Table A1 Parameter values used in the present exposure assessment.

Table A2 Genus composition of sampling sites during the three years of the COVID-19.

Table A3 Specific environmental conditions for sampling at each site. Temperature: TEM(°C), humidity level: HUM (%), light intensity: LI (Lux), Wind speed: WS (m/s). 2019: A, 2020: B, 2021: C. North Door (ND), West Door (WD), North playground (NP).

Table A1 Parameter values used in the present exposure assessment.

Parameters	Values
Inhalation rate (IR) (m^3/d)	19.02 (Adult male), 14.17 (Adult female)
Exposure time (ET) (yr)	24
Exposure frequency (EF) (d/yr)	180
Average body weight (BW) (kg)	66.2 (Adult male), 57.3 (Adult female)
Average time (AT) (d)	73.64×365 (Adult male), 79.43×365 (Adult female)
Exposure skin area (SA) (m^2)	0.215
Skin adherence factor (SL) (kg/(m^3/d))	0.07
Dermal absorption factor (ABS)	0.001

Table A2 Genus composition of sampling sites during the three years of the COVID-19.

genus	19ND	19NP	19WD	20ND	20NP	20WD	21ND	21NP	21WD
Pseudomonas	10.41%	9.01%	10.38%	69.38%	49.29%	30.06%	11.42%	13.70%	19.16%
Micrococcaceae	46.51%	19.35%	29.82%	0.86%	1.00%	6.10%	18.38%	11.49%	19.97%
Bacillus	0.12%	0.12%	0.06%	0.72%	2.55%	3.99%	8.31%	26.68%	19.23%
Pantoea	0.01%	0.05%	0.04%	2.15%	5.43%	2.61%	7.54%	7.79%	21.04%
Sphingomonas	7.99%	15.98%	18.93%	0.09%	0.06%	0.07%	0.00%	0.01%	0.00%
Paenarthrobacter	1.47%	20.78%	0.15%	0.29%	1.23%	5.45%	3.72%	2.02%	2.28%
Exiguobacterium	0.02%	0.09%	0.21%	7.06%	6.58%	7.80%	3.39%	0.21%	0.03%
Chitinophagaceae	8.21%	3.73%	7.95%	0.01%	0.00%	0.02%	0.00%	0.00%	0.00%
Stenotrophomonas	3.30%	0.88%	0.03%	0.02%	0.04%	2.03%	10.64%	1.57%	1.10%
Acinetobacter	0.03%	0.02%	0.09%	4.56%	1.21%	6.88%	2.75%	2.70%	0.16%
Others	21.88%	29.97%	32.33%	14.82%	32.58%	34.94%	33.76%	33.77%	16.96%
Unknown	0.04%	0.03%	0.03%	0.04%	0.03%	0.04%	0.09%	0.07%	0.07%

Table A3 Specific environmental conditions for sampling at each site. Temperature: TEM(°C), humidity level: HUM (%), light intensity: LI (Lux), Wind speed: WS (m/s). 2019: A, 2020: B, 2021: C. North Door (ND), West Door (WD), North playground (NP).

A1

WD	Date	Sampling time	TEM	HUM	LI	WS
March 28th		17:18-17:33	16	35	3621	3.6
March 29th		17:27-17:40	19	36	2214	2.8
March 30th		17:20-17:40	16.5	38	1295	2.4
March 31th		17:32-17:49	18.2	40	2935	1.5
April 1st		17:02-17:17	20.5	33	4424	1.2
April 2nd		17:10-17:30	19.7	34	6524	3.2
April 3rd		17:10-17:30	21	48	3023	2.7
April 4th		17:35-17:54	22.4	34	6343	2.4
April 5th		17:34-17:51	26.7	28	2041	3.7
April 6th		17:34-17:51	21	48	1084	4
April 7th		17:31-17:50	24	35	2091	2.1
April 8th		17:32-17:54	14	58	867	1.6
April 9th		17:32-17:51	10	79	935	5
April 10th		17:29-17:50	14	57	676	1.2
April 11th		18:10-18:29	21	65	492	2.6
April 12th		17:26-17:46	19.7	70	2324	2.8
April 13th		17:29-17:47	23	59	321	0
April 14th		17:26-17:44	20.5	40	852	2.4
April 15th		17:08-17:27	21.2	27	1024	4.2
April 16th		17:09-17:28	24	48	4022	5.2
April 17th		18:48-19:04	30	45	109	3.8
April 18th		17:27-17:40	26	44	5935	6.5
April 19th		17:20-17:40	18.2	34	4476	5.2
April 20th		17:32-17:49	24.1	37	9234	2.8
April 21st		17:02-17:17	16.5	89	2324	3.4
April 22nd		17:10-17:30	14.5	90	102	1.2
April 23rd		17:10-17:30	24.5	54	2451	2.5

