

SUPPLEMENTAL MATERIAL

Chemical-by-chemical and cumulative risk assessment of residential indoor exposure to semivolatile organic compounds in France

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Table of contents:

Table S1: Reference doses (RfD) and cancer slope factors (CSF) retrieved from literature for most critical effect for SVOCs and used for chemical by chemical risk assessment by estimation of hazard quotients and excess risks

Table S2: SVOC oral bioavailabilities (f_{oral}) used for the estimation of internal reference doses (average values) retrieved from Pelletier et al. (2017) and online databases

Table S3: Hazard quotients estimated for indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

Table S4: Excess risks (ER) for carcinogenic indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

Table S5: Neurotoxic reference doses (RfD) retrieved from literature or established by the authors for neurotoxic cumulative assessment group

Table S6: Hazard indexes for neurotoxic indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

Table S7: Reprotoxic reference doses (RfD) retrieved from literature or established by the authors for reprotoxic cumulative assessment group

Table S8: Hazard indexes for reprotoxic indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

Table S9: Relative potency factors (RPF) and TEF (Toxicity Equivalent Factors) used for tier 2 cumulative assessments

Table S10: Reference compounds's cancer slope factor (CSF) or reference dose (RfD) retrieved from literature or established by the authors for specific health effects and used for cumulative risk assessment by using toxicity equivalency factor and relative potency factor approaches

Table S11: Reference doses (RfD) constructed for the 8 PCBs included in this study from the RfD retrieved from literature for the Aroclor 1254 for immunotoxic effect

References

Table S1: Reference doses (RfD) and cancer slope factors (CSF) retrieved from literature for most critical effect for SVOCs and used for chemical by chemical risk assessment by estimation of hazard quotients and excess risks

SVOC	RfD ^a (µg/kg- bw/d)	CSF (mg/kg /d) ⁻¹	Reference	Critical effect (following oral exposure)	Point of departure (mg/kg-bw/d)	Uncertainty factor
Aldrin	0.03		ANSES ^b (2015) ATSDR ^c (2002) US EPA ^d (1988)	Liver lesions and increased relative liver weight in adult male and female rats after chronic exposure (2 years)	LOAEL=0.025	UFH=10 UFA= 10 UFL=10
Aldrin	2 (gest)		ATSDR ^c (2016)	Decreased body weight and electroconvulsive shock threshold in offspring male and female after acute exposure (7 days) of pregnant mice	LOAEL=2	UFH= 10 UFA = 10 UFL=10
Anthracene	300		US EPA ^d (1991)	No observed effects in adult male and female mice after subchronic exposure (90 days)	NOAEL=1000	UFH= 10 UFA= 10 UFS= 30
BBP	200		US EPA ^d (2000)	Increased relative liver and brain weights in adult male rats after chronic exposure (6 months)	NOAEL=159	UFH= 10 UFA= 10 UFS= 10
BDE 47	0.002 (child)		Li et al. (2014)	Decreased relative uterus weight in 2 months female rats after single dose exposure at PND 10	BMDL=0.002	UFA=10 UFH=10 UFS=10 MF=1
BDE 99 ^e	0.1 (child)		US EPA ^d (2008)	Neurobehavioral developmental effects in adult male and female mice after exposure to single dose at PND 10	BMDL _{1SD} =0.29	UFH= 10 UFA= 10 UFS= 3 UFD= 10
BDE 99 ^e	10 (gest)		Kortenkamp and Faust (2010)	Suppression of testosterone levels, reductions of anogenital distance in offspring male after acute exposure (10 days) of pregnant rats	NOAEL=1	UFH= 10 UFA= 10
Benzo[a]pyrene	0.3 (child)		US EPA ^d (2017)	Neurobehavioral impairment in adult male and female rats after postnatal exposure from PND 5 to PND 11	BMDL ₅ =0.092	UFH= 10 UFA= 10 UFD= 3
Benzo[a]pyrene		1	US EPA ^d (2017)	Tumor response in the alimentary tract (forestomach, esophagus, tongue, and larynx) of female mice after oral chronic exposure (2 years).	BMDL ₁₀ ^f	
Chlorpyrifos	0.1 (child)		OEHHA ^g (2010)	Reduced plasma and red blood cells cholinesterase activity in adult Beagle dogs after chronic exposure (2 years)	NOAEL=0.03	UFH=10 UFA=3 UF ^h =10
Chlorpyrifos	1		ATSDR ^c (2016) ANSES ^b (2015)	Reduced red blood cells cholinesterase activity in adult male and female rats after chronic exposure (2 years)	NOAEL=0.1	UFH= 10 UFA= 10
DBP	2 (gest/ child)		ANSES ^b (2008)	Reduction of spermatocyte development and mammary glands dysplasia in offspring male after subchronic exposure of pregnant rats and offspring from GD 15 to PND 21	LOAEL=2	UFH= 10 UFA= 10 UFL= 10

