



## Preventing infectious diseases & tackling antibiotic resistance is everyone's responsibility: a call for an integrated strategy for hygiene behaviour change in home and everyday life

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There is no doubt that in the future we are going to have to view our microbial world very differently. Microbiome science is now showing us that the millions of microbes that live on and within us (the human microbiome) are as essential to our health as our liver and kidneys. Lack of exposure to the microbes in our human, animal and natural environments, the key to sustaining a diverse healthy microbiome, is now being associated with rising levels of allergic and autoimmune diseases, inflammatory bowel disease, type 1 diabetes, and other diseases. Avoiding our microbial world is no longer the healthy option.

Set against this is the growing awareness of the vital importance of hygiene in preventing infectious diseases caused by exposure to harmful microbes. Not only are infectious diseases a significant burden of health and prosperity, hygiene is also crucial for addressing pressing health concerns, such as tackling antibiotic resistance, by reducing the need for prescribing antibiotics and preventing the spread of resistant strains. It is also key in reducing pressure on national health services.



Following a meeting in London in 2017, a group of experts in hygiene agreed to prepare a consensus paper summarizing why hygiene in home and everyday life is important and what needs to be done to address these apparently conflicting issues. The question which the paper sets out to answer is: "how do we protect ourselves against harmful microbes whilst at the same time sustaining exposure to the diverse range of microbes that also inhabit our world and which are vital to health?".

Key to this is understanding why we have lost contact with essential microbes. Is it a product of our success in reducing the burden of disease through water, sanitation and clean food and clean environments which has inadvertently reduced exposure to good as well as harmful microbes? Or is it something else? Most experts now agree that the rapid rise in allergies and other diseases in the last 50-60 years is largely down to changes in lifestyle. This includes increasing preference for C-section rather than natural childbirth, bottle rather than breast feeding, less sibling interaction and less time spent outdoors. Once acquired, altered diet and excessive use of antibiotics can adversely affect our ability to sustain a healthy microbiome. Key to tackling this problem is the need to understand that "being less clean" or relaxing hygiene standards is not the solution; evidence suggests that if personal and environmental cleanliness is involved, its contribution is likely to be small, relative to the cumulative effect of these other factors.

An issue likely to dominate future health policy is the recognition that our human microbiota (the microbes inhabiting our gut, respiratory tract, skin, etc.) constitutes an organ as essential to health as our liver and kidneys.<sup>1</sup> It is now clear that diverse exposure to human, animal, and natural environments, particularly in early life, are key to building a healthy

microbiota. Failure to maintain a diverse microbiota is being associated with an increasing range of diseases (Note 5) including allergic (asthma, eczema, hay fever, food allergies) and autoimmune diseases (such as multiple sclerosis, type 1 diabetes and inflammatory bowel disease) which have risen dramatically, particularly in the last 50 years.

### **Overcoming barriers to change**

In tackling this issue there are a number of barriers which must be addressed if we are to be successful in promoting hygiene as part of tackling urgent public health issues.

A key problem is the fact that the public has become confused about hygiene - what it is and how it differs from cleanliness. Significant confusion arises because we still hold to the idea that dirt is the main source of harmful germs, and that hygiene means cleanliness aimed at eradicating dirt: in other words, the belief that cleanliness and hygiene are the same thing. Another source of confusion is that although we now talk about “good germs” and “bad germs”, articles and infographics still represent them in a manner that engenders fear and the need to “search and destroy”. They fail to tell us that the largest proportion of the “millions of germs” that are found in our homes are mainly harmless and probably beneficial.

Another issue is the hygiene hypothesis, first published in 1989, which proposed that children who had fewer infections were more likely to develop allergies, and that this could be due to “improved household amenities and higher standards of personal cleanliness”. Although this concept has now been refuted (i.e. research shows that the exposures we need are to beneficial rather than harmful bacteria), widespread publicity given to the “hygiene” hypothesis since the 1990s has led to a prevalent conviction that we have become “too clean for our own good”. The misconception that we need exposure to harmful germs to build a strong immune system is still being constantly repeated. These issues have caused the public to become mistrustful about hygiene.

