

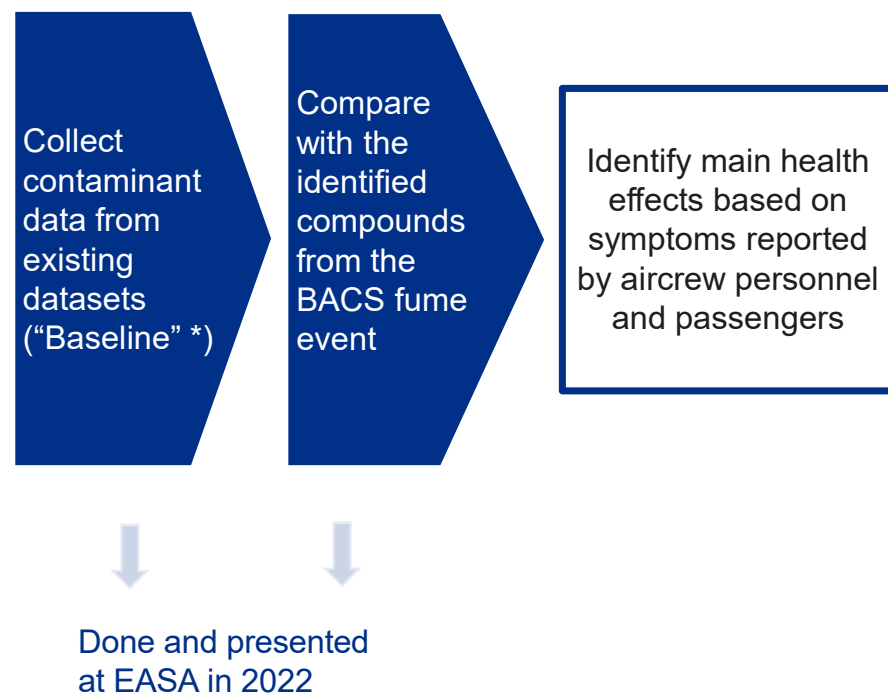
WP1 Toxicology & Health Hazard Identification

EASA CAQ III

EASA CAQIII Stakeholder Workshop
Cologne, February 20-21th 2024



WP1 Flow and input from other parties



Symptoms reported by aircrew personnel and passengers experiencing contaminated air in aircrafts

