Supporting Information for:

Semivolatile endocrine disrupting compounds in paired indoor and outdoor air in two northern California communities

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CONTENTS:

Details of Sampling and Chemical Analytical Methods

Custom Sampling Pump

Custom-made air sampling pumps built at the Harvard School of Public Health consisted of an Advanced Torque Systems 70 LPM linear vacuum pump with 3 parallel sampling ports and a bleed (each controlled with Swagelok air regulating valves), a weather resistant enclosure and used standard AC power. Teflon tubing was used to reduce opportunities for contamination by phthalates or other target analytes. URG sampling cartridges were attached to the pump by Teflon hoses and were located "upstream" of the pump. Cartridges were suspended from a wooden rack about 4-5 feet above the floor/ground using metal clips. Indoor samples were typically collected in the living room and cartridges were at least 3 feet from the wall. Outdoor samples were typically collected in backyards, at least 5 feet from a wall. Cartridges were shielded from possible rain by an "umbrella" made of an inverted stainless steel bowl attached about 1 foot above the cartridges, however it rarely rained during the collection period (June-October in northern California).

Neutrals/Phthalates Extraction and Analysis

The contents of each URG (XAD-2/PUF/filter) were placed in a Soxhlet and 100 uL of surrogate solution (diazinon-d10, anthracene-d10 and p-terphenyl-d10 at 2 ng/uL) was added and matrix spike solution as required. The samples were extracted for 16 h in 150 - 200 mL of 6% ether in hexanes solution. After being cooled, if water was visibly present in any of the extracts, the extract was passed through a glass drying tube containing sodium sulfate. The extracts were concentrated to a final volume of 1 mL and quantitatively transferred to a 1-dram vial and the final volume was adjusted using 10% diethyl ether in hexanes.

Analysis for the 80 neutral target analytes was performed using an Agilent 6890 GC coupled with an Agilent 5973 Mass Selective detector run in selected ion monitoring (SIM) mode. Due to the large number or target analytes, two analyses were performed. A total of 45 analytes (pesticides, PCBs, PBDEs and benzyl butyl phthalate) were determined in the first analysis on a ZB-5ms 60 m x 0.25 mm i.d. x 0.25 um column. Quantification was performed using o-phenylphenol-13C6, acenaphthene-d10, carbaryl-13C6, chlorpyrifos-d10, chrysene-d12 and cis-permethrin-13C6 as the internal standards. A total of 35 analytes (PAHs, sulfur PAHs, methyl phenanthrenes and the remaining phthalates) were determined in the second analysis on a ZB-5ms 30 m x 0.25 mm i.d x 0.25 um column. Quantification was performed using acenapthene-d10, phenanthrene-d10 and chrysene-d12 as the internal standards. The surrogate diazinon-d10 was determined in the first analysis and anthracene-d10 and p-terphenyl-d10 were determined in the second analysis. A continuing calibration standard was processed at the beginning and end of each sequence of 15 samples. The percent relative standard deviation (%RSD) was maintained within 30% during the initial five-point standard calibration. The percent difference of each analyte in the mid-level standard was generally maintained within 40% of the initial calibration value during continuing calibrations.

Phenols Extraction and Analysis

The contents of each URG (quartz filter/PUF/XAD-2) was spiked with surrogate solution, consisting of 2,4,6-tribromophenol, 4-nonylphenol-d4 and bisphenol A-d4 at 2 ng/uL and matrix spike solution as required. The samples were extracted 3 times with 50 mL of acidified GC2 grade dichloromethane (DCM). The samples were shaken 10 min per extraction. After each

extraction, the DCM was decanted thru a glass drying tube (1.5 in. diameter, 5 in. length, HGF Scientific, Inc. Stafford, TX) containing a glass wool plug. After the last extraction, the PUF was added to the drying tube to remove any residual water. The extracts were concentrated to 1.0 mL under zero nitrogen using an N-EVAP analytical evaporator at 35 – 40°C. All glassware was washed with acidified DCM (3 mL of HCl/600 mL of DCM) prior to use.

The air extracts were derivatized with *N,O*-bis(trimethylsilyl) trifluoroacetamide (BSTFA) + 10% Trimethylchlorosilane (TMCS) at 60°C for 60 min. Analysis was performed on an Agilent 6890 coupled with an Agilent 5973 Mass Selective detector run in selected ion monitoring (SIM) mode. A 30 m x 0.32 mm i.d. HP-5 column was used as the GC analytical column. Quantification was performed using 3,4,5-trichlorophenol, o-phenylphenol-13C6 and pentachlorophenol-13C6 as internal standards. The percent relative standard deviation (%RSD) of each analyte was maintained within 30% during the initial five-point calibration. A continuing calibration standard was processed at the beginning and end of each sequence of 15 samples. The percent difference of each analyte in the mid-level standard was generally maintained within 40% of the initial calibration value during continuing calibrations.

Quality Assurance/Quality Control (QA/QC) Methods and Results

Extensive QA/QC measures were conducted to ensure accuracy and reliability of measurements. To evaluate contamination from laboratory, sampling matrices, and sample handling, we analyzed field blanks (n=4 neutrals; 3 phenols), sampling cartridge batch blanks (n=5), and matrix blanks (n=6 neutrals , 5 phenols). To estimate precision we collected four duplicate air samples for the neutral analytical method and one duplicate sample for the phenols method. Matrix spikes (n=2) and surrogate recoveries were used to characterize accuracy, compound recovery from the matrix, and extraction efficiency.

For each analyte, the method reporting limit (MRL) was defined as the maximum of the analytical detection limit or the 90^{th} percentile of the blank concentrations, considering batch, matrix, and field blanks. MRLs were calculated on a mass-basis and converted to a concentration by dividing by the average sample volume. Estimated concentrations falling above the analytical detection level and below the MRL were flagged and were not counted as detects when calculating %>MRL, but were used in correlation analyses, statistical testing, and in graphical presentation of the concentration distributions.

Potential air sample contamination by target compounds was evaluated using batch, matrix, and field blanks. Laboratory analysts were blinded to the identity of the field blanks. The target compounds benzyl butyl phthalate, bis(2-ethylhexyl) adipate, bis(2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-hexyl phthalate, di-n-octyl phthalate, dicyclohexyl phthalate, diethyl phthalate, diisobutyl phthalate, 4-nonylphenol, PBDE 47, dibenz(a,h)anthracene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, 4,4'-DDE, 4,4'-DDT, pentachlorophenol, o-phenyl phenol, 2,4-dihydroxybenzophenone, and 4-nitrophenol were detected in at least one blank. Mass values for one batch blank were especially elevated for six compounds: bis(2-ethylhexyl) phthalate, bis(2-ethyhexyl) adipate, di-n-octyl phthalate, PBDE 47, and 4,4'-DDE, 4,4'-DDT. Mass values for another batch blank were especially elevated for di-n-hexyl phthalate, dicyclohexylphthalate, dibenzo(a,h)anthracene, fluorene, and pyrene. These elevated mass values were not consistent across all blank samples, most of which were much lower. Maximum concentrations detected in the blanks are given in Table S4. In Figures 1a-h, concentrations less than the 90 percentile of the blanks (the MRL) are displayed as estimated values and so can be

readily differentiated from values that are not qualified. Because there are more than 10 blanks, this method of calculating the MRL (using the 90th percentile of blanks) is not sensitive to the case where most blanks are low but there is one high value. Because of this, Table S-4 includes both the MRL based on the 90th percentile and a MRL calculated based on the highest blank to aid in identifying these cases. We have also identified in Tables S1 and S4 those compounds that had at least one detected blank above the median field sample concentration, indicating less certainty in the reported values. We chose the 90th percentile of blanks as the MRL for this study because it is less sensitive to extreme values and can be estimated for data that are not normally distributed. However, reported measurements near the MRL based on the maximum blank values are less certain than those far above any blank values. Any compounds with detects in blanks and no reported values above the MRL were dropped from the analyte list, since background noise interfered with measurements for these compounds. In addition, octylphenol mono-ethoxylate and octylphenol di-ethoxylate were dropped from further consideration because of concerns that laboratory contamination of the sampling matrix may have interfered with measurements. In reviewing the data for these compounds, we observed that 1) the overall distribution of blank and field samples were completely overlapping (even though a few field samples had detects at higher concentrations than the highest blank) and 2) the highest detects were observed in outdoor field samples, despite the expectation that these would be primarily indoor contaminants. Although we cannot be sure that these findings were due to blank contamination, we do not have enough confidence in these data to report them in this paper.

Blank correction, used to correct potential bias in the reported levels, was performed if the median mass of the blank samples was significantly different from zero as determined by a Wilcoxon rank sum test. Five analytes (benzyl butyl phthalate, bis(2-ethylhexyl) phthalate, di-n-butyl phthalate, diethyl phthalate, and diisobutyl phthalate) were subjected to blank correction by subtracting the median blank value from the reported value and these data are presented in Table S4.

Four neutral and one phenol duplicate samples were used to assess precision. For values below the MRL, the sample-specific method reporting limit (volume adjusted) was used in the percent difference calculations. Percent differences for duplicates where both values were above the MRL were typically less than 30%. For a few compounds, average percent differences were higher than 30% (anthracene, 86%; 4,6-dimethyl dibenzothiophene, 31%; 2-methyl dibenzothiophene, 31%; and 4,4;-DDT, 32%;). See Table S4.

Accuracy was evaluated using matrix spike samples. Average recoveries for two matrix spike samples ranged from 38-208% across compounds, with an average recovery of 85%. Four air analytes (1-nitropyrene, 2,2-bis(bromomethyl)-1,3-propanediol, 3,5,6-trichloro-2-pyridinol, and 4,4'-biphenyldiol) had average matrix recoveries outside of the 50-150% acceptance range and were subsequently dropped from further analysis. See Table S4.

Surrogate recoveries were generally within the 50-150% acceptance range. Three different surrogates were used to evaluate each analytical method. Diazinon-d10, anthracene-d10, and p-terphenyl-d14 were used as surrogates in the neutral analytical method (n=114) and 2,4,6-tribromophenol, 4-nonylphenol-d4, and bisphenol A-d4 were used in the phenols analytical method (n=75). Recovery of diazinon-d10 was acceptable in all samples (114/114), recovery of anthracene-d10 was above 150% for 2/114 samples, recovery of p-terphenyl-d14 was above 150% in 1/114 samples, recovery of 2,4,6-tribromophenol was acceptable in all samples (75/75), recovery of 4-nonylphenol-d4 was below 50% in 3/75 samples, and recovery of bisphenol A-d4

was below 50% in 8/75 samples. Despite sporadic recoveries outside of the pre-determined acceptable range, reported values were not adjusted or corrected. See Table S4.

