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**To the Inspector General of the Netherlands Food
and Consumer Product Safety Authority**

**Advisory report of the Director of the Office for
Risk Assessment and Research concerning**

risks in the consumer products domain

**Office for Risk Assessment
& Research**

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Most people use a large number of non-food consumer products on a daily basis. These can vary from child use and care articles, textiles, toys, electrical appliances and amusement rides to tattoo inks and cosmetics. The range of non-food consumer products on the market is immense, and these products contribute to the welfare of consumers, but they can also potentially expose users to physical, chemical and microbiological hazards. The possibility of harmful effects depends on the nature and composition of the products and, also to a large extent, the behaviour of the user.

The Office for Risk Assessment & Research (*Bureau Risicobeoordeling & Onderzoek*, hereinafter referred to as "BuRO"), part of the Netherlands Food and Consumer Product Safety Authority (*Nederlandse Voedsel- en Warenautoriteit*, hereinafter referred to as "the NVWA") has conducted an assessment of risks to public health relating to the use of non-food consumer products (hereinafter referred to as "consumer products"). In addition to public health, consumer products can also pose a threat to other public values such as nature, animal health and animal welfare. These threats can be caused by the manufacturing, usage or disposal of the product in question. In this risk assessment, we only consider risks relating to the use of the end products. Sometimes, public health is endangered indirectly, such as when the use or poor maintenance of a product results in a house fire. To the greatest possible extent, this risk assessment also includes risks of this nature.

The risk assessment for consumer products is part of a BuRO risk assessment programme focusing on risks to public interests in all product categories and production chains under the supervisory jurisdiction of the NVWA. This programme systematically and periodically monitors and gains insight into all risks to people, animals, plants and the natural environment.

The consumer products product category is extremely broad and includes thousands of types of product. Only a small fraction of all consumer products purchased and used in the Netherlands are actually manufactured in the Netherlands. Complete products are very frequently imported: it is estimated that around 75% of products used by Dutch consumers originate from outside the EU (NVWA, 2016). Consumer products and the risks associated with them differ immensely in nature. For example, the risks posed by paint, playground equipment and drills have practically no common ground other than that these products are often available to buy from the same DIY store. Furthermore, manufacturers are continually changing and improving their products, new products are being introduced to the market and new manufacturers and suppliers are entering the marketplace all the time. Given the scale, the diversity and the dynamics in the consumer products category, a risk assessment for this product category will never be 100% complete and up to date. The substantiating information could be out of date, for example, if certain products are removed from the market, if consumer awareness increases or if new trends arise. For this reason, the risk assessment in the report entitled "Risk Assessment for Non-Food Consumer Products 2021" will be amended and supplemented every year based on new information and research. Based on this amended report, BuRO will periodically issue recommendations to the Inspector General of the NVWA focusing on two key questions:

- *How can we ensure optimally knowledge-driven and risk-oriented monitoring of non-food consumer products?*
- *What are the main risks to public health in the non-food consumer products domain?*

The risk assessment for consumer products includes all of the product groups specified as "technical products" in the Commodities Act (*Warenwet*), including food contact materials.

The following products are also included in this category of the risk assessment:

- products that are used by consumers or are offered for sale via sales channels accessible to the consumer, e.g. retail and internet;
- products that are not primarily developed to be sold to consumers but are subsequently made available to them, e.g. rubber playground turf;

- products that are used or are made available to consumers during the process of service provision, e.g. fairground rides, tanning beds in tanning salons, leased DIY equipment or the application of tattoo ink by tattoo artists.¹

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The consumer products category is divided into 16 subdomains based on specific legislation or a specific classification of a product group (such as child use and care articles). The "other consumer products" subdomain includes products that do not qualify as any of the other 15 subdomains.

The NVWA has defined the following 16 subdomains:

- amusement devices;
- child use and care articles;
- biocides and plant protection products;
- chemical substances in consumer products;
- cosmetics;
- portable climbing equipment;
- electrical equipment;
- gas appliances;
- machines (for private use);
- food contact materials;
- personal protective equipment;
- toys;
- playground equipment;
- products used for tattooing or piercing;
- textiles;
- other consumer products.

It was decided to limit the scope of this first domain wide risk assessment, as explained in the description of the scope of the "Risk Assessment for Non-Food Consumer Products 2021". The scope of this risk assessment does not include products governed by other statutory regimes or regulators, namely:

- medicines;
- medical devices;
- rubber granulate for sports fields;
- radio equipment (including products using Wi-Fi and Bluetooth);

¹ Legally, when the product is rented to a specific consumer, this is still classified as trade. If the use of the product by one person or multiple persons takes place at the premises of the operator, as is the case for carnival rides, then it is classified as service provision.

- vehicles;
- alcohol and tobacco (including e-cigarettes);
- fireworks;
- printing equipment;
- products intended for professional use.

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Approach

For the purposes of the recommendations stemming from the "Risk Assessment for Non-Food Consumer Products 2021", all hazards to public health have been classified into one of three categories: physical hazards, chemical hazards and microbiological hazards. A detailed description of the subdomains of consumer products, the risk assessment and the sources (literature) consulted can be found in the "Risk Assessment for Non-Food Consumer Products 2021".

A multidisciplinary team at BuRO created the draft assessment. Divisions of the NVWA's Enforcement Directorate were invited to suggest additions and check for any factual inaccuracies. Subsequently, representatives of sector organisations were asked to check the draft assessment for any factual inaccuracies. At a later stage, a draft was presented to various peer reviewers.

The risk assessment method used involves the customary steps²: hazard identification, hazard characterisation, exposure assessment and risk characterisation. The risk characterisation reflects the degree of risk and is based on the severity of the hazard and the level of exposure to this hazard. These characterisations were based on the EU guidelines for risk classification³ applicable to the non-food consumer products category.

The estimates are subject to a large degree of uncertainty, particularly the estimates for chemical risks. These risks primarily involve long-term effects, and hence a causal dose-response relationship is extremely difficult to establish, if not impossible. Despite these limitations, BuRO still conducted a risk classification and employed the customary scientific approach for the risk assessment of physical, chemical and microbiological hazards.

² As stipulated by the Act established on 26 April 2006 regulating the independent performance of risk assessments by the Netherlands Food and Consumer Product Safety Authority (*Wet van 26 april 2006 tot regeling van een onafhankelijke uitoefening van risicobeoordeling door de Voedsel en Waren Autoriteit*). Bulletin of Acts and Decrees 2006, 247, last amended by Bulletin of Acts and Decrees 2018, 488.

³ Commission Decision 2015/15/EU of 16 December 2009 laying down guidelines for the management of the Community Rapid Information System 'RAPEX' established under Article 12 and of the notification procedure established under Article 11 of Directive 2001/95/EC (the General Product Safety Directive) (2010/15/EU).

The report "Risk Assessment for Non-Food Consumer Products 2021" provides further explanation for each hazard and subcategory of how this risk classification was conducted. In 2020, BuRO commissioned a research agency (Motivaction, 2020) to perform a survey in order to get an impression of risk perception among consumers.

Findings

General findings

- There is an immense degree of diversity between the various product types in the consumer products category. Therefore, the risks involved are also hugely diverse.
- The subdomains vary greatly with regard to legislation and monitoring.
- One important characteristic of consumer products is that a huge range of user scenarios exist. Certain product characteristics can be identified as hazards, although the hazardous situation in question only occurs when a user interacts with the product. This interaction could involve the product being used as intended, although this is not always the case. To an important extent, the risk can also be determined by the abuse and improper use of products. Furthermore, lots of consumer products are used over a long period of time, so factors such as maintenance and wear and tear come into play. With many consumer products, consumers can have a substantial influence on the nature, risk and severity of any possible harmful effects.
- Some products are purchased or maintained by contractors/operators rather than consumers themselves. In such situations, the risks to users are largely determined by third parties. Examples include playground equipment in public spaces or amusement rides. In the case of certain products for which consumers are responsible for the risks, such as gas appliances, the risk to the consumer may be dependent on third parties (for example, a technician who performs maintenance on the appliance).
- There are no national or international databases that provide an adequate overview or insight into hazards and the degree of exposure (or likelihood thereof) to hazardous consumer products across all 16 subdomains. The available databases, such as summaries of hazardous chemical substances, paint a fragmented picture of the risks. As a result, very limited quantitative data are available, and the risk estimates are therefore subject to uncertainty.

- Quantitative risk assessment of physical hazards presented by consumer products generally involves uncertainty due to the lack of sufficient insight into user scenarios. Quantitative estimates of the harmful effects of exposure to chemical substances via consumer products also involve uncertainty. These harmful effects sometimes manifest many years subsequent to exposure or as a result of long-term exposure. There is also the possibility of aggregated exposure, in which case other sources such as food or interior environment can play a role. As a result, estimates concerning the contribution of each source to the risk are largely subject to substantial error, insofar as they are even possible.
- For some subdomains, the data from the NVWA's market research into product failures (physical), the presence of chemical substances or the presence of microbial pollution are dated or only cover one subarea (see Table 3).
- The NVWA's research into consumer products is predominantly conducted in order to facilitate specific projects focusing on direct monitoring and enforcement measures. Research to obtain data for the exposure assessment and risk identification is not conducted periodically.
- In some subdomains, perceived risks among consumers do not match the risk estimates established by BuRO.

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Findings with respect to physical hazards

- Information about acute injuries caused by physical risks associated with consumer products can be found in accident registers such as the Dutch Injury Surveillance System (*Letsel Informatie Systeem, LIS*). It is estimated that, on an annual basis, consumer products play a significant role in approximately 60,000 incidents and accidents that require emergency care at a hospital. No estimates are available for the number of injuries that require treatment from a GP or the number of incidents or accidents for which no medical assistance is sought, as these occurrences are not recorded.
- No scenario descriptions are included with entries in the Injury Surveillance System. For this reason, it is not possible to determine whether the accident was caused by a failure of the product or the behaviour of the consumer. As a result, estimates of the likelihood of injury are subject to uncertainty. No European accident databases comparable to the Injury Surveillance System are available with a specific focus on consumer products.