A2

ND	Date	Sampling time	TEM	HUM	LI	WS
March 28th		15:37-15:55	18	35	1037	4.5
March 29th		15:29-15:44	18.4	36	8625	2.4
March 30th		15:32-15:51	15.5	38	1463	2.8
March 31th		15:35-15:56	16.4	40	4212	1.4
April 1st		15:35-15:56	20	33	7035	1.3
April 2nd		15:55-16:16	21	34	1265	3.7
April 3rd		15:40-16:00	20.1	48	1893	2.4
April 4th		15:52-16:14	23.2	34	4212	2.8
April 5th		15:32-15:50	26.8	28	5232	3
April 6th		15:31-15:49	22.1	48	1962	4.2
April 7th		15:33-15:48	22.6	35	1925	2.1
April 8th		15:37-15:55	15	58	1882	1.8
April 9th		15:52-16:07	10	79	532	6.8
April 10th		15:40-16:00	13.6	57	3432	1.4
April 11th		15:32-15:48	20.5	65	7129	2.4
April 12th		15:30-15:44	21.7	70	6243	2.5
April 13th		15:29-15:44	20.4	59	67600	0
April 14th		15:34-15:51	22.5	40	1988	2.3
April 15th		15:32-15:51	20	27	24850	4.3
April 16th		15:35-15:56	22.3	48	16990	5.2
April 17th		15:30-15:49	38.5	45	23212	3.5
April 18th		15:24-15:40	25.1	44	23670	8
April 19th		15:37-15:53	16	34	18580	6,4
April 20th		15:32-15:49	23.1	37	44900	2.4
April 21st		15:32-15:48	16	89	12455	3.1
April 22nd		15:10-15:31	16.4	90	24524	1
April 23rd		15:28-15:45	24	54	42142	2.2

A3

NP	Date	Sampling time	TEM	HUM	LI	WS
March 28th		16:12-16:30	15	35	2999	4.2
March 29th		16:07-16:24	18.2	36	2820	2.4
March 30th		15:54-16:09	15.5	38	1037	2
March 31th		15:57-16:12	18	40	4321	1.4
April 1st		16:07-16:24	21	33	4520	1.2
April 2nd		16:02-16:21	20.8	34	6253	3.6
April 3rd		16:03-16:22	22	48	2463	2.2
April 4th		16:04-16:25	24.2	34	5343	2.5
April 5th		16:00-16:21	27.8	28	12241	3.5
April 6th		16:50-17:04	22.6	48	7832	4.6
April 7th		16:00-16:19	25.1	35	35480	2.5
April 8th		16:00-16:16	16.7	58	8140	1.6
April 9th		16:00-16:16	10	79	680	7.5
April 10th		15:40-15:57	14	57	540	1.2
April 11th		15:49-16:06	20.4	65	3975	2.5
April 12th		16:00-16:15	21	70	1079	2.3
April 13th		15:57-16:12	23	59	21220	0
April 14th		16:02-16:21	20.8	40	33570	2.4
April 15th		16:12-16:30	22	27	14270	4.7
April 16th		16:07-16:24	26.1	48	20480	5.2
April 17th		15:54-16:09	30	45	9600	3.7
April 18th		15:57-16:12	26.2	44	52430	9
April 19th		16:00-16:15	16	34	12241	7.2
April 20th		15:57-16:12	25.5	37	42480	2.1
April 21st		16:00-16:20	17	89	35480	3.5
April 22nd		16:12-16:30	19	90	24552	1.5
April 23rd		16:07-16:24	24.6	54	12341	2.5