While it may be helpful to encourage children to spend more time playing outdoors and getting dirty, messages such as “we must stop washing our hands”, which involve a significant risk of increased exposure to infection, are unacceptable and could result in increased health risks.

A further need is to balance evidence of the health benefits of hygiene against possible risks, such as environmental impacts and human safety issues. Lack of a unified voice advocating hygiene means these issues can take precedence, leaving hygiene and its importance in second place. For example, we need to balance trends towards reducing laundry temperatures against data showing that this causes a reduction in hygiene efficacy. Evidence shows that clothing and household linens in close contact with the body can be a means of spread of antibiotic resistant strains associated with our skin and bowel microflora. Concerns about whether, and to what extent, household disinfectants might contribute to development of antibiotic resistance must be properly weighed against the need for targeted use of disinfectants products in situations where other hygiene practices may be insufficient to prevent spread of infection.

To address these issues, however, we need a smarter approach to hygiene. Since 1980s the International Scientific Forum for Home Hygiene (IFH) has been developing a new approach which is called **targeted hygiene**.

### **Targeted hygiene – a framework for change**

Targeted hygiene is a risk-management approach to hygiene in the home and everyday life. The aim is to focus our hygiene practices in places and at times when harmful microbes are

most likely to be spreading (i.e. where there is risk) rather than regarding hygiene as “cleanliness aimed at eradicating dirt”, where dirt is seen as the main source of harmful microbes.

This means recognising that the main sources of harmful microbes are not places which are ‘dirty’, but contaminated foods, domestic animals (pets), and people who are infected or are healthy carriers of potentially harmful microbes. Since the presence of these potential sources in the home is inevitable, this means that the only way to protect ourselves from infection is by preventing the spread of harmful microbes from these sources. Research shows that the main routes of spread of harmful microbes are via surfaces such as the hands, hand contact surfaces, food contact surfaces and via cleaning cloths, which is where targeted hygiene practices are the most important. Equally important, we need to be aware of the times when they are most likely to be spread, i.e. the times when we need to practice hygiene. These occur during food handling, using the toilet, coughing, sneezing, nose blowing, care of domestic animals, handling and disposal of refuse, or where a family member is infected. In short, getting people to adopt targeted hygiene means getting them to visualise the chain of infection, and to understand that hygiene is about breaking it.

What targeted hygiene does is to balance the need to protect against infectious disease, whilst also taking into account the various other issues. It provides a framework for maximising protection against infection whilst allowing maximum exposure to our microbial world. It also allows us to focus the use of resources (heat, water, mechanical action, detergents, disinfectants) in a manner which minimises environmental and other impacts.

### Summary of Key points

<p>1. <b>Hygiene in home and everyday life is a vital part of a sustainable public health</b> – not only for preventing infectious disease per se, but it is also key in tackling antibiotic resistance by reducing the need for prescribing antibiotics and reducing the spread of resistant strains.</p>
<p>2. <b>Building and sustaining a diverse human microbiome is vital to health.</b> Lack of exposure to the microbes in our human, animal and natural environments is now being associated with rising levels of allergic and autoimmune diseases, inflammatory bowel disease, type 1 diabetes, and other diseases.</p>
<p>3. <b>The question is</b> “how do we protect ourselves against harmful microbes whilst at the same time sustaining exposure to the diverse range of microbes that also inhabit our world and are vital to health?”</p>
<p>4. <b>“Being too clean” is not the problem. Experts agree that rising levels of allergies and other diseases is largely due to changes in lifestyle</b> (e.g C-section rather than natural childbirth, less time spent outdoors, diet, antibiotic use) which affect our ability to sustain a healthy microbiome. If home cleanliness is involved, its contribution is likely to be small relative to other factors.</p>
<p>5. <b>The public have become confused and mistrustful about hygiene</b></p> <ul style="list-style-type: none"> <li>• As the result of ongoing communications with the public, hygiene is still largely seen as synonymous with cleanliness aimed at eradicating dirt – ‘dirt’ being regarded as the main source of harmful microbes.</li> <li>• Widespread publicity given to the “hygiene” hypothesis since it was first proposed in the 1990s has led to a prevalent conviction that we have become “too clean for our own good”. The misconception that we need exposure to harmful germs to build a strong immune system is still being constantly repeated. Although this concept has now been refuted.</li> </ul>