- The number of published academic studies into physical risks associated with consumer products is small compared to the number of products used in our society, and the studies that have been performed are usually limited to analysis of accident statistics or questionnaire surveys.
- Incidents leading to serious health damage (including death by entrapment, strangulation, suffocation, collision, falls or electrocution) do occur, but they are relatively rare occurrences.
- Falls from and collisions on playground equipment and amusement rides occasionally result in injuries that require hospital admission, long rehabilitation periods and/or incurable health damage.
- Exposure to UV light via tanning beds can mildly affect health and can occasionally cause serious health damage.
- A proportion of house fires in the Netherlands are caused by consumer products such as electrical goods (domestic appliances, mobile battery packs) and gas appliances. Such incidents can easily cause serious injury.
- More and more products featuring rechargeable power sources – including lithium-ion batteries – are appearing on the market. The number of house fires involving a battery or battery pack has risen in recent years.
- Physical accidents involving consumer products can be partly or entirely caused by incorrect or improper use of the products.
- Adequate maintenance of products is a vital factor in minimising physical risks during the service life of products. For many frequently used consumer products that can cause serious damage to health, such as boilers, domestic appliances and machines, maintenance of the product is the responsibility of the consumer. Many consumers may not always be aware of this responsibility and the possible physical risks.
- With regard to amusement rides, the risks are greater when consumers themselves have influence on the course of the ride. The percentage of young users (age range 10-15 years) in the accident register is high.
- With playground equipment and amusement rides, users can also be exposed to risks stemming from improper, negligent or other behaviour by the providers/operators.
- There is only a small number of registered inspection bodies for amusement rides in the Netherlands. This makes the monitoring system vulnerable and can influence risks and risk mitigation measures with regard to public health.

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Findings in respect of chemical hazards

- A number of chemical risks involve possible long-term damage to health. As a result, there is a degree of uncertainty whether certain health damage (e.g. cancer) can be causally linked to exposure to a chemical substance in a certain product. It is also difficult to estimate the effects on consumers of long-term exposure to a certain substance. Moreover, the same substance (or related substances) can be contained in multiple products, meaning risks relating to usage of individual products are not always easy to estimate. The exposure characterisation is subject to a large degree of uncertainty. Furthermore, consumer products cause largely temporary exposure to users, and few to no solid scientific methods are available to make a quantitative estimate of the risks. Using different products can result in aggregated exposure to these substances. In situations where exposure to one product would usually present a low or negligible risk, exposure to multiple products could present a greater risk. This could apply to:
 - o preservatives and allergenic fragrances used in many consumer products such as household and other cleaning agents, cosmetics, toys and textiles;
 - o plasticisers contained in many different consumer products, such as child use and care articles, toys, food contact materials and sex toys.
- There are indications that biocides and plant protection products containing unauthorised substances are currently available on the Dutch market (in the DIY sector).
- To the best of our knowledge, the use of DIY products and household chemicals only presents a risk to consumers if the safety and user instructions on the label are not followed.
- A wide range of chemical substances are found in food contact materials. Usually, insufficient knowledge is available concerning the toxicological properties of these substances. There is also insufficient knowledge concerning whether these substances can migrate to foodstuffs. For this reason, these substances can present a risk to public health, and this risk varies for each different combination of substances and food contact materials.
- Tattoo inks can contain substances that could damage the health of the large group of exposed consumers. Laser removal of tattoos can release toxic degradation products stemming from colour inks. The quantity of

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degradation products released depends on the size of the tattoo being removed. The long-term effects of chemical substances in tattoo inks as well as the degradation products are as yet unknown, although they present a risk to public health, especially when you consider that some people have extensive tattoos, and some people also have tattoos removed.

- Most of the chemical substances used for the production of textile products are washed out of the products. Nevertheless, some residues can remain in the textiles for some time, resulting in consumers being exposed during use. Azo dyes in particular can present risks to consumers.
- Occasionally, child use and care articles and toys can also contain hazardous substances such as nitrosamines, plasticisers and bisphenols.
- From time to time, cosmetics can contain pharmacologically active substances or other active substances that can pose a risk to public health.
- Jewellery – including piercings – occasionally contain heavy metals, particularly lead, cadmium and nickel, which constitute a risk to public health.

Findings with respect to microbiological hazards

- Safety Gate reports show that water-based consumer products could be microbiologically contaminated, particularly products manufactured outside the EU.
- In the Netherlands, all reported cases of illness ascribed to microorganisms in consumer products are limited to sporadic cases and a few outbreaks.
- Consumer products that are particularly prone to contamination with microorganisms include child use and care articles (e.g. soothers), specific biocides and plant protection products such as microorganism-based cleaning agents, fluids in consumer products (e.g. water-based paint, screen cleaners, fluid for bubble machines or smoke machines), cosmetics, food contact materials (e.g. ice-cube trays, reusable trays), toys (e.g. bubble fluids), fluids for tattooing and piercing (e.g. tattoo ink) and other consumer products (e.g. potting soil).
- In the event that antimicrobial agents are used in consumer products (such as textiles), there is a small risk of antimicrobial resistance developing.
- In the event poor hygiene is practised, microbial contamination via the use of consumer products can present a risk in practically all categories. This is particularly the case when used by people who are unaware that they are

carriers of pathogenic microorganisms for which the symptoms increase the risk of infection.

- Social behavioural trends relating to the circular economy and sustainability (e.g. washing clothes at a lower temperature, recycling waste into compost, lowering the temperature of the boiler, etc.) can increase the likelihood of microorganisms developing and therefore increase the risk of exposure.
- In many categories of consumer products such as toys and electronic devices, new products are frequently entering the market. Furthermore, the reuse of consumer products is a growing trend, such as refurbished products.
- In certain situations, citizens can be exposed to pathogenic microorganisms in their living environment but can protect themselves against exposure using personal protective equipment. In such cases, consumers must be able to trust that specific consumer products provide adequate protection against dangerous microorganisms. Examples of such products include face masks and hand sanitisers during the COVID-19 pandemic.

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Conclusions

In many cases, the hazard identification and hazard characterisation of physical and microbiological hazards presented by consumer products can be adequately conducted as data on human health are readily available. However, in most cases, the exposure assessment is much more difficult to conduct due to the lack of data, so even in the best case scenario, the risk assessment is only semi-quantitative.

The assessment and characterisation of chemical hazards is predominantly qualitative, as adequate dose-impact relationships often cannot be established and human studies often do not clearly demonstrate a causal relationship between exposure via a consumer product and the manifestation of symptoms. Establishing a causal link between chemical exposure and long-term effects in particular involves a large number of uncertain factors. Furthermore, the extent to which consumers were actually exposed during use of the product is often unclear due to a lack of information about the migration of substances from the consumer product in question. In specific cases, e.g. chemical substances in food contact materials, too little knowledge is available about which substances are even involved, let alone data about their effects on human health.

Despite the uncertainties involved in the chemical risk assessment, there are interesting clues that some plasticisers, allergens and other substances contained in a variety of consumer products can present a non-negligible risk to consumers.

Given that legislation in this area specifically focuses on regulating substances in particular products or subdomains, attention must be paid to situations in which a particular substance is contained in multiple products and/or subdomains.

For consumer products, no systematic product investigation plan is in place (like the National Residues Plan or other such plans) that generates data for the purposes of exposure assessments and randomised monitoring.

Inspection and laboratory results are therefore recorded in a manner that does not enable easy retrieval and analysis for the purposes of risk assessments. The reports of existing NVWA studies into the risks of consumer products are often out of date.

The number of consumers who come into contact with certain consumer products is usually unknown due to the lack of data on the use and consumption of these products. Moreover, reports are not available for all subdomains.

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As health risks can be elevated by consumer behaviour, it is important to gain greater insight into this factor. However, the accident register is not currently capable of accurately and effectively recording the influence of the product, the consumer and the consumer's behaviour on the risk at the time of the accident. Furthermore, it is conceivable that many accidents stemming from incorrect use are not reported.

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No system is in place to assess whether consumer products are safe before they enter the market, as this is the responsibility of the company in question. This also applies to reused products. In order to protect consumers, it is therefore important that possible risks stemming from new products and product ranges can be rapidly assessed.

Recommendations to the Inspector General of the NVWA

This report focuses on two key questions. The following recommendations relate to the question *"How can we ensure optimally knowledge-driven and risk-oriented monitoring of non-food consumer products?"*

1. Develop a methodology to identify new and emerging physical, chemical and microbiological risks in the area of consumer products, including risks relating to the use of recycled and refurbished consumer products.
2. Improve the accident registration system to boost knowledge of the causes of accidents.
3. Based on risk estimates, develop a plan for structural testing of consumer products by the NVWA's product safety laboratory, e.g. in a manner analogous to the National Residues Plan.
4. Record inspection data and results from laboratory research in a way that facilitates easy retrieval and effective searches.
5. Primarily focus active monitoring and research efforts on consumer products involving potential effects classified as severe, severe to very severe or very severe, even if these hazards occur to only a limited or negligible extent. Predominantly focus NVWA activities on consumer products for which there is little to no reasonable expectation that individual consumers will be capable of estimating the risks associated with the product or for which consumers are dependent on managers, operators or regulators to estimate these risks for them.

6. Ensure that monitoring and research capacity can be flexibly deployed in the event new risks are identified or the number of indications of documented risks increases.
7. Communicate as much information as possible about insights into risks as well as the results of monitoring and random inspections of consumer products using the NVWA's communication channels and with the aid of stakeholders. This will help to boost consumers' knowledge about how their actions can influence the risks presented by a consumer product.

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This report does not extensively examine the question “*What are the main risks to public health in the non-food consumer products product category?*” This question will be the main focus of BuRO's follow-up recommendations. At the moment, the recommendations stemming from this question are limited in number, and their primary focus is the conduct of more detailed research. They relate to two types of health hazards that are relevant to a large proportion of the population and can potentially cause extremely serious damage to health, for which more detailed information must be obtained in order to more accurately estimate the risks.

8. Research the risk presented by mobile power sources in consumer products such as lithium-ion batteries and other types of batteries and battery packs.
9. Gain greater insight into aggregated exposure to identified chemical substances (particularly plasticisers) by focusing product research on multiple products rather than on one specific product-substance combination.

Yours sincerely,

Office for Risk Assessment & Research
Prof. Antoon Opperhuizen

Appendix 1: General notes on the term “risk” and possibilities for risk-oriented and knowledge-driven monitoring

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Risk

BuRO uses the Rosa definition of the term “risk”, which is also used by the Health Council, among others.⁴ This definition includes an essential element: impairment or endangerment of something of value to one or more people. Within the NVWA, this primarily relates to endangerment of the following public values: public health (food safety and product safety), animal welfare, animal and plant health and nature. In many cases and situations, a variety of public and private values can be simultaneously endangered by the same social activity. Furthermore, in every case and in every situation in which the NVWA is involved, considerations must be made to safeguard public values, public interests can conflict with private interests and situations even arise in which a balance must be struck between various public interests. BuRO assists and supports risk managers by establishing a clear picture of a variety of risks.