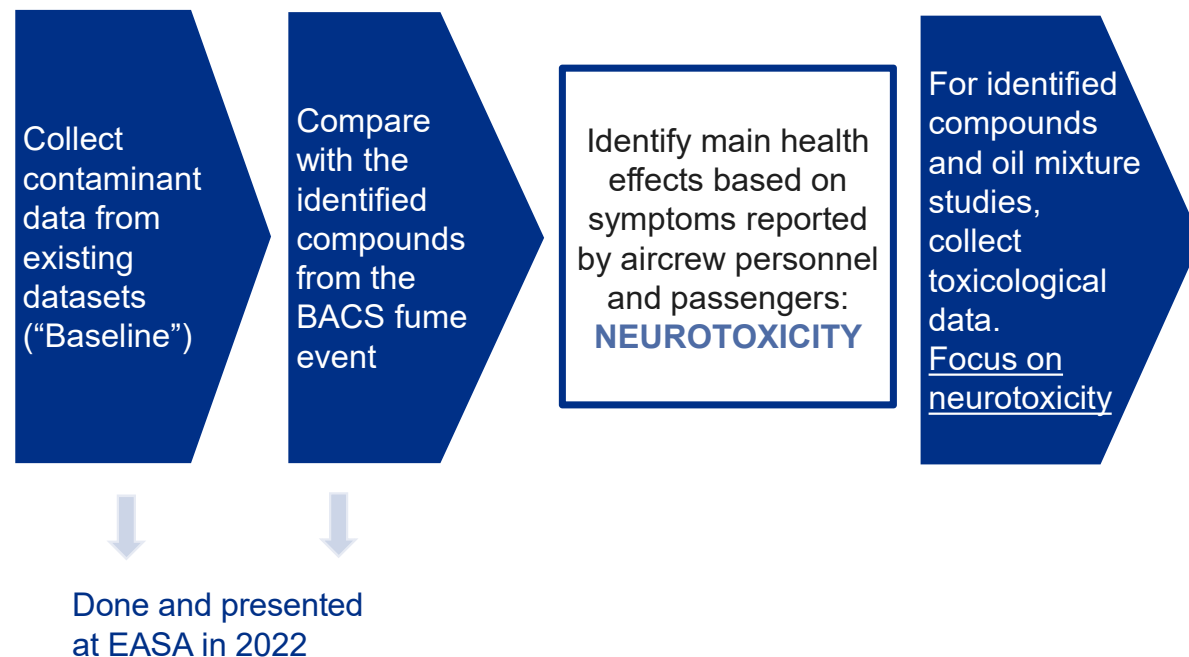
Neurological symptoms marked in yellow

TABLE 2: STUDY B: INDEPENDENT MEDICAL FINDINGS/DIAGNOSES BY MEDICAL STAFF			
SHORT-TERM MEDICAL FINDINGS & DIAGNOSES	No.	LONG-TERM MEDICAL FINDINGS & DIAGNOSES	No.
Hydrocarbon fume inhalation/chemical injury on aircraft	1	RADS [Reactive Airways Dysfunction Syndrome] / occupational asthma	6
Adverse effect on the vocal chords and bronchial tubes	1	PTSD [Post Traumatic Stress Disorder]	3
Tricresyl phosphate (TCP) in blood	1	Neurotoxic injury	1
Raised levels of VOCs, nickel, cell degradation	1	Toxic encephalopathy	1
Double hernia due vomiting	1	Neuropathy on vocal chords/limbs	3
Poisoning by non-medical agent	5	MCS [Multiple Chemical Sensitivity]	1
SpO2 70% / 80% [peripheral capillary oxygen saturation]	2	CFS [Chronic Fatigue Syndrome]	1
Abnormal blood results: CK; CK-MB; LDH; GOT (AST); GPT (ALT)	2	Anxiety/depression	1
Traumatic muscle damage and ischemia due excessive athletic sports or contamination	2	Cognitive dysfunction	4
Toxic effect of gas, fumes or smoke	2	Dementia	1
Possible inhibition of the enzyme AChE or other neurospecific esterase caused by organophosphates	2	ADHD [Attention Deficit Hyperactivity Disorder]	1
Toxicopy	2	Seizure disorder	1
carboxyhemoglobin at or above the high normal range - exposure to burned organic chemicals	4	Depression	1
TOCP [Triortho cresyl phosphate] adduct on Bche	1	Aerotoxic syndrome	1
Inhalation injury	1	Chemical injury at work	1
Organophosphate [OP] type poisoning/internal bleeding	1	Neurological chemical injury	1
		CNS injury	1
		G4 GBM [deceased] - [Glioblastoma brain tumour]	1
		Wallerian degeneration	1
		Vocal polyps	1
		Heart attack + phosphate exposure [deceased]	1
		Frontal lobe damage	1
		Optic nerve damage	1
		Migraines	1



Michaelis et al. 2017, Public Health Panorama

WP1 FLOW and input from other parties



We have the list of substances that are increased during the BACS simulated fume event



Substance names

Formaldehyde	Nonanoic acid
Acetaldehyde	Decanoic acid
Acetone	Acetic acid
Propionaldehyde	Isopropyl alcohol
Butyraldehyde	Acetophenone
Propionic acid	Butanone
2-methyl butyric acid	Hexanal
Pentanoic acid	Heptanal
Hexanoic acid	1-Octanol
Heptanoic acid	Many unknown VOCs, about 100 unknown compounds, with an estimated proportion of 350 µg/m ³
Octanoic acid	Methylsiloxanes of complex composition

Databases were searched and data retrieved

- Gestis Database – Toxicological report, Occupational Exposure Limits (OELs) and Derived No Effect Levels (DNELs)
- RTECS – Reports
- EU harmonised classifications
- EU notified classifications
- Quantitative structure activity relationship (QSAR) testing on human respiratory sensitisation
- REACH dossiers, registration reports and studies of neurotoxicity
- Scientific Committee on Occupational Exposure Limits (SCOEL) reports
- Risk assessment committee (RAC) reports
- Scientific Committee on Consumer Safety Reports (SCENIHR) (EU)
- International Programme on Chemical Safety (IPCS) reports
- Literature available in the PubMed and Web of Science databases



