



APPENDIX AVAILABLE ON REQUEST

Research Report 155

The Impact of the Congestion Charging Scheme on Air Quality in London

Part 1. Emissions Modeling and Analysis of Air Pollution Measurements

Frank Kelly et al.

Appendix K. Results for Weekend Congestion Charging Hours: Background Monitoring Stations Only

Note: Appendices Available on the Web may appear in a different order than in the original Investigators' Report, and some remnants of their original names may appear in Table and Figure numbers. HEI has not changed the content of these documents, only the letter identifier.

Appendix K was originally Appendix F4.

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This document was reviewed by the HEI Health Review Committee but did not undergo the HEI scientific editing and production process.

APPENDIX K

RESULTS FOR WEEKEND CONGESTION CHARGING HOURS

BACKGROUND MONITORING STATIONS ONLY

Table K.1. Controlled ratios for changes in weekend NO_x geometric mean concentrations before/after introduction of CCS at Bloomsbury, City of London and Westminster compared to other background locations 8 km+ from zone center - congestion charging hours only

Within charging zone background										
Bloomsbury - AURN	BL0									
City of London 1 - Senator House	CT1									
Westminster AURN	WM0									
Outer London background		BL0 %	LCL	UCL	CT1 %	LCL	UCL	WM0 %	LCL	UCL
Barnet 2 - Finchley	BN2	8.2	-9.9	30.0	1.0	-18.4	25.0	19.2	-5.4	50.4
Ealing 1 - Ealing Town Hall	EA1	5.5	-12.3	27.0	-0.2	-18.8	22.5	12.3	-10.1	40.2
Enfield 3 - Salisbury Sch Ponders End	EN3	7.7	-9.8	28.6	4.8	-13.8	27.5	20.0	-3.3	49.0
Harrow 1 - Stanmore Background	HR1	2.0	-15.2	22.7	-1.9	-20.0	20.3	13.8	-9.1	42.5
Lewisham 1 - Catford	LW1	4.4	-13.3	25.8	8.3	-10.8	31.5	19.2	-4.5	48.6
Redbridge 1 - Perth Terrace	RB1	3.0	-13.0	22.0	0.4	-16.4	20.6	15.3	-6.3	41.9
Waltham Forest 1 - Dawlish Road	WL1	8.6	-9.8	30.8	0.7	-17.8	23.4	14.3	-8.2	42.4
	FE	5.6	-1.4	13.1	1.9	-5.5	9.9	16.3	7.0	26.3
	RE	5.6	-1.4	13.1	1.9	-5.5	9.9	16.3	7.0	26.3

Notes: % - change in weekend NO_x concentrations at the within-zone sites before and after the introduction of the CCS as a percentage of the corresponding change measured at individual outer-London sites. LCL & UCL – lower and upper 95% confidence intervals; FE & RE – fixed and random effects summary estimates.

Table K.2 Controlled ratios for changes in weekend NO geometric mean concentrations before/after introduction of CCS at Bloomsbury, City of London and Westminster compared to other background locations 8 km+ from zone center - congestion charging hours only

Within charging zone background										
Bloomsbury - AURN	BL0									
City of London 1 - Senator House	CT1									
Westminster AURN	WM0									
Outer London background		BL0 %	LCL	UCL	CT1 %	LCL	UCL	WM0 %	LCL	UCL
Barnet 2 - Finchley	BN2	-12.5	-36.3	20.2	-3.8	-30.0	32.4	14.7	-26.7	79.5
Ealing 1 - Ealing Town Hall	EA1	-4.4	-30.9	32.3	4.8	-23.3	43.1	3.9	-31.2	57.0
Enfield 3 - Salisbury Sch Ponders End	EN3	-16.9	-39.2	13.6	-4.7	-28.7	27.4	-1.1	-33.9	47.9
Harrow 1 - Stanmore Background	HR1	-23.7	-43.7	3.4	-14.1	-35.5	14.3	-4.2	-36.1	43.6
Lewisham 1 - Catford	LW1	-53.4	-69.0	-29.7	3.8	-22.1	38.2	0.7	-34.7	55.4
Redbridge 1 - Perth Terrace	RB1	-18.1	-39.8	11.4	-0.3	-24.5	31.6	-1.3	-33.7	46.9
Waltham Forest 1 - Dawlish Road	WL1	-20.8	-44.5	13.0	-19.9	-41.5	9.6	-11.9	-42.2	34.2
	FE	-20.7	-30.0	-10.3	-5.1	-15.2	6.1	-0.4	-14.9	16.5
	RE	-21.3	-32.6	-8.3	-5.1	-15.2	6.1	-0.4	-14.9	16.5

