Supporting Information

Emerging Flame Retardants, PBDEs, and HBCDDs in indoor and outdoor media in Stockholm, Sweden

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Materials 3

Table S1 - Information about origin and purity of native standards 4

Table S2 – Information about the origin and purity of the isotopically-labelled standards 6

Table S3 – Flame retardant concentrations in dust 7

Table S4 - Dates and meteorological conditions for outdoor air sampling. 9

Figure S1 - Results from the filter spiking experiment 10

Table S5 - Method limits of detection (mLOD) and method limits of quantification (mLOQ) 11

Table S6 - Flame retardant concentrations in indoor and ventilation air 13

Table S7 – Flame retardant concentrations in outdoor air samples 15

Table S8 – Flame retardant concentrations in soil samples 17

Table S9 - Geometric mean (GM) flame retardant concentrations (pg m^{-3}) in indoor and ventilation system air in different microenvironments 18

Table S10 - Geometric mean (GM) flame retardant concentrations (ng g^{-1}) in indoor dust in different microenvironments 19

Figure S2 - Dust-air partitioning coefficients (K_{da}) plotted against K_{oa} values 20
Air-soil fugacity fraction calculation 21
Table S11 - Results from fugacity fraction calculations 21

Materials

Dichloromethane (DCM) and *n*-hexane (both Lichrosolve) were obtained from Merck (Darmstadt, Germany; diethyl ether and *iso*-octane (both HPLC-grade) from LabScan (Gliwice, Poland); acetonitrile and methanol (B&J Brand) from Honeywell (Seelze, Germany); and sulfuric acid (AnalaR, BDH) from VWR International (Pennsylvania, USA). Water was obtained from a Milli-Q water purification unit (Millipore AB, Solna, Sweden). Other materials used were silica gel 60 (0.0063-0.200 mm) from Merck; anhydrous Na_2SO_4 (reagent grade) from Scharlau (Barcelona, Spain); ISOLUTE aminopropyl columns (0.5 g), empty reservoirs and frits from Biotage (Uppsala, Sweden). For dust sampling, cellulose filters (7 cm diameter) in styrene–acrylonitrile holders inserted in a polypropylene nozzle (Krim. Teknisk Materiel AB, Bålsta, Sweden), attached to the intake nozzle of an industrial strength vacuum cleaner (Alto AERO 840) were used. For indoor and ventilation system air, polyurethane foam plugs (PUFs, diameter 15 mm, thickness 15 mm, Specialplast AB, Gillinge, Sweden) and glass fiber filters (GFF, binder-free A/E borosilicate, 25 mm diameter, Pall Corp., MI, USA) were used. For outdoor air, larger PUFs (78 x 75 mm, DP Sunde, Norway) and GFFs (MG 160, 293 mm diameter, Munktell, Sweden) were used. The vacuum evaporator was a Syncore® Line from Büchi (Flawil, Switzerland). The surrogate/reference standards used were purchased from Wellington Laboratories Inc. (Guelph, Canada), Cambridge Isotope Laboratories Inc. (Andover, USA), and AccuStandard Inc. (New Haven, USA); for details see Tables S1 and S2, Supporting Information (SI).

Table S1 - Information about origin and purity of native standards and the fraction in which they elute from the silica gel column used for sample clean-up.

Abbreviation	**Compound name**	CAS #	**Chemical Purity**	**Manufacturer**	**Elutes in fraction**
α-DBE-DBCH	α - tetrabromoethylcyclohexane	3322-93-8	>98 %	WL	I
β-DBE-DBCH	β - tetrabromoethylcyclohexane	3322-93-8	>98 %	WL	I
BATE	2-bromoallyl 2,4,6-tribromophenyl ether		>98 %	WL	I
PBT	pentabromotoluene	87-83-2	>98 %	WL	I
PBEB	pentabromoethylbenzene	85-22-3	>98 %	WL	I
TBP-DBPE	2,3-dibromopropyl 2,4,6-tribromophenyl ether	35109-60-5	>98 %	WL	I
HBB	hexabromobenzene	87-82-1	>98 %	WL	I
DBHCTD	hexachlorocyclopentenyl-dibromocyclooctane	51936-55-1	>98 %	WL	I
OBTMPI	octabromotrimethylphenylindane	1084889-51-9, 1025956-65-3, 893843-07-7	>98 %	WL	I
DBDPE	decabromodiphenylethane	84852-53-9	>98 %	WL	I
BTBPE	1,2-bis(2,4,6-tribromophenoxy)ethane	37853-59-1	>98 %	WL	II
EH-TBB	2-ethylhexyl-2,3,4,5-tetrabromobenzoate	183658-27-7	>98 %	WL	II
BEH-TEBP	bis(2-ethyl-1-hexyl)tetrabromophthalate	26040-51-7	>98 %	WL	II
anti-DDC-CO	Dechlorane Plus *Anti*	135821-74-8	98 %	CIL	I
syn-DDC-CO	Dechlorane Plus *Syn*	135821-03-3	98 %	CIL	I
BDE-47	2,2',4,4'-tetrabromodiphenyl ether	5436-43-1	99 %	CIL	I
BDE-99	2,2',4,4',5-pentabromodiphenyl ether	60348-60-9	99 %	CIL	I
BDE-100	2,2',4,4',6-pentabromodiphenyl ether	189084-64-8	99 %	CIL	I
BDE-153	2,2',4,4',5,5'-hexabromodiphenyl ether	68631-49-2	99 %	CIL	I
BDE-154	2,2',4,4',5,6'-hexabromodiphenyl ether	207122-15-4	99 %	CIL	I
BDE-183	2,2',3,4,4',5',6-heptabromodiphenyl ether	207122-16-5	99 %	CIL	I
BDE-197	2,2',3,3',4,4',6,6'-octabromodiphenyl ether	117964-21-3	>98 %	WL	I
BDE-203	2,2',3,4,4',5,5',6-octabromodiphenyl ether	337513-72-1	100 %	AS	I

BDE-206	2,2',3,3',4,4',5,5',6-nonabromodiphenyl ether	63387-28-0	>98 %	WL	I
BDE-207	2,2',3,3',4,4',5,6,6'-nonabromodiphenyl ether	437701-79-6	>98 %	WL	I
BDE-208	2,2',3,3',4,5,5',6,6'-nonabromodiphenyl ether	63936-56-1	>98 %	WL	I
BDE-209	2,2',3,3',4,4',5,5',6,6'-decabromodiphenyl ether	1163-19-5	99 %	CIL	I
α-HBCDD	α-1,2,5,6,9,10-hexabromocyclododecane	134237-50-6	98 %	CIL	III
β-HBCDD	β-1,2,5,6,9,10-hexabromocyclododecane	134237-51-7	98 %	CIL	III
γ-HBCDD	γ-1,2,5,6,9,10-hexabromocyclododecane	25637-99-4	98 %	CIL	III

WL = Wellington Laboratories Inc. (Guelph, Canada)

CIL = Cambridge Isotope Laboratories Inc. (Andover, USA)

AS = AccuStandard Inc. (New Haven, USA)

Table S2 – Information about the origin and purity of the isotopically-labelled standards

Abbreviation	Compound name	Chemical Purity	Isotopic Purity	Manufacturer
^{13}C-α-HBCDD	α-1,2,5,6,9,10-hexabromo[$^{13}C_{12}$]cyclododecane	>98 %	>99 %	WL
^{13}C-β-HBCDD	β-1,2,5,6,9,10-hexabromo[$^{13}C_{12}$]cyclododecane	>98 %	>99 %	WL
^{13}C-γ-HBCDD	γ-1,2,5,6,9,10-hexabromo[$^{13}C_{12}$]cyclododecane	>98 %	>99 %	WL
^{13}C-BTBPE	1,2-bis(2,4,6-tribromophenoxy)[$^{13}C_{12}$]ethane	>98 %	>99 %	WL
^{13}C-BDE-155	2,2',4,4',6,6'-hexabromo[$^{13}C_{12}$]diphenyl ether	>98 %	99 %	CIL
^{13}C-BDE-197	2,2',3,3',4,4',6,6'-octabromo[$^{13}C_{12}$]diphenyl ether	>98 %	>99 %	WL
^{13}C-BDE-209	2,2',3,3',4,4',5,5',6,6'-decabromo[$^{13}C_{12}$]diphenyl ether	98 %	99 %	CIL
^{13}C-*anti*-DDC-CO	$^{13}C_{10}$-Dechlorane Plus *Anti*	98 %	99 %	CIL
^{13}C-*syn*-DDC-CO	$^{13}C_{10}$-Dechlorane Plus *Syn*	98 %	99 %	CIL
$^{13}C^{2}$H-EHTBB	2,3,4,5-tetrabromo-[$^{13}C_6{}^{2}H_{17}$]ethylhexylbenzoate	>98 %	≥99 % ($^{13}C_6$) ≥98 % ($^{2}H_{17}$)	WL
$^{13}C^{2}$H-BEH-TEBP	2,3,4,5-tetrabromo-[$^{13}C_6{}^{2}H_{17}$]bis(2-ethylhexyl) phthalate	>98 %	≥99 % ($^{13}C_6$) ≥98 % ($^{2}H_{17}$)	WL
^{2}H-β-HBCDD	$^{2}H_{18}$-β-1,2,5,6,9,10-hexabromocyclododecane	>98 %	98 %	WL
^{13}C-CB-180	2,2',3,4,4',5,5'-heptachloro[$^{13}C_{12}$]biphenyl	>98 %	99 %	CIL