DBP	52	RIVM (2001)	Decreased number and body weight of offspring rats (without maternal toxicity) after a two-generation reproductive toxicity study	LOAEL=52	UFH= 10 UFA= 10 UFL= 10
DEHP	44 (gest)	Health Canada (1994)	Decreased fetus number after acute exposure (17 days) of pregnant mice	NOAEL=44	1000
DEHP	3.7	RIVM (2001)	Sertoli cells vacuolation in adult male rats after subchronic exposure (13 weeks)	NOAEL=3.7	UFH= 10 UFA= 10 UFS= 10
DEP	200	RIVM (2001)	Degeneration and atrophy of testes and spermatogenesis impairment in adult male rats after chronic exposure (16 weeks)	NOAEL=100	UFH= 10 UFA= 10 UFD= 5
DiBP	200 (gest)	Kortenkamp and Faust (2010)	Suppression of fetal testosterone synthesis after acute exposure (10 days) of pregnant rats	BMDL=40	200
Dieldrin	0.05	ATSDR ^c (2016) ANSES ^b (2009) US EPA ^d (1998)	Increased relative liver weight and hepatic lesions in adult female rats after chronic exposure (2 years)	NOAEL=0.005	UFH= 10 UFA= 10
DiNP	800 (gest)	Benson (2009)	Decreased fetal testosterone and retained areolas/nipples in offspring male after acute exposure (14 days) of pregnant rats	LOAEL=750	UFH= 10 UFA= 10 UFL=10
Fluorene	40	US EPA ^d (1990)	Decreased red blood cells, packed cell volume and hemoglobin in adult male mice after subchronic exposure (13 weeks)	LOAEL=125	UFH= 10 UFA= 10 UFS=10 UFL= 3
Galaxolide	1500	Bonvallet et al. (2010)	Increased body weight and relative liver weight in adult male and female rats after subchronic exposure (90 days)	NOAEL=150	UFH= 10 UFA= 10
Lindane	0.01	ATSDR ^c (2016)	Biphasic changes in cell- and humoral-mediated immunity to red blood cells in adult female mice after chronic exposure (24 weeks)	LOAEL=0.012	UFH= 10 UFA= 10 UFL= 10
Lindane	1.1	OEHHA ^e (2011)	Increased in liver tumor of male mice after oral chronic exposure (2 years)	Q _{animal} ⁱ	
Phenanthrene	40	RIVM (2001)	Decreased body weight, increased relative liver and kidney weight (unknown species and duration of exposure)	na	UFH= 10 UFA= 10
Tributyl phosphate	1100 (gest)	ATSDR ^c (2016)	Decreased maternal body weight gain after acute exposure (10 days) of pregnant rats	BMDL _{1SD} =110	UFH= 10 UFA= 10
Tributyl phosphate	80	ATSDR ^c (2016)	Urinary bladder hyperplasia in adult male rats after chronic exposure (2 years)	BMDL ₁₀ =8.03	UFH= 10 UFA= 10
Tonalide	15	Bonvallet et al. (2010)	Increased relative liver weight in adult rats after subchronic exposure (90 days)	NOAEL=1.5	UFH= 10 UFA= 10

BMDL: benchmark dose modelling; GD: gestational days; LOAEL: low observed adverse effect level; na: not available; MF: modifying factor; NOAEL: no observed adverse effect level; PND: postnatal day; UF_A: interspecies uncertainty factor; UF_B: database deficiency uncertainty factor; UF_H: intraspecies uncertainty factor; UF_L: LOAEL uncertainty factor; UF_S: acute/subchronic uncertainty factor.