Additional Results and Discussion

Polycyclic Aromatic Hydrocarbons

PAHs arise from a variety of combustion-related sources. A total of 24 PAHs were analyzed, ranging from lower molecular weight, 2-ring PAHs (e.g. acenaphthylene), to the higher molecular weight, 6 ring PAH, dibenzo(a,e)pyrene. In addition, 4 thiophenes -- PAH compounds characterized by a 5-membered ring containing sulfur -- were measured due to their potential associations with petroleum refining, since crude oil with high sulfur content is refined at the Chevron refinery adjacent to the Richmond study community.

Outdoor Air. Of the 12 PAHs detected outdoors, 7 were detected at significantly higher frequencies in Richmond versus Bolinas ($p<0.05$) and none were detected significantly more often in Bolinas (Table S2). All three of the PAHs with adequate detects (> 50% above MRL in both communities) were detected at significantly higher median concentrations in Richmond than Bolinas. The 4 methylphenanthrenes (3-ring PAHs) were detected in almost all Richmond outdoor air samples but very few Bolinas samples. Acenaphthene (2 ring), fluorene (3 ring), and phenanthrene (3 ring), all lower molecular weight PAHs (MW: 154-178), were detected in almost all outdoor air samples; and they were observed at significantly higher median concentrations in Richmond ($p<0.05$). Fluoranthene and pyrene (4 ring PAHs) and acenaphthylene (2-ring) were more frequently detected in Richmond. The heavier, 5-6 ring PAHs were not detected outdoors in either community. Dibenzothiophene, the only thiophene (sulfur-containing PAH) detected outdoors, was detected in three Richmond outdoor samples.

Outdoor concentrations of phenanthrene and pyrene were lower than those reported in the RIOPA study, which targeted worst-case locations for outdoor pollution (*1*).

Indoor Air. Nine PAHs, all 2-4 ring PAHs, including the 4 methylphenanthrenes, acenaphthene, fluoranthene, fluorene, phenanthrene and pyrene, were detected in 100% of indoor air samples (Table S1). Five PAHs (acenaphthene, fluoranthene, fluorene, phenanthrene, and pyrene) had significantly higher median indoor concentrations in Richmond, while indoor levels of the methyl phenanthrenes did not differ between communities (Table S3). Maximum indoor anthracene concentrations were similar between Cape Cod and California (3.7 vs. 5 ng/m3 respectively); however, indoor pyrene concentrations were much higher in two homes in Richmond than the reported maximum in Cape Cod (27 vs 3.4 ng/m3). Observed indoor air phenanthrene concentrations (6.1 to 44 ng/m3) are in the lower range of previously reported concentrations (*2*).

Indoor-Outdoor Relationships. Indoor air concentrations of PAHs tend to exceed outdoor air concentrations; however, in some instances, the ranges of concentrations are similar (e.g. fluoranthene and pyrene) (Figure 1). Median indoor concentrations of 8 PAHs were significantly higher than corresponding outdoor concentrations, ($p<0.05$), and median indoor-outdoor differences were significantly greater than zero for 10 of 12 PAHs with at least 50% pairs > MRL (anthracene and fluoranthene were not significant). Figure S1 shows paired indoor-outdoor differences for phenanthrene, as an example compound with indoor-outdoor differences below zero, illustrating the influence of outdoor sources.

Scatterplots of PAHs in indoor and outdoor air suggest a combination of indoor and outdoor sources (Figure 2). The methyl phenanthrenes, seem to be dominated by indoor sources based on higher indoor relative to outdoor concentrations and lack of indoor-outdoor correlation. Acenaphthene, fluorene, fluoranthene, and phenanthrene, however, appear to have important outdoor sources with data points closer to the 1:1 line and significant positive correlation between indoors and outdoors ($p < 0.05$). Pyrene also appears to originate from both indoor and outdoor sources although the correlation was not significant. Thus, PAHs are elevated in Richmond ambient and indoor air compared with Bolinas, and correlations between indoor and outdoor levels indicate the influence of outdoor sources on indoor concentrations for some PAHs. The methyl phenanthrenes, however, appear to be originating primarily from indoor sources.

Pesticides

A total of 38 pesticides were targeted in this study including banned organochlorines (e.g. DDT, PCP), and current use products such as carbamates (e.g. propoxur), organophosphates (e.g. chlorpyrifos), and pyrethroids (cypermethrin). o-Phenylphenol, a phenolic compound registered as a microbicide and with other uses, including as a plasticizer, was also measured.

Outdoor Air. Thirteen pesticides were detected outdoors (Table S2). o-Phenylphenol was detected most frequently and at higher concentrations in Richmond. The insecticides chlorpyrifos, permethrin, diazinon, and malathion, the fungicide chlorothalonil, and DDE (a breakdown product of DDT) were detected in 1-2 Richmond samples and not in Bolinas. The wood preservative pentachlorophenol was detected in 55% of Richmond samples and not in Bolinas, The older insecticides chlordane and heptachlor and the herbicide trifluralin were detected in one Bolinas sample but not in Richmond. The concentration of chlordane (sum of *alpha*- and *gamma*-chlordane) in this sample was higher than many others reported in the literature (*3*).

Indoor Air. Sixteen pesticides were detected in indoor air (Table S3). Pesticides were detected more frequently indoors than outdoors, and more pesticides were detected indoors in Richmond than Bolinas, although detection frequencies were similar in the 2 communities. alpha-Chlordane was found at higher concentrations in Bolinas (<MRL to 3.5 ng/m3). Chlorpyrifos had some substantially higher concentrations in Richmond (range in Richmond <MRL to 9.9 ng/m3; range in Bolinas <MRL to 1 ng/m3). The contemporary insecticides propoxur, diazinon, permethrin and piperonyl butoxide (synergist), were detected in a few Richmond samples.

Comparison of detection frequencies between this study and Cape Cod is not feasible, because this study has substantially lower MRLs. However, the maximum indoor air concentrations of many of the historic use pesticides in this study were 4-35 times lower than those reported from Cape Cod; whereas the maximum concentrations of the more contemporary pyrethroid pesticides, *cis*- and *trans*-permethrin, were similar. o-Phenylphenol, which was detected in 100% of indoor air samples in both studies, was found at much higher concentrations in Cape Cod (range 12 to 970 ng/m3, median 70 ng/m3) compared to the present study (range 2.8 to 61 ng/m3, median 8.5 ng/m3). Differences between the Cape Cod and California studies may be due to geographic differences in use patterns, for example DDT may have been used more extensively on Cape Cod than in northern California, or the older study population on Cape Cod may simply have had older homes and furnishings that predated the DDT ban. For o-phenyl phenol, since it has a wider variety of uses beyond as an antimicrobial, and since it was identified

as an EDC during the 1990s, the lower levels in California may reflect changes in product formulations or use patterns between 2000, when Cape Cod homes were sampled, and 2006, when California homes were sampled.

Indoor-Outdoor Relationships. Chlordane, DDT, DDE, chlorpyrifos, propoxur, and the synergist piperonyl butoxide were detected with significantly greater frequency in indoor air compared to outdoor samples (Table S1) ($p<0.05$), and for three of these, paired indoor-outdoor concentration differences indicate mostly indoor sources and/or limited degradation indoors (Figure S1). Only the microbicide o-phenylphenol was detected frequently, and indoor concentrations were significantly higher ($p<0.05$) (Figure 1) and not correlated (Figure 2), indicating dominant indoor sources. In general, the historic-use organochlorines were detected more frequently indoors than outdoors. Malathion and trifluralin, both of which are approved for outdoor and not indoor use, were detected in one outdoor sample each but not indoors.

Mixtures: Factor Analysis

Exploratory factor analyses were conducted on log-transformed indoor and outdoor air concentrations in order to identify potential structures within the data. These analyses are exploratory and must be interpreted with caution given the small sample size. Only those compounds with reported concentration values for 100% of the samples were included, resulting in inclusion of a limited number of analytes, mostly phthalates and PAHs. Phthalates BBP, DBP, DEHA, DEHP, DEP and DIBP and PAHs acenaphthene and phenanthrene were included in exploratory factor analysis of outdoor air. For indoor air, nonylphenol, 4-t-butylphenol, the phthalates BBP, DBP, DEHA, DEHP, DEP, and DIBP, the PAHs 1-methylphenanthrene, 2-methylphenanthrene, 3-methylphenanthrene, 9-methylphenanthrene, fluorene, fluoranthene, phenanthrene, and pyrene, and o-phenylphenol were included. Factor designations were confirmed using proc factor (method = ML and rotation = promax) in SAS (Version 9). Results are shown in Figure S2.

Outdoor air. Factor analysis revealed two factors for the outdoor air data (n=43). The first factor with loadings ≥ 0.4 included the PAHs acenaphthene (loading = 0.96) and phenanthrene (0.95), with moderately weak loadings for DEHA (0.46) and DIBP (0.41). The second factor included DBP (0.99), BBP (0.74), and DIBP (0.47). Note the DIBP loaded onto both factors but with stronger loading on Factor 2. Both DEHP and DEP failed to load on either factor. Inclusion of DEHA in the first factor with two PAH compounds is expected based on the significant positive Kendall tau correlation estimates between DEHA and most PAHs. BBP and DBP, both with strong loadings in Factor 2, were also fairly strongly correlated in the Kendall tau correlation analysis (Figure S2), suggesting shared sources.

