A·I·S·E

International Association for Soaps, Detergents and Maintenance Products

IFH INTERNATIONAL SCIENTIFIC FORUM ON HOME HYGIENE

Developing household hygiene to meet 21st century needs

A collaborative industry/academia report on cleaning and disinfection in homes

& Analysis of European consumers' hygiene beliefs and behaviour in 2020

By A.I.S.E. (International Association for soaps, detergents and maintenance products) & IFH (International Scientific Forum on Home Hygiene)

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Report summary

This joint report is co-authored by A.I.S.E., the International Association for Soaps, Detergents and Maintenance products, and the International Scientific Forum on Home Hygiene. Hygiene, i.e. the practices through which people maintain or promote good health, is of paramount importance in the 21st century and has played a critical role in fighting the coronavirus pandemic in 2020 and 2021.

A.I.S.E. and IFH support the principles of Targeted Hygiene, an approach based on risk assessment and risk management which argues that, to be effective, hygiene practices need to be focussed at the times (moments) and in the places that matter to break the chain of infection and reduce the risk of exposure to harmful microbes. An evaluation of the microbiological data related to the transmission of harmful microbes in living environments, coupled with observation of people's behaviours indicates that there are 9 key moments in our daily lives where hygiene really matters. At each of these moments, hygiene practices need to be targeted at critical surfaces such as hands, hand contact surfaces and cleaning utensils to prevent spread of harmful microbes. An equally important aspect of targeted hygiene is the need for effective hygiene procedures which can be used to break the chain of infection at key moments. In many cases this can be achieved by removal of microbes e.g. using detergent-based cleaning products, but in some cases a surface or hand disinfectant product is needed.

This report evaluates the ways in which household hygiene is changing to meet 21st century needs. Growing awareness of the need for effective hygiene offers significant opportunities to the industry to innovate, develop and market novel hygiene products which not only maximise protection against infection but also ensure sustainable use of resources.

We believe that getting consumers to adopt this scientifically-proven targeted approach to hygiene in their home and everyday life, could have a significant impact in reducing the spread of infection and securing better health for European citizens.

The report also contains the results of a pan-European poll carried out by A.I.S.E. in February 2020 to evaluate how consumers' beliefs about hygiene risks affect their actions. The poll indicates that, although consumers' actions are to some extent guided by their perception of risk, there was limited understanding of what are key risk situations, and when (and where) hygiene is needed. Similarly, consumers report using disinfectants in some situations where they are needed, whilst in other similarly risky situations, they are only rarely used. Similarly, there was usage in situations normally considered as low risk.

When the poll was repeated in June 2020, it was found that, despite the fact that the COVID-19 pandemic has provided an unprecedented opportunity for hygiene promotion, there was little evidence that this has altered consumer's perception of risk and hygiene behaviours.

A further barrier to behaviour change highlighted by the poll is lack of clarity about what the term hygiene actually means. Whilst the majority of consumers agreed that hygiene is more than just cleanliness, a significant number thought that they were one and the same thing, whilst others thought that hygiene is specifically about using a disinfectant.

The findings suggest that, if hygiene promotion activities aimed at consumer behaviour change are to be successful, they must be accompanied by consumer education on the basic concepts of Targeted Hygiene.

In conclusion, the report sets out a number of actions that need to be taken, in order to maximise effectiveness of hygiene whilst at the same time addressing sustainability issues.

Foreword by Professor Didier Pittet

My passion for hand washing as key to preventing the spread of infectious diseases began in 2004, when the WHO World Alliance of Patient Safety approached me to lead the First Global Patient Safety Challenge "Clean Care is Safer Care", launched in October 2005. In 2009, WHO Patient Safety also launched the "SAVE LIVES: Clean Your Hands" campaign to ensure ongoing global focus on hand hygiene in health care. A key component of the campaign is the "My 5 Moments for Hand Hygiene" concept designed to enable healthcare professionals to easily visualize the "risk moments" where hand hygiene is needed, and thereby optimize patient safety.

What we have seen with the COVID-19 pandemic, which took off with such speed in the early months of 2020, is that, in a situation where we lack access to effective antimicrobials and vaccines, hand hygiene and other hygiene behaviours become the first line of defence – not only in healthcare settings, but also, critically, in our homes and everyday lives in public spaces. But beating COVID-19 is not the only challenge we face ongoing. In 2019, the WHO already warned that the next pandemic is already underway, namely the spread of existing infectious diseases for which antibiotics are no longer effective; in that light, good hygiene practices are going to play a major role in preventing infections with these.*

This joint A.I.S.E./IFH report sets out an approach to hygiene in home and everyday life settings, called Targeted Hygiene, which is based on risk assessment and risk management, and is designed to meet current and ongoing needs. One of the issues highlighted by this report is that the public have become confused about hygiene and how best to protect themselves against the risk of infection. Like the "Clean Your Hands campaign" Targeted Hygiene is designed to help the public easily recognize the key risk moments in their daily lives, where hand hygiene combined with other hygiene actions are needed.

I fully support the concept of Targeted Hygiene which means focusing hygiene practices at the "moments" and in the places that matter most. Not only does it offer the means to develop effective hygiene, it also provides a framework to ensure sustainable use of resources (chemicals, energy/biocides) ranging from cleaning with soap or detergents, to use of disinfectants when and where they are needed.

I welcome this joint industry/academia report which promotes the vital role that hygiene in home and everyday life plays to prevent the spread of infectious diseases and I encourage all stakeholders to work together to achieve the recommendations of the report.

Going forward into the 21st century, if we are to adequately address the infectious disease issues we now face, we must ensure that hygiene in our homes and in our everyday lives is recognised as an equal partner to hygiene in healthcare and other settings, and pay greater attention to improving hygiene understanding and hygiene behaviour.

Professor Didier Pittet,
MD, MS, CBE, Director Infection Control Programme, University of Geneva Hospitals and Faculty of Medicine, Geneva, Switzerland

* https://www.who.int/news/item/29-04-2019-new-report-calls-for-urgent-action-to-avert-antimicrobial-resistance-crisis

1. Introduction – Objective of the report and definitions

1.1. Objective of the report

This report aims to provide a common understanding by experts on 'good hygiene practice' by European consumers aimed at preventing the spread of infections. It provides common understanding on definitions and science-based advice centred on the concept of 'Targeted Hygiene' at the core of the guidance. Ultimately, this report aims to promote appropriate and correct use of cleaning and/or disinfectant products to enable good hygiene practices as a routine part of normal daily life as well as during a public health crisis. The report also shares an analysis of perceptions and habits reported in 2020 by European consumers – and how they were affected during the first four months of the COVID-19 pandemic.

This report is intended for all stakeholders involved in the domain of health, hygiene and infection prevention such as health authorities, medical practitioners, consumer organisations, health scientists, environmental groups, the media and interested consumers. It is also intended to provide a reference document for industry members involved in the development and/or placing on the market of products that are within the scope of this document.

The report is co-authored by A.I.S.E., the International Association for Soaps, Detergents and maintenance products in Brussels and IFH, the International Scientific Forum on Home Hygiene.

1.2. Common definitions and vocabulary used in this report

There are a number of benefits associated with good hygiene practices, ranging from the removal of visible dirt to removal of allergens, mould and other potentially harmful substances. They also include benefits on the mental health of people living in a clean home, demonstrating respect for others, ensuring longer durability of goods etc..

The focus of this report however is on the prevention of infections in household settings. Whilst it is clear that professional cleaning and hygiene solutions are key in places outside the homes (such as day-care for children, schools, restaurants, hospitals, public transport etc.), these are subject to specific and different standards as compared with consumer products and are outside the scope of this report[1].

Because it has been observed that various terms and definitions may be understood differently by different audiences (especially in Europe with its 24 languages), the terms used in this report will be based on the following definitions:

- **Hygiene** is the practice through which people maintain or promote good health by breaking the chain of infection. Practices to make themselves and their surroundings (e.g. surfaces, hands, surroundings and items of personal use) clean by cleaning and – when needed – disinfecting all contribute to hygiene. Other hygiene measures include for instance keeping a certain distance from people who are infected and wearing masks.

  NOTE: The term "hygiene" is also used to describe practices such as personal and oral hygiene – and also other public health issues such as obesity, alcohol abuse, air quality, etc.. When used IN THE CONTEXT OF THIS REPORT, the word "hygiene" will solely refer to the scope of the definition provided above i.e. ***"practices aimed at promoting good health by breaking the chain of infection"****.*

1. For more information on professional cleaning, go to www.aise.eu/professionaluseractivities

- **Cleaning** is the mechanical or chemical removal of dirt and soil from the human body, an inanimate object or an area. Normally, cleaning with soap or detergent followed by rinsing with water is adequate to remove visible dirt and allergens. Cleaning, especially cleaning followed by rinsing also reduces the number of microbes on hands, surfaces and fabrics.
- **Infection Prevention (IP) cleaning –** For the purposes of this report, IP cleaning will be used as a generic term for any procedure which is used with the intent of reducing harmful microbes to a safe level, which means it can involve both cleaning and / or disinfection processes.

  Note: The term "hygienic cleaning" has been adopted by IFH as the term to describe this concept as set out in the IFH home hygiene training resource[2].
- **Disinfection** (in this report) is the targeted use of a disinfectant to help prevent the spread of infection in situations where there is high risk of transmission of harmful microbes (e.g. when someone is infected or is vulnerable to infection). These products prevent the spread of infection by deactivating or killing harmful organisms. (see also other CEN definition[3])
- **Microbes** are tiny living cells or particles that are found all around us and are too small to be seen by the naked eye. They may include bacteria, viruses, fungi and protozoa. They are found in water, soil, and in the air. The human body is also home to millions of these microbes, also called micro-organisms. Some pathogenic bacteria and all types of viruses can only grow and multiply in living organisms.
- **Micro-organism** (as per EU BPR regulation): means any microbiological entity, cellular or non-cellular, capable of replication or of transferring genetic material, including lower fungi, viruses, bacteria, yeasts, moulds, algae, protozoa and microscopic parasitic helminths.
- **Targeted Hygiene** means focusing hygiene practices at the times (moments) and in the places that matter to break the chain of infection and reduce the risk of exposure to harmful microbes (*see Section 2.3*).
- **Biocidal products are** (as per EU BPR regulation – *see page 14*):
  - any substance or mixture, in the form in which it is supplied to the user, consisting of, containing or generating one or more active substances, with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on any harmful organism by any means other than mere physical or mechanical action.
  - any substance or mixture, generated from substances or mixtures which do not themselves fall under the first indent, to be used with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on any harmful organism by any means other than mere physical or mechanical action.
- **Disinfectants** are (under BPR), biocidal products for hands, surfaces (including those in contact with food/animal feed), veterinary applications and drinking water disinfection. In the context of this report, disinfectants may be used for disinfection of surfaces including those of the hands, hand contact, food contact surfaces and or fabrics.

2. Home Hygiene: Prevention of infection at home and in everyday life: a learning and training resource (2018) http://www.ifh-homehygiene.org/training-best-practice/home-hygiene-prevention-infection-home-and-everyday-life-learning-and-0

3. Definition agreed by CEN TC216 "chemical disinfection": reduction of the number of micro-organisms in or on an inanimate matrix, achieved by the irreversible action of a product on their structure or metabolism, to a level judged to be appropriate for a defined purpose

PART ONE: COMMON PRINCIPLES

2. Targeted Hygiene and its benefits

2.1. The key role of hygiene in the 21st century

During the 19th and early 20th centuries, clean water, safe disposal of human waste and hygiene were key to reduce morbidity and mortality from infectious disease. During the latter half of the 20th century however, once vaccines and antibiotics became freely available, investment in hygiene education and hygiene promotion declined and people became increasingly complacent about practicing hygiene. There was even a suggestion in the 1970s that by the end of the century, infectious disease would be a thing of the past[4].

By the end of the 20th century, things were changing, and it was becoming clear that relying on pharmaceutical measures to control the burden of infectious diseases was not a sustainable strategy on-going.

- Whereas, during most of the 20th century emphasis was mainly on controlling bacterial infections (including food borne infections), from the 1980s onwards, viral infections such as norovirus became increasingly important. Viral infections are not treatable by antibiotics – so prevention through hygiene is vital.
- From the start of 21st century the emergence of new respiratory viruses has posed an on-going threat of global pandemics. Since 2000, national and international agencies have been developing "pandemic preparedness plans". **These clearly recognise that *"in the event of a pandemic hygiene is essential to mitigate the spread before other measures can be put in place"***[5]. Although several potentially pandemic situations have been successfully controlled (SARS, MERS, avian flu), in the last year, as we witnessed the global pandemic of COVID-19, which took off with frightening speed, we have come to realise how reliant we are on the hygiene behaviour of the public to sustain public health.
- A key development which has exacerbated this situation are the social and demographic changes which mean that more people who are at increased risk of infection are living and being cared for in the community. A 2020 Lancet review estimates that one in five individuals worldwide could be at increased risk of severe COVID-19, due to underlying health conditions[6].
- Tackling antibiotic resistance is a global priority. Global action plans focus on three key areas – reducing antibiotic prescribing, developing new antibiotics and preventing the spread of infection. Where early initiatives focussed on healthcare settings, policy makers now recognise that reducing the spread of infection cannot be achieved without also reducing circulation of pathogens (or "silent" carriage of infectious strains) in the home and in the community. Promoting hygiene in community settings addresses antibiotic resistance in a number of ways. Firstly, it prevents people from being sick; therefore, it reduces the need for antibiotic prescribing. Then, it provides a means to reduce the spread of resistant strains such as MRSA, and multi-drug resistant Gram-negative strains across the community and across international borders. As persistent nasal or bowel carriage in the healthy population spreads in the community, this increases the risk of infection with resistant strains in both hospitals and the community[7].

4. Anthony S. Fauci, Infectious Diseases: Considerations for the 21st Century, *Clinical Infectious Diseases*, Volume 32, Issue 5, 1 March 2001, Pages 675–685.

5. Jefferson T, Del Mar C, Dooley L, Ferroni, E, Al-Ansary, LA, Bawazeer GA, van Driel M,Foxlee R, Rivetti A. Physical interventions to interrupt or reduce the spread of respiratory viruses: systematic review. BMJ 2009; 339:b3675:doi:10.1136/bmj.b3675.

6. Clark A, Jit M, Warren-Gash C, Guthrie B, Wang HH, Mercer SW, Sanderson C, McKee M, Troeger C, Ong KI, Checchi F. How many are at increased risk of severe COVID-19 disease? Rapid global, regional and national estimates for 2020. medRxiv. 2020 Jan 1.

7. Maillard J-Y, Bloomfield S; 'Reducing antibiotic prescribing and addressing the global problem of antibiotic resistance by targeted hygiene in the home and everyday life settings,' due to be published in the American Journal of Infection Control September 2020 issue. Available online: https://www.ajicjournal.org/article/S0196-6553(20)30209-1/fulltext

It is only when these issues are looked at together that the importance of hygiene in home and everyday life can be understood. This report urges all relevant bodies to recognise that **hygiene must be everyone's responsibility if the global burden of infectious diseases is to be contained in a manner which is sustainable**. Hygiene in home and everyday life must become an integral part of the "one health" approach. Reinvestment in public hygiene education is key to help meet these challenges and should definitely be included as a part of the **European Commission programme "EU4Health"** launched in May 2020[8].

2.2. Introducing the chain of infection

Although one of the primary aims of cleaning and laundering is the removal of stains and dirt (visible and invisible) and mould from used and worn textiles or hands and household environmental surfaces, controlling the spread of microbial contamination is also an important aim of hygiene processes in situations where there is a risk of transmission of infection. Infections are caused by micro-organisms (microbes) including, for example, bacteria, fungi, viruses and protozoa. Microbes live in water, soil, and in the air. The human body is home to millions of microbes. We have always known about the diverse population of microbes that inhabit our gut, our skin, our mouth and so on – it is called the human microbiome. But it is only now that we are realising how fundamental a healthy microbiome is to our health, and that failure to build a healthy microbiome is being linked to a range of health issues including, allergic, auto immune and other diseases which have become increasingly prevalent in the last 50 years[9,10].

"**Harmful** microbes are called **pathogenic** and are the microbes that infect the body and cause disease. Infectious diseases which commonly circulate in the home include respiratory infections (colds, flu, coronavirus), gut infections (food poisoning, norovirus/winter vomiting) skin and eye infections (MRSA, conjunctivitis, athletes foot) and are caused by bacteria, fungi or viruses etc.."

Source: IFH

However, as much as we clean and disinfect, we cannot rid the home of microbes, nor do we need to. **Good hygiene is ensuring that we are not exposed to microbes that can be harmful in a manner that causes infections.** Hygiene means protecting oneself from infections. We can only become infected if harmful microbes enter our body through the nose, mouth eyes, cuts and wounds etc.. Therefore, it is crucial to know how the microbes that can be harmful can spread – this is known as the chain of infection.

Figure 1 shows that the main sources of harmful microbes in everyday living environments are not places which are "dirty", but **people** (people who are infected and people who are healthy carriers of potentially pathogenic strains such as *S. aureus*) **and also contaminated foods and domestic animals**. Harmful organisms are continually shed into the environment from these sources and can then be spread via hands, surfaces, fabrics and via the air. They can only infect us if they can gain entry to a human host through an "entry portal".