^a “Gest” correspond to RfD specific to gestational exposure and “child” to RfD specific to postnatal exposure.

^b Retrieved from: <https://www.anses.fr/fr/content/les-valeurs-de-r%C3%A9f%C3%A9rence>

^c Retrieved from: <https://www.atsdr.cdc.gov/mrls/mrllist.asp>

^d Retrieved from: <https://cfpub.epa.gov/ncea/iris/search/index.cfm?>

^e Assumption of similar toxic potency between congeners having the same molecular formula (same number of halogenated atoms) led to use the RfD of BDE 99 also for BDE 85 and BDE 100.

^f BMD₁₀: the animal cancer potency was estimated from a linear extrapolation from the 90% confidence bound on the BMD₁₀ (estimated using multistage-Weibull model).

^g Retrieved from: <https://oehha.ca.gov/chemicals>

^h Additional factor for children extrapolation.

ⁱ q_{animal} : correspond to the animal cancer potency estimated from the upper 95% confidence bound on the linear extrapolation using the Crump linearized multistage polynomial model.

Table S2: SVOC oral bioavailabilities (f_{oral}) used for the estimation of internal reference doses (average values) retrieved from Pelletier et al. (2017) and online databases

SVOC	f_{oral} (-) ¹	SVOC	f_{oral} (-) ¹
Aldrin	0.53	Dieldrin	0.53
Anthracene	0.68	Fluorene	0.60
BBP	0.75	Lindane	0.62
BDE 47	0.85	Galaxolide	0.50
BDE 85	0.44	PCB101	0.70
BDE 99	0.82	PCB105	0.80
BDE 100	0.84	PCB118	0.64
BDE 153	0.85	PCB138	0.89
Benzo[a]pyrene	0.43	PCB153	0.72
Chlorpyrifos	0.83	PCB28	0.78
DBP	0.75	PCB31	0.79
DEHP	0.75	PCB52	0.83
DEP	0.75	Phenanthrene	0.93
DiBP	0.75	Tonalide	0.50
DiNP	0.75	Tributyl phosphate	0.50
DPP	0.75	2,3,7,8-TCDD	0.76
Cypermethrin	0.36		

¹Arithmetic mean estimate from retrieved values from online databases (Agency for toxic substances and disease registry (ATSDR); Hazardous substances data bank (HSBD)).

Table S3: Hazard quotients estimated for indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

SVOC	Highest hazard quotient		Children		Adults		Pregnant women	
	p50	p95	p50	p95	p50	p95	p50	p95
Aldrin	0.004	0.01	0.004	0.01	0.001	0.005	0.00002	0.00007
Dieldrin	0.03	0.1	0.03	0.1	0.009	0.05		
Lindane	0.3	2.1	0.3	2.1	0.09	0.7		
Chlorpyrifos	0.002	0.005	0.002	0.005	0.00007	0.0002		
Tributylphosphate	0.00003	0.0001	0.00003	0.0001	0.000009	0.00004	0.0000007	0.000003
Galaxolide	0.00008	0.0004	0.00008	0.0004	0.00003	0.0001		
Tonalide	0.002	0.01	0.002	0.01	0.0008	0.004		
Anthracene	0.000002	0.000009	0.000002	0.000009	0.0000007	0.000004		
Benzo[a]pyrene	0.001	0.007	0.001	0.007				
Fluorene	0.00004	0.0002	0.00004	0.0002	0.00001	0.00009		
Phenanthrene	0.0002	0.001	0.0002	0.001	0.00007	0.0004		
BBP	0.001	0.004	0.001	0.004	0.0001	0.0005		
DBP	0.3	2.1	0.3	2.1	0.004	0.03	0.1	0.7
DEHP	0.2	0.7	0.2	0.7	0.02	0.08	0.002	0.007
DEP	0.002	0.02	0.002	0.02	0.0006	0.005		
DiBP	0.004	0.01					0.004	0.01
DiNP	0.00008	0.0004					0.00008	0.0004
BDE 47	1	2.7	1	2.7				
BDE 85	0.0002	0.0009	0.0002	0.0009	0.00006	0.0003	0.0000006	0.000003
BDE 99	0.008	0.01	0.008	0.01			0.00003	0.00006
BDE 100	0.01	0.06	0.01	0.06	0.005	0.02	0.00005	0.0002

