

**Mobile Phone and Seat Belt Usage Rates in London
2007**

by L Walter, J Broughton and G Buckle

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Executive Summary

The second London Seat Belt and Mobile Phone survey was carried out in March 2007 to survey the use of restraints¹ by car, taxi and van occupants, and the use of mobile phones by drivers. The survey used the same method as the first London survey in 2006 and the long running Department for Transport (DfT) Seat Belt and Mobile Phone survey. Observations were made on a weekday at 33 sites in London covering a range of different road types – one site in each borough and one in the City. A selection of these sites was also surveyed at the weekend. The method and analysis were virtually replicated in 2007 to match those used in 2006 in order to make direct comparisons.

In 2007 32,153 cars and taxis and 6,006 vans were observed: 9% more cars and taxis and 22% more vans, than in 2006. The restraint use, age group and sex of all drivers, 14,722 car and taxi passengers and 1,550 van passengers were observed, as well as whether the drivers were using mobile phones. The report compares results from the 2007 survey with results from the 2006 London survey and the most recent DfT survey.

The 2007 survey found that 87% of car drivers in London were wearing a seat belt, a marked increase from the level of 82% found in 2006. There was also an increase in wearing rate in cars for front and rear seat passengers, and drivers and passengers in vans. The proportion of taxi drivers wearing seat belts reduced from 14% in 2006 to 12% in 2007 and wearing rates for van occupants were around 50% - i.e. approximately half of all van occupants observed in London were not wearing a seat belt.

Overall proportion of vehicle occupants using restraints in London

	Cars			Taxis			Vans		
	2006	2007	% change*	2006	2007	% change	2006	2007	% change
Drivers	82%	87%	+6%	14%	12%	-12%	51%	56%	+11%
Front seat passengers	80%	84%	+4%	17%	19%	+12%	40%	49%	+21%
Rear seat passengers	49%	65%	+33%						
Number of vehicles	27,638	30,126		1,497	2,027		4,709	6,006	

* Percentage change represents difference in wearing rates from 2006 to 2007 using 2006 as a baseline

It is concluded that the wearing rate increased appreciably between the 2006 and 2007 surveys, and that this cannot be the result of sampling or the minor changes to the methodology that were necessary. The new child restraint regulations implemented in September 2006 may have had an effect on the overall rate, and the increase in penalties for using a hand-held mobile phone in February 2007 may have had an indirect effect. A national THINK campaign on seat belt use that was carried out just before the survey and increased police enforcement around the time of the survey may also have influenced the results. These influences may diminish in time, however, so these increases may not be sustained: it would be useful to repeat the survey in 2008 to check.

The 33 sites were divided into five areas of London for analysis. This showed that the wearing rates were lowest in the Central area and the highest in North West and South East London.

The survey records the type of child restraint used, so the effects of the new child restraint regulations could be assessed. The results show that a significantly higher proportion of 0-4 and 5-9 year olds were using appropriate types of restraint in 2007 than in 2006. The proportion of unrestrained children had also dropped since 2006.

After the implementation of the mobile phone regulations in 2003 which banned the use of hand-held mobile phones whilst driving, the proportion of drivers using hand-held or hands-free mobile phones dropped, as reported in the DfT survey. The penalties for using a hand-held phone increased in

¹ Restraint includes seat belt and appropriate child restraint systems.

February 2007 to three penalty points and the fine was doubled to £60. The effect in London was of similar magnitude to the effect of the original regulations measured by the DfT survey. The proportion of car drivers observed using a hand-held phone decreased from 2.6% in 2006 to 1.4% in 2007, but the overall level of mobile phone use scarcely changed for car drivers, increased for van drivers and doubled for taxi drivers. A hands-free phone was more frequently used in 2007 than a hand-held phone, which is likely to be the result of the increased penalties for hand-held mobile phone use and a period of increased enforcement. While more drivers were complying with the law, they may have accepted the message that hands-free mobile phones are safer to use than hand-held, whereas research suggests that there is no difference (e.g. Kircher et al, 2004).

Overall proportion of drivers using mobile phones in London

	2006			2007		
	Car	Taxi	Van	Car	Taxi	Van
Hand-held	2.6%	1.1%	3.8%	1.4%	0.7%	1.8%
Hands-free	1.2%	0.8%	1.0%	2.3%	3.1%	4.9%
Either	3.8%	1.9%	4.8%	3.7%	3.8%	6.7%
Number of Vehicles	27,640	1,497	4,709	30,126	2,027	6,006

The proportion of drivers observed using a mobile phone was found to be highest in Central London and lowest in North West and South East London.

A correlation between seat belt use and mobile phone use was established with the 2006 London results and this correlation was evident again in 2007. 6.1% of car and taxi drivers not wearing a seat belt were using a mobile phone, which was significantly higher than the 3.2% of those using a mobile phone who did wear a seat belt. Conversely, the seat belt wearing rate for drivers using a hand-held mobile phone was significantly lower (66% for car and taxi drivers and 44% for van drivers) than for those drivers not using a mobile phone (84% and 56% respectively).

The Police issue fixed penalty notices (FPNs) for most restraint and mobile phone driving offences. Corresponding to the patterns of restraint and mobile phone use found in this survey, the rates of FPNs per million vehicle kilometres (vkm) issued for restraint and mobile phone offences in London in 2006 were highest in Central London and lowest in South East and North East London. The rate of mobile phone FPNs was consistently higher than seat belt FPNs and over double for the overall London rate.

In conclusion, although wearing rates were higher in 2007 than in 2006, the wearing rates in London remained consistently below the level found by the DfT surveys and overall mobile phone use was consistently above. If the levels of restraint and mobile phone use in London were increased to 100% and reduced to 0% respectively, the number of casualties would be expected to fall. This casualty saving can be estimated using the survey results and effectiveness estimates from reported research, although the estimated savings are necessarily approximate. It is estimated that if the use of mobile phones in London reduced to 0%, 426 fewer people would be killed or seriously injured per year; overall, 3,215 fewer people would be injured. If restraint wearing rates in London rose to 100%, it is estimated that 208 fewer car occupants would be killed or seriously injured, and overall 723 fewer car occupants would be injured per year.

1 Introduction

The use of seat belts by drivers and front seat passengers was made compulsory in cars and vans in January 1983, and for rear seat passengers in 1991 - where belts were available. A DfT-funded seat belt survey was implemented in 1982, and superseded in 1988 by a more comprehensive TRL survey that is carried out twice a year to record the use of restraints by car, van and taxi drivers and their passengers. The survey was adapted in the year 2000 to record the use of hand-held and hands-free phone use by drivers, so was able to monitor drivers' response when the use of a hand-held mobile phone while driving was prohibited in December 2003.

An equivalent study in London was carried out in March 2006 for Transport for London. The restraint and mobile phone use was observed at one site in each of the 32 London boroughs and another in the City, and the results were published by Broughton and Buckle (2006). The survey was repeated in March 2007 and the results are presented in this report. In addition to estimating the levels of restraint and mobile phone usage across London, these findings are compared with the 2006 results for London and the October 2006 results from the DfT survey.

The 2006 survey found levels of mobile phone use in London were higher than those found in the DfT survey, and levels of restraint wearing were lower. If the levels in London had matched those found in the DfT survey, fewer people in London would have been killed and injured in road collisions, and the extent of these casualty savings is estimated in Section 5.

2 Survey methods

2.1 Data collection

In March 2006, the first seat belt and mobile phone survey for London was completed using the methodology that had been developed for the DfT survey. The basic methodology has been applied since 1988, with adaptations to the data requirements and collection procedures, and each year the results are published in a leaflet (e.g. TRL, 2006). Two extensive areas are used for the DfT survey, centred on Crowthorne and Nottingham, and other areas are surveyed each year to build up a national picture (Broughton, 2003). Restraint usage is well represented by the two areas; mobile phone usage is more varied, however, so these proportions are not so nationally representative.

For the London survey, detailed data were collected at 33 sites – one site per London borough and one in the City. In order to make direct comparisons between the results of the two surveys, the same sites as visited in 2006 were revisited in 2007 – with two minor adjustments discussed in Section 2.2.

In order to achieve a representative London estimate, the 33 sites cover all types of road – 12 were situated on the TfL road network, 11 on the Borough Principle Road Network and the remaining 10 on Minor roads. The sites are not designed to be representative of individual boroughs, but to give a balanced view of seat belt and drivers' mobile phone use in London. In the analysis, data are weighted to represent the distribution of traffic on these three types of road in London.

The survey collected information on drivers, front and rear seat passengers and people sitting on laps in cars, vans and taxis (hackney carriages and private hire vehicles). The information comprised details of restraint use for all occupants (including the different child restraint types) and mobile phone use for drivers. Age group and sex were also collected along with car registration, as cars older than E registration are not required to have rear seat belts.

Each set of data was collected at a signal controlled junction in eight half hour sessions during daylight hours on a weekday. 10 sites were also surveyed at the weekend in order to detect any changes in restraint wearing and mobile phone use during the weekend. Two people were posted at each site: one recorded the number and type of vehicles passing in the observation session while the other recorded restraint and phone use for occupants of vehicles that stopped at the traffic signal. The detailed data on occupants in each vehicle were recorded via a digital voice recorder. The survey collection methodology was virtually identical to that used in the 2006 London survey, and the

supervisor and most survey staff worked on both surveys. This ensures that data collection and methodology were as consistent as possible across the years. The data recorded for each vehicle are detailed in Table 2.1.

Table 2.1: Variables and categories of data collected in survey

Variable	Categories
Seating position	driver, front seat passenger, rear seat passenger (left, central, right); people seated on passengers' laps
Sex	male, female, unknown.
Age (estimated)	0, 1-4, 5-9, 10-13, 14-29, 30-59, 60+, unknown.
Restraint used	seat belt, unrestrained, child seat, rear facing baby seat, booster seat with seat belt, booster cushion with seat belt, booster seat without seat belt, booster cushion without seat belt, cheated (restraint not used properly), unknown
Driver mobile phone use	Hand-held, hands-free, none
Vehicle type	car, van, hackney carriage, private hire vehicle
Vehicle prefix	L and later registrations, H-K, E-G, C-D, older, other

As mentioned above, the survey was only conducted during daylight hours, in order to observe vehicle occupants accurately, so the results presented below relate to the daytime. Broughton and Walter (2007) present evidence to suggest that restraint wearing rates are lower at night (defined as 8pm-7.59am) than during the day (8am-7.59pm), so wearing rates for the full day are likely to be slightly lower than the rates calculated from the survey data.

Observations of drivers using hands-free kits are only recorded if the observer is sure that a hands-free kit is being used. Due to the difficulty in observing hands-free kits, these results are underreported.

2.2 Changes from previous survey

Two sets of changes occurred between the 2006 and 2007 surveys: the road traffic regulations changed in two significant respects and certain minor adjustments were made to the survey procedure.

On 18 September 2006, a new regulation took effect that requires a driver to ensure that any child travelling in their vehicle uses an appropriate type of restraint (DfT, 2006). The definition of 'appropriate' depends upon the child's age, weight and height, but the conventional belt designed for adults is not regarded as appropriate for children up to 135cm in height (or 12th birthday, whichever they reach first). The introduction of the new regulation was accompanied by extensive national publicity and public discussion.

The use of a hand-held mobile phone while driving was prohibited in December 2003, and new penalties were introduced on 27 February 2007. From that date, the fixed penalty included three penalty points and the basic fine was doubled to £60. Thus, it became possible for a driver to be disqualified from driving as a result of repeated mobile phone offences. Again, the new regulation was introduced to the accompaniment of extensive national publicity and public discussion.

Whilst every effort was made to keep the methodology and analysis identical to the 2006 study for comparison reasons, certain minor changes were necessary. The site in Hammersmith & Fulham was moved, as a site visit showed that the road was too wide at the original site to measure traffic volume accurately. A similar but slightly smaller junction 100m away was selected as a replacement site to maintain comparability as far as possible.

The Barnet site in 2007 was at the junction of Pinkham Way and Bounds Green Road, whereas the 2006 site was at the junction of the North Circular and Falloden Roads: approximately 5km away, on the same road. This was due to an error in the 2006 London Mobile Phone and Seat Belt survey report, which has now been rectified, and insufficient checking by the project team in 2007. The site used in 2007 is just outside the Barnet boundary, but all traffic being observed at the junction had travelled through Barnet. Repeat surveys at the 2006 Barnet site (North Circular Road) were carried out in September 2007, however these observations do not reflect conditions in March 2007, shortly after the mobile phone regulations changed. The results for both sites are compared in Appendix B, and the March 2007 data from Pinkham Way are used in the main analysis as these results are the most comparable with the rest of the survey data. The conclusions drawn using Pinkham Way or North Circular Road data are the same at a regional or London level. As discussed before, the sites are not designed to be representative of individual boroughs, but to give a balanced view of rates in London.