8. https://ec.europa.eu/health/funding/eu4health_en

9. Bloomfield SF, Rook GAW, Scott EA, Shanahan F, Stanwell-Smith R, Turner P. Time to abandon the hygiene hypothesis: New perspectives on allergic disease, the human microbiome, infectious disease prevention and the role of targeted hygiene. *Perspectives in Public Health* 2016; 136(4): 213–224.http://rsh.sagepub.com/content/136/4/213.full.pdf+html

10. Rook G, Bäckhed F, Levin BR, McFall-Ngai MJ, McLean AR. Evolution, human-microbe interactions, and life history plasticity. The Lancet. 2017 Jul 29;390(10093):521-30.

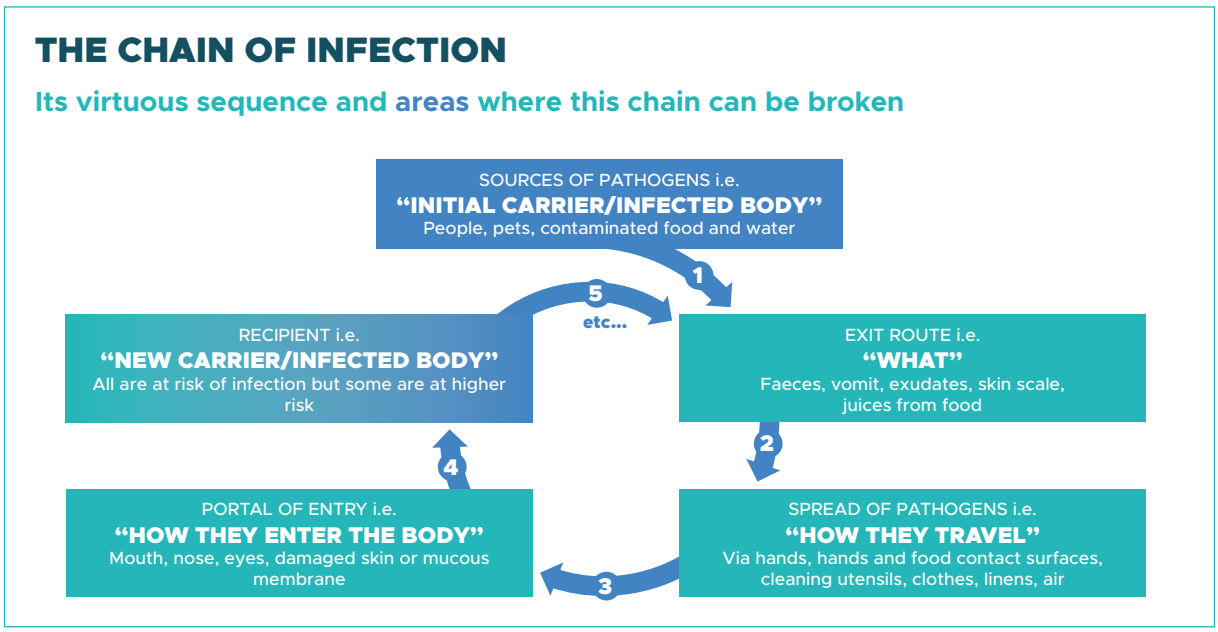


Figure 1. *The chain of infection transmission*

2.3. Targeted Hygiene – an effective approach to hygiene in home and everyday life

In line with the changes which have occurred in the last 20 to 30 years and our growing awareness of the importance of hygiene, it has become apparent that guidance on hygiene practices in home and everyday life needs to be reviewed to ensure that it is appropriate for the issues we currently face. Since 1997 the IFH has been developing an approach to infection prevention in home and everyday life, which is based on risk management and has come to be known as **Targeted Hygiene**.[11,12]

The essence of **Targeted Hygiene** is focusing hygiene practices at the times and in the places that matter to break the chain of infection and reduce the risk of exposure to harmful microbes.

Targeted Hygiene is focusing hygiene practices at the times and in the places that matter most to break the chain of infection and reduce the risk of exposure to harmful microbes. This contrasts significantly with historical approaches equating hygiene with eradicating dirt and maintaining visual cleanliness – incorrectly regarded as the main source of harmful microbes.

The IFH targeted approach to home hygiene is based on the risk assessment approach to preventing the spread of harmful microbes which has been developed and used by the food and pharmaceutical industries (also known as HACCP) since the 1960s to control microbial risks. This microbiological and other data used in development of Targeted Hygiene is set out in a 2012 review prepared by IFH[13].

11. International Scientific Forum on Home Hygiene. Containing the burden of infectious diseases is everyone's responsibility: a call for an integrated strategy for developing and promoting hygiene behaviour change in home and everyday life". October 2018. Available from: https://www.ifh-homehygiene.org/sites/default/files/publications/IFH%20White%20Paper-10-18.pdf Accessed April 6, 2020.

12. RSPH 'Too clean or not too clean:' The case for targeted hygiene in everyday life report. 2019. https://www.rsph.org.uk/static/uploaded/06b37f30-2241-4e98-aba93fc15346e7a5.pdf

13. Bloomfield SF. Exner M, Signorelli C, Nath KJ, Scott EA. 2012. The chain of infection transmission in the home and everyday life settings, and the role of hygiene in reducing the risk of infection. https://www.ifh-homehygiene.org/review/chain-infection-transmission-home-and-everyday-life-settings-and-role-hygiene-reducing-risk

Although the Targeted Hygiene concept is now widely accepted by hygiene stakeholders (see the IFH White Paper 2018[14]), it has become apparent that the population at large does not understand what it means in practice – i.e. that it does not mean "obliterating germs from risky places", but that it does mean "cleaning at the times or "moments" when there is most risk of spread of germs".

By observing behaviour and using microbiological data IFH has identified 9 key moments during our daily lives when hygiene really matters to break the chain of infection. Although they are not the only moments when hygiene practices are needed it is argued that, if we routinely practice hygiene at each of these moments, this will deal with most of the risk of spread of infection in our homes.

The "9 key moments for hygiene" includes the following activities:

1. During food handling

2. Whilst eating with fingers

3. Using the toilet or changing a baby's nappy

4. Coughing, sneezing and nose blowing

5. Touching surfaces frequently touched by other people

6. Handling and laundering of clothing, towels and bed linens etc.

7. Caring for domestic animals

8. Handling and disposing of rubbish

9. Caring for an infected family member

See ANNEX 1 for additional information on the 9 moments.

During these 9 moments, hygiene measures need to focus on, what risk management approaches call, **the critical surfaces** most likely to spread harmful microbes. Those critical surfaces include notably the hands, hand and food contact surfaces and cloths/sponge/pads used to clean surfaces.

14. Containing the burden of infectious diseases is everyone's responsibility: a call for an integrated strategy for developing and promoting hygiene behaviour change in home and everyday life". 2018 https://www.ifh-homehygiene.org/review/containing-burden-infectious-diseases-everyones-responsibility-call-integrated-strategy

2.4. The critical contact points

By examining each of the 9 moments, it is possible to identify which surfaces are most often involved as **critical control points** i.e. the surfaces most likely to cause further spread of microbes from the source such that someone is exposed and infected.

The method used to identify "critical control points" follows the standard method for risk assessment:

Infection Risk	=	Hazard	x	Exposure
		Probability of contamination with harmful microbes at that moment		Probability of subsequent exposure to these microbes

Considering the different surfaces in the home, below is an overview of the main critical contact points.

- **The hands** are a critical point at all 9 moments: IP cleaning of hands is particularly important after handling food, using the toilet, coughing, sneezing, handling pets, handling soiled laundry, disposing of waste, and caring for those who are sick.
- **Hand contact surfaces** (e.g. surfaces frequently touched by many people) including door and tap handles, stair rails, toilet seat and lid, TV remotes, computer keyboards, shared mobile devices etc.) are also critical at all 9 moments.
- **Cloths/sponge/pads used to clean surfaces –** such tools used for IP cleaning of surfaces are highest risk because, by virtue of the way they are used, they have a high risk of becoming a hazard (i.e. picking up harmful microbes) and also have a high risk of transmitting these microbes in a manner which causes human exposure (e.g. by hand to mouth or via ready to eat food). This means that they need to be IP cleaned AFTER each use to ensure that they do not spread pathogens from one hand or food contact surface to another. There is a significant amount of data to support this recommendation[15].
- **Food contact surfaces** are critical points during handling and preparing food. IP cleaning of food contact surfaces is vital after preparing raw foods such as meat and poultry, or before preparing ready to eat foods such as sandwiches and snacks, or if salads are washed in the kitchen sink for example.
- **Clothing** (particularly clothing in contact with the human body), **bed linens, hand and bath towels, and face cloths etc.** can also contribute to the spread of infection, although risks associated with these surfaces are normally somewhat lower as they rely on other chain links such as hands to transfer the microbes from the fabric to a susceptible person. Clothing of healthcare professionals (nurses/doctors/dentists) who launder their uniforms at home is also important. Advising people how often to launder clothing is extremely difficult, but regular laundering can contribute to preventing spread of infection particularly where there is someone who is infected (e.g. with norovirus, cold virus or food poisoning) or who is more vulnerable to infection.
- **Toilets, sink and bath surfaces** can also contribute to establishing a chain of infection, although again, data suggest that risks associated with these surfaces are normally somewhat lower as they rely on other "chain links" such as hands to transfer the microbes from the bath, toilet or sink surface to a susceptible person.

15. Bloomfield SF. Exner M, Signorelli C, Nath KJ, Scott EA. 2012. The chain of infection transmission in the home and everyday life settings, and the role of hygiene in reducing the risk of infection. https://www.ifh-homehygiene.org/review/chain-infection-transmission-home-and-everyday-life-settings-and-role-hygiene-reducing-risk

- By contrast **floors, walls, furniture and surfaces which are not hand or food contact surfaces** are considered as low risk based on data which shows that pathogenic organisms are only rarely isolated on these surfaces (even where there is a dog or cat in the home) and that we do not have frequent exposure to them (e.g. we do not eat off the floor – see further below). This means that the daily/weekly routine process of keeping floors furniture etc. visibly clean contributes little to preventing exposure to harmful microbes during our daily lives, as compared with hygiene practices carried out at critical moments e.g. when using the toilet or handling raw food. Although these latter surfaces may look visibly dirty and may have high levels of microbes, they are a low risk for spreading infections because harmful microbes are unlikely to be present.

From this analysis, **it is possible to construct a rule of thumb "ranking of surfaces"** according to the likelihood that they present a risk:

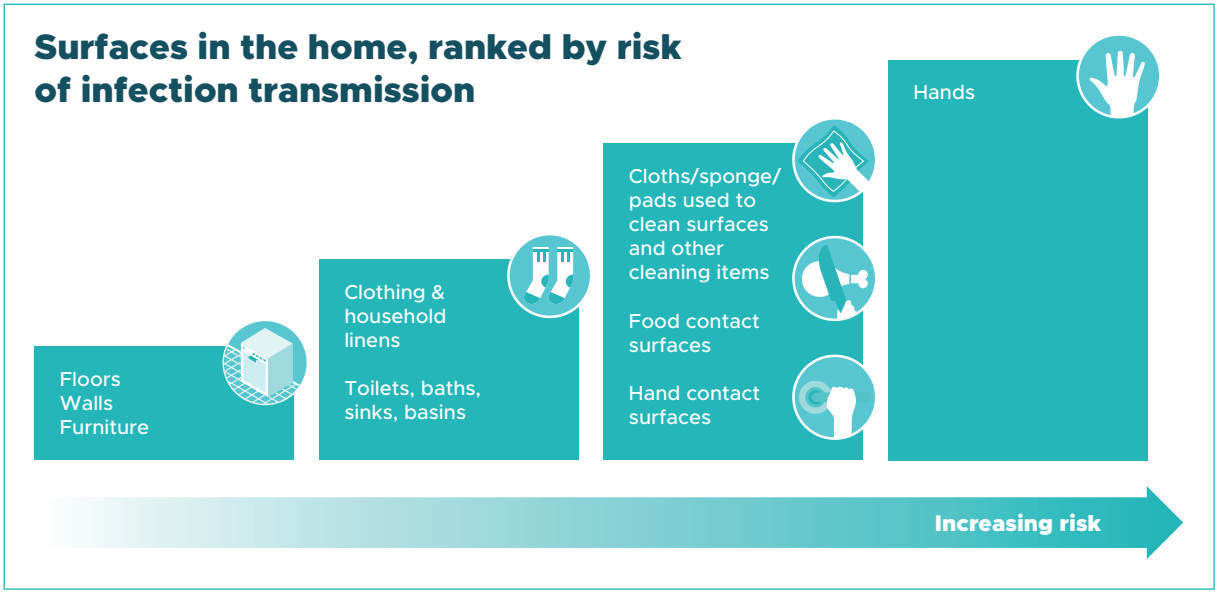


Figure 2. *Surfaces in the home, ranked by risk of infection transmission*

Fig. 2 above shows that the surfaces most often responsible for the spread of harmful microbes at the 9 moments when cleanliness and hygiene really matters, are **the hands, hand contact surfaces, food contact surfaces and cloths/sponge/pads used to clean surfaces**.

However, this rule of thumb ranking is not a constant. Thus, for example, although toilets are considered to be relatively low risk based on data showing that toilets do what they were designed to do i.e. get rid of faecal pathogens from the home safely, there are data which show that, where someone has norovirus infection or diarrhoeal disease, there is splashing and aerosol generation causing some contamination of hand contact surfaces. In such cases, additional measures should be taken to secure IP cleaning of the toilet and its surroundings.

Similarly, on the basis of risk assessment, floors are considered as low risk, but this risk will increase where there is e.g. a crawling baby on the floor who may become exposed, or where certain groups may eat on the floor during family get together, religious festivals etc.. To contain this risk however, the relevant hygiene product must be used immediately before putting the baby on the floor.

3. Towards a sustainable approach to achieving hygiene

3.1. Some key principles

An equally important part of Targeted Hygiene is "breaking the chain of infection". Breaking the chain of infection involves using hygiene procedures on critical surfaces (or the air) at key moments to reduce the level of harmful microbes which might be present, to a safe level (see text box below) and thereby prevent transmission of infection.

What is meant by a "safe level"?

In order to become infected, we need to be exposed to a sufficient number of bacterial cells, viral particles etc. (an infectious dose). The minimum infectious dose for different pathogens may be as little as 10 particles for some viruses or up to several thousand for some types of bacteria. The dose may also be lower for people with reduced immunity to infection. The objective of a hygiene process is to reduce the number of bacterial cells or particles on surfaces to a level below the infectious dose.

In principle, regardless of whether it is being applied to hands, surfaces, fabrics or in the air, there are two ways of reducing microbe levels:

- **Physical removal** of the dirt and/or microbes: using soap or detergent-based cleaning (cleaning followed by rinsing under clean running water) or dry wiping.
- **Killing the microbes:** Using a disinfectant product or hand disinfectant or a process (e.g. heat at 60°C or above) that inactivates/kills microbes *in situ*.

In household situations, these processes may be used alone (as in hand washing with soap), or in combination (use of disinfectant-cleaners), or sequentially e.g.:

- cleaning of surfaces followed by disinfection[16],
- or, as in laundry and dishwashing cycles, heat inactivation combined with mechanical/chemical action to detach microbes from fabrics, followed by a rinse cycle to remove microbial contaminants into the household waste system.

At present many experts still believe that, for domestic situations, risks of infection are relatively low except where a family member is sick.[17,18] As a result, they advised that hygiene can be consistently achieved using soap or detergent and water or dry wiping. However, research data to confirm this is lacking and a number of more recent *in situ* studies suggest otherwise[19]. These studies show that, wiping a surface with detergent, without subsequent rinsing, transfers contamination to the cloth and

16. Cogan, T. A., Bloomfield, S. F. and Humphrey, T. J.: The effectiveness of hygiene procedures for prevention of cross-contamination from chicken carcases in the domestic kitchen. Lett. Appl. Microbiol. 29 (1999) 354–358. PMid:10664978; DOI:10.1046/j.1472-765X.1999.00656.x

17. Gebel J, Exner M, French G, Chartier Y, Christiansen B, Gemein S, Goroncy-Bermes P, Hartemann P, Heudorf U, Kramer A. The role of surface disinfection in infection prevention. GMS Hyg. Infect. Control. 2013;8(1).

18. Kampf G, Dettenkofer M. Disinfection in the domestic area–what is really meaningful. Hygiene & Medizin. 2011:36-1.

19. Cogan, T. A., Slader, J., Bloomfield, S. F. and Humphrey, T. J.: Achieving hygiene in the domestic kitchen: the effectiveness of commonly-used cleaning products. J. Appl. Microbiol. 92 (2002) 885–892. PMid:11972693; DOI:10.1046/j.1365–2672.2002.01598.x

Scott, E., Bloomfield, S. F. and Barlow, C. G.: Evaluation of disinfectants in the domestic environment under \in use" conditions. J. Hyg. Camb. 92 (1984) 193–203. PMid:6323576; DOI:10.1017/S0022172400064214

Exner, M., Vacata, V., Hornei, B., Dietlein, B. and Gebel, J.: Household cleaning and surface disinfection: new insights and strategies. J. Hosp. Infect. 56 (suppl 2) (2004) S70–5. PMid:15110127; DOI:10.1016/j.jhin.2003.12.037

Barker, J., Vipond, I. B. and Bloomfield, S. F.: The effects of cleaning and disinfection in reducing the spread of Norwalk-like virus contamination via environmental surfaces. J. Hosp. Infect. 58 (2004) 42–49. PMid:15350713; DOI:10.1016/j.jhin.2004.04.02

hands, which is then spread to other surfaces, thereby promoting transmission of microbes. In this situation cleaning and disinfection are needed to break the chain of infection.