Table S4: Excess risks (ER) for carcinogenic indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

SVOC	Adults	
	p50	p95
Lindane	$2.4 \cdot 10^{-7}$	$2.0 \cdot 10^{-6}$
Benzo[a]pyrene	$1.3 \cdot 10^{-8}$	$8.2 \cdot 10^{-8}$

Table S5: Neurotoxic reference doses (RfD) retrieved from literature or established by the authors for neurotoxic cumulative assessment group

SVOC	RfD ^a (µg/kg-bw/d)	Reference	Critical effect (following oral exposure, excepted if specified)	Point of departure (mg/kg-bw/d)	Uncertainty factor
Aldrin	2 (gest)	ATSDR ^b (2016)	Decreased body weight and electroconvulsive shock threshold in offspring male and female after acute exposure (7 days) of pregnant mice	LOAEL=2	UFH= 10 UFA = 10 UFL=10
BBP	170 (child)	This study (from Min et al., 2014)	Learning and memory impairment, decreased locomotor activity and induce depression in 1 month-old male rats after acute exposure (2 weeks)	NOAEL=50	UFA=10 UFH=10 UFS=3
BDE 47	0.1 (child)	US EPA ^c (2008)	Spontaneous motor behavior impairment and decreased habituation capability in adult male mice after single dose exposure at PND 10	BMDL _{1SD} =0.35	UFH= 10 UFA= 10 UFD= 10 UFS= 3
BDE 99	0.1 (child)	US EPA ^c (2008)	Neurobehavioral developmental effects in adult male and female mice after single dose exposure at PND 10	BMDL _{1SD} =0.29	UFH= 10 UFA= 10 UFD= 10 UFS= 3
BDE 153	3 (child)	This study (from Zhang et al., 2013)	Decreased spontaneous behavior in 1 and 2 months-old male rats after intraperitoneal ^d single dose exposure at PND 10	NOAEL=1	UFA=10 UFH=10 UFS=3
Benzo[a]pyrene	0.3 (child)	US EPA ^c (2017)	Neurobehavioral impairment in adult male and female rats after postnatal exposure from PND 5 to PND 11	BMDL ₅ =0.092	UFH= 10 UFA= 10 UFD= 3
Chlorpyrifos	1	ATSDR ^b (2016) ANSES ^e (2015)	Reduced red blood cells cholinesterase activity in adult male and female rats after chronic exposure (2 years)	NOAEL=0.1	UFH= 10 UFA= 10
Chlorpyrifos	0.1 (child)	OEHHA ^f (2010)	Reduced plasma and red blood cells cholinesterase activity in adult Beagle dogs after chronic exposure (2 years)	NOAEL=0.03	UFH=10 UFA=3 UF ^g =10
DBP	17	This study (from Yan et al., 2016)	Anxiety and oxidative stress in brain tissue in 10 weeks male rats after 1 month exposure	NOAEL=5	UFA=10 UFH=10 UFS=3
DEHP	17	This study (from Tang et al., 2015)	Spatial learning impairment and memory dysfunction in 2 months-old male mice after acute exposure (10 days)	NOAEL=5	UFA=10 UFH=10 UFS=3
DiBP	170	This study (from Ma et al., 2013)	Learning impairment and increased apoptosis rate of hippocampal cells in adult male and female mice after subchronic exposure (8 weeks)	NOAEL=500	UFA=10 UFH=10 UFD=10 UFS=3

