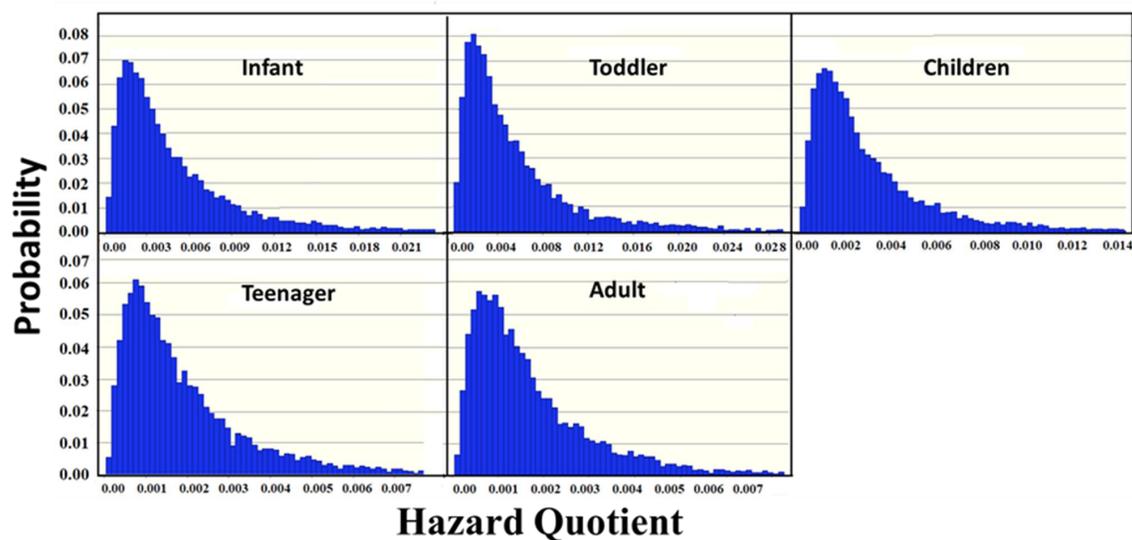


Supplementary Figure 1. OPE concentrations of dust from homes of Cartagena ($n = 19$), Bogotá ($n = 20$) and Medellín ($n = 14$), and Medellín cars ($n = 5$).



Supplementary Figure 2. Probabilistic density function (PDF) of simulated hazard quotients (HQs) for TCEP in Bogotá.

Supplementary Table 1. TFC-LC conditions for purification and chromatographic separation of OPEs

			Pump1: load pump (Turboflow)					Pump2: elute pump (Chromatographic)				
			Injection volume: 20 μ L									
			Purification columns: PI: Cyclone TM -P (0.5 mm \times 50 mm) PI: C18-XL (0.5 mm \times 50 mm)					Analytical column: PI: Purosphere STAR RP-18 (125 mm \times 0.2 mm)				
			Solvent A: PI: Water + 0.1% formic acid Solvent B: PI: Methanol + 0.1% formic acid					Solvent A: PI: Water + 0.1% formic acid Solvent B: PI: Methanol + ammonium acetate				
Step	Loop	Start (min)	Flow (mL/min)	Gradient	A%	B%	Description	Flow	Gradient	A%	B%	Description
1	out	0.00	0.75	Step	98	2	Sample loading into the TF column	0.25	Step	50	50	Analytical column conditioning
2	in	2.00	0.13	Step	-	100	Analyte transfer to analytical column	0.12	Step	100	-	Analyte transfer to analytical column
3	in	4.00	0.75	Step	-	100	TurboFlow TM column cleaning	0.25	Step	50	50	LC separation
4	in	5.00	0.75	Step	-	100	TurboFlow TM column and loop cleaning	0.25	Ramp	20	80	LC separation
5	in	7.00	0.75	Step	-	100	TurboFlow TM column and loop cleaning	0.25	Step	20	80	LC separation
6	in	8.00	0.75	Step	-	100	TurboFlow TM column	0.25	Ramp	10	90	LC separation

							and loop cleaning					
7	out	13.00	0.75	Step	-	100	TurboFlow™ column conditioning	0.25	Step	10	90	Analytical column cleaning
8	out	21.00	0.40	Step	-	100	TurboFlow™ column conditioning	0.25	Ramp	-	100	Analytical column cleaning
9	out	26.00	0.40	Step	-	100	TurboFlow™ column conditioning	0.25	Step	-	100	Analytical column cleaning
10	out	35.00	0.40	Step	-	100	TurboFlow™ column conditioning	0.25	Ramp	50	50	Analytical column conditioning
11	out	36.00	0.75	Step	100	-	TurboFlow™ column conditioning	0.25	Step	50	50	Analytical column conditioning

