Supplementary Materials.

Table S1:Participant and household characteristics by indoor smoking and vaping status

Variables	Study Participants															
	Neither smoking nor vaping indoors n=105				Exclusively smoke indoors n=33				Exclusively vape indoors n=10				Smoke and vape indoors n=16			
	N	Mean	Range	SD	N	Mean	Range	SD	N	Mean	Range	SD	N	Mean	Range	SD
Proportion Males	33 (31%)				11 (33%)				3 (30%)				7 (44%)			
Proportion Females	72 (69%)				22 (67%)				7 (70%)				9 (56%)			
Mean adult age (≥ 18 years)	104	57	22-92	16	32	61	25-89	15	10	50	33-69	10	16	56	28-71	11
Smoking status																
Never-smoker	39 (37%)				2* (6%)				2*** (20%)				0			
Ex-smoker	49 (47%)				5** (15%)				6 (60%)				5 (31%)			
Current smoker	17 (16%)				26 (79%)				2 (20%)				11 (69%)			
Current <5 a day	6 (6%)				4 (12%)				0				2 (12%)			
Current 5-15 a day	9 (9%)				14 (42%)				2 (20%)				3 (19%)			
Current >15 a day	1 (1%)				8 (24%)				0				6 (37%)			
Current (quantity not reported)	1 (1%)				0				0				0			

Respiratory Health																
Emphysema or chronic bronchitis	11 (10%)				2 (6%)				1 (10%)				1 (6%)			
Adults with wheeze or dry cough in ≤ 12 months	38 (36%)				9 (27%)				4 (40%)				5 (31%)			
Seen a doctor in ≤ 12 months for:																
Asthma	26 (25%)				10 (30%)				2 (20%)				5 (31%)			
Allergy	19 (18%)				7 (21%)				2 (20%)				3 (19%)			
Mean household occupancy & household occupancy	105	1.96	1-6	1.15	33	1.45	1-4	0.74	10	2.5	1-4	1.02	16	2.25	1-5	1.1
1- single occupancy	47 (45%)				22 (66%)				2 (20%)				4 (25%)			
2- double occupancy	33 (31%)				8 (24%)				3 (30%)				7 (44%)			
3- triple occupancy	12 (11%)				2 (6%)				3 (30%)				3 (19%)			
4+ multiple occupancy	13 (12%)				1 (3%)				2 (20%)				2 (12%)			
EPC Band																
Band B	5/100 (5%)				4 (12%)				3 (30%)				0			
Band C	89/100 (89%)				23/33 (70%)				6 (60%)				14 (88%)			
Band D	6/100 (6%)				6 (18%)				1 (10%)				2 (12%)			

Households with gas heating	99 (94%)				31 (94%)				10 (100%)				16 (100%)			
Households with electric heating	6 (6%)				2 (6%)				0				0			
Front room window opened at least weekly	81/104 (78%)				27/32 (84%)				8 (80%)				15 (94%)			
Average hours a day spent indoors during week	103	19.34	8-24	3.87	33	20.68	12-24	3.03	10	18.9	12-24	4.51	16	20.75	13-24	2.59
Average hours a day spent indoors during weekend	103	20.20	8-24	3.43	33	21.24	12-24	2.76	10	20.5	15-25	3.43	16	20.38	13-24	2.68

* One of the never-smokers had a partner noted as current smoker

** Two of the ex-smokers had partners who were current smokers; one had a partner who was also an ex-smoker and the smoking status of the other partners were not specified

*** One respondent and their partner were never-smokers but exclusively vaped in the house

Table S2. External sensors with complete values over study period (Dec 2018-Nov 2019).