Database finished in draft

Number for sorting	Name (of substance identified in Simulated BACS fumecrest Measured in the breathing zone of the animals)	CAS number	Gestis profile search possible?	OEL in GESTIS	DNEL registered (Local) [mg/m³]	DNEL registered (Systemic) [mg/m³]	RTECS contains acerotox?	RTECS contains acerotox?	EU harmonised classifications, health (Yes, No) Annex VI ATP18 https://echa.europa.eu	EU harmonised classification for acerotox (STOT3, STOT5, STOT6)	Index No	Internal Chemical Identification	EC No	CAS No	Classification	Labelling		Specific Conc. Limits, M-factor	Notes	ATP inserte d/ATP Updat ed	H330 - Fatal if inhaled	H331 - Toxic if inhaled	H332 - Harmful if inhaled	H334 - May cause allergy or asthma	H335 - May cause respiratory target	AC: H336, specific target	EU Modified classifications	QSAR human respiratory sensitization	Is there a REACH dossier?	REACH studies of acerotox (OECD TG 424) in E-Chemportal https://www.echemportal.org/echa	SCoEL report yes / no	SCoEL contains acerotox?	Risk assessment report (RAC)	RAC contains acerotox?	Scientific Committee on Consumer Products	SCoEL contains acerotox?																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
																H3302 Dgr	H225																				GH502 Dgr	H225	STOT SE 3: H335; C ≥ 10 % Skin Corr. 1B; H314: C	B	CLP00	H335 H336	H335 H336	H335	H335	H331 H332	H332 H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335	H335

Zoomed in (first section)

Name (of substance identified in Simulated BACS fume event Measured in the breathing zone of the animals)	CAS number	Gestis profile search possible?	OEL in GESTIS	DNEL registered (Local) [mg/m³]	DNEL registered (Systemic) [mg/m³]	RTECS reports available	RTECS contains neurotox?	EU harmonised classifications, health (Yes, No) Annex VI ATP18 https://echa.europa.eu/da/information-	EU harmonised classification for neurotoxicity (STOT3, H336)
Formaldehyde	50-00-0	Yes	Yes	0,375	9	Yes	Yes	Yes	No
Acetaldehyde	75-07-0	Yes	Yes	No	No	Yes	Yes	Yes	No
Acetone	67-64-1	Yes	Yes	No	1210	Yes	Yes	Yes	Yes
Propionaldehyde	123-38-6	Yes	Yes	12,1	6,1	Yes	Yes	Yes	No

Zoomed in (2)

Index No	International Chemical Identification name	EC No	CAS No	Classification		Labelling			Specific Conc. Limits, M-factors	Notes	ATP inserted/ ATP Updated	H330 - Fatal if inhaled	H331- Toxic if Inhaled	H332- Harmful if Inhaled	H334 – May cause allergy or asthma symptoms or
				Hazard Class and	Hazard Statement	Pictogram, Signal	Hazard statement	Suppl. Hazard							
605-001-00-5	formaldehyde ...%	200-001-8	50-00-0	Carc. 1B Muta. 2 Acute Tox.	H350 H341 H331	GHS08 GHS06 GHS05	H301 H311 H331		STOT SE 3; H335: C ≥ 5 %	B D	CLP00/ATP 06	No	Yes	No	No
605-003-00-6	acetaldehyde; ethanal	200-836-8	75-07-0	Flam. Liq. 1 Carc. 1B Muta. 2	H224 H350 H341 H335	GHS02 GHS08 GHS07 Dgr	H224 H319 H341 H350				CLP00/ATP 13	No	No	No	No
606-001-00-8	acetone; propan-2-one; propanone	200-662-2	67-64-1	Flam. Liq. 2 STOT SE 3 Eye Irrit. 2	H225 H336 H319	GHS02 GHS07 Dgr	H225 H319 H336	EUH066			CLP00	No	No	No	No
605-018-00-8	propanal; propionaldehyde	204-623-0	123-38-6	Flam. Liq. 2 STOT SE 3 Skin Irrit. 2 Eye Irrit. 2	H225 H335 H315 H319	GHS02 GHS07 Dgr	H225 H319 H335 H315				CLP00	No	No	No	No