Supplementary Table 2. Instrumental TFC-LC-MS-MS parameters: retention times (Rt), transitions (SRM₁ and SRM₂), declustering potential (DP) and collision energy (CE₁ and CE₂) for each OPE analyte

	Rt (min)	SRM ₁ /SRM ₂	DP (V)	CE ₁ /CE ₂ (V)		Rt (min)	SRM ₁ /SRM ₂	DP (V)	CE ₁ /CE ₂ (V)
TEP	4.7	183→81	36	35	2IPPDPP	14.3	369→152	77	39
		183→99		19			369→327		19
TCEP	4.9	287→224	58	16	4IPPDPP	14.9	369→152	86	39
		287→98		39			369→327		20
TPPO	9.2	279→201	108	28	TMCP	15.4	369→165	54	59

		279→173		35			369→91		41
TCIPP	9.5	327→99	62	24	EHDPP	15.9	363→251	66	15
		327→250		10			363→151		45
TPP	9.6	225→81	38	37	B4IPPP	18.2	411→152	87	44
		225→99		26			411→327		24
TDCIPP	11.3	431→99	78	27	IDPP	18.4	391→251	80	26
		431→320		16			391→152		53
TPHP	11.7	327→152	83	39	IPPP	20.1	453→327	87	29
		327→215		27			453→369		27
TNBP	12.6	267→99	47	20	THP	20.6	351→99	71	22
		267→210		8			351→267		12
DCP	12.8	341→151	80	36	TEHP	29.2	435→99	65	36
		341→228		27			435→80		59
TBOEP	13.1	399→299	69	13					
		399→199		17					

Supplementary Table 3. Recoveries, relative standard deviations (RSDs) and limits of detection (LODs) and quantification (LOQs) of LC-MS-MS analysis of selected OPEs in dust samples

Analyte	Recovery (%)	RSD (%)	LOD (ng/g)	LOQ (ng/g)
TCEP	59	5.2	5.7	19
TPPO	63	6.7	2.2	7.3
TCIPP	62	9.7	4.4	15
TDCIPP	105	3.3	5.8	19
TPHP	103	2.5	2.7	9.1
TNBP	85	3.7	7.9	26
DCP	101	7.5	3.2	11
TBOEP	75	1.5	7.9	26
2IPPDPP	111	5.7	1.9	6.3
4IPPDPP	97	4.3	1.9	6.5
TMCP	91	5.0	1.0	3.2
EHDPP	70	4.4	18	59
B4IPPP	118	6.7	0.8	2.7
IDPP	93	2.8	23	77
T2IPPP	95	2.1	0.9	3.1
THP	97	5.5	5.0	17
TEHP	107	3.4	42	141

Supplementary Table 4. Noncancer and cancer endpoints, reference dose (RfD) and slope factor for cancer risk (SF) of target OPE compounds

OPEs	Acronym	CAS	Formula	Endpoint for noncancer	RfD ($\mu\text{g}/\text{kg}\text{-}\text{bw}/\text{day}$)	SF ($\text{mg}/\text{kg}\text{-}\text{bw}/\text{day}$)	Endpoints for cancer	Ref.
Tris(2-ethylhexyl) phosphate	TEHP	78-42-2	$\text{C}_{24}\text{H}_{51}\text{O}_4\text{P}$	Increased incidence of follicular cell hyperplasi	100	3.20E-03	Hepatocellular adenoma/carcinoma	[1]
Triphenylphosphine oxide	TPPO	791-28-6	$\text{C}_{18}\text{H}_{15}\text{OP}$	Cholinesterase inhibition	20			[2]
Tris(2-chloroethyl) phosphate	TCEP	115-96-8	$\text{C}_6\text{H}_{12}\text{Cl}_3\text{O}_4\text{P}$	Increased liver and kidney weights	7	2.00E-02	Renal tubular cell adenomas and carcinomas	[3]
Tris(2-chloroisopropyl) phosphate	TCIPP	13674-84-5	$\text{C}_9\text{H}_{18}\text{Cl}_3\text{O}_4\text{P}$	Hepatotoxicity	10	-		[4]
Tris(1,3-dichloro-2-propyl) phosphate	TDCIPP	13674-87-8	$\text{C}_9\text{H}_{15}\text{Cl}_6\text{O}_4\text{P}$	Renal tubular epithelial hyperplasia	20	-		[5]
Tricresyl phosphate	TMCP	1330-78-5	$\text{C}_{21}\text{H}_{21}\text{O}_4\text{P}$	Ovarian lesions	20	-		[5]

