



Supplementary File

Table S1. Distribution (%) of antibiotic exposure, household cleaning products use and selected covariates at 3–4 months, 12 months and both time points; compared to the entire CHILD cohort at 3 sites (Edmonton, Winnipeg, Vancouver).

Column percentages	3–4 Month Sample % n=1,429	12 Month Sample % n=1,728	Persistent Sample** % n=653	CHILD Cohort at 3 Sites % n=2,150
Any antibiotics*				
No	51	50	52	50
Yes	49	50	48	50
Household cleaning products use				
Lower (below average)	53	54	54	53
Higher (above average)	47	46	46	47
Birth method				
Vaginal	78	75	77	76
Caesarean	22	25	23	24
Breastfeeding				
No	18	14	16	15
Yes	82	86	84	85
Infant sex				
Male	54	52	56	52
Female	46	48	44	48
Smoke exposure				
No	82	83	83	82
Yes	18	17	16	18

Notes: *Any antibiotics: Exposure to maternal intrapartum antibiotic or direct infant antibiotic by 3 Months. **Persistent sample: Subset of infants used to identify *C. difficile* colonization at both 3–4 months and 12 months (persistent colonization).

Table S2. Sensitivity analysis for antimicrobial exposure and *C. difficile* colonization at 12 months of age.

Antimicrobial Exposure* (ref=NALC)	Adjusted OR† (95% CI)	p value	Adjusted OR‡ (95% CI)	p value
AALC	1.35 (1.00-1.83)	0.043	1.41 (1.02-1.94)	0.034
NAHC	1.12 (0.84-1.49)	0.438	1.06 (0.78-1.44)	0.694
AAHC	1.35 (0.99-1.85)	0.057	1.33 (0.95-1.88)	0.095

Notes: *Antimicrobial exposure by 3 months (NALC: no antibiotics and lower usage of cleaning products, AALC: any antibiotics and lower usage of cleaning products, NAHC: no antibiotics and higher usage of cleaning products, AAHC: any antibiotics and higher usage of cleaning products); †Adjusted for antibiotics after 3 months and variables in final model, ‡ Excluding any infant that

received antibiotics after 3 months and adjusted for variables in final model; OR: odds ratio; CI: confidence interval; statistically significant *p*-values displayed in **bold**.

Table S3. Population characteristics and *C. difficile* colonization at 3–4 months and 12 months.

Row percentages	<i>C. difficile</i> Colonization at 3–4 Months Total <i>n</i> =1429			<i>C. difficile</i> Colonization at 12 Months Total <i>n</i> =1728		
	Total ^a	<i>C. difficile</i> Yes, <i>n</i> (%)	<i>p</i> value (X ² exact)	Total ^a	<i>C. difficile</i> Yes, <i>n</i> (%)	<i>p</i> value (X ² exact)
Antimicrobial exposure*						
NALC	406	97 (24%)	<0.001	488	198 (41%)	0.009
AALC	346	105 (30%)		447	223 (50%)	
NAHC	318	103 (32%)		369	164 (44%)	
AAHC	359	140 (39%)		424	212 (50%)	
Maternal age						
18 – 29	503	195 (39%)	<0.001	576	268 (47%)	0.916
30 – 39	874	238 (27%)		1,094	501 (46%)	
≥40	52	12 (23%)		58	28 (48%)	
Maternal race						
Caucasian	1,072	346 (32%)	0.162	1315	583 (44%)	<0.001
Asian	203	52 (26%)		248	147 (59%)	
Other	141	42 (30%)		156	63 (40%)	
Family income						
<50,000	199	71 (36%)	0.201	212	85 (40%)	0.208
50,000 – 99,999	487	158 (32%)		597	271 (45%)	
≥100,000	516	160 (28%)		730	347 (48%)	
Prefer not to answer	130	39 (30%)		147	73 (50%)	
Birth method						
Vaginal	1,096	314 (29%)	0.002	1297	584 (45%)	0.248
CS-elective	134	50 (37%)		175	86 (49%)	
CS-emergency	194	77 (40%)		252	126 (50%)	
Gestational age						
<39 weeks	372	115 (31%)	1.000	455	226 (50%)	0.070
≥39 weeks	1,057	326 (31%)		1,267	566 (45%)	
Infant Sex						
Male	766	255 (33%)	0.067	896	378 (42%)	0.001
Female	663	190 (29%)		832	419 (50%)	
Breastfeeding at 3 Months						
Exclusive	791	182 (23%)	<0.001	1072	488 (46%)	0.717
Mixed	384	142 (37%)		420	201 (48%)	
Formula	251	121 (48%)		435	108 (46%)	
Furry pet						
No	777	217 (28%)	0.005	936	443 (47%)	0.244
Yes	648	226 (35%)		787	350 (44%)	
Older sibling						
No	712	240 (34%)	0.034	884	462 (52%)	<0.001
Yes	712	202 (28%)		839	333 (40%)	
Smoke exposure						
No	1,160	332 (29%)	<0.001	1,422	657 (46%)	0.697
Yes	248	103 (42%)		285	128 (45%)	

