

RSPH and IFH call for a clean-up of public understanding and attitudes to hygiene

There is a deep-rooted belief that a bit of dirt is good for you, such as in the 18th century proverb 'You eat a peck of dirt before you die', although even then it was not supposed to be taken as good advice. They had the excuse of not knowing about microbial pathogens or the microbiome, but the persisting ideas about the dangers of a perceived over-sanitised environment have led to confusion about the still much-needed role of hygiene to prevent infectious disease. Professor Bloomfield, an expert in the field of hygiene, describes a public survey that shows the need to change consumer attitudes to address our increasing understanding of microbial exposure and the role of targeted hygiene.

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The Royal Society for Public Health (RSPH) policy paper released in June 2019 called for an end to the myth that cleanliness is bad for health.¹ Their concern is that protecting ourselves against infection (i.e. hygiene) is a vital public health issue which is being undermined by the idea that 'we have become too clean for our own good'.

One of the reasons this paper attracted widespread media attention was its report of an online poll of 2000 members of the public, showing how confused we have become about hygiene and cleanliness and how commonly quoted 'myths' have fuelled this confusion. The RSPH policy paper was prompted by a 2018 paper published by the International Scientific Forum on Home Hygiene (IFH)² setting out why home and everyday life hygiene is important and what is needed to achieve behaviour change.³ One of the issues identified was the need to change consumer beliefs.

DO WE NEED 'EXPOSURE TO GERMS' TO BUILD A STRONG IMMUNE SYSTEM?

A common belief is that 'we (particularly children) need exposure to germs to build a strong immune system'. The RSPH poll¹ showed that 23% of those polled

agreed with this statement, but how this impacts our hygiene beliefs depends on how we interpret the words 'germs' and 'strong'. One interpretation, that 'strong' means immunity to infection, derives from our knowledge that vaccines containing attenuated measles or poliovirus stimulate production of antibodies against these infections. From my reading of the literature, the idea that broad exposure to different germs increases general immunity to infection is a myth.

The other common belief is that 'we have become too clean for our own good' because a strong immune system built through germ exposure is needed to 'ward off allergies'. This stems from the so-called hygiene hypothesis, published in 1989.⁴ This proposed that lack of exposure to childhood infections (harmful germs) is an underlying cause of rising allergies because of higher standards of home and personal cleanliness. Unfortunately, the public tend to use the same reasoning to explain 'resistance' to allergies and infections. In atopic disorders, such as hay fever, there is an abnormal reaction to pollen or dust that would be tolerated by the normally functioning immune

system: this is not mediated by cleanliness. Microbe exposure acts to regulate the immune system so that it tolerates rather than attacks things like pollen which are actually harmless, if left alone.

SO – ARE WE 'TOO CLEAN FOR OUR OWN GOOD' – THE HYGIENE HYPOTHESIS MISNOMER

While pathogen–human interactions cause infections and can be fatal, rapid development of microbiome science is now showing that exposure to 'beneficial' microbes through contact with our human, animal and natural environment is essential for health.⁵ These microbes

allow us to build a diverse microbiome in our gut, respiratory tract, skin and other areas. Failure to maintain a diverse microbiota on and in our body is being linked to

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an increasing range of diseases which include not only allergies (asthma, eczema, hay fever and food allergies) but also autoimmune diseases (multiple

sclerosis, type 1 diabetes and inflammatory bowel disease). These disorders have risen dramatically, particularly in the last 50 years.⁵ Lack of microbiome diversity is also being

linked to other maladies such as depression and obesity.⁵

Altered lifestyle choices have caused us to lose contact with beneficial microbes. This includes spending less time outdoors and less time interacting with friends, family (due to smaller family sizes) and pets. Since early life exposure appears to be important, opting for

natural childbirth and breastfeeding is also seen as important, while avoiding unnecessary use of antibiotics and adopting a healthy diet are important for sustaining a healthy diverse microbiome.⁵

Unfortunately, the widespread publicity given to the hygiene hypothesis has led to the idea that ‘being too clean’ is an underlying cause of all these various diseases becoming received wisdom. This is despite the fact that there is no good evidence to support this. As Professor Rook says, ‘*The common childhood infections that hygiene measures are designed to combat appeared much too late in our evolutionary history to have evolved an essential role in the development of our immune system*’.⁶