In view of this data and the growing concerns about the importance of hygiene in homes and in the community (*see section 2.1.*), opinions are beginning to change and **there is increasing acceptance amongst health professionals, health agencies etc. that disinfectant products are required in Targeted Hygiene situations such as:**

- For targeted decontamination of surfaces which cannot be rinsed under running water at risk moments e.g. kitchen surfaces following raw food contact, frequent hand contact surfaces, floors which have become contaminated with vomit, faeces etc..
- For disinfection of the hands in situations where there is no access to soap and running water
- For IP cleaning of hands and surfaces in situations where a household member is ill and is more vulnerable to infection by a lower infectious dose.
- For IP cleaning of cloths/sponge/pads used to clean surfaces after use because data show that microbes can become strongly attached to fabric surfaces and are not sufficiently removed by detergent based cleaning and rinsing alone. [20]
- For IP cleaning of surfaces where there is risk of spread of viruses such as norovirus which have a very low infectious dose (10 particles may be sufficient) where the log reduction obtained by detergent-based cleaning may be insufficient to reduce contamination below the infectious dose.

3.2. Regulatory landscape for cleaning & hygiene products in Europe

The recently updated multi-lingual www.cleanright.eu consumer portal provides – among other information – an overview of the products placed on the market in Europe, by product category.

EU regulations ensure that all detergents, biocides and maintenance products available on the market in Europe are safe for the end-user and the environment. EU regulations also ensure that all products which exert a biocidal action comply with the requirement that they *"reduce the number of micro-organisms to a level judged to be appropriate for a defined purpose" (source BPR).* The EU applies the most ambitious set of regulations for the placing on the market of chemicals. The most relevant pieces of legislation for detergents, biocides and maintenance products are:

- REACH (Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals)
- CLP (Regulation on Classification, Labelling and Packaging of substances and mixtures)
- BPR (Biocidal Products Regulation)
- Detergents Regulation

The European Chemicals Agency (ECHA) is the EU agency responsible for the implementation of EU chemical legislation. ECHA works for the safe use of chemicals for the benefit of EU citizens and the environment. A.I.S.E. is an ECHA accredited stakeholder, working with ECHA towards successful implementation of key legislation such as REACH, CLP and BPR.

Remark: Hand soaps – one of the key products to help secure good hand hygiene – are (depending on the claims) subject to the Cosmetics Regulation.[21]

For further details, please see ANNEX 2.

20. Scott, E. and Bloomfield, S.F. 1990. Investigation of the effectiveness of detergent washing, drying and chemical disinfection on contamination of cleaning cloths. Journal of Applied Bacteriology 68, 279-283.

21. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009R1223&from=EN

3.3. Sustainability and sustainable health matters

A key issue which Targeted Hygiene seeks to address is sustainable use of resources i.e. that hygiene procedures are targeted in a way that achieves maximum reduction in the risk of spread of infection, whilst minimising potential adverse effects such as environmental impacts, and toxicity and health issues. The lack of a unified voice advocating for hygiene in home and everyday life situations means these issues can take precedence, leaving hygiene and its importance in second place.

Whilst Targeted Hygiene has been adopted as a means to develop effective hygiene practice for home and everyday life, it also provides a **framework for addressing these issues and building sustainability into hygiene** and the use of hygiene products because it meets the following criteria:

- Targeted Hygiene maximises protection against infection by ensuring that hygiene interventions are focused on the times and in the places that matter in order to break the chain of infection transmission.
- Targeted Hygiene minimises environmental impacts associated with use of cleaning chemicals in domestic situations and maximises safety margins against hazards. As outlined in section 4.1 above, it ensures prudent use of cleaning products and biocides for IP hygiene purposes which is limited to situations where they will deliver real health benefits while at the same time limiting the release of these agents into the environment.
- Targeted Hygiene minimises any risk of development of antibiotic resistance. Concern has been expressed as to whether the expanding use of biocidal products, in the home and everyday life may contribute to the rise in Antimicrobial Resistance (AMR). Despite more than 20 years of research, there is still no conclusive answer to the question of whether and to what extent biocides might contribute to AMR in clinical practice. In light of laboratory data, which indicates that biocide-induced AMR is biologically plausible for some types of biocides, it is concluded that the use of biocides needs to be prudent and appropriate, and that the products containing them must be used at recommended concentrations with appropriate contact time[22]. Concerns about this issue must be properly weighed against the need for targeted use of disinfectants products in situations where other hygiene practices may be insufficient to prevent the spread of infection. What tends to be overlooked is that failure to use disinfectants and hand disinfectants (usually referred to as hand sanitisers or hand rubs) where a risk of infection is indicated could increase the risk of development of AMR by increasing the need for antibiotic prescribing (cf ref 5 cited above).
- Targeted Hygiene works to sustain normal interaction with the microbial flora of our world to the extent that is important to build a healthy microbiome[23]. In recent years we have seen widespread publicity about the concept of "being too clean". As also discussed in 2.2, the evidence suggests that loss of exposure to essential microbes from other humans, animals and the natural environment is associated with failure to build a healthy and diverse microbiome, which in turn is an underlying cause of a range of allergic, auto immune and other diseases which have become increasingly prevalent in the last 50 years. This concept tends to be called the "Hygiene Hypothesis"; but there is no good evidence to support the idea that hygiene is an underlying cause of reduced exposure to essential microbes.

22. Maillard J-Y, Bloomfield S; et al. 'Reducing antibiotic prescribing and addressing the global problem of antibiotic resistance by targeted hygiene in the home and everyday life settings,' due to be published in the American Journal of Infection Control September 2020 issue. Available online: https://www.ajicjournal.org/article/S0196-6553(20)30209-1/fulltext

23. Time to abandon the hygiene hypothesis: New perspectives on allergic disease, the human microbiome, infectious disease prevention and the role of targeted hygiene. Bloomfield SF, Rook GAW, Scott EA, Shanahan F, Stanwell-Smith R, Turner P. *Perspectives in Public Health* 2016; 136(4): 213–224

Discussion points *(beyond the scope of this report):*

A key feature of Targeted Hygiene is that it provides a framework to develop hygiene which is both effective and addresses sustainability issues. New developments now offer opportunities to further develop the principles of Targeted Hygiene and enable innovation of novel hygiene products and technologies which combine clinical efficacy with sustainability.

Breaking the chain of infection transmission inevitably requires consumption of resources, which includes one of more of the following: detergents, soap, water, mechanical action, heat, disinfectants etc.. In recent years there has been increasing investment in developing models simulating use conditions in order to evaluate how these resources work independently and/or together to reduce contamination on hands, surfaces and fabrics[24], and how these processes can be optimised to deliver hygiene with more sustainable use of energy and chemical products. An example of this is the use of the ***Sinner circle*** *(Sinner 1960) to optimise domestic laundry procedures[25]. This is based on the concept that each resource contributes a percentage of the total hygiene performance and can in principle be compensated by one of the others e.g. laundering at low temperatures to save energy can be compensated by longer cycle times or use of low level biocidal agents.*

*In recent years we have also seen the development of Quantitative Microbial Risk Assessment (****QMRA****) which is being used to ensure that hygiene interventions are effective, based on clinical criteria (infection risk reduction)[26,27]. QMRA uses microbiological data from the published literature (initial pathogen level, extent of transfer via hands and surfaces, infectious dose etc.) to model the chain of infection and give a quantitative estimate of infection risk from exposure (e.g. hand to mouth) to harmful microbes and the risk reduction due to hygiene interventions. QMRA offers the means to develop procedures which ensure that the amount of resource (heat, detergent, biocides etc.) used is tailored more precisely to the amount needed to reduce infection risk to a safe level, thereby avoiding unnecessary overuse of resources. This contrasts with current approaches where biocides are required to conform to standard performance tests (i.e. 3.4.5 log reduction in level of contamination) but is not linked to clinical efficacy.*

24. Bloomfield SF, Carling PC, Exner M. A unified framework for developing effective hygiene procedures for hands, environmental surfaces and laundry in healthcare, domestic, food handling and other settings. GMS Hyg Infect Control. 2017;12:Doc08. DOI: 10.3205/dgkh000293, URN: urn:nbn:de:0183-dgkh0002937

25. Bockmühl DP. Laundry hygiene—how to get more than clean. Journal of applied microbiology. 2017 May;122(5):1124-33

26. Ryan MO, Haas CN, Gurian NL, Gerba CP, Panzl BM, Rose JB. Application of quantitative microbial risk assessment for selection of microbial reduction targets for hard surface disinfectants. Am J Infect Control. 2014;42:1165-72.

27. Haas CN, Marie JR, Rose JB, Gerba CP. Assessment of benefits from use of antimicrobial hand products: reduction in risk from handling ground beef. International journal of hygiene and environmental health. 2005 Nov 18;208(6):461-6.

PART TWO: CONSUMER HYGIENE HABITS & UNDERSTANDING – ANALYSIS

4. Analysis of European consumers' hygiene beliefs and behaviour in 2020

4.1. Insites Consulting surveys

Every three years since 2008, A.I.S.E. commissions a pan-European survey on consumers' habits and perceptions. The objective is to find out about perceptions vis-à-vis the cleaning and hygiene products industry, as well as to monitor habits and their evolution, in the domains of washing and cleaning as well as sustainability.

Starting in late 2019, A.I.S.E. offered IFH the opportunity to build on their 2018 RSPH poll[28] and include questions related to hygiene understanding and hygiene habits in the A.I.S.E. 2020 study, with specific reference to prevention of infection. This quantitative survey was carried out in February 2020 prior to the outbreak of COVID-19 in Europe. In light of the ensuing pandemic, the A.I.S.E. Board also agreed to repeat this part of the survey in June 2020 so as to establish whether, and to what extent, attitudes and understandings about hygiene may have changed due to the extensive government messaging about hygiene in the period March to May 2020. See details of the methodology used for the studies in *ANNEX 3*.

Note: It is important to note that the results are based on self-reported actions and may not accurately reflect actual behaviours. Such data would need to be generated in a different way.

The objectives of this survey (with focus on the topics relevant to this report) were to:

- Understand how consumers perceive the importance of hygiene.
- Find out what consumers understand about hygiene and its role in the prevention of infection in home and everyday life – and how this differs from cleanliness (i.e. that hygiene is more than cleanliness).
- Find out whether and to what extent consumers' actions are driven by their perception of risk – and whether and to what extent their perception of risk is consistent with Targeted Hygiene.
- Whether hygiene promotion during the early part of the COVID-19 pandemic (i.e. winter/spring 2020) modified consumers' understanding of a risk-based approach to hygiene.

A **summary** of the findings of the February and June polls is provided in section 4.2. below. In a few cases, data are compared with those of the 2017 A.I.S.E. pan-European survey.

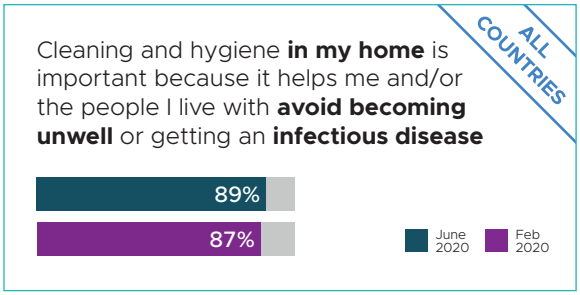
The **full results** of the polls are set out in *ANNEX 4*.

28. Sally F Bloomfield. RSPH and IFH call for a clean-up of public understanding and attitudes to hygiene 2019; Volume: 139 issue: 6, page(s): 285-288 https://journals.sagepub.com/doi/pdf/10.1177/1757913919878367

4.2. Summary findings of the studies

Consumers are concerned about the importance of hygiene

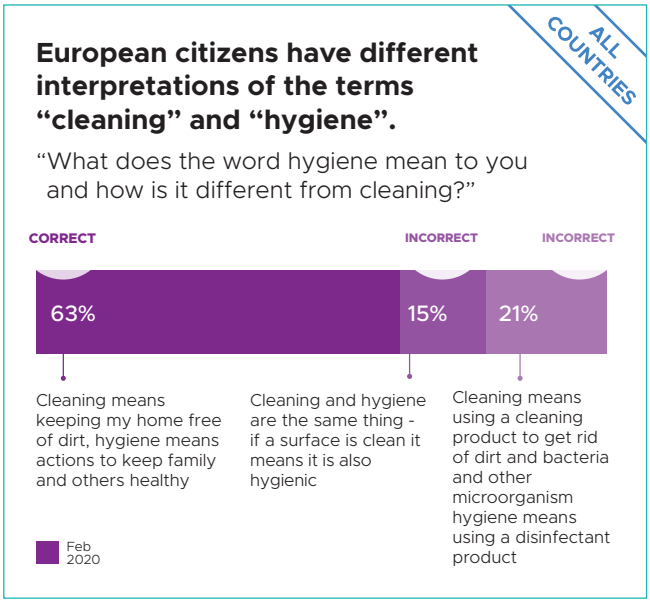
The results of the poll indicated that people are very aware and concerned (83-96% across the 5 regions) about protecting themselves and their families against infection by practicing good hygiene. Increased awareness of the importance of hygiene between February and June as a result of the COVID-19 pandemic was limited (from 87 to 89%) but not unexpected since high awareness was already indicated by the February poll.



Consumers recognise the need for products to clean their homes

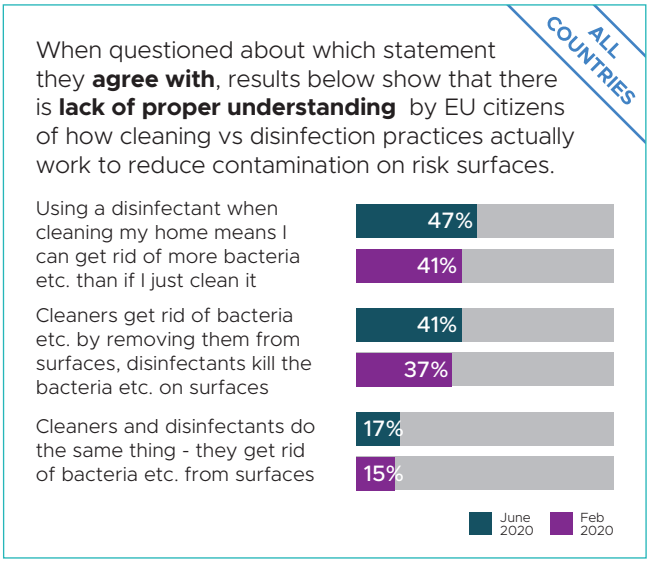
Whilst very much appreciating the benefits of a clean home, we see that there is a slightly lower (in comparison to the topic mentioned above) percentage of persons who recognise the value of the cleaning and hygiene industry. Still, European citizens increasingly recognise the need for products to clean their homes and workplaces in a safe, efficient and effective manner.

Consumers may fail to understand what hygiene means and how it differs from cleanliness



One of the key things that the survey highlighted is the extent to which consumers have become confused about what hygiene means and how it differs from cleanliness. The February poll showed that whereas a good proportion (58-68% across the 5 regions) agreed that hygiene is more than cleaning, it is about protection of health, a significant number (15-20%) believed that hygiene and cleaning are the same thing, whilst some (16-28%) associate hygiene with the need to use a disinfectant. This confusion may also have been further impacted by the translation needs and various nuances at local level. Data from the June poll suggests that the COVID-19 pandemic had little or no impact on these beliefs.

The results of the February poll suggest that consumers are also unclear about how cleaning and disinfectant products work to "get rid" of microbes from risk surfaces in order to break the chain of infection transmission i.e., that the mode of action of cleaning is significantly different from the "killing/inactivating" action of disinfectants. There seems little awareness that, if properly applied, both processes have the capability to reduce contamination to a safe level and thereby break the chain of infection. Data from the June poll suggests that the COVID-19 pandemic had little or no impact on these beliefs.