WL = Wellington Laboratories Inc. (Guelph, Canada)

CIL = Cambridge Isotope Laboratories Inc. (Andover, USA)

Table S3 – Flame retardant concentrations in dust (ng g^{-1}) for all indoor microenvironments sampled. Numbers in beige have been replaced with the mLOD and numbers in blue are reported as a range between the mLOD and mLOQ.

Location	Description	Sample intake (mg)	α-DBE-DBCH	β-DBE-DBCH	ΣDBE-DBCH	PBT	HBB	BTBPE	EHTBB	BEH-TEBH	Syn-DDC-CO	Anti-DDC-CO	α-HBCDD	β-HBCDD	γ-HBCDD	ΣHBCDD	DBDPE
Office 1	On Office Chair	54	1.0	0.74	1.7	0.26-0.78	1.0-3.1	<11	4.4	260	<0.42	0.49-1.5	64	24	140	220	370
Office 1	General Sample	84	0.12	<0.052	0.15	0.46	3.1	6.0	30	200	4.5	8.8	75	18	33	130	430
Office 3	General Sample	555	0.020-0.060	0.067	0.028-0.15	0.17	1.1	<1.1	2.8	120	0.040-0.12	0.048-0.14	4.5	3.4	8.7	17	7.8
Office 4	General Sample	85	0.49	0.26	0.74	2.7	22	150	12	240	30	39	110	19	18	150	400
Office 5	General Sample	141	<0.079	<0.031	<0.11	0.12	1.3	<4.3	6.6	150	2.3	4.6	75	25	47	150	140
Store 1	Red Couch in corner	103	2.3	1.6	3.8	2.1	3.6	12	57	1200	6.8	61	610	210	2100	2900	2200
Store 1	Area around Red Couch	19	0.60-1.8	0.16	0.83-2.0	<0.76	<2.9	<32	9.1	210	<1.2	<1.4	230	65	64	360	<6.8
Store 1	Leather couch	9	1.2-3.6	0.46-1.4	1.7-5.0	<1.5	<5.9	<64	32	190	<2.4	<2.8	210	180	370	760	<14
Store 1	Area around leather couch	22	0.50-1.5	<0.19	0.69-1.7	0.63-1.9	<2.4	<27	2.5-7.6	340	<1.0	<1.2	330	110	82	520	<5.7
Store 2	On top of various cables	14	<0.81	<0.31	<1.1	<1.0	4.0-12	<43	4.1-12	38	3800	960	45	18	18	80	8.3
Store 2	Area around cables	193	0.38	0.25	0.62	1.5	8.5	30	4.6	140	110	130	220	38	59	320	170
Store 3	Two soft fabric couches close to air sampler	151	<0.074	<0.029	<0.10	<0.093	<0.36	<4.0	65	1500	4.6	11	370	140	680	1200	<0.84
Store 3	Table and lamp near first two couches	7	<1.5	<0.58	<2.1	<1.9	<7.3	<80	<7.6	170	<3.0	<3.5	210	63	48	320	<17
Store 3	Leather couch	9	<1.2	<0.48	<1.7	<1.6	<6.1	<66	6.3-19	120	2.5-7.5	<2.9	49	13	33	94	<14
Store 3	Table near leather couch	12	<0.93	<0.36	<1.3	<1.2	<4.6	<50	<4.7	91	<1.9	<2.2	200	83	360	650	<11
Store 4	On LCD TV	8	<1.4	<0.56	<2.0	<1.8	9.5	<77	<7.3	64	<2.9	<3.4	59	12	6.0	77	<16
Store 4	Area around LCD TV	9	<1.2	<0.48	<1.7	<1.6	13	<66	94	170	<2.5	<2.9	110	24	17	160	<14
Store 4	LED TV	6	<1.9	<0.72	<2.6	<2.3	30	<100	<9.4	79	<3.7	<4.4	79	14	9.0	100	<21
Store 4	Panosonic and Philip Plasma TVs	10	<1.1	<0.44	<1.6	<1.4	5.5-17	<60	<5.7	<54	<2.3	<2.7	54	10	12	75	<13
Store 4	On Macintosh	9	<1.2	<0.46	<1.6	<1.5	5.8-18	<64	6.0-18	110	<2.4	<2.8	30	11	11	52	<14
Store 4	Around Macintosh	28	<0.40	<0.15	<0.55	0.50-1.5	7.2	<21	2.0-6.0	400	<0.80	<0.94	620	120	130	880	<4.5
Apartment 1	General Sample	12	0.96-2.9	0.37-1.1	1.3-4.0	2.4	3.0	<51	3.4	<46	<1.9	6.1	55	19	33	110	<11
Apartment 2	General Sample	38	0.29-0.87	0.11-0.34	0.86	2.2	1.4-4.3	<16	9.1	51	<0.58	<0.69	23	7.6	14	44	<3.3
Apartment 3	General Sample	16	0.68-2.1	<0.27	0.95-2.3	5.5	9.7	<37	<3.5	120	<1.4	<1.6	17	3.7	2.5	23	<7.8
Apartment 4	General Sample	36	0.79	0.42	1.2	0.71	5.3	<17	30	52	1.9	2.3	21	8.1	68	97	3.5-5.0
School 1	General Sample	220	1.6	1.1	2.7	1.6	1.1	3.9	17	140	1.6	3.2	450	88	98	640	<0.58
School 2	General Sample	54	0.70	0.71	1.4	0.85	69	<11	9.4	84	<0.42	<0.49	170	52	160	380	300

Table S3 continued – Flame retardant concentrations in dust (ng g^{-1}) for all indoor microenvironments sampled