In 2006 the vehicle categories comprised car, van and hackney carriage. In 2007 'private hire vehicle' was included as a category. Taxi (hackney carriage or private hire vehicle) drivers are not required by law to wear a seat belt whilst carrying a passenger, so this ensured that these private hire vehicles (previously without a specific category) would not affect the proportion of car drivers wearing seat belts. In principle, the only consequence should be to subdivide the hackney carriage category. In practice, however, it may have led the survey staff to look more carefully for the licensing plate in 2007, and a more accurate differentiation of taxis from cars. In analysing the results for 2006 and 2007 it was clear that most 'private hire vehicles' were not being recorded as cars in 2006 and thus the effect of subdividing the taxi category for data collection in 2007 has not had an appreciable effect on the results. Hackney carriages and private hire vehicles are reported as one group and will be referred to as taxis in this report.

The survey team and methodology were mainly unchanged in 2007. The methodology was improved slightly by replacing the words 'unrestrained' and 'restrained' with 'no seat belt' and 'seat belt', as there was difficulty in a few cases in 2006 in differentiating between 'restrained' and 'unrestrained' because of the traffic noise. There is no reason to expect that this would have raised rather than lowered the overall result. The survey team also wore full yellow jackets rather than fluorescent yellow bibs for reasons of Health and Safety. When a similar change was made in the DfT survey, the results were not affected.

2.3 Data Analysis

The data have been analysed identically to the 2006 survey data, so the two sets of results can be compared directly.

Restraint use and mobile use that are classified as unknown are excluded from the analysis, and occupants classified as not using their restraint properly (cheated) are included as 'unrestrained passengers'. Weights were applied to the data to give a more representative estimate of rates across London. At the borough level, these weights were based on traffic counts in each session to ensure that the proportion of vehicles for which detailed data is collected is the same across all sites and sessions. When the data were combined to give an overall estimate for London, an additional weighting procedure allowed for traffic flows on different types of road in London. The identical process was used to analyse the data from the 2006 London and DfT surveys.

The results from 2007 were compared with the London 2006 results and the October 2006 results from the DfT survey (using observations from sites with a speed limit of at most 40mph) where appropriate. At the time of this report being prepared, the most recent DfT seat belt and mobile phone survey to have been carried out was in October 2006. As this was completed shortly after the child restraint regulations took effect and before the penalties for mobile phone were increased, the results of the 2007 London survey and the October 2006 DfT survey are not entirely comparable.

3 2007 survey results

During March 2007, observations were made at 33 sites in London. Table 3.1 shows the numbers of vehicles observed on 43 site visits (33 sites visited on a weekday and 10 sites revisited at the weekend). Detailed observations were made of the occupants of 32,153 cars and taxis and 6,006 vans. This was an increase in the number of observations of 9% and 22% respectively, compared with 2006. These figures were compared with comparable TfL traffic data as overall, traffic has decreased on Major roads² in London since 2006. The differences in the survey data are due to the variability amongst traffic flow at sites and different times. The average number of front and rear seat passengers per vehicle scarcely changed – there was an average of 0.30 front seat passengers per car in 2006 and 0.28 in 2007, while there was an average of 0.18 rear seat passengers in both years. 2,027 taxis were observed during the study, nearly 70% of these were observed in Central London and just over 10% in the North East.

The numbers of observations of vans and taxi occupants are lower than for car occupants, so larger differences between results from the 2006 and 2007 survey may arise by chance for van and taxi occupants than car occupants. In some cases only car driver or car occupant results are displayed to provide the most reliable results.

Once the data had been verified and validated, weights were applied to each data point dependent on the road type, a weekend or weekday loading and the proportion of vehicles that passed during the survey session for which detailed observations were made. The weights ensure that results represent London averages as well as possible. All proportions reported in this report have been weighted, and any sample size is reported as an unweighted actual representation of how many observations were made.

Table 3.1: Number of vehicles and occupants observed, London surveys.

	2006	2007
Cars	27,638	30,126
Front seat passenger	8,534	8,893
Rear seat passenger	4,343	4,734
Taxis	1,497	2,027
Passenger	790	1,095
Vans	4,709	6,006
Passenger	1,252	1,550

Table 3.2: Distribution of vehicles observed and annual traffic by road type in London, 2007

Road type	Vehicles observed		Traffic volume ³ (million vkm)	
	car or taxi	van	car or taxi	van
TLRN	12,855	2,528	7,549	1,177
BPRN	9,653	1,784	6,816	897
MINOR	9,645	1,694	10,237	1,651

² Table 1, RNPR Traffic Note 1 (RNPR, 2007).

³ Traffic data sources: Table 9, RNPR Traffic Note 1, (RNPR, 2007); Table 3.1.2, London Travel Report 2006, (TfL, 2007a). (Source: National Road Traffic Survey, DfT).

The 33 sites are spread relatively equally across the three types of road in London – Transport for London Road Network (TLRN), Borough Principal Road Network (BPRN) and Minor roads (Minor). Table 3.2 shows the numbers of vehicles observed on each road type during the study and the estimated annual traffic flow in million vehicle kilometres travelled on these roads in London. These numbers form the basis of the weighting system.

The vehicle registration is recorded in order to identify older cars which, if older than an E registration, were not required by law to be fitted with rear seat belts. However, as shown in Table 3.3, the vast proportion (over 99%) of vehicles observed were younger than this, so no adjustment for these older vehicles was deemed to be necessary. These data do show an increase in the proportion of newer cars (L registration and later) in 2007 – there were 4.0% of vehicles in this category more than in 2006. This is an expected increase due to the constant renewal of the national vehicle fleet.

Table 3.3: Distribution of car registrations in London surveys

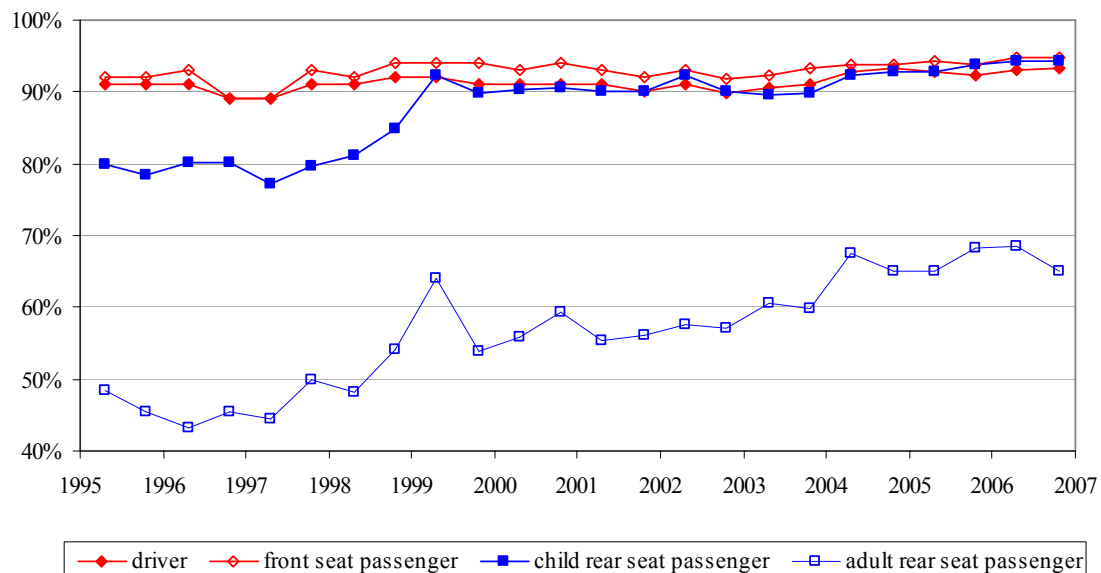
Registration prefix	L and later	H-K	E-G	C-D	Older
2006	90.4%	5.8%	2.3%	0.5%	0.9%
2007	97.4%	3.7%	1.2%	0.4%	0.4%

Distribution excludes other registrations, e.g. military and diplomatic

3.1 Use of seat belts and other restraints

The DfT survey has been running for many years, so it is possible to follow the trend in restraint wearing across time for different categories of occupants and vehicles. Figure 3.1 shows this trend from 1995 for driver, front seat passenger and child and adult rear seat passengers in cars. The driver and front seat wearing rates have been around 92% over the last few years whilst rear restraint wearing rates for children⁴ and adults have tended to increase. The adult rear seat wearing rate remains considerably lower than the other rates.

Figure 3.1: Trends in wearing rate, DfT survey



The first London Seat Belt and Mobile Phone survey was carried out in 2006. The results of the 2006 and 2007 surveys are directly comparable in all cases, and the overall results for restraint use are displayed in Table 3.4. The results of the latest DfT survey (October 2006) are included but are not

⁴ Seat belt wearing rate for children includes appropriate use of child seats, booster seats and cushions.

directly comparable due to changes in legislation (see Section 2.2). There were very few front seat passengers in taxis and rear seat passengers in vans, so these groups have been combined within vehicle type to form the category 'passenger'.

Table 3.4: Overall proportion of vehicle occupants using restraints

	Cars			Taxis		Vans		
	DfT, October 2006	London, March 2006	London, March 2007	London, March 2006	London, March 2007	DfT, October 2006	London, March 2006	London, March 2007
Drivers	92%	82%	87%	14%	12%	63%	51%	56%
Front seat passengers	93%	80%	84%	17%	19%	55%	40%	49%
Rear seat passengers	83%	49%	65%					
Number of vehicles	15,497	27,638	30,126	1,497	2,027	2,403	4,709	6,006

Very few rear seat passengers were observed in vans and front seat passengers in taxis, so they have been combined to form passenger groups

The results show that 87% of car drivers in London were observed wearing a restraint in 2007, compared with 82% in 2006. There was also an increase in wearing rate in cars for front and rear seat passengers, and drivers and passengers in vans. The proportion of taxi drivers wearing seat belts fell from 14% in 2006 to 12% in 2007. Drivers of hackney carriages are not legally required to wear a seat belt whilst on duty and private taxi drivers do not have to wear a seat belt when they are carrying a fare paying passenger, but taxi drivers face the same risks as car drivers when involved in a collision. Wearing rates for van occupants were around 50%, which means that approximately half of all van occupants in London did not wear a restraint.

Overall, it appears that the increase in wearing rates between 2006 and 2007 that is shown in Table 3.4 is genuine, rather than an unintended consequence of the minor changes in survey procedure that were made as discussed in Section 2.2. The Metropolitan Police ran a six week campaign starting on the 5th February 2007 which was specifically targeting hand-held mobile phone use while driving. In the middle two weeks, they also concentrated on seat belt wearing in addition to mobile phone use. In addition a national TV and radio THINK campaign which ran from 8th – 15th March and concentrated on encouraging vehicle occupants to wear seat belts may explain some of the increase. The increased penalties for mobile phone use and the new child seat belt regulation, along with accompanying publicity and increased enforcement is likely to have contributed to the increase. This may cause only a temporary improvement in results, as was seen in the DfT results in 1999 and it is not certain that this improvement will be sustained.

Table 3.5: Proportion of car occupants using restraints, by road type

Road type	TLRN		BPRN		Minor	
	2006	2007	2006	2007	2006	2007
Drivers	82%	90%	83%	86%	82%	85%
Front seat passengers	82%	88%	77%	81%	79%	83%
Rear seat passengers	50%	65%	39%	52%	55%	69%
Number of vehicles	10,894	11,971	7,726	9,181	9,018	8,974

Table 3.5 shows the wearing rates for car occupants on the three road types – TLRN, BPRN and Minor. All wearing rates were consistently higher in 2007 than 2006 results. The 2006 wearing rates did not differ by road type, except that rear seat passengers on BPRN roads had relatively low wearing rates, possibly affected by small numbers. The 2007 results showed a less consistent picture. For drivers and front seat passengers the wearing rates were higher on the TLRN than on the BPRN and Minor roads. Rear seat passenger wearing rates were highest on Minor roads. The most recent DfT survey results were broadly consistent with the conclusions of the London surveys and did not show that wearing rates on A (TLRN and BPRN) and Minor roads differed consistently.

