysis of the resulting dataset enables us to compare cycling activity (and overall physical activity) in the CDTs and CCTs with those in other local authority areas.

The Active People Survey has two limitations for our current purposes. First, it covers entire local authority areas, which in some instances are larger than the urban area which was the focus of the CDT / CCT intervention. Second, its definition of cycling activity is a trip lasting at least 30 minutes. This is problematic because it fails to capture information on the significant proportion of (shorter) cycling trips. We know from the ICM survey of cycling and physical activity in the CDTs (reported in section 4) that around two-thirds of people who did any cycling in a typical week in the previous year said that they did so for *less* than 30 minutes per day – which is unsurprising, given that the size of these towns (as well as most of the CCTs) is such that many trips from, say, home to the town centre or to a place of employment might be expected to take well under 30 minutes. None of these trips would be captured in the Active People Survey. However, the evidence from the Active People Survey may perhaps be more valuable in larger towns and cities, such as Bristol (where trip distances might be expected to be longer), and it also gives us some insights into changes in the number of what might be termed ‘highly committed’ cyclists in all the CDTs and CCTs.

In analysing the Active People Survey data, we compared the CDTs and CCTs with all other local authorities, and with a set of non-CDT/CCT local authorities matched by demographics, using the same ONS area classification as before. We looked at the proportion of respondents cycling for at least 30 minutes once or more per month, and also the (much smaller) proportion cycling for at least 30 minutes 12 times or more per month. Both analyses are presented in the full report, but here we focus on the proportion of respondents cycling for at least 30 minutes once or more per month.

Table 6 summarises these results for all CDTs and all CCTs. These data appear to be inconsistent with the (more robust) evidence of increases in cycling trips seen in the automatic cycle counts⁵⁰. Although there seems to have been an increase in participation in cycling in the CDTs between 2005/06 and 2007/08, this does not seem to have been sustained. The CCTs also show a ‘peak’ in cycling activity in

⁴⁹The Active People Survey aims to measure the number of adults (aged 16 and over) participating in various types of sport and recreational physical activity. The first survey (APS1) was conducted between October 2005 and October 2006, with subsequent surveys in 2007/08, 2008/09, 2009/10 and 2010/11. The survey is carried out by telephone, using random digit dialling to generate a representative sample of telephone numbers. APS1 conducted interviews with a minimum of 1000 people per local authority, but from APS2 onwards, 500 interviews were conducted per local authority.

⁵⁰There were changes to the way cycling data were collected in different waves of the APS, but these changes alone seem unlikely to explain the observed pattern.

2007/08, but this is before the start of the CCT investment programme and cannot therefore be attributed to it. The data for the matched towns show a similar rather variable pattern. In our analysis published in 2009, we concluded that the Active People Survey data demonstrated growth in participation in cycling in the CDTs, but it now seems unlikely – at least using this metric of '30 minutes cycling at least once a month' – that significant growth has occurred in the six CDTs, and nor does this metric appear to show significant growth for the CCTs.

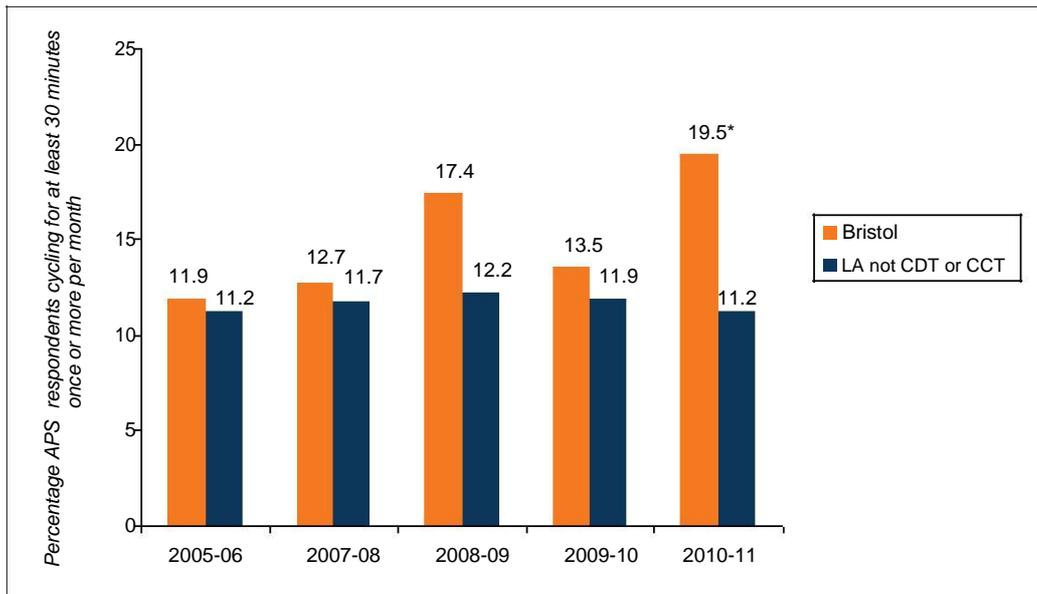
However, a different pattern may be seen in the case of Bristol, which, as we noted above, might be expected to offer more opportunities for regular cycling journeys above the '30 minute' threshold. This is shown in Figure 10. Here, the proportion of respondents who cycled at least 30 minutes once or more per month increased from 11.9% in 2005/06 to 19.5% in 2010/11 (though with an apparent decline in 2009-10). The pattern observed in Bristol is *not* seen in other CDTs / CCTs where automatic cycle counters record a substantial absolute uplift in average daily count, and where we might therefore expect a similar pattern (e.g. Brighton and Hove, Exeter, Lancaster and Cambridge). It seems plausible that this is because these towns are simply too small for typical 'everyday' cycling trips to take more than 30 minutes.