Location	Description	BDE-47	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-196	BDE-197	BDE-203	BDE-206	BDE-207	BDE-208	BDE-209
Office 1	On Office Chair	25	53	11	11	7.8	<9.1	14	4.4	1.8	130	100	27	490
Office 1	General Sample	36	56	10	32	9.4	100	9.3	14	<0.29	23	21	8.7	120
Office 3	General Sample	2.9	3.5	0.78	1.0	0.61	3.5	0.13	0.18	<0.044	3.6	3.0	1.7	24
Office 4	General Sample	140	180	30	28	19	51	5.0	10	5.5	28	22	11	130
Office 5	General Sample	9.8	17	3.2	4.6	1.9	29	2.8	5.0	2.4	9.8	6.6	3.6	300
Store 1	Red Couch in corner	150	200	35	25	17	24	5.2	6.4	5.3	120	37	21	2600
Store 1	Area around Red Couch	22	48	3.6-11	<6.1	3.3-10	<26	<0.93	<2.3	<1.3	0.98	39	32	79
Store 1	Leather couch	7.9-24	38	7.1-21	<12	<6.7	<53	1.9-5.6	11	<2.6	2.8-8.3	3.1-9.3	3.5-10	88
Store 1	Area around leather couch	16	54	11	14	12	<22	0.77-2.3	0.53	<1.1	180	140	99	320
Store 2	On top of various cables	<5.3	9.2-28	<4.8	<8.3	<4.5	<36	<1.3	6.0	<1.8	97	53	33	140
Store 2	Area around cables	22	27	4.6	9.0	3.7	57	12	23	17	130	74	49	1600
Store 3	Two soft fabric couches close to air sampler	<0.49	59	<0.44	<0.76	<0.41	<3.3	<0.11	9.9	<0.16	<0.17	<0.19	<0.21	<2.7
Store 3	Table and lamp near first two couches	9.9-30	41	<8.9	<15	<8.3	<66	2.3-6.9	4.0	<3.3	3.5-10	47	10	210
Store 3	Leather couch	<8.2	<14	<7.4	<13	<6.9	<55	<1.9	3.3	<2.7	14	22	22	330
Store 3	Table near leather couch	6.2-18	11-32	<5.6	<9.5	<5.2	<41	<1.4	8.9	<2.0	2.2-6.5	17	9.7	160
Store 4	On LCD TV	9.5-28	30	<8.6	<15	<8.0	<63	<2.2	3.8	<3.1	3.3-10	3.7-11	4.1-12	50
Store 4	Area around LCD TV	8.2-25	33	<7.4	9.0	<6.9	<55	<1.9	3.3	<2.7	2.9-8.6	3.2-10	3.6-11	59
Store 4	LED TV	12-37	21-64	<11	<19	<10	<82	<2.9	5.0	<4.1	<4.3	4.8-14	5.4-16	<69
Store 4	Panosonic and Philip Plasma TVs	<7.5	<13	<6.7	<12	<6.3	<50	<1.7	3.0	<2.5	<2.6	2.9-8.8	3.3-10	<42
Store 4	On Macintosh	7.9-24	27	<7.1	<12	<6.6	<52	1.8-5.5	3.2	<2.6	2.8-8.3	3.1-9.2	3.4-10	35
Store 4	Around Macintosh	15	47	9.1	14	11	<17	<0.61	1.1	<0.87	65	59	46	130
Apartment 1	General Sample	21	25	7.7	<10	<5.3	<42	<1.5	9.2	<2.1	8.8	17	17	78
Apartment 2	General Sample	9.2	10	1.7-5.2	6.3	<1.6	<13	<0.45	2.8	<0.63	<0.67	9.0	0.84-2.5	<11
Apartment 3	General Sample	84	70	22	15	3.8-11	<30	<1.1	1.8	<1.5	<1.6	<1.8	<2.0	<25
Apartment 4	General Sample	18	11	3.2	1.4	1.7-5.2	14-41	1.9	4.4	<0.68	7.6	8.0	7.0	140
School 1	General Sample	49	68	11	10	7.0	<2.2	<0.079	4.2	5.3	<0.12	<0.13	0.10	<1.9
School 2	General Sample	11	19	4.9	5.6	3.9	<9.2	1.6	0.019	<0.45	35	26	16	130

<mLOD

Between mLOD and mLOQ

Table S4 - Dates and meteorological conditions for outdoor air sampling.

Sample	Sampling dates	Average Temperature (Range) °C[1]	millimeters precipitation (% of hours with precipitation)[1]
Rural Far West Sample 1	May 29-31, 2012	9.8 (5.9-15.1)	5.5 (9)
Rural Far West Sample 2	May 31 – June 2, 2012	7.5 (4.5-15.1)	22 (53)
Western Urban Sample 1	May 31 – June 2, 2012	7.5 (4.5-15.1)	28 (53)
Western Urban Sample 2	June 2-4, 2012	7.8 (4.5 – 15.6)	19 (25)
Urban North	April 30 – May 02, 2012	9.6 (1.8-19.9)	0 (0)
Urban Central Sample 1	April 30 – May 02, 2012	10 (1.8-19.9)	0 (0)
Urban Central Sample 2	June 1-4, 2012	7.9 (4.5-15.6)	39 (35)
Urban South	April 30 – May 2, 2012	9.4 (1.8-19.9)	0 (0)
Rural East Site 1 Sample 1	May 30 – June 2, 2012	8.1 (1.8-19.9)	35 (42)
Rural East Site 1 Sample 2	June 2-4, 2012	8.0 (4.5 – 15.6)	13 (25)
Rural East Site 2 Sample 1	May 31 – June 2, 2012	7.8 (4.5-15.1)	30 (53)
Rural East Site 2 Sample 2	June 2-4, 2012	8.1 (4.5 – 15.6)	14 (25)

1. Average temperatures and amount of precipitation are site specific[1] however, temperature range and hours of precipitation are reported from Bromma airport in the western part of Stockholm[2]

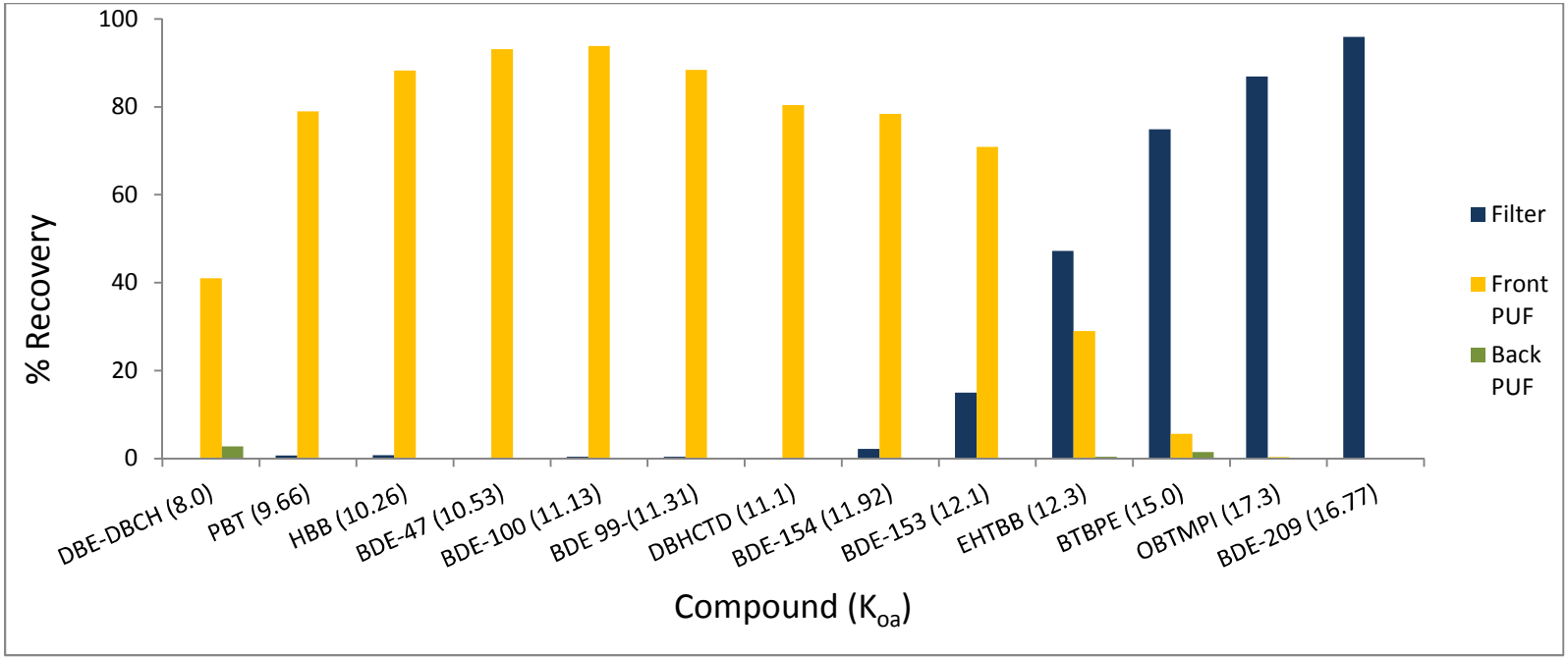

Figure S1 - Results from the filter spiking experiment in which indoor air GFFs were spiked with standard and run for 24 and 48 hours (% recovered substance on spiked filter and the following, downstream PUFs). The compound's K_{oa} are shown within parenthesis.

Table S5 - Method limits of detection (mLOD) and method limits of quantification (mLOQ) for each compound in each matrix.