Notes: *Antimicrobial exposure by 3 months (NALC: no antibiotics and lower usage of cleaning products, AALC: any antibiotics and lower usage of cleaning products, NAHC: no antibiotics and higher usage of cleaning products, AAHC: any antibiotics and higher usage of cleaning products);
 *Total may not add up due to missing data; *p*-value calculated using Fisher's (X^2) exact test and displayed in **bold** when statistically significant.

Table S4. Individual adjustment for covariates on antimicrobial exposure and *C. difficile* colonization.

		<i>C. difficile</i> Colonization (3–4 months)		<i>C. difficile</i> Colonization (12 months)		Persistent <i>C. difficile</i> Colonization	
		Odds Ratio (95% CI)	<i>p</i> value	Odds Ratio (95% CI)	<i>p</i> value	Odds Ratio (95% CI)	<i>p</i> value
CRUDE OR							
	Antimicrobial Exposure* (Ref=NALC)						
	AALC	1.38 (1.00-1.91)	0.047	1.45 (1.12-1.88)	0.004	1.75 (1.06-2.89)	0.028
	NAHC	1.52 (1.10-2.11)	0.011	1.17 (0.89-1.54)	0.256	1.59 (0.95-2.67)	0.075
	AAHC	2.03 (1.49-2.78)	<0.001	1.46 (1.12-1.90)	0.004	3.20 (1.96-5.23)	<0.001
ADJUSTED FOR							
Maternal age							
	AALC	1.45 (1.04-2.01)	0.026	1.45 (1.12-1.88)	0.004	1.83 (1.10-3.03)	0.019
	NAHC	1.47 (1.05-2.04)	0.022	1.17 (0.89-1.54)	0.256	1.60 (0.95-2.69)	0.073
	AAHC	2.11 (1.54-2.89)	<0.001	1.46 (1.12-1.90)	0.004	3.36 (2.05-5.52)	<0.001
Maternal race							
	AALC	1.36 (0.98-1.90)	0.060	1.42 (1.09-1.85)	0.008	1.78 (1.07-2.95)	0.025
	NAHC	1.47 (1.05-2.05)	0.023	1.18 (0.89-1.56)	0.227	1.55 (0.92-2.63)	0.099
	AAHC	1.95 (1.41-2.69)	<0.001	1.48 (1.13-1.93)	0.003	3.26 (1.99-5.36)	<0.001
Birth method							
	AALC	1.21 (0.85-1.71)	0.284	1.47 (1.10-1.96)	0.008	1.57 (0.91-2.69)	0.101
	NAHC	1.53 (1.10-2.12)	0.011	1.17 (0.89-1.54)	0.242	1.61 (0.96-2.69)	0.070
	AAHC	1.67 (1.17-2.40)	0.005	1.49 (1.10-2.01)	0.008	2.76 (1.56-4.87)	<0.001
Gestational age							
	AALC	1.38 (1.00-1.92)	0.048	1.40 (1.08-1.83)	0.009	1.70 (1.03-2.82)	0.038
	NAHC	1.53 (1.10-2.12)	0.011	1.16 (0.88-1.52)	0.286	1.59 (0.95-2.66)	0.077
	AAHC	2.02 (1.47-2.77)	<0.001	1.41 (1.08-1.84)	0.010	3.04 (1.86-4.98)	<0.001
Infant sex							
	AALC	1.37 (0.99-1.89)	0.055	1.47 (1.14-1.91)	0.003	1.77 (1.07-2.93)	0.025
	NAHC	1.52 (1.10-2.12)	0.011	1.17 (0.89-1.54)	0.249	1.59 (0.95-2.67)	0.074
	AAHC	2.01 (1.47-2.75)	<0.001	1.47 (1.13-1.92)	0.004	3.24 (1.98-5.24)	<0.001
Breastfeeding at 3 Months							
	AALC	1.34 (0.96-1.87)	0.076	1.46 (1.12-1.89)	0.004	1.59 (0.95-2.65)	0.076
	NAHC	1.29 (0.92-1.80)	0.138	1.17 (0.88-1.54)	0.265	1.36 (0.80-2.31)	0.252
	AAHC	1.76 (1.28-2.43)	<0.001	1.45 (1.11-1.89)	0.005	2.79 (1.69-4.61)	<0.001
Furry pet							
	AALC	1.36 (0.98-1.88)	0.061	1.47 (1.13-1.90)	0.004	1.73 (1.04-2.86)	0.032