B1

WD	Date	Sampling time	TEM	HUM	LI	WS
June 24th		18:00-18:25	30	58	2311	0
June 25th		18:10-18:37	32	47	234	1.5
June 26th		19:25-19:53	28.4	74.4	336	0
June 27th		17:35-18:00	30	66.1	3652	0.5
June 28th		19:20-19:37	26.9	38	296	0
June 29th		19:30-19:48	19.6	78	168	3
June 30th		20:15-20:32	27.3	65.4	1	0.6
July 1st		18:55-19:14	28.4	34	1203	0.9
July 2nd		17:17-17:34	29	48	21340	1.8
July 3rd		18:48-19:05	28	34	1864	0.6
July 4th		18:58-19:25	19.1	68	1698	2.5
July 5th		19:02-19:20	29.7	48	2339	0
July 6th		18:54-19:10	32.6	35	2584	1.2
July 7th		18:45-19:03	32.8	58	3212	0.7
July 8th		19:22-19:40	26.4	79	89	0
July 9th		18:48-19:08	29.4	57	2034	0.8
July 10th		18:37-18:55	28.2	65	689	0
July 11th		18:41-19:02	22.1	70	423	2.5
July 12th		18:30-18:50	24.5	59	1864	1.9
July 13th		18:49-19:07	27.1	40	3174	0
July 14th		18:45-19:07	25.4	27	1759	0
July 15th		19:00-19:13	27.6	48	1864	1.6
July 16th		19:13-19:36	27.1	45	545	1.3
July 17th		19:10-19:27	25.6	44	795	0
July 18th		19:03-19:20	25	34	564	0
July 19th		19:25-19:40	26.4	37	419	0
July 20th		19:17-19:34	28.4	89	521	2.6
July 21st		19:07-19:24	19.4	79	685	1.4
July 22nd		18:42-19:00	25.1	54	1464	0

B2

ND	Date	Sampling time	TEM	HUM	LI	WS
June 24th		18:32-18:55	20	42.6	270	0.5
June 25th		19:31-19:49	21.7	37.3	580	1
June 26th		20:35-21:00	28	76	3267	0
June 27th		18:36-18:55	31.6	60.5	2249	0
June 28th		20:11-20:23	26.8	71	324	0.6
June 29th		20:01-20:20	19.6	75	29	1.6
June 30th		21:15-21:27	26.4	64.1	22	0
July 1st		19:48-20:05	29	56.5	92	1
July 2nd		18:05-18:23	30.2	61.9	13865	0
July 3rd		19:43-20:03	28.4	63.5	96	0
July 4th		19:23-19:42	19.6	76	103	2.1
July 5th		19:48-20:07	29.6	63.8	86	0
July 6th		19:42-20:00	33.6	47.3	146	0.8
July 7th		19:35-19:52	33.6	51.6	421	3.2
July 8th		20:13-20:30	26.5	86.1	70	0
July 9th		19:40-20:00	29	65.4	126	1.9
July 10th		19:29-19:45	29	68.9	189	1
July 11th		19:46-20:05	18.4	78	201	2.2
July 12th		19:28-19:43	23.8	74.8	523	0
July 13th		19:41-19:56	27.6	62.6	196	0.3
July 14th		19:41-19:57	24.4	86.3	192	0
July 15th		19:45-19:58	28.5	62.4	188	3.2
July 16th		20:08-20:15	28	62.5	31	0
July 17th		20:03-20:12	24.3	77.5	40	0.5
July 18th		19:46-20:00	27.6	67.8	18	0
July 19th		20:10-20:38	24.2	90	12	0
July 20th		20:02-20:20	30.4	55.7	14	2.4
July 21st		20:00-20:19	20.1	69	108	3
July 22nd		19:25-19:40	24.7	82.9	252	0

