



At *risk* from a young age?

While children need our protection from many health risks, they are not as helpless as they may seem.

Illustrations: André Gottschalk

Minimise risks – the guiding principle before a child is even born. So much so that the German Federal Institute for Risk Assessment (BfR) advises that women planning a pregnancy consume extra folic acid in their diet as well as through supplements beginning at the latest four weeks before conception. Until the end of the first trimester, a consistently higher intake of folate is required to prevent early stage developmental deformities of the embryo known as “neural tube defects” (e.g. “spina bifida”).

EVERYTHING FOR THE CHILD

When children become more curious and mobile with time, more and more substances come into play – both intentionally and accidentally. Parents

constantly ask themselves new questions. Does the teething ring contain plasticisers? Are there carcinogens in the finger paint? Which seemingly harmless everyday items such as toilet cleaner or laundry detergent gel tabs can lead to accidental poisoning?

These examples show that parental responsibility is rarely child’s play and requires parents to be on constant alert for countless health risks. But does it also mean that mum, dad and the rest of the family need to tread so carefully around their child to protect them from every perceived and real risk? While there is no way to eliminate worry entirely, science can offer support. Scientists at the BfR focus on many of these questions and deliver answers and assessments with their own research. For example, the BfR advises pregnant women to avoid

eating raw meat. This reduces the risk of an infection from toxoplasma pathogens that can harm children in the womb. And children under one year of age should not eat honey due to the risk of infant botulism, a severe bacterial disease.

SMALL, BIG, DIFFERENT

French painter Henri Matisse once said, "One must not forget to view the world through the eyes of a child." To a certain extent this also applies to scientific risk assessment because it is not sufficient to assess harmful effects of a substance on healthy middle-aged people alone. There are certain risk groups that also need to be considered, for example, the elderly, people with certain illnesses, pregnant women and children. The BfR pays close attention in particular to children's unique characteristics in its risk assessments.

Since children have higher energy requirements, they ingest higher amounts of a substance via food than an adult (exposure) in relation to their body-weight. This is also true for intake via the skin and through inhalation. "This means that children have higher concentrations in their body which possibly can lead to a stronger effect," says BfR Vice President Professor Dr Tanja Schwerdtle.



Swallowed button cell batteries can cause chemical burns to the oesophagus. The BfR regularly counsels parents and caregivers on the risks.

How a substance is distributed, broken down, as well as excreted from the body is also important. When it comes to certain harmful substances, these processes are much slower in the first year of life. Older children, on the other hand, break down some substances even faster than adults (kinetics). "This too is related to high energy turnover and the high metabolic performance connected with it," says food chemist Schwerdtle, who also heads a department at the BfR assessing the risks for sensitive subpopulations.

As a child's body is still growing and maturing in all aspects, individual organs and tissues can be more



When playing with toys, children can be exposed to lead. Even the smallest amounts of lead negatively affects their health, which is why toy materials must comply with strict EU limits.



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Professor Dr Tanja Schwerdtle, BfR Vice President

sensitive or react differently to undesired substances. Children may be particularly sensitive in certain time periods, such as before birth or in the first year of life (dynamics). Lastly, behaviour is a decisive factor. “Due to their curiosity, young children are especially at risk of putting things in their mouth and choking,” explains Schwerdtle. With increasing self-responsibility and a collected wealth of experiences and observations, this situation changes – although the teenage years reintroduce higher risk propensity.

ALL IN THE SAME BOAT

The annual statistics of the seven German Poison Centres (GIZ) show that roughly half of all inquiries involve children under four years of age. Toddlers try everything. This can lead to problems in the home if cleaning supplies or medicines are stored in reach of



Spraying deodorant onto skin beyond the pain threshold – or even inhaling it on purpose: the “deodorant challenge” can lead to skin damage and circulatory collapse.

children or if aesthetically pleasing plants are toxic.

It is primarily up to parents to know what happens within their own four walls. However, the responsibility is on manufacturers to make products such as toys and household chemicals as safe as possible. Depending on the product, this can relate to multiple aspects such as ingredients, materials used, or a child-proof design (e.g. of a battery compartment or screw top). Many of these measures are the result of legal requirements based on scientific research – which leads us back to risk assessment. Much is being done for children in this field (see box) to learn more about what substances in food and “everyday things” they are exposed to and in what amounts. The results are part of the BfR’s risk assessments,

which serve as a basis for policymakers regarding laws and regulations.

A vital part of this is risk communication, a legal mandate for the BfR. It is aimed at multiple target groups including adolescents. Since 2013, the BfR has offered the free app “Poisoning accidents among children”. The app, which is being continuously developed, features information about the ingredients in chemical products, plants and medicines. It also provides tips on what to do in a poisoning emergency as well as the phone numbers for the Poison Centres.