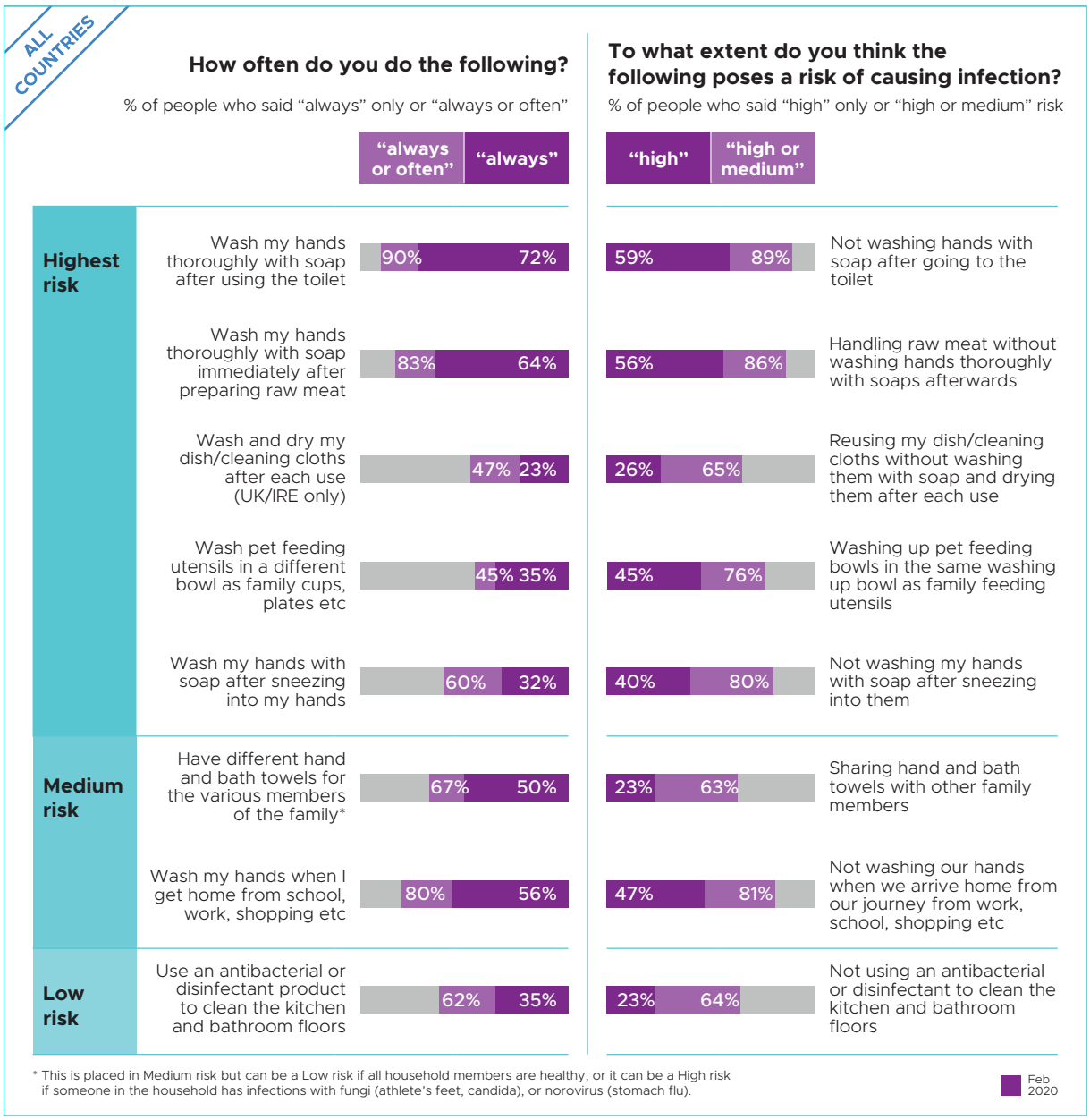
It must be borne in mind that consumers' confusion about the terms cleaning and hygiene and how the action of cleaning products differs from that of disinfectants, may, to an extent, have reduced the value of the poll. Although care was taken to formulate questions in a way that avoided confusion, consumers will have answered survey questions based on their understanding of these terms and concepts. The dictionary definition of the term hygiene is "the protection of health" which includes protection against infection. Whilst there is consistent agreement (aligned with the dictionary definition) that cleaning, means removal of visible dirt, the term cleaning is also widely used as a generic term for any process (including processes involving use of a disinfectant or the application of heat) used to reduce harmful microbes to a safe level.

This becomes even more confusing in some European countries where cleanliness "absence of dirt" is regarded as a hygiene benefit because it promotes consumers feelings of well-being, and products make hygiene claims based on their ability to deliver cleanliness. This may also have affected consumer's responses to poll questions.

To what extent does people's perception of risk influence their hygiene behaviour?

A key objective of the poll was to find out how consumers' self-reported hygiene behaviours reflect their beliefs about infection risks, and how their beliefs and actions align with Targeted Hygiene. Consumers were questioned about 10 different situations which ranged from actions associated with the 9 key moments for hygiene which would be considered as highest risk, to those generally considered low risk (*see section 2.4*).

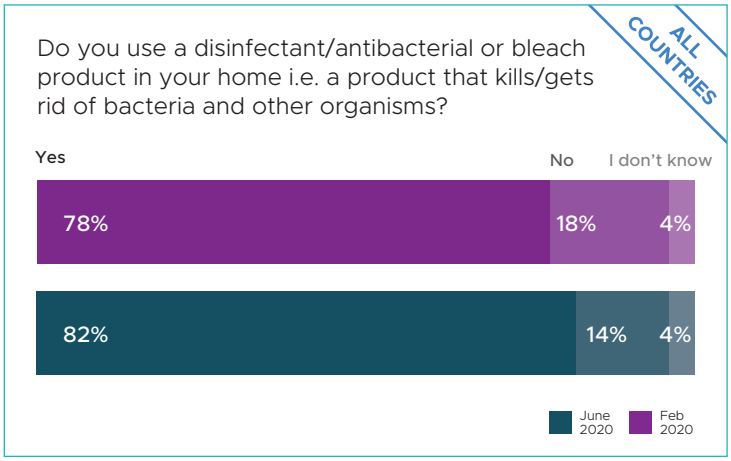
The data presented here illustrates that for key moments such as handling food, using the toilet, coughing, sneezing and caring for pets, there was good risk awareness and consumers acted accordingly by washing their hands. By contrast, in other situations which would also be regarded as risky (e.g. handling of cloths/sponge/pads used to clean surfaces), this was not the case. Additionally, in some cases e.g. routine cleaning of general surfaces such as kitchen and bathroom floors, normally considered low risk, there was substantial overestimation of risk which corresponded with an inappropriate use of disinfectants (e.g. not needed, or used too often).



When the poll was repeated in June 2020, results indicated some increase in the number of people who recognised actions that were risky, but overall perception of risk and behaviour remained largely the same i.e. there was an underestimation of risk in some situations and overestimation of risks in others. In view of the strong messaging about the need to "wash hands frequently", the increase in numbers of people who agreed "not washing their hands at key moments" was risky and acted accordingly was surprisingly small. Particularly surprising is the finding that there was only a relatively small increase in perception of risk associated with sneezing into ones' hands (80 up to 82%). More important, although there was a 6 point increase (i.e. a relative growth rate of + 10%) in those reporting that they washed their hands ("always" or "often") after sneezing into them, this still remained relatively low at 66%.

Consumers' attitudes about disinfectant usage are variable within and between European regions

Results of the February poll show that across Europe, 78% of people said that they used a product that kills or gets rid of bacteria and other organisms such as a disinfectant, an antibacterial, or a disinfectant bleach (see below).[29] It should be noted though that there were variations between regions with 60% in the Nordics confirming their use of disinfectants, rising up to 96% in Southern Europe. A slightly bigger proportion of the population indicated that they were using such products in June 2020.



In February 2020, overall, 16% of consumers said there was no need to use disinfectants in the home, cleaning is enough. Again, there was significant variation between regions. The Nordics and West Europeans were most likely and the Southern Europeans and those in UK/Ireland were least likely to agree that there is no need for disinfectants.

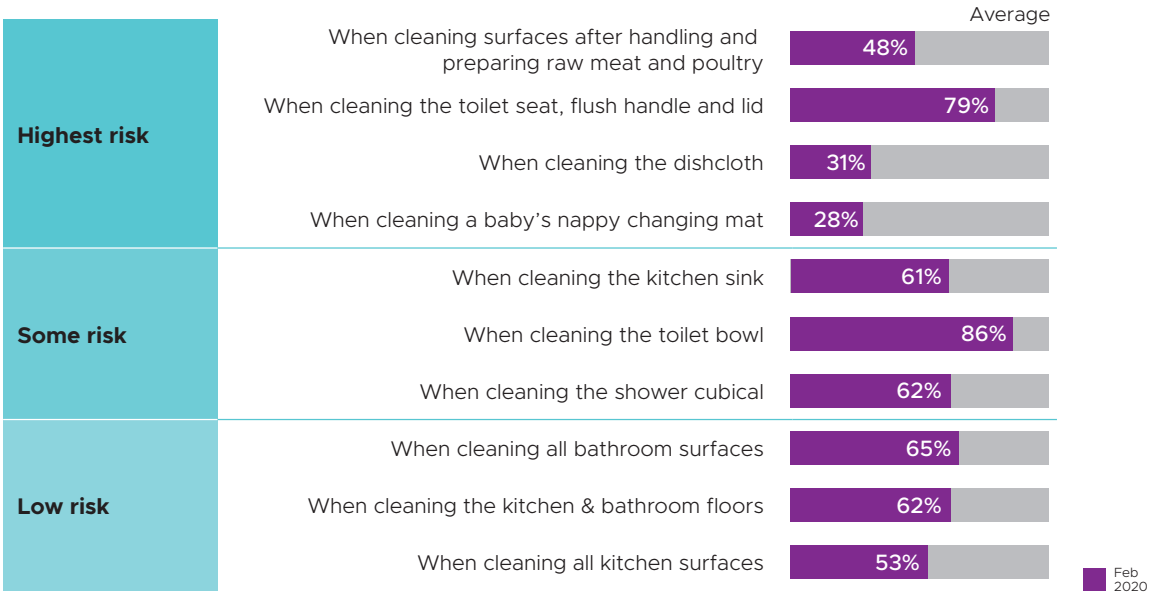
Those consumers (82% of those questioned in June 2020) who used disinfectants in their homes were then questioned about the situations in which they would use them (indicating that they perceived there to be significant infection risk). Consumers were questioned about 10 different situations which ranged from critical control points associated with the 9 key moments for hygiene, which would be considered as highest risk to those generally considered low risk (see section 2.4). Again, the poll results indicated overestimation of risk in some situations and underestimation in others. Medium to high usage was recorded in situations deemed as high risk (e.g. cleaning toilet and bathroom hand contact surfaces, or food contact surfaces), but in other situations regarded as high risk (cleaning a cloth/sponge/pad used to clean surfaces or a baby's changing mat) relatively few consumers considered there was need to use a disinfectant. By contrast for routine cleaning of general environmental surfaces such as kitchen and bathroom floors, normally considered low risk there was substantial usage of disinfectants ranging from 62 to 70%.

29. "Given current consumers confusion around the terminology correlated to cleanliness/hygiene and disinfection, the question has been formulated with the intention to cover any product proposition which could be, either appropriately or inappropriately, perceived by EU consumers as delivering biocidal actions on micro-organisms. In the poll, the question was phrased as follows: "Do you use a disinfectant/antibacterial or bleach product in your home i.e. ***"a product that kills/gets rid of bacteria and other organisms"***".

Of the 82% of consumers who indicated that they were using disinfectants in their homes, they indicate to use those in the following situations:

ALL COUNTRIES

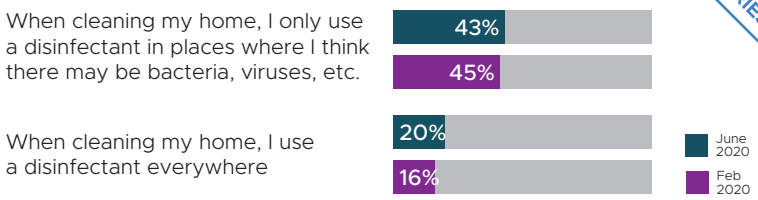
In what situations might/would you use a disinfectant product?



Although 43-45% of those who said they used a disinfectant in their homes claimed they only used disinfectants in situations where they think there may be harmful microbes, 16-20% who said they used them everywhere.

ALL COUNTRIES

But also, consumers **agree with** the following statements:



In relation to usage of disinfectants, as found in the February poll, the June poll suggest that use of disinfectant products was not well correlated with the concept of Targeting Hygiene procedures at moments most likely to be associated with spread of harmful microbes.

In all situations there was some increase in usage of disinfectants in June compared with February, but again use of disinfectant products was not well correlated with the concept of Targeting Hygiene procedures at moments most likely to be associated with spread of harmful microbes. The largest increases were in situations generally considered as low risk:

- For situations considered as most risky e.g. cleaning surfaces after handling raw food, cleaning toilet seat, flush handle and lid, and cleaning dishcloths, the increased usage was of the order of 2-3 points.
- For situations considered as least risky i.e. cleaning all bathroom and kitchen surfaces and floors, and cleaning the kitchen sink, increased usage ranged from 5-9 points.

Impact of COVID-19 on disinfectant usage – between Feb and June 2020	Increased usage June 2020 vs Feb 2020
For situations considered "most risky" e.g. • surfaces after handling raw food, • toilet seat, flush handle and lid, • Cleaning cloths.	**+ 2-3 points on average**
For situations considered "least risky" i.e. • all bathroom & kitchen surfaces and floors.	**+ 5-9 points on average**

Cleanliness outside the home

As part of the June poll, it was decided to ask consumers about their beliefs about hygiene outside the home. When the data were compared with that of an identical polling carried out as part of the 2017 A.I.S.E survey, it suggested increased concern about the importance of cleanliness and hygiene issues outside the home when using public transport (77-83%), with 43% of citizens 'fully agreeing' with this statement (i.e. a relative increase of +38%). Similarly, good cleaning and hygiene standards in shops and supermarkets are highly appreciated (79%), as well as clean offices spaces (78%). People also expressed a desire to know more about the importance of (and standards used for) ensuring cleanliness and hygiene outside the home (67% in June 2020 vs. 62% in 2017), with a relative increase of +14% of persons 'fully' agreeing with this (i.e. 25%) in 2020. Increased awareness of risk outside the home was also indicated by the finding that there was a 7 point increase in those who believed failing to wash their hands when arriving home is a significant risk and acted accordingly (80% to 93% i.e. a relative growth rate of +16%).

The need for further studies on consumer understanding of hygiene

Although the poll provides valuable data about consumers' understandings and misunderstandings of hygiene and its relationship to cleanliness, there is ideally a need for more work using direct approaches such as one to one interviews or focus groups, to get a more in depth understanding than can be achieved by online polling.

If we are to improve consumer hygiene behaviour in a manner which leads to more effective and sustainable hygiene, we must first understand why consumer actions fail to align with Targeted Hygiene. Is it because they have limited understanding of the concept that hygiene means breaking the chain of infection, or that their understanding of risk is mostly determined by childhood education and their fear of dirt and germs? We also need to know more about their understanding (or lack of understanding) of how cleaning and disinfectants work to "get rid" of microbes and how this informs their choice of an intervention in a particular situation and can lead to use of disinfectants where they have no measurable benefit.

5. Conclusions

Infection Prevention Hygiene i.e. the practices through which people maintain or promote good health by breaking the chain of infection is of paramount importance in the 21st century. It is critical not only in fighting the current COVID-19 pandemic and other infectious diseases, but also for addressing other crucial issues such as the global problem of antibiotic resistance and protecting the increasing numbers of people living in the community who are more vulnerable to infection due to ageing or underlying health conditions.

Targeted Hygiene – a framework for developing effective and sustainable hygiene products to meet the needs of the 21st century

A.I.S.E. supports the principles of Targeted Hygiene as set out by a consensus of experts in a 2018 IFH White paper[30]. Targeted Hygiene is based on the principles of risk assessment and risk management and the concept that, to be effective, hygiene practices need to be focussed at the times (moments) and in the places that matter to break the chain of infection and reduce the risk of exposure to harmful microbes. In this report, the principles of Targeted Hygiene are described and discussed in relation to the ways in which hygiene needs to evolve to meet the needs and challenges of the 21st century. Although Targeted Hygiene was originally developed as a means to maximise its effectiveness in home and everyday life, it also provides a framework for addressing sustainability issues, by ensuring that use of hygiene products is focused in situations where they are needed and in the quantities which are sufficient to break the chain of infection. This is particularly relevant for A.I.S.E. and its members in a context where Europe has the EU Green Deal as its first priority and aims at becoming the first climate neutral continent[31] in the world and where industry is committed to actively contribute to such ambitions.

The product portfolio covered by A.I.S.E. i.e. detergents and maintenance products, including disinfectants, is integral to enabling consumers to practice effective Targeted Hygiene. Growing awareness of the need for hygiene in home and everyday life settings as set out in *section 4.2.*, coupled with our increasing understanding of how infections are spread within domestic settings and the application of risk management techniques (*see section 3*), offer significant opportunities to the industry to develop, innovate and market novel hygiene products which maximise protection against infection, and ensure sustainable use of the resources (water, soap, detergents, disinfectants, heat etc.) available to prevent spread of infections.

- **A.I.S.E. and IFH believe that getting consumers to adopt this scientifically proven approach to hygiene in their home and everyday life, would have a significant impact in reducing the spread of infection and thus securing better health for European citizens.** We therefore strongly encourage its recognition and inclusion under the EU4Health European Commission programme.

Improving hygiene behaviour by European consumers through education could provide opportunities to further reduce the burden of infectious diseases.

Achieving the health benefits that a risk management approach to hygiene in community settings could offer means getting consumers to adopt Targeted Hygiene in their home and everyday life.

This report contains the results of a pan-European poll carried out in February 2020 by A.I.S.E. and co-created with IFH, to better understand consumers' beliefs about hygiene in relation to infection

30. Containing the burden of infectious diseases is everyone's responsibility: a call for an integrated strategy for developing and promoting hygiene behaviour change in home and everyday life". 2018 https://www.ifh-homehygiene.org/review/containing-burden-infectious-diseases-everyones-responsibility-call-integrated-strategy

31. See European Commission priorities – https://europa.eu/european-union/about-eu/priorities_en

risks in their homes, and how this affects their actions and their use of hygiene products. The poll confirms that consumers are aware of the importance of cleanliness and hygiene in Europe. But it also indicates that, although consumers' actions are to some extent guided by their perception of risk, there was significant misunderstanding of what the key risk situations in their homes are, and when (and where) hygiene needs to be practiced so as to maximise protection against infection. Similarly, when patterns of self-reported disinfectant usage were evaluated, it was found that although consumers who said they used disinfectants, said that they only used them in situations where they believed there was risk, in reality, we observed self-reported use in some risk situations where they are needed, whilst in other similarly risky situation, they were only rarely used. Similarly, there was also usage in situations normally considered as low risk.