Table 6: Change in proportion of respondents cycling for at least 30 minutes, once or more per month, in CDTs and CCTs, matched local authorities, and all non-CDT/CCT authorities⁵¹

	2005-06	2007-08	2008-09	2009-10	2010-11
LAs with a CDT	11.7	15.1	13.5	14.4	12.4
Matched CDT LAs	11.4	11.5	13.2	13.2	11.2
LAs not CDT	11.2	11.7	12.2	11.9	11.2
LAs with a CCT	13.7	15.5	14.2	13.9	13.3
Matched CCT LAs	11.7	12.4	13.4	12.7	11.3
LAs not CDT or CCT	11.2	11.7	12.2	11.9	11.2

Figure 10: Change in proportion of respondents cycling for at least 30 minutes, once or more per month, between 2005/06 and 2010/11, in Bristol and all non-CDT/CCT authorities

⁵¹ When comparing the LAs with a CDT, the Matched CDT LAs and LAs not CDT between 2005-06 and 2010-11 (the relevant period for CDTs), none of the changes are significant ($p > 0.05$). When comparing the LAs with a CCT, the Matched CCT LAs and LAs not CDT or CCT between 2007-08 and 2010-11 (the relevant period for CCTs) all of the changes are significant decreases ($p < 0.05$).



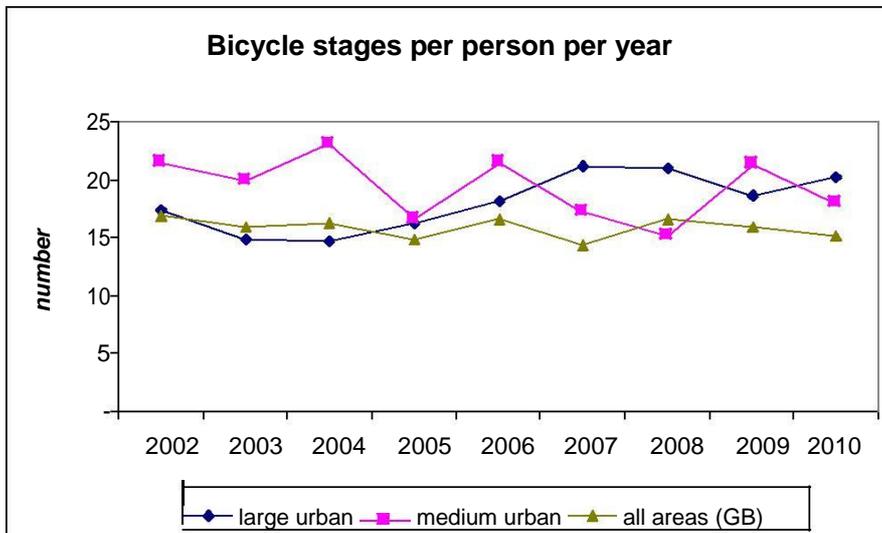
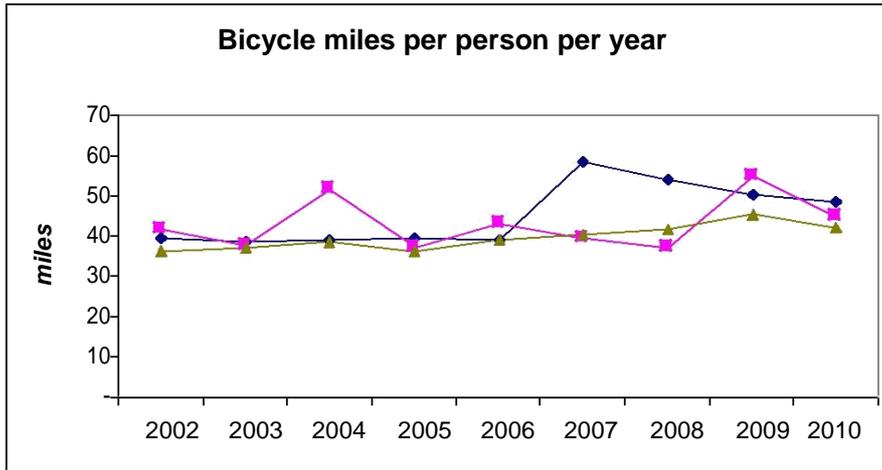
* Significant change since the start of the CCT programme (2007-08)