Supplementary Table 5. Parameters used in the Monte Carlo simulation

Parameter	Abbreviation	Unit	Probability distribution	Mean \pm SD	Ref.
Concentration	C	ng mL^{-1}	lognormal		Measured
Ingestion rate	IR	g day^{-1}	lognormal		[6]

Infant				0.025 ± 0.024	
Toddler				0.061 ± 0.055	
Children				0.047 ± 0.048	
Teenager				0.0032 ± 0.0025	
Adult				0.0037 ± 0.0029	
Body weight	BW	kg	Normal		[6]
Infant				9.1 ± 12	
Toddler				15.4 ± 2.1	
Children				30.7 ± 6.4	
Teenager				58.2 ± 10.6	
Adult				71.6 ± 12.5	
Fraction of time spent in a house	FT _H		Uniform		[6]
Infant				0.875	
Toddler				0.792	
Children				0.792	
Teenager				0.875	
Adult				0.875	
Fraction of time spent traveling in a car	FT _C		Lognormal		[6]
Infant				0.065 ± 0.063	
Toddler				0.044 ± 0.039	

Children				0.045 ± 0.050	
Teenager				0.048 ± 0.050	
Adult				0.065 ± 0.064	
Body Surface Area	BSA	cm ²	Normal		[6]
Infant				906 ± 91	
Toddler				1567 ± 157	
Children				2825 ± 263	
Teenager				4213 ± 421	
Adult				4807 ± 481	
Dust adhered to skin	DA	mg/cm ²	Uniform		[6]
Fraction absorbed	FA	%	Lognormal		[6]
TCEP				0.283 ± 0.023	
TPPO				0.139 ± 0.015	
TCIPP				0.247 ± 0.014	
TDCIPP				0.139 ± 0.015	
TMCP				0.139 ± 0.015	
TEHP				0.139 ± 0.015	
Exposure duration	ED	year	Uniform		[6]
Infant				1	
Toddler				5	

Children				11	
Teenager				19	
Adult				50	
Exposure frequency	EF	day/year	Uniform	319.4	
Average time	AT	day	Uniform	25550	
Reference dose	RfD	$\mu\text{g/ Kg/day}$	Uniform		[1-5]
Slope factor	SF	$(\mu\text{g/ Kg/day})^{-1}$	Uniform		