Dieldrin	0.1	ATSDR ^b (2016)	Learning impairment in young adult male monkeys after subchronic exposure (55 days)	NOAEL=0.01	UFH= 10 UFA= 10
Fluorene	33	This study (from Peiffer et al., 2016)	Spatial learning ability impairment in adult male rats after acute exposure (4 weeks)	NOAEL=10	UFA=10 UFH=10 UFS=3
PCB 52	0.3 (gest/ child)	This study (from Boix et al., 2010, 2011)	Motor coordination impairment in 4 months-old male and female rats after subchronic exposure of pregnant rats from GD 7 to PND 21	LOAEL=1	UFA=10 UFH=10 UFL=10 UFS=3
PCB 118	0.4 (gest)	This study (from Kuriyama and Chahoud 2004)	Spontaneous reflexes impairment and increased motor activity in offspring male and female after single dose exposure of pregnant rats	LOAEL=0.375	UFA=10 UFH=10 UFL=10
PCB 138 ^h	0.3 (gest/ child)	This study (from Boix et al., 2010, 2011)	Spontaneous motor activity and learning impairment in 4 months-old male and female rats after subchronic exposure of pregnant rats from GD 7 to PND 21	LOAEL=1	UFA=10 UFH=10 UFL=10 UFS=3
Lindane	2.7 (gest/ child)	This study (from Myers 1999)	Increased motor activity and decreased motor reflex in offspring rats after subchronic exposure of pregnant rats from GD 6 to PND 10	NOAEL=0.8	UFA=10 UFH=10 UFS=3

BMDL: benchmark dose modelling; GD: gestational days; LOAEL: low observed adverse effect level; NOAEL: no observed adverse effect level; PND: postnatal day; UF_A: interspecies uncertainty factor; UF_D: database deficiency uncertainty factor; UF_H: intraspecies uncertainty factor; UF_L: LOAEL uncertainty factor; UF_S: acute/subchronic uncertainty factor.

^a "Gest" correspond to RfD specific to gestational exposure and "child" to RfD specific to postnatal exposure.

^b Retrieved from: <https://www.atsdr.cdc.gov/mrls/mrllist.asp>

^c Retrieved from: <https://cfpub.epa.gov/ncea/iris/search/index.cfm?>

^d For BDE 153, no studies performing *in vivo* oral exposures of mammalian species were found and the one of Zhang et al. (2013) performing *in vivo* intraperitoneal exposure of rats was selected.

^e Retrieved from: <https://www.anses.fr/fr/content/les-valeurs-de-r%C3%A9f%C3%A9rence>

^f Retrieved from: <https://oehha.ca.gov/chemicals>

^g Additional factor for children extrapolation.

^h Assumption of similar toxic potency between congeners having the same molecular formula (same number of halogenated atoms) led to use the RfD of PCB 138 also for PCB 153.

Table S6: Hazard indexes for neurotoxic indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

SVOC	Children		Adults		Pregnant women	
	p50	p95	p50	p95	p50	p95
Aldrin					0.00002	0.00007
Dieldrin	0.01	0.07	0.004	0.02		
Lindane	0.001	0.008			0.0003	0.003
Chlorpyrifos	0.002	0.005	0.00007	0.0002		
Benzo[a]pyrene	0.001	0.007				
Fluorene	0.00005	0.0003	0.00002	0.0001		
PCB 52	0.001	0.007			0.0003	0.002
PCB 118					0.0001	0.0002
PCB 138	0.0003	0.002			0.00008	0.0002
PCB 153	0.0003	0.002			0.0001	0.0003
BBP	0.002	0.004				
DBP	0.04	0.2	0.01	0.09		
DEHP	0.05	0.1	0.004	0.02		
DiBP	0.01	0.04	0.005	0.02		
BDE 47	0.02	0.05				
BDE 99	0.008	0.01				
BDE 153	0.00002	0.0001				
Hazard index	0.2	0.4	0.03	0.1	0.001	0.005