Zoomed in (3)

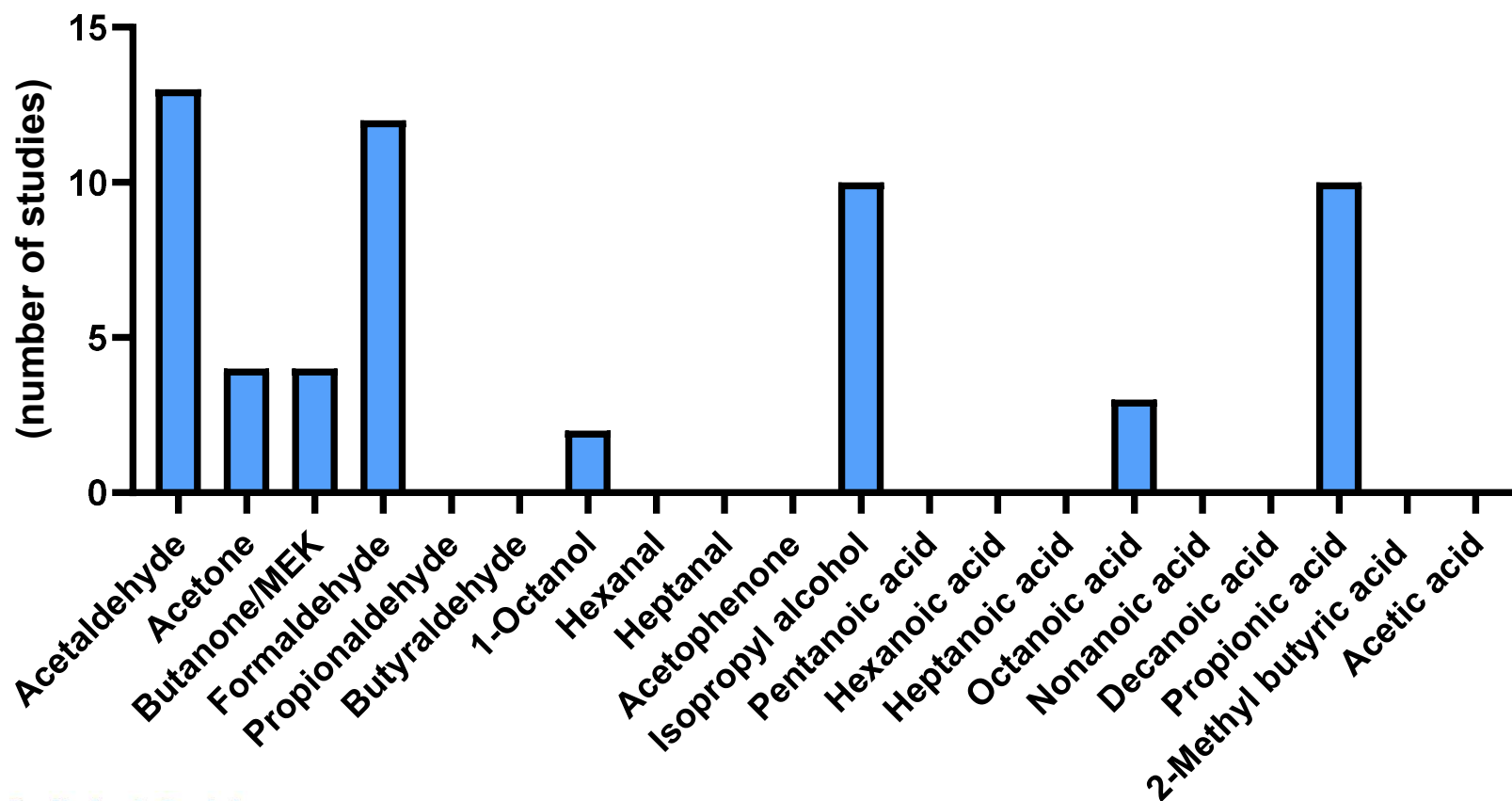
STOT SE 3- H335 – May cause respiratory irritation.	STOT SE 3: H336, specific target organ toxicity, Dizziness	EU Notified classifications	QSAR human respiratory sensitisation	Is there a REACH dossier? (yes/no)	REACH studie of neurotox (OECD TG 424) in E-Chemportal https://www.echemportal.org/echemportal/ ?	SCOEL report yes / no	SCOEL contains neurotox?	Risk assessments t report (RAC)	RACcontains neurotox?
Yes	No	H331 H334 H335	Negative or outside domain (not	Yes	No	Yes	Yes	Yes	No
Yes	No	H335 H336 - Nervous System H332	Negative or outside domain	Yes	No	No	No	Yes	No
No	Yes	H336 - CNS H335	Negative or outside domain	Yes	No	Yes	Yes	No	No
Yes	No	H332 H335	Negative or outside domain	Yes	No	No	No	No	No