	Indoor and Ventilation Air (pg m^{-3})[a]				Outdoor Air (pg m^{-3})[b]				Dust (pg $sample^{-1}$)[c]		Soil (pg $sample^{-1}$)[c]	
	PUF mLOD	PUF mLOQ	Filter mLOD	Filter mLOQ	PUF mLOD	PUF mLOQ	Filter mLOD	Filter mLOQ	mLOD	mLOQ	mLOD	mLOQ
α-DBE-DBCH	3.5	11	3.5	11	0.087	0.26	0.087	0.26	11	33	1.3	3.8
β-DBE-DBCH	2.8	8.3	2.8	8.3	0.079	0.24	0.079	0.24	4.3	13	1.7	5.2
Σ DBE-DBCH	6.3	19	6.3	19	0.17	0.50	0.17	0.50	15	46	3.0	9.0
PBT	2.2	6.6	2.2	6.6	0.061	0.088	0.025	0.035	14	42	17	22
HBB	5.1	7.2	5.0	7.1	0.053	0.16	0.053	0.16	55	160	2.4	7.2
BTBPE	29	42	31	44	0.077	0.23	0.077	0.23	600	850	290	420
EHTBB	300	470	330	500	0.029	0.087	0.029	0.087	57	170	3.2	10
BEH-TEBP	35	110	35	110	1.6	2.4	2.3	3.3	540	750	6.9	21
Syn-DDC-CO	17	23	17	23	0.17	0.51	0.17	0.51	22	67	80	80
Anti-DDC-CO	20	28	20	28	0.19	0.58	0.19	0.58	26	79	73	73
α-HBCDD	0.37	1.1	0.37	1.1	0.010	0.030	0.010	0.030	0.049	0.15	140	150
β-HBCDD	0.27	0.80	0.27	0.80	0.0054	0.016	0.0054	0.016	0.00037	0.0011	18	21
γ-HBCDD	0.66	2.0	0.66	2.0	0.010	0.031	0.010	0.031	0.010	0.030	46	48
ΣHBCD	1.3	3.9	1.3	3.9	0.026	0.077	0.026	0.077	0.084	0.25	210	220
DBDPE	7.1	21	90	140	0.78	1.1	0.12	0.16	130	180	100	140
BDE-47	13	19	13	20	0.13	0.20	0.012	0.037	74	220	470	680
BDE-100	10	15	7.6	11	0.038	0.11	0.038	0.11	67	200	30	90
BDE-99	13	19	13	19	0.19	0.26	0.055	0.17	130	380	210	300
BDE-154	4.2	5.9	1.5	1.6	0.17	0.52	0.17	0.52	62	190	37	51
BDE-153	12	17	8.6	12	0.16	0.47	0.16	0.47	110	340	200	280
BDE-183	1.9	1.9	1.9	1.9	-	-	-	-	490	1500	30	90
BDE-196	1.9	2.7	1.9	2.7	0.032	0.095	0.032	0.095	17	52	10	9.9
BDE-197	3.8	5.9	3.8	5.9	-	-	-	-	42	130	33	33
BDE-203	0.86	2.6	0.86	2.6	0.029	0.086	0.029	0.086	24	73	65	89
BDE-206	5.0	7.5	5.0	7.5	0.0039	0.012	0.0039	0.012	26	78	230	320
BDE-207	5.0	7.7	5.0	7.7	0.016	0.047	0.016	0.047	29	87	100	150
BDE-208	2.0	3.0	2.0	3.0	0.010	0.031	0.010	0.031	32	97	21	29
BDE-209	29	42	31	44	0.27	0.40	0.0047	0.0047	410	610	1500	2000

a) mLODs and mLOQs are calculated for a typical sample size of 17 m^3, however actual sample sizes deviated slightly from this b) mLODs and mLOQs are calculated for a typical sample size of 1200 m^3,

however actual sample sizes deviated slightly from this c) mLODs and mLODs are given in pg sample^{-1} but differ for each sample depending on sample intake (mg dust or % OM in soil)

Table S6 - Flame retardant concentrations in indoor and ventilation air (pg m^{-3}) samples from different microenvironments. Dashes indicate that data were unable to be used. ND = not detected and no value was used to replace non-detects. This was done for DBE-DBCH, PBT, and HBB for filter samples because these compounds were never found on filters. Numbers in beige have been replaced with the mLOD and numbers in blue are reported as a range between the mLOD and mLOQ.

	α-DBE-DBCH	β-DBE-DBCH	ΣDBE-DBCH	PBT	HBB	BTBPE	EHTBB	BEH-TEBH	Syn-DDC-CO	Anti-DDC-CO	α-HBCDD	β-HBCDD	γ-HBCDD	ΣHBCDD	DBDPE
Office 1 Indoor (PUF + Filters)	4.5	2.6	7.0	<1.1	3.1	<15	660	150	<0.38	<0.87	<0.26	<0.19	<0.46	<0.91	<44
Office 2 Indoor (PUF + Filters)	16	11	27	8.2	1.3-1.8	<7.6	80-120	8.7-26	<0.19	<0.43	<0.13	<0.093	<0.23	<0.45	<22
Office 3 Indoor Filters	ND	ND	ND	ND	ND	<31	<330	<35	<17	<20	<0.53	<0.38	<0.94	<1.8	<90
Office 3 indoor PUFs	30	15	45	16	11	<29	<300	<35	<17	<20	<0.53	<0.38	<0.94	<1.8	<7.1
Office 3 Vent Filters	ND	ND	ND	ND	ND	<31	<330	<36	<17	<20	<0.53	<0.38	<0.94	<1.9	<90
Office 3 Vent PUFs	38	20	58	14	10	<30	<310	<36	<17	<20	<0.53	<0.38	<0.94	<1.9	<7.1
Office 4 Indoor Filter	ND	ND	ND	ND	ND	<33	<350	<38	<18	<21	<0.57	<0.41	<1.01	<2.0	<97
Office 4 Indoor PUFs	17	10	27	11	21	<32	<330	69	<18	<21	<0.57	<0.41	<1.01	<2.0	<7.6
Office 4 Vent Filter	ND	ND	ND	ND	ND	<33	310	<38	<18	<21	<0.57	<0.41	<1.01	<2.0	<97
Office 4 Vent PUFs	3.8-11	3.0-8.9	6.8-20	18	5.6	<32	430	<38	<18	<21	<0.57	<0.41	<1.01	<2.0	<7.6
Store 1 Indoor Filter	ND	ND	ND	ND	ND	<31	<330	<36	<17	<20	<0.54	<0.38	<0.95	<1.9	<91
Store 1 Indoor PUFs	58	36	93	16	5.2	<30	<310	<36	<17	<20	<0.54	<0.38	<0.95	<1.9	<7.2
store 1 Vent Filter	ND	ND	ND	ND	ND	<37	<390	<42	<20	<23	<0.63	<0.45	<1.1	<2.2	<110
Store 1 Vent PUFs	24	15	39	9.5	<6.1	<35	<360	<42	<20	<23	<0.63	<0.45	<1.1	<2.2	<8.4
Store 2 Indoor Filters	ND	ND	ND	ND	ND	<30	<320	<34	<16	<19	<0.51	<0.37	<0.91	<1.8	<87
Store 2 Indoor PUFs	10	5.0	15	4.5	<5.0	<29	<300	<34	<16	<19	<0.51	<0.37	<0.91	<1.8	<6.9
Store 2 Vent Filters	ND	ND	ND	ND	ND	<30	9000	230	44	58	<0.51	<0.36	<0.90	<1.8	120
Store 2 Vent PUFs	8.2	2.6-7.9	11-16	2.1-6.3	30	<28	<290	<34	<16	<19	<0.51	<0.36	<0.90	<1.8	<6.8
Store 3 Indoor Filters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Store 3 Indoor PUFs	23	14	37	28	11	<55	<570	<66	<31	<37	<0.99	<0.71	<1.8	<3.5	<13
Store 3 Vent Filters	ND	ND	ND	ND	ND	<29	<310	<34	16-22	280	<0.50	<0.36	<0.9	<1.7	<85
Store 3 Vent PUFs	9.7	5.8	15	17	11	<28	<290	<34	<16	<19	<0.50	<0.36	<0.89	<1.7	<6.7
Store 4 indoor Filters	ND	ND	ND	ND	ND	<31	<330	<35	-	-	<0.53	<0.38	<0.94	<1.8	<90
Store 4 indoor PUFs	36	19	55	29	64	<29	<300	<35	<17	<20	<0.53	<0.38	<0.94	<1.8	<7.1
Store 4 Vent Filters	ND	ND	ND	ND	ND	<30	<320	<35	-	-	<0.52	<0.37	<0.92	<1.8	<88
Store 4 Vent PUFs	11	2.7-8.1	14-19	27	11	<29	<300	<35	<16	<19	<0.52	<0.37	<0.92	<1.8	<7.0
Apartment 1 Indoor Filters	ND	ND	ND	ND	ND	<30	<320	<35	<16	<19	<0.52	<0.37	<0.92	<1.8	<88
Apartment 1 indoor PUFs	36	19	55	11	<5.0	<29	<300	<35	<16	<19	<0.52	<0.37	<0.92	<1.8	<7.0
Apartment 1 Vent Filters	ND	ND	ND	ND	ND	<30	<320	<35	<16	<19	<0.52	<0.37	<0.92	<1.8	<88
Apartment 1 Vent PUFs	67	39	110	52	5.0-7.1	<29	<300	<35	<16	<19	<0.52	<0.37	<0.92	<1.8	<7.0
Apartment 2 indoor Filters	ND	ND	ND	ND	ND	<30	<320	<34	-	-	<0.51	<0.37	<0.91	<1.8	<87
Apartment 2 indoor PUFs	81	50	130	9.7	5.0-7.0	<29	<300	<34	16-23	<19	<0.51	<0.37	<0.91	<1.8	<6.9
Apartment 2 Vent Filters	ND	ND	ND	ND	ND	<31	<320	<35	-	-	<0.52	<0.37	<0.93	<1.8	370
Apartment 2 Vent PUFs	93	52	140	53	5.1-7.2	<29	<300	<35	<17	<19	<0.52	<0.37	<0.93	<1.8	<7.0
Apartment 3 indoor Filters	ND	ND	ND	ND	ND	<36	<380	<42	<20	<23	<0.62	<0.45	<1.1	<2.2	<110
Apartment 3 indoor PUFs	36	21	57	11	<6.0	<35	<360	<42	<20	<23	<0.62	<0.45	<1.1	<2.2	51
Apartment 3 Vent Filters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apartment 3 Vent PUFs	110	62	180	68	<6.0	<35	<360	<42	<20	<23	<0.62	<0.45	<1.1	<2.2	<8.4
Apartment 4 Indoor Filters	ND	ND	ND	ND	ND	<30	<320	<35	-	-	<0.52	<0.37	<0.92	<1.8	<88
Apartment 4 Indoor PUFs	44	22	66	9.9	<5.0	<29	<300	<35	<16	<19	<0.52	<0.37	<0.92	<1.8	<7.0
Apartment 4 Vent Filters	ND	ND	ND	ND	ND	<31	<320	<35	-	-	2.4	1.9	2.8	7.1	<89
Apartment 4 Vent PUFs	510	270	780	35	16	<29	<300	<35	<17	<19	<0.52	<0.37	<0.93	<1.8	<7.0
School 1 Indoor Filter	ND	ND	ND	ND	ND	<33	<350	<38	<18	<21	12	3.2	2.4	18	240
School 1 indoor PUFs	55	33	89	2.4-7.1	<5.5	<32	<330	<38	<18	<21	<0.57	<0.41	<1.0	<2.0	<7.6
School 1 Vent Filters	ND	ND	ND	ND	ND	<33	<350	<37	<18	<21	<0.56	<0.40	<0.99	<2.0	<95
School 1 Vent PUFs	<3.7	<2.9	<6.6	2.3-7.0	<5.4	<31	<320	<37	<18	<21	<0.56	<0.40	<0.99	<2.0	<7.5
School 2 Vent Filters	ND	ND	ND	ND	ND	<33	<340	<37	-	-	<0.56	<0.40	<0.99	<1.9	<95
School 2 Vent PUFs	29	15	44	9.1	5.4-7.6	<31	<320	<37	<18	<21	<0.56	<0.40	<0.99	<1.9	7.5-22