	NAHC	1.45 (1.04-2.02)	0.026	1.19 (0.90-1.58)	0.197	1.53 (0.91-2.58)	0.104
	AAHC	1.90 (1.39-2.61)	<0.001	1.49 (1.14-1.95)	0.003	3.05 (1.86-5.01)	<0.001
Older sibling							
	AALC	1.34 (0.97-1.86)	0.073	1.38 (1.06-1.79)	0.015	1.52 (0.91-2.55)	0.104
	NAHC	1.54 (1.11-2.15)	0.009	1.18 (0.90-1.56)	0.224	1.72 (1.01-2.91)	0.043
	AAHC	1.95 (1.43-2.67)	<0.001	1.38 (1.06-1.80)	0.016	3.01 (1.82-4.96)	<0.001
Smoke exposure							
	AALC	1.37 (0.99-1.90)	0.055	1.44 (1.11-1.87)	0.006	1.73 (1.04-2.88)	0.033
	NAHC	1.44 (1.03-2.01)	0.029	1.15 (0.87-1.52)	0.295	1.45 (0.85-2.46)	0.165
	AAHC	1.90 (1.38-2.61)	<0.001	1.46 (1.12-1.90)	0.005	3.15 (1.92-2.45)	<0.001

Notes: *Antimicrobial exposure by 3 months (NALC: no antibiotics and lower usage of cleaning products, AALC: any antibiotics and lower usage of cleaning products, NAHC: no antibiotics and higher usage of cleaning products, AAHC: any antibiotics and higher usage of cleaning products); OR: odds ratio; CI: confidence interval; *p*-value calculated using logistic regression and displayed in **bold** when statistically significant.