Another way of classifying road type is by speed limit, and Table 3.6 shows that front seat wearing rates were higher on roads with higher speed limits. Rear seat wearing rates fluctuated more, but are affected by small numbers.

Table 3.6: Proportion of car occupants using restraints, by speed limit, 2007

Speed limit	30mph	40mph	50mph
Drivers	86%	91%	92%
Front seat passengers	83%	83%	90%
Rear seat passengers	63%	45%	63%
Number of vehicles	16,492	1,196	1,046

At 10 survey sites, observations were made at the weekend as well as on a weekday. Table 3.7 compares the weekday and weekend wearing rates at the sites where observations were made at the weekend. The results for 2007 showed a relatively consistent picture between weekend and weekdays for drivers and front seat passengers. Wearing rates for rear seat passengers were observed to be higher at the weekend in 2007, while the opposite was found in 2006. These results may again be affected by small numbers.

Table 3.7: Proportion of car occupants using restraints, by time of week

	Weekday		Weekend	
	2006	2007	2006	2007
Driver	85%	87%	85%	87%
Front seat passenger	82%	82%	81%	84%
Rear seat passenger	55%	60%	49%	67%
Number of vehicles	6,387	7,000	6,929	6,558

The variation of wearing rate by sex and age is demonstrated in Table 3.8 and Table 3.9. In the majority of cases wearing rates for males were lower than for females in all three surveys reported. For drivers and front seat passengers there was a general increase in wearing rate as age increases, and children had higher wearing rates than young adults (aged 14-29). The driver is responsible for children wearing a restraint up to the age of 14 and this could explain the lower restraint wearing rates of young adults.

Table 3.8: Proportion of male car occupants using restraints, by age, sex and seating position

		DfT 2006		London 2006		London 2007	
		Rate	Sample size	Rate	Sample size*	Rate	Sample size*
Drivers	17-29	88%	1,770	80%	2,991	80%	2,520
	30-59	90%	5,660	78%	13,097	85%	14,218
	60+	93%	1,968	83%	2,365	89%	2,576
	All	90%	9,398	79%	18,470	85%	19,368
Front seat passengers	0-13	95%	263	72%	448	85%	417
	14-29	84%	570	68%	1,047	72%	994
	30-59	91%	605	74%	1,705	81%	1,982
	60+	93%	247	84%	299	91%	328
	All	90%	1,685	73%	3,497	80%	3,732
Rear seat passengers	0-4	97%	475	74%	232	91%	312
	5-13	87%	357	54%	530	71%	613
	14-29	52%	183	36%	342	37%	340
	30-59	47%	115	31%	447	25%	377
	60+	75%	57	40%	83	51%	76
	All	83%	1,187	46%	1,640	60%	1,747

* Sample sizes for all age groups may not equal the sum of the age groups due to occupants with unknown age

Adult seat belts are not designed for use by children so, as mentioned in Section 2.2, a new regulation took effect in September 2006 concerning the restraints to be used by children. The effects are discussed in detail in Section 4.2; however, it is clear from Table 3.8 and Table 3.9 that the use of restraints by children in London increased appreciably between 2006 and 2007.

Table 3.9: Proportion of female car occupants using restraints, by age, sex and seating position

		DfT 2006		London 2006		London 2007	
		Rate	Sample size	Rate	Sample size*	Rate	Sample size*
Drivers	17-29	94%	1,931	87%	2,265	89%	2,210
	30-59	95%	3,777	88%	6,210	90%	7,530
	60+	96%	792	91%	664	94%	958
	All	95%	6,500	88%	9,158	90%	10,725
Front seat passengers	0-13	97%	220	75%	370	81%	304
	14-29	93%	857	79%	1,353	79%	1,236
	30-59	94%	1,339	87%	2,549	88%	2,575
	60+	97%	923	93%	675	93%	871
	All	94%	3,339	86%	4,947	86%	5,005
Rear seat passengers	0-4	97%	485	79%	235	92%	304
	5-13	87%	380	54%	537	75%	629
	14-29	59%	310	35%	591	47%	478
	30-59	64%	189	36%	712	43%	553
	60+	73%	161	56%	154	55%	140
	All	82%	1,525	42%	2,237	63%	2,156

* Sample sizes for all age groups may not equal the sum of the age groups due to occupants with unknown age

Figure 3.2 presents the results for the London 2007 survey. It is easier to see from these plots that females have higher wearing rates across almost all sub-groups and that wearing rates for rear seat passengers were particularly low for passengers aged 14 years and older. The biggest gap between male and female rates occurs in the rear seat passengers age group 30-59 where only 25% of males were reported to be wearing restraints compared with 43% of females.

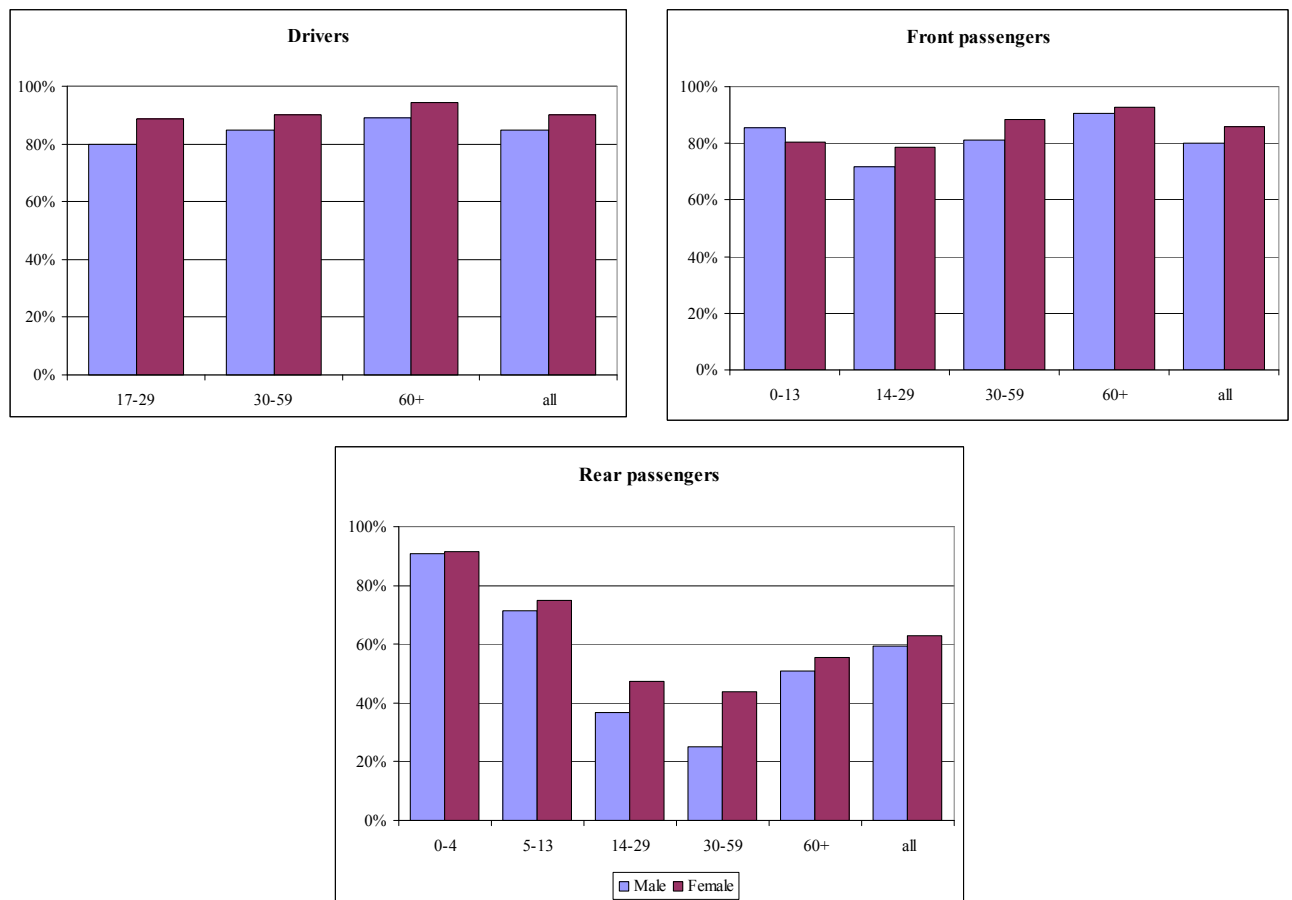
Figure 3.2: Proportion of restrained car occupants, by age, sex and seating position, 2007

Table 3.10 examines the use of restraints by children in greater detail, with all of the categories of restraint used in the survey. Children carried on the lap of another passenger could be at as much risk in a collision as an unrestrained child and so are considered to be unrestrained.

In 2007, in the front seat, 3% of 0-4 year olds and 19% of 5-9 year olds were unrestrained compared to 42% and 28% respectively in 2006. This is still substantially higher overall than in the DfT survey. A similar pattern is found for rear seat passengers, albeit with higher unrestrained rates.

In the front seat the majority of 0-4 year olds were restrained in a rear facing baby seat, child seat or booster seat/cushion (with seat belt). In the rear seat this age group were mainly restrained in a child seat or booster seat/cushion (with seat belt). The older age group of 5-9 year olds were mainly restrained by adult seat belts in the front and rear seats. Over a quarter of 5-9 year olds in the rear seat were unrestrained (19% in the front seat) and similar proportions were observed on booster seats/cushions (with seat belts). Of the oldest child age group (aged 10 to 13 years), a large majority were restrained by adult seat belts (85% and 65% respectively for front seat and rear seat). The remaining children in this age group were unrestrained.

Table 3.10: Use of child restraints in cars

	Age	DfT 2006		London 2006		London 2007		
		0-4	5-9	0-4	5-9	0-4	5-9	10-13
Front seat passengers	Seat belt	17%	71%	17%	57%	1%	61%	85%
	Booster seat/cushion with seat belt	11%	23%	9%	8%	50%	16%	0%
	Child seat	33%	2%	20%	8%	19%	4%	0%
	Rear facing child seat	36%	0%	12%	0%	26%	0%	0%
	No restraint	1%	4%	4%	26%	1%	17%	14%
	Booster seat/cushion without seat belt	2%	1%	32%	1%	0%	1%	0%
	Carried on lap	4%	0%	6%	1%	2%	1%	0%
Number observed	115	191	168	490	142	371	323	
Rear seat passengers	Seat belt	4%	47%	32%	34%	3%	43%	65%
	Booster seat/cushion with seat belt	12%	36%	13%	12%	42%	23%	3%
	Child seat	70%	6%	25%	7%	39%	6%	0%
	Rear facing child seat	11%	0%	6%	1%	7%	0%	0%
	No restraint	2%	8%	13%	42%	4%	24%	31%
	Booster seat/cushion without seat belt	0%	2%	4%	0%	0%	2%	0%
	Carried on lap	1%	1%	7%	2%	4%	1%	0%
Number observed	1,070	526	902	867	1,119	1,011	349	

A large variation in wearing rates was observed across London in the 2006 survey. With only one site per borough, it is unlikely that borough wearing rates are represented reliably, so Table 3.11 groups the London boroughs into five areas and the results for the seven Police areas are shown in Table 3.12 for 2007. The results are compared to the overall London results for car occupants and areas in which the observed restraint use differs significantly from the overall level are marked by a *. The individual wearing rates by borough are presented in Appendix A. The results show some differences from 2006, but the order of boroughs by wearing rate is broadly unchanged. The grouping of boroughs into these areas is shown in Appendix A, this increases the number of observations in each group and thus reduces the possible random variability in the wearing rates. Wearing rates were lowest in the Central and North East areas for drivers and front seat passengers, and highest in the South East area. Figure 3.3 shows the 2007 wearing rates for car drivers.