Notes: % - change in weekend concentrations at the within-zone sites before and after the introduction of the CCS as a percentage of the corresponding change measured at individual outer-London sites. LCL & UCL – lower and upper 95% confidence intervals; FE & RE – fixed and random effects summary estimates.

Table K.3 Controlled ratios for changes in weekend NO₂ geometric mean concentrations before/after introduction of CCS at Bloomsbury, City of London and Westminster compared to other background locations 8 km+ from zone center - congestion charging hours only

Within charging zone background										
Bloomsbury - AURN	BL0									
City of London 1 - Senator House	CT1									
Westminster AURN	WM0									
Outer London background		BL0 %	LCL	UCL	CT1 %	LCL	UCL	WM0 %	LCL	UCL
Barnet 2 - Finchley	BN2	31.9	12.6	54.4	4.8	-11.0	23.5	19.6	-0.1	43.2
Ealing 1 - Ealing Town Hall	EA1	15.7	-0.9	35.0	-2.8	-16.2	12.9	10.1	-6.4	29.5
Enfield 3 - Salisbury Sch Ponders End	EN3	31.2	12.2	53.5	10.7	-5.0	29.0	26.6	7.2	49.6
Harrow 1 - Stanmore Background	HR1	21.0	0.7	45.3	6.1	-10.7	26.0	21.9	1.3	46.7
Lewisham 1 - Catford	LW1	27.9	6.4	53.8	7.7	-6.8	24.5	20.1	2.3	41.0
Redbridge 1 - Perth Terrace	RB1	18.8	2.5	37.8	2.4	-10.8	17.5	18.7	1.5	38.7
Waltham Forest 1 - Dawlish Road	WL1	38.8	17.7	63.7	11.2	-4.8	29.9	25.4	6.2	48.2
	FE	26.0	18.5	34.0	5.5	-0.4	11.7	20.1	12.7	27.9
	RE	26.0	18.5	34.0	5.5	-0.4	11.7	20.1	12.7	27.9

Notes: % - change in weekend NO₂ concentrations at the within-zone sites before and after the introduction of the CCS as a percentage of the corresponding change measured at individual outer-London sites. LCL & UCL – lower and upper 95% confidence intervals; FE & RE – fixed and random effects summary estimates.

Table K.4 Controlled ratios for changes in weekend PM₁₀ geometric mean concentrations before/after introduction of CCS at Bloomsbury compared to other background locations 8 km+ from zone center - congestion charging hours only.

Within charging zone background				
Bloomsbury - AURN	BL0			
Outer London background				
		BL0 %	LCL	UCL
Barnet 2 - Finchley	BN2	-12.5	-23.8	0.5
Enfield 3 - Salisbury Sch Ponders End	EN3b	-1.0	-15.1	15.5
Harrow 1 - Stanmore Background	HR1	-6.8	-18.5	6.7
Redbridge 1 - Perth Terrace	RB1b	-17.1	-27.8	-4.7
Waltham Forest 1 - Dawlish Road	WL1	-11.7	-23.2	1.5
	FE	-10.3	-15.7	-4.4
	RE	-10.3	-15.7	-4.4

Notes: % - change in weekend PM₁₀ concentrations at the within-zone sites before and after the introduction of the CCS as a percentage of the corresponding change measured at individual outer-London sites. LCL & UCL – lower and upper 95% confidence intervals; FE & RE – fixed and random effects summary estimates.