Table S6 continued - Flame retardant concentrations in indoor and ventilation air (pg m^{-3}) samples.

	BDE-47	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-196	BDE-197	BDE-203	BDE-206	BDE-207	BDE-208	BDE-209
Office 1 Indoor (PUF + Filters)	<6.6	0.78	0.28	<4.2	<0.72	0.093-0.28	0.049-0.14	0.10	<0.42	<2.4	<2.1	<1.1	<15
Office 2 Indoor (PUF + Filters)	12	3.2-4.6	3.3	<2.1	<0.36	<0.046	<0.025	0.10	<0.21	<1.2	<1.1	<0.57	<7.6
Office 3 Indoor Filters	<13	<13	<7.6	<8.6	<1.5	<1.9	<1.9	<3.8	<0.86	<5.0	<5.0	<2.0	<31
Office 3 indoor PUFs	18	<13	<10	<12	<4.2	<1.9	<1.9	<3.8	<0.86	<5.0	<5.0	<2.0	<29
Office 3 Vent Filters	<14	<13	<7.6	<8.7	<1.5	<2.0	<1.9	<3.9	<0.86	<5.0	<5.0	<2.0	<31
Office 3 Vent PUFs	38	<13	<11	<12	<4.2	<2.0	<1.9	<3.9	<0.86	<5.0	<5.0	<2.0	<30
Office 4 Indoor Filter	<15	<14	<8.2	9.3-13	1.6-1.7	<2.1	<2.0	<4.1	0.92-2.8	<5.4	<5.4	<2.1	33-47
Office 4 Indoor PUFs	28	<14	<11	<13	<4.5	<2.1	<2.0	<4.1	<0.92	<5.4	<5.4	<2.1	<32
Office 4 Vent Filter	<15	<14	<8.2	<9.3	<1.6	<2.1	<2.0	<4.1	<0.92	<5.4	<5.4	<2.1	<33
Office 4 Vent PUFs	<14	<14	<11	<13	<4.5	<2.1	<2.0	<4.1	<0.92	<5.4	<5.4	<2.1	<32
Store 1 Indoor Filter	<14	<13	<7.7	<8.7	<1.5	<2.0	<1.9	<3.9	<0.87	<5.1	<5.1	<2.0	<31
Store 1 Indoor PUFs	<13	<13	<11	<12	<4.2	<2.0	<1.9	<3.9	<0.87	<5.1	<5.1	<2.0	<30
store 1 Vent Filter	<16	<15	<9.0	<10	<1.7	<2.3	<2.2	<4.6	<1.0	<5.9	<5.9	<2.4	<37
Store 1 Vent PUFs	<15	<15	<12	<14	<5.0	<2.3	<2.2	<4.6	<1.0	<5.9	<5.9	<2.4	<35
Store 2 Indoor Filters	<13	<13	<7.4	<8.4	<1.4	<1.9	<1.8	<3.7	<0.83	<4.9	<4.9	<1.9	<30
Store 2 Indoor PUFs	<12	<12	<10	<12	<4.1	<1.9	<1.8	<3.7	<0.83	<4.9	<4.9	<1.9	<29
Store 2 Vent Filters	<13	<12	<7.3	<8.3	<1.4	<1.9	<1.8	<3.7	<0.82	4.8-7.2	<4.8	<1.9	110
Store 2 Vent PUFs	<12	<12	<10	<11	<4.0	<1.9	<1.8	<3.7	<0.82	<4.8	<4.8	<1.9	<28
Store 3 Indoor Filters	-	-	-	-	-	-	-	-	-	-	-	-	-
Store 3 Indoor PUFs	<24	<24	<20	<22	<7.8	<3.7	<3.6	<7.2	<1.6	<9.4	<9.4	<3.7	<55
Store 3 Vent Filters	<13	<12	<7.2	<8	<1.4	<1.8	<1.8	<3.6	<0.81	<4.7	<4.7	<1.9	<29
Store 3 Vent PUFs	<12	<12	<10	<11	<4.0	<1.8	<1.8	<3.6	<0.81	<4.7	<4.7	<1.9	28
Store 4 indoor Filters	<13	<13	<7.6	<8.6	<1.5	-	-	-	-	-	-	-	<31
Store 4 indoor PUFs	<13	<13	<10	<12	<4.2	<1.9	<1.9	<3.8	<0.86	<5.0	<5.0	<2.0	<29
Store 4 Vent Filters	<13	<13	<7.5	<8.5	<1.4	-	-	-	-	-	-	-	<30
Store 4 Vent PUFs	<13	<12	<10	<12	<4.1	<1.9	<1.9	<3.8	<0.84	<4.9	<4.9	<1.9	<29
Apartment 1 Indoor Filters	<13	<13	<7.5	<8.5	<1.4	<1.9	<1.9	<3.8	<0.84	<4.9	<4.9	<1.9	<30
Apartment 1 indoor PUFs	<13	<12	<10	<12	<4.1	<1.9	<1.9	<3.8	<0.84	<4.9	<4.9	<1.9	<29
Apartment 1 Vent Filters	<13	<13	<7.5	<8.5	<1.4	<1.9	<1.9	<3.8	<0.84	<4.9	<4.9	<1.9	<30
Apartment 1 Vent PUFs	<13	<12	<10	<12	<4.1	<1.9	<1.9	<3.8	<0.84	<4.9	<4.9	<1.9	<29
Apartment 2 indoor Filters	<13	<13	<7.4	<8.4	<1.4	-	-	-	-	-	-	-	<30
Apartment 2 indoor PUFs	32	25	<10	<12	4.0	<1.9	<1.8	<3.7	<0.83	6.8	4.9-7.5	2.7	110
Apartment 2 Vent Filters	<13	27	<7.5	<8.5	<1.5	-	-	-	-	-	-	-	<31
Apartment 2 Vent PUFs	160	36	7.8	<12	<4.1	<1.9	<1.9	<3.8	<0.85	<5.0	<5.0	<2.0	<29
Apartment 3 indoor Filters	<16	<15	<9.0	<10	<1.7	<2.3	<2.2	<4.5	<1.0	<5.9	<5.9	<2.3	<36
Apartment 3 indoor PUFs	<15	<15	<12	<14	<4.9	<2.3	<2.2	<4.5	<1.0	<5.9	<5.9	<2.3	<35
Apartment 3 Vent Filters	-	-	-	-	-	-	-	-	-	-	-	-	-
Apartment 3 Vent PUFs	<15	<15	<12	<14	<4.9	<2.3	<2.2	<4.5	<1.0	<5.9	<5.9	<2.3	<35
Apartment 4 Indoor Filters	<13	<13	<7.5	<8.5	<1.4	-	-	-	-	-	-	-	<30
Apartment 4 Indoor PUFs	41	<12	<10	<12	<4.1	<1.9	<1.9	<3.8	<0.84	<4.9	<4.9	<1.9	32
Apartment 4 Vent Filters	<13	<13	<7.5	<8.5	<1.5	-	-	-	-	-	-	-	<31
Apartment 4 Vent PUFs	110	<13	<10	<12	<4.1	<1.9	<1.9	<3.8	<0.85	<5.0	<5.0	<2.0	<29
School 1 Indoor Filter	<15	<14	<8.2	<9.3	<1.6	<2.1	<2.0	<4.1	<0.92	<5.4	<5.4	<2.1	<33
School 1 indoor PUFs	17	<14	<11	<13	<4.5	<2.1	<2.0	<4.1	<0.92	<5.4	<5.4	<2.1	<32
School 1 Vent Filters	<14	<14	<8.1	<9.1	<1.6	<2.1	<2.0	<4.1	<0.91	<5.3	<5.3	<2.1	<33
School 1 Vent PUFs	14	<13	<11	<13	<4.4	<2.1	<2.0	<4.1	<0.91	<5.3	<5.3	<2.1	50
School 2 Vent Filters	<14	<14	<8.0	<9.1	<1.5	-	-	-	-	-	-	-	<33
School 2 Vent PUFs	13-20	<13	<11	<12	<4.4	<2.0	<2.0	<4.0	<0.90	<5.3	<5.3	<2.1	21