Zoomed in (4)

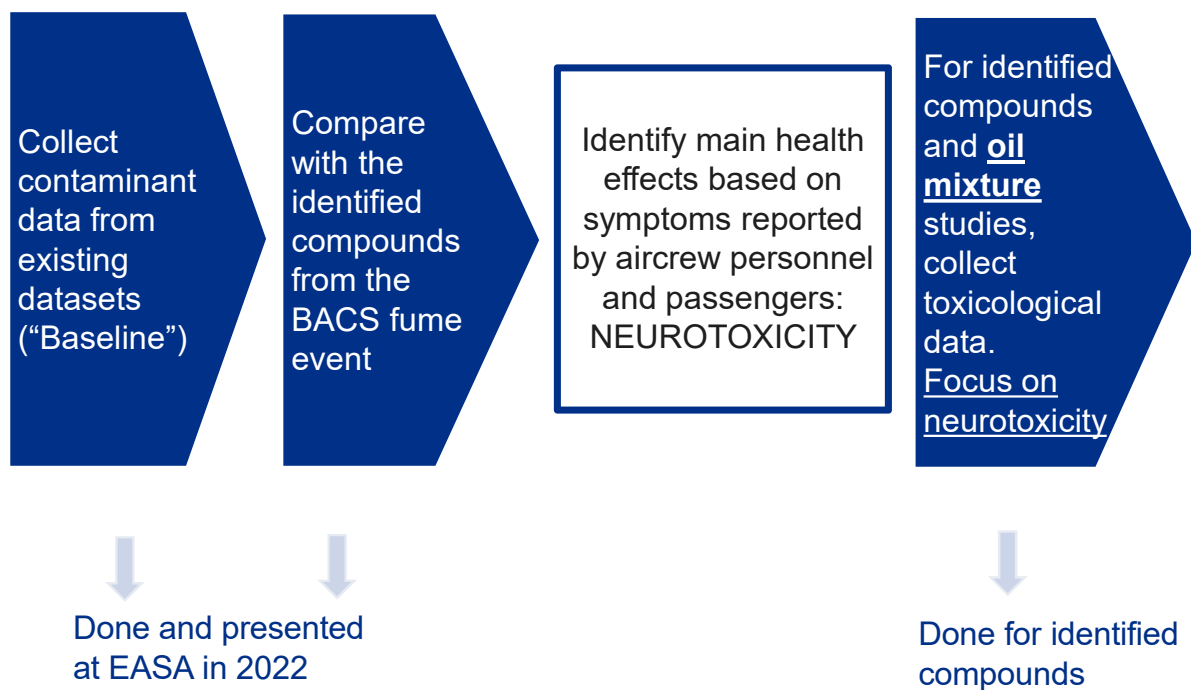
Scientific Committee on Consumer Safety (SCENIHR)	SCENIHR contains neurotox?	REACH registration report	International Programme on Chemical Safety(IPCS	IPCS contains neurotox?	Litterature available in PubMed
N/A	N/A	Yes	Yes	No	Yes
N/A	N/A	Yes	Yes	Yes	Yes
N/A	N/A	Yes	Yes	Yes	Yes
N/A	N/A	Yes	Yes	No	Limited

Substances identified in the BACS simulated fume event: Available peer-reviewed literature on neurotoxicity