Note: APS data are for Bristol unitary authority, and do not include those parts of Greater Bristol which were part of the Cycling City programme but are administratively in South Gloucestershire.

6.5 Data on cycle trip stages and trip distances from National Travel Survey

Finally, we examined special tabulations of data on cycle distance and trip stages from the National Travel Survey, both for the whole of Britain and for medium-sized urban areas (with a population between 25,000 and 250,000) and large urban areas (over 250,000 population). Medium-sized urban areas correspond with the range in population of the CDTs and 11 of the CCTs (excluding Greater Bristol), while large urban areas correspond to the population of Greater Bristol. The NTS data are shown in Figure 11.

Figure 11: Cycling distance and trip stages per person, for large urban areas, medium urban areas, and all of Britain



Note: data for trip stages include cycling as part of a trip (e.g. from home to the station) as well as trips made entirely by bicycle. Relevant period for comparison of medium urban areas with CDTs is from 2005 to 2010; relevant period for comparison of medium urban areas with CCTs is from 2007 to 2010; relevant period for comparison of large urban areas with Greater Bristol is from 2007 to 2010. Earlier data (pre-2005/ 2007) are included to illustrate erratic fluctuations from year to year in the datasets for medium and large urban areas, due to the small number of cycle trips which are recorded by the National Travel Survey. This is particularly an issue for the years 2002-2005, 2009 and 2010 for large urban areas, where the unweighted sample size is less than 1000 stages.

Nationally, it appears that there may have been an increase in cycle distance over the period of the CDT / CCT programme, but not a corresponding increase in cycle trip stages. For medium urban areas and large urban areas, the data show more erratic variations from one year to the next, due to small sample sizes. Due to data limitations, it is not possible to say whether or not there is a growth trend in these areas that is comparable to the growth trend for cycle trips observed from automatic count data for the CDT and CCT programmes.

7 Conclusions and comment

In this summary report, we have focussed on two key questions about the investment programme in the CDTs and CCTs. First, we have considered whether levels of cycling increased in the 18 towns and cities, and by how much. Second, we have asked to what extent we may attribute the change in the 18 areas to the investment programme – that is, did change happen *because* of the investment programme, or would it have happened anyway?

In considering the first of these questions, we are able to say that:

- Cycling trips increased in all six CDTs and 12 CCTs, and across the programme as a whole. This is evident in automatic cycle counts, which show overall increases of +29% for the CDT programme, and +24% for the CCT programme over a slightly shorter time period. The overall range across towns was 6% to 62%.
- Growth in cycling trips was widespread across the towns, rather than being confined to a few locations, with, overall, seven in every ten counters showing increases.
- Manual count data suggest that these increases were reflective of a general uplift in cycling trips, at both 'on-road' and 'off-road' locations, rather than being confined to off-road cycle paths, with increases in cordon and screenline manual counts in the CDTs of between +0.1% and +9% per year.

The similarity of the scale of effect in the CCT and CDT programmes gives us confidence that a similar effect might be expected if a comparable investment programme took place in similar areas – that is, we can say that the results of the programme appear to be replicable.

The data also suggest that towns with a range of characteristics and different baseline levels of cycling can deliver increases in cycle trips, and that these increases can be sustained over time in at least some towns.

The annual rate of growth for the CDT and CCT programmes overall (5.3% and 8.0% respectively) is comparable to rates of growth seen in international cities which have demonstrated sustained long-term commitment to cycling. In our earlier report⁵², we

⁵² Sloman L, Cavill N, Cope A, Muller L and Kennedy A (2009) *Analysis and synthesis of evidence on the effects of investment in six Cycling Demonstration Towns* Report for Department for Transport and Cycling England

noted that annual average increases in cycling flows in such cities were in the range of 1.2% to 10.1% (with lower growth rates in cities that had higher cycling levels).