Table 3.11: Car occupant wearing rates, by area,2007

Area	Driver	Front passenger	Rear passenger
South West	87%	83% *	73% *
South East	89% *	88% *	78% *
North West	88% *	84%	54% *
North East	86% *	84%	58% *
Central	82% *	79% *	48% *
London	87%	84%	65%

* Proportion significantly different from London result

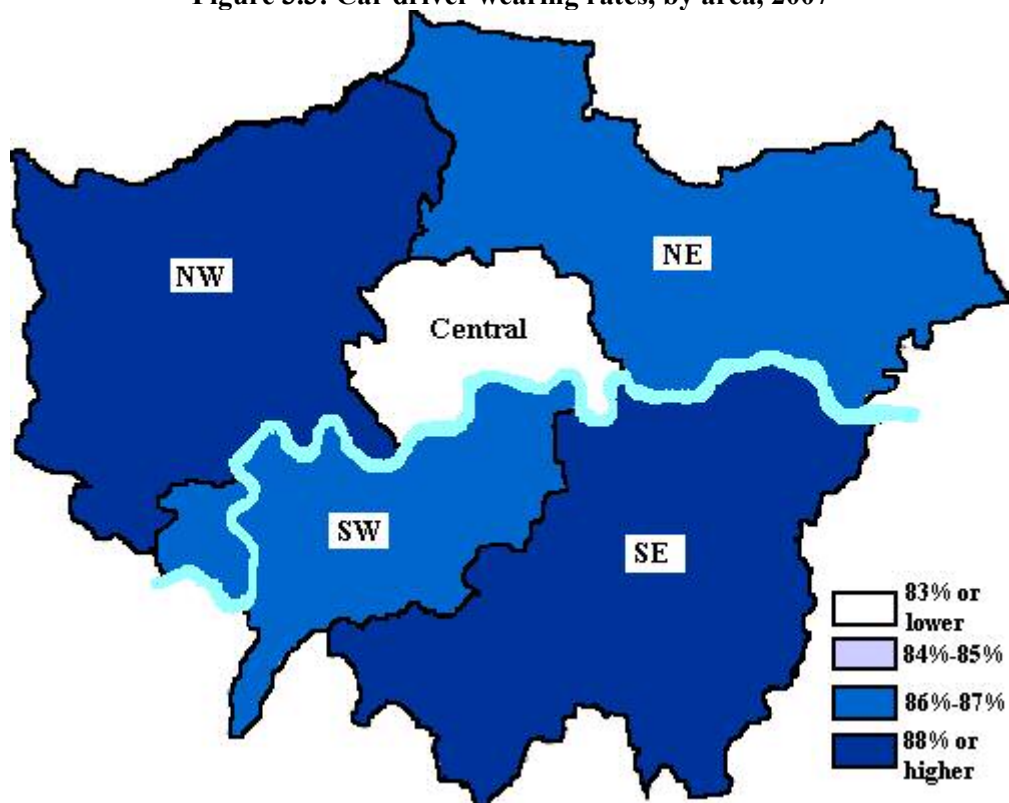
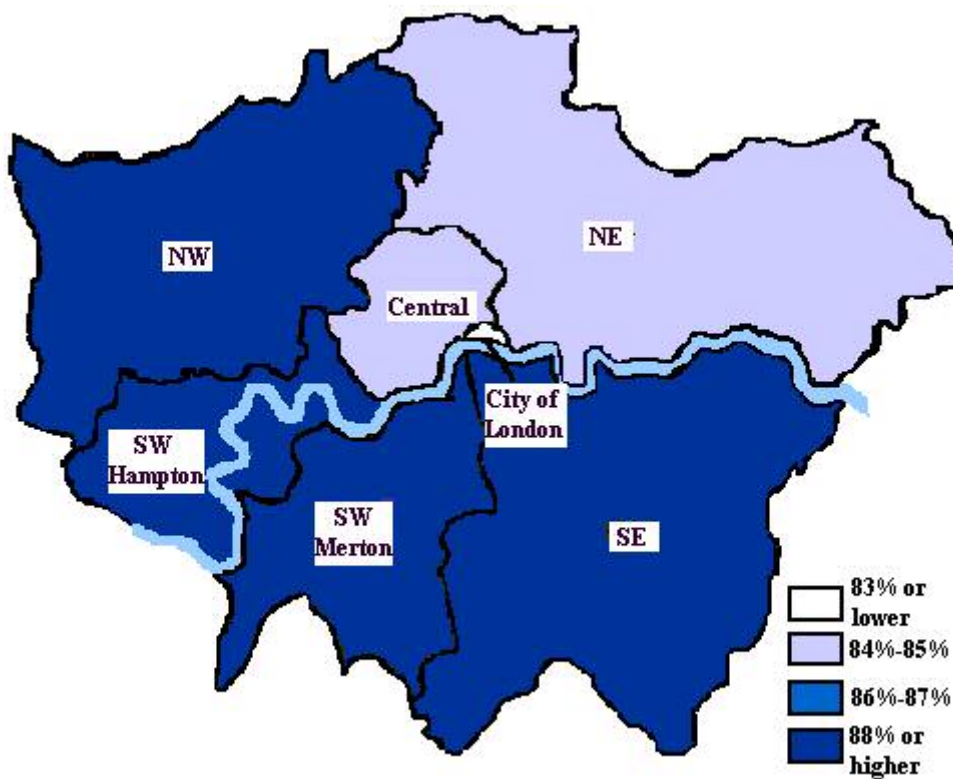
Figure 3.3: Car driver wearing rates, by area, 2007

Table 3.12: Car occupant wearing rates, by Police garage

Police area	Driver	Front seat passenger	Rear seat passenger
Central garage	84% *	84% *	48% *
NE garage	85% *	83% *	56% *
NW garage	88% *	84%	54% *
SW Hampton garage	88% *	85% *	59% *
SW Merton garage	88% *	85%	76% *
SE garage	89% *	87% *	76% *
City of London	76% *	86% *	32% *

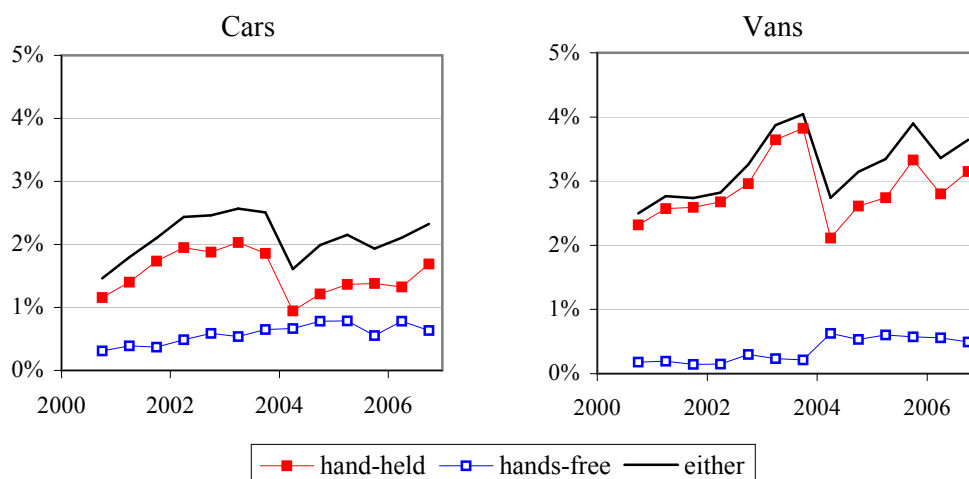
* Proportion significantly different from London result

Figure 3.4: Car driver wearing rates, by Police garage

3.2 Use of mobile phones

Regulations prohibiting the use of hand-held mobile phones by drivers took effect in December 2003. The effects were seen in the results of the DfT Seat Belt and Mobile Phone survey and are shown in Figure 3.5. Figure 3.5 shows the dip in use after the regulations took effect, and the subsequent return to almost the pre-regulation level. In the DfT survey, mobile phone use was shown to be higher in vans than in cars, and hand-held phones were more commonly used than hands-free phones. Usage of mobile phones varies more around the country than usage of restraints, so these results may not be nationally representative, but should still show the trend in use across years.

Figure 3.5: Trends in mobile phone use, DfT survey



The penalties for using a hand-held mobile phone were increased in February 2007, so a comparison of results from the 2006 and 2007 surveys will demonstrate the effects in London. The most recent DfT survey took place in October 2006, before the new mobile phone legislation was introduced. Therefore, the results from the London 2007 survey cannot be compared to the DfT results, and at the time of writing there was no DfT survey that had been undertaken after the new legislation.

Table 3.13: Overall proportion of drivers using mobile phones in London

	2006			2007		
	Car	Taxi	Van	Car	Taxi	Van
Hand-held	2.6%	1.1%	3.8%	1.4%*	0.7%	1.8%*
Hands-free	1.2%	0.8%	1.0%	2.3%*	3.1%*	4.9%*
Either	3.8%	1.9%	4.8%	3.7%	3.8%*	6.7%*
Number of vehicles	27,640	1,497	4,709	30,126	2,027	6,006

* differs significantly from 2006 results

Table 3.13 shows the proportion of drivers observed using mobile phones in the London surveys in 2006 and in 2007. The overall use ('either' in Table 3.13) of a mobile phone has remained broadly the same for car drivers and has increased for van and taxi drivers. As with the DfT results, the use of hand-held mobile phones was highest amongst van drivers, then car drivers and finally taxi drivers who were observed to be using hand-held mobile phones the least. The pattern for hands-free use was

different from hand-held and different from the distribution of hands-free use in 2006. In 2007, van drivers were observed to use hands-free kits most frequently, followed by taxi drivers and car drivers.

Most overall and hands-free proportions were significantly greater in 2007 than in 2006 (but not car driver overall use), and significantly lower for car and van drivers using hand-held phones.

Figure 3.6 compares the 2006 and 2007 results for hand-held mobile phone use by age and sex among car and taxi drivers, while Figure 3.7 makes the corresponding comparison for hands-free phone use. The results for hand-held phones have maintained a pattern of being lower among women than men and falling with increasing age.

Figure 3.6: Hand-held mobile phone use by car and taxi drivers in London, by age and sex

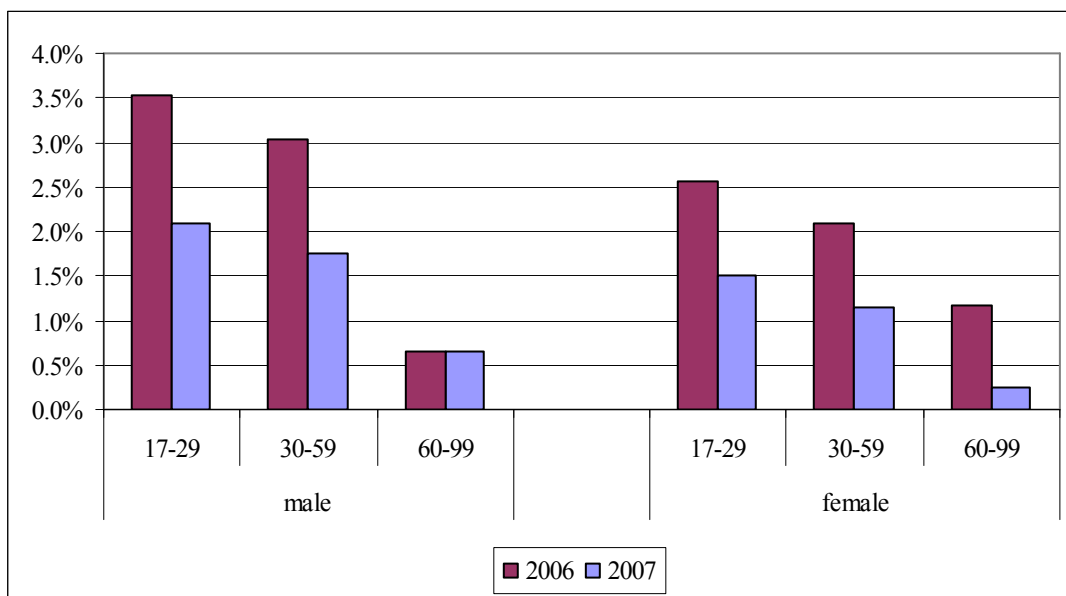
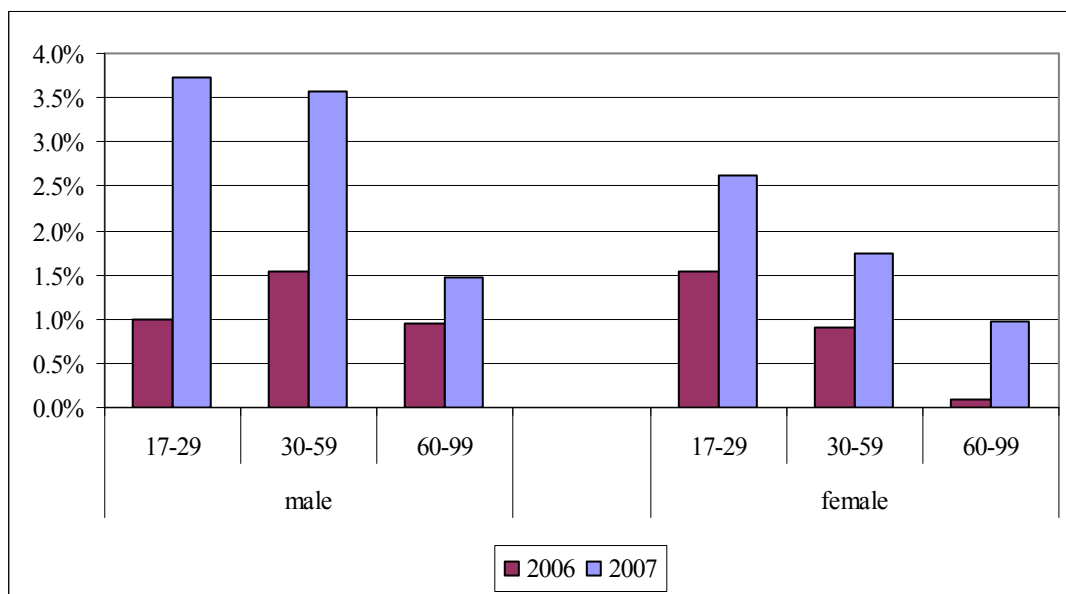