Indoor air. Factor analysis was conducted in two different ways: 1) including data from only those homes with both phenol and neutral sample analysis (n=31) and 2) including data from only neutral sample analysis (n=50). In the combined data, three factors were revealed. Factor 1 included methylphenanthrenes (0.89-0.94), BBP (0.68), DBP (0.75), DEP (0.62), and o-phenylphenol (0.91). Factor 2 included PAHs acenaphthene (0.81), fluorene (0.81), fluoranthene (0.98), phenanthrene (0.85), and pyrene (0.82). Factor 3 included 4-t-butylphenol (0.59), nonylphenol (0.45), DEHA (0.62), DEHP (1.0), and DIBP (0.60). For the neutral only data, three factors were also revealed. Factor 1 was similar to Factor 1 from the combined neutrals-phenols data analysis and included methylphenanthrenes (0.92-1.0), BBP (0.48), DBP (0.78), DEP (0.44), and o-phenylphenol (0.81). It also included two phthalates (DEHP and DIBP) that

were previously found in Factor 3 of the combined data analysis. Factor 2 included PAHs fluoranthene (1.0), phenanthrene (0.59), and pyrene (0.97), as it did in the combined analysis. Factor 3, however, included two PAHs loaded onto Factor 2 in the combined analysis, namely acenaphthene (0.94) and fluorene (0.70). DEHP failed to load (<0.4) in the neutral only analysis. Factor 1 in both analyses included compounds associated with indoor sources, including the methylphenanthrenes. Factor 2 in both analyses included PAHs, which have important outdoor sources. Factor 3 seemed to include a subset of PAHs. In the combined analysis, it included the phenolic compounds and some phthalates, which are typically indoor source compounds, although they were detected outdoors (in Richmond). In the neutral only analysis, it included acenaphthene and fluorene, which may have both indoor and outdoor sources and were fairly strongly correlated with each other ($\tau = 0.7$).

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Table S1. Summary statistics for endocrine disruptors in outdoor and indoor air in all California homes (ng/m^3)

		Outdoor						Indoor									
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	95th %tile	Max.	F.E. Test[c]	Wil. Test[d]	MRL	Ref.
Phthalates																	
benzyl butyl phthalate[e,g]	BBP	43	5	--	--	4.8	8.5	50	50	--	6.8	38	80	I	--	6	1, 2(I)
bis(2-ethylhexyl) adipate[g]	DEHA	43	100	1.0	2.1	5.5	8.7	50	100	6.9	27	70	76		I	1	1, 2(IIIb)
bis(2-ethylhexyl) phthalate[e,g]	DEHP	43	14	--	--	120	230	50	82	--	68	130	200	I	--	40	1, 2(I)
di-n-butyl phthalate[e]	DBP	43	35	--	--	15	32	50	100	28	140	550	1100	I	--	7	1, 2(I)
di-n-hexyl phthalate[g]	DHP	43	5	--	--	4.5	15	50	2	--	--	--	52		--	6	1, 2(II)
di-n-octyl phthalate[g]	DOP	43	0	--	--	--	--	50	2	--	--	--	0.80		--	0.7	2(IIIb)
di-n-pentyl phthalate	DPeP	43	0	--	--	--	--	50	2	--	--	--	4.0		--	0.7	1, 2(I)
di-n-propyl phthalate	DPP	43	0	--	--	--	--	50	2	--	--	--	2.3		--	1	1, 2(II)
dicyclohexyl phthalate[f,g]	DCP	43	5	--	--	0.77	2.0	50	0	--	--	--	--		--	0.7	1, 2(I)
diethyl phthalate[e]	DEP	43	47	--	--	160	610	50	100	110	330	1200	2500	I	--	60	1, 2(I)
diisobutyl phthalate[e]	DIBP	43	93	--	3.6	11	18	50	100	17	130	370	1700		I	1	1, 2(I)
Alkylphenols																	
4-nonylphenol[f,g]	NP	29	14	--	--	34	40.	31	97	--	53	86	89	I	--	10	1, 2(I)
nonylphenol monoethoxylate	NP1EO	29	0	--	--	--	--	31	97	--	20	41	72	I	--	6	1
nonylphenol diethoxylate	NP2EO	29	0	--	--	--	--	31	3	--	--	--	18		--	7	1, 2(II)
Parabens																	
butyl paraben	BuPa	29	0	--	--	--	--	31	3	--	--	--	7.8		--	0.8	2(I)
ethyl paraben	EtPa	29	0	--	--	--	--	31	0	--	--	--	--		--	0.8	2(I)
methyl paraben	MePa	29	0	--	--	--	--	31	23	--	--	16	17	I	--	0.8	2(I)
Polybrominated Diphenyl Ethers (PBDEs)																	
PBDE 47[g]	PBDE47	43	0	--	--	--	--	50	14	--	--	2.3	3.4	I	--	0.7	2(II)
PBDE 99	PBDE99	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	2(II)
PBDE 100	PBDE100	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	2(II)
Polychlorinated Biphenyls (PCBs)																	
PCB 52	PCB52	43	0	--	--	--	--	50	42	--	--	2.3	3.3	I	--	0.3	1, 2(I)
PCB 105	PCB105	43	0	--	--	--	--	50	12	--	--	0.44	1.2	I	--	0.3	1, 2(I)
PCB 153[f]	PCB153	43	0	--	--	--	--	50	4	--	--	0.31	1.9		--	0.3	1, 2(I)
Polycyclic Aromatic Hydrocarbons (PAHs)																	
acenaphthene	AcNThe	43	100	0.58	4.3	9.6	11	50	100	1.5	5.3	19	29		I	0.3	
acenaphthylene[f]	AcNThy	43	35	--	--	2.7	3.2	50	4	--	--	4.5	220	O	--	0.3	
anthracene	Anth	43	14	--	--	0.96	1.3	50	16	--	--	1.7	5.0		--	0.3	
benzo(a)anthracene	BaA	43	0	--	--	--	--	50	2	--	--	--	0.66		--	0.3	1, 2(II)

		Outdoor						Indoor									
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	95th %tile	Max.	F.E. Test[c]	Wil. Test[d]	MRL	Ref.
benzo(a)pyrene	BaP	43	0	--	--	--	--	50	2	--	--	--	2.1		--	0.3	1, 2(I)
benzo(b&j)fluoranthene	BbjFluAn	43	0	--	--	--	--	50	2	--	--	--	2.7		--	0.6	
benzo(k)fluoranthene	BkFluAn	43	0	--	--	--	--	50	2	--	--	--	1.1		--	0.3	
benzothiophene	BThPhe	43	0	--	--	--	--	50	0	--	--	--	--		--	0.6	
chrysene/iso-chrysene	Chrys	43	0	--	--	--	--	50	2	--	--	--	0.39		--	0.3	
dibenz(a,e)pyrene	DBaePyr	43	0	--	--	--	--	50	0	--	--	--	--		--	0.3	
dibenz(a,h)anthracene[g]	DBahA	43	0	--	--	--	--	50	0	--	--	--	--		--	0.3	
3,6-dimethyl phenanthrene	DMPhenan	43	0	--	--	--	--	50	6	--	--	0.44	1.0		--	0.3	
fluoranthene	FluAn	43	81	--	0.91	2.4	3.8	50	100	0.55	0.9	2.3	12	I		0.3	
fluorene	Flu	43	95	--	3.9	9.2	11	50	100	2.0	6.7	18	28		I	0.6	
indeno(1,2,3-cd)pyrene[f,g]	IcdPyr	43	0	--	--	--	--	50	4	--	--	0.31	4.4		--	0.3	
phenanthrene	Phenan	43	100	1.5	6.6	16	16	50	100	6.1	11	29	44		I	0.9	
pyrene	Pyr	43	77	--	0.52	1.7	1.9	50	100	0.36	0.81	1.7	27	I	I	0.3	
dibenzothiophene	DBTPhe	43	7	--	--	1.3	1.5	50	2	--	--	--	10.		--	0.6	
4,6-dimethyl dibenzothiophene	DMDBTPhe	43	0	--	--	--	--	50	18	--	--	2.2	4.1	I	--	0.6	
2-methyl dibenzothiophene	2MDBTPhe	43	0	--	--	--	--	50	22	--	--	4.1	8.5	I	--	0.5	
1-methyl phenanthrene	1MPhenan	43	63	--	0.36	0.85	1.0	50	100	0.45	1.2	2.9	4.1	I	I	0.3	
2-methyl phenanthrene	2MPhenan	43	81	--	0.69	1.6	2.0	50	100	0.83	2.0	4.5	6.0	I	I	0.3	
3-methyl phenanthrene	3MPhenan	43	79	--	0.61	1.5	2.0	50	100	0.71	1.8	4.7	6.6	I	I	0.3	
9-methyl phenanthrene[f]	9MPhenan	43	56	--	0.31	0.76	0.91	50	100	0.45	1.3	3.4	4.3	I	I	0.3	
						Pesticides											
alachlor	Alach	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(I)
aldrin	Aldr	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(II)
atrazine	Atraz	43	0	--	--	--	--	50	0	--	--	--	--		--	0.3	1, 2(I)
bendiocarb	Bendio	43	0	--	--	--	--	50	0	--	--	--	--		--	2	
carbaryl	Carb	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(I)
carbofuran	Crbfur	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	2(II)
alpha-chlordane	aChlor	43	2	--	--	--	0.81	50	26	--	--	0.5	3.5	I	--	0.3	1, 2(I)
gamma-chlordane	gchlor	43	2	--	--	--	1.1	50	32	--	--	0.65	4.8	I	--	0.3	1, 2(I)
chlorothalonil[f]	Chorth	43	5	--	--	0.46	1.7	50	12	--	--	6.7	27		--	0.4	
chlorpyrifos[f]	ChlPy	43	5	--	--	0.31	0.86	50	56	--	0.39	2.8	9.9	I	--	0.3	1, 2(IIIa)
cyanazine	Cyan	43	0	--	--	--	--	50	0	--	--	--	--		--	1	1, 2(II)
cypermethrin	Cyper	43	0	--	--	--	--	50	0	--	--	--	--		--	2	1, 2(II)
4,4'-DDD[f]	DDD	43	0	--	--	--	--	50	4	--	--	0.31	0.41		--	0.3	1, 2(I)
4,4'-DDE[g]	DDE	43	2	--	--	--	0.35	50	22	--	--	0.58	1.2	I	--	0.3	12(I)
4,4'-DDT[g]	DDT	43	0	--	--	--	--	50	24	--	--	0.74	1.7	I	--	0.3	1, 2(I)