Studies on neurotoxicity



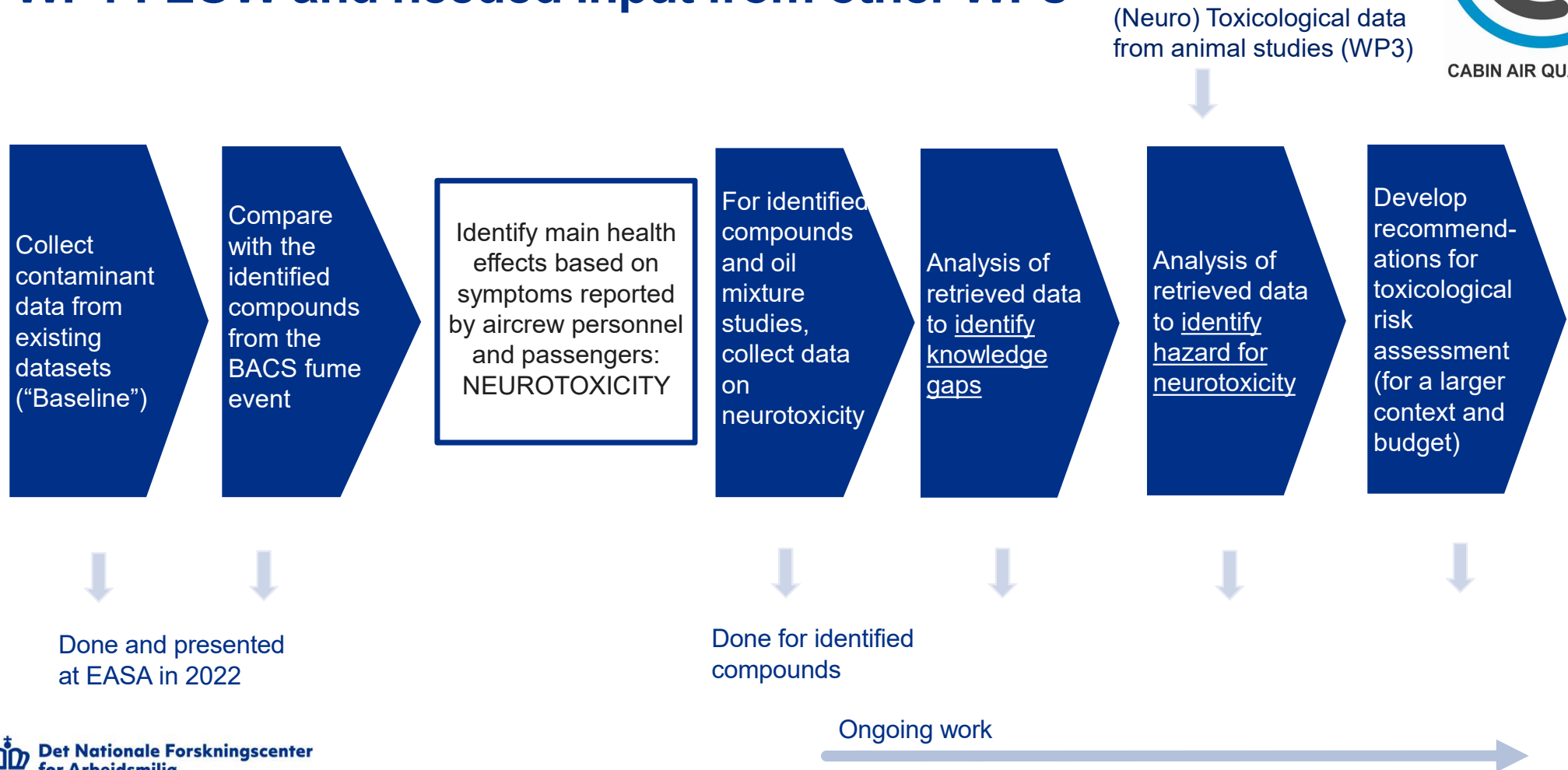
WP1 FLOW and input from other parties



Oil mixture studies

- Literature is collected for oil mixture studies:
 - a) Human data
 - b) Data from studies in animals
- We are currently reviewing the studies to obtain conclusions to feed into the interpretation of:
 - a) The CAQIII animal studies
 - b) Hazard identification of the area

WP1 FLOW and needed input from other WPs



Thank you for your attention!



InstPharmToxBw



LIEBHERR

Honeywell