Variable	N	Mean $PM_{2.5}$ ($\mu g/m^3$)	Range	SD	Distance from 'A' Road (meters)
External annual $PM_{2.5}$ ($\mu g/m^3$) sensor data	5/30	10.52	5.38-28.67	10.16	
Sensor 1		6.05			16
Sensor 2*		28.67			142
Sensor 3		6.94			323
Sensor 4		5.56			600
Sensor 5		5.38			600
DEFRA mean external annual $PM_{2.5}$ ($\mu g/m^3$) for CPIR (2018)	20	7.01	6.27-8.10	0.51	

(Department for Environment Food & Rural Affairs, 2021a.)				
DEFRA mean external annual $PM_{2.5}$ ($\mu g/m^3$) for CPIR (2019) (Department for Environment Food & Rural Affairs, 2021a)	20	6.34	5.74-7.20	0.40
* Sensor was located outside a smoke and vape free home whose indoor annual $PM_{2.5}$ was 1.44 $\mu g/m^3$				

Table S3:Highest mean annual PM2.5 readings per household type

House Identifier	Mean annual $PM_{2.5}$ ($\mu g/m^3$) *	Range	SD	Comment
Smoke and vape free households (n=105)				
9	6.73	0.35-20.55	7.48	A single occupant who is an ex-smoker and lives c100m from an Main road. Atypically, the lowest readings are in the winter (Dec: 0.51 $\mu g/m^3$; Jan: 0.35 $\mu g/m^3$) and highest readings in the summer (Aug: 19.0 $\mu g/m^3$; Sep: 20.55 $\mu g/m^3$).
33	6.92	3.94-9.88	1.75	Multi occupancy with one current smoker; c140m from an Main road. Avoids ventilating and turning on heating because of the cost.
42	7.33	2.26-14.50	3.66	A single occupant who is a never-smoker and lives c600m from an Main road.
Smoking households (n=33)				
132	35.43	22.80-40.38	4.92	A single occupant who smokes 5-15 daily (self-reported) and lives c20m from an Main road.
137	96.38	84.98-114.13	8.32	A single occupant who smokes <5 daily (self-reported) who doesn't open the front room window regularly nor ventilate and lives c. 370m from an Main road. Avoids ventilating and turning on heating because of the cost. This data is an outlier; all individual values from raw data are high. The sensor gave low values up until the date the sensor was installed, which suggests the sensor is reading correctly and data should be included. The mean for the nearest external sensor is 4.8 $\mu g/m^3$.
Vaping households (n=10)				
141	5.67	1.05-8.31	2.31	Multi occupancy with one current smoker, who does not open the front room window regularly. Avoids turning on heating because of the cost. Lives c1640m from an Main road.

House Identifier	Mean annual $PM_{2.5}$ ($\mu g/m^3$) *	Range	SD	Comment
143	4.82	3.10-7.16	1.46	A single occupant who is an ex-smoker. Avoids turning on heating because of the cost. Lives c470m from an Main road.
Smoking and Vaping households (n=16)				
161	19.23	6.74-33.10	9.91	A single occupant who smokes 5-15 daily (self-reported) and lives c30m from an Main road. Avoids ventilating because of the cost.
162	21.06	10.51-30.98	7.95	Multi occupancy with one current smoker, >15 daily (self-reported) and one ex-smoker. Lives c600m from an Main road.

*Mean $PM_{2.5}$ varies from those in Table 4 due to rounding

Supplementary 5. Smoking status and Annual PM2.5 concentrations

Smoking status (self-reported)	N	Mean annual $PM_{2.5}$ ($\mu g/m^3$)	Range	SD
Smoking status and PM2.5 measurements for households who exclusively smoke (n=33)				
Never-smoker[i]	2	4.44	4.30-4.58	0.20
Ex quantity not reported[ii]	1	7.58	N/A	N/A
Ex <5 times per day[iii]	1	0.48	N/A	N/A
Ex >15 times per day[iv]	3	1.46	0.81-1.16	0.85
Current <5 times per day	4	40.54	11.55-96.58	40.54
Current 5-15 times per day[v]	14	13.68	1.03-35.36	11.97
Current >15 times per day[vi]	8	13.24	9.57-23.40	5.30

[I] One respondent stated their partner smoked 5-15 per day

[ii] Respondent stated their partner smoked >15 per day

[iii] Partner's smoking status was not recorded

[iv] One respondent stated their partner smoked 5-15 per day, whilst one partner was stated as an ex-smoker and one partners details was not recorded

[v] Two respondents stated their partners smoked >15 per day

[vi] One respondent stated their partner smoked 5-15 per day

Smoking status and $PM_{2.5}$ measurements for households who smoke and vape (n=16)				
Ex <5 times per day[i]	1	5.94	N/A	N/A
Ex 5-15 times per day[ii]	1	5.14	N/A	N/A

