



# HAZARDOUS SUBSTANCE REDUCTION POTENTIALS IN PRIVATE HOUSEHOLDS

ASSESSMENT OF HOUSEHOLD CHECKS AS A TOOL FOR AWARENESS RAISING ABOUT HAZARDOUS SUBSTANCES

## AUTHORS

Heidrun Fammler	Baltic Environmental Forum Germany
Martyn Futter	Swedish University of Agricultural Sciences
Kai Klein	Baltic Environmental Forum Estonia
Martin Krekeler	Baltic Environmental Forum Germany
Anne Lagerqvist	City of Stockholm, Sweden
Fee Widderich	Baltic Environmental Forum Germany

## LIST OF CONTRIBUTORS

Aleksandra Konieczna	DetoxED Ltd. Poland
Aleksandra Rutkowska	DetoxED Ltd. Poland
Antonia Reihlen	Ökopol & Baltic Environmental Forum Germany
Katarina Johansson	City of Stockholm, Sweden
Susanna Grystad	City of Västerås, Sweden
Monika Piotrowska-Szypryt	Gdańsk Water Utilities Ltd., Poland
Egle Ruskute	Baltic Environmental Forum Lithuania
Kristine Senele	Baltic Environmental Forum Latvia
Alina Bushmovich	Ecopartnership Belarus
Alesia Chumakova	Ecopartnership Belarus

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# EDITORIAL

## About this publication

The NonHazCity Household Check Campaign is a new communication tool implemented by the project partners. It involves personal visits into private homes where people's actual consumption patterns of products and articles potentially containing hazardous substances were discussed. Consumption patterns were then related to possible impacts on participant's health as well as on the environment when hazardous substances emitted from their homes reach the wastewater. The partners implementing this action were from environmental NGOs, municipalities and a water utility company - for the municipalities, such direct communication with inhabitants is not a common activity, but a new experience.

All partners perceived the campaign as very effective, describing it as joyful and judging it to be a good instrument for making people think about and change their consumption habits. It has been an activity with on the spot improvisation and a lot of creativity.

This publication aims to go one step further than analysing the chemical risk reduction potential in households by actual substitution of products and articles. Instead, we analyse the implemented household check in light of the question "how can we effectively change consumer behaviour" in relation to the purchase and use of products and articles that may contain hazardous substances. The intention of the NonHazCity consortium was to apply behaviour change theories to a very practical example: the household check while asking ourselves "why is there no behaviour change happening, since information about hazardous substances is available?"

From our experience, chemical risks are well known and alternative products, especially cleaning agents and cosmetics, are often available at a reasonable price - but people generally do not buy them. This indicates that knowledge alone does not lead to behaviour change, something more is needed. People need something more than just reading information. Facilitating behaviour change needs to be more practical and must reach people at their homes and affect their very personal "do's and don'ts".

Can instruments such as the NonHazCity household check support changes in consumption? And, if yes, is the household check suitable for application at a larger scale, potentially helping millions of people to change their consumption patterns? By using a SWOT analysis, we evaluated the strengths, weaknesses, opportunities and threats of the household check. The analysis gave some insight into the chemical risk reduction potential such household change actually has - and if this is measurable and possible to extrapolate to a larger scale. Let's have a look - we invite you to an interesting little discourse!

# 1 INTRODUCTION

## 1.1 The NonHazCity project

The Baltic Sea environment assessment performed by the Baltic Marine Environment Protection Commission (HELCOM) has shown that the load of hazardous substances (HS) entering the marine environment is still an issue of major concern. Despite numerous regulations and other measures for emission reduction, HS are still released from land-based sources to the aquatic environment. These releases occur through three main pathways: industrial wastewater, municipal wastewater and stormwater. Today, consumption-related diffuse sources, including indoor dust, laundry wastewater and excretion of ingested pharmaceuticals, are more important sources for HS in wastewater, compared to release from production-related point sources (Gercken, et al. 2018).

The Interreg Baltic Sea Region Project “NonHazCity” (“Innovative management solutions for minimizing emissions of hazardous substances from urban areas in the Baltic Sea Region”, 2016-2019) aimed to demonstrate possibilities to reduce HS emissions. The main focus was on emissions from small scale emitters in urban areas that cannot be controlled by traditional water treatment and enforcement techniques: private households, offices, schools and day-cares, recreational facilities, and businesses served by municipal wastewater plants.

### The NonHazCity consortium and stakeholder groups

The NonHazCity consortium consisted of eighteen partners from nine municipalities as well as expert organisations in the Baltic Sea Region (BSR) that have taken responsibility for finding new ways to tackle the large number of HS emissions from small and scattered sources in their urban territories. In addition, a network of 26 associated organisations including other municipalities, water utilities, national and international environmental authorities, and non-governmental organisations (NGOs) supported them. Funding was received from the Swedish Institute to include IPO Eco-partnership (a Belarussian NGO) as an associated partner, and through this, two Belarussian municipalities in the Baltic Sea drainage basin, Vileyka and Ivyje were connected to the project.

Within NonHazCity three stakeholder groups were approached: municipalities, businesses and private households. Strategic chemical risk reduction goals were set as a part of Chemical Action Plans (CAPs) developed by the partner municipalities. These plans define HS reduction measures for municipal entities, businesses and inhabitants together with strategies for their implementation. Information campaigns and training addressing different stakeholders are also parts of the CAPs.

### Results from analyses

New knowledge and evidence of the targeted HS in wastewater and the aquatic environments of the pilot municipalities as well as HS in indoor dust from preschools was obtained within the NonHazCity project. Moreover, analyses of old and new preschool articles showed high levels of HS in old articles, but newly purchased ones were most often free of the analysed HS. By reducing the amount of HS containing items in the preschool indoor environment, it was possible to detect a reduction of HS levels in dust (Givanoulis et.al. 2019; Pettersson, Oldén, & Lagerqvist, 2018; Gercken, et al., 2018).

### Brief project conclusions

NonHazCity showed that municipalities have a great potential to foster better chemical risk management in their territories and that they can act in many different ways to minimize HS in the urban environment and emissions to the Baltic Sea. In summary, municipalities can:

- set and implement objectives and strategic goals for HS reduction
- influence markets for goods and services and make businesses act
- deliver targeted information campaigns to raise inhabitants’ knowledge and awareness.

*“Municipalities can do more than nations – they can act at local level”  
(quote: Gunnar Söderholm, City of Stockholm).*

Results from the two first action areas are published in other reports (Lagerqvist et al., 2018; Alijosiute et al., 2019), the last area is the focus of this report. NonHazCity addressed inhabitants of the pilot municipalities as “consumers”. The intention was to show inhabitants their individual HS emission share and to give them information about how to change their behaviour by purchasing and using fewer HS containing products and articles in everyday life. The motivation was to help protect the Baltic Sea environment but also to improve the inhabitants’ own health, by reducing HS exposure.

One communication measure developed for inhabitants was a campaign including household checks of HS present in products and articles in the home. This activity involved visits by project partner teams at 5-10 volunteering households in eight of the participating municipalities. This household check is the primary subject of the present report and is described in further detail in section 2, below.

The partners implemented intensive campaigns in the municipalities. A large set of information materials has been developed and distributed in local languages, all reports and other materials produced are available at [www.nonhazcity.eu](http://www.nonhazcity.eu).