		Outdoor						Indoor									
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	95th %tile	Max.	F.E. Test[c]	Wil. Test[d]	MRL	Ref.
diazinon	Diaz	43	2	--	--	--	2.6	50	2	--	--	--	31		--	0.3	2(II)
dichlorvos	Dclv	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	2(IIIa)
dicofol	Dico	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	2(II)
dieldrin	Dield	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(II)
endrin	Endr	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(II)
ethyl parathion	Parath	43	0	--	--	--	--	50	0	--	--	--	--		--	2	1, 2(II)
heptachlor[f]	Hept	43	2	--	--	--	1.3	50	4	--	--	0.37	5.0		--	0.3	1, 2(II)
HPTE	HPTE	29	0	--	--	--	--	31	3	--	--	--	3.9		--	0.8	1, 2(I)
lindane	Lind	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(I)
malathion	Malth	43	2	--	--	--	16	50	0	--	--	--	--		--	0.3	1, 2(II)
methoxychlor	MX	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(I)
methyl parathion	MePthion	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(II)
metolachlor	Metol	43	0	--	--	--	--	50	0	--	--	--	--		--	0.3	
nitrofen	Nitrof	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(I)
pentachlorophenol[f,g]	PCPh	29	38	--	--	2.6	5.8	31	42	--	--	3.3	11		--	0.8	1, 2(I)
cis-permethrin[f]	cPerm	43	5	--	--	0.37	1.5	50	8	--	--	0.43	2.0		--	0.3	1, 2(II)
trans-permethrin[f]	tPerm	43	2	--	--	--	0.73	50	4	--	--	0.62	3.0		--	0.6	1, 2(II)
piperonyl butoxide[f]	PipBO	43	0	--	--	--	--	50	10	--	--	1.4	2.3	i	--	0.3	1, 2(II)
o-phenyl phenol	oPPh	43	98	--	1.1	2.7	4.8	50	100	2.8	8.5	32	61		I	0.3	1, 2(II)
prometon	Prom	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	
propoxur	PrPx	43	0	--	--	--	--	50	14	--	--	6.8	11	I	--	1	
simazine	Simz	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(II)
trifluralin	Trifl	43	2	--	--	--	0.54	50	0	--	--	--	--		--	0.4	1, 2(I)
Phenols and Miscellaneous																	
3-biphenylol	mPPh	29	0	--	--	--	--	31	0	--	--	--	--		--	0.8	
bisphenol A	BPA	29	14	--	--	1.7	1.7	31	16	--	--	1.6	22		--	0.8	1, 2(I)
bisphenol B	BPB	29	0	--	--	--	--	31	0	--	--	--	--		--	0.8	1, 2(I)
2-sec-butylphenol	2sBPh	29	0	--	--	--	--	31	3	--	--	--	4.1		--	0.8	
4-sec-butylphenol	4sBPh	29	0	--	--	--	--	31	3	--	--	--	6.8		--	2	1, 2(II)
4-tert-butylphenol[f]	4tBPh	29	55	--	0.85	2.6	3.4	31	100	2.5	12	22	32	I	I	0.8	1, 2(II)
4-cumylphenol	4CPh	29	0	--	--	--	--	31	0	--	--	--	--		--	0.8	
2,3-dibromo-1-propanol	23DB1P	29	0	--	--	--	--	31	0	--	--	--	--		--	0.8	
2,4-dichlorophenol[f]	24DCPh	29	7	--	--	2.9	4.9	31	10	--	--	5.0	8.7		--	0.8	1, 2(II)
3,4-dichlorophenol	34DCPh	29	0	--	--	--	--	31	0	--	--	--	--		--	4	
2,4-dihydroxybenzophenone[g]	24dhbzon	29	3	--	--	--	0.96	31	0	--	--	--	--		--	0.8	2(I)

		Outdoor						Indoor									
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	95th %tile	Max.	F.E. Test[c]	Wil. Test[d]	MRL	Ref.
2-ethylhexyl 4-hydroxybenzoate	2eh4hbenz	29	0	--	--	--	--	31	0	--	--	--	--		--	0.8	
3-hydroxybenzophenone	3Hybzon	29	0	--	--	--	--	31	0	--	--	--	--		--	1	
4-hydroxybenzophenone	4Hybzon	29	0	--	--	--	--	31	0	--	--	--	--		--	2	1
4,4'-methylenediphenol	44MDPh	29	0	--	--	--	--	31	6	--	--	4.8	20.		--	0.8	1
4-nitrophenol[g]	4NPh	29	34	--	--	12	18	31	10	--	--	9.1	15	O	--	0.8	2(II)
4-nitrotoluene	4NT	43	0	--	--	--	--	50	0	--	--	--	--		--	0.7	1, 2(I)
p-pentylphenol	pPPh	29	0	--	--	--	--	31	0	--	--	--	--		--	0.8	1
p-phenylphenol	pPhPh	29	0	--	--	--	--	31	0	--	--	--	--		--	1	1, 2(I)

'--' indicates insufficient number of detects to calculate summary statistic

[a] Number of analyzed samples.

[b] MRL = method reporting limit (defined as the maximum of the analytical detection limit and the 90th percentile of the blanks).

[c] Fisher's exact test. O or I indicates significantly greater number of values above the MRL in outdoor or indoor air, respectively ($p<0.05$); o or i indicates borderline significantly greater number of values above the MRL in outdoor or indoor air, respectively ($0.05 \leq p<0.1$).

[d] Wilcoxon rank sum test conducted when greater than 50% of the values in each community were detected; O or I indicates significantly higher median in outdoor or indoor air, respectively ($p<0.05$); o or i indicates borderline significantly higher median in outdoor or indoor air respectively ($0.05 \leq p<0.1$); '--' indicates insufficient number of detects; blank indicates sufficient data but nonsignificant result.

[e] Values subjected to blank correction by subtracting the median blank concentration.

[f] Indicates that elevated nondetect values (due to analytical interferences) are included in summary statistics presented.

[g] Indicates less certainty about reported values due to at least one blank value exceeding the median of field samples.

References:

[1] Evidence of endocrine disrupting activity cited in Rudel 2001.

[2] Listed as a suspected endocrine disruptor by the European Commission; numbers in parentheses denote categories 1-3b. (http://ec.europa.eu/environment/endocrine/documents/studies_en.htm)

Table S2. Summary statistics for endocrine disruptors detected in outdoor air in Richmond and Bolinas (ng/m3)

		Richmond Outdoor						Bolinas Outdoor						
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	Max.	F.E. Test[c]	Wil. Test[d]
						Phthalates								
benzyl butyl phthalate[e]	BBP	33	3	--	--	--	8.5	10	10	--	--	7.2		--
bis(2-ethylhexyl) adipate	DEHA	33	100	1.0	2.3	5.7	8.7	10	100	1.2	1.5	2.1		R
bis(2-ethylhexyl) phthalate[e]	DEHP	33	18	--	--	160	230	10	0	--	--	--		--
di-n-butyl phthalate[e]	DBP	33	33	--	--	19	32	10	40	--	--	15		--
di-n-hexyl phthalate	DHP	33	6	--	--	6.8	15	10	0	--	--	--		--
dicyclohexyl phthalate	DCP	33	6	--	--	1.1	2.0	10	0	--	--	--		--
diethyl phthalate[e]	DEP	33	39	--	--	150	610	10	70	--	99	220		--
diisobutyl phthalate[e]	DIBP	33	91	--	4.0	14	18	10	100	1.4	2.9	5.6		r
						Alkylphenols								
4-nonylphenol[f]	NP	20	15	--	--	20.	40.	9	11	--	--	39		--
						Polycyclic Aromatic Hydrocarbons								
acenaphthene	AcNThe	33	100	2	4.8	9.7	11	10	100	0.58	0.81	4.6		R
acenaphthylene	AcNThy	33	45	--	--	2.7	3.2	10	0	--	--	--	R	--
anthracene	Anth	33	15	--	--	0.8	1.3	10	10	--	--	1.1		--
fluoranthene	FluAn	33	100	0.41	1.0	2.3	2.7	10	20	--	--	3.8	R	--
fluorene	Flu	33	97	--	5.5	9.4	11	10	90	--	1.1	5.6		R
phenanthrene	Phenan	33	100	3.1	8.6	16	16	10	100	1.5	2.2	15		R
pyrene	Pyr	33	97	--	0.62	1.6	1.9	10	10	--	--	1.9	R	--
dibenzothiophene	DBTPhe	33	9	--	--	1.3	1.5	10	0	--	--	--		--
1-methyl phenanthrene	1MPhenan	33	79	--	0.42	0.88	1.0	10	10	--	--	0.67	R	--
2-methyl phenanthrene	2MPhenan	33	100	0.35	0.76	1.7	2.0	10	20	--	--	1.2	R	--
3-methyl phenanthrene	3MPhenan	33	97	--	0.69	1.6	2.0	10	20	--	--	1.2	R	--
9-methyl phenanthrene	9MPhenan	33	70	--	0.34	0.78	0.91	10	10	--	--	0.45	R	--
						Pesticides								
alpha-chlordane	aChlor	33	0	--	--	--	--	10	10	--	--	0.81		--
gamma-chlordane	gchlor	33	0	--	--	--	--	10	10	--	--	1.1		--
chlorothalonil	Chorth	33	3	--	--	--	0.47	10	10	--	--	1.7		--
chlorpyrifos	ChlPy	33	6	--	--	0.45	0.86	10	0	--	--	--		--
4,4'-DDE	DDE	33	3	--	--	--	0.35	10	0	--	--	--		--
diazinon	Diaz	33	3	--	--	--	2.6	10	0	--	--	--		--
heptachlor	Hept	33	0	--	--	--	--	10	10	--	--	1.3		--
malathion	Malth	33	3	--	--	--	16	10	0	--	--	--		--
pentachlorophenol[f]	PCPh	20	55	--	0.85	2.8	5.8	9	0	--	--	--	R	--

		Richmond Outdoor						Bolinas Outdoor						
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	Max.	F.E. Test[c]	Wil. Test[d]
cis-permethrin[f]	cPerm	33	6	--	--	0.51	1.5	10	0	--	--	--		--
trans-permethrin	tPerm	33	3	--	--	--	0.73	10	0	--	--	--		--
o-phenyl phenol	oPPh	33	100	0.38	1.2	2.8	4.8	10	90	--	0.52	1.1		R
trifluralin	Trifl	33	0	--	--	--	--	10	10	--	--	0.54		--
Phenols and Miscellaneous														
bisphenol A	BPA	20	15	--	--	1.7	1.7	9	11	--	--	1.7		--
4-tert-butylphenol[f]	4tBPh	20	60	--	0.85	2.7	3.4	9	44	--	--	0.85		--
2,4-dichlorophenol	24DCPh	20	10	--	--	4.2	4.9	9	0	--	--	--		--
2,4-dihydroxybenzophenone	24dhbzon	20	5	--	--	--	0.96	9	0	--	--	--		--
4-nitrophenol	4NPh	20	45	--	--	13	18	9	11	--	--	2.1		--

'--' indicates insufficient number of detects to calculate summary statistic

[a] Number of analyzed samples.