Figure 3.7: Hands-free mobile phone use by car and taxi drivers in London, by age and sex



The level of mobile phone use by London area is shown in Table 3.14, and the hand-held results are illustrated in Figure 3.8. The highest proportion of car drivers observed using a hand-held mobile

phone was in Central London, followed by the South West. The results are compared to the overall London results for car drivers and areas in which the observed phone use is significantly different from the overall results are marked by a *. Most of the results were significantly higher or lower than the overall results which implies that there is a large amount of variation in use of mobile phones across London.

Table 3.14: Proportion of car and taxi drivers using mobile phones, by area

Area	Hand-held	Hands-free	Either
South West	1.6% *	2.2% *	3.8%
South East	1.2% *	1.6% *	2.8% *
North West	1.0% *	3.3% *	4.3% *
North East	1.3%	2.0% *	3.3% *
Central	1.8% *	3.4% *	5.1% *
London	1.3%	2.4%	3.7%

* Significantly different from London result

Figure 3.8: Proportion of car and taxi drivers using hand-held mobile phones, by area

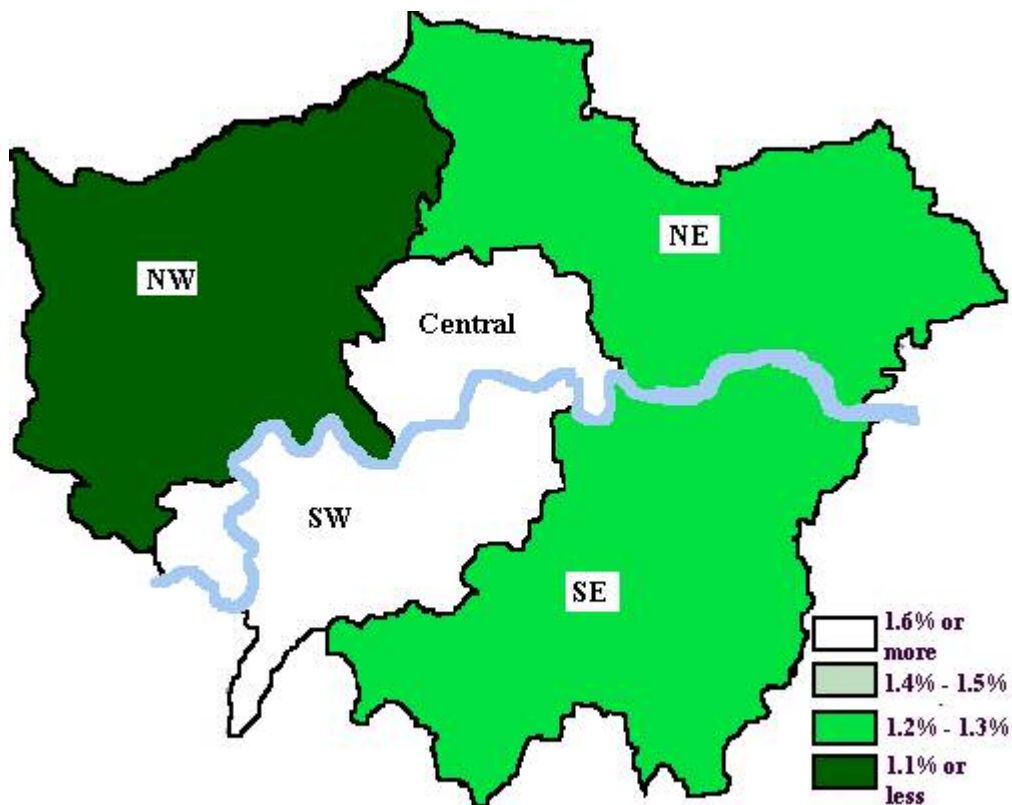
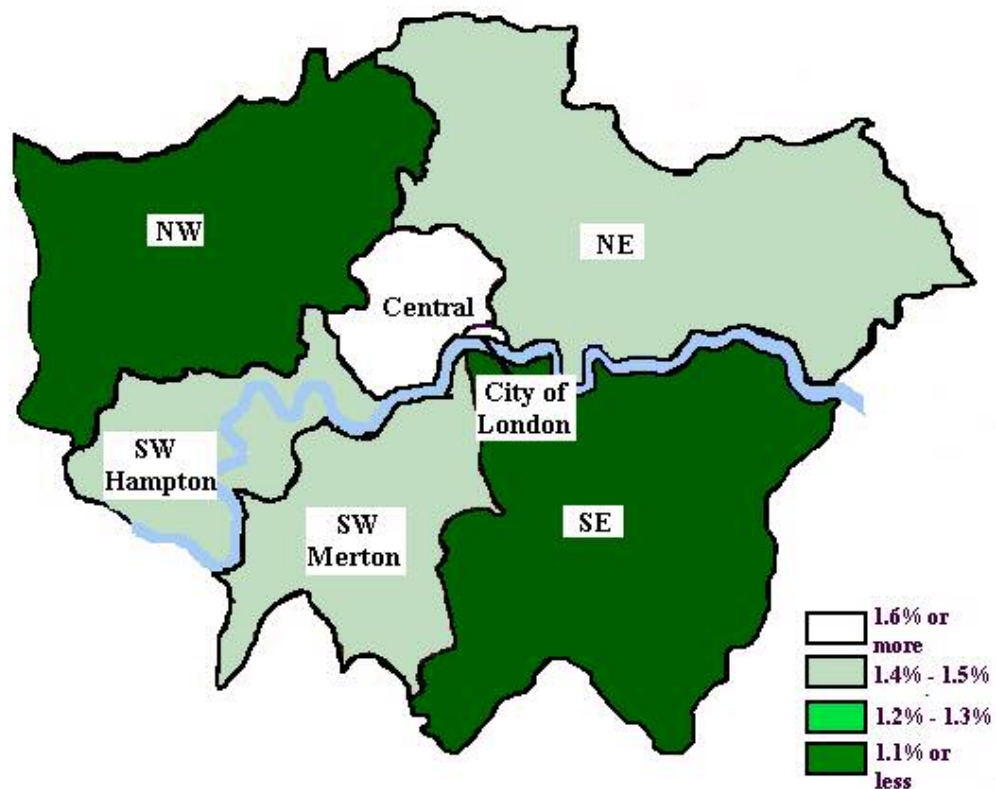


Table 3.15: Proportion of car and taxi drivers using mobile phones, by Police garage

Area	Hand-held	Hands-free	Either
Central garage	1.7% *	4.0% *	5.7% *
NE garage	1.4%	2.1% *	3.5% *
NW garage	1.0% *	3.1% *	4.0% *
SW Hampton garage	1.4%	4.1% *	5.5% *
SW Merton garage	1.5% *	1.8% *	3.3% *
SE garage	1.1% *	2.2% *	3.3% *
City of London	1.7% *	3.3% *	5.0% *
London	1.3%	2.4%	3.7%

* Significantly different from London result

Figure 3.9: Proportion of car and taxi drivers using hand-held mobile phones, by Police garage

The 2006 survey showed that drivers' use of mobile phones was correlated with their use of seat belts. Table 3.16 shows the proportion of drivers using mobile phone by seat belt use in 2006 and 2007. Results that differ significantly from 2006 results are marked *, and results from 2007 where the proportion of seat belt wearers using mobile phone differs significantly from that for non-wearers are marked +. Table 3.16 shows that, as in 2006, belted drivers in 2007 were less likely than unbelted drivers to use hand-held mobile.

Table 3.16: Proportion of drivers using mobile phones, by restraint status

		Car and taxi drivers		Van drivers	
		2006	2007	2006	2007
Drivers wearing seat belt	Hand-held	2.2% ⁺	1.1% ^{+*}	2.3% ⁺	1.4% ^{+*}
	Hands-free	1.1%	2.2% ^{+*}	1.2%	5.5% ^{+*}
	Either	3.3% ⁺	3.2% ⁺	3.5% ⁺	6.9% ^{+*}
Drivers not wearing seat belt	Hand-held	3.6%	2.8% [*]	5.3%	2.4% [*]
	Hands-free	1.2%	3.3% [*]	0.9%	4.1% [*]
	Either	4.8%	6.1% [*]	6.2%	6.5%

** Differs significantly from 2006 result*

⁺ Differs significantly from drivers not wearing seat belt

Table 3.17 shows the alternative view of the interaction between wearing rates and phone use. The results confirm that wearing rates in London were significantly lower for drivers who were using mobile phones than for drivers who were not using phones. Among car and taxi drivers, only the wearing rate of drivers not using a mobile phone changed significantly between 2006 and 2007.

Table 3.17: Proportion of drivers wearing seat belts, by mobile phone use in London

	Car and taxi drivers		Van drivers	
	2006	2007	2006	2007
Drivers using hand-held mobile phones	69% ⁺	66% ⁺	32% ⁺	44% ^{+*}
Drivers using hands-free mobile phones	78%	77% ⁺	59%	63% ⁺
Drivers using mobile phones	72% ⁺	73% ⁺	38% ⁺	58% ^{+*}
-----	-----	-----	-----	-----
Drivers <i>not</i> using mobile phones	79%	84% [*]	52%	56% [*]

** Significant change between 2006 and 2007*

⁺ Differs significantly from drivers not using a mobile phone

4 Law Enforcement

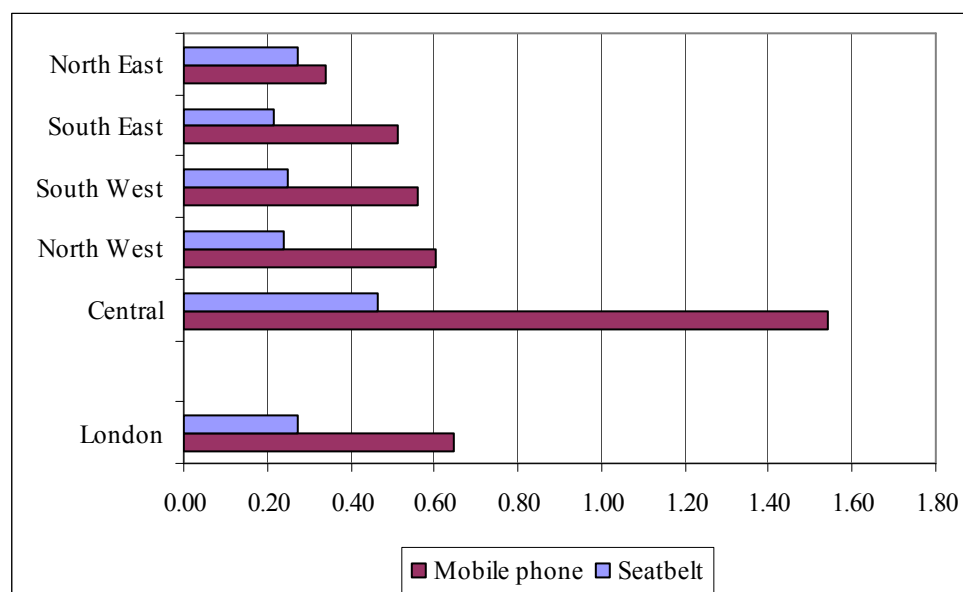
4.1 Law enforcement and Compliance

The Police issue Fixed Penalty Notices (FPNs) for many seat belt and mobile phone driving offences. The numbers of FPNs issued in each borough and the City in 2006 were provided by the Metropolitan Police and the City of London Police and have been used to compare the rates of FPNs distributed across London. Results for each borough (displayed in Appendix A) have been combined into the London areas used above, and rates of FPNs per million vehicle kilometres have been computed. Rates of seat belt FPNs issued vary from 0.22 per million vehicle km in South East London to 0.47 in Central London, with an average in London of 0.27. Mobile phone FPNs are more common, even though fewer drivers use hand-held mobile phones than fail to wear seat belts. Overall 0.65 FPNs per million vehicle km were issued in 2006, which was highest in Central London (1.54) and lowest in North East London (0.34). It is known from papers reviewed by Elliott and Broughton (2005) that a higher level of law enforcement links to higher levels of compliance. Figure 4.1 depicts the results in order of rate of mobile phone FPNs.