## 1.2 Hazardous substances: definition, occurrence and exposure

### Definitions

Substances are usually regarded as hazardous if they negatively affect the health of humans, other organisms or ecosystems. Some substances are classified as hazardous because of their persistence in the environment and their ability to accumulate in organisms to levels causing adverse effects. Other substances are hazardous due to their toxic properties. Some persistent HS may travel long distances, thereby polluting not just areas near their emission sources but potentially around the world. Another group of HS are those that are classified as carcinogenic, mutagenic or toxic for reproduction (CMR) and cause adverse effects at the cellular and genetic level. (CLP, 2008)

Endocrine disrupting chemicals (EDCs) comprise another heterogeneous group of HS for which there is no unified classification, although some EDCs are classed with one of the definitions described in the paragraph above. The list of known EDCs includes metals such as cadmium, certain plastic additives, flame retardants, synthetic hormones and many more. EDCs cause adverse health effects by mimicking the action of hormones and altering their proper functioning. Exposure to EDCs may contribute to the development of several hormonal disorders, e.g., diabetes, obesity, breast and prostate cancer, fertility problems and developmental abnormalities. While all humans (and other organisms) might be affected by exposure to EDCs, the most vulnerable groups are foetuses, infants and children. (Rutkowska et al. 2015; Rutkowska and Konieczna 2016)

Chemical products are subject to specific regulations including a demand for a label of contents and a safety data sheet (SDS) stating ingredients, how the product should be handled and a hazard classification. Examples of chemical products are:

- cleaning agents, window cleaners and floor polish
- glues and lubricants
- detergents
- dishwasher tablets

Cosmetic products are also subject to specific regulations including a demand for a label of contents. Examples of cosmetic products are:

- soap and shampoo
- deodorant and lotions
- toothpaste
- make up and perfume

Articles, on the other hand, are not presently subject to any similar demand for a label of chemical content. Examples of articles are:

- furniture and flooring materials
- toys, clothes and interior textiles
- kitchen utensils
- electronic devices

Products and articles present in the home environment may contain HS, but it can be difficult to understand labels and content information. This makes it hard to understand which everyday products contain HS and how to avoid them. For articles, it is even more complex, since these do not need to have a label of content. Once it is clear which products and articles may contain HS, these can be substituted, used less or even completely avoided.

Chemical and cosmetic products are mixtures of several substances - liquid or powder while articles are solid objects with a form or surface which determine their function to a larger extent than their chemical ingredients.

### **Emissions of HS from households through wastewater to the environment**

The urgency of focusing on private households emerged from various previous projects and studies (COHIBA, BaltActHaz, BEAST, SOCOPE, ScorePP) and was supported by the findings from NonHazCity. To raise awareness about the presence of HS in the partner municipalities, selected substances of concern have been identified, prioritized and analysed within the NonHazCity project.

The HS selected for analysis included pharmaceuticals, phthalates, alkylphenols, bisphenols, highly fluorinated substances (PFAS), flame retardants and heavy metals. The findings from the analyses gave the following conclusions:

- The analysed substance groups were found in all types of water samples in all pilot municipalities irrespective of their size or location.
- All of the analysed substances were detected in wastewater coming from residential areas, some of them in high concentrations.
- Wastewater treatment plants are important pathways for release of HS to the Baltic Sea. The HS are incompletely removed during ordinary wastewater treatment and can thus enter the freshwater and marine environments.
- Upstream sources such as households, municipal entities and businesses are all important HS sources due to emissions from products, articles and materials.
- Changing consumption patterns can reduce the use of products and articles containing HS and thereby reduce both personal exposure and emissions into the environment.

The findings from the substance occurrence screening and source tracking activities are important messages for “everyone in town”, both for professional and private users:

Products and articles may contain HS which are not only emitted to wastewater and the environment but also affect our health when we are constantly exposed to them from various indoor sources in our workplaces and homes.



*Picture 1: Plastic waste from households can be a source of hazardous substances, leaching into the environment. Photo: Katarina Johansson*

### Human exposure to HS from articles, cleaning products and cosmetics in the home

The products of interest in the household checks included surface cleaning chemicals, dishwashing liquids, detergents, air fresheners, body care & cosmetics as well as hygiene products. These products potentially contain HS such as fragrances on the EU 26 allergenic fragrance list or active chlorine substances in disinfectants and bleaching agents. Furthermore, they can contain HS in the form of preservatives and other biocides.

Some HS, such as bisphenol A (BPA) and phthalates, which are EDCs, are used in the production of plastic materials. BPA is used in impact resistant, hard plastic, while phthalates are used to make certain types of plastic flexible.

Kitchenware, decorations, electronic equipment and dental fillings can all contain BPA. It is also used in epoxy, which can be present in the inner lining of food cans, in relined water pipes and in glue. Moreover, BPA is used as a component in receipts, which have been shown to be a prominent exposure source for cashiers (Lee I., 2018).

Phthalates are mainly used as plasticisers in poly vinyl chloride (PVC) and certain rubbers, to ensure flexibility of the material. These materials are used in, e.g., toys, flooring, medical devices, hoses, cables, tool handles as well as in the plastic lining of lids on glass food jars. Phthalates have also been used in cosmetic products. Within the EU, phthalate use in toys and cosmetics has been discontinued during the last decades due to increased legislation and four of the worst phthalates are banned from presence in all articles from 2020.



*Picture 2: The EU has banned some phthalates from being used in toys. Photo: Anne Lagerqvist*

Other HS which can be present in the home environment include persistent substances such as flame retardants in electronic equipment, textiles and furniture, as well as highly fluorinated substances (PFAS) which are used for their water and oil repellent properties in textiles and kitchenware as well as in various chemical and cosmetic products.

Human exposure to HS may occur via different routes:

- Dermal (skin) contact, for example with chemical products and articles.
- Direct inhalation of HS containing dust from products, articles and building materials.
- Inhalation of dust to which HS have migrated from items in the indoor environment.
- Direct oral contact with an item, e.g., if an infant puts a HS containing toy in the mouth.
- Consumption of food containing HS, e.g. some wild-caught fish.
- Consumption of food stored in packages containing HS, such as plastic boxes and bags, as well as cans. The concentration of HS in food products contaminated by the packaging material is dependent on:
  - Temperature
  - Time of storage in contact with the HS containing material
  - Type of food, acidic products and/or with greater fat content usually increase HS emissions from the packaging material
  - Mechanical damage to the packaging material

There is more and more evidence that the increase of many of the diseases of modern civilization are, at least in part, caused by continuous exposure to HS (Late lessons from early warnings: science, precaution, innovation, 2013). Hence, it is of societal benefit to find out if and how this exposure plays a role in the diseases that are a threat for humanity and costs society billions of euros per year, and what can be done to counteract the exposure” (Trasande L., 2015)

#### **Sampling of volunteers in Gdańsk**

Around Christmas 2016, we decided to measure urine BPA concentration in our DetoxED team. We were aware that HS exposure is a real problem and not surprisingly, all of our samples had detectable concentrations of this very common EDC. After that we tested how avoiding plastics would affect the BPA concentration in our body:

We limited our contact with artificial products and consumption of food from plastic packaging, we avoided canned foods, boiling rice in plastic bags and drinking from plastic bottles. Additionally, we packed our own prepared food in glass jars or lunchboxes, sandwiches in paper – not in plastic. In short, we applied just small changes – the things one can do without great effort.

After a year we determined urine BPA concentrations once more and the values were significantly changed. We managed to reduce BPA levels almost ten times, and in two samples the concentrations were not even detectable.

This study indicates, not only that the exposure to endocrine disrupting chemicals is a fact and that we are all at risk of potentially harmful consequences, but also that simple actions may lead to a decrease in the exposure during everyday life. (Rutkovska, NonHazCity event, Gdańsk 2018)

### **1.3 Behaviour change – how to make it happen**

Campaigns to raise people’s awareness about environmental issues have been conducted for decades. In the 1970s, strategic actions concerning such issues were planned and performed by civil society organisations aiming to provide knowledge and changing people’s behaviour into a more environmentally friendly direction. These activities have been linked to the assumption that increased knowledge will more or less automatically lead to a change in behaviour. However, these high hopes have led to disappointment again and again. Thus, the link between knowledge and action seems to be neither direct nor unhindered. Behavioural science has come up with a wide variety of models that try to grasp and explain this type of human behaviour (Kollmuss & Agyeman 2002).

Based on the incomplete link between knowledge and action, psychologists have developed the term “knowledge-action-gap” in order to describe the discrepancy. The “knowledge-action-gap” has been further developed into the “value-action-gap”. This is a result of the finding that even if individuals have incorporated relevant knowledge into their personal values, usually examined by asking whether a certain societal issue is seen as important to be considered or supported, the individual does not necessarily act accordingly.

#### **Different factors influence human behaviour: individual, social and infrastructural parameters**

Both individual and social parameters as well as infrastructural frameworks determine whether or not we act according to our knowledge and values (Southerton et al. 2011).