Risk is often technically described as “probability multiplied by impact”. The term “impact” here represents an impairment of values. In order to assess a risk, it is important to know the likelihood of the impact occurring, which is also known as the probability. Does the situation in question occur frequently, rarely or never? What is the scale of the incident: are few or many people, animals or plants involved, and does it affect large or small nature conservation areas in the Netherlands? How these probabilities are expressed can differ from risk to risk. The purpose of monitoring, enforcement and inspections is to decrease the probability of undesired effects (impairment of public values). In this regard, what is and is not considered acceptable is determined by legislation and is primarily established by the political system. What is acceptable is sometimes described very specifically in a closed standard and sometimes more abstractly in an open standard.

One inevitable factor concerning risk is that various people and/or interest groups assign different meanings to the value of certain threats (probability and/or impact), so different perceptions of the same risk can exist simultaneously. These

⁴ A risk is “A situation or occurrence in which things of value to one or more persons (including the individuals themselves) are at stake and in which the results are uncertain.” In: Rosa, E.A.: “Metatheoretical foundations for post-normal risk.” In: *J Risk Research*, 1998, 1, p. 15-44.

perceptions are all part of public discourse concerning risk-oriented and knowledge-driven monitoring.

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Risk oriented and knowledge driven

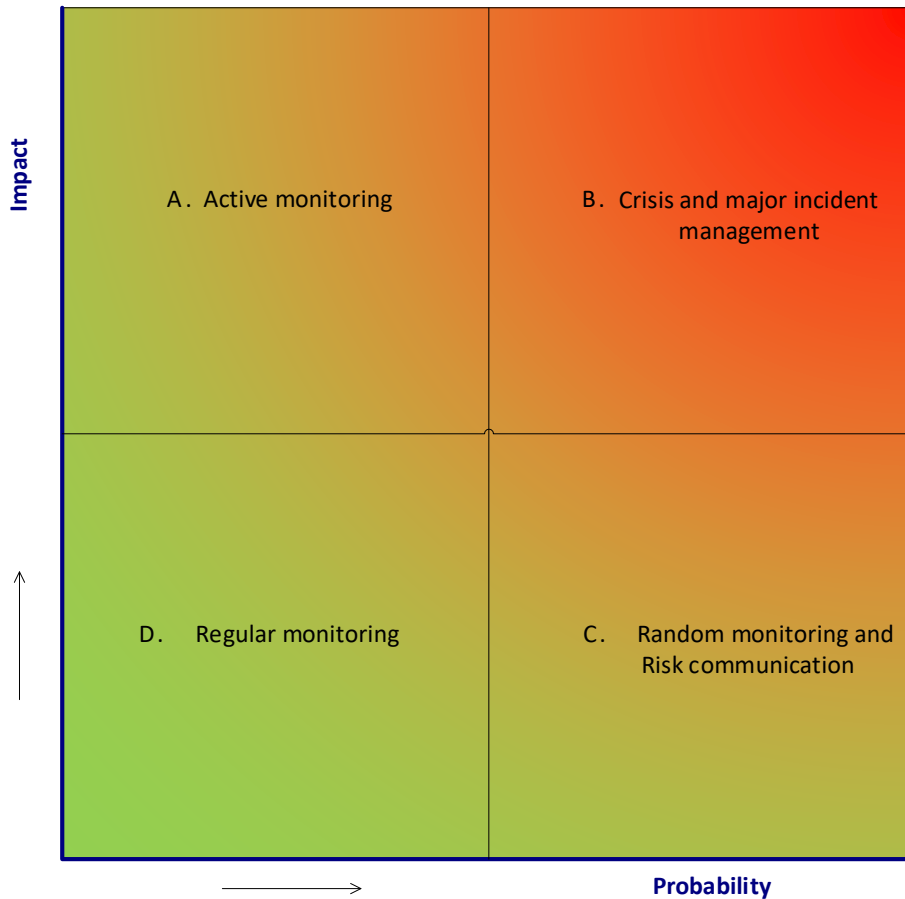
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Among other sources, the NVWA by and large bases its methodology on the basic principles of the Codex Alimentarius. Within this code, risk assessment – alongside risk management and risk communication – is considered one component of the total risk analysis as specified in Regulation (EU) 2019/1381 of the European Parliament and the Council of 20 June 2019 on the transparency and sustainability of the EU risk assessment in the food chain. To a significant extent, risk management is based on the results of risk assessment, and although Regulation (EU) 2019/1381 focuses on food and animal feed, the basic principles are suitable for application to other fields of activity of the NVWA (even if some aspects of the terminology and methodology are slightly different).

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The NVWA's regulatory jurisdiction covers an immense range of risks of varying severity and nature. It is impossible to monitor absolutely everything. The probability and impact of the risk can be used as a tool for risk management and to set regulatory priorities, as illustrated in Figure 1 below. Important information for the purposes of accurately estimating risks is often lacking, especially when quantitative estimation of probability is involved. A great deal more research and exploration is required in this area. Within this framework, an effective system for monitoring and detection of known and emerging risks is of crucial importance. Despite this, risk estimates are often semi-quantitative in nature due to a lack of suitable databases, meaning expert judgement often has to be used. In the years to come, BuRO will work hard to ensure the risk assessments become more quantitative in nature.

Figure 1 Risk matrix



Notes on the risk matrix

The risk matrix is divided into four quadrants across the x-axis (probability: low to high) and the y-axis (impact: low to high). For each quadrant, specific monitoring activities must be defined in order to minimise risks.

A. Active monitoring

The NVWA defines this quadrant as risks that pose a serious threat to public health, animal welfare, the environment or other values (major impact) but have a low probability of occurring. Active and intensive monitoring of these risks is particularly appropriate.

B. Crisis and major incident management

This concerns risks that pose a serious threat to large numbers of people, animals, plants and/or natural areas and could eventually result in an incident or crisis.

These situations must be managed extremely actively.

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C. Random monitoring and risk communication

This involves risks with limited impact that could occur very frequently. Individual cases cannot all be prevented by active monitoring and enforcement. Risk communication focusing on prevention is the most effective method of reducing incidents that, for example, could happen 10,000 times per year and have a mild impact, as active monitoring of such large numbers is not realistically possible. Moreover, this monitoring must be supplemented with systematic and random monitoring of businesses in the markets in question in order to optimally draw attention to frequently occurring mild threats. Transparency concerning the identified risks not only encourages compliance, but also boosts the confidence of citizens and other stakeholders in the monitoring activities and ensures that the NVWA maintains a clear overview of each sector/category as a whole. A vital part of a risk-communication-oriented monitoring strategy is devoting intensive attention to indications and reports from citizens and organisations (including via social media, among many other channels), as this will enable precisely targeted activities to be conducted.

D. Extensive NVWA monitoring and regular enforcement

Some of the NVWA's regulatory sectors include risks for which the potential impact on public interests and the probability of the impact occurring are both limited. In such cases, extensive monitoring in combination with regular enforcement could be justified if necessary. Among other aspects, extensive NVWA monitoring could involve delegation of primary monitoring activities to a different organisation.

Appendix 2: Elaboration of the general risk matrix in the “Risk Assessment for Non-Food Consumer Products 2021”

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In principle, the methodology for the compilation of a risk matrix for consumer products could be based on data on the severity of the impact on public health and the probability of a consumer product causing damage to health, even if these data are subject to a reasonable degree of uncertainty. A great deal of quantitative information is currently lacking, and it is therefore only possible to give semi-quantitative estimates. In some cases, it can even be entirely based on an expert opinion due to a complete lack of adequate information. The reasoning is that, in such cases, if certain products pose high to very high risks, this will be evident from the existing registration systems. As no such reports have been registered, it has been concluded that no products present risks with this degree of severity.

The following elaboration of the categories in the general risk matrix is based on the European guidelines for RAPEX⁵, which distinguishes between the following levels of severity of health damage:

1. Injury or consequence that after basic treatment (first aid, normally not by a doctor) does not substantially hamper functioning or cause excessive pain; usually the consequences are completely reversible. Classification: “rapidly reversible without medical treatment”.
2. Injury or consequence for which a visit to A&E (emergency department) may be necessary, but in general, hospitalisation is not required. Functioning may be affected for a limited period, not more than about 6 months, and recovery is more or less complete. Classification: “reversible with medical treatment”.
3. Injury or consequence that normally requires hospitalisation and will affect functioning for more than 6 months or lead to a permanent loss of function. Classification: “long-term impact, possibly irreversible”.
4. Injury or consequence that is or could be fatal, including brain death; consequences that affect reproduction or offspring; severe loss of limbs and/or function, leading to more than approximately 10 % of disability. Classification: “more than 10% disability or death”.

⁵ Commission Decision of 16 December 2009 laying down guidelines for the management of the Community Rapid Information System ‘RAPEX’ established under Article 12 and of the notification procedure established under Article 11 of Directive 2001/95/EC (the General Product Safety Directive). OJ L 22, 26.1.2010, p. 1-64. Please note: RAPEX is the predecessor of Safety Gate.

The RAPEX classification is easier to apply to physical aspects of consumer products than for chemical and microbiological aspects. For these aspects, there is a very large degree of uncertainty, particularly for chemical risks involving damage to health that only manifests in the long term. Furthermore, these risks can result in different end points that could be classified in a number of severity categories. In practice, this means that, for chemical risks, the end point involving the most serious impact is selected, although this may not be the most frequently occurring end point. The RAPEX methodology focuses on a specific flaw in a specific product. For chemical risks, this probably results in an overestimate of the actual risk. One example of this is the risk estimate for a specific group of phthalates present in a variety of product groups. If these phthalates result in serious impact, then this will probably only involve a small percentage of people who have been exposed to relatively high concentrations over a long period of time, with a less serious impact possibly affecting a larger group whose exposure was less intensive, while the vast majority of the population will likely suffer no impact at all. The gradation of possible impact is therefore linked to the probability. As well as causing less or more effects, variation in the degree of exposure can also result in different kinds of health damage manifesting.

To assess the probability of exposure, the RAPEX guidelines use eight levels: the lowest level has a probability of less than $1:10^6$, while each subsequent level increases the maximum probability for the level by a factor of 10. However, this detailed probability estimate is only possible and useful for the risk assessment of a specific product or scenario. For the purposes of the risk assessment of the wider consumer products sector, it was decided to use four probability levels that express the probability in terms of the number of Dutch citizens who suffer some degree of damage to their health as a result of consumer products:

1. rare or one-off (rough indication: no more than several cases per year);
2. occasional (rough indication: a few dozen to around one hundred cases per year);
3. possible or regular (rough indication: several hundred to around a thousand per year);
4. probable or frequent (rough indication: at least one thousand per year).