[b] MRL = method reporting limit (defined as the maximum of the analytical detection limit and the 90th percentile of the blanks). Compound-specific MRLs presented in Supporting Information.

[c] Fisher's exact test. R or B indicates significantly greater number of values above the MRL in Richmond or Bolinas, respectively ($p<0.05$); r or b indicates borderline significantly greater number of values above the MRL in Richmond or Bolinas, respectively ($0.05 \leq p<0.1$).

[d] Wilcoxon rank sum test conducted when greater than 50% of the values in each community were detected; R or B indicates significantly higher median in Richmond or Bolinas respectively ($p<0.05$); r or b indicates borderline significantly higher median in Richmond or Bolinas, respectively ($0.05 \leq p<0.1$); '--' indicates insufficient number of detects

[e] Values subjected to blank correction by subtracting the median blank concentration.

[f] Indicates that elevated nondetect values (due to analytical interferences) are included in summary statistics presented

Table S3. Summary statistics for endocrine disruptors detected in indoor air in Richmond and Bolinas (ng/m3)

		Richmond Indoor						Bolinas Indoor						
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	Max.	F.E. Test[c]	Wil. Test[d]
Phthalates														
benzyl butyl phthalate[e]	BBP	40	52	--	7.5	41	80	10	40	--	--	15		--
bis(2-ethylhexyl) adipate	DEHA	40	100	8.3	32	70.	76	10	100	6.9	23	69		
bis(2-ethylhexyl) phthalate[e]	DEHP	40	90	--	69	130	200	10	50	--	47	100	R	R
di-n-butyl phthalate[e]	DBP	40	100	28	140	650	1100	10	100	88	140	310		
di-n-hexyl phthalate	DHP	40	2	--	--	--	52	10	0	--	--	--		--
di-n-octyl phthalate	DOP	40	2	--	--	--	0.8	10	0	--	--	--		--
di-n-pentyl phthalate	DPeP	40	2	--	--	--	4.0	10	0	--	--	--		--
di-n-propyl phthalate	DPP	40	2	--	--	--	2.3	10	0	--	--	--		--
diethyl phthalate[e]	DEP	40	100	130	330	1400	2500	10	100	110	320	930		
diisobutyl phthalate[e]	DIBP	40	100	17	140	390	1700	10	100	23	81	250		R
Alkylphenols														
4-nonylphenol	NP	21	95	--	53	82	89	10	100	26	49	89		
nonylphenol monoethoxylate	NP1EO	21	95	--	19	35	36	10	100	13	29	72		
nonylphenol diethoxylate	NP2EO	21	0	--	--	--	--	10	10	--	--	18		--
Parabens														
butyl paraben	BuPa	21	5	--	--	--	5.8	10	0	--	--	--		--
methyl paraben	MePa	21	33	--	--	16	17	10	0	--	--	--	r	--
Polybrominated Diphenyl Ethers (PBDEs)														
PBDE 47	PBDE47	40	18	--	--	2.3	3.4	10	0	--	--	--		--
Polychlorinated Biphenyls (PCBs)														
PCB 52[f]	PCB52	40	40	--	--	1.6	2.7	10	50	--	0.30	3.3		--
PCB 105	PCB105	40	15	--	--	0.48	1.2	10	0	--	--	--		--
PCB 153	PCB153	40	5	--	--	0.33	1.9	10	0	--	--	--		--
Polycyclic Aromatic Hydrocarbons (PAHs)														
acenaphthene	AcNThe	40	100	2.8	6.1	19	29	10	100	1.5	3.4	8.9		R
acenaphthylene	AcNThy	40	5	--	--	6.7	220	10	0	--	--	--		--
anthracene	Anth	40	20	--	--	1.8	5.0	10	0	--	--	--		--
benzo(a)anthracene	BaA	40	2	--	--	--	0.66	10	0	--	--	--		--
benzo(a)pyrene	BaP	40	2	--	--	--	2.1	10	0	--	--	--		--
benzo(b&j)fluoranthene	BbjFluAn	40	2	--	--	--	2.7	10	0	--	--	--		--
benzo(k)fluoranthene	BkFluAn	40	2	--	--	--	1.1	10	0	--	--	--		--
chrysene/iso-chrysene	Chrys	40	2	--	--	--	0.39	10	0	--	--	--		--

Compound	Abbrev.	Richmond Indoor						Bolinas Indoor						
		No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	Max.	F.E. Test[c]	Wil. Test[d]
3,6-dimethyl phenanthrene	DMPhenan	40	5	--	--	0.32	1.0	10	10	--	--	0.55		--
fluoranthene	FluAn	40	100	0.56	0.98	2.6	12	10	100	0.55	0.68	1.5		R
fluorene	Flu	40	100	3.8	8.1	19	28	10	100	2.0	5.2	12		R
indeno(1,2,3-cd)pyrene	IcdPyr	40	5	--	--	0.33	4.4	10	0	--	--	--		--
phenanthrene	Phenan	40	100	6.1	12	30.	44	10	100	6.5	9.7	18		R
pyrene	Pyr	40	100	0.36	0.9	2.3	27	10	100	0.4	0.71	0.97		R
dibenzothiophene	DBTPhe	40	0	--	--	--	--	10	10	--	--	2.9		--
4,6-dimethyl dibenzothiophene	DMDBTPhe	40	22	--	--	2.4	4.1	10	0	--	--	--		--
2-methyl dibenzothiophene	2MDBTPhe	40	28	--	--	4.4	8.5	10	0	--	--	--	r	--
1-methyl phenanthrene	1MPhenan	40	100	0.45	1.3	2.7	4.1	10	100	0.75	1.0	3.0		
2-methyl phenanthrene	2MPhenan	40	100	0.83	2.1	4.2	6.0	10	100	1.1	1.5	4.8		
3-methyl phenanthrene	3MPhenan	40	100	0.71	1.8	4.8	6.6	10	100	1.2	1.7	4.8		
9-methyl phenanthrene	9MPhenan	40	100	0.45	1.3	3.6	4.3	10	100	0.73	1.2	3.2		
Pesticides														
alpha-chlordane	aChlor	40	25	--	--	0.41	0.67	10	30	--	--	3.5		--
gamma-chlordane	gchlor	40	32	--	--	0.56	1.1	10	30	--	--	4.8		--
chlorothalonil	Chorth	40	12	--	--	8.5	27	10	10	--	--	0.46		--
chlorpyrifos	ChlPy	40	60	--	0.47	2.9	9.9	10	40	--	--	1.0		--
4,4'-DDD[f]	DDD	40	5	--	--	0.32	0.41	10	0	--	--	--		--
4,4'-DDE	DDE	40	28	--	--	0.64	1.2	10	0	--	--	--	r	--
4,4'-DDT	DDT	40	30	--	--	0.76	1.7	10	0	--	--	--	r	--
diazinon	Diaz	40	2	--	--	--	31	10	0	--	--	--		--
heptachlor	Hept	40	0	--	--	--	--	10	20	--	--	5.0	B	--
HPTE	HPTE	21	5	--	--	--	2.4	10	0	--	--	--		--
pentachlorophenol[f]	PCPh	21	33	--	--	3.3	3.3	10	60	--	0.84	11		--
cis-permethrin	cPerm	40	10	--	--	0.50	2.0	10	0	--	--	--		--
trans-permethrin	tPerm	40	5	--	--	0.63	3.0	10	0	--	--	--		--
piperonyl butoxide[f]	PipBO	40	12	--	--	1.5	2.3	10	0	--	--	--		--
o-phenyl phenol	oPPh	40	100	2.8	8.3	40.	61	10	100	3.0	13	19		
propoxur	PrPx	40	18	--	--	7.0	11	10	0	--	--	--		--
Phenols and Miscellaneous														
bisphenol A	BPA	21	19	--	--	1.7	22	10	10	--	--	0.85		--
2-sec-butylphenol	2sBPh	21	5	--	--	--	2.4	10	0	--	--	--		--
4-sec-butylphenol	4sBPh	21	5	--	--	--	5.8	10	0	--	--	--		--
4-tert-butylphenol	4tBPh	21	100	3.2	12	19	25	10	100	2.5	11	32		
2,4-dichlorophenol[f]	24DCPh	21	14	--	--	5.1	8.7	10	0	--	--	--		--

		Richmond Indoor						Bolinas Indoor						
Compound	Abbrev.	No.[a]	% > MRL[b]	Min.	Median	95th %tile	Max.	No.	% > MRL	Min.	Median	Max.	F.E. Test[c]	Wil. Test[d]
4,4'-methylenediphenol	44MDPh	21	10	--	--	8.8	20	10	0	--	--	--		--
4-nitrophenol	4NPh	21	10	--	--	9.7	15	10	10	--	--	8.6		--

'--' indicates insufficient number of detects to calculate summary statistic

[a] Number of analyzed samples.

[b] MRL = method reporting limit (defined as the maximum of the analytical detection limit and the 90th percentile of the blanks). Compound-specific MRLs presented in Table S1.

[c] Fisher's exact test. R or B indicates significantly greater number of values above the MRL in Richmond or Bolinas, respectively ($p<0.05$); r or b indicates borderline significantly greater number of values above the MRL in Richmond or Bolinas, respectively ($0.05\leq p<0.1$).

[d] Wilcoxon rank sum test conducted when greater than 50% of the values in each community were detected; R or B indicates significantly higher median in Richmond or Bolinas respectively ($p<0.05$); r or b indicates borderline significantly higher median in Richmond or Bolinas, respectively ($0.05\leq p<0.1$); '--' indicates insufficient number of detects; blank indicates sufficient data but nonsignificant result

[e] Values subjected to blank correction by subtracting the median blank concentration.