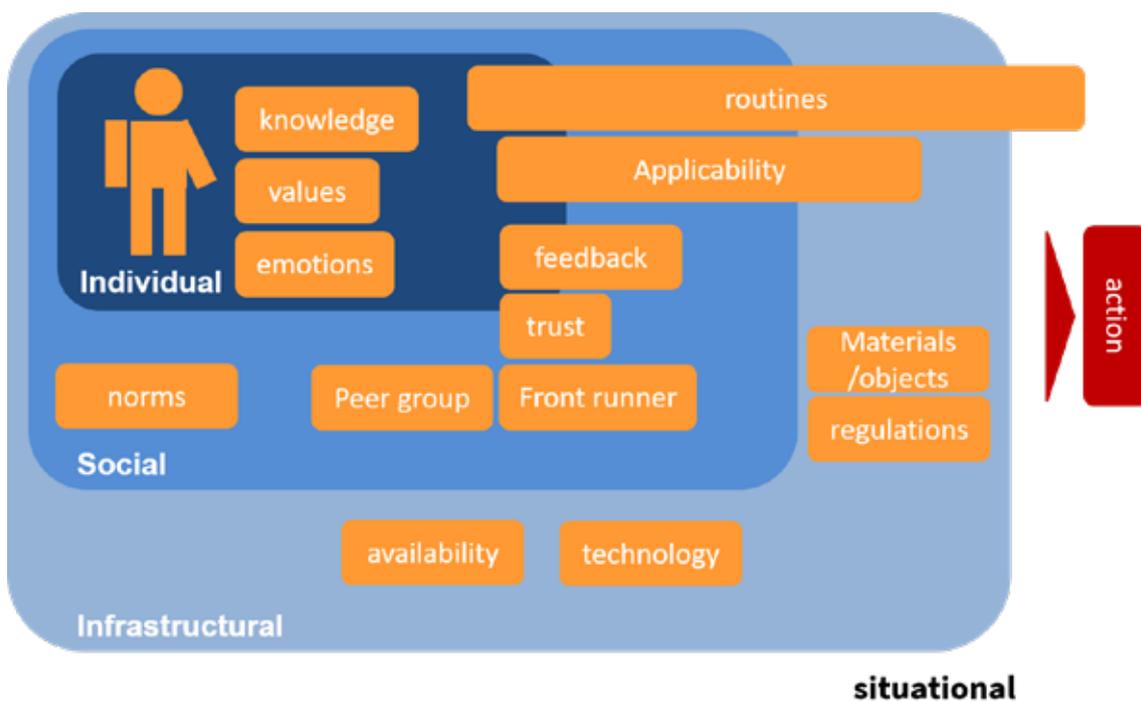
Next to knowledge and values, emotions have been identified as a powerful factor influencing **individual** decision making, sometimes overriding the other factors as the basis for a person’s behaviour. Knowledge, values and emotions can support or contradict each other. These contradictions can lead a state of mind that must be overcome in order to take meaningful action. One strategy to avoid action is the refusal of personal responsibility. Individuals may accept that their own behaviour is not consistent with their personal values, and at the same time, their ability to influence the issue is downplayed (“climate change is bad but it won’t be stopped if I avoid air travel”).

**Social** parameters include peer groups, i.e. parts of our social surrounding that we perceive ourselves as being linked to and with whom we share certain social orientations. Peer groups guide their members by providing specific norms, values and expectations. Front-runners are another group, within or outside the peer group - they are early adopters of (social) innovations and potential role models for others. Trust plays a decisive role in individual’s relations to both peer groups and to front-runners. The impact of the social surrounding on behaviour is strongest if individual action causes a distinct interaction or feedback from the peer group.

On an **infrastructural** level, practical constraints prevent people from adopting pro-environmental action, regardless of their attitudes or intentions (Jackson 2005). These constraints might include lack of availability of HS free products and articles for purchase, as well as lack of disposal options respectively high efforts for disposal.

These three categories affect the possibility to change behaviour, both on an individual level (e.g. lack of time, money and perceived ability to influence the issue), as well as on the infrastructural level (e.g. pro-environmental facilities such as disposal stations together with the possibility to find HS free alternatives).

All three categories (**individual, social and infrastructural**) frame a scope of possibilities for action of an individual. To cope with all these influences and to avoid lengthy and demanding processes of consideration every time an action is performed, humans readily establish routines. These routines determine a major part of our daily behaviour, including consumption pattern and can be used for implementing environmentally friendly choices and consumption of HS free products and articles. Routines help us to come to swift and effective decisions but can also be barriers to change.



*Figure 1. An individual is exposed to many factors, which in turn influence their behaviour. This behaviour then determines an individual's ability to change consumption patterns and everyday choices. The social context, including contact with one's peer group and front runners of change, is vital for a person to feel the urge to change. To be able to change behaviour, certain circumstances need to be met, e.g., availability of HS free products and articles, technologies and regulations. This is then all put in the situational context, which also determines what an individual will or will not do.*

#### **How to overcome barriers to change?**

One way of overcoming barriers is to promote a change of consumption pattern as a social innovation - something that is desirable to achieve. Badilescu-Buda (2013) proposes a social adoption of an innovation model, which includes information systems and social networks. This features front-runners (i.e., innovators and early adopters) that influence each other and participate simultaneously in the process of behavioural change. Goals shall be set realistically and should not be too ambitious so as to give people the chance to adapt. Adopting a certain innovation becomes more likely the less it requires a change of routines or norms/values (Rogers 2003).

### **Closing the gap from knowledge to action**

There are five core principles which are usually quoted when successful marketing is explained (Unilever n.d., with additions):

- Make it understandable: simple language - talking to people in their language;
- Make it easy: simple advice - action that households can easily fit into their daily routines;
- Make it desirable: what's in for me – chemicals and health;
- Make it rewarding: focus on self-efficacy - households as frontrunners and change agents;
- Make it a habit: developing „chemicals intuition“ - rewarding behaviour change.

## **2 THE NONHAZCITY CAMPAIGN FOR INHABITANTS**

The information about HS summarised in section 1.2 and the principles presented in section 1.3 provided a basis for planning the inhabitant campaign activities. Messages about occurrence of targeted substances, their impact on our health or the environment and solutions to avoid them were the same, but the tools and communication instruments were different between municipalities. By testing different communication tools, we hoped to find out which of them would be best at inducing changes in behaviour.

An overview of campaign actions in the partner municipalities is presented in the publication “The NonHazCity Project - Overview of The Inhabitants’ Campaigns In The Cities And The Most Successful Campaign Elements” (Senele, 2018). The household checks were embedded in these larger campaigns.

The overall aim of the campaign was to assess residents’ level of knowledge, their readiness to change consumption patterns and possible reduction of HS containing products and articles.

The goal of the household check was to initiate a change in volunteers’ purchasing patterns with solutions and strategies that everyone can implement.

### **2.1 The household check**

#### **Selection of volunteers**

In total, about 50 private household checks took place in Gdańsk, Hamburg, Pärnu, Riga, Stockholm, Västerås, Šilalė and Kaunas district, as well as in the Belarussian municipalities Vileyka and Luje. Potential households were found by public competitions, ads in local newspapers and by direct recommendations. The volunteers were selected based on criteria involving their motivation to change their consumption and use of products and articles potentially containing HS.

Agreements were made on publicity and performance. In some municipalities, household checks were performed with celebrities and widely distributed, in some the household checks stayed in a close circle and in others, the volunteers participated in seminars. In Gdańsk, volunteers even participated in a urine analysis. In both Gdańsk and Stockholm, dust was sampled from volunteer’s homes.

The project teams in the respective municipalities visited single person households as well as family homes with up to six members. Several of the families participated in the project for the well-being of their children. Furthermore, pets were part of some of households and worries about pet health were the reason to participate for one volunteer. Even the Swedish Minister of Environment participated in a household check by the Stockholm team, which was recorded and made public. A prominent blogger took part in and promoted the Riga household checks. In general, most volunteers already had an awareness of sustainability and environmental matters, although they had more to learn when it came to choices about HS in everyday life.

#### **Getting started: Setting the standard for the household checks**

The household checks were unified in terms of:

- Background information provided to the families
- Information in local languages on HS in products and articles.

Project teams had flexibility concerning:

- Priorities or criteria that were set, substances or products to focus on and links to other ongoing environmental campaigns.