Table S7: Reprotoxic reference doses (RfD) retrieved from literature or established by the authors for reprotoxic cumulative assessment group

SVOC	RfD ^a (µg/kg-bw/d)	Reference	Critical effect (following oral exposure)	Point of departure (mg/kg-bw/d)	Uncertainty factor
BBP	1200	OEHHA ^b (2013)	Reduced birth weight in F1 male and female rats after a two-generation reproductive toxicity study	NOAEL=20	1000
BDE 47	0.002 (child)	Li et al. (2014)	Decreased relative uterus weight in 2 months female rats after single dose exposure at PND 10	BMDL=0.002	UFA=10 UFH=10 UFS=10 MF=1
BDE 99 ^c	10 (gest)	Kortenkamp and Faust (2010)	Suppression of testosterone levels, reductions of anogenital distance in offspring male after acute exposure (10 days) of pregnant rats	NOAEL=1	UFH= 10 UFA= 10
Benzo[a]pyrene	0.02	This study (from Fournier et al., 2016)	Decreased in testosterone synthesis in adult male rats after subchronic exposure (90 days)	BMDL ₁₀ =0.002	UFA=10 UFH=10
Chlorpyrifos	40 (gest)	This study (from Shin et al., 2015)	Sperm motility impairment in offspring male after acute exposure (10 days) of pregnant mice	NOAEL=4	UFA=10 UFH=10
Chlorpyrifos	27	This study (from Sai et al., 2014)	Reduced sperm counts, motility in caudal epididymidis, testosterone level and altered seminiferous tubules in adult male rats after subchronic exposure (90 days)	NOAEL=2.7	UFA=10 UFH=10
DBP	2 (gest/ Child)	ANSES ^d (2008)	Reduction of spermatocyte development and mammary glands dysplasia in offspring male after subchronic exposure of pregnant rats from GD 15 to PND 21	LOAEL=2	UFH= 10 UFA= 10 UFL= 10
DBP	52	RIVM (2001)	Decreased number and body weight of offspring rats (without maternal toxicity) after a two-generation reproductive toxicity study	LOAEL=52	UFH= 10 UFA= 10 UFL= 10
DEHP	44 (gest)	Health Canada (1994)	Decreased fetus number after acute exposure (17 days) of pregnant mice	NOAEL=44	1000
DEHP	3.7	RIVM (2001)	Sertoli cells vacuolation in adult male and female rats after subchronic exposure (13 weeks)	NOAEL=3.7	UFH= 10 UFA= 10 UFS= 10
DEP	200	RIVM (2001)	Degeneration and atrophy of testes and spermatogenesis impairment in adult male rats after chronic exposure (16 weeks)	NOAEL=100	UFH= 10 UFA= 10 UFD= 5

DiBP	200 (gest)	Kortenkamp and Faust (2010)	Suppression of fetal testosterone synthesis after acute exposure (10 days) of pregnant rats	BMDL=40	200
Dieldrin	0.02	This study (from Perobelli et al., 2010)	Increased immotile sperm in adult male rats after subchronic exposure (8 weeks)	LOAEL=0.05	UFA=10 UFH=10 UFL=10 UFS=3
DiNP	750 (gest)	Benson (2009)	Decreased fetal testosterone and retained areolas/nipples in offspring male after acute exposure (14 days) of pregnant rats	LOAEL=750	UFH= 10 UFA= 10 UFL=10
PCB 101 and 118 ^e	0.0003 (gest/ child)	This study (from Pocar et al., 2011)	Decreased relative teste and ovary weight in offspring (F1 and F2) after subchronic exposure of pregnant mice from GD 0 to PND 21	LOAEL=0.001	UFA=10 UFH=10 UFL=10 UFS=3
Lindane	3 (child)	ATSDR ^f (2016)	Reduced relative testicular and epididymis weight, spermatid and sperm counts, and testosterone level in male offspring of rats after acute exposure (6 days) during lactation	LOAEL=1	UFH= 10 UFA= 10 UFL= 3

BMDL: benchmark dose modelling; GD: gestational days; LOAEL: low observed adverse effect level; MF: modifying factor; NOAEL: no observed adverse effect level; PND: postnatal day; UF_A: interspecies uncertainty factor; UF_D: database deficiency uncertainty factor; UF_H: intraspecies uncertainty factor; UF_L: LOAEL uncertainty factor; UF_S: acute/subchronic uncertainty factor.