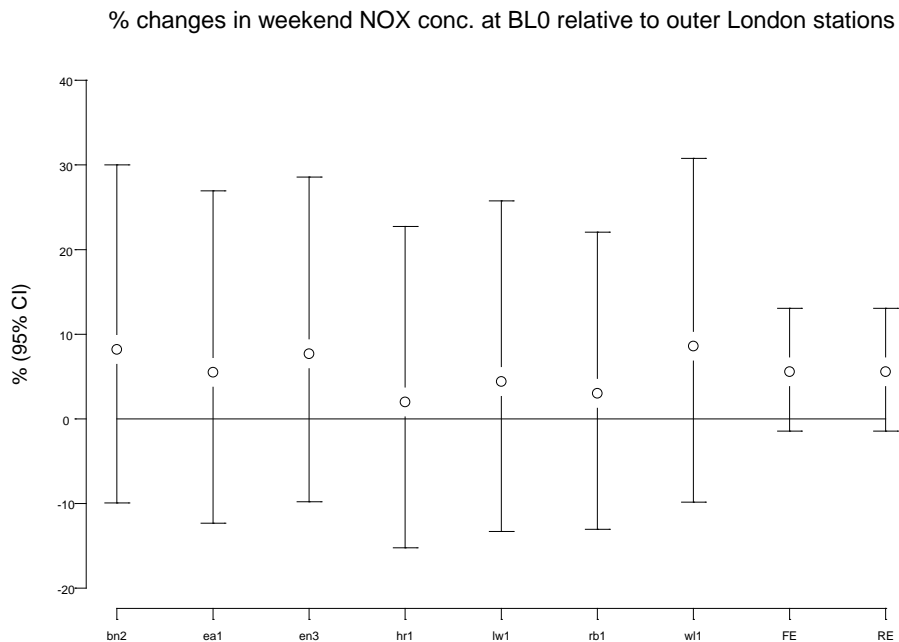
Table K.5 Controlled ratios for changes in weekend CO geometric mean concentrations before/after introduction of CCS at Bloomsbury and Westminster compared to other background locations 8 km+ from zone center - congestion charging hours only

Within charging zone background							
Bloomsbury - AURN	BL0						
Westminster AURN	WM0						
Outer London background		BL0 %	LCL	UCL	WM0 %	LCL	UCL
Enfield 3 - Salisbury Sch Ponders End	EN3	-12.3	-25.2	2.86	-12.2	-24.1	1.6

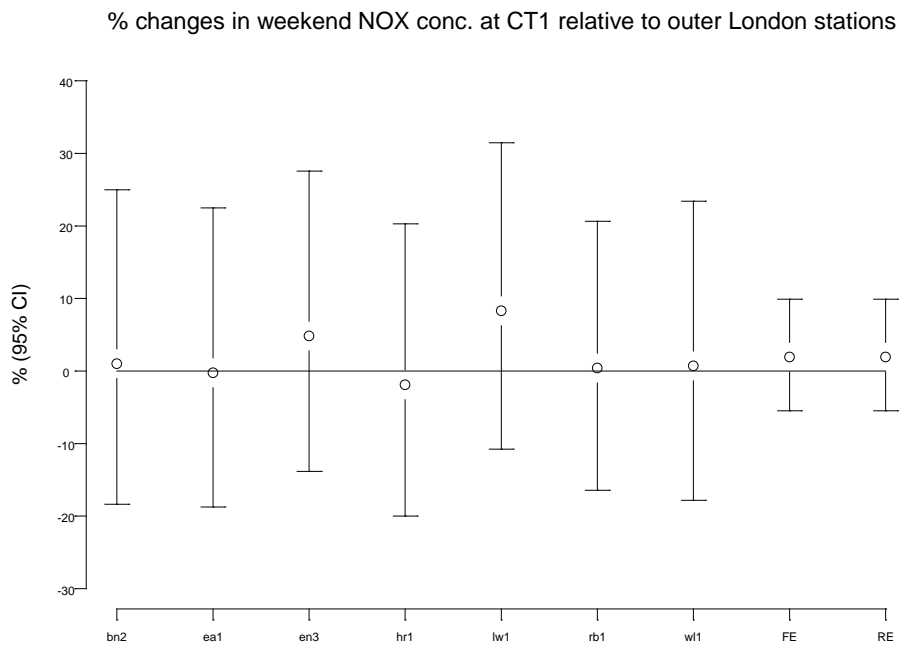
Notes: % - change in weekend CO concentrations at the within-zone sites before and after the introduction of the CCS as a percentage of the corresponding change measured at individual outer-London sites. LCL & UCL – lower and upper 95% confidence intervals.