Ex >15 times per day[iii]	3	8.26	1.79-13.23	5.87
Current <5 times per day	2	12.68	6.16-19.19	9.22
Current 5-15 times per day	3	10.99	5.17-18.44	6.78
Current >15 times per day[v]	6	8.77	1.96-21.01	7.83

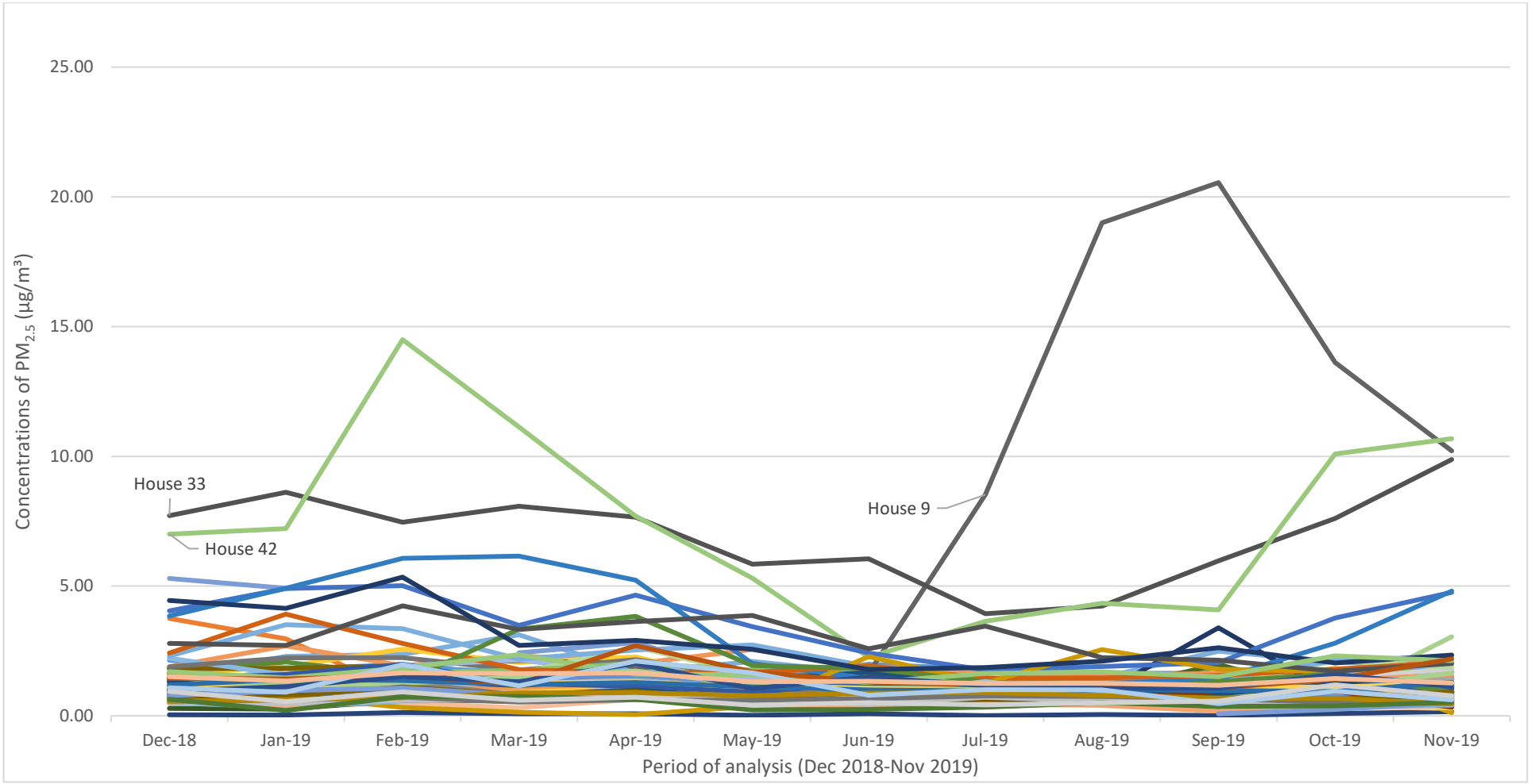
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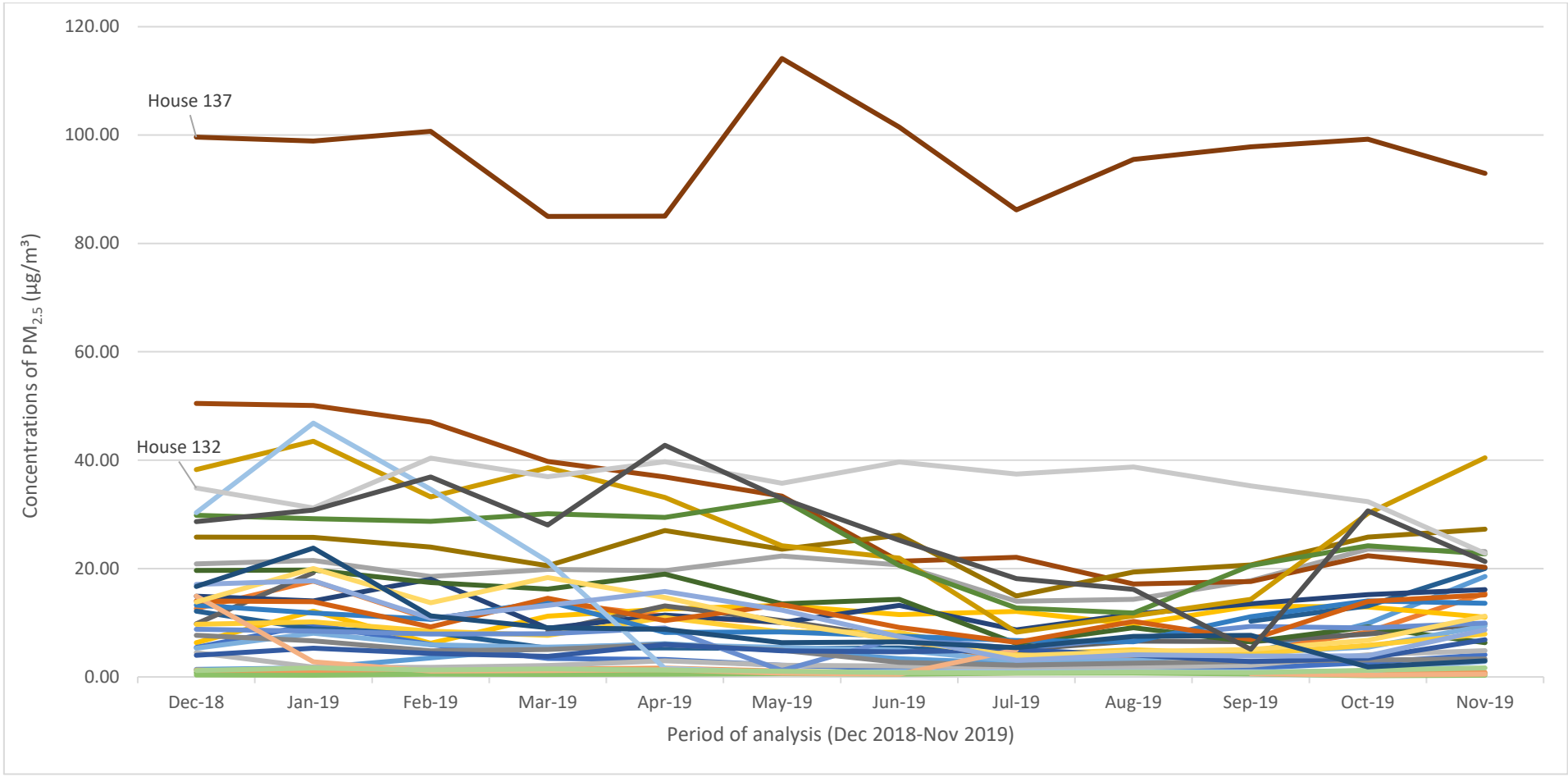