When assigning probabilities to a subcategory or part of a subcategory, a variety of factors play a role, such as:

- the percentage of the population that comes into contact with this kind of product;

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- the probability of exposure to the hazard and occurrence of an unsafe scenario;
- the probability of the negative impact occurring (damage to health, injury, illness).

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For some of these factors, fair to good substantiation of estimates can be provided using data, while other estimates are subject to a large degree of uncertainty, particularly when long-term impact is involved (as is often the case for chemical substances).

A fixed scale for classifying the degree of health risks has not yet been developed for consumer products, although BuRO is currently working on one. When all of the above is combined with the opportunities to establish risk-oriented and knowledge-driven monitoring (see Appendix 1), this results in classification into one of the quadrants in Figure 1, which determines the corresponding monitoring activities. Active monitoring is suitable for the management of potentially serious impact. If the potential impact is less serious, various forms of monitoring can be suitable depending on the probability (e.g. regular monitoring, random monitoring and risk communication). In this report, based on expert estimates, a distinction is made for products presenting a high to very high risk between those where the risk is caused predominantly by the product itself and those where the risk is to a significant extent the result of the consumer's behaviour in relation to the product. For example, exposure to UV radiation due to use of tanning beds can result in serious damage to health in many people, but in a significant proportion of cases, this is largely the result of long-term use by consumers. The market regulator can be expected to monitor the maximum permissible radiant intensity of new equipment and equipment that is used in tanning salons and other businesses. However, the regulator cannot be expected to monitor how consumers use the product: this is the consumers' own responsibility. The situation is different for exposure to substances such as plasticisers. Consumers have little to no knowledge of whether such substances are present in consumer products, and as a result, they have little to no ability to minimise their level of exposure. In such cases, consumers can only trust that the products entered into the market by the manufacturer are safe and that the regulator is monitoring the safety of these products. However, given the immense number of consumer products on the market and the dynamics of the consumer products market, it is impossible for the regulator to monitor every specific product type. When prioritising NVWA monitoring activities, a substantial degree of consideration should be given to the

degree to which consumers are able to play a role in minimising the risk. For example, in situations in which consumers have little to no perspective for action, the NVWA should conduct active monitoring activities in order to mitigate major risks presented by consumer products.

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Overview of the main risks

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Physical risks

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Potentially serious impact, occasional occurrence (highly suitable for active monitoring):

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- fire and electrocution caused by electrical appliances and machines;
- UV radiation from tanning beds.

Potentially serious impact, occasional occurrence (suitable for active monitoring):

- fire, suffocation and falls caused by toys;
- suffocation and strength of child use and care articles;
- fire and carbon monoxide poisoning caused by gas appliances;
- defective personal protective equipment;
- SPF (sun protection factor) of cosmetics;
- fire and strangulation caused by textiles.

Accidents on amusement rides and playground equipment can also cause serious damage to health. In order to minimise such risks, active monitoring of both the functionality and the maintenance of the rides and equipment is vital. As this kind of monitoring must be partly entrusted to third parties, partly due to the specialist knowledge it requires, active secondary monitoring by the NVWA is vitally important.

Chemical risks

Potentially serious impact, regular occurrence (highly suitable for active monitoring):

- allergenic substances (preservatives and allergenic fragrances) in many different consumer products, impact sometimes caused by aggregated exposure;
- metals in jewellery and other consumer products, particularly lead, cadmium and nickel.

Potentially serious impact with uncertain probability (suitable for active monitoring and further research):

- plasticisers in many different consumer products, impact sometimes caused by aggregated long-term exposure. In this regard, we must note that it is difficult to estimate the long-term effects, but the worst-case scenario should be taken as a point of departure;
- nitrosamines and PAHs in specific consumer products;
- PFAS, flame retardants and bisphenols in consumer products;
- formaldehyde and melamine, particularly in food contact materials;
- Azo dyes, particularly in textiles.

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Due to the intensive contact between the user and the product, active monitoring of the chemical risks of the following consumer products is vital:

- child use and care articles;
- toys;
- cosmetics;
- hygiene products;
- food contact materials;
- rubber products;
- tattoo inks;
- unauthorised biocides.

Microbiological risks

To a large extent, microbiological risks depend on the degree of hygiene practised by consumers, providers and operators. As a result, a large number of consumer products can present such risks in a manner that cannot always be prevented by active monitoring. Risk communication and random monitoring are therefore extremely important. However, there are a few product categories for which active or regular monitoring must be conducted (part of these efforts can be conducted as secondary monitoring):

- personal protective equipment;
- food contact materials;
- tattoo inks;
- biocides;
- contaminated cosmetics, particularly water-based products.

Appendix 3: Findings per subcategory

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General

Distribution of risks across product categories

Within the 16 product safety subdomains, many product groups can be distinguished that predominantly involve chemical risks, and others that predominantly involve physical risks. This resembles the distinction made in the REACH⁶ framework between mixtures and articles. In mixtures, the properties largely depend on the chemical composition, whereas for articles, the properties are largely determined by the physical shape, despite the fact that articles can also release substances into their environment. To illustrate, amusement rides, playground equipment and electrotechnical products predominantly pose physical hazards, and biocides, household chemicals and cosmetics present largely chemical hazards. However, some product groups require examination of multiple types of risk. For example, toys could include small parts, ropes or strings (suffocation/strangulation hazards) but could also release dyes or other substances if children chew on them. Microbiological hazards can present themselves in all kinds of product groups, particularly those that create favourable environments for organisms to grow. In practice, such favourable environments are usually limited in new products, although microbiological risks can increase as a result of long-term and unhygienic use.

The Rapid Alert System for Dangerous Non-Food Products (Safety Gate, previously known as RAPEX) is a system used by EU Member States and EFTA/EEA countries to issue alerts regarding hazardous non-food products. An indication of the distribution of the various hazards involved in the Safety Gate alerts over the past few years can be found in Table 1.

⁶ REACH (Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)) is an EU regulation governing the production of and trade in chemical substances. It describes the rules with which businesses and government bodies must comply. REACH stands for the Registration, Evaluation, Authorisation and Restriction of Chemicals.

Table 1: Number of Safety Gate alerts (10,061) submitted between 2014 and 2018 inclusive, classified according to type of hazard.Date
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Hazard	2014		2015		2016		2017		2018	
	N	%	N	%	N	%	N	%	N	%
Chemicals	604	26.9	524	28.2	421	22.5	434	21.5	579	28.1
Microbiology	35	1.6	13	0.7	32	1.7	20	1.0	11	0.5
Physical	1332	59.2	1108	59.7	1158	61.8	1345	66.6	1223	59.3
Combustion (excluding chemical combustion)	246	11.0	183	9.9	226	12.1	189	9.4	221	10.7
Other (including environment)	29	1.3	27	1.5	38	2.0	33	1.6	30	1.5
Total	2246	100	1855	100	1875	100	2021	100	2064	100

Every year, approximately 2,000 alerts are registered via Safety Gate, of which around 60% of cases involve physical risks, 25% of cases involve chemical risks, 10% involve combustion and approximately 1% of cases involve microbiological risks.

Safety Gate does not include alerts relating to food contact materials, as such alerts are made via the Rapid Alert System for Food and Feed (RASFF). RASFF was set up by EU Member States, the European Commission (EC), the EFSA, Norway, Liechtenstein, Iceland and Switzerland in order to ensure rapid data exchange regarding unsafe or harmful foodstuffs and animal feed. In the period from 2014 to 2018 inclusive, a total of 722 RASFF alerts concerning food contact materials were submitted, which can be classified into a number of hazard categories (see Table 2).

Table 2: Number of RASFF alerts (722) concerning food contact materials submitted between 2014 and 2018 inclusive, classified according to type of hazard.

Hazard category	Number of reports from 2014 to 2018 inclusive
Chemical contaminants (other)	4
Irradiation	2
Absent/incomplete/incorrect labelling	1
Industrial contaminants	47
Metals	279
Microbial contaminants (other)	1
Migration	381
Substances harmful to the environment	2
Indeterminate/other	5
Organoleptic aspects	18
Process contaminants	2
Composition	15
Defective/incorrect packaging	7
Falsification/fraud	11
Food additives and flavourings	12
Foreign objects	7

Approximately half of the approximately 180 European RASFF alerts made for food contact materials each year involve migration of substances from products.

When interpreting these data, it is important to bear in mind that Safety Gate and RASFF do not give a representative picture of the market. The EU regulators issue alerts for products in the event that a moderate/high/very high risk is identified that is applicable to multiple Member States. However, the selection of products for investigation is not random: products are often selected based on suspicions of standards breaches and experiences from previous studies.

Unsafe conduct by consumers

Product designers are legally obliged to supply products that are safe to use. They are also required to ensure correct labelling of products and provide user instructions in Dutch. These are all rational rules to ensure that products are used in the correct fashion and to prevent accidents from occurring. A lot of human behaviour has been found to be less rational in nature and more automatically driven by unconscious processes (O'Brien, 2012). Users often focus – at least in part – on the product characteristics to understand how to use it and to estimate the risks involved. They only study the product characteristics partially and then quickly devise a method of using the product in order to obtain results with which they are satisfied (van Duijne, 2005). All kinds of factors can contribute to a consumer not or insufficiently reading the instructions or using a product incorrectly (van Duijne, 2005; Pape, 2011). The perception of the hazard, the perceived familiarity with the product and the costs involved in using the product safely are three key factors that influence safe or unsafe use of products.

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In the study entitled "The State of Product Safety" (NVWA, 2016), the NVWA analysed accident registers and concluded that 60-80% of accidents involving machines, electrotechnical equipment and children's products (among others) were caused by incorrect and careless use of the consumer product in question.⁷ The majority of accidents involving consumer products are caused by consumers failing to use the product in question in the correct fashion.

Perception of hazards

People consciously or subconsciously weigh up the risks associated with products. This is largely done by intuitively estimating how serious the potential injuries could be. It is extremely difficult for people to intuitively estimate probabilities to a sufficient degree of accuracy. This has been shown by studies of risk perception in people upon showing them warning texts and symbols on consumer products (van Duijne, 2005). One important finding in the literature is that the effectiveness of such warnings increases when the perceived severity of the hazard presented by the product is higher. People have a tendency to be unrealistically optimistic when assessing risks in relation to themselves. This

⁷ The accident registers do not show what percentage of the remaining cases (20-40%) can be ascribed to product-related or environmental factors (NVWA, *De Staat van productveiligheid - 'Hoe veilig zijn consumentenproducten in Nederland?' [The State of Product Safety - 'How safe are consumer products in the Netherlands?']*, NVWA, Utrecht, 2016, pp. 116).

optimism bias can influence how people estimate the risk of potentially hazardous products or activities (DeJoy, 1999). Many victims of accidents involving consumer items were unaware of the possibility that they could hurt themselves when using the product in the way they did. Whether or not the users that did not have an accident were aware of the potential hazards involved in using the products in question is unknown (van Duijne, 2005).