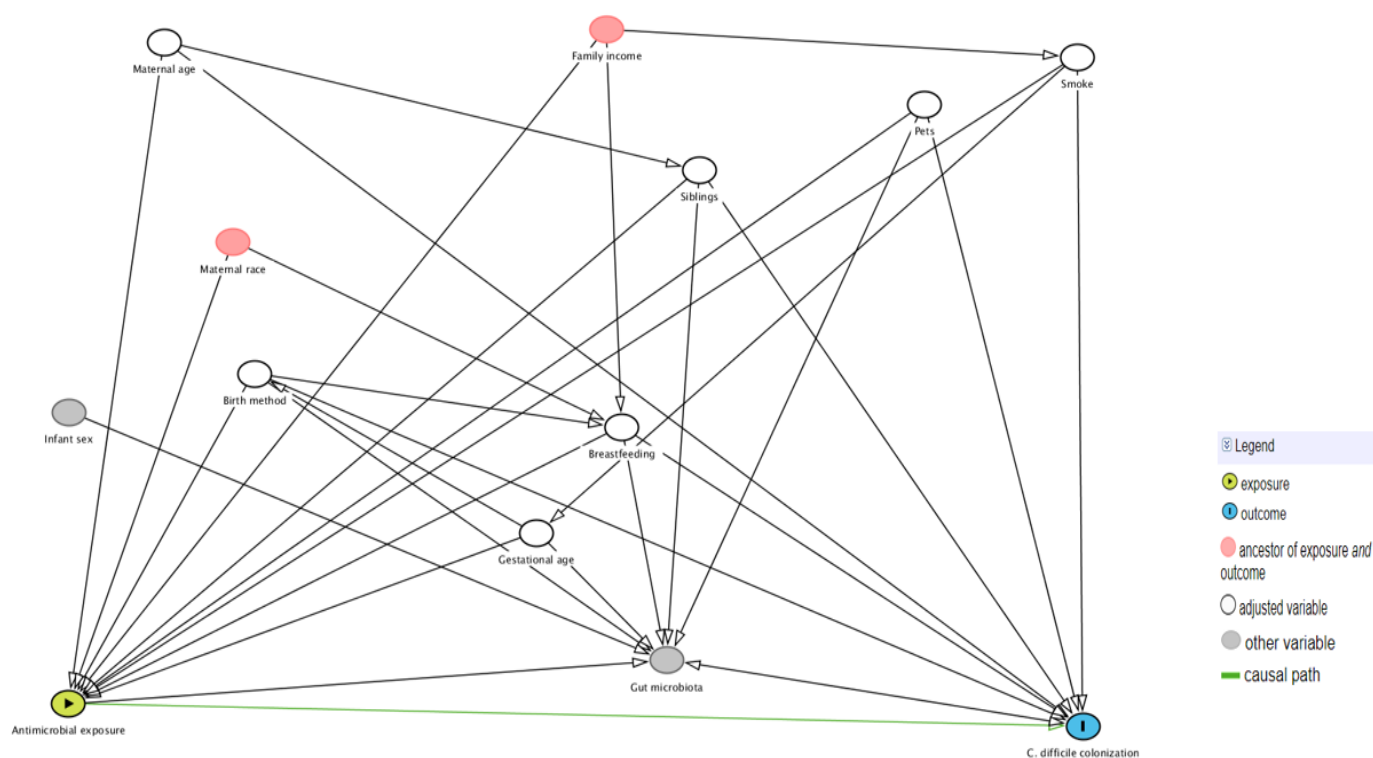


Figure S1. Directed Acyclic Graph (DAG) for antimicrobial exposure and *C. difficile* colonization at 3–4 Months (minimal sufficient adjustment sets for estimating the total effect of exposure on outcome: Maternal age, Birth method, Gestational age, Breastfeeding, Older sibling, Furry pet, Smoke exposure).