^a “Gest” correspond to RfD specific to gestational exposure and “child” to RfD specific to postnatal exposure.

^b Retrieved from: <https://oehha.ca.gov/chemicals>

^c Assumption of similar toxic potency between congeners having the same molecular formula (same number of halogenated atoms) led to use the RfD of BDE 99 also for BDE 100.

^d Retrieved from: <https://www.anses.fr/fr/content/les-valeurs-de-r%C3%A9f%C3%A9rence>

^e For PCB 101 and 118, only Pocar et al. (2011) studied combined exposure to both congener and their LOAEL for reprotoxic effects was employed to construct a common RfD_{rep}.

^f Retrieved from: <https://www.atsdr.cdc.gov/mrls/mrllist.asp>

Table S8: Hazard indexes for reprotoxic indoor SVOCs in France (median and high uptakes with percentiles 50th and 95th respectively)

SVOC	Children		Adults		Pregnant women	
	p50	p95	p50	p95	p50	p95
Dieldrin	0.07	0.3	0.02	0.1		
Lindane	0.0009	0.01				
Chlorpyrifos	0.000007	0.00002	0.000003	0.000007	0.000002	0.000005
Benzo[a]pyrene	0.02	0.1	0.006	0.03		
ΣPCB 101+118	1	5			0.1	1
BBP	0.0002	0.0006	0.00002	0.00008		
DBP	0.3	2.1	0.004	0.03	0.1	0.7
DEHP	0.2	0.6	0.02	0.08	0.002	0.007
DEP	0.002	0.02	0.0006	0.005		
DiBP					0.004	0.01
DiNP					0.00009	0.0004
BDE 47	1	2.7				
BDE 99					0.00004	0.00009
BDE 100					0.00005	0.0002
Hazard index	3	8.1	0.07	0.2	0.3	1.4

Table S9: Relative potency factors (RPF) and TEF (Toxicity Equivalent Factors) used for tier 2 cumulative assessments

Reference	SVOCs	Relative toxicity indicator
TEF (Ineris 2003)	Benzo(a)pyrene	1
	Anthracene	0.01
	Fluorene	0.001
	Phenanthrene	0.001
TEF (Van den Berg 1998, 2006)	PCB 105	0.0003
	PCB 118	0.0003
RPF (Benson 2009)	DEHP	1
	BBP	0.21
	DBP	0.64
	DiBP	0.24
	DiNP	0.39
RPF (Hannas et al., 2011)	DEHP	0.11
	DiBP	0.15
	DiNP	0.06
RPF (Fournier et al., 2016)	Benzo(a)pyrene	1597
	DEHP	1.08
	DEP	22.63
	BBP	0.095
RPF from this study based on benchmark doses (BMD10 in μM) indicated in brackets and corresponding to a decrease of 10% in neuronal viability (Fournier et al., 2017)	Chlorpyrifos	1 (20.1)
	Benzo(a)pyrene	8.27 (2.4)
	DEHP	1.89 (10.6)
	PCB 52	0.5 (39.9)
	PCB 153	279.03 (0.1)
	Dieldrin	1.29 (15.5)
	Lindane	0.52 (38.9)
	BDE 47	4.16 (4.8)
BDE 99	2.95 (6.8)	

Table S10: Reference compounds’s cancer slope factor (CSF) or reference dose (RfD) retrieved from literature or established by the authors for specific health effects and used for cumulative risk assessment, tier 2 by using toxicity equivalency factor and relative potency factor approaches. Reference compounds were selected from the literature for PAHs (benzo(a)pyrene as recommended by Ineris, 2003), PCBs (2,3,7,8-TCDD as recommended by Van den Berg 1998, 2006), phthalates (DEHP and DPP as recommended respectively by Hannas et al. 2011 and Benson et al., 2009), and a mixture of reprotoxic SVOCs (cypermethrin as recommended by Fournier et al., 2016). For mixture of neurotoxic SVOCs, we consider the chlorpyrifos as the reference compounds because of its well-known neurotoxic effect, and the availability of a relevant RfDs as described in the method section.