BS10	nd	nd	nd	nd	nd	nd	2.51	9.21	nd	11.7							
BS11	nd	nd	0.26	nd	0.30	nd	nd	0.23	nd	0.09	nd	nd	nd	nd	0.42	nd	1.31
BS12	4.79	6.23	nd	nd	nd	nd	47.8	4.31	nd	63.1							
BS13	0.25	0.31	nd	nd	nd	0.11	70.2	14.2	33.3	0.43	4.48	nd	nd	nd	nd	nd	123
BS14	nd	nd	0.63	1.38	0.68	0.17	nd	1.34	10.4	0.21	0.06	0.25	0.26	nd	1.05	nd	16.4
BS15	0.14	nd	nd	nd	nd	nd	1.26	1.28	nd	0.25	3.70	nd	nd	nd	nd	nd	6.61
BS16	0.37	1.75	nd	nd	nd	nd	18.3	1.80	61.0	0.35	5.01	nd	nd	nd	nd	nd	88.6
BS17	2.36	nd	0.27	nd	0.31	nd	28.6	5.74	nd	0.09	nd	nd	nd	nd	0.44	nd	37.8
BS18	1.80	nd	0.27	nd	0.31	nd	18.5	17.4	nd	0.10	nd	nd	nd	nd	0.44	nd	38.8
BS19	nd	2.21	0.70	1.30	0.67	0.76	4.72	1.68	50.1	0.47	30.2	0.17	0.13	0.48	4.27	nd	97.9
BS20	nd	51.9	1.60	11.0	0.67	2.22	25.0	0.52	nd	0.44	11.6	4.68	0.59	0.02	6.08	5.24	121
Medellin, Homes																	
MS1	nd	1.61	74.5	6.16	0.72	0.18	0.75	0.87	1.68	0.25	5.00	0.91	0.12	nd	1.34	nd	94.1
MS2	1.79	2.65	2.08	0.45	0.76	2.80	35.5	8.26	1.68	1.92	55.8	1.85	0.13	10.3	60.2	nd	186
MS3	1.87	nd	nd	nd	nd	nd	25.6	nd	27.5								
MS4	3.08	nd	0.30	nd	0.35	nd	31.8	8.58	nd	0.11	nd	nd	nd	nd	0.49	nd	44.7
MS5	0.99	0.24	1.30	1.94	0.68	1.90	6.41	2.20	1.87	0.32	13.0	0.21	0.14	0.07	2.01	nd	33.3
MS6	16.2	nd	nd	nd	nd	nd	29.7	nd	45.8								
MS7	2.37	3.67	0.64	nd	nd	nd	nd	1.67	nd	8.35							
MS8	nd	nd	0.32	nd	0.36	nd	nd	0.28	nd	0.11	nd	nd	nd	nd	0.51	nd	1.58
MS9	1.64	0.11	nd	nd	nd	nd	7.82	nd	9.56								
MS10	0.45	54.0	1.10	3.08	0.75	0.49	nd	3.62	1.77	0.51	7.84	2.13	0.18	nd	2.52	nd	78.5
MS11	nd	nd	1.00	3.26	nd	0.81	nd	2.04	1.16	0.39	9.48	1.20	0.15	nd	3.73	nd	23.2
MS12	5.97	nd	nd	nd	nd	nd	36.5	10.6	nd	53.1							
MS13	0.34	1.56	0.92	1.04	0.71	nd	nd	17.6	0.03	0.31	3.22	7.43	0.12	nd	2.02	nd	35.3
MS14	1.45	nd	nd	nd	nd	nd	10.8	nd	12.2								
Medellin, Cars																	
MS15	2.67	18.1	1.40	134	0.72	328	4.65	2.67	86.1	0.36	16.2	0.70	0.21	0.17	2.81	0.96	599
MS16	1.92	nd	nd	nd	nd	nd	19.7	nd	21.7								
MS17	3.12	6.83	nd	nd	nd	nd	352	4.04	nd	366							
MS18	9.32	nd	1.27	75.9	0.68	24.7	nd	0.88	3.66	0.23	2.33	0.90	0.17	nd	1.46	nd	121
MS19	0.11	16.5	1.33	3.61	0.61	nd	nd	2.95	12.5	0.22	4.02	1.34	0.29	nd	1.49	0.32	45.4

nd: Not detected, below LOD.

Supplementary Table 7. Concentrations ($\mu\text{g/g}$) of OPEs in indoor dust samples in different published works

Ambient	Location	Sampling year	n ^a	n ^b	OPE Levels		Ref.
					Range	Mean/Median	
Homes	12 countries	2010-14	341	20	0.05-249	13.8/2.22	[7]
Homes	Canada	2014	134	13	-	41.9/nr	[8]
Homes and gymnastic training	Seattle, USA	2015	-	3	-	51.7/nr	[9]
Homes	New York State, USA	2018	8	15	16-224	57.9/30.6	[10]
Homes	Flemish region, Belgium	2008	33	10	1.92-94.7	19.4/13.1	[11]
Stores					6.70-136	31.2/16.5	
Homes	Germany	2018	18	10	17.0-19.0	18.7/18.0	[12]
Building material markets			7		133-196	160/153	
Homes	Spain	2019	22	6	< LOD-8.15	2.11/0.95	[13]
Education buildings			16		0.21-87.7	8.16/2.08	
Homes and building material markets	Germany	2019	15	10	-	142 /nr	[14]
Homes, offices and schools	Spain	2019-2020	9	20	5.82148	32.1/17.2	[15]
Newly built preschools	Sweden	2018	23	9	0.1163	10.7/nr	[16]
Homes	South Africa	2019	20	10	-	44.8/nr	[17]
Infant homes	Harbin, China	2013-14	25	9	1.9431.3	8.25/6.01	[18]
Indoor environments	Guangzhou, China	2015-17	45	10	0.73-39.3	9.44/nr	[19]
Homes	China	2019	20	19	-	2.4/nr	[20]

College library	China	2017	78	10	8.71-34.9	nr/14.4	[21]
Cars	Japan	2013	25	12	< LOD640	nr/nr	[22]
Homes	Australian	2015	85	9	-	nr/40.0	[23]
Homes	Colombia	2018	55	19	1.31-446	85.1/37.8	This study
Cars			5		21.7-599	231/121	

^aNumber of analysed samples; ^bNumber of OPE compounds analysed. nr: Not reported.