Overall, the survey results suggest that consumers have rather limited awareness of how harmful microbes are spreading in their homes (the chain of infection), and poor understanding of the need to target hygiene practices and use products appropriately to break the chain of infection – and how to achieve this.

Immediately after the February poll was completed, there was the rapid onset of the COVID-19 pandemic across Europe. In June 2020, it was decided to repeat the poll to look for changes in hygiene attitudes and behaviour. Despite the fact that the COVID-19 pandemic provided an unprecedented opportunity for health authorities to promote important messages about hygiene such as hand washing aimed at preventing person-to-person COVID-19 infection, there was little evidence that this was sufficient to alter peoples' perception of risk and adopt hygiene behaviours which better aligned with Targeted Hygiene. One place where the poll identified a noticeable change was in consumer awareness of risk and the importance of hygiene outside their homes, on public transport and in shops and supermarkets. There was also a marked increase in the number of consumers reporting that they washed their hands when arriving home.

- **The findings suggest that, if hygiene promotion activities aimed at consumer behaviour change are to be successful, they must be accompanied by consumer education on these basic concepts.** However, if behaviour change is to be achieved, some further in-depth research in order to obtain a clearer understanding of how consumers view hygiene and how it affects their behaviour would be very valuable.

Complexity of hygiene messaging and understanding across Europe – potential barriers to consumer behaviour change

A further barrier to achieving consumer behaviour change highlighted by the poll is the lack of clarity and consistency across Europe regarding what is meant by the terms "hygiene" and "cleaning", most particularly as to how hygiene differs from cleanliness. Addressing these issues is made even more challenging by variations in cultural attitudes to hygiene and linguistic subtleties. Although the majority of consumers agreed that hygiene is more than cleanliness and involves protection of health, a significant number of consumers thought that they were one and the same thing i.e. cleanliness means hygiene, whilst others thought that hygiene is specifically about using a disinfectant. The poll also indicated that consumers are confused about how cleaning and disinfectant products work to "get rid" of microbes. These findings suggest that consumers may therefore interpret products claims and instructions for use differently based on what they believe these terms mean.

- **In this context, the education of consumers and adequate practical guidance by health professionals, industry and other stakeholders will be crucial.**

Working together to change public understanding and hygiene behaviour

In the 2018 IFH white paper the consensus working group concluded that *"the bottom line is that promotion of hygiene behaviour change will not be effective unless and until we also work to change public understanding of hygiene and its role in protecting us for infectious diseases whilst also allowing exposure to microbes which are essential to our health"*. The 2019 RSPH policy paper also said that *"if action is not taken, right across the whole spectrum of stakeholders (including government agencies, community health professionals/carers, the media and the private sector) to change consumer understanding of the microbes in their modern world and how cleaning and hygiene can work to protect themselves against exposure to harmful microbes, the impact of investment in hygiene promotion will not be realised"*.

> The report concludes that to restore confidence in hygiene and achieve hygiene behaviour change, hygiene stakeholders need to work collaboratively with those who communicate directly with the public including community workers, the media and the private sector to ensure consistent and responsible messaging about hygiene practices and products. Consumers need clear statements of the importance of hygiene and a simple, plausible targeted approach to hygiene based on breaking the chain of infection transmission, which replaces current simplistic notions of achieving hygiene through home cleanliness and germ elimination.
>
> *One of the key conclusions from the IFH White Paper, 2018*

→ **The authors of this report, A.I.S.E. and IFH agree that in order to realise the health benefits to consumers from adopting a targeted approach to hygiene, a number of actions need to be taken, in order to maximise effectiveness of hygiene in terms of reducing burden of infection whilst at the same time addressing sustainability issues.**

These include:

- Engaging with and persuading consumers to understand and adopt Targeted Hygiene where hygiene actions are taken at the moments/times that matter in order to break chain of infection.
- Engaging and educating consumers in a way that will encourage them to focus use of disinfectants in risk situations where usage can have real impact on reducing the spread of infection and explaining the differences between cleaning and disinfection.
- Creating a dialogue within the industry on the opportunities that exist for more consistent and coherent approaches in Europe regarding terminology, product claims and usage advice.
- Extending this dialogue between industry, the scientific community, competent authorities and other relevant stakeholders to take advantages of the opportunities offered by Targeted Hygiene, with a view to further progress towards the enforcement of a Single Market approach and the provision of an increased health benefit for European citizens.

The authors of this report plan to develop consumer guidance material so as to help change these habits, as appropriate. IFH has been active since 1997 in developing and promoting training materials for various different target groups via the IFH website (www.ifh-homehygiene.org). A.I.S.E. has been providing consumer guidance via its cleanright.eu portal since 2008. As a follow up to this report, A.I.S.E. is keen to pursue an education programme with all relevant parties so as to ensure adequate behaviour by citizens in Europe.

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ANNEX 1: THE CRITICAL CONTACT POINTS AT THE 9 MOMENTS FOR HYGIENE

KEY MOMENT	TYPICAL PATHOGENS (NON EXHAUSTIVE LIST)	CRITICAL CONTROL POINTS (CCPS)	ADVICE
 **1. During food handling**	Foodborne illness can be caused by pathogenic bacteria viruses and protozoa, eg Campylobacter, salmonella, *Staphylococcus aureus, Listeria, norovirus*	Hands, food contact surfaces, cooking utensils, cloths/sponge/pads used to clean surfaces	When handling and preparing raw foods, IP cleaning of CCPs should be carried out immediately afterwards. This means the risk is fully and immediately contained. It is also the most "sustainable" way because it means it is not necessary to treat all the surfaces in the kitchen in order to contain risks from foodborne pathogens.
 **2. Whilst eating with fingers**	Gastrointestinal pathogens – as above	Hands	Hands are the "last line of defence". Hygienic cleaning of hands ensures any gastrointestinal pathogens picked up on the hands during normal daily life are not transferred from the hands via food to the mouth.
 **3. Using the toilet or changing a baby's nappy**	Gastrointestinal pathogens, as above, found in faeces of an infected person	Hands, hand contact surfaces (toilet handle, seat and lid, tap handles, toilet door), hand towels, cloths/sponge/pads used to clean surfaces	Hand washing after using the toilet is the "last line of defence", but hygienic cleaning of hand contact surfaces combined with hand washing prevents spread of gut pathogens from toilet splashes or aerosols, or via hands.
 **4. Coughing, sneezing and nose blowing**	Colds and influenza viruses and more recently, COVID-19	Hands, hand contact surfaces, cloths/sponge/pads used to clean surfaces, tissues	Social distancing and masks prevent respiratory viruses that are expelled in airborne particles generated by coughing and sneezing being inhaled by others who are close by. Hand hygiene prevents viruses picked up on hands from nose and mouth from being transmitted to others via hand contact surfaces frequently touched by others.
 **5. Touching surfaces frequently touched by other people**	Any pathogenic viruses; bacteria or fungi; gastrointestinal, respiratory, skin, eye or wound	Door handles, stair rails TV remotes, computer keyboards, shared mobile devices etc., cloths/sponge/pads used to clean surfaces	We cannot be washing our hands all the time – so hand hygiene together with IP cleaning of theses surfaces combine together to prevent spread of pathogens.
 **6. Handling and laundering clothing, towels and bedlinens**	Skin microbes such as *Staph. aureus* (including MRSA) (skin infection), tinea pedis (athletes foot), gastrointestinal pathogens.	Hands, clothing (particularly clothing in close contact with the body) hand and bath towels, bedlinen, facecloths	Although there is risk of infection spread via clothing towels and bed linens etc., risks are considered less than with hands, cloths/sponge/pads used to clean surfaces and hand contact surfaces. Most risky are items in frequent or persistent contact with the body especially when a family member has a gastrointestinal or skin infection. Other items – outer clothing – are considered low risk. If items are not laundered properly pathogens may spread from clothing of infected family members to clothing etc. of uninfected family members.

KEY MOMENT	TYPICAL PATHOGENS (NON EXHAUSTIVE LIST)	CRITICAL CONTROL POINTS (CCPS)	ADVICE
 **7. Caring for domestic animals**	Bacterial, viral, parasitic and fungal pathogens (e.g. Campylobacter, Salmonella, Cryptosporidium) etc..	Hands, hand and food contact surfaces, pet feeding utensils, pet bedding, cloths/ sponge/pads used to clean surfaces and utensils	The main risk arises when handling and caring for pets and their bedding, feeding utensils etc..
 **8. Handling and disposing of rubbish**	Microbes recovered from offensive waste (stoma bags, dressings, sputum containers etc..) are mostly normal body flora or environment. Food waste contains more hazardous microbes than healthcare waste.	Hands, hand contact surfaces, rubbish bin lid, cloths/sponge/ pads used to clean surfaces	Once disposed of into a plastic bag, sealed and placed in a bin outside, rubbish is unlikely to pose a risk. Ensure safe disposal, but do not overstate the risk.
 **9. Caring for an infected family member**	Moments 1 to 8 apply i.e. focus on key activities which carry the greatest risk of spread of infection. The difference is that when someone in the family is infected, the risk of infection spreading to other family members is greater if the actions above are not carried out rigorously.		

ANNEX 2: REGULATORY ENVIRONMENT FOR DETERGENTS AND DISINFECTANTS IN EUROPE IN 2020

Detergent Regulation

This Regulation has been in force since 2005, when it replaced various earlier legislative measures. It requires that surfactants used in detergents meet stringent biodegradation criteria. This is important for the protection of the environment since most detergents and cleaning products are released down the drain and treated in water treatment plants. The Regulation also calls for specific product information to be made available on the packaging and via the internet, for example, the presence of small levels of allergenic ingredients. This Regulation has been extended to restrict the use of phosphate in laundry consumer products and in automatic dishwashing detergents in all EU countries as of 2013 (EU 259/2012). It also includes a certain number of labelling requirements on pack and information provision on line.

Biocidal Products Regulation

The Biocidal Products Regulation (EU No 528/2012) that went into effect on 1 September 2013 regulates biocidal products in a harmonised way across the European Union to ensure that they are safe to put on the market.

A.I.S.E. is assisting with its implementation in several ways by contributing to discussion and activities with the European Commission, the competent authorities and the European Chemicals Agency (ECHA).

Biocidal products are used to control unwanted organisms that are harmful to human or animal health or to the environment, or that cause damage to human activities. These harmful organisms include pests (e.g. insects, rats or mice) and microorganisms (e.g. bacteria, viruses, mould).

Biocidal products must:

- **Comply with strict requirements related to human and environmental protection, and efficacy**
- **Be authorised by a Member State Competent Authority or by the EU Commission before their placing on the market.**

A.I.S.E. manufacturers of biocidal products (and using active substances i.e. a substance or a micro-organism that has an action on or against harmful organisms) are committed to providing quality products which meet the high BPR standards.

Any product that is subject to the BPR authorisation process carries an official number granted by authorities to track this authorisation process.

It is important to note that the definition of a biocidal product provided in the BPR (see section 1.3.) refers to the intention of controlling harmful organisms. Such intention could be defined for instance by a claim concerning the control of harmful organisms, by the product's presentation, or the advertising communication.

ANNEX 3: INSITES CONSULTING RESEARCH FOR A.I.S.E. – METHODOLOGY

Method

The two surveys referred to throughout this report were carried out by the market research agency Insites Consulting for A.I.S.E. between 7-15 February 2020 and partially re-run (i.e. the section of relevance to this report) between 17-26 June 2020.

Both were conducted online in 23 countries which were categorised into 5 regions (and exact sample size per region) for Feb 2020/June 2020):

- **WESTERN EUROPE**: Belgium, Netherlands, France, Germany, Austria, Switzerland (1188/1200)
- **EASTERN EUROPE**: Hungary, Poland, Romania, Slovakia, Czech Republic, Bulgaria (1194/1200)
- **SOUTHERN EUROPE**: Greece, Italy, Portugal, Spain, Turkey (1004/1000)
- **UK / IRELAND** (398/400)
- **THE NORDICS**: Denmark, Finland, Norway, Sweden (799/800)

TOTAL 4583 panellists (Feb 2020) and 4600 panellists (June 2020). About 200 per country.

Participants were aged 18-65 and comprised householders who were responsible for purchase of household care products and doing the household laundry using a laundry machine. The numbers of households with children was 50% which divide into (NB: first percentages apply to Feb. 20 poll; others in parenthesis, to the June 20 poll):

- Under 6 years old: 19% (16%)
- Between 7 and 12 years old: 20% (19%)
- Between 13 and 18 years old: 17% (16%)
- Over 18 years old: 10% (10%)

Note: There were no questions regarding income and/or employment included in these questionnaires.

Guidance for results' interpretation (and limitations)

Most of the results shared in this report are based on the total sample size (i.e. Europe/4500 respondents), which is a robust sample size to draw conclusions and trends. Some results are provided at regional level to highlight differences between regions. Those have more or less a sample size of about 1000 persons which was confirmed by the agency as reasonable to allow comparisons and trends.[32] National data have been collected and provided to A.I.S.E./IFH. However, care is advised on the opportunity to exploit those in official communications and draw clear conclusions as – to do so – a larger sample size per country would be advised by the market research agency. General trends though may be derived.

Also, people have been asked a number of questions on perceptions and behaviour; these are "claimed behaviours" and could obviously not be checked in practice. Taking this into account, the data below are an indicator of "trends" observed in our sample population.

Finally, regarding the terminology, whilst "we" can control the exact meaning used in this report by stating it at the outset – and although we tried to ensure in the survey that it was clear that we were talking about infection prevention hygiene, the value of the survey may be "weakened" by the fact that there are areas where consumers are quite likely to have answered based on their own understanding of the words hygiene, cleaning and disinfection. This may also have been further impacted by the translation needs and various nuances at local level.

32. Agency remark: The topic of minimum sample size depends entirely on the desired margin of error. For large populations it is around 3% at n=1000, which is indeed a good margin in order to have statistically valid results. Since many of the findings are reported at regional level, the error margin is also close to this percentage.

ANNEX 4: 2020 SURVEY FINDINGS – COMPREHENSIVE OVERVIEW

1. Do people understand the value of cleanliness and hygiene?

When questioned about the importance of hygiene and cleanliness, polling results (Fig. 1) show that **European citizens do understand and value the health and infection prevention benefits of IP hygiene and cleanliness in their homes.** In February 2020, 87% of people expressed the opinion that "Cleaning and Hygiene in my home is important because it helps me and/or the people I live with avoid becoming unwell or getting an infectious disease", as well as 90% that "one's own cleanliness and hygiene is not just important for oneself but for the health of people around us". Set against this however, 91% of people agreed that it was important to not to be too obsessive about home cleanliness). Opinions were broadly consistent across all European regions.

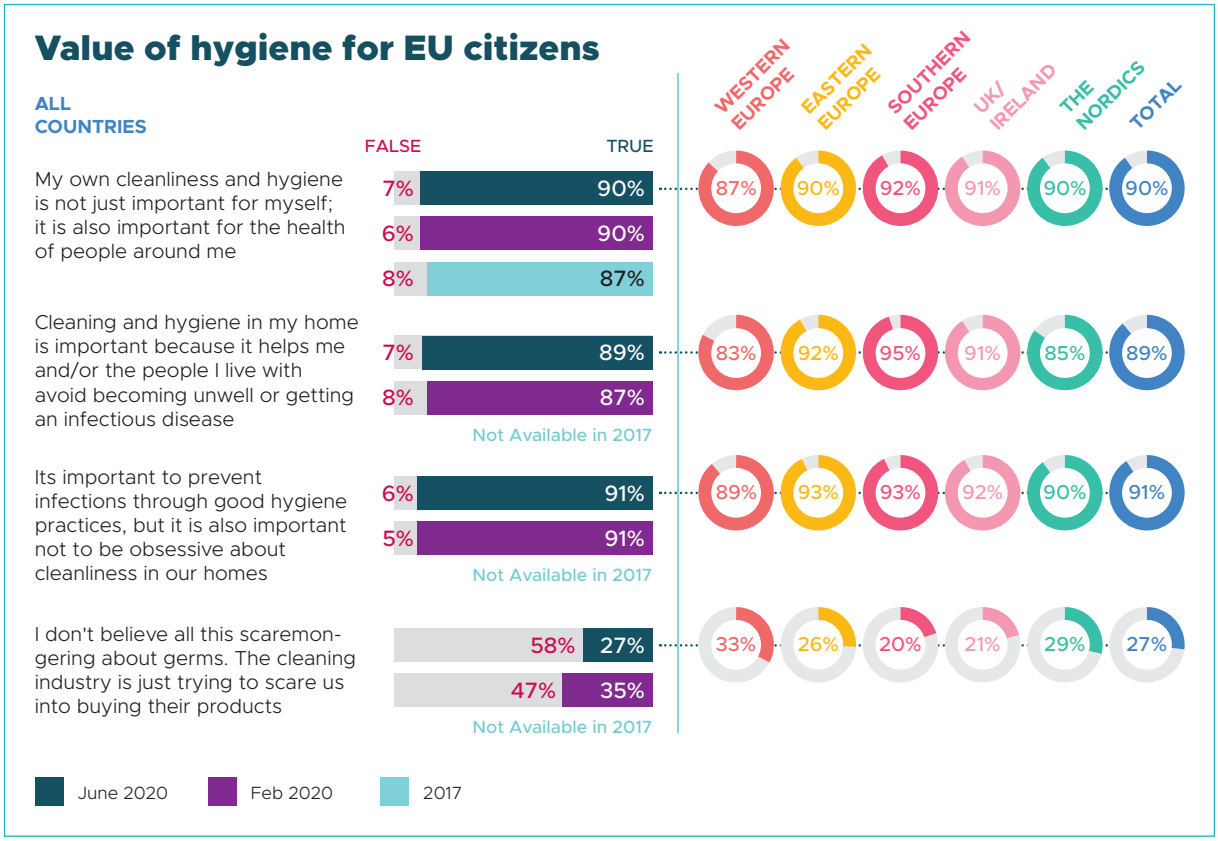

Figure 1. *Value of hygiene for EU citizens*

NB: The poll also enquired about additional benefits (such as mark of respect, durability of goods, etc..) but the results presented here focus on the topic of health and infection prevention. See full summary via www.aise.eu

2. Consumers' perceptions of the cleaning & hygiene industry

When looking at the correlation between the consumer perceptions of benefits (i.e. the value of hygiene for health) and the perception of the cleaning and hygiene industry (see Fig. 2), we see that there is a slightly lower percentage (between 64-75%, compared to the 87-91% of Fig. 3) of persons who recognise the contribution that the industry makes to protect our health and help ensure good hygiene in home, or in public places. However, we note quite a strong evolution of this perception of the industry in February 2020 vs the last measure done by A.I.S.E. in 2017 (i.e. growth rate of +19% for public places, +21% for homes, +33% for health). **This indicates that European citizens increasingly recognise the need for products to clean their homes and workplaces in a safe, efficient and effective manner.**

Interestingly though, this perception varies quite a lot across the different regions of Europe, with an overall strong perception in Southern Europe (around 85%), and the UK/Ireland (around 80%), but a lower perception in the Nordics (50-55%) and Western Europe (55-65%). Further opportunities therefore exist to better explain the value of the products to society, especially in certain regions.