SVOC	CSF (mg/kg-bw/d) ⁻¹ /RfD ^a (mg/kg-bw/d)	Reference	Critical effect (following oral exposure)	Point of departure (mg/kg-bw/d)	Uncertainty factor
Benzo[a]pyrene	CSF=1	US EPA ^b (2017)	Based on the tumor response in the alimentary tract (forestomach, esophagus, tongue, and larynx) of female mice after oral chronic exposure of 2 years	na	na
Chlorpyrifos	RfD=0.0001 (child)	OEHHA ^c (2010)	Reduced plasma and red blood cells cholinesterase activity in adult Beagle dogs after chronic exposure (2 years)	NOAEL=0.03	UFH=10 UFA=3 UF ^d =10
Chlorpyrifos	RfD=0.001	ATSDR ^e (2016) ANSES ^f (2015)	Reduced red blood cells cholinesterase activity in adult male and female rats after chronic exposure (2 years)	NOAEL=0.1	UFH=10 UFA=10
Cypermethrin	RfD=0.04	This study (from Fournier et al., 2016)	Decreased testosterone level in adult male rats after acute exposure (15 days)	BMDL ₁₀ =3.7	UFA=10 UFH=10
DEHP	RfD=0.044 (gest)	Health Canada (1994)	Decreased fetus number after acute exposure (17 days) of pregnant mice	NOAEL=44	1000
DPP	RfD=0.2 (gest)	Benson (2009)	Decreased fetal testosterone production after acute exposure (10 days) of pregnant rats	BMDL _{1SD} =17	100
2,3,7,8-TCDD	RfD=7.10 ⁻¹⁰	US EPA ^b (2012)	Decreased sperm count and motility in men exposed to TCDD as boys. Increased TSH in noenates.	LOAEL=2.10 ⁻⁸	UFH=3 UFL=10

na: not available

^a “Gest” correspond to RfD specific to gestational exposure and “child” to RfD specific to postnatal exposure.

^b Retrieved from: <https://cfpub.epa.gov/ncea/iris/search/index.cfm?>

^c Retrieved from: <https://oehha.ca.gov/chemicals>

^d Additional factor for children extrapolation

^e Retrieved from: <https://www.atsdr.cdc.gov/mrls/mrllist.asp>

^f Retrieved from: <https://www.anses.fr/fr/content/les-valeurs-de-r%C3%A9f%C3%A9rence>

Table S11: Reference doses (RfD) constructed for the 8 PCBs included in this study from the RfD retrieved from literature for the Aroclor 1254 for immunotoxic effect

SVOC	RfD ($\mu\text{g}/\text{kg}\text{-}\text{bw}/\text{d}$)	Reference	Critical effect (following oral exposure)	Point of departure ($\text{mg}/\text{kg}\text{-}\text{bw}/\text{d}$)	Uncertainty factor
Σ 8 PCB (28, 31, 52, 101, 105, 118, 138, 153)	0.007	This study (from Arnold et al., 1995 and Tryphonas et al., 1991)	Immunotoxicity in offspring after subchronic exposure to Aroclor 1254 of pregnant monkeys during gestation and lactation (46 weeks) and in adult after chronic exposure of 23 and 55 months	LOAEL=0.005* 0,34 ^a	UFH= 10 UFA= 10 UFL= 3

^a The LOAEL was multiplied by a factor of 0.34 which correspond to the proportion (34%) of the 8 congeners in the Aroclor 1254.

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