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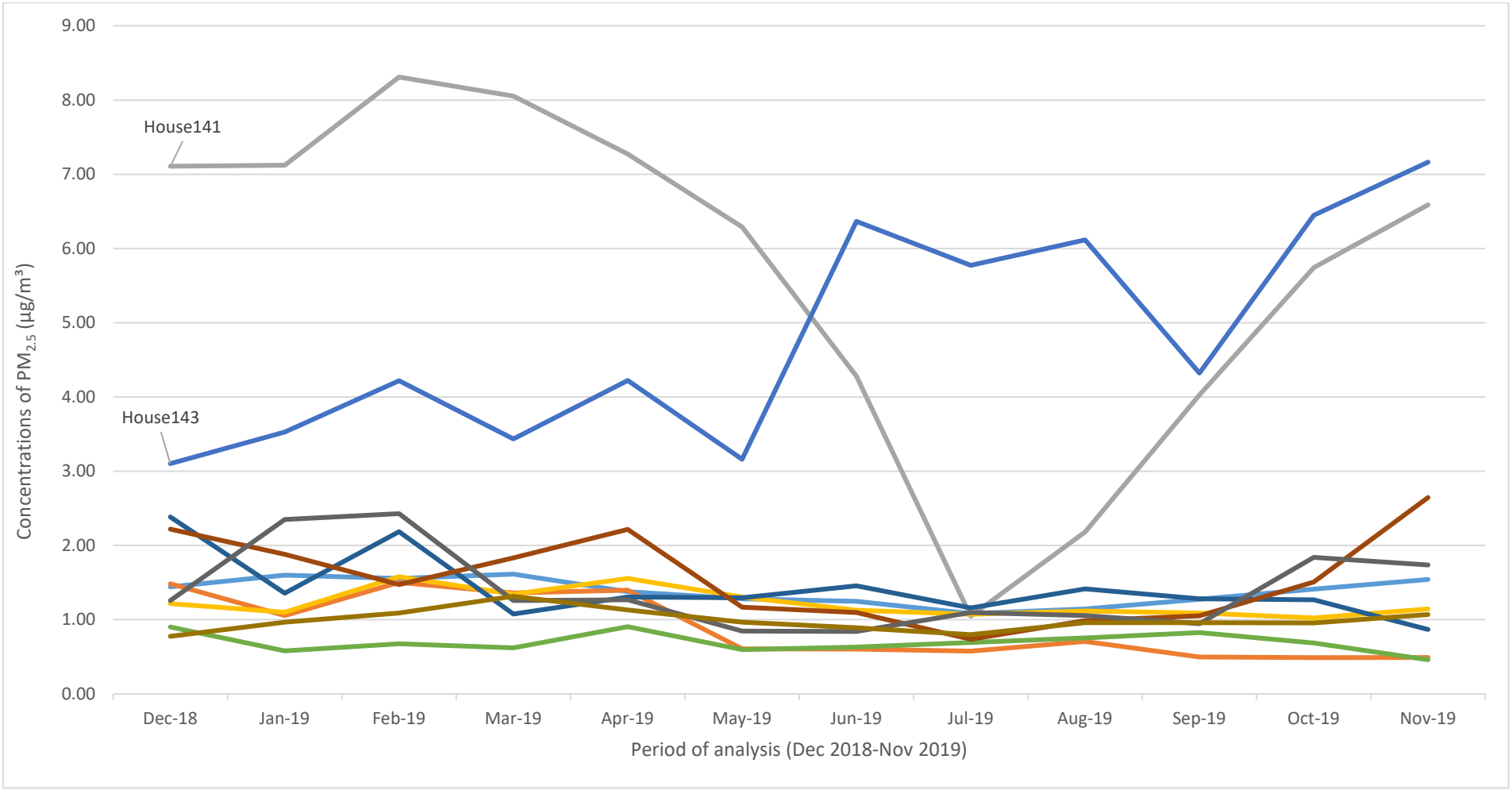
Figure S1. Indoor air monitoring overtime.