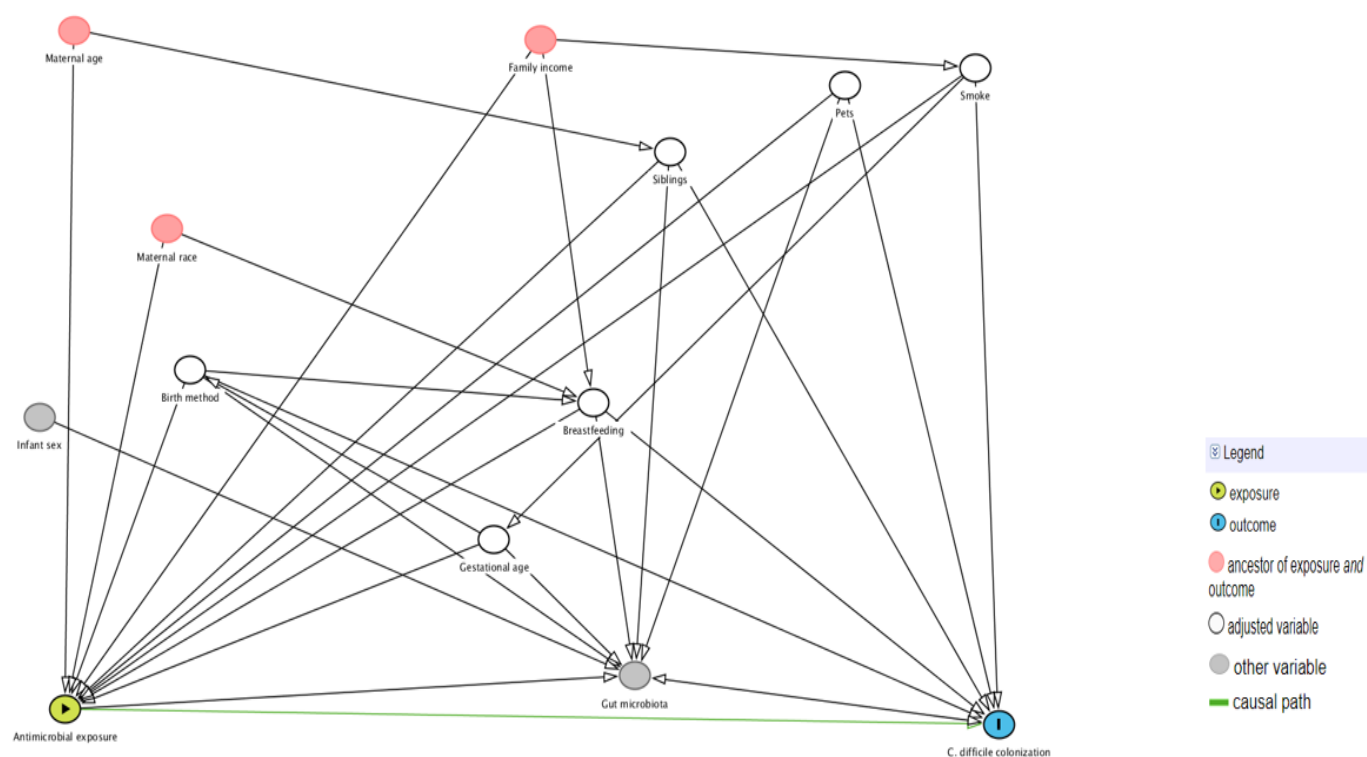


Figure S2. Directed Acyclic Graph (DAG) for antimicrobial exposure and *C. difficile* colonization at 12 Months (minimal sufficient adjustment sets for estimating the total effect of exposure on outcome: Birth method, Gestational age, Breastfeeding, Older sibling, Furry pet, Smoke exposure).

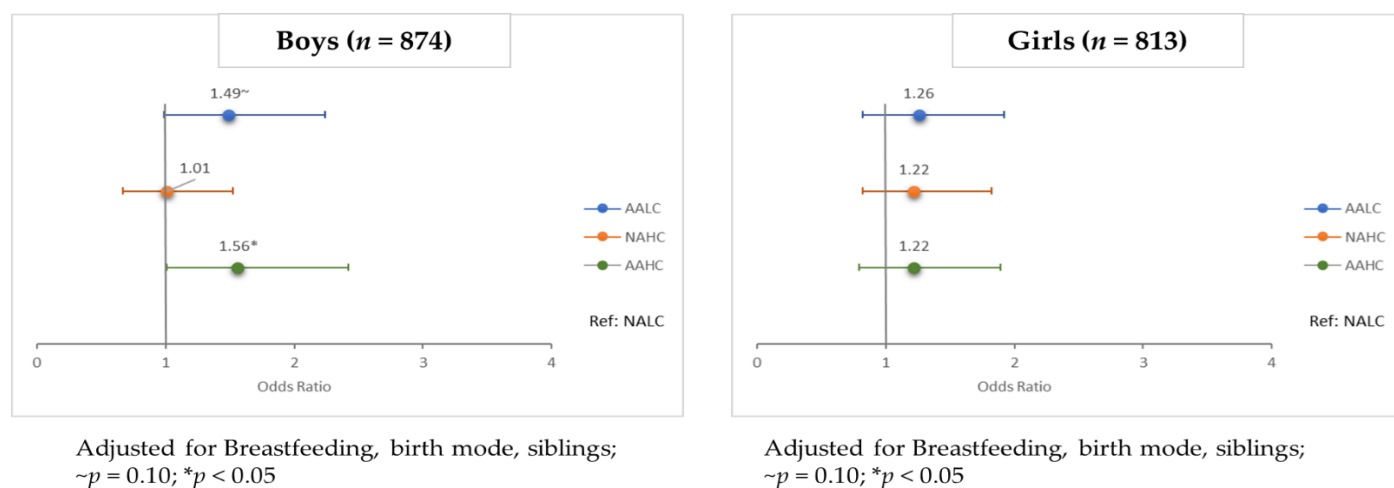


Figure S3. Stratified analysis by infant sex for antimicrobial exposure and *C. difficile* colonization at 12 months.