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Familiarity effect

The more familiar the user feels with the product, the stronger the conviction that they know everything that a user needs to know concerning safe use of the product. If people use a product without any safety problems occurring, they worry less about the hazards and become more confident when using the product. Users appear to pay less attention to product characteristics such as warning messages for frequently used products in comparison with products that they use less frequently (van Duijne, 2005). The familiarity effect also occurs when people get used to seeing a particular warning message, causing it to effectively fade into the background. As a result, well-designed warnings sometimes command little attention. The ubiquitous presence of warnings can contribute to the problem of habituation (DeJoy, 1999). Experienced users can also have less of a tendency to comply with warnings when they switch between products in a product category that they are familiar with. This can cause potentially serious problems if new versions of familiar products are more hazardous than previous versions, and for some products, specific hazards can only be discovered once a certain product has been in use for multiple years or longer (Pape, 2011).

Perceived “costs” of safe use

The amount of time, effort, inconvenience and/or money that the user believes will be required in order to use the product in line with the instructions can influence the degree to which they will comply with them. People have a strong subconscious preference for convenience (O'Brien, 2012). The tendency of users to make as little effort as possible can result in hazardous situations, e.g. touching the blades of electric gardening equipment without removing the plug from the socket. Users can also underestimate hazards and have an incorrect idea of the “costs” and “benefits” of such conduct if they have never had an accident or near-accident until then (Pape, 2011).

Risks per subcategory

This section provides a brief description of the risks involved in each subcategory. For extensive explanation and substantiation of these risks, we refer you to the "Type of Risk" section of the "Risk Assessment for Non-Food Consumer Products 2021".

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Amusement rides

The physical risks of amusement rides depend not only on the ride but also on the actions of the user (the consumer) and the operator of the ride. When these actors conduct themselves in an improper manner that was not or could not have been foreseen by the manufacturer of the ride, then the probability of injury stemming from use of the ride increases. The risk of injury to the consumer as a result of impact caused by a defective ride has been estimated as moderate to high. The risk of injury to the consumer as a result of a fall caused by a defective ride has been estimated as low to moderate.

Pathogens can be present on amusement rides. The presence of pathogens is not inherent to the ride itself, with the predominant cause being use of the product (hygiene). The risk of exposure via amusement rides to microorganisms that are pathogenic to humans has been estimated as low.

Child use and care articles

When it comes to child use and care articles, parental supervision and correct use of the product are two key factors in determining safe use. Defects in child use and care articles are not necessarily caused by problems with the products themselves. The risk of injury due to falls (e.g. if a product falls over or is not sufficiently strong) or suffocation has been estimated as low to moderate.

A number of chemical substances found in child use and care articles have been identified as hazardous. Product studies have shown that these child use and care articles are compliant with the applicable safety limits in this area. However, these studies are dated. The risk of damage to health as a result of exposure to nitrosamines and nitrosatable substances in bottle teats and soothers, bisphenols in baby bottles and soother shields, additives and plasticisers in children's tableware and drinkware or heavy metals in children's high chairs are estimated as low to moderate. Child use and care articles are used for a relatively short period of time (the first few years of life), although the use during this period can be intensive. The risk of damage to health as a result of exposure to metals, primary aromatic amines (PAAs), plasticisers, formaldehyde and wood

preservation agents from soother holder clips has been estimated as low to moderate. The same applies to exposure to flame retardants, plasticisers and isocyanates in baby mattresses and mattress covers, for which an estimate of low to moderate has been determined.

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In addition to child use and care articles, plasticisers can also be found in a vast range of other consumer products, such as toys, food contact materials and sex toys. This can result in aggregated exposure. The risk of damage to consumer health as a result of exposure to plasticisers in child use and care products has been estimated as low to moderate. However, the estimated risk to consumers of aggregated exposure to plasticisers from all consumer products is higher.

Pathogenic microorganisms can be present on child use and care products. In most cases, the current strategy to minimise the risk (mandatory provision of instructions) is sufficient. In the event that the instructions are not followed (e.g. not boiling a dummy or baby bottle for long enough), the risk of consumers falling ill as a result of using microbiologically contaminated child use and care articles has been estimated as low to moderate.

Biocides and plant protection products

In general, active substances in biocides and plant protection products can harm both people and the environment. The severity of this health damage has been estimated as "long term and irreversible". There are also indications that biocides and plant protection products containing unauthorised substances are currently available on the Dutch market (in the DIY sector). The suspicion that unauthorised biocides are present in the Dutch market has been confirmed by NVWA research. Data requested from the National Poisoning Information Centre (*Nationaal Vergiftigingen Informatie Centrum*, hereinafter referred to as "the NVIC") show that cases of children being accidentally exposed to biocides do exist. It is expected that consumers are aware of the fact that these products contain hazardous substances and act accordingly (usage in line with the instructions). However, the risk of damage to health due to exposure to biocides and plant protection products has been estimated as moderate to high, as despite this expected level of consumer awareness, exposure to these substances to a degree that can cause damage to health is a regular occurrence.

Biocides and plant protection products do not present direct microbial risks to consumers. However, their use can result in the survival, and therefore selection,

of resistant pathogens. Selection of resistant pathogens presents a risk to public health. In the Netherlands, the risk of the development of resistant microorganisms that are pathogenic to humans as a result of the use of biocides and plant protection products has been estimated as low.

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Chemical substances in consumer products

The fire risk presented by chemical substances in consumer products has been estimated as low, even if these substances intrinsically present a hazard to public health. It is likely that the accidents stemming from these products are predominantly caused by behaviour (incorrect use). In principle, there are enough safeguards in place to warn consumers of the hazards posed by the flammability or corrosiveness of these products.

The subcategory of chemical substances in consumer products includes a large number of products that contain an even larger number of chemical substances. Information about the possible risks to consumers' health is only available for DIY products, household chemicals and laughing gas. One point for attention is the rising number of reports to the NVIC of children aged 12 or younger being exposed to textile detergents, e.g. via liquid detergent capsules. In general, the use of DIY products and household chemicals does not present a risk to consumers, provided the safety and user instructions on the label are followed.

DIY products, household chemicals and detergents contain preservatives and allergenic fragrances. The presence of these substances in the products can result in sensitisation, which can subsequently cause contact dermatitis. Preservatives and allergenic fragrances are present in a vast range of other consumer products such as cosmetics, toys and textiles. This can result in aggregated exposure. The risk of damage to consumer health as a result of exposure to preservatives and allergenic fragrances in DIY products, household chemicals and detergents has been estimated as low. The risk to consumers of aggregated exposure to preservatives and allergenic fragrances contained in all consumer products is elevated.

The risk of damage to consumer health due to the use (improper or otherwise) of laughing gas has been estimated as high, with risks also being presented to bystanders, e.g. stemming from the use of laughing gas while driving.

Pathogenic microorganisms can be found in chemical substances contained in consumer products, although in all reported cases, these were opportunistic pathogens (e.g. in fluid for smoke machines or bubble machines). In the Netherlands, the risk of exposure via chemical substances in consumer products to microorganisms that are pathogenic to humans has been estimated as low.

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Cosmetics

For sunscreen products that deviate significantly from the advertised sun protection factor (SPF), it is possible that consumers can be exposed to the sun for longer than is indicated by the protection period specified for the product. In addition to defective products (due to insufficiently high SPF), the likelihood of damage to health occurring is also affected by behaviour (the frequency of application and the quantity of sunscreen applied). The risk of injury caused by sunscreen products with incorrect SPF ratings has been estimated as moderate to high.

A variety of hazardous substances have been identified in cosmetics. Many substances are regulated via the Cosmetic Products Regulation.⁸ Cosmetics can sometimes contain pharmacologically active substances that are used as active ingredients in medicines (e.g. bimatoprost in mascara). The use of such products presents a risk and consumers do not have access to guidance from a doctor. In addition, a lack of awareness in a particular consumer could result in drug interactions if such cosmetics are used at the same time as the consumer is taking medications. The risk of damage to health as a result of exposure to pharmacologically active substances in cosmetics has been estimated as low. The risk of damage to health as a result of exposure to aluminium in anti-perspirant products, parabens in baby lotions/creams, PFAS in cosmetics, UV filters in sunscreen products or vitamin A in cosmetic products for the hands and face has been estimated as low.

The risk of damage to health as a result of exposure to asbestos from products containing talcum powder has been estimated as low, as has the risk of polyethylene microplastics in facial peels, shower gels and toothpaste. The risk presented by mineral oils in skin cosmetics or lip balms has been estimated as low to moderate.

⁸ Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products OJ L 342, 22.12.2009, p. 59-209.

Just like DIY products, household chemicals and detergents, cosmetics contain preservatives and allergenic fragrances. As a result, aggregated exposure can occur. This exposure can result in sensitisation, which can subsequently cause contact dermatitis. The risk of damage to consumer health as a result of exposure to preservatives and allergenic fragrances in cosmetics has been estimated as low. However, the estimated risk to consumers of aggregated exposure to preservatives and allergenic fragrances from all consumer products is higher.

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Pathogenic microorganisms are regularly found in unopened cosmetic products. In addition, pathogenic microorganisms can contaminate and/or propagate in cosmetic products after they have been opened as a result of usage. The few documented cases of illness involved opportunistic pathogens or vulnerable/highly vulnerable sections of the population. In the Netherlands, the risk of exposure via cosmetics to microorganisms pathogenic to humans has been estimated as low to moderate for the general population and moderate to high for vulnerable populations.

Portable climbing equipment

Portable climbing equipment is relatively frequently involved in accidents that result in injury. At the same time, there are practically no reports of defective material available on the market. The risks presented by these products therefore appear to be mainly caused by unsafe use. The risk to consumers of injury due to defective climbing equipment has been estimated as low.

There are no products in the portable climbing equipment category that present risks relating to microbial safety. In the Netherlands, the risk of exposure via portable climbing equipment to microorganisms that are pathogenic to humans has been estimated as low.