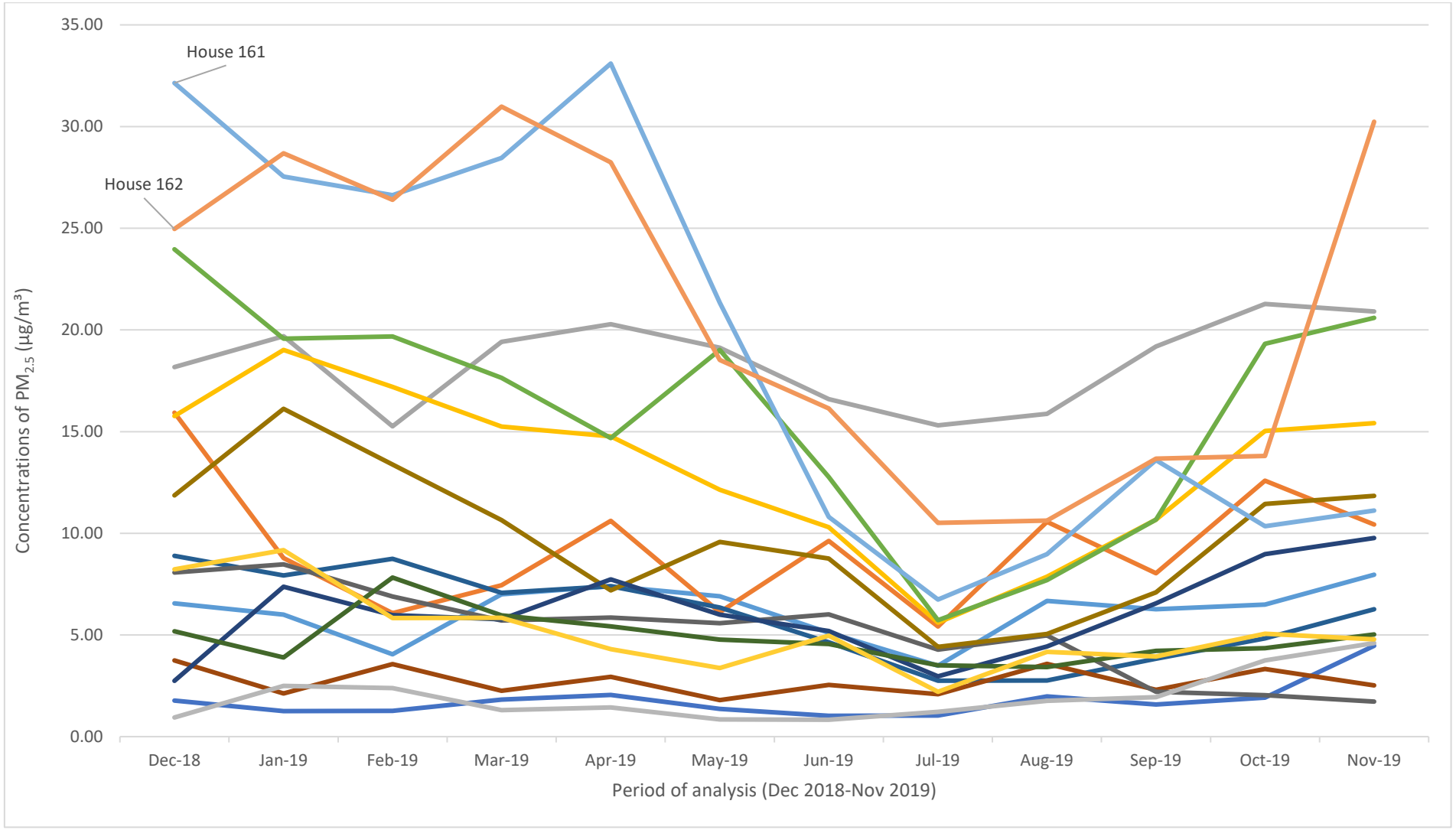
A Monthly $PM_{2.5}$ values in households who are smoke and vape free (Dec 2018-Nov 2019)