- The demographics of the volunteers: single persons or families, public figures and celebrities, young or elderly people.
- Which areas of the household were checked: kitchen, bathroom, child's room, etc.
- Which additional measures beside the household checks were offered to the inhabitants: informative seminars, DIY cosmetic creation, urine tests, dust sampling.

At the beginning of the campaign, all volunteers completed questionnaires concerning their knowledge and awareness about HS in the environment and their use of products and articles potentially containing HS. After roughly half a year, the volunteers completed a second questionnaire to assess changes in their consumption pattern and behaviour related to products and articles potentially containing HS. The completed questionnaires provided a good basis for discussion and helped to understand participant priorities and concerns

### **Gdańsk**

In Gdańsk, household checks have been embedded into a whole series of awareness raising and training activities with the volunteer households. Members of the volunteer households took part in workshops where they learned how to avoid HS: Detergents, cosmetics and personal care products were produced by workshop participants. Additionally, testing campaigns took place at the volunteer households. Household members' urine and dust from the floors of their homes was collected and tested for phthalates and other endocrine disruptors. Testing was repeated after the workshops in order to show the significance of changes in household behaviour for the occurrence of HS in the human body and, consequently, for human health.



*Picture 3: A household check in Lithuania. Photo: Egle Ruskute*

The main activity of the household visit was a check for the presence of products (and sometimes articles) possibly containing HS. The aim was to explore the potential for HS reduction and alert the inhabitants on the number of chemicals they are using, purchasing and surrounded by. Items that could be replaced by suitable alternatives were discussed and achieving a reduction in number of products and target substances was suggested. Individual consultation was provided; substances and alternatives for substitution were researched and communicated.

The NonHazCity teams used checklists elaborated by the project consortium that helped evaluate chemical risks from certain products and provided explanations to household members. While checking the products and articles, HS were counted and listed on an evaluation sheet, photos were taken and potential issues for later research or clarification were carefully noted. In some cities, Facebook groups were established for dialog amongst the project team and volunteers during the campaign period.

Chemical and cosmetic products subject to checks and discussions were:

- cleaning agents for different purposes of all rooms and surfaces of the home
- laundry products
- disinfectants and specific cleaning agents
- air fresheners (sprays and other)
- personal care products (washing, lotions, crèmes)
- hygiene products
- baby care products
- perfumes
- make-up

Articles subject to checks and discussions were:

- kitchen utensils (food containers, pans, cutlery)
- any type of plastic products with identifiable plastic codes
- toys, textiles and furniture

Cosmetics and chemicals were usually discussed first since their HS content can be determined from the label of content provided for these products. Articles such as kitchen appliances, clothes, furniture, electronics and toys were more time consuming to assess, due to the lack of a label of content. Therefore, these articles were often not assessed or were set aside for the second visit.

In this campaign, no laboratory testing of products or articles was performed. However, the chemical inventory method developed for companies and municipalities within other project activities was simplified and applied: This method includes listing products and articles potentially containing HS, screening their labels and compiling an inventory table. Target products and articles included detergents and disinfectants, personal care and cosmetic products, and in some cases clothes, shoes, interior textiles, childrens' toys and household utensils. Built-in or installed items (e.g. flooring materials) were typically not assessed but notes on flooring materials were taken in Stockholm as background information for the dust samples.

### **Pärnu**

Pärnu is one of the smaller NonHazCity municipalities, so it was possible to organize household checks on an all-city level. The campaign was announced on the city's website, so that inhabitants could apply to the local organizing partner, BEF Estonia. Accompanying articles in the local newspaper contributed to dissemination. Since the city supported the activities, the campaign itself threw a positive light on the environmental efforts of the municipal administration. Consequently, the City of Pärnu initiated a follow-up with BEF Estonia: more households were checked in the beginning of 2019!

One inherent challenge in the household checks was the multitude of products and substances present in a typical home. Since the household checks could not be too costly in terms of time and staff, a maximum duration of approximately 1.5 hours per check was agreed as an optimum. This could not be achieved without a strict focus on some specific product and article groups and decisions about what to investigate in each household. The visits were carefully prepared and pre-visit communication with the coordinating family member took place to get an idea about the possible focus or main interest.

It was important to train the partner teams performing the household checks: during the first NonHazCity partners' meetings, information and materials were shared, potential cases discussed together with questions and challenges that could arise during the visits. Test checks at colleagues' homes were carried out to pilot the approach.

### **Hamburg**

During the household checks in Hamburg, two strategies proved successful:

Firstly, online applications like ToxFox or CodeCheck were used to support the inventory and identification of products with hazardous substances. These apps rely on scanning of barcodes and access to a database with information on product ingredients. By using these apps, household members could support the check and immediately saw the result on the screens of their own devices. Secondly, a „traffic-light-system“ with boxes to place the identified products and articles into was used:

- green - harmless
- grey - use up and do not buy again
- red - to avoid

The grey box varied according to the environmental awareness of the household members: those who were more environmentally conscious were judged more stringently than less aware people. This supported a step-by-step approach to behaviour change and helped volunteers to prioritize changes to their consumption patterns.



*Picture 4: Sorting household chemicals and cosmetics during a household visit by the number of problematic ingredients. Photo: Martin Krekeler*

#### **“Please, come in!” implementing the household checks**

Shortly before the date of the visit, households received an informative email about the exact process of the checking visit. On place, after introduction of the NonHazCity project team and their background, the procedure was presented briefly. The household check was implemented by a two or three person team, with one answering the questions of the families and the other “chemical expert” checking the products and materials.

During the household check, volunteers’ daily routines were discussed, and project teams gave general advice about products and lifestyle. In some municipalities, apps and substance lists were used to identify HS. While the checking was performed it was important that the volunteers were not overwhelmed by the amount of information or frustrated by the large number of “bad products”. It was important that volunteers were praised for positive features, e.g. for wooden material instead of plastic, so that their motivation was maintained until the end of the household check.

#### **Kaunas and Šilalė**

Šilalė and Kaunas district municipalities were quite different from the other municipalities in the NonHazCity project: Kaunas district has a lot of small towns scattered around the main city Kaunas. Šilalė is also a very small rural municipality. Because of this, the main tool to reach people was personal contact. The household checks were also presented during town celebrations in a special stand. Moreover, presentations in town councils were made and information was spread during seminars for inhabitants. The volunteers for the household checks were quite well known in the community (deputy mayors, school principals, doctors, etc.) so they were the main people spreading the word in their circles. To spread good practices, the tips that were given to the volunteer families were transformed into short Facebook posts so everybody following the project could try the advice that was given to the families in the experiment. The start of the campaign and the results were also presented on the NonHazCity webpage and sent as a press release to the media.

## “Experiences from the project team’s visit” After the household checks

After checking the products and articles, the findings were presented to the household members. Feedback from the volunteers was received and it turned out that all families were positively surprised about the richness of information they gained during the household checks and about the various possibilities for them to act. The second contact with the volunteers revealed that they were all eager to present the changes they had made.

Personalized feedback was delivered to each household. Questions from the families concerning specific products and articles sometimes required more thorough investigation to be answered.

The families were interviewed or communicated themselves in social media, about their experiences. In some of the municipalities there were articles about household visits in local newspapers, as well as different events and accompanying measures for the volunteers.

### Riga

The project partner in Riga increased the impact of the household checks by strongly connecting advice and content to the current environmental discourse in Latvia. At the time of the campaign with volunteer households, the issue of avoiding waste in general, and plastic waste, in particular, was widely discussed in the country. This opportunity to tie the topic of chemicals to the already existing zero waste movement was used. In general, the HS topic is not particularly visible to most people, so it is easier to relate it to a recognisable environmental problem. The team of Riga had a special video “Green Brigade” which showed the household check. The video was also disseminated to the Facebook group ‘Zero Waste’.

## 2.2 Results of the household checks

### Chemicals in everyday products of volunteer households

Households hoarded a much greater amount of products than expected. Logically, families tend to possess more products than single person households, but it was a tremendous amount per person nonetheless. Some households had more than 20 different cleaning agents. On average, more than 50 cosmetic products and cleaning agents were found in each household. Of all those products, more than 20 contained HS, of which many were EDCs. Multiple spray articles like deodorants or cleaning agents were found. Sprays can harm our lungs when aerosols produced by the spray are inhaled. Fragrances such as limonene, geraniol and others on the EU list of allergenic fragrances were frequently found (see appendix 1) as well as colouring agents, some of which can be allergenic and sensitizing. Furthermore, chemical UV filters were found in many body care cosmetics. Products containing preservatives, including parabens, formaldehyde releasers, isothiazolinones and azolidinyls as well as triclosan, quaternary amines and other biocides added for conservation and disinfection purposes were also noted.