Electrical equipment

There has been an increase in the number of products on the market that make use of mobile power sources (batteries, battery packs or chargers). This increases the risk of fire, not only due to the number of products, but also due to the way that consumers charge products. The probability of mobile power sources causing fires increases as the devices age. Chargers that are not specifically created for a specific product present an elevated risk of fire and electrocution. The risk of fire due to defective electrical equipment has been estimated as high to very high.

The risk of electrocution due to defective electrical equipment has been estimated as low to moderate.

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When using tanning beds, consumers are exposed to UV radiation. A standard is in place for the maximum radiant intensity of tanning beds. The risk of a consumer making use of tanning beds in such a way that this standard will be exceeded has been estimated as low. However, it has been demonstrated that there is no safe amount of exposure to UV light via tanning beds. At the same time, these products are used by many consumers. As a result, the health risk of tanning beds has been estimated as high to very high.

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Pathogenic microorganisms regularly contaminate electrical equipment as a result of usage (e.g. washing machines, refrigerators or blenders). Reported cases of illnesses involved vulnerable populations. In the Netherlands, the risk of exposure via electrical equipment to microorganisms that are pathogenic to humans has been estimated as low to moderate.

Gas appliances

The risk of injury caused by fire or carbon monoxide poisoning as a result of defective mains-connected gas appliances that satisfy all applicable legislation has been estimated as low to moderate depending on the type of appliance. Nevertheless, a number of people die every year as a result of incidents involving mains-connected gas appliances. Installation and maintenance of mains-connected gas appliances plays a vital role in the risks they present. The way in which the law provides for this places a large degree of the responsibility on consumers. Market regulation of non-mains-connected gas appliances regularly identifies violations of applicable legislation. However, only a limited number of reports are made of accidents involving this kind of appliance. The risk presented by non-mains-connected gas appliances has been estimated as moderate to high. The risk of injury presented by defective carbon monoxide detectors has been estimated as moderate to high.

Gas appliances do not present direct microbial risks to consumers. The risks presented by gas appliances stem from possible decisions to lower the temperature of the appliance (the boiler) in order to prevent other negative effects (e.g. scalding). In the Netherlands, the risk of exposure via gas appliances to microorganisms that are pathogenic to humans has been estimated as low.

However, for cases in which gas appliances are incorrectly used or adjusted and vulnerable groups are exposed, the risk has been estimated as low to moderate.

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Machines (for private use)

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The data concerning injuries caused by private use of machines do not provide information on whether the injuries were caused by a defective product or by behavioural factors (e.g. incorrect use of the machine). Only a small proportion of the machines on the market have been researched, most of which displayed no technical defects. For this reason, the risk to consumers of injury caused by electrocution, suffocation, poisoning or fire as a result of defective machines has been estimated as low to moderate. The risk to consumers of injury caused by exposure to defective machines has been estimated as low in the event of correct usage and maintenance.

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It has been assumed that machines for private use are not a likely source of microbial infections. In the Netherlands, the risk of exposure via machines for private use to microorganisms that are pathogenic to humans has been estimated as low.

Food contact materials

The risk of burns or injury from glass fragments caused by the use of food contact materials has been estimated as low. Examples from the past include shattering soft drinks bottles and tea cups.

A wide range of chemical substances are found in food contact materials. Usually, insufficient knowledge is available concerning the toxicological properties of these substances. Whether these substances actually migrate to the food depends on the specific combination of substance and food contact material, and we currently possess insufficient knowledge of this factor. There is limited to no risk of exposure to formaldehyde and PAAs in imported melamine and polyamide kitchenware, heavy metals in tajines or mineral oils in cardboard boxes. The risk of damage to health due to exposure to formaldehyde, PAAs, heavy metals and mineral oils from these food contact materials has been estimated as low.

The risk to consumers of aggregated exposure to plasticisers from all consumer products has been estimated as moderate to high, although this assessment is subject to a significant degree of uncertainty. It is likely that all people are exposed to some degree via a variety of exposure routes. However, the degree

and duration of exposure is largely unknown. Furthermore, the potential effects can be serious, although they are likely to affect only an extremely small proportion of the people exposed. More research is required to establish a more accurate risk assessment. Plasticisers in food contact materials, such as inlays in lids for glass pots, can migrate into food. Plasticisers can also be found in a vast range of other consumer products, such as toys, child use and care articles, food contact materials and sex toys. This can result in aggregated exposure.

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Plastic food contact materials containing biological materials such as “bamboo” cups, kitchenware and other consumer items could possibly pose a risk due to elevated release of melamine and formaldehyde. This risk has been estimated as moderate to high. More research is required into the migration of PFAS and nanoparticles from food contact materials. For this reason, no estimate has been made of the possible risk thereof.

Pathogenic microorganisms are sometimes present in food contact materials. It is expected that microbial contamination of food contact materials will occur more often as a result of social developments relating to sustainability, the circular economy and recycling. In the Netherlands, the risk of exposure via food contact materials to microorganisms that are pathogenic to humans has been estimated as low to moderate for the general population. The risk is elevated for vulnerable groups.

Personal protective equipment

Risks relating to personal protective equipment mainly present themselves when consumers are confident that the product will protect them yet the product proves defective. Other scenarios relate to consumer behaviour, such as the use of the product for unintended purposes and incorrect use of the product (i.e. not applying the product as intended). The consequences can be serious depending on the impact caused. In general, the risk of injury to consumers as a result of defective personal protective equipment has been estimated as low to moderate, although this estimate is subject to a large degree of uncertainty, and a great deal of variety exists between specific products.

Personal protective equipment can present a microbiological hazard to users. They are only used occasionally, although usually in hazardous situations, such as during a pandemic. In the Netherlands, the risk of exposure via personal protective equipment to microorganisms that are pathogenic to humans has been

estimated as low for less serious pathogens. This estimate does not apply to specific situations in which personal protective equipment is required to shield the user against serious pathogens that can cause extremely serious damage to health. For this particular scenario, the risk has been estimated as high to very high.

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Toys

Defective toys can result in suffocation due to blockage of the airways or in injuries caused by falls from moving products or from the product itself falling. Alerts concerning suffocation hazards are made relatively often via Safety Gate. Regulators therefore pay specific attention to these hazards. In this category, fall incidents are reported more often than suffocation incidents. The risk of injury to the consumer as a result of suffocation due to defective toys has been estimated as low to moderate. The risk of injury to the consumer as a result of a fall incident due to a defective product has been estimated as low. However, this risk can be significantly elevated in the event of risky consumer behaviour.

When cuddly toys catch fire, this can result in first-degree burns being suffered. When costumes, wigs or play tents catch fire and/or result in materials melting and dripping hot liquid, in addition to first-degree burns, this can also result in serious second or third-degree burns. Information from Safety Gate alerts and NVWA research shows that there are toys on the market that do not comply with flammability requirements. The NVWA's research data are out of date. The risk of burns due to defective toys (cuddly toys and electrical products) has been estimated as low. For costumes and play tents, the risk of burns due to a defective product has been estimated as low to moderate.

Just like DIY products, household chemicals, detergents and cosmetics, toys contain preservatives and allergenic fragrances. As a result, aggregated exposure can occur. This exposure can result in sensitisation, which can subsequently cause contact dermatitis. The risk of damage to consumer health as a result of exposure (aggregated or otherwise) to preservatives and allergenic fragrances in toys has been estimated as moderate to high, maybe even high to very high.

The risk of damage to health as a result of exposure to metals in finger paint and painted wooden toys, to PAHs in rubber toys or to bisphenols in plastic toys has been estimated as low to moderate. The risk of damage to health due to exposure to nitrosamines in balloons, finger paints and slime and to plasticisers in PVC toys

has been estimated as high to very high. Plasticisers can be found in other consumer products besides toys, such as child use and care articles, food contact materials and sex toys. The risk to consumers of aggregated exposure to plasticisers from all categories of consumer products has been estimated as moderate to high, although based on some studies, the risk should also be estimated as high to very high. Further research into this issue is required in order to make a more accurate estimate of the risks.

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Pathogenic microorganisms are regularly present in toys, with the most prominent case being microbial contamination of bubble fluid, predominantly imported from China. This exposure poses a risk to vulnerable groups. There have only been a limited number of cases of illness in which toys have been identified as the source. The risk of exposure via toys to microorganisms that are pathogenic to humans has been estimated as low.

Playground equipment

The risk of injury due to falls from playground equipment is always present. The height and the climbing activities are a significant factor in the challenge for the children using it. In addition to defective equipment, behaviour is also an important factor in determining the risk of injury due to falls. The risk of injury to consumers due to falls as a result of defective playground equipment has been estimated as high to very high. Impairment of breathing can also occur as a result of entanglement of cords or clothing (such as scarves). The risk of injury due to entrapment has been estimated as low to moderate.

The risk of damage to consumer health as a result of exposure to PAHs in rubber playground turf has been estimated as low to moderate. The risk of damage to consumer health as a result of exposure to short-chain chlorinated paraffins (SCCPs) in rubber playground turf has been estimated as low. Exposure can occur, although the duration of exposure is limited and the migration of substances is probably also limited. There is currently insufficient insight into the presence of and level of exposure to the other identified substances (such as phthalates). For this reason, no estimate of the risk has been made.

Pathogenic microorganisms are regularly present on playground equipment, particularly sandpits and ball pits. Exposure can take place via hand-to-mouth contact or inhalation. The risk of exposure via playground equipment to

microorganisms that are pathogenic to humans has been estimated as low to moderate.

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Tattoos and piercings

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With regard to the tattoos and piercings category, detailed investigation has only been conducted into the chemical and microbiological risks. The knowledge and skills of the person applying the products in this category are not included in the scope of this report.

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Tattoo ink can contain substances that can cause damage to health. The long-term effects of chemical substances in tattoo inks are as yet unknown although they could possibly present a high risk given the large number of exposed consumers, the extent of tattooing on individual consumers and the lack of knowledge about long-term effects. Using tattoo ink that contains aromatic amines presents a non-negligible additional risk of cancer. Substances that do not cause an allergic reaction when applied to the top layer of skin can possibly cause an allergic reaction when applied to deeper layers of skin. This exposure route is not included in the REACH risk assessment. More research is required into the safety of tattoos applied together with cremated human ashes. Laser removal of tattoos can release toxic degradation products stemming from colour inks. The quantity of degradation products released depends on the size of the tattoo being removed. The use of chemical tattoo removal agents can result in burns, necrosis, secondary infections and scarring. The risk of damage to health due to chemical substances in tattoo ink has been estimated as moderate to high. The risk of damage to health due to the removal of tattoos using a laser or chemical products is unknown and requires further research.