But, like the measles/MMR story, the ‘too clean’ myth persists in the minds of the public and the media. In the RSPH online poll,³ people were asked to identify factors that prevent children coming into contact with bacteria which they believed beneficial to their child’s health. Responses included the following:

- 59% and 56% of people identified lifestyle factors such as using too many antibiotics and spending too much time indoors as causative factors
- Almost as many (55% and 52%) still hold view that keeping homes too clean and using too many antibacterials are important
- Less than one in five (22% and 9%) were aware that Caesarean section (C-section) rather than natural childbirth and bottle rather than breastfeeding were probable risk factors

So why does the ‘hygiene hypothesis’ concept persist? In 2017, IFH surveyed media articles spread over the period 1989–2017.⁷ The survey revealed that 22 (88%) of 25 articles mentioned home or personal cleanliness as an underlying cause of reduced exposure to beneficial microbes and 56% cited the ‘hygiene hypothesis’ as an explanation for the link to immunological disorders. Of concern, 15 (60%) of 25 cited antibacterials/hand sanitisers as factors despite the fact that there is no evidence for this. These reports have persisted despite the fact that most experts now agree that lifestyle choices (such as C-section, less outdoor

living, diet and overuse of antibiotics) are the underlying problem.

THE TARGETED APPROACH TO HYGIENE

Encouragingly, when questioned directly about hygiene in relation to health, the RSPH poll¹ indicated general awareness, with 98% acknowledging the importance of hygiene in the home. People also seemed aware of current issues that make hygiene important. Half of the people surveyed (50%) agreed that poor hygiene contributes to antibiotic resistance and almost three (74%) in four people believed hygiene is important because it reduces pressure on the National Health Service (NHS) by preventing ill health.

The bottom line is that in future we are going to have to view the microbial world very differently. Since 1997, IFH has been developing an approach to infection prevention in home and everyday life, which has come to be known as Targeted Hygiene.³ Targeted Hygiene is a lifestyle choice which maximises ongoing interaction with essential microbes from human, animal and natural environments but at the same time maximises protection against infection. Targeted Hygiene means focusing on 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. RSPH has produced a simple graphic showing these ‘moments for hygiene in home and everyday life’:⁸

- During food handling;
- While eating with fingers;
- Using the toilet;
- Coughing, sneezing and nose blowing;
- Touching surfaces frequently touched by other people;
- Handling and laundering ‘dirty’ clothing and household linens;
- Caring for domestic animals;
- Handling and disposing of refuse;
- Caring for an infected family member.



During these ‘moments’, hygiene measures need to focus on critical surfaces most likely to spread harmful microbes including the hands, hand and food contact surfaces and cleaning cloths. For example, after handling raw meat and poultry, pathogens are contained by immediately cleaning and disinfecting food contact surfaces; cleaning, rinsing and drying utensils; and cleaning cloths and washing hands.

Half of the people surveyed (50%) agreed that poor hygiene contributes to antibiotic resistance



LACK OF PUBLIC UNDERSTANDING OF CLEANLINESS AND ITS RELATIONSHIP TO HYGIENE

One of the most important revelations of the RSPH and IFH surveys is the extent of public misunderstanding about hygiene. Consumers are unclear about the meaning of the term hygiene and fail to understand that, although cleaning can be a means of achieving hygiene if carried out in the prescribed way, a visibly clean surface can be contaminated with sufficient harmful microbes to cause infection.

The 1989–2017 IFH survey of media coverage⁷ suggests we still largely see hygiene as synonymous with cleanliness aimed at eradicating dirt – inappropriately regarded as the main source of harmful

Table 1.

How do people's hygiene-related behaviours correlate with their perception of risk? (RSPH survey 2018)