Some products seemed more environmentally friendly than they actually were. They were labelled with signs declaring their naturalness or “being green” although these labels were not officially recognised and controlled but company’s self-proclaimed statements. A conclusion from this is that while established eco-labels are trustworthy, companies’ own promotional statements definitely need more scrutiny to safeguard consumers from false claims.



Picture 5: Examples of labels. On the pink label to the left, there is detailed content information, the product is free of HS, and there is no added perfume. Whereas, on the red label to the right, the information is not that detailed and it is very hard to judge if this product contains HS. If there is a safety data sheet supplied or available at the producers homepage, this can give more information. Photo: Anne Lagerqvist (left photo), BEF Lithuania (right photo)

Articles which potentially contain HS found in the homes included frying pans with non-stick surfaces which often contain PFAS, plastic kitchen utensils with suspected BPA content, old painted toys which can contain lead and other hazardous metals and furniture potentially treated with flame retardant chemicals.

Urine sample analysis for BPA, performed in Gdańsk, gave an indication on the actual HS exposure of household members (Rutkowska and Konieczna, 2018). Comparative testing before and after a change of consumption involving avoidance of certain plastic products, especially those which are heated purposely or unintentionally, showed distinct differences. Concentrations of bisphenol A and S, phthalates and nonylphenol in urine samples from the household volunteers decreased after they took action. Furthermore, the results from the dust samples taken in Stockholm indicated the presence of target HS in volunteers' homes, although, the levels were lower than those found in preschools (Giovanoulis et. al. 2019).

### **Behaviour of the household check volunteers**

The volunteers were sometimes a bit hesitant at the start of the household check, but after a while, they opened up and provided access to most of the rooms in their home. They got more and more encouraged and confident to show their products and articles as the check continued. Other volunteers prepared themselves by collecting their products in their kitchen ahead of the project team's visit. In general, volunteers were very open and inquisitive.

Families were very accepting in their attitude, especially the ones with small children. Some families not only promised to change products but also threw away some on the spot. Many of the volunteers were pleasantly surprised that various easy, inexpensive changes were possible, e.g., exchanging a dish soap for an ecological product at the same price.

During the check, volunteers asked numerous questions and project teams gave lots of advice. Volunteers' main interest was the substitution of products to safer alternatives. For example, they presented a shampoo with HS and wanted to know which brand could be a healthier alternative and where to find it. Fortunately, some teams prepared a list with possible substitutions in advance, to be prepared for this scenario.

Other common questions were "why is this product harmful?" and "in which way?", "which products should be thrown away immediately?" or "can this product still be used?". Further questions about HS in articles were raised concerning, among others, microplastics from polyester fleece materials, glues and aluminium espresso pots.

In general, the support from the project team was welcomed and happily received. The advice given following the questions from the volunteers included:

- buy and use less
- use products with mainly natural ingredients
- look for ecolabels and choose labelled products and articles
- throw away old plastic toys
- change plastic food containers and dishes to glass or metal

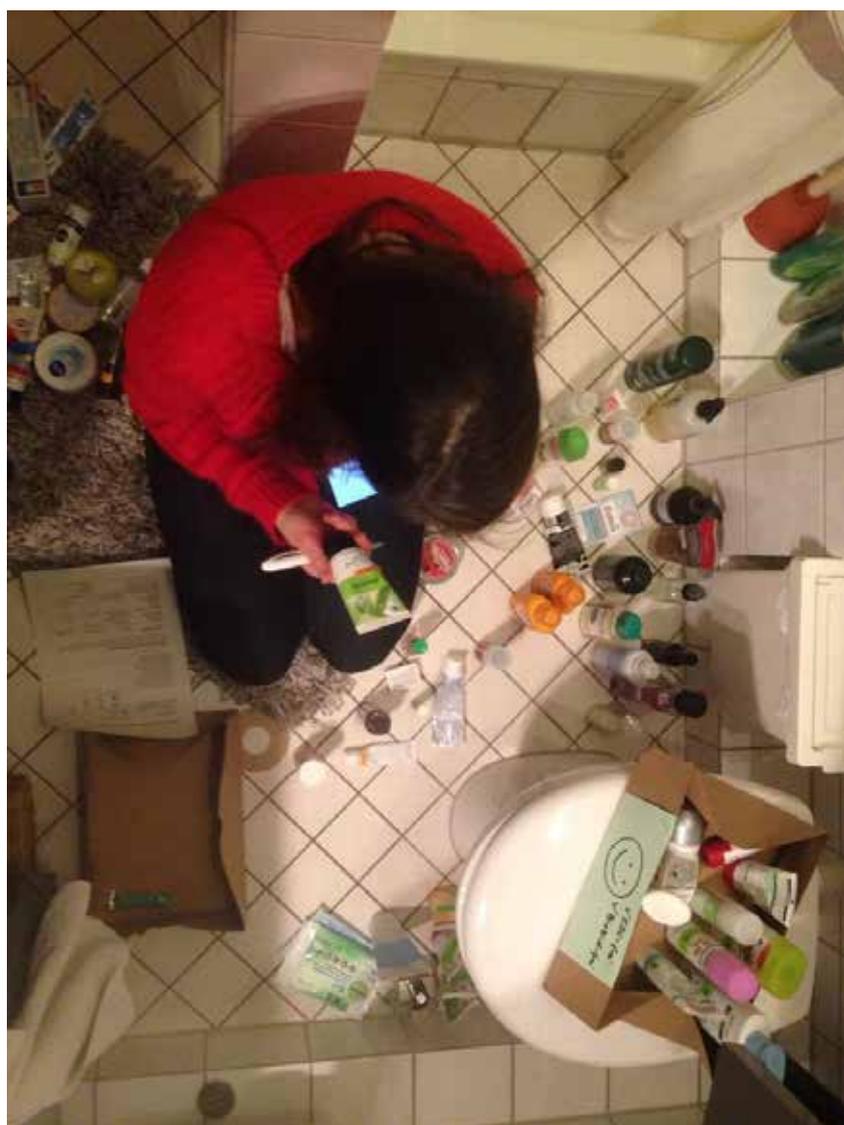
### **Viliejka and Iŭje**

Viliejka and Iŭje are small towns in Belarus. Residents of the Belarusian regions mainly receive information from regional media and the Internet. In this regard, the invitation to become a volunteer and check a household for HS was published in Viliejka and Iŭje regional newspapers, as well as in local popular public posts on the social network V Kontakte. Then, in the district media and social networks, photo reports were published about visiting volunteers, along with recommendations on how to make your home non-toxic. Two volunteers were regional media journalists, which increased their loyalty to the project topic. A lot of attention among the residents was caused by TV spots prepared by the TV channel Iŭje and IPO "Ecopartnership". The employees of the IPO "Ecopartnership" were not only guests in the studio, but they also wrote the script themselves and got to try on the presenter's role. Consultations were also provided to local residents during public events and seminars held in Viliejka and Iŭje. Throughout the project, posts with recommendations on how to avoid HS in products were published weekly in popular public social media groups.

The household checks provided a personal view of everyday decisions, routines and behaviour of families and single person households. The household members were very affected by the topic of HS when their products and articles were literally put on the table. By doing this, emotions could be directly linked to the product or article and the ground was paved to immediately implement measures to reduce exposure and emissions

### Västerås

In Västerås, the project partner chose to visit households with different numbers of occupants and members of different ages. Older people, single person households and families with children were visited. In order to recruit the volunteers, the City of Västerås participated at fairs and arranged its own information day. After the visits, an exhibition at the Västerås art museum was made with information on HS that can be found in household products and pictures of what has been found in the volunteers' homes. The exhibition supported the wide dissemination of results from the home visits to members of the public with pictures grouped according to different substances, such as phthalates, flame retardants and PFAS.