[f] Indicates that elevated nondetect values (due to analytical interferences) are included in summary statistics presented

Table S4. Quality assurance and quality control (QA/QC) summary data.

	Blanks									Duplicates			Matrix Spike Recoveries		
Compound	Blank Correct.[a]	Blank Correct. Mass (ng)	Blank Correct. Conc. (ng/m3)	Change in Median (%)[b]	Field Blank Max. Mass (ng)[c]	Batch Blank Max. Mass (ng)[d]	Matrix Blank Max. Mass (ng)[e]	MRL (ng/m3)[f]	Max.-based MRL (ng/m3)[g]	No. of Dup. Pairs	No. of Det. Dup. Pairs[h]	Mean Percent Diff. (%)	Matrix Spike Recov. 1 (%)	Matrix Spike Recov. 2 (%)	Ave. Matrix Spike Recov. (%)
Phthalates															
benzyl butyl phthalate[i]	yes	33	2.7	53	130	150	56	6	10	4	4	27	78	83	81
bis(2-ethylhexyl) adipate[i]	no	<DL	<DL	--	11	3200	13	1	300	4	4	11	64	80	72
bis(2-ethylhexyl) phthalate[i]	yes	120	9.5	19	160	3800	190	40	300	4	4	11	67	79	73
di-n-butyl phthalate	yes	62	5.1	7	140	190	160	7	20	4	4	30	77	99	88
di-n-hexyl phthalate[i]	no	<DL	<DL	--	79	440	<DL	6	40	4	1	7	73	84	79
di-n-octyl phthalate[i]	no	<DL	<DL	--	<DL	38	<DL	0.7	3	4	0	--	96	74	85
di-n-pentyl phthalate	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	94	97	96
di-n-propyl phthalate	no	<DL	<DL	--	<DL	<DL	<DL	1	1	4	0	--	89	89	89
dicyclohexyl phthalate[i]	no	<DL	<DL	--	<DL	84	<DL	0.7	7	4	0	--	70	76	73
diethyl phthalate	yes	440	37	17	1600	840	440	60	100	4	4	28	85	117	101
diisobutyl phthalate	yes	21	1.7	5	31	39	45	1	4	4	4	23	84	86	85
Alkylphenols															
4-nonylphenol[i]	no	<DL	<DL	--	100	340	<DL	10	30	1	1	8	74	64	69
nonylphenol monoethoxylate	no	<DL	<DL	--	<DL	<DL	<DL	6	6	1	1	4	59	71	65
nonylphenol diethoxylate	no	<DL	<DL	--	<DL	<DL	<DL	7	7	1	1	20	91	84	88
Parabens															
butyl paraben	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	59	60	59
ethyl paraben	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	99	81	90
methyl paraben	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	85	80	82
Polybrominated Diphenyl Ethers (PBDEs)															
PBDE 47[i]	no	<DL	<DL	--	<DL	15	<DL	0.7	1	4	0	--	--	--	--
PBDE 99	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	--	--	--
PBDE 100	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	--	--	--
Polychlorinated Biphenyls (PBCs)															
PCB 52	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	1	7	112	95	104
PCB 105	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	99	88	94
PCB 153	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	104	92	98
Polycyclic Aromatic Hydrocarbons (PAHs)															
acenaphthene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	4	15	89	94	92
acenaphthylene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	94	85	90
anthracene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	1	86	91	86	89
benzo(a)anthracene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	103	96	100

	Blanks									Duplicates			Matrix Spike Recoveries		
Compound	Blank Correct.[a]	Blank Correct. Mass (ng)	Blank Correct. Conc. (ng/m3)	Change in Median (%)[b]	Field Blank Max. Mass (ng)[c]	Batch Blank Max. Mass (ng)[d]	Matrix Blank Max. Mass (ng)[e]	MRL (ng/m3)[f]	Max.-based MRL (ng/m3)[g]	No. of Dup. Pairs	No. of Det. Dup. Pairs[h]	Mean Percent Diff. (%)	Matrix Spike Recov. 1 (%)	Matrix Spike Recov. 2 (%)	Ave. Matrix Spike Recov. (%)
benzo(a)pyrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	82	77	80
benzo(b&j)fluoranthene	no	<DL	<DL	--	<DL	<DL	<DL	0.6	0.6	4	0	--	83	73	78
benzo(k)fluoranthene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	87	80	84
benzothiophene	no	<DL	<DL	--	<DL	<DL	<DL	0.6	0.6	4	0	--	86	90	88
chrysene/iso-chrysene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	96	100	98
dibenz(a,e)pyrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	167	66	117
dibenz(a,h)anthracene[i]	no	<DL	<DL	--	<DL	23	<DL	0.3	2	4	0	--	98	75	87
3,6-dimethyl phenanthrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	97	97	97
fluoranthene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	4	6	103	97	100
fluorene	no	<DL	<DL	--	8.1	11	<DL	0.6	0.9	4	4	19	92	89	91
indeno(1,2,3-cd)pyrene[i]	no	<DL	<DL	--	<DL	8.6	<DL	0.3	0.7	4	0	--	91	70	81
phenanthrene	no	<DL	<DL	--	15	9.3	<DL	0.9	1	4	4	13	95	95	95
pyrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	4	12	103	99	101
dibenzothiophene	no	<DL	<DL	--	<DL	<DL	<DL	0.6	0.6	4	2	19	92	90	91
4,6-dimethyl dibenzothiophene	no	<DL	<DL	--	<DL	<DL	<DL	0.6	0.6	4	1	31	96	98	97
2-methyl dibenzothiophene	no	<DL	<DL	--	<DL	<DL	<DL	0.5	0.5	4	1	31	96	90	93
1-methyl phenanthrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	3	15	91	98	95
2-methyl phenanthrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	4	10	91	100	96
3-methyl phenanthrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	4	16	102	90	96
9-methyl phenanthrene	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	3	15	99	94	97
Pesticides															
alachlor	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	88	76	82
aldrin	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	107	86	97
atrazine	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	94	125	110
bendiocarb	no	<DL	<DL	--	<DL	<DL	<DL	2	2	4	0	--	65	86	76
carbaryl	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	85	94	90
carbofuran	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	72	104	88
alpha-chlordane	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	1	4	97	83	90
gamma-chlordane	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	1	10	97	83	90
chlorothalonil	no	<DL	<DL	--	<DL	<DL	<DL	0.4	0.4	4	1	13	122	137	130
chlorpyrifos	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	2	10	96	95	96
cyanazine	no	<DL	<DL	--	<DL	<DL	<DL	1	1	4	0	--	104	87	96
cypermethrin	no	<DL	<DL	--	<DL	<DL	<DL	2	2	4	0	--	74	104	89
4,4'-DDD	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	82	75	79

	Blanks									Duplicates			Matrix Spike Recoveries		
Compound	Blank Correct.[a]	Blank Correct. Mass (ng)	Blank Correct. Conc. (ng/m3)	Change in Median (%)[b]	Field Blank Max. Mass (ng)[c]	Batch Blank Max. Mass (ng)[d]	Matrix Blank Max. Mass (ng)[e]	MRL (ng/m3)[f]	Max.-based MRL (ng/m3)[g]	No. of Dup. Pairs	No. of Det. Dup. Pairs[h]	Mean Percent Diff. (%)	Matrix Spike Recov. 1 (%)	Matrix Spike Recov. 2 (%)	Ave. Matrix Spike Recov. (%)
4,4'-DDE[i]	no	<DL	<DL	--	<DL	7.8	<DL	0.3	0.6	4	0	--	99	86	93
4,4'-DDT[i]	no	<DL	<DL	--	<DL	11	<DL	0.3	0.9	4	1	32	69	69	69
diazinon	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	92	85	89
dichlorvos	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	91	109	100
dicofol	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	70	88	79
dieldrin	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	100	82	91
endrin	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	76	78	77
ethyl parathion	no	<DL	<DL	--	<DL	<DL	<DL	2	2	4	0	--	58	81	70
heptachlor	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	95	86	91
HPTE	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	75	62	69
lindane	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	101	84	93
malathion	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	1	18	73	107	90
methoxychlor	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	68	76	72
methyl parathion	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	57	86	72
metolachlor	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	84	76	80
nitrofen	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	55	70	63
pentachlorophenol[i]	no	<DL	<DL	--	70	<DL	<DL	0.8	6	1	1	4	76	88	82
cis-permethrin	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	0	--	99	96	98
trans-permethrin	no	<DL	<DL	--	<DL	<DL	<DL	0.6	0.6	4	0	--	77	100	89
piperonyl butoxide	no	<DL	<DL	--	<DL	<DL	<DL	0.3	0.3	4	1	5	52	75	64
o-phenyl phenol	no	<DL	<DL	--	3.6	<DL	<DL	0.3	0.3	4	4	23	76	80	78
prometon	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	61	64	63
propoxur	no	<DL	<DL	--	<DL	<DL	<DL	1	1	4	0	--	61	71	66
simazine	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	88	117	103
trifluralin	no	<DL	<DL	--	<DL	<DL	<DL	0.4	0.4	4	0	--	52	53	53
Phenols and Miscellaneous															
3-biphenylol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	52	69	61
bisphenol A	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	81	78	80
bisphenol B	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	60	56	58
2-sec-butylphenol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	67	62	65
4-sec-butylphenol	no	<DL	<DL	--	<DL	<DL	<DL	2	2	1	0	--	81	64	72
4-tert-butylphenol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	1	5	70	57	64
4-cumylphenol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	51	61	56
2,3-dibromo-1-propanol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	--	--	--

	Blanks									Duplicates			Matrix Spike Recoveries		
Compound	Blank Correct.[a]	Blank Correct. Mass (ng)	Blank Correct. Conc. (ng/m3)	Change in Median (%)[b]	Field Blank Max. Mass (ng)[c]	Batch Blank Max. Mass (ng)[d]	Matrix Blank Max. Mass (ng)[e]	MRL (ng/m3)[f]	Max.-based MRL (ng/m3)[g]	No. of Dup. Pairs	No. of Det. Dup. Pairs[h]	Mean Percent Diff. (%)	Matrix Spike Recov. 1 (%)	Matrix Spike Recov. 2 (%)	Ave. Matrix Spike Recov. (%)
2,4-dichlorophenol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	75	60	68
3,4-dichlorophenol	no	<DL	<DL	--	<DL	<DL	<DL	4	4	1	0	--	88	90	89
2,4-dihydroxybenzophenone[i]	no	<DL	<DL	--	<DL	13	<DL	0.8	1	1	0	--	92	66	79
2-ethylhexyl 4-hydroxybenzoate	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	70	72	71
3-hydroxybenzophenone	no	<DL	<DL	--	<DL	<DL	<DL	1	1	1	0	--	85	107	96
4-hydroxybenzophenone	no	<DL	<DL	--	<DL	<DL	<DL	2	2	1	0	--	--	--	--
4,4'-methylenediphenol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	43	124	83
4-nitrophenol[i]	no	<DL	<DL	--	44	<DL	<DL	0.8	4	1	1	30	102	87	95
4-nitrotoluene	no	<DL	<DL	--	<DL	<DL	<DL	0.7	0.7	4	0	--	74	77	76
p-pentylphenol	no	<DL	<DL	--	<DL	<DL	<DL	0.8	0.8	1	0	--	78	69	74
p-phenylphenol	no	<DL	<DL	--	<DL	<DL	<DL	1	1	1	0	--	48	73	60

-- indicates not applicable or not available.