In 2026, the BfR will also launch a central poisoning register that collects information on cases of poisoning reported by all Poison Centres across Germany as well as by physicians directly to the BfR. Data

BFR RESEARCHES RISKS TO CHILDREN

Assessing health risks requires knowledge – on the one hand regarding which substances are harmful and how they impair health (hazard), and on the other hand about how we are exposed to potentially dangerous substances and in what amounts (exposure). Risk assessment takes into account both the potential hazard of a substance and the amount to which an organism is exposed. The BfR carries out its own research to fill knowledge gaps. For example, the EDKAR study investigates associations between teenage consumption of energy drinks as well as other lifestyle factors, and teenager’s cardiovascular risks. The KiESEL study researches the food consumption of children between six months and five years of age. The BfR MEAL study analyses the ingredients of different meals typically prepared in Germany and clarifies what substances in what amounts children are exposed to on average. In the future, it is also planned for children to be involved in the COPLANT study, a long-term observation on plant-based nutritional habits in German-speaking regions.



Long-term excessive consumption of vitamin D supplements can increase blood calcium levels and even cause kidney damage in severe cases. The BfR advises that vitamins and minerals from nutritional supplements are not needed for children that have a varied and balanced diet.

The social media dare to eat tortilla chips strongly spiced with capsaicin (active ingredient of chilli peppers) leads to medical emergencies in serious cases. It has been scientifically proven that children react very sensitively to spicy chili products.



Nervousness and excitability, sleeplessness, sweating attacks and racing hearts are to be expected when children ingest high doses of caffeine. The BfR recommends that children not consume energy drinks.

from the register will provide a national overview of poisoning risks for the first time and will be used to support both risk assessments and targeted risk communication.

GROWING UP: THE BIGGEST CHALLENGE

It is especially crucial to reach teenagers and young adults when it comes to trends that pose risks to health, achieve fast popularity on social media and encourage others to copy. This includes dares that can be harmful to health such as the “hot chip challenge”, in which extremely spicy tortilla chips are eaten, as well as the much riskier deodorant challenge where deodorant is sprayed or inhaled until the pain threshold is reached. There are also the trend-in-

dependent long-running issues of e-cigarette use and alcohol consumption, both of which are subject to age restrictions. In all of these cases, scientific reason in its role as a “buzzkill” battles with appearing cool in front of peers. None of this is easy. Children are only likely to understand later when the cycle begins again and the next generation has to be protected from everyday health risks. —

More information



BfR information
“Children”

“Small children are especially at risk”

Professor Dr Tanja Schwerdtle, Vice President of the German Federal Institute for Risk Assessment (BfR), on the risks of undesirable substances for children – and new research approaches.



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Ms Schwerdtle, why are children especially vulnerable in terms of health risks caused by undesirable substances for example?

In relation to their body weight, children have a significantly higher energy requirement than adults, due to growth and their urge to move. This means they have to eat more – and thus are at risk of consuming more problematic substances, too. Small children are especially at risk because their bodies' detoxification process does not function well yet. On top of this, their organs are still more sensitive and bone growth and pubertal development can be affected. Children's curiosity can also harm them because they can put things such as household chemicals, medicines or button cells in their mouths and choke.

Are there also examples of how the child's organism can better cope with certain risks? Children appear to get over infections faster than adults, for example.

Newborns and infants are still far more sensitive to pathogens. Ten to twelve infections a year are normal for toddlers! The immune system is not sufficiently trained until they reach school age. But this age-dependent development is not as relevant to risks from toxic substances – in this case there is unfortunately no “child bonus”. With one exception: schoolchildren can detoxify some substances faster due to their faster

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metabolism. An example for this is the fever and pain reliever paracetamol. Children need a higher dose in relation to their body weight due to this faster breakdown.

How does the BfR research children’s specific situation?

Important questions of risk assessment can only be answered by observational studies. They compare which effects different amounts of a substance can have on an organism. An example at the BfR is the EDKAR study with which we, together with the Charité in Berlin, are investigating the effect of energy drinks on the teenage circulatory system. And as part of the COPLANT study, a large investigation of plant-based foods, one module also focuses on the eating habits and health of children.

Take food supplements, such as vitamins and minerals, as an example: What do parents need to be aware of when they are considering this for their children?

Such supplements are, with few exceptions, unnecessary for healthy children and adults. They are no replacement for a balanced and varied diet. One exception to this are micronutrients such as fluorine and vitamin D, which are important for young children. Overall, children in Germany get enough of most nutrients.

Which deficits do you see regarding children and risk assessment?

Just not enough is known about the particular health risks for children. Many have been revealed by chance. There were cases of liver cirrhosis in small children up until the 1980s in Germany, Austria and elsewhere in Europe. At some point it was discovered that copper was the cause. It entered the child’s system from copper water pipes and milk containers made of copper, and poisons it. Only then was it understood that the gall bladder regulates copper metabolism. Liver damage occurred because the excretion of toxic substances via the gall bladder is not yet fully functional in small children. —