*Picture 6: Scanning articles for hazardous substances during the household visit. Photo: Martin Krekeler*

### Revisiting the volunteer households

When contacting the households a second time, the project teams were inquisitive about what had changed in the interior of the volunteers' homes and with the products they used.

One primary finding was a decrease in the number of detergents. Some personal care products had been substituted. Changes in cosmetics use were inconclusive. Several people held on to specific luxury cosmetic products (e.g. make-up) which were difficult to substitute since these products satisfy

individual requirements or have been used for a lifetime and are therefore have an emotional value. This made cosmetics a delicate topic, while detergents and personal care products seemed to be easier to exchange.

Kitchen appliances such as pans with non-stick surface coatings were exchanged almost immediately, and food containers were changed to ones with less or no plastic.

From the questionnaire completed during the second contact, the volunteers were asked to assess how the check affected them. It was clear that the volunteers felt more aware and self-confident about HS after the check.

### Conclusions on the household check as a tool to document HS emission reductions

In general, the household check results are not quantifiable since there were not enough participants in each municipality. Furthermore, there are many factors influencing behaviour change which together with the project teams' time constraints as well as lack of information on occurrence or quantity of HS in products and articles make it difficult to quantify individual household emission reductions. The household check provides very useful qualitative indicators about possibilities to implement behavioural changes relating to consumption patterns. The checks also gave project teams a wide range of experiences concerning inhabitant campaigns with a personalized approach as well as insights into the wide variety of products and articles present in homes and their potential HS content.

## 3 EVALUATION AND RECOMMENDATIONS

### 3.1 Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis of the household check

A SWOT analysis is a well-known and relatively simple method to analyse the advantages and disadvantages of communication tools (Harvard Business School Review, 2015). SWOT stands for Strengths, Weaknesses, Opportunities, and Threats, where the opportunities also include strategic plans for future possibilities to use the communication tool.

Strengths and weaknesses are internal to the tool – something which an individual has control over and can change. Opportunities and threats are external – something going on outside the scope of the action, in the larger context. It is possible to take advantage of opportunities and protect against threats, but they cannot be changed.

	Household check	Families/Society
+	<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Personalized advice</li> <li>• Adapted approach fits household routines, priorities, values and needs</li> <li>• Direct feedback to/from household members</li> <li>• Empowerment, self-efficacy of action</li> <li>• Mix of theory and practice possible</li> </ul>	<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Social media</li> <li>• Existing information offers</li> <li>• Existing offer of eco-labelled products</li> <li>• Existing initiatives (slow food, zero waste etc.)</li> <li>• Societal discourse on plastic (and some substances)</li> <li>• Transferability to other formats and issues</li> </ul>
-	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Limited outreach</li> <li>• Needs a lot of capacity (time and staff)</li> <li>• Detailed checks for hazardous substances is only possible for products with labels, not for articles</li> <li>• Trust, threshold to take part</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Social media – influencer, customized advertisements</li> <li>• Routines, convenience</li> <li>• Societal trends: online shopping, less cooking etc.</li> <li>• Lack of information along the supply chain</li> </ul>

Figure 2: The SWOT analysis

Here, the strengths and weaknesses relate to the NonHazCity household check itself, the process of preparation and implementation as well as its dissemination. Opportunities and threats originate from the societal surroundings in which the household check takes place. The first level of the surroundings

includes household members with their relations, values, routines and social, cognitive and economic abilities. The second level includes the wider spheres of society, i.e. neighbours, friends and peers, and society as a whole.

### **Strengths**

The strengths of the household check include its very personal approach providing detailed, personalised advice. This facilitates the incorporation of the routines, priorities, values, and needs of every household checked. Each household gets customized feedback and personalized advice for learning and changing future behaviour.

### **Weaknesses**

The personalised approach is also one of the major weakness of the method since it has limited outreach. Each check takes time and other resources from the project team. While the visit gives very concrete advice by checking cosmetic products and detergents with ingredients labels at individual households, it offers only very generic advice about articles and materials that do not have lists of ingredients. A final weakness is that people tend to be cautious about trusting strangers enough to let them into their homes.

### **Opportunities**

Nowadays traditional and social media give good opportunities to promote and disseminate tools such as the household check. With a personal touch it is easy to distribute the existing information through social media networks, apps and websites. Front runners and other influencers in social media are one key to distribution of the information – if they care, followers also care. Furthermore, connections to existing initiatives, e.g., slow food and zero waste can be made; to follow and learn from as well as transfer the household check concept to other environmental areas including the societal discourse on plastic. These are factors which might support market development, creating good preconditions and suitable alternatives that support the change consumers would like to make. As an example, the amount of eco-labelled products has remarkably increased in recent years and these are now routinely available at supermarkets.

### **Threats**

While social media is a powerful tool to relay information between people and to trigger changes in behaviour, it is also a threat to any kind of information distribution. There is a lot of information available and during its distribution, it tends to get simplified, garbled or reaches only the interested group. Furthermore, big channels like Google, YouTube and Facebook customize the content people get based on already existing interests and search history and therefore do not support change in consumption behaviour.

People tend to hang on to their consumption patterns and habits and change them only if it is comfortable and does not require much effort.

Today's societal trends of convenience such as online shopping and less cooking together with current trends of individualisation may hinder conscious change of consumption patterns.

As soon as people get interested in changing their consumption patterns, they are faced with a confusing variety of eco-labels, including self-made statements on ecological status of products and articles, as well as lack of information along the supply chain. The number of claims made is remarkable and it is quite difficult to understand if a declaration is a real, certified, eco-label or a company's own, self-proclaimed statement. The lack of legislation demanding a list of content for articles is also a threat since this makes it hard to assess if an article is at risk of containing HS.

### **Conclusion on the SWOT of the household checks**

It is crucial to think about how to simplify the check so that each household can perform the check themselves and create a snowball effect – “if one can do it then others can as well”. It is also critical to find the key persons or families who are ready to share their experiences in order to achieve efficient distribution of the messages.

## 3.2 Lessons learned and recommendations on how to make good household checks

One aim of the project was to evaluate the effectiveness of the household check as a tool contributing to behaviour change among inhabitants at a larger scale.

### **Talk about how change can make everyday life easier**

Many volunteers found it difficult to include new routines in their hectic everyday life. Think jointly about ways how to make change possible. Sometimes certain products and articles can be avoided completely, which makes life easier by saving time and money. There is a need to show how easily every one of us can change routines and habits in our daily life. One little step every day can lead to big changes. The household check is one step to guide people, so they get the opportunity to make new and better decisions in the future.

### **Needs and priorities of the volunteers must be the point of departure**

Every household has individual barriers and opportunities to change the use of products and articles containing HS. Long-term favourite products with positive connotations will probably not be the first ones to be replaced. So, allow people to keep favourites even if they are disadvantageous from a chemical perspective. Show them alternatives without imposing rules and do not blame consumers for their existing consumption patterns. To have a range of possibilities is the best way to get people to move.

Show people how many products they possess and how many of these they actually use: Most people are surprised when they realize how many products they have stored in their bathroom and kitchen. Discuss the numbers obtained at the household check and put all the products together so that they form a visible “heap”.

It might seem tantalizing to compare old vs. new consumption patterns in terms of worse vs. better. However, this should not lead to a blaming of consumers as this might trigger counter-reactions. Existing routines and habits are the result of available knowledge, experiences and values, as well as social and infrastructural conditions. They are not “wrong” or “inappropriate” but, instead, the result of a person’s strategy to efficiently coordinate and synchronize several internal and external factors. Make sure to appreciate and understand people’s choices before talking about change.

### **Talk about personal experiences and challenges**

Share your own challenges and failures to make clear to your counterpart that nobody is perfect. This gives a better feeling which makes change more prone to happen. Talking about your own experiences regarding the use of products and articles with less hazardous substances had a very positive influence on the course of the household checks.

### **Each step counts, prioritise advice and let people adapt**

Change always need time and it is logical is to implement change gradually. It’s easier and more motivating to experience small, successful changes than having the feeling of changing everything at once. When giving advice it is also important to have a good structure, so that the implementation remains simple. Set priorities of what type of products or articles should be checked first. Items can then be sorted into different categories in boxes as in the example from Hamburg: green (harmless), grey (use up and do not buy again) and red (avoid). Compiling a guide with such advice and ideas helps to implement change.