Table 4.1: Number and rate of Fixed Penalty Notices in London, 2006

	Seat belt		Mobile Phone		Traffic volume (million vkm)
	Number	Rate	Number	Rate	
South West	1,334	0.25	2,986	0.56	5,323
South East	1,431	0.22	3,391	0.51	6,617
North West	2,220	0.24	5,589	0.61	9,237
North East	1,936	0.27	2,419	0.34	7,151
Central	2,030	0.47	6,725	1.54	4,357
London	8,951	0.27	21,110	0.65	32,685

Figure 4.1: Rate of Fixed Penalty Notices per million vehicle-km in London, 2006



4.2 Effect of new child restraint law

The new regulation that took effect on 18 September 2006 concerning the restraints to be used by children was discussed in Section 2.2. They require the driver of any vehicle to be responsible for making sure that the child occupant shorter than 135cm or younger than 12 years in their vehicle uses the correct child restraint. Children over this age or height should be restrained in adult seat belts and are still the responsibility of the driver until the age of 14 years. The child restraint that should be used is based on the weight of the child, a good proxy for this being age. It is only feasible to record age in the survey with any degree of reliability, so the approximate equivalent age groups are shown here:

- A rear facing baby seat is appropriate for children aged between 0 and 9-12 months;
- Children from approximately 9 months to 4 years should be using a child seat;
- A booster seat with seat belt is required for children from approximately 4 years; and
- A booster cushion with seat belt should be used for children from approximately 6 years.

The child restraint data collected in the survey is sufficiently detailed to complete a relatively simple analysis on the observance of the new regulation, although the classification cannot be exact. The different child restraints described above and recorded in the survey are classified by age group as appropriate, inappropriate and unrestrained, as shown in Table 4.2. Table 4.3 shows the proportion of children appropriately restrained, inappropriately restrained and unrestrained.

Table 4.2: Classification of child restraint use

	0-4	5-9
Appropriate	child seat rear facing baby seat	booster seat with seat belt booster cushion with seat belt
Inappropriate	booster cushion with seat belt booster seat with seat belt seat belt	seat belt rear facing baby seat child seat
Unrestrained	no restraint carried on lap booster seat without seat belt booster cushion without seat belt	no restraint carried on lap booster seat without seat belt booster cushion without seat belt

The following conclusions can be drawn from Table 4.3:

- Appropriate restraint use was considerably higher in 2007 than in 2006, and the proportion of children travelling unrestrained in cars was lower in 2007 (17%) than in 2006 (33%). These results are likely to be due to the child restraint legislation changes in September 2006;
- Appropriate restraint use was significantly higher for 0-4 year olds (80% in 2007, 21% in 2006) than 5-9 year olds (31% in 2007, 11% in 2006) in both years;
- Appropriate restraint use was higher for 5-9 year olds in the rear seat (23% in 2007) than on the front seat (16% in 2007) although this is still less than a quarter;
- Appropriate restraint use for children aged 0-9 was significantly higher in 2007 (43%) than 2006 (16%). This result is also likely to be due to recent changes in child restraint legislation.

Table 4.3: Approximate assessment of child restraint use in London.

Restraint use	Seat	2006		2007	
		0-4	5-9	0-4	5-9
Appropriate	Front	32%	8%	82%	16%
	Rear	31%	12%	79%	23%
Inappropriate	Front	26%	65%	14%	65%
	Rear	45%	42%	12%	49%
Unrestrained	Front	42%	28%	3%	19%
	Rear	24%	44%	8%	27%

4.3 Effect of increased penalties for hand-held mobile phone use

The penalties for drivers using a hand-held mobile phone were increased in February 2007 with the aim of reducing the number of drivers using hand-held mobile phones. Table 4.4 shows the proportion of drivers observed using hand-held mobile phones in 2006 and in 2007.

Table 4.4: Mobile phone use by drivers in London

	2006		2007	
	Hand-held	Either	Hand-held	Either
Car	2.6%	3.8%	1.4%	3.7%
Taxi	1.1%	1.9%	0.7%	3.8%
Van	3.8%	4.8%	1.8%	6.7%

The proportion of drivers in all vehicle types using a hand-held mobile phone fell substantially between 2006 and 2007, while the use of hands-free mobile phone increased dramatically. Overall, the use of a mobile phone remained broadly the same for car drivers in 2007 as in 2006, increased considerably for van drivers and doubled for taxi drivers.

The increase in use of hands-free phones in conjunction with the decrease in hand-held phones suggests that drivers have perceived that it is safer to use a hands-free kit whilst driving. There is evidence (Kircher et al, 2004) to suggest that hands-free mobile phones carry the same risk whilst driving as hand-held mobile phones, so whilst the new penalties have caused the use of hand-held mobile phones to drop, the overall use of mobile phones has not decreased and for van and taxi drivers it has increased.

5 Casualty saving

The regulations requiring most vehicle occupants to use seat belts and other restraints exist because of the ample evidence of the protection that they provide when vehicles are involved in collisions. Consequently, if more vehicle occupants in London used restraints then fewer people would be killed and injured, and Section 5.1 estimates the casualty reduction that could be expected from increased compliance with the seat belt regulations. The estimates are not precise, but do help to illustrate the human consequences of the relatively low wearing rates that have been observed in London.

Similarly, the regulation prohibiting drivers from using hand-held mobile phones exists because of the increased risk of a driver being involved in a collision when using a mobile phone. Section 5.2 uses a similar approach to illustrate the consequences of the relatively high levels of mobile phone use in London.

5.1 Casualty saving of increased seat belt use

The effectiveness of restraints in preventing or at least reducing injuries to vehicle occupants in collisions has been shown in many studies (e.g. Cummings et al, 2003). In general it is agreed that restraints are more effective in higher severity crashes, although the estimation of the effectiveness of restraints in casualty reduction is technically complex.

The most recent known UK study that calculated seat belt effectiveness (Broughton and Walter, 2007) found a value of 0.72 for fatally injured cars drivers, i.e. using a restraint reduced the risk of fatal injury by 72%. Effectiveness values for serious and slight casualties are estimated at 0.57 and 0.20 respectively. These are net values and, for example, the value for serious casualties takes account of both:

- the drivers whose injuries were slight rather than serious because they were belted, and
- the smaller number of drivers whose injuries were serious rather than fatal.

These values were used to calculate the reduction in casualties due to increased restraint use. The calculation of the casualty reduction to be expected from an increase in restraint use relies on two assumptions, and the estimates are subject to random variation, so the results should be regarded as illustrative values rather than precise estimates. The necessary assumptions are:

- a) The underlying collision-involvement rate of belted and unbelted drivers do not differ. It seems likely in fact that unbelted drivers would tend to have a more risky driving style, and Table 3.8 shows that wearing rates were lowest among young drivers who are more likely to be involved in collisions than older drivers. Consequently, the estimated casualty reductions are conservative.
- b) The estimates of effectiveness prepared for car drivers also apply to car passengers.

Using the effectiveness values quoted above, the overall wearing rates for car occupants (83.2% in the London 2007 survey and 91.2% in the DfT survey) and the number of car occupant casualties in London in 2006, the conservative estimates of casualty reductions are shown in Table 5.1 and Table 5.2. Table 5.1 estimates the casualty saving in London (given 2006 casualty numbers) if the restraint usage rates matched the rates found by the DfT survey. Table 5.2 shows the casualty reduction if every car occupant wore a restraint, i.e. the overall wearing rate rose to 100%. Casualty savings are indicative and do not take into account the proportion of 2006 casualties who were wearing a seat belt. Cost savings were calculated from official figures for the average value of preventing a casualty (DfT, 2007a).

Table 5.1: Estimated car occupant casualty saving in London per year if restraint use increased to level found by DfT survey

Casualty	Casualties in 2006	Casualty saving	Cost saving
Fatal	61	9	£12.5m
Serious	1,045	91	£14.5m
Slight	12,749	245	£3.0m

Total	13,855	344	£30.1m

Table 5.2: Estimated car occupant casualty saving in London per year if restraint use increased to 100%

Casualty	Casualties in 2006	Casualty saving	Cost saving
Fatal	61	18	£26.3m
Serious	1,045	190	£30.5m
Slight	12,749	514	£6.4m

Total	13,855	723	£63.2m

The Mayor of London has set targets to reduce road traffic casualties by 2010. The target for all KSI casualties is a 50% reduction by 2010 (from a baseline of the average number of KSI casualties for 1994-1998). There were 3,946 KSI casualties in London in 2006, representing a 41% reduction from the 6,684 KSI casualties in the 1994-1998 baseline (TfL, 2007b). Using the estimated casualty savings for car occupants calculated in Table 5.2, had all car occupants been wearing seat belts in 2006, the total number of KSI casualties could have been reduced by a further 208 casualties, representing 44% reduction from the baseline.

5.2 Casualty saving of reduced mobile phone use

Unlike restraints, which tend to reduce the injury to the occupants once involved in a collision, the effect of a mobile phone is known to be detrimental to driving and reaction times (RoSPA), and therefore increases the risk of a collision occurring. However estimating the size of this effect is difficult. Several studies have attempted to estimate the increased risk, mostly from the USA in the late 1990s and all report different results with large confidence intervals. Perhaps the most widely quoted result is that by Redelmeier and Tibshirani (1997) who reported a four-fold increase in risk of involvement in a collision for drivers using a mobile phone. Even this estimate has a relative risk confidence interval of 3 to 6 and some research (Violanti, 1998) has suggested that there is as much as a nine-fold increase in fatality risk for drivers using mobile phones. TRL research (Stevens and Minton, 2000) which analysed Police Fatal accident files from 1985 to 1995 showed three out of 5,740 distraction collisions reported were caused by mobile telephones. However in 1995 there were approximately 5 million mobile phones in the UK compared to an estimated 65 million in 2006.

The estimate that will be used to estimate the consequences of reduced mobile phone use is a four-fold increase in the risk of being involved in a collision if a driver uses a phone. The general approach used in the previous Section was used again, with the following assumptions:

- The overall levels of mobile phone use reported in Section 3.2 for drivers in London also apply to drivers of other types of vehicle (HGVs etc.), and that the same is true of the results of the DfT survey;

- The underlying collision-involvement rate of drivers who use mobile phones does not differ from the rate of those who do not. It seems likely in fact that the rate for phone users would tend to be higher than for non-users, for the reasons discussed in the case of unbelted drivers, so the estimated casualty reductions are conservative;
- The increased risk of being involved in a collision is the same for all injury severities;
- Results for cars and vans can be combined using the national traffic proportions of 86:14 (DfT, 2007b).

231 fatal casualties, 3,716 seriously injured casualties and 25,884 slight casualties were reported in London in 2006. It is estimated, conservatively, that reducing the proportion of mobile phone users from the London level of 4.0% (combined result for car, taxi and van drivers) to the level reported in the latest DfT survey of 2.5% (combined result) would produce the casualty reductions detailed in Table 5.3. Table 5.4 estimates the reductions of reducing the level to 0%, so in essence estimates the number of casualties that may be attributed to drivers' use of mobile phones.

