Our Children

Poisoning Children vs Adults

Chemicals target the nervous system.

The manner in which a child's body handles foreign substances, in the possible case scenario that we are focussing on here : **‚fume/ smell events'** on aircraft, whether by ‚accidental' exposure or otherwise, the resulting response may vary substantially from the average adult.

Absorption, distribution, metabolism, excretion rates change as we age and are major determining factors for the actual dose received by the targeted (storage) organ in the body. The response to chemical exposure can vary greatly between different age groups.
This is also due to variation among the stages of development within the body.

In some cases the actual response may be opposite to the expected response – which is soften not recognised by first-aiders and physicians.

From embryonic development in the womb through adolescence, children are forming organs to last a lifetime. Exposure to chemicals that target developing organ systems can cause organ malformations (birth deffects), disruption of organ function and even premature death (misscarriages).

The nervous system and the lungs have little ability to repair themselves if harmed during development. The nervous system developes throughout childhood making it especially vulnerable. The immune and endocrine (hormonal) system are also important targets of (neuro-) toxins.

Immature organ systems may not be capable of metabolizing or neutralizing certain foreign materials quite as effectively to rid the body of waste. Also, an immature immune system will not respond as quickly to remove or neutralize foreign materials harmful to the body.

Note: Our bodies are not made to metabolise SYNTHETIC materials!

Per pound of body weight a child ingests more food, drinks more water, and inhales more air than an adult.

So, logically, **exposure to dangerous substances translates into <u>higher doses</u> for babies and children under the same exposure scenario as adults.** ([i] source)

Signs and Symptoms

Medical students, clinical toxicologists and emergency room physicians are often taught acronyms for the classic constellation of symptoms of cholinergic excess:

- copious respiratory and oral secretions
- diarrhea and vomiting
- sweating
- altered mental status
- autonomic instability
- and generalized weakness
- that can progress to paralysis and respiratory arrest

One example is **M-U-D-D-L-E-S**:

- **m**iosis,
- **u**rination
- **d**iarrhea
- **d**iaphoresis
- **l**acrimation
- **e**xcitation of the central nervous system
- **s**alivation.

This works reasonably well in adults.

However, reviews indicate that (organophosphate =OP) poisonings in children often manifest with hypotonia or mental status changes such as lethargy and coma, as well as seizures which are not as common in adults.

Diagnosing OP poisoning in children is complicated by the fact that the non-specific symptoms of acute pesticide toxicity can easily be attributed to common pediatric diagnoses such as respiratory infections, viral syndromes, gastroenteritis, atopic dermatitis or drug-related encephalopathy.

Diagnosis of organophosphate poisoning is often made based on the history of significant exposure and consistent symptoms.

If organophosphate poisoning is suspected, which could be the case after a so called 'fume event' onboard an aircraft, immediate treatment is recommended without waiting for laboratory confirmation.

Please make sure to tell your physician that it could be from the inhaled fumes on the aircraft – and if you have been exposed to a so called 'desinsection', the spraying of pesticides on board before landing in certain countries, please mention that too (in this case i.e. used can-ingredients could be: permethrin, d-phenothrin, resmethrin etc.)!

Also, you should know that you have been exposed to toxic fumes if you 'only' smell strong odours, but do not actually see fumes or mist. Smells are similar to very smelly socks, wet dogs, electrical smells, vomit type and burn smells, all of which could be caused by a mixture of chemicals, which are inhaled and uncovered skin and eyes are exposed to. Each breath is a dose!

Also note, that if many others are feeling sick, complaining of sudden onset of headaches or many are even vomiting and feeling dizzy, it can very well be in connection with such fumes/ smells = First reactions to a poisoning!

Immediate consultation with a poison/poisoning specialist (toxicologist) is recommended and is available through online call-centres usually called something like "Poison Help Center in" every country. Please ensure that you also report in writing to the airline/s and the regulating bodies! (can be done on-line, please download a copy and save that).

In suspect cases, blood samples should always be drawn (within hours, latest within 24 to max 48 hours) to measure plasma pseudo-cholinesterase and red blood cell (RBC) acetylcholinesterase (AChE) levels.

These tests are available in most hospital laboratories. Depressions of plasma pseudocholinesterase and/or RBC AChE activities are indicative of organophosphate absorption.

The enzyme depression becomes apparent within a few minutes or hours after absorption of organophosphates. Certain organophosphates may selectively inhibit either plasma pseudocholinesterase or RBC acetylcholinesterase.

Depression of the plasma enzyme generally persists for several days to a few weeks.

The RBC enzyme activity may take several days to reach its minimum and usually remains depressed longer, sometimes 1-3 months, until new enzyme replaces that inactivated by organophosphate. (source [ii])

Furthermore:

Physicians should also be made aware of the WHO classification listings available for them to consult here, especially if you are an airline worker/ crew-member:

WHO ICD-10 Classification 2016 (World Health Organisation)

http://apps.who.int/classifications/icd10/browse/2016/en#/X49

http://apps.who.int/classifications/icd10/browse/2016/en#/X46

http://apps.who.int/classifications/icd10/browse/2016/en#/X47

http://apps.who.int/classifications/icd10/browse/2016/en#/T51-T65

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[i] Source: http://extoxnet.orst.edu/faqs/extoxnet.htm

[ii] Source: http://depts.washington.edu/opchild/acute.html