Supplementary Table 8. Estimated daily intakes of OPEs via dust ingestion exposure, EDI_{Ingestion}, expressed in ng/kg bw/day.

		Bogotá				Cartagena				Medellín			
		Mean	SD	Median	95th percentile	Mean	SD	Median	95th percentile	Mean	SD	Median	95th percentile
TCEP	Infant	19.6	30.1	10.4	65.4	43.8	90.2	18.9	159	22.9	57.9	8.50	82.3
	Toddler	25.4	39.0	13.6	85.2	54.6	96.1	25.4	193	29.9	80.2	11.2	110
	Children	10.1	18.4	5.01	35.0	22.2	48.1	9.15	81.2	11.5	29.4	4.13	42.2
	Teenager	0.40	0.58	0.22	1.30	0.87	1.49	0.41	3.14	0.45	0.94	0.19	1.68
	Adult	0.37	0.51	0.21	1.25	0.82	1.49	0.39	2.86	0.43	0.94	0.18	1.52
TPPO	Infant	1.54	2.11	0.89	4.87	2.21	2.76	1.38	6.88	22.9	65.4	6.79	88.9
	Toddler	1.95	2.50	1.18	6.19	2.82	3.29	1.82	8.49	29.5	89.6	8.89	113
	Children	0.78	1.17	0.43	2.56	1.12	1.45	0.66	3.64	11.7	38.5	3.30	45.3
	Teenager	0.03	0.04	0.02	0.10	0.04	0.05	0.03	0.13	0.45	1.22	0.15	1.79

	Adult	0.25	0.22	0.19	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Supplementary Table 9. Estimated daily intakes of OPEs via dust dermal absorption exposure, EDI_{Dermal}, expressed in ng/kg bw/day

		Bogotá				Cartagena				Medellín			
		Mean	SD	Median	95th percentile	Mean	SD	Median	95th percentile	Mean	SD	Median	95th percentile
TCEP	Infant	19.1	19.7	13.7	52.2	42.7	56.3	25.3	137	21.5	33.7	11.6	72.1
	Toddler	17.8	18.2	12.7	48.5	39.5	52.8	23.4	127	20.0	30.9	10.7	67.3
	Children	15.4	16.4	10.9	42.3	34.3	47.1	19.8	111	17.4	27.9	9.07	58.9
	Teenager	14.2	15.0	10.1	39.2	31.6	43.2	18.6	102	15.9	25.0	8.43	53.6
	Adult	13.2	14.1	9.3	35.9	29.2	37.8	17.2	93.9	14.7	22.7	7.88	48.2
TPPO	Infant	0.71	0.53	0.57	1.68	1.04	0.63	0.90	2.23	11.2	25.2	4.61	40.3
	Toddler	0.66	0.49	0.53	1.54	0.97	0.58	0.83	2.07	10.4	22.9	4.23	37.5
	Children	0.57	0.45	0.45	1.41	0.84	0.56	0.70	1.89	9.00	19.5	3.61	33.5
	Teenager	0.53	0.40	0.42	1.28	0.77	0.49	0.65	1.69	8.22	18.0	3.35	29.3
	Adult	0.49	0.37	0.39	1.17	0.72	0.45	0.61	1.56	7.69	17.0	3.12	27.3
TCIPP	Infant	9.58	6.23	8.05	21.2	12.0	6.78	10.4	24.9	5.55	4.12	4.45	13.3
	Toddler	8.89	5.82	7.43	20.0	11.2	6.34	9.73	23.0	5.15	3.83	4.14	12.4
	Children	7.74	5.53	6.31	18.0	9.69	5.96	8.26	20.7	4.45	3.41	3.53	10.8
	Teenager	7.11	4.90	5.88	16.2	8.91	5.27	7.61	18.8	4.10	3.09	3.26	10.1

Supplementary Table 10. Estimated daily intakes of OPEs via dust ingestion and dermal absorption, expressed in ng/kg bw/day, from house and car in Medellin