<mLOD

Between mLOD and mLOQ

Table S7 – Flame retardant concentrations in outdoor air samples (pg m^{-3}). Dashes indicate that data were unable to be used. ND = not detected and no value was used to replace non-detects. This was done for DBE-DBCH, PBT, and HBB in filter samples because these compounds were never found on filters and for BDE-209 and DBDPE in PUF samples because of high mLODs for these compounds in outdoor PUFs. Numbers in beige have been replaced with the mLOD and numbers in blue are reported as a range between the mLOD and mLOQ.

	α-DBE-DBCH	β-DBE-DBCH	ΣDBE-DBCH	PBT	HBB	BTBPE	EHTBB	BEH-TEBP	*Syn*-DDC-CO	*Anti*-DDC-CO	α-HBCDD	β-HBCDD	γ-HBCDD	ΣHBCDD	DBDPE
Rural Far West Sample 1 Filter	ND	ND	ND	ND	ND	<0.14	<0.053	<2.0	<0.22	<0.25	<0.018	<0.010	<0.019	<0.047	<0.21
Rural Far West Sample 1 PUFs	0.11-0.34	0.10-0.31	0.22-0.65	0.16	<0.069	<0.14	0.038-0.16	<2.0	<0.22	<0.25	<0.018	<0.010	<0.019	<0.047	ND
Rural Far West Sample 2 Filter	ND	ND	ND	ND	ND	<0.14	<0.053	<2.0	<0.22	<0.25	<0.018	<0.010	<0.019	<0.047	<0.21
Rural Far West Sample 2 PUFs	0.11-0.34	0.10-0.31	0.22-0.65	0.14	<0.069	<0.14	0.038-0.16	<2.0	<0.22	<0.25	<0.018	<0.010	<0.019	<0.047	ND
Western Urban Sample 1 Filter	ND	ND	ND	ND	ND	0.048	0.030-0.13	<1.6	<0.18	<0.20	<0.015	<0.0080	<0.015	<0.038	0.13
Western Urban Sample 1 PUFs	0.35	0.18	0.53	0.20	0.055-0.16	0.020	0.38	<1.6	<0.18	<0.20	<0.015	<0.0080	<0.015	<0.038	ND
Western Urban Sample 2 Filter	ND	ND	ND	ND	ND	<0.11	0.13	<1.6	<0.18	<0.20	<0.015	<0.0081	<0.015	<0.038	0.18
Western Urban Sample 2 PUFs	0.092-0.28	0.084-0.25	0.18-0.53	0.064-0.093	<0.056	<0.11	<0.043	<1.6	<0.18	<0.20	<0.015	0.043	<0.015	<0.091	ND
Urban North Filter	ND	ND	ND	ND	ND	<0.13	<0.048	<1.8	<0.20	<0.22	<0.016	<0.0089	<0.017	<0.042	0.19
Urban North PUF	<0.10	0.25	0.25	0.17	<0.061	0.0079	0.034-0.14	<1.8	<0.20	<0.22	<0.016	<0.0089	<0.017	<0.042	ND
Urban Central Sample 1 Filter	ND	ND	ND	ND	ND	<0.18	<0.066	<2.5	0.040	<0.31	0.34	0.079	0.12	0.54	0.33
Urban Central Sample 1 PUFs	1.4	0.95	2.4	0.50	0.26	<0.18	0.047-0.20	<2.5	<0.28	<0.31	<0.023	<0.012	<0.023	<0.059	ND
Urban Central Sample 2 Filter	ND	ND	ND	ND	ND	<0.044	0.012-0.050	<0.64	<0.070	<0.079	<0.0058	<0.0032	<0.0060	<0.015	<0.067
Urban Central Sample 2 PUFs	0.50	0.30	0.81	0.16	0.072	<0.044	<0.017	<0.64	<0.070	<0.079	<0.0058	<0.0032	<0.0060	<0.015	ND
Urban South Sample 1 Filter	ND	ND	ND	ND	ND	<0.11	<0.043	<1.6	<0.18	<0.20	<0.015	<0.0081	<0.015	<0.038	0.12-0.24
Urban South Sample 1 PUF	0.36	0.22	0.57	0.17	<0.055	<0.11	<0.043	<1.6	<0.18	<0.20	<0.015	<0.0081	<0.015	<0.038	ND
Rural East Site 1 Sample 1 Filter	ND	ND	ND	ND	ND	<0.11	<0.041	<1.5	<0.17	<0.19	<0.014	<0.0076	<0.014	<0.036	<0.16
Rural East Site 1 Sample 1 PUFs	0.095	0.082	0.18	0.19	0.052-0.16	0.027	<0.041	<1.5	<0.17	<0.19	<0.014	<0.0076	<0.014	<0.036	ND
Rural East Site 1 Sample 2 Filter	ND	ND	ND	ND	ND	0.18	<0.046	<1.7	<0.19	<0.22	<0.016	<0.0086	<0.016	<0.041	0.30
Rural East Site 1 Sample 2 PUFs	0.28	0.15	0.43	0.18	<0.059	<0.12	<0.046	<1.7	<0.19	<0.22	<0.016	<0.0086	<0.016	<0.041	ND
Rural East Site 2 Sample 1 Filter	ND	ND	ND	ND	ND	<0.13	0.12	<1.8	<0.20	<0.23	<0.017	<0.0091	<0.017	<0.043	<0.19
Rural East Site 2 Sample 1 PUFs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rural East Site 2 Sample 2 Filter	ND	ND	ND	ND	ND	<0.094	0.025-0.11	<1.3	<0.15	<0.17	0.0086	0.0047	0.0089	<0.031	<0.14
Rural East Site 2 Sample 2 PUFs	0.075-0.23	0.068-0.21	0.14-0.43	0.11	<0.046	<0.094	<0.035	<1.3	<0.15	<0.17	0.0086	0.046	0.0089	<0.089	ND

Table S7 continued - Flame retardant concentrations in outdoor air samples (pg m^{-3}).