### **Try to get others to spread the word and look for strong partners**

It is even better to get others to write about you, about your work and campaign. This naturally increases the impact. If you have a strong partner or network at your side like a well-known person, celebrity or institution such as a municipality, your outreach increases since these all have the potential to reach many inhabitants

### **Select multipliers and change agents**

To work with change agents ensures the trickle-down of information and behavioural change. In general, celebrities and other public figures have a very strong influence on people since they can be personal idols and respected in the society. Through their influence, change agents can reach many people and make a difference. It is a great opportunity to use a well-known supporter to provide a role model.

### Combine theory and praxis

Learning and action triggers change, and people learn in a hands-on way to change routines and behaviour. The implementation of workshops and seminars helps to link theory with practice. Information materials containing examples or films from the household checks can initiate the necessary emotions for change to happen.

### Concluding remarks from the lessons learned

Change in behavioural patterns should be initiated by making the change attractive to the individual and creating a sense of control over the initiative. This can be done by providing good examples, from peer groups and change agents, including easily adoptable ways of stepwise change, such as suggestions of HS free products within reach for the individual. To share personal experiences and accept the individual preferences and barriers to change is a key to success.

#### Link with communication channels:

Use communication channels like Facebook, Instagram and others help to spread the campaign and to reach many people. Videos or photos are an eye-catcher if they are properly promoted. Using material from the actual household checks makes the message colourful and attractive.

## 4 OVERALL CONCLUSIONS

Household checks are about awareness raising, making the amount of hidden chemicals visible, indicating strategies and offering support for a change of consumption through concrete advice and adaptation to the priorities of the volunteer households.

These strategies can be transferred to other environmental campaigns aiming at behaviour change. The individual's set of values, priorities, and needs should be the point of departure and a choice of alternative options for change should be offered. This opens the possibility of trial-and-error, stepwise progress, playful challenges and finding the suitable level of change to start at.

#### Give some proof that it works:

Show everyone that you have proofs of your theory by implementing, for example, before-after studies. So, that you can really see and feel that something has changed. If the change is noticed people will be more motivated.

### 4.1 Individual consumption changes need policy support

As described in section 1.3, converting knowledge, or even values to individual action is not only dependant on the individual. Social and infrastructural framework conditions influence what we know and feel, and determine what we do. While household checks address the individual household level, infrastructural changes must take place in order to:

- make advice, knowledge and individual preferences applicable and behavioural change feasible in daily life
- establish new routines and habits, i.e. recurring patterns of activity and behaviour which are supported by both societal interaction and infrastructural conditions.

Therefore, a tool like the one described in this publication is only able to take effect if certain further changes occur at policy level.

#### Suggestions for stricter legislative measures to support the phase out of certain HS

- **Restriction procedure under the European chemicals legislation REACH:** Consumer products should not contain any HS for which less hazardous or non-hazardous alternatives are available. However, there are a number of challenges to achieving this goal. At present, responsible authorities must demonstrate on a case by case basis that the HS in a consumer product or article pose a risk that needs addressing at the EU level and to make a restriction based on precautionary considerations is not possible. In combination with a lack of resources, these are the main reasons for the comparably low number of restrictions. To facilitate the restriction process, requirements could be reduced by, e.g., (i) allowing greater use of the precautionary principle,

(ii) accepting evidence based on exposure models rather than relying exclusively on monitoring data and (iii) assuming similar risk levels from HS in products and articles for consumers across the EU. The presence of the most HS used in consumer products and articles could be further regulated by prohibiting all substances on the REACH candidate list. Furthermore, the range of HS prohibited in consumer products should be extended to include neurotoxic substances and proven endocrine disrupter (REACH; entries 28, 29 and 30 of Annex XVII). This could better protect children, adolescents and unborn children from brain damage and other health effects.

- **Food contact materials:** Prohibit the use of carcinogenic, mutagenic and reprotoxic (CMR) substances and substances of very high concern (SVHC) as well as proven neurotoxic substances and endocrine disrupters in any food contact material, regardless of the migration limits. This supports consumer safety and the circular economy.
- **Cosmetics Regulation:** Prohibit the use of SVHC and CMR substances in cosmetic products.
- **Toy Safety:** The Toy Safety Directive prohibits the use of a number of classified fragrances in toys and requires labelling of the content of some additional ones. However, the use of fragrances in children's toys is superfluous as the fragrance most often does not have a relevant function for the toy as such. Hence, any fragrance in toys should be avoided regardless of its toxicity in order to minimise chemical exposures (and with a view to lack of knowledge on mixture effects). Hence, the use of fragrances in toys could be restricted on a general basis.
- **Information on substances in articles for everyone through full material disclosure:** The communication under REACH Art. 33 should be extended from the present requirements for SVHC on the candidate list to include: (i) all CMR substances, (ii) all persistent, bioaccumulative or toxic / very persistent, very bioaccumulative (PBT/vPvBs) substances and (iii) neurotoxic or endocrine disrupting substances. Information about the presence of these groups of substances in consumer products should be a minimum regulatory requirement. Transparent reporting of the full material composition of an article/product is the desirable level of information. Given the occurrence of reluctance from the industry to declare the full composition of articles (due to confidentiality concerns and resource/cost constraints), the necessary information flow should be legally required in a similar way as it is for chemical and cosmetic products. Such full material disclosure could be communicated as a "label" indicating the content of articles. It should be accompanied with a possibility for further information, e.g. on a company website and/or in instructions supplied together with the article.

A harmonised data format accompanied by secure communication on HS at global level is an essential basis to ensure the needed flow of information along the supply chains.

## 4.2 Interface between consumption, chemicals and environmental policy fields

The current report reveals that chemical risk management for private individuals needs to include a change in consumption patterns and personal behaviour related to products and articles that may contain HS. To be effective, different policy areas need to communicate and cooperate across the policy sectors. Policies for substances emitted from products and articles (legislation on products and articles) must be connected to policy for the aquatic environment (water legislation) and human exposure (legislation on OSH, food contact materials, pesticide residues etc.) to facilitate chemical risk reduction. To achieve this goal, the aforementioned policy fields must interact far more than they currently do. Some examples of ways to achieve change, which need policy support, are:

- Implementation of chemical criteria in procurement in municipalities (see NonHazCity report 3.5 "Hazardous substance reduction potentials in Baltic Cities")
- Implementing environmental management practises at businesses (see NonHazCity report 4.5 & 4.7 "Hazardous substance reduction potential at pilot small businesses of the project NonHazCity")
- Promoting a sustainable lifestyle, by campaigns for inhabitants, as described in this report

### 4.3 Further development of the household check tool

A further development of the household check tool should target the weaknesses described in the SWOT analysis described in section 3.1. The most striking challenge is the mass dissemination of the household check. From a theoretical standpoint, future consideration should pay attention to the highly differing consumption patterns, routines, lifestyles and possibilities of private households. A household check 2.0 should:

- Be easily applicable for example as a DIY check so that it has a bigger outreach, easily possible for everyone to change their lifestyle and habits by self-assessment and own initiative.)
- Be adaptable to different target groups
- Be adaptable to different types of products, articles and services (routine consumption vs. informed choice)
- Include stories using the good examples from the household check, for use in future communication
- Include the possibility to use a smartphone app to scan products, offering workshops via webinars or by creating guidance videos.
- Include various innovative ways of communication such as comics, live performance, exhibitions, booth at events or even a theatre playing a household subject to the check can raise awareness. As an example, Riga built a dollhouse to show the public which chemicals that can be found in every room of the household.



Picture 7: A dollhouse as illustration object. Photo: BEF Latvia

Municipalities may consider establishing centres for sustainable living, having all campaigns under one roof, creating synergy effects, facilitating living labs including real time/live experiments, interaction products, and social innovation. This could become municipal “lighthouses” or “model districts” with sample testing, and training courses, e.g., on public health. Consumer protection organisations could be involved hand in hand with local NGOs, recreational and educational entities.

### 4.4 Need for more projects addressing hazardous substances in everyday products

Pilot projects such as NonHazCity with focus on showing that HS are all around us are essential for progress when it comes to reducing HS release and exposure. The most important result of the project was evidence of widespread HS presence in everyday urban life.