Table 5.3: Estimated casualty saving in London per year if mobile phone use reduced to level found by DfT survey

Casualty	Casualties in 2006	Casualty saving	Cost saving
Fatal	231	9	£13.4m
Serious	3,716	151	£24.3m
Slight	25,884	1,053	£13.0m

Total	29,831	1,214	£50.7m

Table 5.4: Estimated casualty saving in London per year if mobile phone use eliminated

Casualty	Casualties in 2006	Casualty saving	Cost saving
Fatal	231	25	£35.6m
Serious	3,715	401	£64.3m
Slight	25,864	2,790	£34.5m

Total	29,810	3,215	£134.4m

Casualty savings for mobile phones are far greater than for seat belts because using a mobile phone while driving can be a contributing factor to collisions and these collisions can injure not just vehicle occupants but other road users too. Not wearing a seat belt does not contribute to a collision but instead can potentially aggravate injuries of vehicle occupants involved in a collision.

The total number of killed or seriously injured casualties in London in 2006 was 3,946. This is a reduction from the 1994-1998 average baseline of 41%. If mobile phone use had been eliminated by drivers then it is predicted that an extra 426 would not have been killed or seriously injured. This would have been a total KSI casualty count of 3,521 which is a reduction of 47% from the baseline.

6 Summary

The London Seat Belt and Mobile Phone survey was carried out in March 2007 at 33 sites in London replicating the methods and analysis of the 2006 London survey. The overall method was largely unchanged in order that the results of the two surveys should be as comparable as possible, but some small improvements were made. Results from this survey have been compared with 2006 results and results from the DfT survey in October 2006 (urban sites only).

The 2007 survey showed that in London 87% of car drivers wore seat belts, compared to 92% in the DfT survey and 82% in the 2006 London survey. Increases in seat belt wearing from 2006 were also found for front and rear seat passengers in cars, drivers and passengers in vans and passengers (but not drivers) in taxis. All restraint wearing rates in London remained lower than those observed in the latest DfT survey.

The increase in overall wearing rate may raise concerns that they are not genuine but have arisen because of changes in the data collection procedures. More detailed comparisons of the results of the 2006 and 2007 surveys suggest, however, that the increases are genuine. While the overall seat belt wearing rate rose by 5% for car drivers between 2006 and 2007, the rate for 17-29 year old men stayed at 80%, and only rose from 87% to 89% for 17-29 year old women. Similarly, while the overall rate for front seat passengers rose by 4%, the rate for females of all ages stayed at 86% while the male rate rose from 73% to 80%. Changes in data collection procedures would be expected to affect all groups of occupants, so these instances of unchanged wearing rates suggest that the increases in wearing rates are genuine.

The national surveys of restraint wearing found that the front seat wearing rate rose rapidly to 95% in 1983, once seat belt wearing became compulsory. Since then however, changes have been gradual, as shown by Figure 3.1, and only the increase in rear seat wearing rates in 1999 is comparable to the increase that has been observed in London. Since the small changes to the data collection procedures cannot account for the increase, there must be other explanations.

A national THINK campaign via radio and TV advertisements on seat belt use was carried out and a period of increased enforcement of seat belt use was implemented by the Metropolitan Police just before the survey, which may well have influenced the results. Indeed, the increase in rear seat wearing rates in 1999 followed an especially effective media campaign in the autumn of 1998. Moreover, the publicity surrounding the new child restraint regulation in September 2006 may have raised general awareness of the value of restraint wearing. The effects of these influences may be temporary, and the improvement in restraint wearing rates may not be sustained in future: it would be useful to repeat the survey in 2008 to check.

The other significant regulatory change that occurred between the 2006 and 2007 London Surveys was the increase in penalties for using a hand-held mobile phone whilst driving. Drivers who use hand-held mobile phones are less likely to wear seat belts than non-users, so it is possible that the regulation led indirectly to an increased compliance by those who had used hand-held phones to wear seat belts.

The results of the 2007 survey show that the new child restraint regulation in September 2006 was followed by a significant increase in the proportion of 0-4 and 5-9 year old passengers using the appropriate type of restraint. Overall, the proportion of restrained children rose between the two surveys.

After the mobile phone regulation took effect in 2003, the DfT survey showed that the proportion of drivers using a hand-held mobile phone dropped. The increase in penalties for using a hand-held phone whilst driving has had an effect of similar magnitude on the proportion of drivers in London who used hand-held mobile phones. The proportion of car drivers using a hand-held phone fell from 2.6% in 2006 to 1.4% in 2007, although overall mobile phone use remained at a similar level for car drivers, increased for van drivers and doubled for taxi drivers. Hands-free phones are now used more commonly than hand-held phones, which is likely to be the result of the increased penalties for hand-held mobile phone use. Drivers may have accepted the implied message that hands-free mobile phones are safer to use than hand-held, whereas the research evidence suggests that there is little or no

difference. These encouraging results will have been temporarily affected by the increased police enforcement and may be due to the time of year that the data were collected – so soon after a change in regulations could be reporting a temporary success and it is possible that the improvements will not be seen in a survey taken at another time of the year.

It is unfortunate that there was no DfT survey in the spring of 2007 to see whether the changes in restraint wearing and mobile phone use observed in London also occurred elsewhere.

The London survey data show that males are less likely to use restraints than females, and that usage increases with increasing age. In terms of compliance with the law, a similar pattern is found with mobile phone use. Men are more likely than women to use a mobile phone while driving, and this rate decreases with increasing age. This suggests that there may be a correlation between seat belt wearing and mobile phone use and this has been demonstrated by comparing the mobile phone use of drivers who do and do not wear seat belts.

Research (for example, Redelmeier et al, 1997) has shown that a driver's risk of being involved in a collision increases four-fold when using either a hand-held or hands-free mobile phone, and that a vehicle occupant is less likely to be injured if a restraint is worn. Consequently, a reduction in casualties would be expected if levels of mobile phone and restraint use in London matched the levels reported in the DfT survey. The reduction has been estimated using the results from the London 2007 survey. The estimates are approximate because certain simplifying assumptions are necessary, but help to illustrate the human consequences of the relatively low level of restraint use and the relatively high level of mobile phone use in London. It is estimated that if mobile phone use fell to the level found by DfT survey then the KSI total could fall by about 160, and total casualties could fall by about 1,200. An increase in restraint wearing rates to the rates found by the DfT survey is estimated to reduce the number of car occupants KSI by 100 and the total of car occupant casualties by nearly 350.

In summary, overall restraint wearing rates in London were found to be appreciably higher in 2007 than in 2006, but still below the levels found by the DfT survey. Mobile phone use in London in 2007 was above the level found by the DfT survey. The overall level of mobile phone use for car drivers was unchanged from 2006, although there had been a major switch from hand-held to hands-free phones. The use of mobile phones by van and taxi drivers increased between 2006 and 2007.

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Appendix A. Borough results

Table A.1: Survey sites

Borough	Road type	Road name	Direction	Junction	Weekend?
Barking & Dagenham	BPRN	Ripple Rd	EB	Goresbrook Int Adj. to Asda	
Barnet	TLRN	Pinkham Way	EB	Bounds Green Rd	Yes
Bexley	MINOR	Westwood Lane	NB	A210 Blackfen Rd	
Brent	BPRN	High Rd	WB	Ealing Rd	Yes
Bromley	TLRN	A21 London Rd	SB	A21 Tweedy Rd	
Camden	MINOR	Guilford St	EB	Gray's Inn Rd	
City	MINOR	Ropemaker St	EB	Moorgate	
Croydon	TLRN	A232 Wickham Rd	EB	Hartland Way	Yes
Ealing	TLRN	Hanger Lane	NB	Western Ave	
Enfield	MINOR	Powys lane	SB	Bowes Rd	Yes
Greenwich	MINOR	Green Lane	SB	A20 Sidcup Jnc	
Hackney	MINOR	Ponsford St	NB	Homerton High St	
Hammersmith & Fulham	BPRN	Shepherds Bush Green	WB	Uxbridge Road	
Haringey	TLRN	Seven Sisters Rd	NB	St. Ann's Rd	Yes
Harrow	BPRN	Greenford Rd	NB	Sudbury Hill	
Havering	BPRN	New Rd to Marsh Way	SB	Marsh Way	
Hillingdon	BPRN	A437 High St	SB	A4 Bath Rd	Yes
Hounslow	TLRN	A312 Harlington Rd East	NB	A24 Hounslow Rd	
Islington	BPRN	Caledonian Rd	SB	Pentonville Rd	
Kensington & Chelsea	TLRN	Cromwell Rd	EB	Exhibition Rd	
Kingston	MINOR	B283 High St	SB	Blagdon Rd	Yes
Lambeth	TLRN	Brixton Rd	NB	A202 Camber New Rd	
Lewisham	TLRN	A21 Bromley Rd	NB	A2015 Beckenham Hill Rd	
Merton	BPRN	A218 Durnsford Rd	SB	Plough Lane	
Newham	BPRN	Stratford High St	EB	Abbey Lane	
Redbridge	MINOR	Clayhall Ave	SB	Woodford Ave	
Richmond-upon-Thames	BPRN	A3063 Wellington Rd South	SB	A314 Hanworth Rd	
Southwark	MINOR	Wyndham Rd	EB	Camberwell Rd	
Sutton	TLRN	A217 Reigate Ave	NB	Rose Hill RBT	Yes
Tower Hamlets	MINOR	Roman Rd	EB	Grove Rd	Yes
Waltham Forest	BPRN	Forest Rd	WB	Hoe St	Yes
Wandsworth	TLRN	A24 Tooting High St	SB	Longley Rd	
Westminster	TLRN	Knightsbridge	WB	William St	

Table A.2: Car driver wearing rates, by Borough, 2007

Borough	Wearing rate
City of London	76% *
Lewisham	78% *
Tower Hamlets	80% *
Kensington & Chelsea	82% *
Hammersmith & Fulham	83% *
Enfield	83% *
Hillingdon	84% *
Islington	84% *
Havering	85% *
Westminster	85% *
Merton	85% *
Bexley	86% *
Waltham Forest	86% *
Southwark	86% *
Kingston	87%
Barking & Dagenham	87%
Harrow	87%
Camden	87%
Hackney	87%
Newham	88%
Brent	88% *
Richmond-upon-Thames	88% *
Redbridge	89% *
Bromley	90% *
Haringey	90% *
Lambeth	90% *
Sutton	90% *
Wandsworth	91% *
Ealing	91% *
Croydon	91% *
Hounslow	92% *
Barnet [†]	92% *
Greenwich	94% *

* denotes that wearing rate differs significantly from the London average (87%)

[†] Pinkham Way March result. See Barnet site analysis in Appendix B.

Table A.3: London areas by Borough

Borough	Area	Police garage
Southwark	South West	SE
Lambeth	South West	SW Merton
Wandsworth	South West	SW Merton
Merton	South West	SW Merton
Kingston	South West	SW Merton
Richmond-upon-Thames	South West	SW Hampton
Sutton	South East	SW Merton
Greenwich	South East	SE
Lewisham	South East	SE
Bexley	South East	SE
Bromley	South East	SE
Croydon	South East	SE
Hammersmith & Fulham	North West	SW Hampton
Hounslow	North West	SW Hampton
Hillingdon	North West	NW
Brent	North West	NW
Ealing	North West	NW
Harrow	North West	NW
Barnet	North West	NW
Waltham Forest	North East	NE
Redbridge	North East	NE
Havering	North East	NE
Barking & Dagenham	North East	NE
Newham	North East	NE
Haringey	North East	NE
Enfield	North East	NE
Hackney	Central	NE
Tower Hamlets	Central	NE
City of London	Central	City
Westminster	Central	Central
Camden	Central	Central
Islington	Central	Central
Kensington & Chelsea	Central	Central

Table A.4: Proportion of car and taxi drivers using mobile phones, by Borough 2007

Borough	Hand-held	Either
Lambeth	0.0% *	7.2%
Southwark	0.2% *	6.9%
Newham	0.3% *	1.3%
Hillingdon	0.5% *	1.7%
Brent	0.7% *	3.2%
Hammersmith & Fulham	0.8% *	7.2%
Croydon	0.8% *	2.3%
Harrow	0.9% *	5.7%
Westminster	0.9% *	6.3%
Enfield	1.0% *	4.0%
Bromley	1.1% *	2.2%
Barnet [†]	1.1% *	5.9%
Haringey	1.2% *	2.9%
Hounslow	1.2% *	4.9%
Greenwich	1.3%	2.8%
Sutton	1.3%	2.3%
Barking & Dagenham	1.3%	3.4%
Kingston	1.5% *	3.0%
Bexley	1.7% *	4.6%
Havering	1.7% *	4.5%
Hackney	1.8% *	3.1%
Tower Hamlets	1.9% *	4.4%
Wandsworth	1.9% *	7.0%
Lewisham	1.9% *	6.1%
Redbridge	2.2% *	3.1%
Richmond-upon-Thames	2.2% *	3.7%
Waltham Forest	2.2% *	3.5%
Ealing	2.5% *	5.6%
Kensington & Chelsea	2.6% *	6.3%
Islington	3.2% *	9.3%
Camden	3.4% *	8.1%
Merton	4.3% *	9.0%
City of London	6.2% *	7.0%