<DL indicates values below analytical detection limit of the laboratory.

[a] Concentrations subject to blank correction if the median mass of all of the blanks is significantly different from zero.

[b] Percent change in the median reported value (if reported) due to blank correction.

[c] Maximum mass detected in field blanks (n=4 neutrals, 3 phenols).

[d] Maximum mass detected in sampler cartridge batch blanks (n=4).

[e] Maximum mass detected in matrix blanks (n=6 neutrals, 5 phenols).

[f] MRL = method reporting limit (defined as the maximum of the analytical detection limit and the 90th percentile of the blanks).

[g] A conservative estimate of the MRL based on maximum detected mass in all blanks (field, batch and matrix). Assumes a median sample volume across all compounds of 12 m^3.

[h] Number of unqualified (non-flagged) duplicate pairs with reported values.

[i] Indicates less certainty about reported values due to at least one blank exceeding the median of field samples.

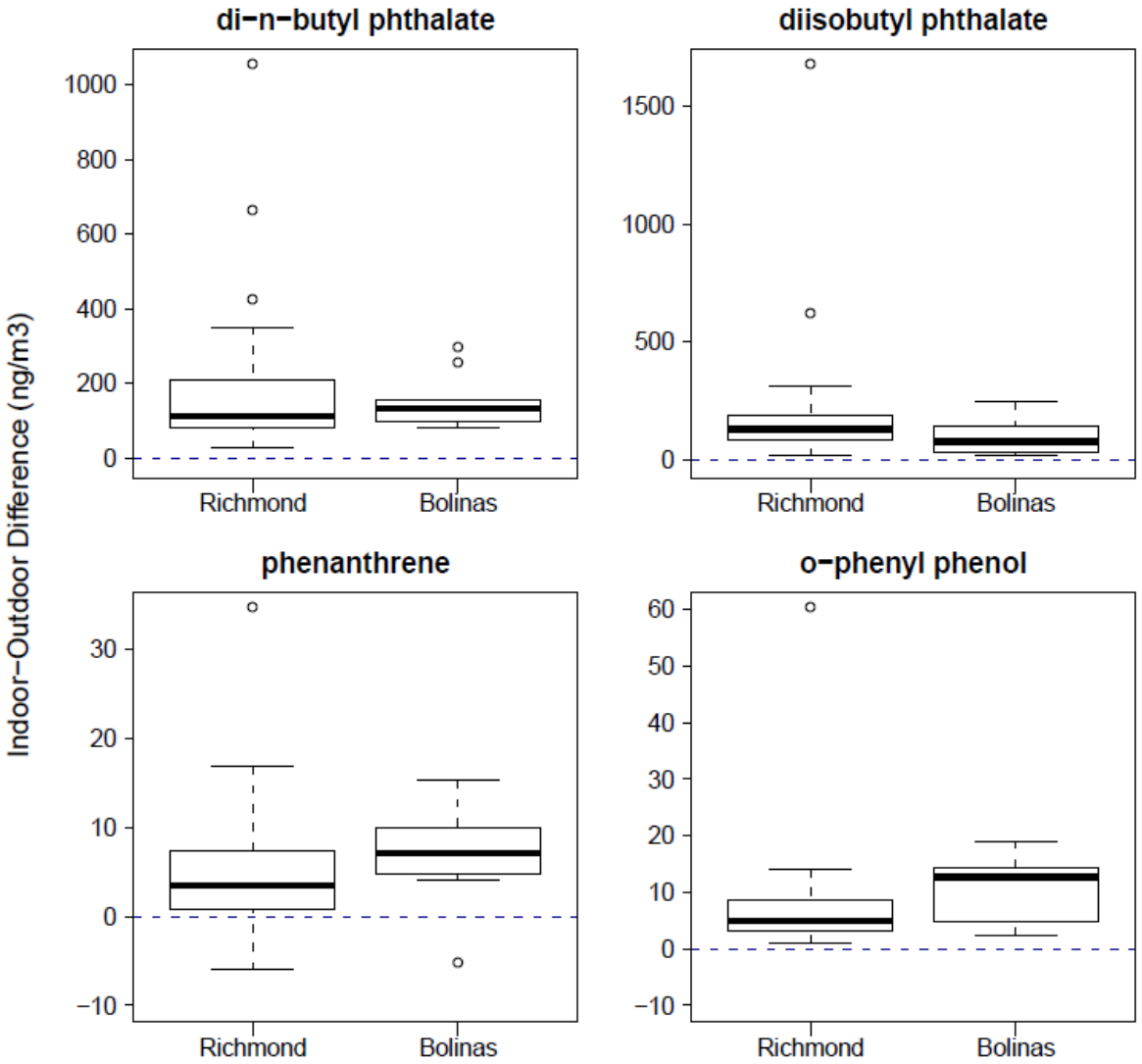


Figure S1 Distribution of indoor-outdoor concentration differences for selected chemicals (concentrations in ng/m^3). Paired indoor-outdoor concentration differences illustrate the predominance of indoor sources for DBP, DIBP, and oPP, and the greater influence of outdoor sources on indoor levels for phenanthrene in Richmond vs. Bolinas, since only phenanthrene has negative differences. The smaller differences between indoor and outdoor concentrations for oPPh and phenanthrene in Richmond reflect higher outdoor concentrations there. These four chemicals were selected to illustrate primarily indoor vs. mixed source pollutants. Medians include estimated and not detected values. All medians for the drawn distributions are significantly different from zero. Indoor-outdoor differences were calculated for all sample pairs and compounds; however, selected chemicals are presented. For non-detects, the sample-specific MRL was used in the difference calculations. Wilcoxon rank sum tests were used to identify compounds with indoor-outdoor concentration differences significantly different from zero.

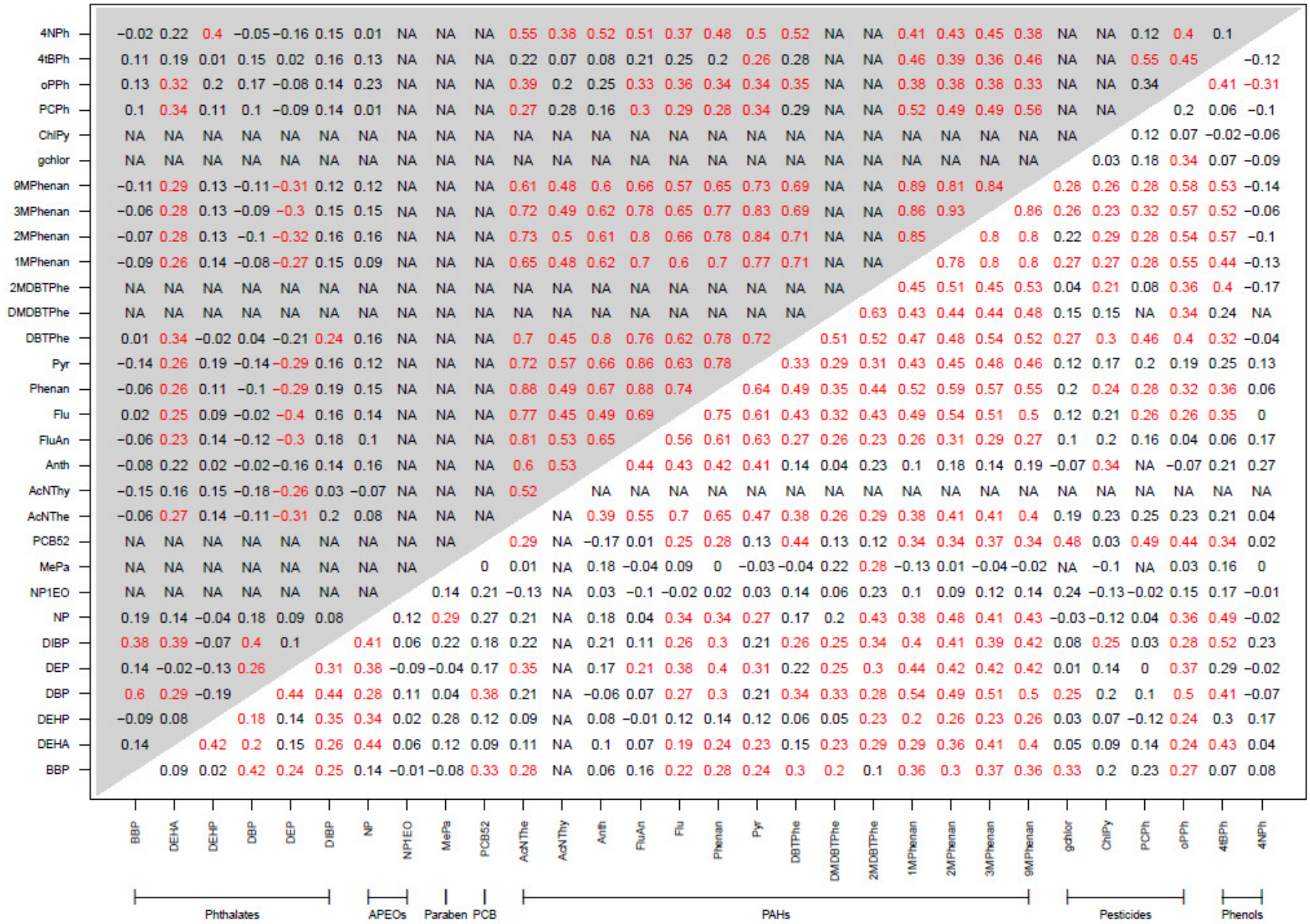
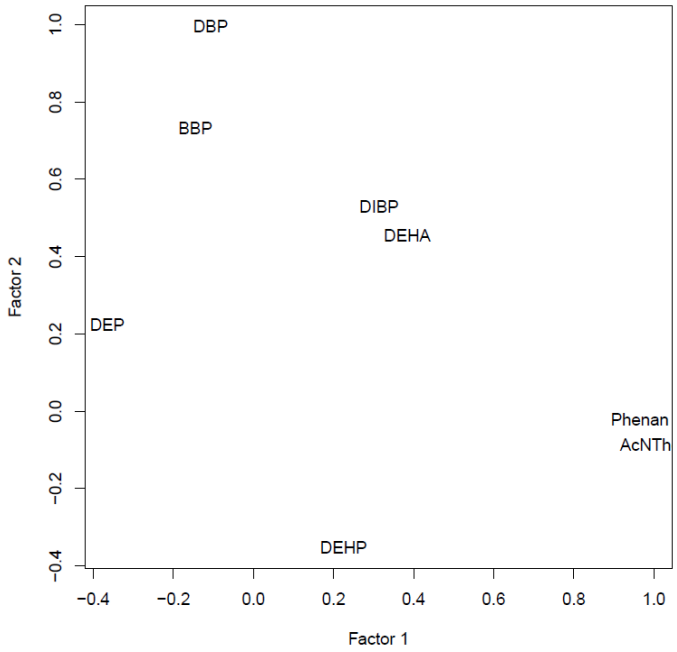
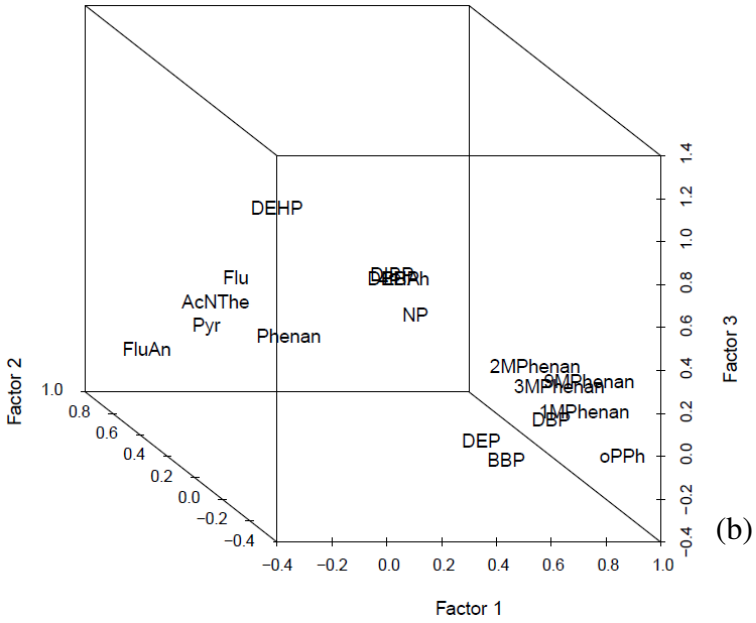