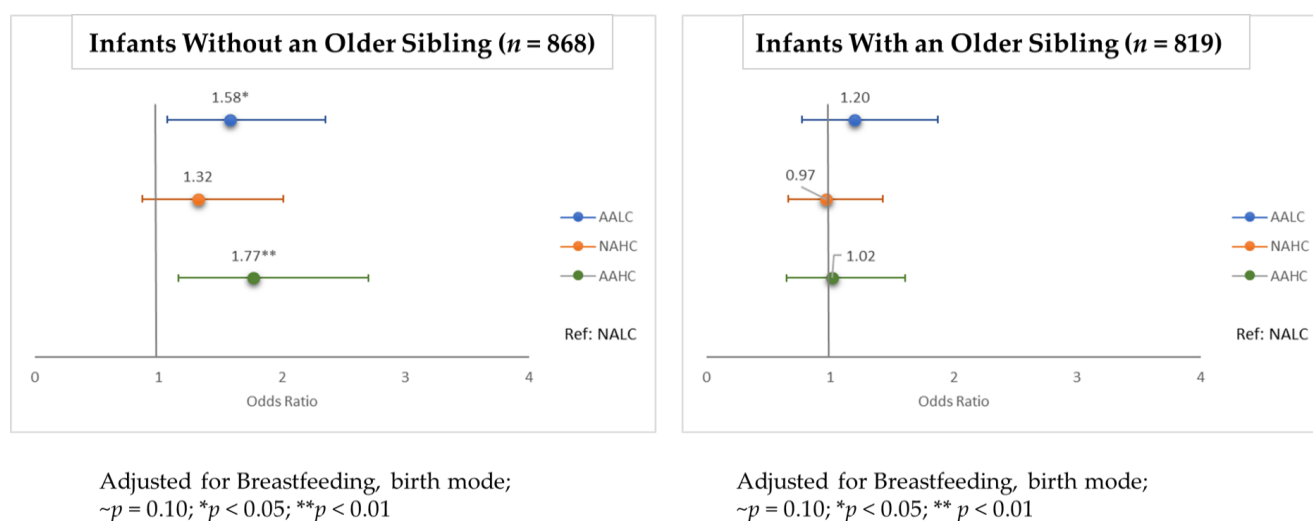


Figure S4. Stratified analysis by older siblingship for antimicrobial exposure and *C. difficile* colonization at 12 months.

50. Which of the following products have been USED in your home since your baby was born?
(Day=daily, Wk=weekly, Mth=monthly, <Mth=less than monthly, No=not used)

Product	Day	Wk	Mth	<Mth	No
50.1 Liquid or solid air freshener:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.2 Spray air freshener:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.3 Plug-in deodorizer/air freshener:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.4 Floor Cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.5 Furniture polish:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.6 Floor polish:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.7 Dusting polish or spray:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.8 Drain cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.9 Hand dishwashing detergent:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.10 Dishwasher detergent:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.11 Bleach:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.12 Multi-surface cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.13 Silver or brass polish:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.14 Disinfectant in bedrooms:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.15 Disinfectant in home in general:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.19 Eco & organic cleaning product:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.20 Glass cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.21 Chemical hand cleaner (e.g., for grease):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.22 Purell-type hand cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.23 Unscented laundry detergent:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.24 Scented laundry detergent:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.25 Fabric softener:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.26 Toilet bowl cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.27 Oven cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.28 Bathroom tile cleaner:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
50.29 Solvents (e.g. nail polish/paint remover):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure S5. Questionnaire on household cleaning products use (Frequency of use score: 0 for never (not used), 1 for less than a month, 2 for monthly, 3 for weekly and 4 for daily).