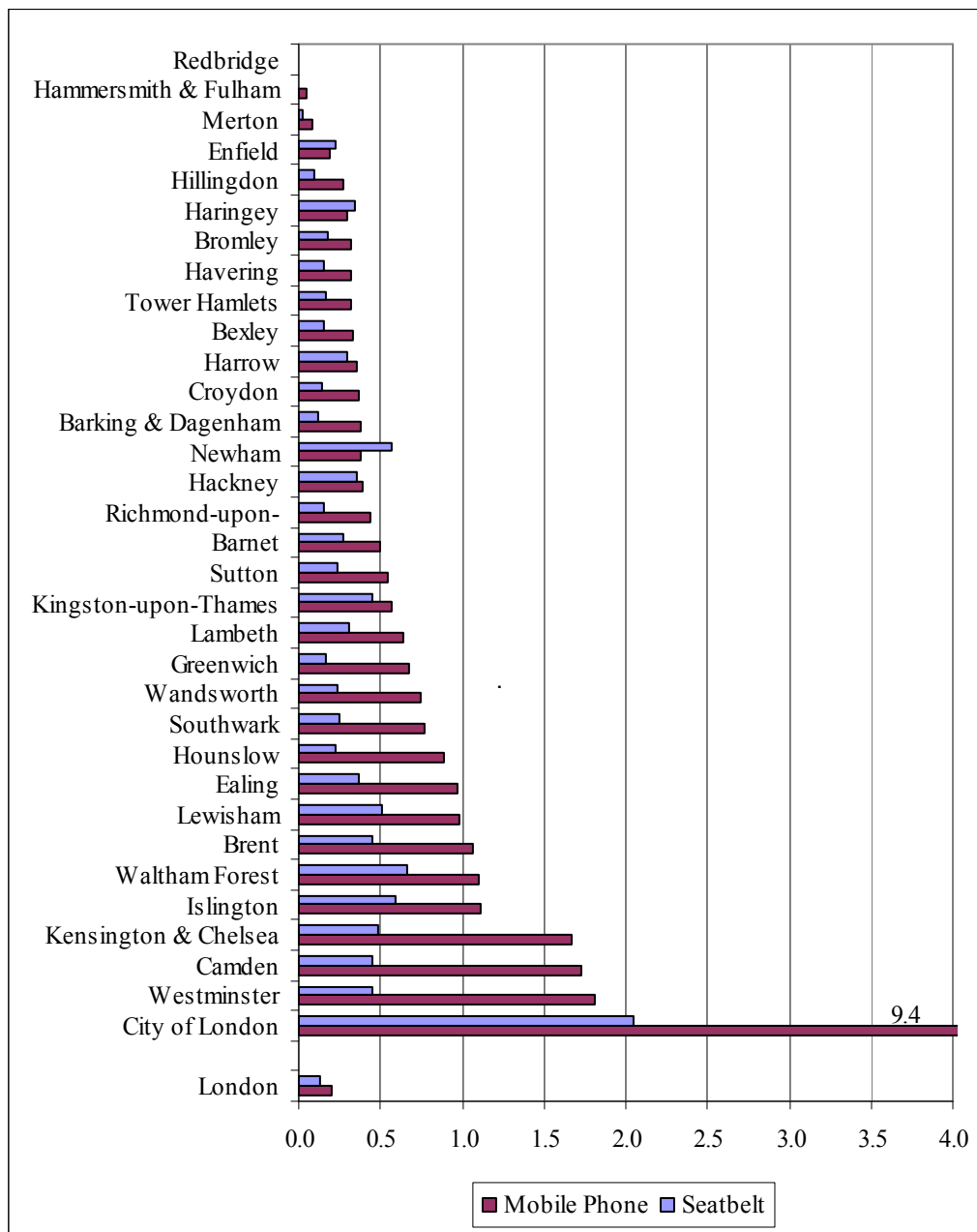
* denotes hand-held rate that differs significantly from the London average (hand-held 1.3% and either 3.7%)

[†] Pinkham Way March result. See Barnet site analysis in Appendix B.

Table A.5: Number and rate of fixed penalty notices in London, 2006

	Seat belt		Mobile Phone		Traffic volume* (million vkm)
	Number	Rate	Number	Rate	
Barking & Dagenham	74	0.12	230	0.37	614
Barnet	454	0.27	835	0.50	1,674
Bexley	160	0.16	347	0.34	1,029
Brent	457	0.45	1,081	1.06	1,017
Bromley	244	0.18	439	0.32	1,386
Camden	238	0.45	917	1.72	532
City of London	410	2.05	1,883	9.42	200
Croydon	200	0.15	506	0.37	1,360
Ealing	507	0.37	1,344	0.98	1,378
Enfield	350	0.22	299	0.19	1,570
Greenwich	205	0.17	813	0.67	1,206
Hackney	197	0.36	216	0.39	547
Hammersmith & Fulham	8	0.01	28	0.05	597
Haringey	217	0.34	186	0.29	634
Harrow	192	0.29	234	0.36	659
Havering	227	0.15	484	0.32	1,515
Hillingdon	224	0.10	606	0.27	2,266
Hounslow	378	0.23	1,461	0.89	1,646
Islington	275	0.59	517	1.11	467
Kensington & Chelsea	278	0.48	971	1.67	580
Kingston-upon-Thames	456	0.45	569	0.56	1,012
Lambeth	266	0.30	564	0.64	877
Lewisham	447	0.50	876	0.99	887
Merton	18	0.03	56	0.08	680
Newham	549	0.57	360	0.38	960
Redbridge	5	0.00	11	0.01	1,088
Richmond-upon-Thames	140	0.16	391	0.43	901
Southwark	217	0.25	670	0.77	873
Sutton	175	0.23	410	0.55	749
Tower Hamlets	157	0.16	314	0.32	980
Waltham Forest	514	0.67	849	1.10	770
Wandsworth	237	0.24	736	0.75	980
Westminster	475	0.45	1,907	1.81	1,051
London	8,951	0.27	21,110	0.65	32,685

Figure A.1: Rate per million vehicle-km of fixed penalty notices in London, 2006*



* Traffic data from Department for Transport (2007b)

Appendix B. Barnet site analysis

Repeat surveys at a new Barnet site (North Circular junction with Fallosen Way) were carried out in September 2007 following the discovery that the original Barnet survey site (Pinkham Way junction with Bounds Green Road) was just outside the Barnet borough boundaries, even if carrying traffic that has all travelled through Barnet. The following tables compare the occupant restraint use and mobile use of drivers for the repeated survey data for Barnet results.

Table B.1 shows the Pinkham Way and N Circular car driver seat belt wearing rates for Barnet. It is clear that there is little difference between the two different surveys. Similarly Table B.2 shows a consistent picture when the March and September Barnet survey results are combined with the other borough results within the North West region.

Table B.1: Car driver wearing rates Barnet results

Barnet	Driver
Pinkham Way (March)	92.4%
N Circular (September)	91.9%

Table B.2: Car occupant wearing rates in North West

North West	Driver	Front passenger	Rear passenger
Inc. Pinkham Way (March)	88.2%	84.1%	54.1%
Inc. N Circular (September)	88.3%	84.0%	53.8%

Figure B.1: Seat belt wearing rate correlation between 2006 results (Barnet = North Circular) and 2007 results (Barnet = North Circular in September– red or Pinkham Way in March – green)

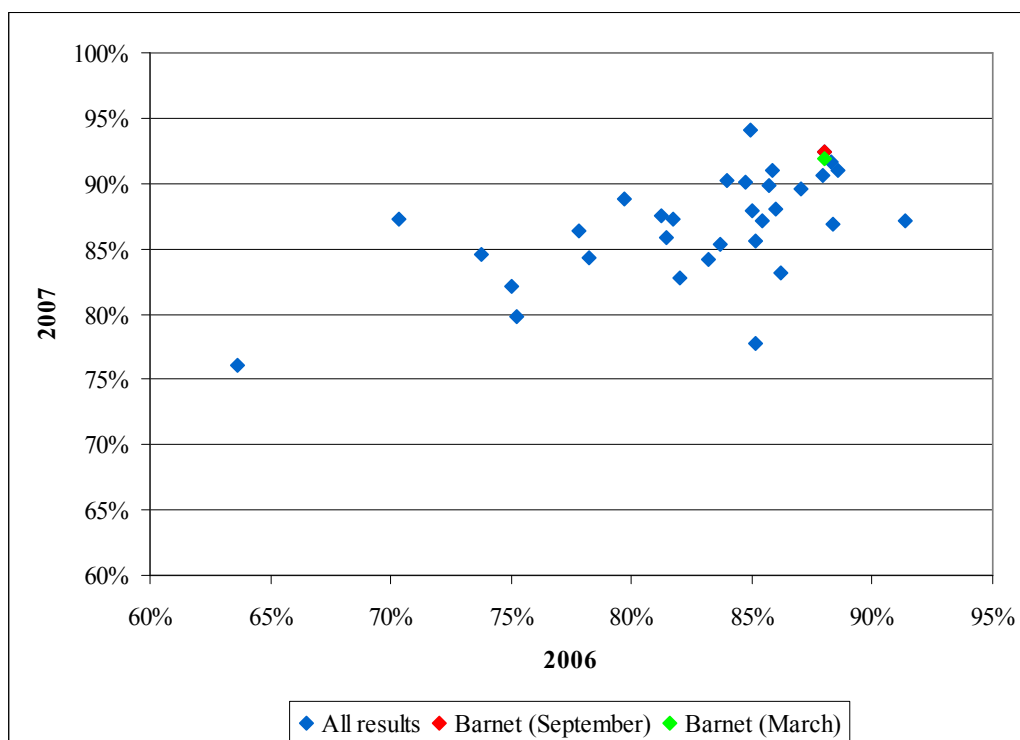


Figure B.1 shows the 2006 and 2007 observations of wearing rates of car drivers in all boroughs. A positive correlation is evident and the two results for Barnet are very close to each other, suggesting that at the two sites we have observed similar sets of drivers.

In Table B.3 and Table B.4, the car and taxi driver mobile phone use is shown. A difference is evident within these results, with more hand-held phones being observed and fewer hands-free kits in the new Barnet site survey. In a regional context the proportion of drivers observed to be using hand-held mobile phones in the North West region increases slightly by 0.3%, and the proportion using either hands-free or hand-held reduces by 0.6%. This variation is likely to be due to the time of survey – the initial survey ran in March just after the increased mobile phone fines and associated media coverage, whereas the new survey ran in September – 6 months later. In addition, some internal variation is to be expected, as shown in the change in results between 2006 and 2007, and within the boroughs in 2007.

Table B.3: Car and taxi driver mobile phone use in Barnet

Barnet	Hand-held	Hands-free	Either
Pinkham Way (March)	1.1%	4.8%	5.9%
N Circular (September)	2.7%	1.4%	3.3%

Table B.4: Car and taxi driver mobile phone use in North West

North West	Hand-held	Hands-free	Either
Pinkham Way (March)	1.0%	3.3%	4.3%
N Circular (September)	1.3%	3.4%	3.7%

Figure B.2 shows the 2006 and 2007 observations of hand-held mobile phone use by car and taxi drivers in all boroughs. The two results for 2007 Barnet surveys are clearly different in this graph, however the variation is similar to between other sites, and there is no clear or statistically significant trend between the 2006 and 2007 showing how variable these results on small sample sizes are. Due to the change in the mobile phone legislation very close to the survey in March there is reason to believe that there may have been a temporary reduction in the proportion of drivers using hand-held mobile phone, thus it is most likely that the variation in the Barnet results between March and September is due to this temporary success fading rather than the change of site. This possible reason is supported by the closeness of the seat belt results.

Figure B.2: Correlation of hand-held mobile phone use between 2006 results (Barnet = North Circular) and 2007 results (Barnet = North Circular in September– red or Pinkham Way in March– green)