Figure K.1 Changes in weekend NO_x geometric mean concentrations before/after introduction of CCS at background locations within zone compared to changes at sites 8 km+ from zone center - congestion charging hours only

a) Bloomsbury



b) City of London



c) Westminster

% changes in weekend NOX conc. at WM0 relative to outer London stations

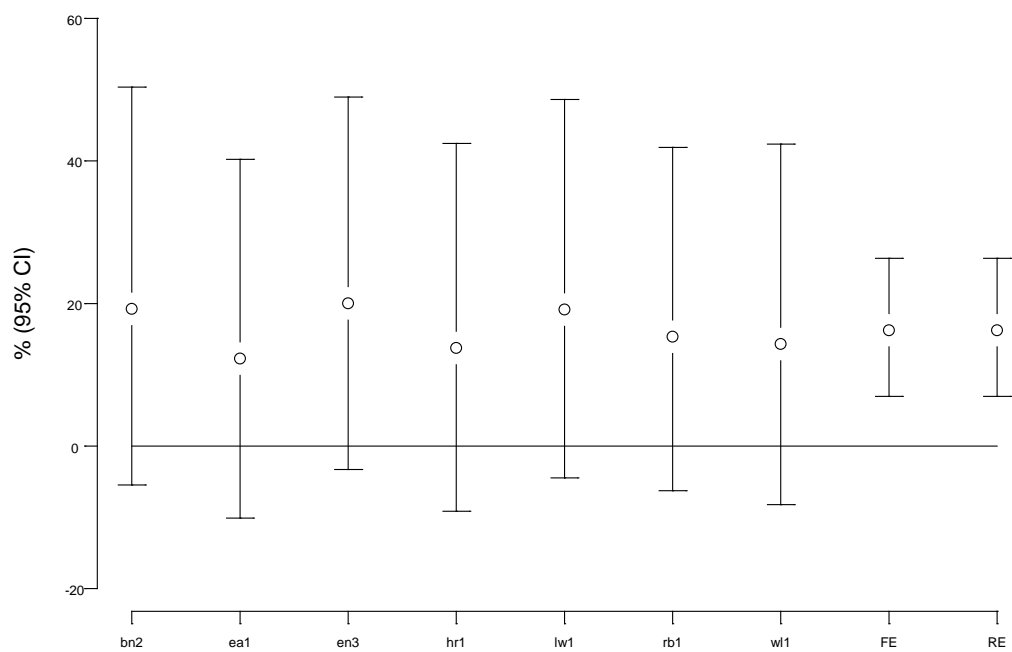
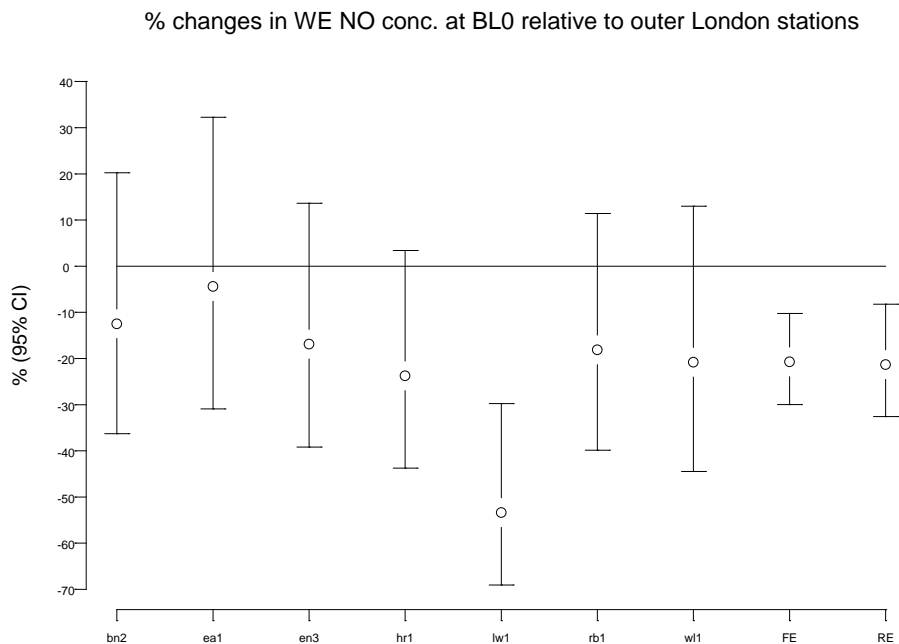
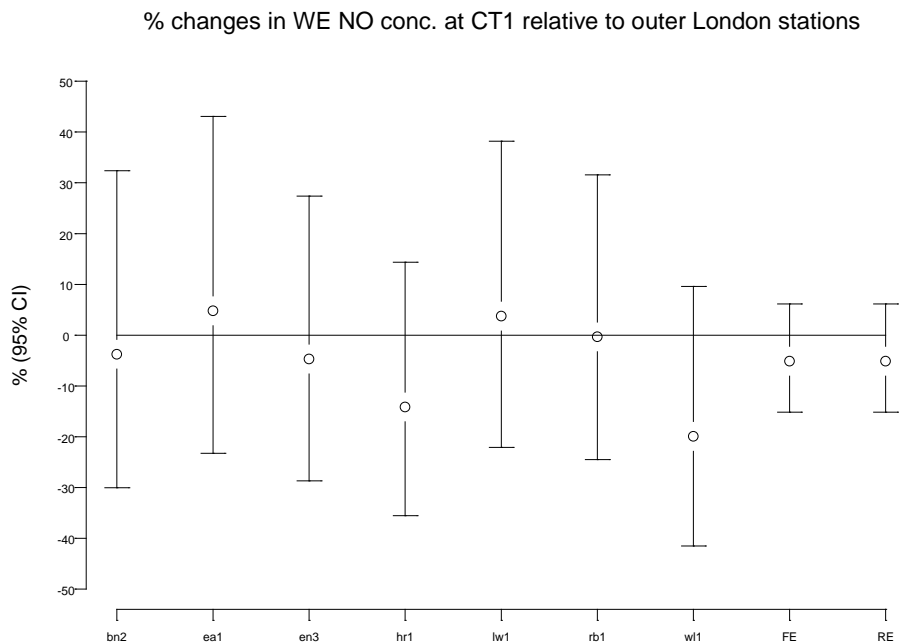


Figure K.2 Changes in weekend NO geometric mean concentrations before/after introduction of CCS at background locations within zone compared to changes at sites 8 km+ from zone center - congestion charging hours only