Communication tools such as the household checks are good instruments to give people what they really need: concrete advice and solutions. The direct interaction and the personal dialogue facilitated the change in behaviour better than anonymous information distributed over traditional and social media. More role models and front-runners are needed to show that behaviour change is possible. Projects involving actions at districts, schools, kindergartens etc., to test out new choices based on the newly gained awareness might be a good idea for future projects and actions.

There is a need of future projects developing the NonHazCity achievements further.

## REFERENCES

- Alijošiūtė-Paulauskienė, A., Fammler, H., Futter, M., Gercken, J., Jamtrot, A., Jegelevičius, G. & Lagerqvist, A. (2019). Hazardous substance reduction potentials at local businesses. NonHazCity report.
- Badilescu-Buga, Emil (2013). Knowledge behaviour and social adoption of innovation. In: Information Processing & Management 49 (4), pp. 902-911.
- CLP. (2008). The Classification, Labelling and Packaging (CLP) Regulation ((EC) No 1272/2008). ECHA.
- Gercken, J., Caban, M., Pettersson, M., Wickman, T., Futter, M., & Ahrens, L. (2018). Hazardous Substance Occurrence in Baltic Sea Pilot Municipalities. NonHazCity report.
- Giovanoulis, G., Lagerqvist, A., Anh Nguyen, M., Arwidsson, M., Langer, S., & Westergren, R. (2019). Reduction of harmful chemicals in Swedish preschool dust. Manuscript in preparation.
- Harvard Business Review (2015). HBR Tools: SWOT Analysis.
- Jackson, T. (2005). Motivating Sustainable Consumption: a Review of Evidence on Consumer Behaviour and Behavioural Change. Centre for Environmental Strategy, University of Surrey, Guildford.
- Kollmuss, A., Agyeman, J (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? Environ Educ Res 8(3): pp. 239-260.
- Lagerqvist, A. (2018). Hazardous Substance Reduction Potentials in Baltic Cities. City of Stockholm within NonNazCity.
- Lagerqvist, A. (2018). Hazardous substance reduction through phase out of old articles and materials in pre-schools – calculations of actual reduction. Stockholm: Chemical Centre, Environment and Health administration, City of Stockholm. NonHazCity report.
- Lee I., e. a. (2018). Bisphenol A exposure through receipt handling and its association with insulin resistance among female cashiers. Environment International.
- Pettersson, M., Oldén, M., & Lagerqvist, A. (2018). Hazardous substances in articles and materials. Analysis of phthalates and alternative plasticisers, flame retardants, chlorinated paraffins, highly fluorinated substances and formamide in old and new pre-school items. Stockholm: Chemical Centre, Department of Environmental Analysis, City of Stockholm. NonHazCity report.
- Rogers, E. (2003). Diffusion of Innovations. Fifth edition. Free Press: New York.
- Rutkowska A., et al. (2015) Polish Society of Endocrinology Position statement on endocrine disrupting chemicals (EDCs). Endokrynol Pol 66(3):276-81
- Rutkowska A., Konieczna (Szybiak) A., et al. (2016). Endocrine disrupting chemicals as potential risk factor for estrogen-dependent cancers. Pol Arch Med Wewn. 126(7-8):562-70.
- Rutkowska A. & Konieczna (Szybiak) A. (2018). Exposure of Gdańsk inhabitants to selected endocrine disruptors as part of the “City on Detox. Report for NonHazCity.
- Senele, K. (2018). The NonHazCity Project - Overview of The Inhabitants’ Campaigns In The Cities And The Most Successful Campaign Elements. Latvia: Baltic Environmental Forum Latvia. NonHazCity report.
- Southerton, D., McMeekin, A. and Evans, D. (2011). International Review of Behaviour Change Initiatives. Available online at <https://www2.gov.scot/Publications/2011/02/01104638/0> (accessed 09.02.2019)
- Trasande L., e. a. (2015). Estimating Burden and Disease Costs of Exposure to Endocrine-Disrupting Chemicals in the European Union. The Journal of Clinical Endocrinology & Metabolism.
- Unilever (ed., n. d.): Inspiring sustainable living. Expert insights into consumer behaviour & Unilever’s Five Levers for Change. Available online at: [https://www.unilever.com/Images/slp\\_5-levers-for-change\\_tcm244-414399\\_en.pdf](https://www.unilever.com/Images/slp_5-levers-for-change_tcm244-414399_en.pdf) (accessed 21.02.2019).
- (2013). Late lessons from early warnings: science, precaution, innovation. Köpenhamn: European Environmental Agency.

## APPENDIX 1: THE EU LIST OF ALLERGENIC PERFUME SUBSTANCES

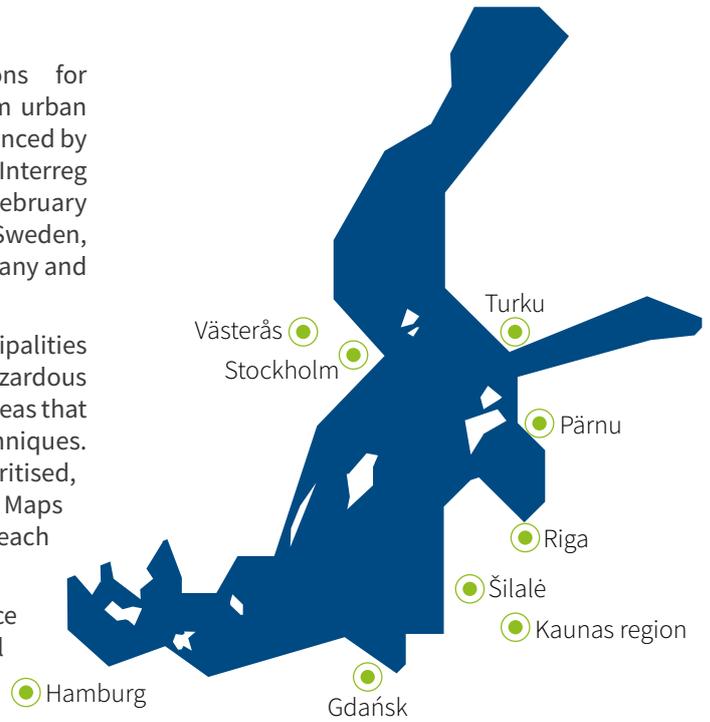
Amyl cinnamal  
Benzyl alcohol  
Cinnamyl alcohol  
Citral  
Eugenol  
Hydroxy-citronellal  
Isoeugenol  
Amylcin-namyl alcohol  
Benzyl salicylate  
Cinnamal  
Coumarin  
Geraniol  
Hydroxy-methylpentylcyclohexenecarboxaldehyd  
Anisyl alcohol  
Benzyl cinnamate  
Farnesol  
2-(4-tert-Butylbenzyl) propionald-hyd  
Linalool  
Benzyl benzoate  
Citronellol  
Hexyl cinnam-aldehyd  
Limonene  
Methyl heptin carbonate  
3-Methyl-4-(2,6,6-tri-methyl-2-cyclohexen-1-yl)-3-buten-2-one  
Oak moss and treemoss extract  
Treemoss extract

## ABOUT THE PROJECT

The project “Innovative Management Solutions for Minimizing emissions of hazardous substances from urban areas in the Baltic Sea Region” (NonHazCity) was financed by the European regional development fund within the Interreg Baltic Sea Region program, from March 2016 to February 2019. The project involved 18 partners from Sweden, Finland, Estonia, Latvia, Lithuania, Poland and Germany and 23 associated partners.

NonHazCity demonstrated the possibilities of municipalities and WWTPs to reduce emissions of priority hazardous substances (HS) from small scale emitters in urban areas that cannot be reached by traditional enforcement techniques. Substances of concern were identified and prioritised, sources tracked and ranked, individual HS Source Maps and Chemicals Action Plans were developed by each partner municipality.

Municipal entities implemented own substance reduction measures at their premises. Private small scale businesses have undertaken pilot substitution actions and improved their assortment. Inhabitants have been shown their HS emission share and tested the use of less HS in every-days household management to help to protect the Baltic Sea environment but also their own health.



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Osterstraße 58, 20259 Hamburg

[www.bef-de.org](http://www.bef-de.org)

Contact: Heidrun Fammler, [heidrun.fammler@bef-de.org](mailto:heidrun.fammler@bef-de.org)

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