The results vary across the towns. The analysis has not identified a clear pattern of which factors determine the extent of impact, but obvious factors that differed between the towns included the nature and extent of delivery (including the capital and revenue split), the target groups, the profile and extent of support for the initiatives that were introduced, changes in political support at different stages of the programme, baseline levels of cycling and baseline levels of car dependence, amongst other factors. The varied degrees of success are not necessarily surprising, as we know that travel behaviour is complex and difficult to influence, and that cycling is strongly influenced by contextual issues.

There are indications that the measured increases in cycle activity may have been the result of more people cycling (rather than being solely due to a small number of existing cyclists making more trips by bike or travelling further). These indications include:

- Evidence collected in the CDTs, which suggests that there was an increase in the proportion of adults who cycled (on trips of any length, once a week or more) from about 24% to about 27% in the first half of the programme.
- Evidence from the Active People Survey for Bristol which suggests that there may have been an increase in the proportion of adults who cycled (on trips over 30 minutes' duration, once a month or more) from about 13% at the start of the CCT programme to about 20%, although this pattern was not seen in other, smaller, towns.
- Evidence from the Pupil Level Annual School Census, which shows a substantial increase in cycling to secondary schools in the CCTs, and modest increases in cycling to CDT secondary schools and both sets of primary schools.

From data collected in the CDTs, the increased participation in cycling amongst adults appears to have been spread across most age groups, both genders, and most socioeconomic groups with the exception of group DE.

Turning to our second question, we have a range of evidence, but of limited quality, on how the growth in cycling in the CDTs and CCTs compares to wider general trends. In particular:

- Evidence from Annual Road Traffic Estimates suggests there may have been an increase in cycle traffic of about 10% over roughly the same period as the CDT / CCT programme in all non-metropolitan areas across England.
- However, the National Travel Survey does not show clear evidence of an increase in cycle trip stages or cycle distance per person over the period of the CDT / CCT programme in urban areas of comparable size⁵³.

⁵³ We place rather less weight on evidence from the Active People Survey, PLASC data and data from the small number of automatic counters in towns that were 'matched' to three CDTs and three CCTs.

The rate of growth in cycling trips in three CDTs and three CCTs appears to have been higher (by, indicatively, around 2 to 3%-points per year) during the period of the CDT / CCT programme, when compared to the period immediately prior to the programme. This means that the average growth rate during the entire programme period (about 6% per year using the limited set of count sites with both pre- and in-programme data) was roughly double the growth rate before the programme started (about 3% per year), although fluctuations in the data at the level of individual towns mean that we cannot be conclusive on this point.

All of our comparative analysis should be treated with caution, with specific limitations and caveats (as stated in the relevant sections above) applying to each of the various datasets used. The national data and the evidence from before the start of the CDT / CCT programmes suggests that these programmes may have delivered greater uplift in cycling than would have happened without Cycling England / DfT / DH investment and support⁵⁴, although we cannot say definitively that this is the case.

From the evidence summarised here, we are able to confirm the conclusion from our interim assessment of phase 1 of the CDT programme in 2009⁵⁵ that investment in cycling (provided it is in a well-designed programme) should be expected to deliver increases in cycling. Towns which already had some culture of cycling showed bigger absolute increases in cycling trips. However, other towns with more modest levels of cycling trips at baseline also achieved increases, and some of these were sizeable. The monitoring data suggest that these towns may consider themselves as 'standard bearers' for the future growth of cycling in Britain.

The conditions with which the towns were faced were by no means ideal. The improvements that they were able to make were limited by political expediency; there were problems with funding uncertainty in the final year of the programme; and the duration of the programme was substantially shorter than the period of several decades over which elevated investment in cycling has occurred in some towns in continental Europe. All these factors are likely to have limited the extent to which 'wholesale' culture change was possible. Changing behavioural patterns is a long-term, difficult task and we should be realistic about what it is possible to do within short timeframes and in a policy context which is not always fully supportive. We also caution against excessive demands to judge what is happening at such an early stage. 'Pulling up the roots to see if the plant is growing' may not be the best way to foster a healthy garden.

There remains very significant work still to do, and both the quality of cycling provision and the levels of cycling in the CDTs and CCTs are still modest in relation

⁵⁴This is based principally on comparison of the overall growth rates recorded by automatic count data in the CDTs and CCTs (29% and 24%) with the growth rate in non-metropolitan areas derived from ARTE manual counts (10%) and the static levels of cycle trips and distance recorded by NTS for medium and large urban areas; and comparison of the 'in-programme' growth rates in three CDTs and three CCTs (unweighted average 6.1% per year) with 'pre-programme' growth rates in the same towns (unweighted average 3.3% per year).

⁵⁵Sloman et al. (2009) *ibid*.

to that observed in much of continental Europe. However, the CDT / CCT programme suggests that with concerted and consistent effort it should be possible to achieve significantly higher levels of cycling here in the UK.