(Note: other parameters were also requested on this topic but are not reflected here as not in the scope of this report).

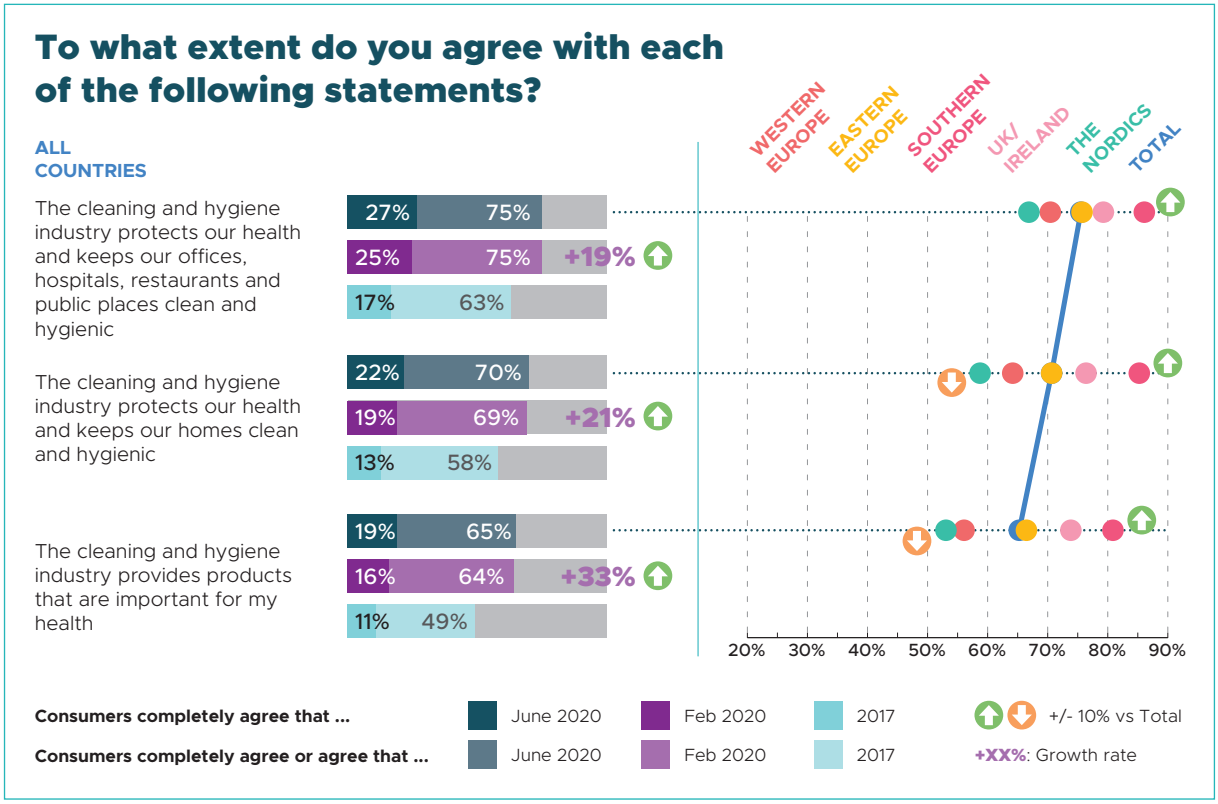

Figure 2. *Perception of the cleaning and hygiene industry*

3. What do consumers understand by the terms “cleaning” and “hygiene”?

Recent work by IFH and RSPH[33] in the UK increasingly suggests that a key barrier to hygiene behaviour change is public misunderstanding of hygiene, what it is, and what it means. Consumers are unclear about the difference between the meaning of the terms hygienic and clean, and fail to understand that although cleaning can be a means of achieving hygiene, if carried out in the prescribed way (e.g. hand washing with soap), a visibly clean surface can still be contaminated with sufficient harmful microbes to cause infection.

When asking this question to the larger European audience (Fig. 3), it becomes clear that **there is no common understanding of the distinction between cleaning and hygiene across the regions.**

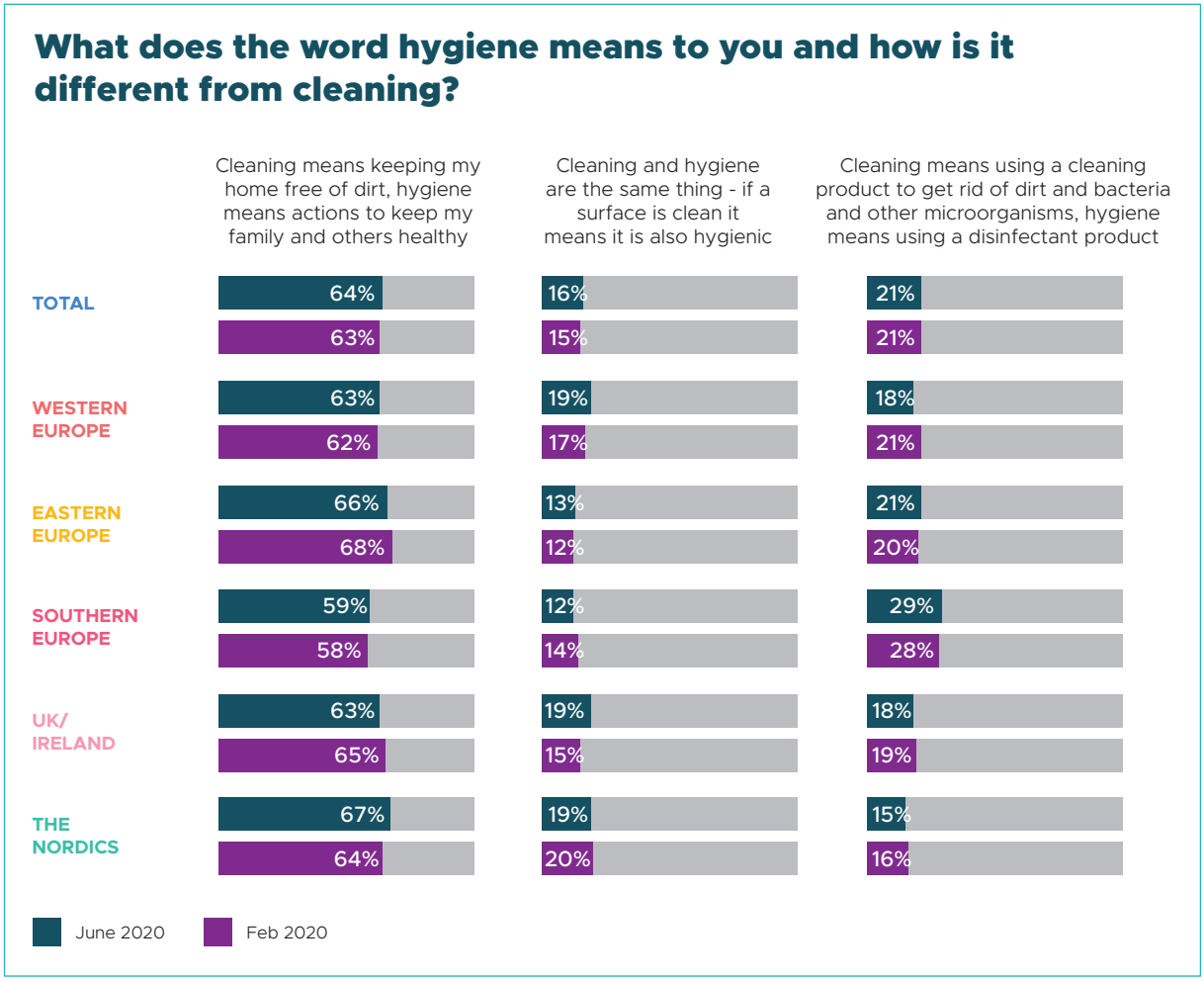

Figure 3. *Understanding of cleaning vs hygiene*

The Feb. and June polls show that 58-68% of people agreed that hygiene is more than just “keeping their homes clean”. On average 15 to 16% (up to a max of 20%) believe that cleaning and hygiene are the same thing. However, a significant proportion (21%, range 16-28%) associate the word hygiene with using a disinfectant, whilst cleaning means using detergent or soap etc.. In Southern Europe, this increased to almost 1 in 3 people (28-29%) that associate hygiene with disinfectant use.

33. Sally F Bloomfield. RSPH and IFH call for a clean-up of public understanding and attitudes to hygiene 2019; Volume: 139 issue: 6, page(s): 285-288 https://journals.sagepub.com/doi/pdf/10.1177/1757913919878367
https://www.ifh-homehygiene.org/review/rsph-and-ifh-call-clean-public-understanding-and-attitudes-hygiene
Too clean or not too clean? The case for targeted hygiene in home and everyday life
https://www.rsph.org.uk/static/uploaded/06b37f30-2241-4e98-aba93fc15346e7a5.pdf

4. Cleaning and disinfectant products – how do they work?

When consumers were questioned about how they thought disinfectants and cleaners worked in risk situations to reduce contamination on surfaces, data in Fig. 4 (from Feb. poll) shows that across European region:

- Only 37% of consumers agreed that "Cleaners get rid of bacteria etc. by removing them from surfaces, disinfectants kill the bacteria etc. on surfaces".
- Only 41% agreed that "Using a disinfectant when cleaning my home means I can get rid of more bacteria etc. than if I just clean it".
- 17% held the belief that cleaners and disinfectants do the same thing.

These results below show that there is lack of proper understanding by European citizens of how cleaning and disinfection practices actually work to reduce contamination on risk surfaces.

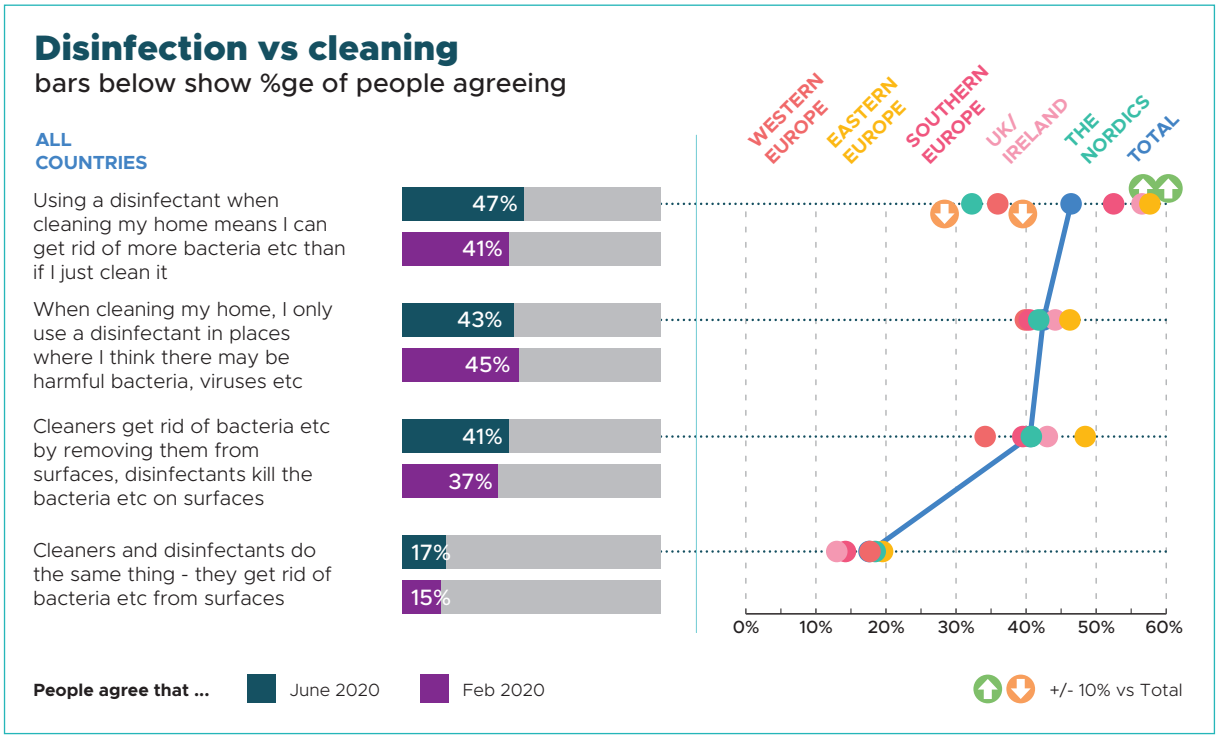

Figure 4. *Disinfectants – How they work*

5. To what extent do people's perceptions of infection risk dictate their actions?

To better understand how consumers' claimed hygiene behaviour reflects their beliefs about infection risks, people were questioned about how often they performed a cleaning or hygiene intervention at a particular time/moment. The responses were then matched against their responses to questions (asked later in the questionnaire) about how risky they perceived these moments to be in order to determine whether and to what extent their reported hygiene habits reflected their perception of risk. Although the questions were presented in random order, the responses (see Fig. 5-8) have been categorised according to level of risk based whether they coincided with critical control points at one of more of the "9 moments for hygiene". It must be borne in mind that the behaviours were *"self-reported"* rather than real/observed ones and may slightly differ from what consumers do in reality.

Looking at the data (Fig. 5) for the **six actions regarded as carrying the highest of transmission of infection** (based on microbial risk assessment) i.e. actions most often associated with key moments for hygiene (comments below relate to Feb. poll):

- Across all regions there was high awareness (85-89%) of infection risks associated with using the toilet, not washing hands after handling raw meat, and eating food with fingers. This correlates with 83-90% respectively saying they washed their hands appropriately.
- Similarly, there was high awareness of risks associated with coughing and sneezing into their hands (80%), although only 60 % of people reported that they always or often washed their hands at these moments.
- When caring for pets, although there was fairly good awareness (76%) that cleaning pet feeding bowls is a key moment for hygiene, only 45% reported that they avoided washing such bowls in the same sink as family utensils.

Although this suggests that most people were aware of infections risk associated with these moments, the percentage of people who rated these moments as high risk (as opposed to medium) risk accounted for only 40% (for coughing and sneezing into hands) up to 69% (for hand washing after toilet use) of total respondents.

Since risk assessment data (see section 2.3) show that cloths/sponge/pads used to clean surfaces and other utensils used to clean surfaces are critical to preventing spread of infection at all 9 key moments, it was surprising (Fig. 6), that only a relatively low number of people (65%) recognised this as a risk situation. Whilst analysing the results, it was identified that whereas, in the UK and Ireland the term 'dishcloths' is used interchangeably with the term 'cleaning clothes', in other countries, 'dishcloths' means "cloths used to dry dishes and utensils after they have been washed" which would be considered as less risky. Nevertheless, if the results for the UK/Ireland are examined (Fig. 6), it still showed significant underestimation of the risk. Only 65% saw these items as high or medium risk and only 47% said they ensured that these items are washed and dried between each use.