Microorganisms regularly contaminate tattoo ink and can result in infections. However, infections are predominantly caused by unhygienic practices during the application of tattoos and/or piercings and during the aftercare process. Behaviour therefore plays a key role. Cases of illness in which products within the tattooing and piercing category (such as tattoo ink and needles) have been identified as the source are rare. In the Netherlands, the risk of exposure via tattooing and piercing to microorganisms that are pathogenic to humans has been estimated as low to moderate.

Textiles

Serious injury can occur when textiles (e.g. clothing or curtain cords) or part thereof become entangled around the neck. The chance of children being involved in fatal accidents caused by strangulation appears small, but given the reported cases, it is non-negligible. The risk of strangulation due to defective textiles has therefore been estimated as low to moderate. When using UV-protective and UV-resistant clothing or swimwear, parents can overestimate the protective capacity of the product if the product does not provide sufficient protection. NVWA research shows that most UV-protective and UV-resistant clothing subject to investigation complied with the requirements. The risk of injury due to insufficient UV protection has been estimated as low.

Textiles that catch fire can result in serious injury. Research into textile fire safety was carried out by the NVWA several years ago. It is unknown to what extent this research is still representative of the current situation. The risk of injury due to flammable textiles has been estimated as low.

Most of the chemical substances used for the production of textile products are washed out of the products at the end of the manufacturing process. However, residues of these substances can remain in the textiles for some time, resulting in consumers being exposed during use. Information about chemical substances is not passed on effectively through the chain, which means there is little clarity with regard to which chemical substances are present in specific textile products. Sufficient concentrations of flame retardants and trace elements can be present in textiles to cause exposure via the skin. The exact contribution made by skin exposure must be investigated further. PFAS and aromatic amines are sometimes present in textiles as well. Information about exposure to nanoparticles (including silver) via the skin is limited. The risk of damage to consumer health as a result of exposure to flame retardants and PFAS has been estimated as low. For aromatic amines, the risk has been estimated as low to moderate. Just like DIY products, household chemicals, detergents, cosmetics and toys, textiles contain allergenic fragrances. As a result, aggregated exposure can occur. This exposure can result in sensitisation, which can subsequently cause contact dermatitis. The risk of damage to consumer health as a result of exposure to allergenic fragrances in textiles has been estimated as low. The risk to consumers of aggregated exposure to allergenic fragrances from all consumer products has been estimated as very high.

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Non-clothing textiles are not a likely source of microbial infections. For clothing textiles, infection could conceivably occur in the event the clothes are not washed before use and the pathogens are able to survive in the environment for a longer period. Biocides that are unauthorised in the EU, such as triclosan, can sometimes be found in imported textiles. The use of biocides in textiles can result in selection of resistant bacteria. In the Netherlands, the risk of exposure via textiles to microorganisms that are pathogenic to humans has been estimated as low.

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Other consumer products

There are few concrete indications of physical risks being presented by consumer products that are not mentioned in one of the above categories. Due to the immense variation of product types, no general conclusion can be established with regard to physical and chemical risks to consumers caused by defective products within the general product safety subcategory. One exception to this rule is the jewellery category. The majority of consumers wear jewellery regularly in a manner that involves frequent and long-term skin contact. Consumers sometimes wear multiple items of jewellery simultaneously. Research by the NVWA shows that 5% of all earrings investigated release excessive levels of nickel. Safety Gate alerts also show that violations of these limits are regularly detected in Europe. The probability of sensitisation developing as a result of cumulative exposure to nickel has been estimated as "rarely occurring". The risk to health of consumers becoming sensitised to nickel as a result of wearing jewellery is currently being estimated. Research by the NVWA shows that 15% of the earrings investigated contain excessive levels of cadmium and 8% contain excessive levels of lead. A particularly high proportion of Safety Gate alerts report excessive levels of cadmium. The quantities detected are high: up to 50% for cadmium and up to 14% for lead. The quantities cannot be directly translated into exposure levels. No data are available regarding migration into the skin. Levels of absorption of lead and cadmium through the skin are low. The probability of consumers being exposed to lead and cadmium as a result of wearing jewellery has been estimated as "occasionally occurring". The overall health risk posed by exposure to lead and cadmium as a result of wearing jewellery has been estimated as high to very high for lead and moderate to high for cadmium.

Pathogenic microorganisms are regularly found in consumer products that cannot be classified into one of the aforementioned categories. Examples of such products include potting soil and compost. The expectation is that the number of cases or outbreaks of illness stemming from microbially contaminated potting soil

will rise in the future. With regard to social developments that are encouraging a greater focus on sustainability, the circular economy and recycling, potting soil is considered a more vulnerable product. In the Netherlands, the risk of exposure via potting soil or compost to microorganisms that are pathogenic to humans has been estimated as low.

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Risk perception among consumers

A survey was conducted to assess consumers' perceptions of risk with regard to a variety of different product groups (subdomains) (Motivaction, 2020). In general, consumers have high levels of trust in the safety of consumer products, although there is some contrast in these levels between the different subdomains. BuRO has conducted a risk assessment for all of these subdomains. Comparisons between the perceived risk among consumers and the risk estimates established by BuRO revealed a number of notable differences:

- Consumers have great confidence in the safety of gas appliances. BuRO's estimate for the risk of injury as a result of defective mains-connected gas appliances and carbon monoxide poisoning is much higher than consumer perceptions, as the impact of this risk can be extremely serious.
- One in five consumers estimate the risk of household chemicals as high, while BuRO estimates this risk as low, provided they are used in accordance with the safety instructions. However, household chemicals can present a risk of aggregated exposure to allergenic substances such as fragrances and preservatives. The difference between BuRO's estimate and the perception of the survey respondents is probably due to the practical scenarios on which consumers base their perception and the safety instructions on which BuRO bases its estimate. The safety instructions draw the users' attention to the potentially serious hazards that can occur, resulting in higher risk perception.
- Although 67% of consumers are confident that cosmetics products are safe, 8% consider them to pose a high risk. BuRO's estimate of the health risks of cosmetics is much lower.
- 82% of consumers have confidence in the safety of electrical equipment, while BuRO estimates the risk of fire as a result of electric appliances (e.g. washing machines, refrigerators or blenders) as high.

Trends in the availability and use of products

In this section, BuRO identifies a number of trends concerning the range of products available and the way products are used, as these trends can influence the risks in multiple subdomains. It is not a comprehensive trend analysis, and the list of trends identified is therefore not exhaustive.

Web shops

The purchase of consumer products online has risen enormously. According to a study commissioned by home shopping website Thuiswinkel.org⁹ and conducted by market research agency GfK, Dutch consumers spent €23.7 billion on products and services in 2018. Of this total, €880 million was spent via web shops based outside the Netherlands, with 47% of online expenditure on products being spent in Chinese webshops. However, this does not give any information about the volume, as the products sold by these web shops are mostly cheap (no VAT or customs charges are applicable to purchases worth less than €22), and China's classification as a developing country means the shipping costs remain low.

In addition to a number of major players such as AliExpress, Amazon and Bol.com (the latter of which is predominantly active in the Netherlands), there are also countless small businesses that mainly focus on reselling rather than manufacturing. A study by the Organisation for Economic Co-operation and Development (OECD) concluded that just 26% of the goods investigated complied with regulations (OECD, 2016). Furthermore, it was clearly established that many online suppliers have no knowledge of the rules governing product safety and therefore make no effort to supply compliant products.

A new trend among web shops is dropshipping, an e-commerce retail fulfilment method in which the manufacturer, wholesaler or supplier sends products directly to the end user (consumer). This means that web shop owners do not have to keep the products they sell in stock. However, the web shop owner remains responsible for the product.

Consumers often order products online from distant countries due to the low prices offered. As the OECD study shows, there is a high probability that these products will be of lesser quality and will not be compliant with health and safety

⁹ <https://www.thuiswinkel.org/nieuws/4016/vijf-miljoen-nederlandse-consumenten-shoppen-online-over-de-grens>

requirements applicable in Europe or the Netherlands. When products are sold to consumers in the European Union via the internet in a targeted manner, these products must be compliant with legislation applicable in the EU. However, it is impossible to inspect all incoming packages. On 26 November 2019, the Dutch central government launched a campaign¹⁰ in the Netherlands to raise consumer awareness of this fact, known as #laatjenietinpakken (#don'tgettakenin).

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The NVWA is able to regulate online purchases from Netherlands-based web shops and also supervises the import of consumer products from outside the EU. However, the NVWA is unable to take direct action against sellers based outside the Netherlands. Similar market regulators do operate within the European Union and the European Economic Area.

Circular economy

In order to boost sustainability, the central government of the Netherlands is striving to move towards a circular economy, i.e. maximising the reuse and recycling of raw materials and products. It is the central government's ambition to work with social partners to achieve an interim target of a 50% reduction in the use of primary raw materials (mineral, fossil and metal) by 2030. This objective matches the level of ambition shown in similar countries with regard to this issue (House of Representatives, 2016). The government believes it is vital to accelerate the current transition to a circular economy. This ambition is reinforced by the Social and Economic Council in the Netherlands (SER, 2016) and the Council for the Environment and Infrastructure (RLI, 2015).

One of the basic principles of the circular economy is the reusability of products and raw materials. This practice has been employed for plastic and cardboard food contact materials for decades. For a number of years, plastics such as PET have also been recycled. Recycling of other products is also practised, such as textiles and car tyres. The recycling process can result in chemical substances being introduced into materials that may then pose a risk to public health. It is also possible that materials created using recycled plastic could have inferior physico-mechanical properties. It is vital that the safety of recycled materials be guaranteed.

¹⁰ <https://www.rijksoverheid.nl/onderwerpen/bescherming-van-consumenten/vraag-en-antwoord/kopen-bij-webwinkels-buiten-de-eu>

The SUP (Single Use Plastics) Directive ¹¹ came into force in July 2021. This directive promotes circular strategies that prioritise sustainable and non-toxic reusable products and systems that promote reuse over products intended for one-off use. Its primary objective is to reduce the amount of waste generated. The most important measures stemming from the SUP Directive are as follows:

- As of 2021, all Member States must reduce the amount of plastic-to-go packaging such as drinking cups and food containers.
- As of 2021, certain disposable plastic products will be banned, such as plastic plates, plastic cutlery, plastic stirrers and plastic straws.
- As of 2024, caps and lids must be attached to plastic bottles and drinks packaging, as this will automatically ensure they are recycled together with the packaging.
- As of 2025, PET bottles must contain a minimum of 25% recycled plastic. By 2030, this figure must be at least 30%.
- As of 2021, it will be mandatory to include instructions on hygiene products (such as moist tissues, tampons and sanitary towels), tobacco products and drinking cups. These instructions will inform consumers of how they should and should not dispose of the product and packaging. They will also contain information about the plastics contained in the product and the impact these plastics have on the environment.
- Manufacturers will become responsible for the waste/litter stemming from a number of the products they bring to market. These products include food and drink packaging, drinking cups, light plastic bags, moist tissues, tobacco products (with or without filters), balloons and fishing gear. Among other responsibilities, the manufacturers must arrange the collection, transport and processing of these plastic products and boost awareness among consumers.
- By 2025, at least 77% of all plastic drink bottles with a volume of under three litres must be collected. By 2029, this figure must be at least 90%.
- The government is going to provide information to consumers regarding reusable alternatives to these plastic products and instructions to facilitate effective waste management (how to dispose of specific products). Consumers will also receive information about the impact of plastic waste on the environment.