	BDE-47	BDE-99	BDE-100	BDE-153	BDE-154	BDE-196	BDE-203	BDE-206	BDE-207	BDE-208	BDE-209
Rural Far West Sample 1 Filter	<0.016	0.072-0.22	<0.049	<0.21	<0.22	<0.041	<0.037	<0.0071	<0.029	<0.013	0.056
Rural Far West Sample 1 PUFs	0.42	<0.24	<0.049	<0.21	<0.22	<0.041	<0.037	<0.0071	0.020-0.086	<0.013	ND
Rural Far West Sample 2 Filter	<0.016	<0.072	<0.049	<0.21	<0.22	<0.041	<0.037	0.0051-0.021	0.088	0.013-0.040	0.16
Rural Far West Sample 2 PUFs	0.17-0.25	<0.24	<0.049	<0.21	<0.22	<0.041	<0.037	<0.0071	<0.029	<0.013	ND
Western Urban Sample 1 Filter	0.27	0.057-0.17	<0.039	<0.16	<0.18	<0.033	<0.030	0.12	0.18	0.011-0.032	0.20
Western Urban Sample 1 PUFs	0.91	0.39	0.039-0.12	<0.16	<0.18	<0.033	<0.030	0.0040-0.017	0.091	0.011-0.032	ND
Western Urban Sample 2 Filter	<0.013	<0.058	<0.040	<0.17	<0.18	<0.033	<0.030	<0.0058	<0.023	<0.011	0.14
Western Urban Sample 2 PUFs	1.0	0.50	<0.040	<0.17	<0.18	<0.033	<0.030	<0.0058	<0.023	<0.011	ND
Urban North Filter	0.55	1.1	0.044-0.13	0.18-0.55	0.20-0.60	<0.037	0.17	0.0045-0.019	0.27	0.20	0.30
Urban North PUF	0.57	0.20	0.044-0.13	<0.18	<0.20	<0.037	<0.033	0.0045-0.019	0.10	0.064	ND
Urban Central Sample 1 Filter	0.49	0.72	0.061-0.18	<0.25	0.28-0.83	<0.051	<0.046	0.39	0.32	0.16	0.55
Urban Central Sample 1 PUFs	1.9	0.35	0.22	<0.25	0.20	<0.051	<0.046	<0.0088	0.025-0.11	0.017-0.050	ND
Urban Central Sample 2 Filter	0.0051-0.015	0.023-0.068	<0.015	<0.065	<0.070	<0.013	<0.012	<0.0022	0.0064-0.027	<0.004	0.034
Urban Central Sample 2 PUFs	0.46	0.087	0.050	<0.065	<0.070	<0.013	<0.012	0.0016-0.0067	0.063	0.067	ND
Urban South Sample 1 Filter	0.013-0.039	0.058-0.17	<0.039	<0.17	<0.18	0.032	<0.030	0.13	0.20	0.12	0.26
Urban South Sample 1 PUF	0.36	0.19-0.80	<0.039	<0.17	<0.18	<0.033	<0.030	<0.0057	<0.023	<0.011	ND
Rural East Site 1 Sample 1 Filter	<0.012	<0.055	<0.037	<0.16	<0.17	<0.031	<0.028	<0.0054	0.015-0.066	0.010-0.031	0.053
Rural East Site 1 Sample 1 PUFs	0.24	0.18-0.76	0.037-0.11	<0.16	<0.17	<0.031	<0.028	<0.0054	<0.022	<0.010	ND
Rural East Site 1 Sample 2 Filter	0.56	0.061-0.18	<0.042	<0.18	<0.19	<0.035	<0.032	<0.0061	0.017-0.074	0.012-0.035	0.31
Rural East Site 1 Sample 2 PUFs	0.32	<0.21	<0.042	<0.18	<0.19	<0.035	<0.032	<0.0061	<0.025	<0.012	ND
Rural East Site 2 Sample 1 Filter	0.23	<0.065	<0.044	<0.19	<0.20	<0.037	<0.034	0.0046-0.019	0.11	0.049	0.059
Rural East Site 2 Sample 1 PUFs	-	-	-	-	-	-	-	-	-	-	-
Rural East Site 2 Sample 2 Filter	0.011-0.032	<0.048	<0.033	<0.14	<0.15	<0.027	<0.025	<0.0047	0.013-0.057	0.0089-0.027	0.23
Rural East Site 2 Sample 2 PUFs	0.21	0.16-0.66	<0.033	<0.14	<0.15	<0.027	<0.025	<0.0047	0.013-0.057	0.056	ND

<mLOD

Between mLOD and mLOQ

Table S8 – Flame retardant concentrations in soil samples (ng g^{-1} organic matter). Numbers in beige have been replaced with the mLOD and numbers in blue are reported as a range between the mLOD and mLOQ.

	% OM	α-DBE-DBCH	β-DBE-DBCH	ΣDBE-DBCH	PBT	HBB	BTBPE	EHTBB	BEH-TEBP	Syn-DDC-CO	Anti-DDC-CO	α-HBCDD	β-HBCDD	γ-HBCDD	ΣHBCDD	DBDPE
Rural Far West	16	<0.0012	<0.0016	<0.0027	<0.015	<0.0022	<0.27	<0.0029	<0.0062	0.36	0.88	1.0	0.49	5.2	6.7	0.87
Urban West	11	<0.0015	<0.0021	<0.0036	<0.020	<0.0029	<0.35	<0.0039	<0.0083	0.14-0.41	<0.37	0.25	0.029	0.078	0.35	0.50
Urban North	13	<0.0016	<0.0021	<0.0037	0.021-0.027	<0.0030	<0.36	<0.0040	<0.0085	2.2	4.4	1.3	0.18	0.47	1.9	79
Urban Central	10	<0.0017	<0.0023	<0.0041	0.023-0.029	6.1	<0.40	<0.0044	<0.0093	<0.15	<0.42	8.3	1.5	1.8	12	4.0
Urban South	82	<0.00042	<0.00057	<0.0010	0.018	<0.00079	<0.10	<0.0011	<0.0023	0.93	3.0	1.3	0.24	1.1	2.7	0.73
Rural East Site 1	14	<0.0012	<0.0017	<0.0029	<0.016	<0.0024	<0.29	<0.0032	<0.0067	0.38	0.39	0.19	0.029	0.16	0.38	0.95
Rural East Site 2	86	<0.00021	<0.00029	<0.00050	0.0028-0.0036	0.070	<0.049	<0.00054	<0.0011	0.16	0.52	0.035	0.084	0.64	0.76	0.20
Rural Far North	15	<0.0014	<0.0019	<0.0033	0.018-0.024	<0.0027	<0.32	<0.0036	<0.0076	4.3	9.3	0.83	0.076	0.43	1.3	160

	BDE-47	BDE-99	BDE-100	BDE-153	BDE-154	BDE-183	BDE-196	BDE-197	BDE-203	BDE-206	BDE-207	BDE-208	BDE-209
Rural Far West	0.45	0.26	0.36	<0.18	<0.033	<0.28	0.013-0.038	<0.030	<0.059	<0.20	0.086	0.074	1.2
Urban West	0.97	0.38	0.13	<0.24	<0.044	<0.37	<0.017	<0.040	<0.079	<0.27	0.11	0.076	1.3
Urban North	0.65	0.55	0.21	<0.24	0.045-0.064	<0.38	0.16	0.066	0.081-0.11	1.8	1.1	0.82	20
Urban Central	0.62	0.42	0.30	<0.27	<0.049	<0.41	0.66	0.19	0.51	5.3	4.6	2.7	31
Urban South	1.7	1.1	0.29	0.13	0.12	0.32	0.13	0.17	0.096	0.46	0.37	0.23	5.1
Rural East Site 1	0.55	0.34	0.10	<0.19	0.036-0.050	<0.30	0.046	0.0057	<0.064	0.17	0.13	0.088	1.9
Rural East Site 2	0.24	0.20	0.046	<0.033	0.0061-0.0085	<0.051	0.0023-0.0069	0.019	0.011-0.015	<0.037	0.031	0.019	0.31
Rural Far North	0.69	0.65	0.14	<0.22	0.040-0.056	<0.34	<0.015	0.024	<0.072	0.15	0.15	0.11	1.0