Figure 5. *Perceptions vs informed behaviours for the highest risk actions (all European countries)*

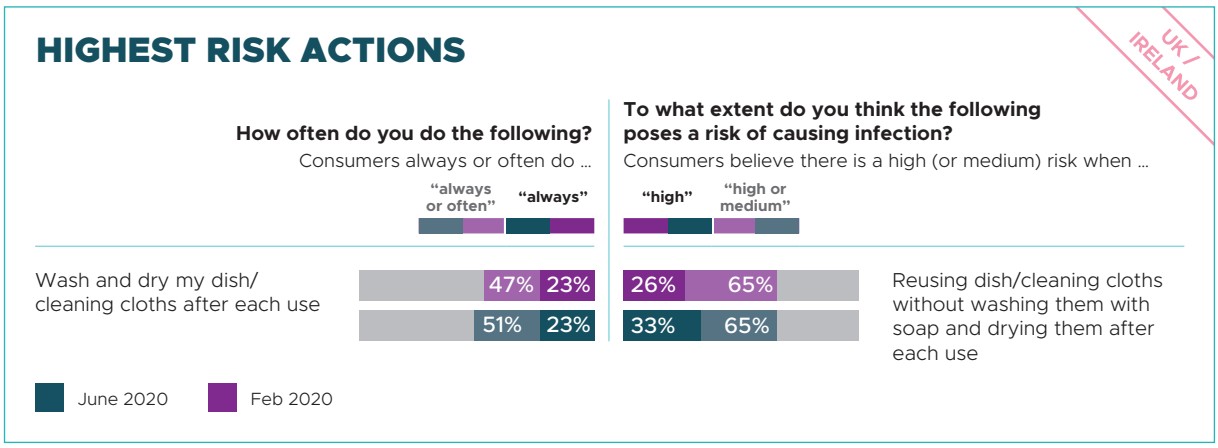

Figure 6. *Perceptions vs informed behaviours for the reuse of dish/cleaning cloths (UK/IRL only)*

For actions classified as "medium" risk i.e. actions that carry a risk of spread of infection which needs to be addressed – but is not highest risk, Fig. 7 shows that (comments below relate to Feb. poll):

- For actions such as the storage of raw foods next to cooked foods in a shopping bag, sharing towels and not washing hands when arriving home, awareness of risks was lower ranging from 50 to 75% with approximately the same percentage of people reporting that they acted accordingly. The exception was Southern and Eastern Europe, where up to 80% of people recognised the importance of washing hands when arriving home from work, school or shopping etc. and acted accordingly.
- In all 59% of people expressed the view that "not disinfecting the toilet everyday" is risky, although 33% (59 minus 26%) regarded this as a "medium" rather than high risk suggesting that they understood that toilet flushing is sufficient to keep the toilet free from harmful microbes. It is perhaps surprising that 88% of people said they cleaned the toilet always or often, but this may be because a significant motivation for cleaning the toilet is to keep it looking clean and smelling fresh.

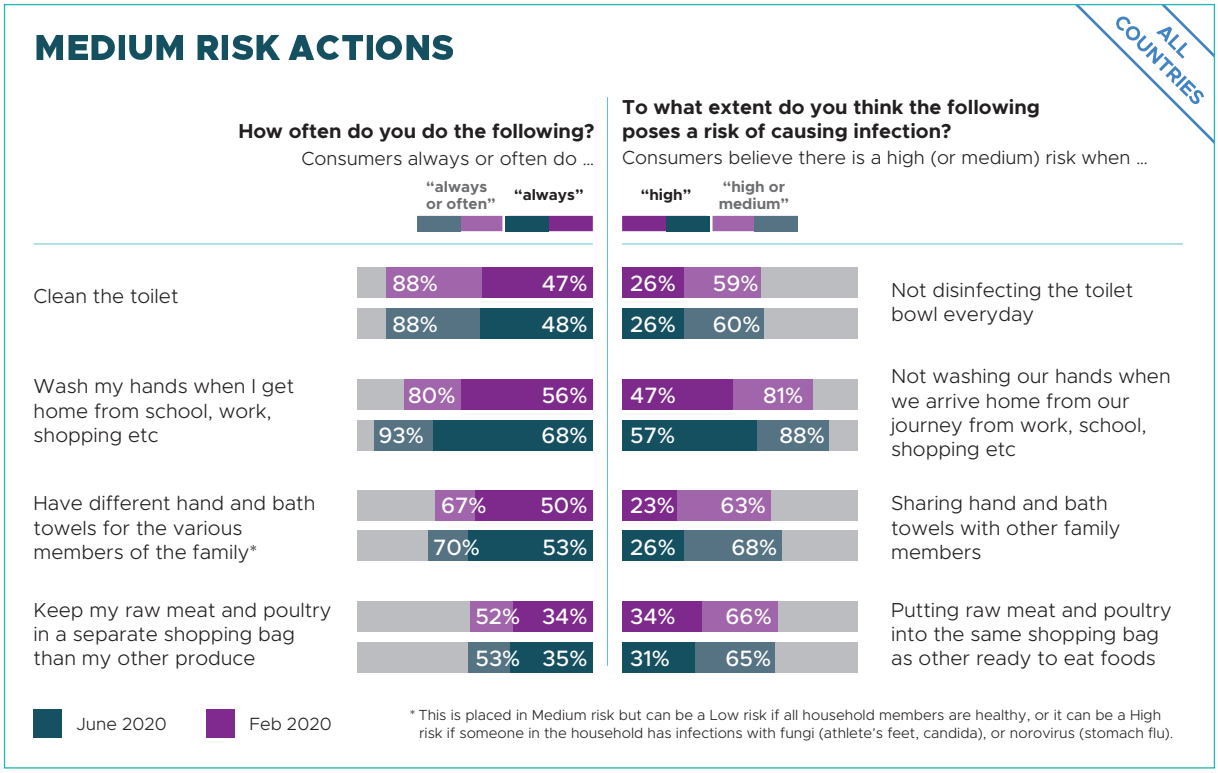

Figure 7. *Perceptions vs behaviours for medium risk actions (all EU countries)*

With regard to the **actions considered as "low risk"** of spreading of infection:

- Although microbial risk assessment suggests that, for all 9 key hygiene moments, floors are not a "critical control point"– 64% responded that "not using an antibacterial or disinfectant* to clean the kitchen and bathroom floors was "high" or "medium risk" and 62% reported "always" or "often" using disinfectant in these situations. In principle, in light of the guidance above, it can be concluded that the use of such antibacterial[34] or disinfectant products*, in this situation, is not appropriate. Consumers' perception regarding the benefit of hygiene measure for kitchen and bathroom floors seems to be overestimated. Only in certain cases (e.g. young children crawling on floors) would this be advised, and unless this is carried out immediately before placing the child on the floor is it likely to have a benefit.
- More detailed analysis suggests that risk perception associated with floors bears a relationship to family structure. Fig. 8 shows that, if perceptions and actions for families with children under 6 years old is compared with that of other consumers, a higher number of families with young children (30% compared with 23%) thought that not using disinfectants to clean kitchen and bathroom floors was high risk 74% compared with 63% who said they always or often used a disinfectant.

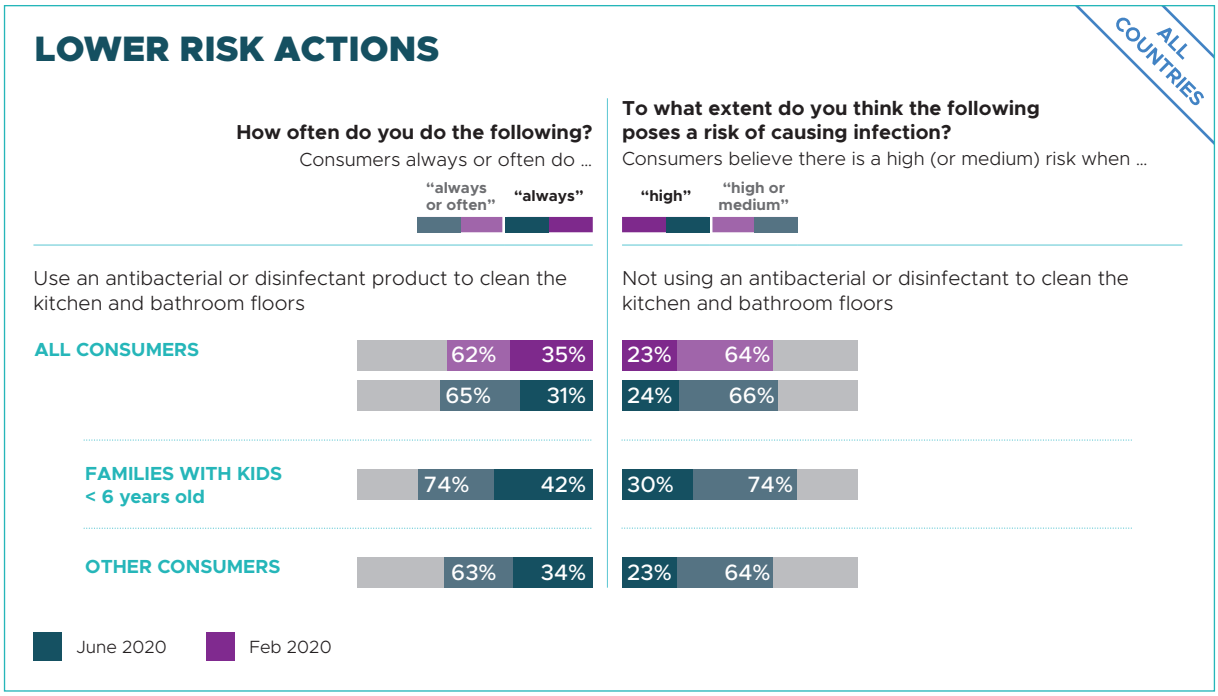

Figure 8. *Perceptions vs behaviours for lower risk areas, with zoom on families with young children (all European countries)*

34. i.e. products destroying bacteria or suppressing their growth or their ability to reproduce

* : NB: an antibacterial product is a disinfectant – The terminology above reflects the way the question has been posed to the respondents.

6. Use of disinfectants

To further identify the moments when people perceive there is risk of spread of harmful microbes sufficient to require a hygiene intervention to "get rid" of microbes, they were questioned about their use of disinfectant products. Since many actions in the above sections related to hand washing, this section was aimed at gaining a better understanding of the use of disinfectants on surfaces by consumers and their motivations.

Results of the February poll (Fig. 9) show that across Europe, 78% of people said that they used "a disinfectant/antibacterial or bleach product in their home i.e. a product that kills or gets rid of bacteria and other organisms". It should be noted though that there were variations between regions with 60% in the Nordics confirming their use of disinfectants, rising up to 96% in Southern Europe.

Important remark:

Terminology used in the survey

The terminology that was used in the questionnaire was the following: "Do you use a disinfectant/antibacterial or bleach product in your home i.e. ***"a product that kills/gets rid of bacteria and other organisms"***".

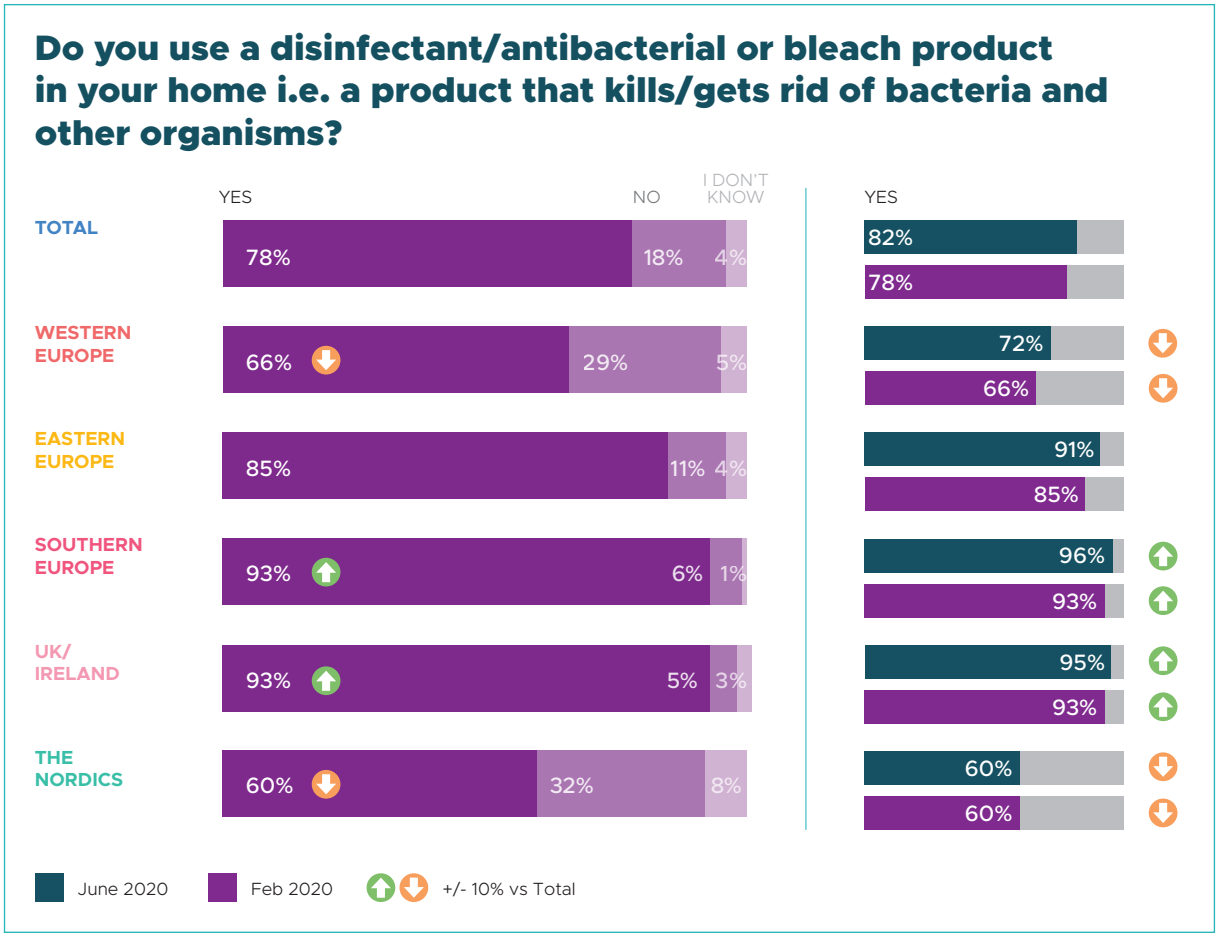

Figure 9. *Disinfectant use (yes/no)*

When consumers were questioned about their general attitudes to using a disinfectant, data from the February poll (Fig. 10) showed also that across the European region:

- Overall, 16% agreed they used disinfectants "everywhere" but there was significant difference between regions varying from 6% in the Nordics to 30 % in Southern Europe.
- Overall, 15% said there was no need to use disinfectants in the home, cleaning is enough. Again, there was significant variation between regions. The Nordics and West Europeans were most likely to say that there is no need for disinfectants whilst those least likely to agree were the Southern Europeans and the UK/Ireland.

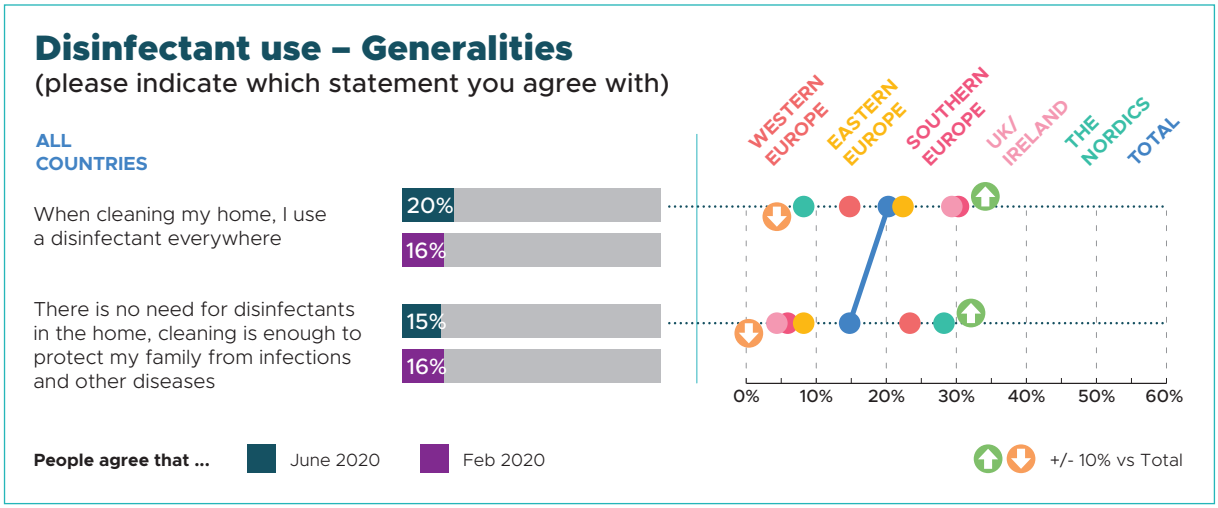

Figure 10. *Disinfectants use (statements)*

7. How does the use of disinfectants correlate with Targeted Hygiene? Where are they used?

Having established that, on average, 43% said they only use disinfectants in places where they believed there would be harmful microbes, the 78% (in Feb 20) and 82% (in June 20) who said they used disinfectants (cf Figure 11) were questioned on the specific places where they used them. To achieve this, they were presented with a range of situations and asked "in which of these situations might/ would you use a disinfectant product?".

Fig. 11 shows the average frequency of use in each situation, for all European citizens listed in order of decreasing usage. For each action, the data also shows regional variations. The data shows important differences in usage between regions which may be due to cultural Factors or historical reasons. In general, as also found in Fig. 9, the UK/Ireland, Southern Europe and Eastern Europe tended to be the biggest users of disinfectants.