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¹¹ Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment.

The SUP Directive will encourage both reuse and recycling. However, both of these options create risks: physical risks due to possible weakening of the materials, chemical risks due to the possible introduction of undesired substances and microbiological risks in the event microbiological contamination remains on the material after the first use. It is possible that a shift to alternative packaging materials to plastic may occur, which can result in different risks arising.

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Mobile power sources

Due to climate change, numerous agreements have been made to prevent further warming of the planet. The Paris Agreement, signed in 2015, established official targets for countries. In order to achieve these targets, the Netherlands must switch from fossil fuels to sustainable sources of energy such as solar and wind power. This transition will require substantial investment. In December 2019, the European Commission approved an initiative proposed by seven EU Member States to invest €3.2 billion to support research and innovation with regard to the joint EU focus area of "Batteries and Battery packs". In addition, it is expected that the business sector will contribute €5 billion to these projects.

The need to change the way we use energy goes hand in hand with developments in the field of mobile power sources. In 2019, the Nobel Prize for Chemistry was awarded to John Goodenough, M. Stanley Whittingham and Akira Yoshino for the development of lithium-ion batteries. They received this prize for creating the necessary conditions to enable a wireless and fossil-fuel-free society.¹²

The rise of lithium-ion batteries and battery packs enables the transport of and transition to electrical energy, such as e-bikes, e-scooters and electric cars. Lithium-ion batteries are rechargeable battery packs with a high energy density and a long service life. The benefits of these batteries are the substantial capacity and the relatively low costs. The disadvantage of lithium-ion batteries is that they can become unstable during overcharging or deep discharging and in high and low temperatures (<-20 °C or >60 °C). They are also vulnerable to impact, which in the worst case scenarios can result in short circuits, thermal runaway and fire, which in turn can result in the release of highly poisonous pyrolysis products. To minimise overcharging and deep discharging, these kinds of batteries are equipped with a Battery Management System. When these batteries are used as a

¹² <https://www.nobelprize.org/prizes/chemistry/>

mobile power source for transport (hoverboards, electric cars, etc.), mechanical shocks cannot be prevented, which creates a potential risk of fire.

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Reports are frequently made of e-bike or hoverboard batteries catching fire as a result of overcharging. The fire brigade has voiced concerns about this development.¹³ It is advisable to avoid charging devices when unattended (e.g. at night) and to remove them from the charger when the battery is full.

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Refurbished products

One development that is being encouraged as part of the transition to a circular economy is a trend for buying refurbished rather than new products. The term “refurbished” is used for products that are inspected following their initial useful life and then repaired if necessary before being made available for reuse. This is particularly the case for mobile phones, tablets and computers. Buying refurbished products can also be more attractive from a financial point of view.

When products are refurbished, some components may be replaced by non-original components. However, this can present risks. For example, if a new lithium-ion battery is used in a device, then it must be properly compatible with the device in question, and the Battery Management System must be properly adjusted to the new battery. If this is not the case, this presents a risk of overcharging and fire.

Internet of Things

The Internet of Things (IoT) is defined in a variety of ways, although in a nutshell, it is the ability to connect everyday items to a network in order to exchange data. Nowadays, it is perfectly normal for people to operate washing machines and dishwashers using an app on their phone, even when they are far away from home.

In principle, the various aspects of the products are covered by product safety legislation. For regular machines and domestic appliances, for example, EU directives and regulations apply as normal, but if they include a Wi-Fi functionality, then regulations stemming from the Radio Equipment Directive¹⁴

¹³ <https://www.brandweer.nl/brandveiligheid/lithium-ion-batterij>

¹⁴ Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC. OJ L 153, 22.5.2014, p. 62-106.

apply, which in the Netherlands is incorporated into the Radio Equipment Decree 2016 (*Besluit radioapparaten 2016*).¹⁵

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However, it remains to be seen whether all parties are aware of the necessary knowledge of the various aspects. Manufacturers will have to pay more attention to safety requirements incorporated into different laws, and this knowledge may not be immediately accessible. Regulators will also have to adapt: the NVWA is responsible for regulating consumer products, and Radiocommunications Agency Netherlands is responsible for regulating all devices covered by the Radio Equipment Decree. For this reason, collaboration in the field of product safety will be vital.

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Global pandemic

At the time of publication of this risk assessment, the COVID-19 (coronavirus disease 2019) pandemic – an infectious disease affecting the entire world – is currently ongoing. A pandemic is an exceptional situation, the likes of which has occurred only a few times in recent centuries. As well as having a major impact on global health, pandemics can also seriously disrupt market forces. However, pandemics are not the only situations that can have this effect, as an impact of similar scale can be caused by war and natural or nuclear disasters. In our modern society, which features extensive globalisation in many areas, the impact of such occurrences can affect the whole of society. Every situation – and in the case of a pandemic, every pathogen – has its own specific characteristics that can result in major or minor consequences.

The potential disruption to market forces will affect the consumer products sector, although it will certainly not be restricted to this sector. Pandemics quickly result in shortages of personal protective equipment and disinfectants. This can result in lesser-quality products being supplied, which may be ineffective and therefore unsafe. Furthermore, in the wake of this scarcity, new businesses spring up to manufacture these products. This creates a risk that these new companies possess insufficient knowledge of this type of product and consequently will introduce an unsafe product to the market.

Another aspect is that there are indications that viruses such as SARS-CoV-2 can survive on plastic or metal surfaces. It is currently not clear how long the virus remains contagious on such surfaces (Goldman, 2020). Based on current

¹⁵ Radio Equipment Decree 2016 (*Besluit radioapparaten 2016*), Bulletin of Acts and Decrees 2016, 525.

knowledge, the probability of the virus causing infections as a result of transmission via consumer products is low.

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NVWA consumer-product monitoring reports

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The NVWA has conducted market research into various subdomains of consumer products. Table 3 below displays an overview of the subdomains for which monitoring data have been reported.

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Table 3: Subjects of recent NVWA monitoring reports

Subcategory	Physical	Chemical	Microbiological
Amusement devices	Monitoring of theme parks (2015); monitoring of carnival rides (2017)	N/A*	No NVWA product research
Child use and care articles	Soothers and soother holders (PROSAFE 2018); soothers and soother holders (2010); high chairs (2015)	Soother and soother holders (2003, 2010); Soothers and soother holders (PROSAFE 2018); children's tableware and drinkware (2005); high chairs (2015)	No NVWA product research
Biocides and plant protection products	N/A*	Hand disinfectants (2018)	No NVWA product research
Chemical substances in consumer products	No NVWA product research	No NVWA product research	No NVWA product research

Subcategory	Physical	Chemical	Microbiological
Cosmetics	SPF sunscreen products (2014)	Baby lotions and creams (2016); eye creams (2017); asbestos in cosmetics (2018);	Cosmetic products for babies and children older than three years (2007)
Portable climbing equipment	No NVWA product research	N/A*	No NVWA product research
Electrical equipment	USB chargers (2015); LED and CFL lights, domestic appliances and haircare appliances (PROSAFE 2018); tanning beds (2016)	N/A*	No NVWA product research
Gas appliances	Gas appliances for cooking and barbecuing (2008-2011); portable and foldable gas appliances (2014); wok burners (2016); CO detectors (2016)	N/A*	No NVWA product research

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Subcategory	Physical	Chemical	Microbiological
Machines (for private use)	Angle grinders, portable circular saws, hammer drills (PROSAFE 2017); hoverboards (2018)	N/A*	No NVWA product research
Food contact materials	Tea cups (2003-2008); glass utensils (2009)	Metals in tajines (2014); plasticisers in lids (2011, 2013); imported kitchenware (2014, 2015)	Hygienic foodstuff packaging (2000); water filters (2005)
Personal protective equipment	Ear protection (2016); climbing equipment (PROSAFE, 2016)	N/A*	No NVWA product research
Toys	Fire safety of textile toys (2004-2005)	Finger paint (2015); soft plastic toys (2010); dolls (2017); wooden toys and bath toys (2004); balloons (2018); wooden toys (2016)	Bubble fluids (2016)
Playground equipment	Substrates for playground equipment (2006)	Rubber playground turf (2014)	Ball pools (2002, 2010); sandpits (2002)
Tattoos and piercings	N/A*	Tattoo and PMU inks (2014 and 2017)	Tattoo ink (2004, 2007, 2015)

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Subcategory	Physical	Chemical	Microbiological
Textiles	UV protective swimwear (2017); fire safety of rolls of textiles (2003); fire safety of domestic textiles (2004); fire safety of children's nightwear (2009); fire safety of summer clothes (2009)	Jeans (2018); work gloves and sports gloves (2017)	No NVWA product research
General product safety	Lighters (2018)	Jewellery (2016-2017); sex toys (2002 and 2009)	No NVWA product research

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Acronyms

ANSES	Agence nationale de sécurité sanitaire de l'Alimentation, de l'environnement et du travail
BfR	Bundesinstitut für Risikobewertung
BuRO	Office for Risk Assessment & Research
EPA (DK)	Danish Environmental Protection Agency
LIS	Letsel Informatie Systeem (Dutch Injury Surveillance System, managed by VeiligheidNL)
NVIC	Nationaal Vergiftigingen Informatie Centrum (National Poisoning Information Centre)
NVWA	Nederlandse Voedsel- en Warenautoriteit (Netherlands Food and Consumer Product Safety Authority)
PAAs	Primary aromatic amines; can be released by azo dyes
PAHs	Polycyclic aromatic hydrocarbons
PFAS	Per- and polyfluoroalkyl substances
RASFF	Rapid Alert System for Food and Feed
RIVM	Rijksinstituut voor Volksgezondheid en Milieu (National Institute for Public Health and the Environment)
SAFETY GATE	Rapid alert system for dangerous non-food products
SCCPs	Short-chain chlorinated paraffins

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