		Mean	SD	Median	95th percentile
TCEP	Infant	46.4	78.1	24.5	154.0
	Toddler	51.1	90.0	26.0	171.0
	Children	30.1	52.3	16.0	101.0
	Teenager	17.2	25.7	9.6	55.3
	Adult	16.3	23.8	9.3	52.7
TPPO	Infant	33.9	87.7	12.4	130.0
	Toddler	39.4	89.2	14.2	154.0
	Children	20.3	46.3	7.56	78.4
	Teenager	8.51	17.0	3.58	32.4
	Adult	7.88	15.5	3.31	30.1
TCIPP	Infant	36.3	46.9	23.9	102
	Toddler	34.6	43.4	23.1	94.7
	Children	19.8	22.5	13.3	57.2
	Teenager	10.5	10.2	7.67	26.7
	Adult	12.0	15.4	8.4	31.2
TDCIPP	Infant	51.5	89.3	27.1	170
	Toddler	46.8	77.0	25.5	148
	Children	24.7	44.8	12.8	81.4
	Teenager	9.88	13.5	5.85	30.7
	Adult	12.1	16.0	7.04	38.7
TMCP	Infant	8.59	9.80	5.54	25.41
	Toddler	10.3	13.1	6.43	30.0
	Children	5.27	6.08	3.43	15.51
	Teenager	2.20	2.00	1.61	5.90
	Adult	2.07	1.86	1.53	5.56
TEHP	Infant	0.25	0.35	0.16	0.69
	Toddler	0.24	0.29	0.16	0.66

	Children	0.13	0.16	0.08	0.37
	Teenager	0.05	0.05	0.04	0.12
	Adult	0.06	0.05	0.04	0.15

Supplementary Table 11. Hazard Quotient of OPEs via dust ingestion and dermal absorption from house and car in Medellin

		Mean	SD	Median	95th percentile
TCEP	Infant	6.6E-03	1.1E-02	3.5E-03	2.2E-02
	Toddler	7.3E-03	1.3E-02	3.7E-03	2.4E-02
	Children	4.3E-03	7.5E-03	2.3E-03	1.5E-02
	Teenager	2.5E-03	3.7E-03	1.4E-03	7.9E-03
	Adult	2.3E-03	3.4E-03	1.3E-03	7.5E-03
TPPO	Infant	1.7E-03	4.4E-03	6.2E-04	6.5E-03
	Toddler	2.0E-03	4.5E-03	7.1E-04	7.7E-03
	Children	1.0E-03	2.3E-03	3.8E-04	3.9E-03
	Teenager	4.3E-04	8.5E-04	1.8E-04	1.6E-03
	Adult	3.9E-04	7.7E-04	1.7E-04	1.5E-03
TCIPP	Infant	3.6E-03	4.7E-03	2.4E-03	1.0E-02
	Toddler	3.5E-03	4.3E-03	2.3E-03	9.5E-03
	Children	2.0E-03	2.3E-03	1.3E-03	5.7E-03
	Teenager	1.0E-03	1.0E-03	7.7E-04	2.7E-03
	Adult	1.2E-03	1.5E-03	8.4E-04	3.1E-03
TDCIPP	Infant	2.6E-03	4.5E-03	1.4E-03	8.5E-03
	Toddler	2.3E-03	3.8E-03	1.3E-03	7.4E-03
	Children	1.2E-03	2.2E-03	6.4E-04	4.1E-03
	Teenager	4.9E-04	6.8E-04	2.9E-04	1.5E-03
	Adult	6.1E-04	8.0E-04	3.5E-04	1.9E-03
TMCP	Infant	4.3E-04	4.9E-04	2.8E-04	1.3E-03
	Toddler	5.1E-04	6.6E-04	3.2E-04	1.5E-03
	Children	2.6E-04	3.0E-04	1.7E-04	7.8E-04

	Teenager	1.1E-04	1.0E-04	8.1E-05	3.0E-04
	Adult	1.0E-04	9.3E-05	7.7E-05	2.8E-04
TEHP	Infant	2.5E-06	3.5E-06	1.6E-06	6.9E-06
	Toddler	2.4E-06	2.9E-06	1.6E-06	6.6E-06
	Children	1.3E-06	1.6E-06	8.3E-07	3.7E-06
	Teenager	5.1E-07	4.9E-07	3.8E-07	1.2E-06
	Adult	5.8E-07	5.3E-07	4.2E-07	1.5E-06

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