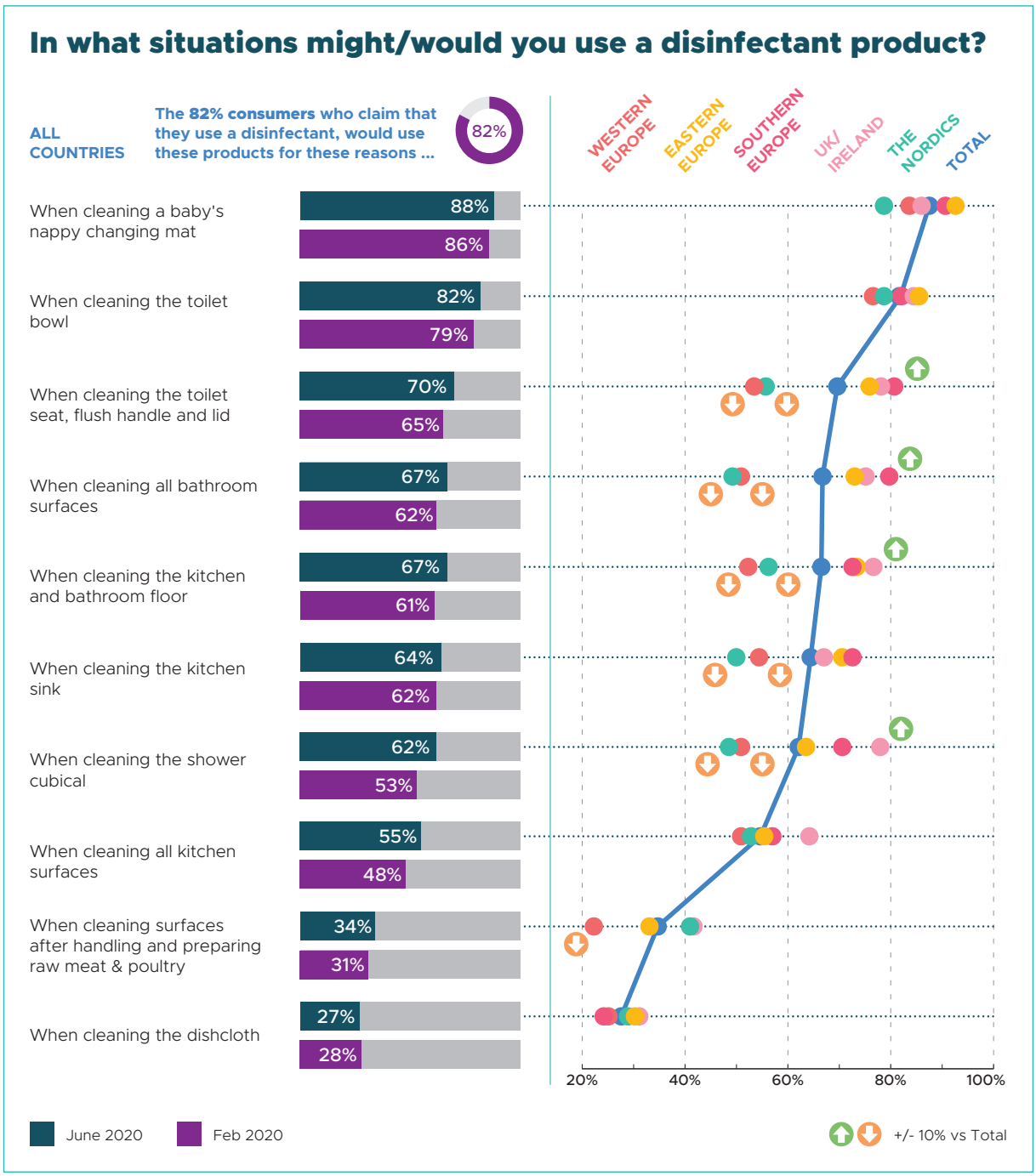

Figure 11. *Situations for the use of disinfectants*

To better understand whether consumers beliefs about where disinfectants are needed correlated with Targeted Hygiene, the data in Fig. 11 situations were afterwards – during the analysis phase – grouped accordingly to show the extent to which consumer usage correlates with risk assessment based on microbiological data i.e. to what extent were disinfectants being used at key moments for hygiene.

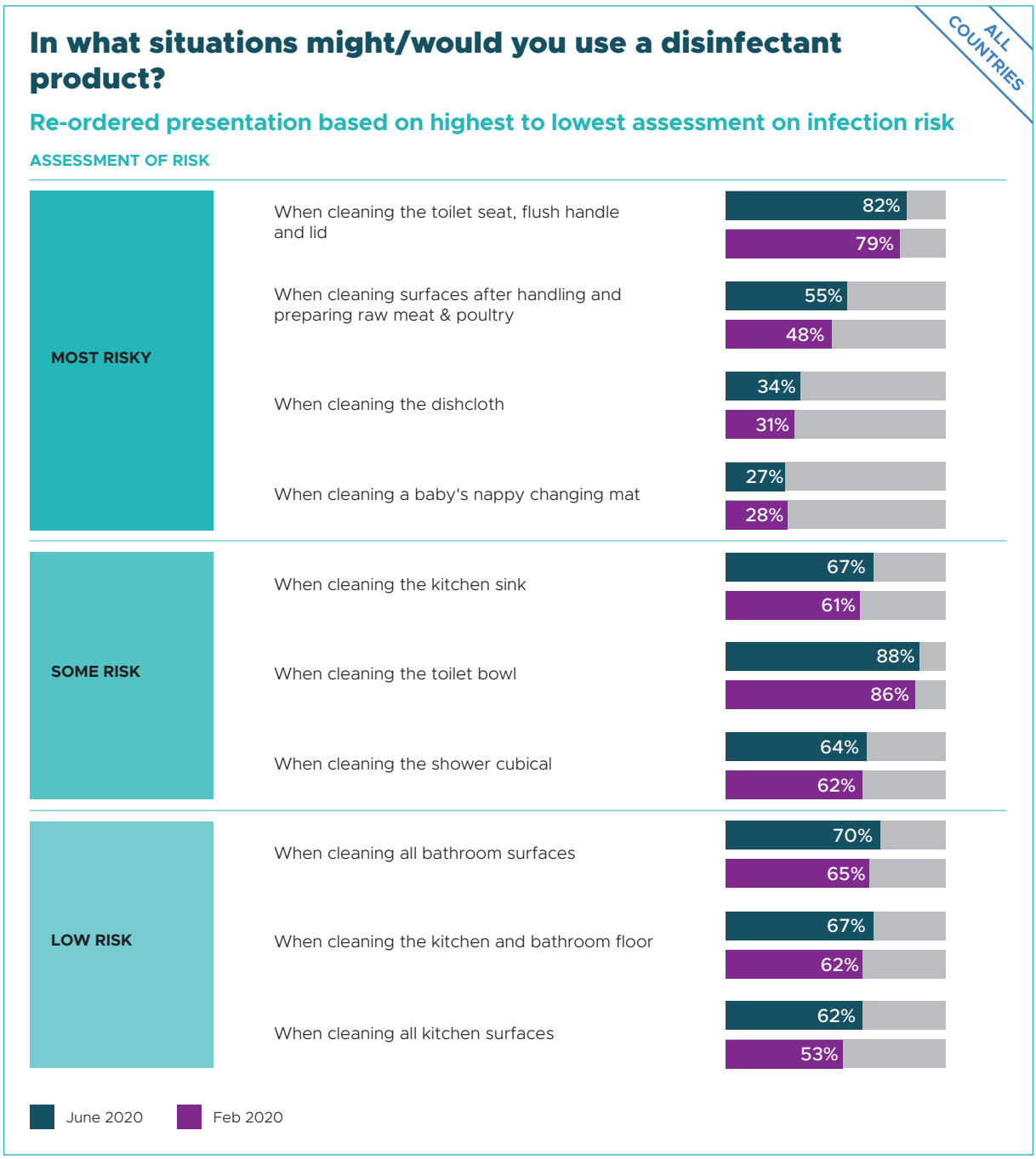

Figure 12. *Correlation of disinfectant usage with assessment of risk*

Data in Figure 12 show that consumers may use disinfectants in high risk situations where they are needed, but in some risk situations, they are rarely used. Equally disinfectants are often used in situations considered as low risk i.e. where there is no evidence of infection risk reduction outcome. Thus:

- Although in Feb. 20, 79% of consumers said they used a disinfectant for IP cleaning of hand contact surfaces associated with the toilet, less than 50% said they used them for IP cleaning of contact surfaces after handling/preparing raw meat and poultry or cleaning a baby's changing mat.
- More than 50% of consumers said they used disinfectants for general cleaning of kitchen and bathroom surfaces and floors, despite the fact that these are generally considered as low risk.

8. Impact of COVID-19 pandemic on hygiene perception and behaviours

General perception on hygiene

The June poll (Fig.1) confirmed, as found in the February survey, that, across the European region, there was high awareness and concern about protecting themselves and their families against infection by practicing good hygiene.

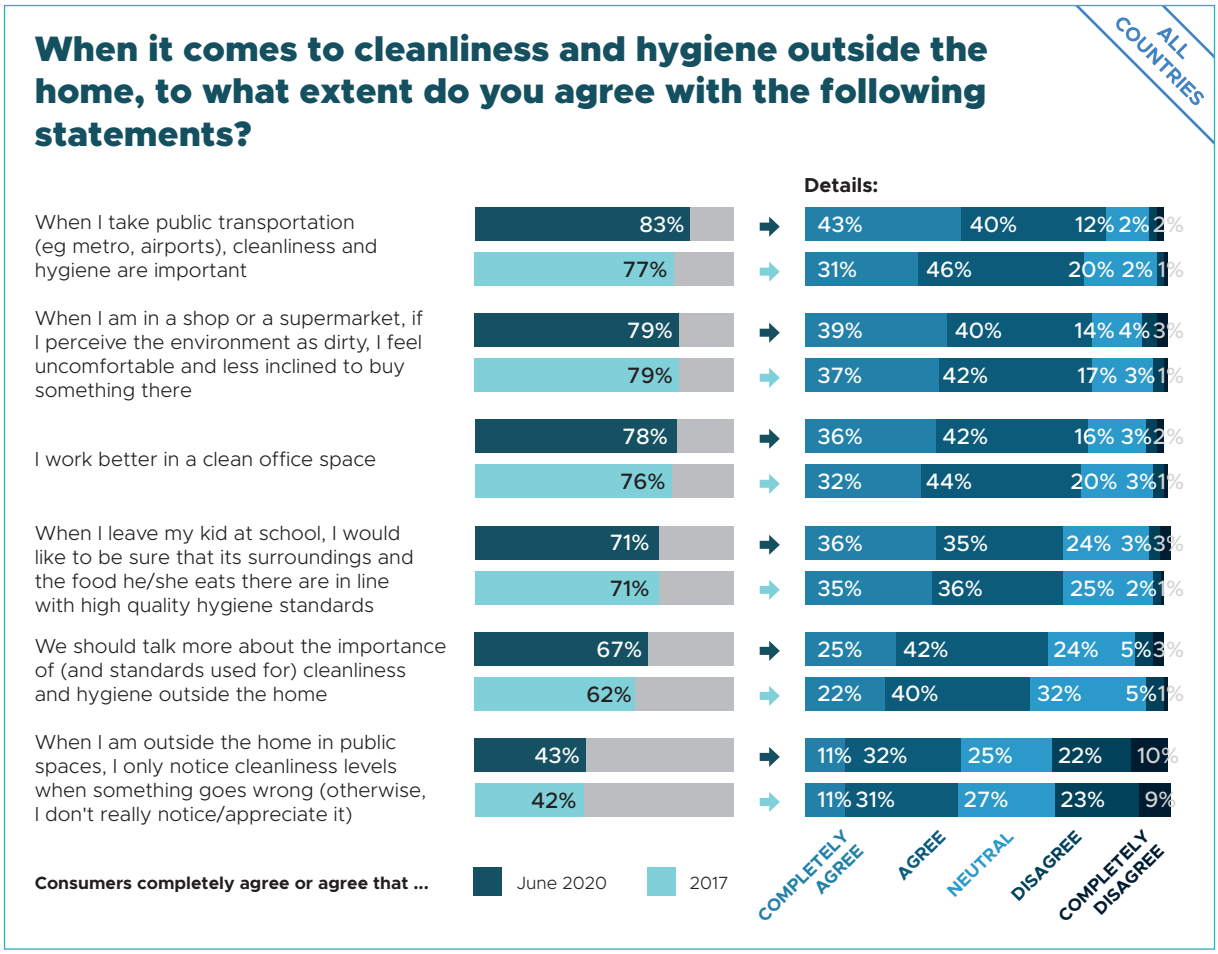

Figure 13. *Cleanliness outside the home*

As part of the June poll (as those were not in the Feb. 20 poll), it was decided to ask consumers about their beliefs about hygiene outside the home (see Fig. 13). When the data was compared with that of identical polling carried out as part of the 2017 survey, it suggested an increased concern about the importance of cleanliness and hygiene issues outside the home when using public transport (77-83%), with 43% of citizens 'fully agreeing' with this statement (i.e. a relative increase of +38%). Similarly, good cleaning and hygiene standards in shops and supermarkets are highly appreciated (79%), as well as clean offices spaces (78%). Also, we saw that people would be keen to know more the standards used to ensure cleanliness and hygiene outside the home (67% in June 2020 vs. 62% in 2017), with a relative increase of +14% of persons 'fully' agreeing with this (i.e. 25%) in 2020.

For most other questions about perceptions of hygiene and cleaning, there was little difference in the data obtained in June compared with February (Figs. 1, 2 and 3).

Perception of infection risk and claimed behaviour

Comparing insights from the June and Feb. polls as shown in Figs. 5 to 8, data suggests that there was some increase in the number of people who recognised that some, but not all actions, were risky and acted accordingly, but overall, their perception of risk and behaviour remained largely the same. This includes an underestimation of risk in some situations and overestimation of risks in others. Thus, for example:

- The increase in numbers of people who agreed "not washing their hands at key moments" was risky and acted accordingly was surprisingly small. Particularly surprising is the finding that there was only a relatively small increase in perception of risk associated with sneezing into ones hands (80-82%). More importantly, although there was a 6 point increase (i.e. a relative growth rate of + 10%) in those reporting that they washed their hands ("always" or "often") after sneezing into them, this still remained relatively low at 66% (Fig. 5).
- There was some increase in perception of risk associated with hand contact surfaces frequently touched by others related to using the toilet and sharing and laundering of towels and bed linens, but increases were relatively small (cf Fig. 6).
- The number of people who responded that "not using an antibacterial or disinfectant to clean the kitchen and bathroom floors", (not regarded as high risk for spread of COVID-19) was high or medium risk increased from 64 to 66%, and the number who reported always or often using disinfectant in these situations increased from 62 to 65% (Fig. 8).
- One area where there was **marked increase** in awareness of **risk was outside the home**, where there was a 7 point increase in those who believed failing to wash their hands when arriving home is a significant risk and acted accordingly (80 to 93% i.e. a relative growth rate of + 16%).

Use of disinfectants

Comparing insights from the June and Feb. polls as shown in Fig. 9, data shows an increase in the number of EU consumers who said they used disinfectants from 78 to 82%. Regions showing the greatest increase were Western Europe (66-72%) and Eastern Europe (85 to 91%). In Nordic countries there was no increase with only 60% of people reporting use of such products.

Fig. 4 shows little change in general attitudes to disinfectants and how they work, although there was some increase in the number of people (47% with a relative growth rate of +15%) confirming that "using a disinfectant when cleaning my home means that they can get rid of bacteria etc. more than if they just clean it" suggesting greater awareness of the difference between cleaning and disinfection.

Both polls suggest that use of products was not well correlated with places where harmful bacteria are most likely to be found, or with the concept of targeting hygiene procedures at moments most likely to be associated with spread of harmful microbes (Figs. 4 and 11). In all situations there was increased usage of disinfectants in June compared with February, but the largest increases were in situations generally considered as low risk:

- For situations considered as most risky e.g. cleaning surfaces after handling raw food, cleaning toilet seat, flush handle and lid, and cleaning dishcloths, the increased usage was of the order or 2-3 points.
- For situations considered as least risky i.e. cleaning all bathroom and kitchen surfaces and floors, and cleaning the kitchen sink, increased usage ranged from 5-9 points.

About the authors

This report has been prepared jointly between:

A.I.S.E.

The "International Association for Soaps, Detergents and maintenance products" (A.I.S.E.) has been representing the detergents and maintenance products industry in Europe to EU regulators for over 65 years. Through its extensive membership network of 29 national associations, 18 corporate members and 13 value chain partners, A.I.S.E. represents over 900 companies supplying household and professional cleaning products and services across Europe. A.I.S.E. has a long history in leading voluntary industry initiatives that focus on sustainable design, manufacturing and consumption, product safety and safe use of products by consumers and professional customers. Based in Brussels, A.I.S.E. is the key industry body providing industry's expertise to EU policy makers on regulatory matters; its role is also to support its members in the adequate implementation of such regulations.

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IFH

The International Scientific Forum on Home Hygiene is a leading scientific authority on home hygiene. It is a not for profit, non commercial, Registered Charity in the UK which was established in 1997 with the mission to promote health and wellbeing through improved hygiene (infection prevention and control) in home and everyday life settings. The IFH is unique in that it addresses hygiene from the viewpoint of the home and, more importantly, the family or household.

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