a) Bloomsbury, BL0



b) City of London, CT1



c) Westminster, WM0

% changes in WE NO conc. at WM0 relative to outer London stations

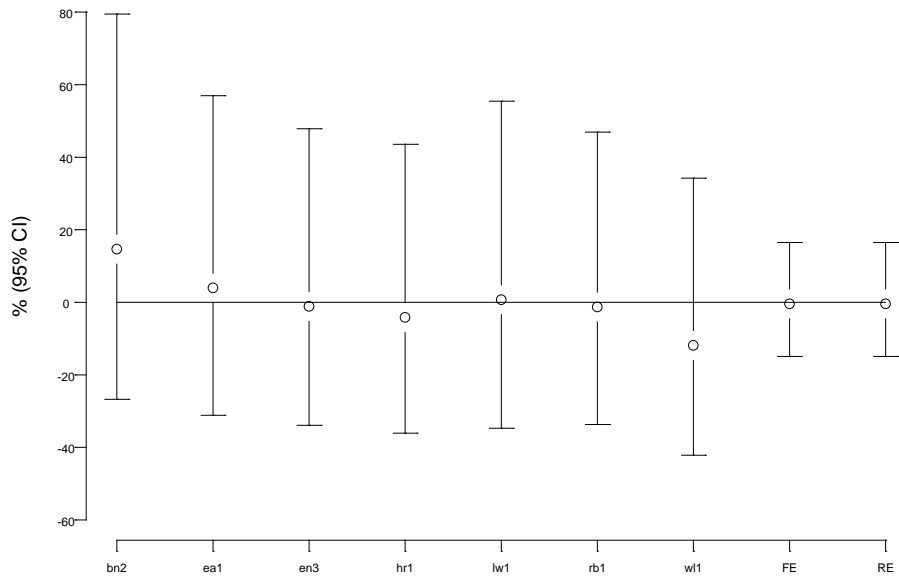
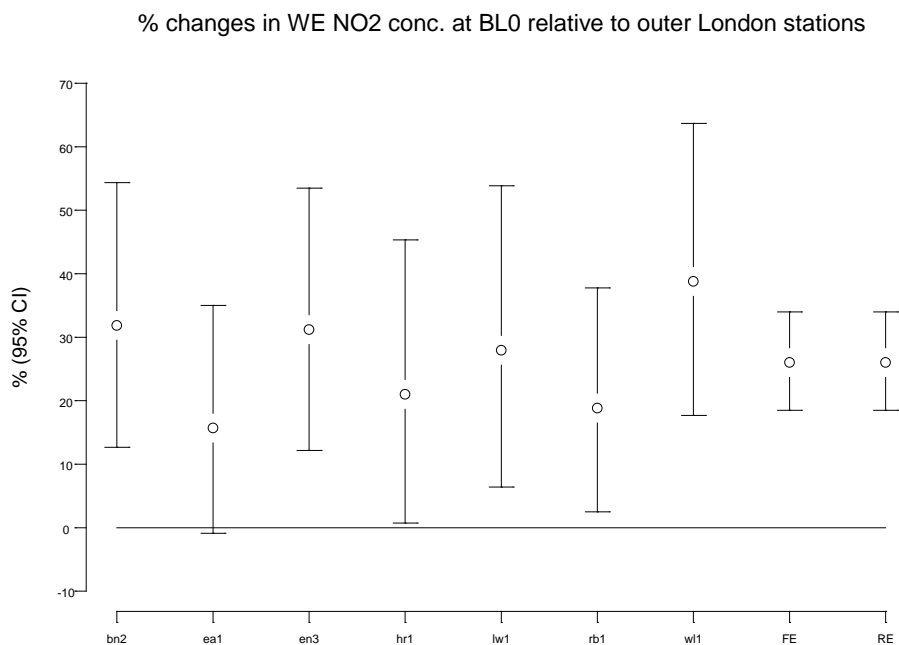
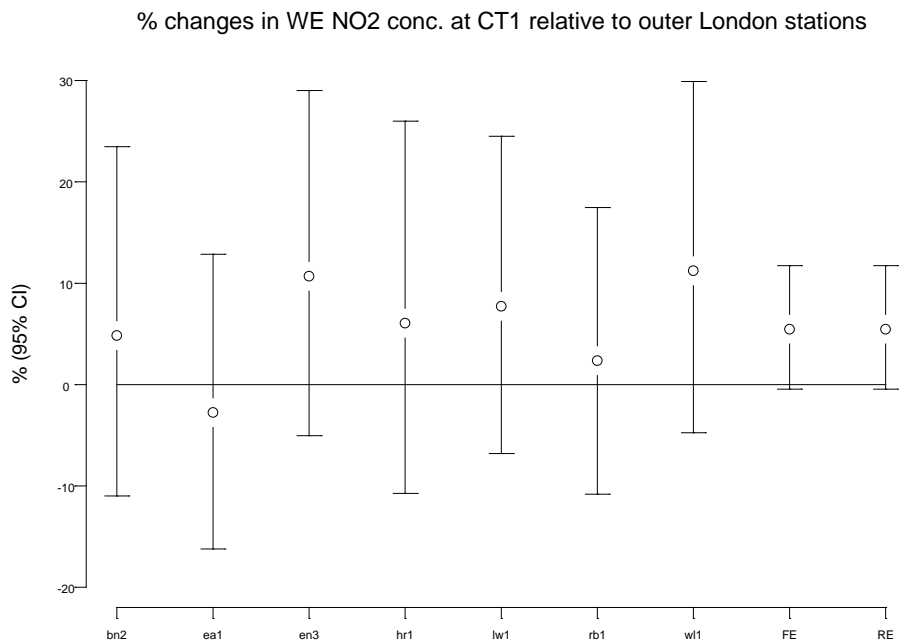