<mLOD

Between mLOD and mLOQ

Table S9 - Geometric mean (GM) flame retardant concentrations (pg m^{-3}) in indoor and ventilation system air in different microenvironments (4 offices, 4 stores, 4 apartments, 2 schools). GM values are calculated by replacing non-detects with the mLOD divided by the square root of two. ΣHBCDD = α-HBCDD + β-HBCDD + γ-HBCDD; ΣPentaBDE = ΣBDE-47,-99,-100,-153,-154; and ΣPBDE = ΣPentaBDE + ΣBDEs-196, -197, -203, -206, -207, -208, -209. n refers to the number of air samples used in calculating the means. Dashes indicate that a compound was not detected in that microenvironment.

	GM office (n=6)	GM store (n=8)	GM apartment (n=8)	GM school (n=3)
α-DBE-DBCH	15	18	80	16
β-DBE-DBCH	8.9	10	44	10
PBT	8.1	14	23	6.1
HBB	6.1	11	7.2	4.3
BTBPE	-	-	-	-
EHTBB	290	400	-	-
BEH-TEBP	41	36	-	-
α-HBCDD	-	-	0.49	1.3
β-HBCDD	-	-	0.36	0.65
γ-HBCDD	-	-	0.84	1.1
ΣHBCDD	-	-	0.84	1.1
DBDPE	-	75	87	110
BDE-47	17	-	29	25
BDE-99	-	-	14	-
BDE-100	-	-	8.2	-
BDE-153	6.8	-	-	-
BDE-154	2.2	-	3.3	-
BDE-209	18	33	32	34
ΣPentaBDE	38	-	72	55
ΣPBDE	58	78	110	93

Table S10 - Geometric mean (GM) flame retardant concentrations (ng g^{-1}) in indoor dust in different microenvironments (4 offices, 4 stores, 4 apartments, 2 schools). GM values are calculated by replacing non-detects with the mLOD divided by the square root of two. ΣHBCDD = α-HBCDD + β-HBCDD + γ-HBCDD; ΣPentaBDE = ΣBDE-47,-99,-100,-153,-154; ΣPBDE = ΣPentaBDE + ΣBDEs-183, -196, -197, -203, -206, -207, -208, -209; ΣEFR = ΣDBE-DBCH, PBT, HBB, BTBPE, EHTBB, BEH-TEBP, DDC-CO, DBDPE. n refers to the number of dust samples used in calculating the means. Dashes indicate that a compound was not detected in that microenvironment.

	GM office (n=5)	GM store (n=16)	GM apartment (n=4)	GM school (n=2)
α-DBE-DBCH	0.17	0.76	1.1	1.1
β-DBE-DBCH	0.10	0.27	0.35	0.87
PBT	0.43	0.94	2.1	1.2
HBB	2.9	5.2	4.6	8.6
BTBPE	7.0	29	-	5.5
EHTBB	7.8	11	6.9	13
BEH-TEBP	190	170	57	110
Syn-DDC-CO	1.5	3.9	1.0	0.70
Anti-DDC-CO	2.8	4.6	1.7	1.1
α-HBCDD	45	150	26	280
β-HBCDD	15	42	8.1	68
γ-HBCDD	32	60	17	120
ΣHBCDD	100	270	57	490
DBDPE	150	12	4.3	11
BDE-47	21	13	23	23
BDE-99	32	34	21	36
BDE-100	6.1	5.8	6.7	7.4
BDE-153	8.5	8.1	5.5	7.5
BDE-154	4.4	4.9	3.4	5.2
BDE-196	3.0	1.6	0.83	0.30
BDE-197	3.5	4.1	3.8	0.29
BDE-203	0.69	1.6	-	1.3
BDE-206	6.9	13	4.2	1.3
BDE-207	16	16	6.2	1.5
BDE-208	20	9.9	2.4	1.7
BDE-209	140	110	35	13
ΣPentaBDE	72	73	62	80
ΣPBDE	340	350	170	200
ΣEFR	440	390	110	286

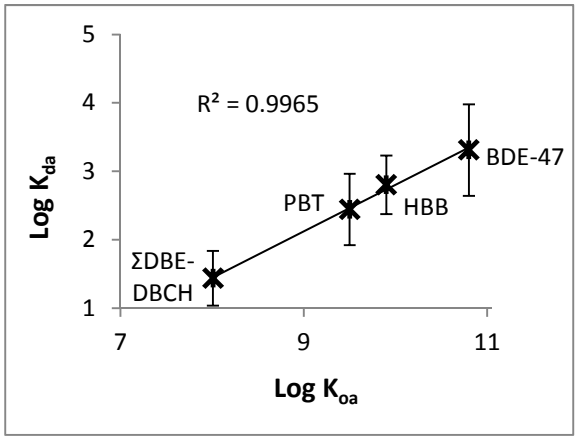

Figure S2 - Dust-air partitioning coefficients (K_{da}) plotted against K_{oa} values

Air-soil fugacity fraction calculation

The fugacity fraction (ff) is calculated from the measured air and soil concentrations, C_A and C_S, in pg·m^{-3}:

$$ff = 1 / (1 + (C_A/C_S \cdot E\ L\ \ octanol \cdot kg^{-1}\ OC \cdot f_{OC} \cdot \rho_s \cdot K_{OA}))$$

where E is an empirical coefficient relating partitioning into octanol and natural organic matter (0.75 was used according to Hippelein and McLachlan[3]), f_{OC} is the fraction of organic carbon in soil and K_{OA} is the temperature-dependent octanol-air partition coefficient. The soil concentrations were converted from a mass to volume concentration basis by using a soil solid density ρ_S of 2650 kg m^{-3} and the fraction of organic matter (f_{om}) was converted to f_{oc} by dividing by 1.7.[3, 4]

Table S11 - Results from fugacity fraction calculations for matched air and soil samples. K_{oa} values were taken from the indicated references (5-8) except DBDPE which was estimated using Epiweb 4.1

		Air-soil fugacity fraction						
	K_{oa} used	Rural West	Urban West	Urban North	Urban Central	Urban South	Rural East Site 1	Rural East Site 2
PBT	9.66[5]	-	-	0.054	0.030	0.048	-	0.012
HBB	10.26[5]	-	-	-	0.82	-	-	0.21
α-HBCDD	9.62[6]	-	-	-	0.97	-	-	-
β-HBCDD	10.5[6]	-	-	-	0.76	-	-	-
γ-HBCDD	10.79[6]	-	-	-	0.55	-	-	-
DBDPE	19.22	-	4.7E-10	5.6E-08	3.0E-09	6.0E-10	6.4E-10	-
BDE-47	10.53[7]	0.11	0.066	0.048	0.037	0.23	0.076	0.071
BDE-99	11.31[7]	0.015	0.0098	0.0056	0.0095	0.039	0.018	0.020
BDE-100	11.13[7]	-	0.030	0.019	0.024	-	0.024	-
BDE-154	11.92[7]	-	-	2.2E-04	-	-	-	-
BDE-196	14.29[8]	-	-	-	-	2.7E-05	-	-
BDE-203	15.33[8]	-	-	4.6E-06	-	-	-	-
BDE-206	15.33[8]	-	-	7.4E-05	2.9E-05	3.8E-06	-	-
BDE-207	15.33[8]	1.3E-06	1.0E-06	3.2E-06	2.0E-05	1.9E-06	2.5E-06	4.0E-07
BDE-208	15.33[8]	3.6E-06	3.4E-06	3.4E-06	2.2E-05	1.9E-06	3.3E-06	3.5E-07
BDE-209	16.77[8]	6.5E-07	4.8E-07	2.8E-06	4.2E-06	8.1E-07	5.5E-07	1.1E-07

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