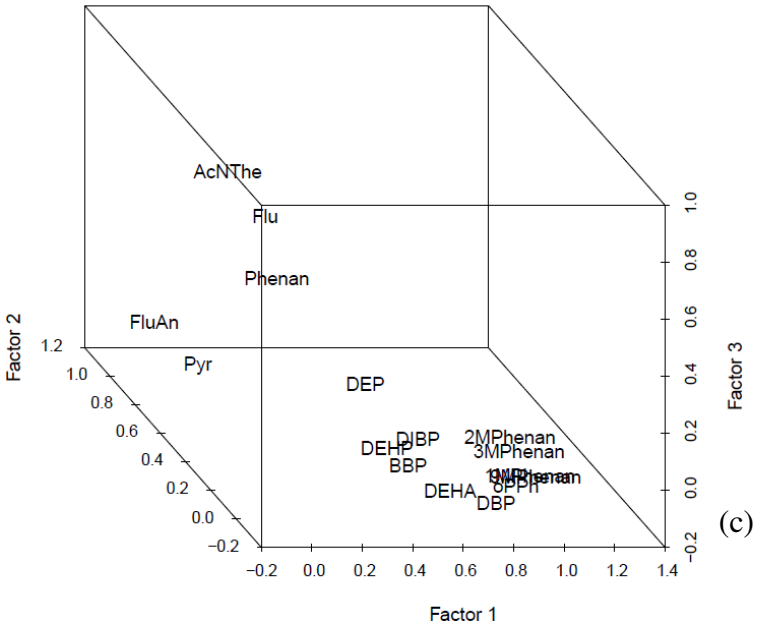
Figure S2 – Kendall's tau correlations between chemicals. Kendall's tau correlation estimates are shown for all pairs of chemicals in outdoor air (shaded) and indoor air (not shaded). Statistically significant correlations ($p<0.05$) are indicated in red. Correlations were estimated for chemicals if >30% of the values were estimated or above MRL. Chemicals are ordered by chemical group (phthalates, APEOs (alkylphenols), parabens, PCBs, PAHs, pesticides, phenols; as in the tables). Tables include key to chemical abbreviations.



(a)



(b)



(c)

Figures S3a-c – Factor loadings for chemicals with 100% detects. Figure S3a shows loadings for 2 factors for chemicals in outdoor air. Figure S3b shows loadings for 3 factors for chemicals detected in indoor air in 31 homes with both phenol and neutral chemicals reported (DEHA, DIBP, and 4-t-butylphenol are overlapping at ~ 0.6 on Factor 3). Figure S3c shows loadings for 3 factors for neutrals analytes in indoor air in 50 homes.

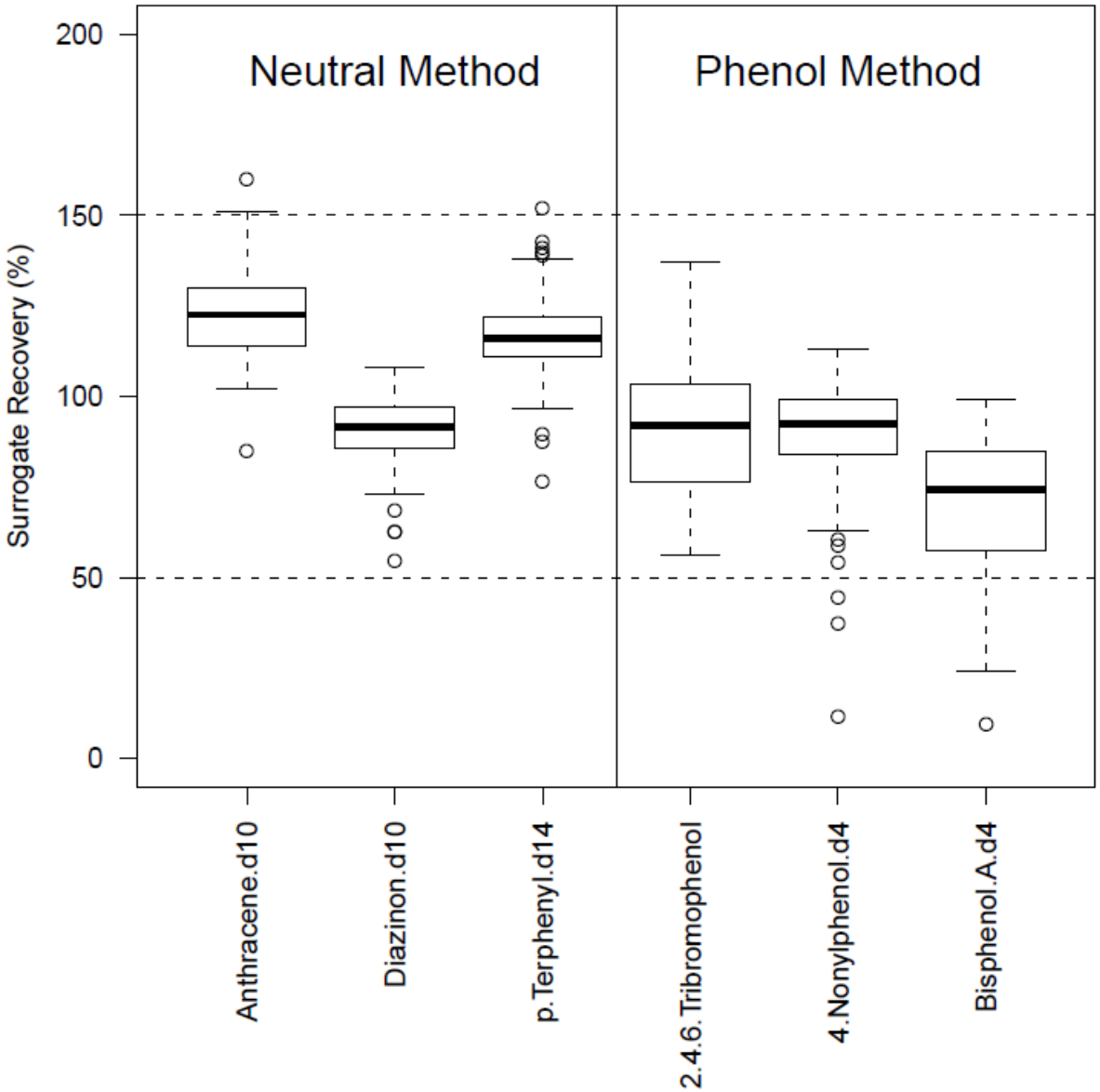


Figure S4 – Surrogate recovery distributions for three surrogates for each analytical method. Recovery of diazinon-d10 was acceptable (within 50-150% acceptance range) in all samples (114/114), recovery of anthracene-d10 was above 150% for 2/114 samples, recovery of p-terphenyl-d14 was above 150% in 1/114 samples, recovery of 2,4,6-tribromophenol was acceptable in all samples (75/75), recovery of 4-nonylphenol-d4 was below 50% in 3/75 samples, and recovery of bisphenol A-d4 was below 50% in 8/75 samples.