B3

NP	Date	Sampling time	TEM	HUM	LI	WS
June 24th		19:52-20:16	20.4	42.6	670	0.8
June 25th		19:55-20:25	22	37.3	320	1.4
June 26th		20:05-20:30	27.8	75.1	13	0
June 27th		18:05-18:28	31.2	62	6277	1.2
June 28th		19:48-20:02	27.1	69.7	89	0.6
June 29th		18:00-18:20	19.8	70.9	303	2.8
June 30th		20:46-21:10	26.4	66.6	21	0
July 1st		19:25-19:42	29	54.9	786	2.5
July 2nd		17:44-17:56	30.2	60.2	20780	2.6
July 3rd		19:19-19:36	28	64	1223	0
July 4th		19:30-19:46	17.9	88	206	3.3
July 5th		19:28-19:45	30.2	60.9	764	0
July 6th		19:18-19:38	32.7	49.1	1874	1.9
July 7th		19:10-19:28	32.9	53.3	2391	2.3
July 8th		19:50-20:07	26.5	89.1	14	0
July 9th		19:18-19:36	29.7	66.4	1467	1.4
July 10th		19:05-19:24	28.9	70.8	732	0.6
July 11th		19:16-19:33	20.6	71.5	1986	2.5
July 12th		19:01-19:20	24.3	71.8	4345	1.2
July 13th		19:16-19:33	27.7	60.7	1435	0
July 14th		15:10-15:31	25.2	80.8	1261	0
July 15th		19:21-19:37	28.4	62.8	1421	2.2
July 16th		19:40-20:02	28.1	61.9	121	0.9
July 17th		19:36-19:56	24.4	77.7	276	0.4
July 18th		19:25-19:40	26.4	71.7	184	0.7
July 19th		19:49-20:03	24.9	87.8	47	0
July 20th		19:41-19:58	29.9	53.9	87	2.6
July 21st		19:41-19:58	20	88.1	43	2.9
July 22nd		19:08-19:22	24.7	81.3	1159	0

C1

WD	Date	Sampling time	TEM	HUM	LI	WS
April 15th		17:26-18:00	19.3	47.9	19870	0.3
April 16th		17:27-17:47	21.2	37.6	5935	0.7
April 17th		17:18-17:33	20.3	37.6	4476	0.6
April 18th		17:27-17:40	22.2	26.7	9492	0.8
April 19th		17:20-17:40	18.7	56.3	2324	0.2
April 20th		17:32-17:49	25.5	39.5	10810	0.2
April 21st		17:02-17:17	19.9	37	2918	0.4
April 22nd		17:10-17:30	22.6	29.1	10840	1.5
April 23rd		17:10-17:30	24.3	36.9	5249	1.6
April 24th		17:35-17:54	25.8	15.3	10610	3.7
April 25th		17:34-17:51	24.1	80	525	4
April 26th		17:34-17:51	23	26	9410	5.4
April 27th		17:31-17:50	21.8	56.8	16720	2.2
April 28th		17:32-17:54	19.8	64.2	2389	0.9
April 29th		17:32-17:51	23.5	50.7	15120	0.7
April 30th		17:29-17:50	27.4	24	27330	1.9
May 1st		18:10-18:29	24.9	20.5	3160	2.6
May 2nd		17:26-17:46	27.6	13.1	20970	5.7
May 3rd		17:29-17:47	23.8	40.2	7865	2.9
May 4th		17:26-17:44	22.3	29.5	2847	0.4

C2

ND	Date	Sampling time	TEM	HUM	LI	WS
April 15th		15:32-15:50	20.4	42.6	23670	0.9
April 16th		15:31-15:49	21.7	37.3	18580	1
April 17th		15:33-15:48	20.3	34.8	44900	1.9
April 18th		15:37-15:55	22	23.3	47380	4
April 19th		15:52-16:07	18.3	56.5	9785	0.4
April 20th		15:40-16:00	27.1	34.6	78810	0.4
April 21st		15:32-15:48	20.5	34.1	70510	1.9
April 22nd		15:30-15:44	22.1	28.7	64660	1.2
April 23rd		15:29-15:44	21.9	45.3	34320	2.1
April 24th		15:32-15:51	27.6	14.1	71290	2.4
April 25th		15:35-15:56	22.9	20	6243	1.5
April 26th		15:42-15:59	23.8	24.9	67600	2.4
April 27th		15:34-15:51	21.3	58.4	19880	1.3
April 28th		15:32-15:51	20.6	62.1	24850	1.6
April 29th		15:35-15:56	22	56.1	16990	0.2
April 30th		15:30-15:49	24	29.1	10620	1.2
May 1st		15:24-15:40	26.5	18	108900	2.4
May 2nd		15:37-15:53	28.7	14	114200	5.6
May 3rd		15:32-15:49	29.7	20.2	207300	7.1
May 4th		15:32-15:48	22.7	32.7	64670	2.1