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| <p><b>6. A further need is to balance evidence of the health benefits of hygiene against possible risks</b>, such as environmental impacts and human safety. Lack of a unified voice advocating for hygiene means these issues can take precedence, leaving hygiene and its importance in second place.</p>   |
| <p><b>7. Targeted hygiene is a new approach to hygiene in home and everyday life – which is simple, credible and sustainable.</b> Targeted hygiene means focussing our hygiene practices in places and at times when harmful microbes are most likely to be spreading (i.e. places and times where there is risk), rather than regarding hygiene as “cleanliness aimed at eradicating dirt, where dirt is seen as the main source of harmful microbes”.</p> |
| <p><b>8. Targeted hygiene provides a framework for optimizing protection against infection whilst allowing maximum exposure to our microbial world.</b> It also allows us to focus on using of resources (heat, water, mechanical action, detergents, disinfectants) in a sustainable manner which minimises environmental and other impacts.</p>   |

## Calls to action

In addition to making constructive recommendations for developing an effective approach to hygiene, this paper issues a number of calls to action:

Call to:	Action
National and international health policy makers, health agencies and health professionals	Give greater recognition to the importance of, and cost-saving implications of hygiene in home and everyday life.
	Provide leadership to develop an integrated approach which addresses hygiene from the point of view of the “family unit” and what they , understand and need to know.
	Current investment in hygiene promotion provides a platform from which to make progress, but strategies need to be integrated rather than developed independently by different agencies.
Scientists & health professionals, together with allergists, nutritionists, microbiomists, environmentalists, regulators, private sector	<p>Ensure a balanced communication approach, where importance of hygiene is given due recognition, and focussed on maximizing protection against infection whilst also addressing other issues.</p> <ul style="list-style-type: none"> <li>• work together to agree on a common approach; and</li> <li>• stop ignoring evidence &amp; embracing misinformation to downplay or exploit hygiene in favour of other agendas.</li> </ul>
Scientists & health professionals, together with those who communicate directly with the public (community workers, the media and the private sector)	<p>Hygiene behaviour change is unlikely to happen unless we also work to change public perceptions of hygiene through consistent and responsible messaging and advertising about hygiene and hygiene products. Consumers need :</p> <ul style="list-style-type: none"> <li>• a clear restatement of the importance of hygiene and how to weigh hygiene importance against other risks;</li> <li>• 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</li> <li>• consistent clear messaging to public about harmful microbes, how infections spread, how this can be prevented, and the role of cleaning and disinfection products.</li> </ul>
Academia and the private sector	Place “targeted hygiene” at the heart of a multimodal infection prevention strategy, alongside vaccination and other interventions.
	Strengthen the scientific framework for delivering effective targeted hygiene through collaborative research which focuses on breaking the chain of infection.

## NOTES

- The full paper can be downloaded from : <https://www.ifh-homehygiene.org/review/containing-burden-infectious-diseases-everyone%E2%80%99s-responsibility-call-integrated-strategy>
- For media and other enquiries please contact [secretariat@ifh-homehygiene.or](mailto:secretariat@ifh-homehygiene.or). If your media enquiry is urgent please call 0791 955 4781
- **The International Scientific Forum on Home Hygiene** is a not-for profit, non government organisation which was established in 1998, and is working to develop and promote hygiene in home and everyday life based on sound scientific evidence ([www.ifh-homehygiene.org](http://www.ifh-homehygiene.org))

<sup>i</sup> Rook G, Bäckhed F, Levin BR, McFall-Ngai MJ, McLean AR Evolution, man-microbe interactions, and life history Plasticity. *Lancet* 2017; 390: 521–30.