Figure K.3. Changes in weekend NO₂ geometric mean concentrations before/after introduction of CCS at background locations within zone compared to changes at sites 8 km+ from zone center - congestion charging hours only

a) Bloomsbury, BL0



b) City of London, CT1



c) Westminster, WM0

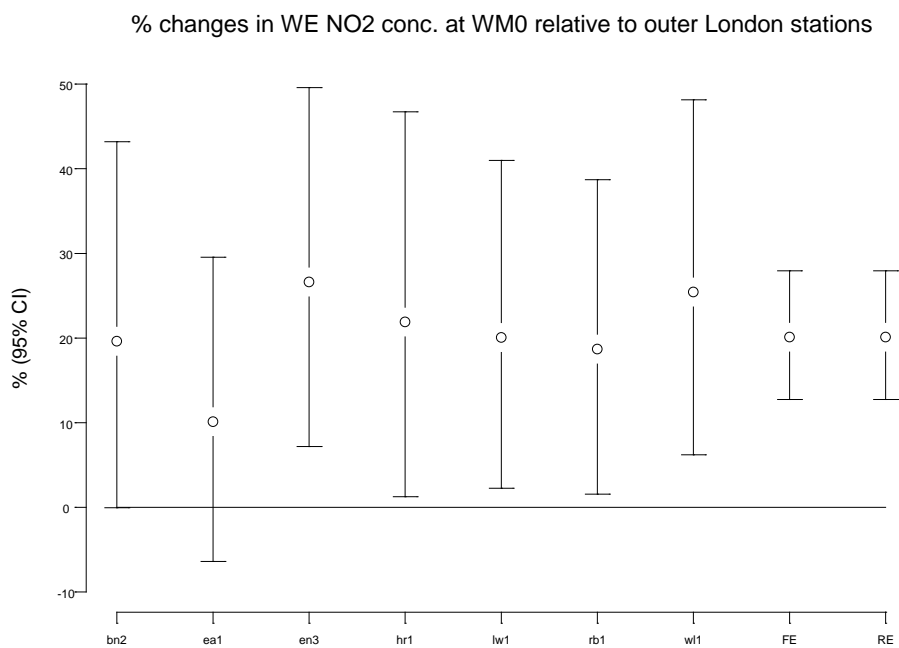


Figure K.4. Changes in weekend PM₁₀ geometric mean concentrations before/after introduction of CCS at background locations within zone compared to changes at sites 8 km+ from zone center - congestion charging hours only

a) Bloomsbury