C3

NP	Date	Sampling time	TEM	HUM	LI	WS
April 15th		16:02-16:20	21.7	39.2	28420	1.5
April 16th		16:00-16:15	25.1	30.9	12700	1.4
April 17th		15:57-16:12	22	30.2	29990	3.2
April 18th		16:00-16:20	24.3	22.7	28110	1.2
April 19th		16:12-16:30	18	57.7	10370	1.1
April 20th		16:07-16:24	29	31.6	43680	0.6
April 21st		15:54-16:09	21.8	33.2	48200	2.2
April 22nd		15:57-16:12	26.3	25.8	62770	2.6
April 23rd		15:52-16:09	26	36.2	24630	4
April 24th		16:00-16:18	29.9	12	53430	3.5
April 25th		16:05-16:23	19.2	22	12241	4.2
April 26th		16:07-16:24	23.5	25.2	62480	5.1
April 27th		16:02-16:21	21.7	61.5	35480	2.5
April 28th		16:03-16:22	20.4	65.3	11840	1.9
April 29th		16:04-16:25	23.6	53.4	69680	2.4
April 30th		16:00-16:21	26.2	23.6	80240	2.6
May 1st		16:50-17:04	24.4	21.3	39750	6.2
May 2nd		16:00-16:19	29.1	13.4	107900	6.4
May 3rd		16:00-16:16	30.2	19.6	212200	7.6
May 4th		16:00-16:16	23.9	25.4	33570	0.6

A1 bacterial solution sample pre-processing steps.

1. Transfer the collected liquid to a centrifuge tube, add 500 µl of Buffer SA, 100 µl of Buffer SC and 0.25 g of grinding beads, mix by vortexing or tissue homogenizer, and then heat lysis at 70°C for 15 min to improve lysis efficiency. 12,000 rpm (~13,400×g) centrifuge for 1 min, transfer the supernatant (about 500 µl) to a new 2 ml centrifuge tube.
2. Add 200 µl of Buffer SH, mix well, vortex for 5 sec, and allow to stand at 4°C for 10 min.
3. Centrifuge at 12,000 rpm (~13,400 x g) for 3 min, transfer the supernatant to a new 2 ml centrifuge tube, add 500 µl of Buffer GFA (check that isopropanol has been added before use), and mix upside down.
4. Add 10 µl of Magnetic Bead Suspension G and mix with shaking for 5 min.
5. Place the centrifuge tube on a magnetic rack and let it stand for 30 sec. After the magnetic beads are fully adsorbed, carefully aspirate the liquid.
6. Remove the centrifuge tube from the magnetic rack, add 700 µl of Deproteinizing Solution RD (check that anhydrous alcohol has been added before use) and mix for 5 min with shaking.
7. Place the centrifuge tube on a magnetic rack and let it stand for 30 sec. After the magnetic beads are fully adsorbed, carefully aspirate the liquid.
8. Remove the tube from the magnetic rack, add 700 µl of Rinse Solution PWD (check that anhydrous ethanol has been added before use) and mix for 3 min with shaking.
9. Place the centrifuge tube on a magnetic rack and let it stand for 30 sec. After the magnetic beads are fully adsorbed, carefully aspirate the liquid.
10. Repeat steps 8 and 9 once.
11. Place the tubes on a magnetic rack and allow to air dry at room temperature for 5-10 min. Note: Ethanol residue can inhibit subsequent enzymatic reactions, so make sure that the ethanol evaporates during air drying. However, do not dry the tubes for too long as it may be difficult to elute the DNA.
12. Remove the centrifuge tube from the magnetic rack, add 50-100 µl of Elution

Buffer TB, mix with shaking, place at 56°C, and incubate for 5 min, during which time mix with shaking 3 times, 3-5 times each.

13. Place the centrifuge tube on a magnetic rack for 2 min. After the magnetic beads are fully adsorbed, carefully transfer the DNA solution to a new centrifuge tube and store under appropriate conditions.