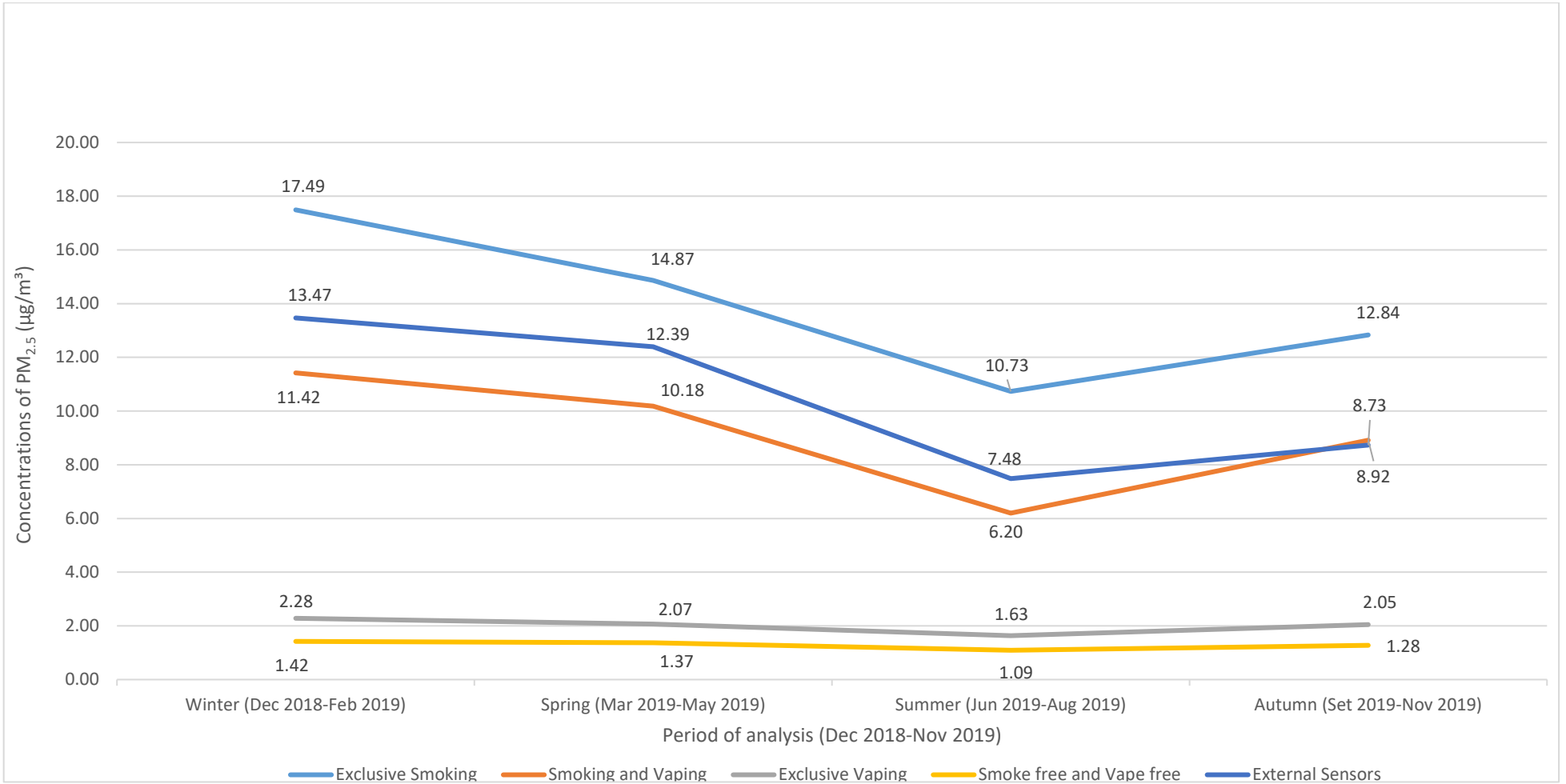
B Monthly $PM_{2.5}$ values in households who exclusively smoke (Dec 2018-Nov 2019)



C Monthly $PM_{2.5}$ values in households who exclusively vape (Dec 2018-Nov 2019).



D Monthly $PM_{2.5}$ values in households who smoke and vape (Dec 2018-Nov 2019)



E Comparison of average seasonal $PM_{2.5}$ values between households with different smoking and vaping status (Dec 2018-Nov 2019)

Supplementary 4. Highest mean annual $PM_{2.5}$ readings per household type

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Smoke and vape free households (n=105)				
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Current 5-15 times per day	3	10.99	5.17-18.44	6.78
Current >15 times per day[v]	6	8.77	1.96-21.01	7.83

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