1. How often do you do the following (always; often; sometimes; never; not applicable)	% of people who said 'always'	2. Which of the following do you agree pose a significant risk to your health?	% who said this was high risk
Wash my hands thoroughly with soap immediately after preparing raw meat	72	Handling raw meat without washing hands thoroughly with soap afterwards	76 (92 said high or medium risk)
Check my meat is cooked all the way through	71	Eating meat without checking it is thoroughly cooked first	68 (93 said high or medium risk)
Wash my hands thoroughly with soap after using the toilet	73	Not washing hands with soap after going to the toilet	57
Wash my hands thoroughly before eating with my hands	42	Not washing hands thoroughly with soap before eating with hands	34
Use an antibacterial or disinfectant to clean the kitchen and bathroom floors	45 (71 said always or often)	Not using an antibacterial or disinfectant to clean the kitchen and bathroom floors	32 (63 said high or medium risk)
Wash my hands with soap after sneezing into my hands	28	Not washing my hands with soap after sneezing into them	29
Keep my raw meat and poultry in a separate shopping bag to my other produce	38	Putting raw meat and poultry into the same shopping bag as other ready-to-eat foods	38
Wash and dry my dish cloths after each use	21	Reusing dish cloths without washing them with soap and drying them after each use	22 (59% said high or medium risk)

RSPH: Royal Society for Public Health.

microbes. An IFH pilot study of 117 people indicated that although 53% thought hygiene was more than cleanliness, that is, associated with protection of health, 38.5% saw cleaning and hygiene as the same thing. The remaining 8.5% thought that cleanliness meant cleaning with detergent, while hygienic meant using a disinfectant.⁹

Use of the term 'germs' also causes confusion. The IFH media survey⁷ showed that the media frequently talk about 'millions of germs' on household and other surfaces but rarely explain that the majority are likely to be harmless and some may be beneficial microbes required to build a healthy microbiome. The idea that germs are harmful is reinforced by media infographics

representing them in a sinister way that indicates we need to 'get rid of them' using statements like '*Here's a map to help identify where germs love to lurk and help you to banish the bugs*'.

The RSPH survey¹ showed that 36% of people thought that germs are sometimes good and sometimes harmful, while 58% thought they were usually or always harmful. How people interpret the idea of 'needing exposure to germs to keep our immune system strong' and how this prompts their hygiene practices will depend on what they understand by the word germs. If we are to get people to view their microbial world differently, we must avoid this commonly used word unless we qualify whether it refers to harmful or beneficial microbes.

THE PUBLIC'S PERCEPTION OF RISK

An objective of the RSPH poll¹ was to elucidate how consumers' hygiene behaviours reflect their beliefs about risks associated with their actions. In an early part of each RSPH online poll (Table 1), people were questioned about their hygiene behaviours and then later asked about how risky they perceived these behaviours to be. Matching the sets of answers (Table 1) indicates that the actions they reported generally reflected their perception of risk. However, their risk perceptions were significantly influenced by the concept that dirt and cleanliness are key indicators of the presence or absence of harmful germs. Thus,

- There was relatively good awareness of risks associated with not washing hands after handling raw meat (76%) and after using the toilet (57%), which correlated with more than 70% of people saying they always did so at these important times. It may be that the relatively high reported compliance rates reflect the fact that media articles featuring food hygiene tips and handwashing are relatively common.
- However, 72% of people said it was very important to remove harmful microbes from the toilet and 79% of people said it was very or fairly important to remove harmful microbes from floors, both of which are traditionally regarded as dirty places. When questioned about their attitudes to dirt, 36% said they believed that dirt was usually or always harmful.
- By contrast, there were a relatively low number of people who recognised the well-established risks of spread of infection via contaminated cleaning cloths (37%) and acted accordingly (22%). This may be because cloths are associated with producing cleanliness and thus not considered risky.

WHAT NEXT?

The RSPH policy paper¹ makes a number of calls to action. One is for adoption of Targeted Hygiene as the

effective way of breaking the chain of infection. It says that

Schools, the media, and manufacturers of hygiene products all have a responsibility to advocate for clear messages about Targeted Hygiene which includes understanding the difference between cleanliness and hygiene, and dispelling myths that disease-like allergies are caused by 'too much household cleanliness'.

My conclusion is that, to do this, we have to find a way to dispel entrenched ideas that dirty places are the likely source of harmful germs, which need to be 'got rid of' to keep the family safe from infection. We need to replace this with the simple concept that hygiene is what we should do at the times when there is risk of spread of infection (the '9 moments for hygiene') and requires focusing hygiene measures on critical sites and surfaces to break the chain of infection. Cleaning is one of the measures we use for this, but cleanliness in itself does not deliver hygiene.

So – is hygiene important? 'Yes' – was my answer to a *Guardian* journalist who asked, after reading the RSPH paper,

but unfortunately this is not apparent to government health agencies because the various reasons why – tackling antibiotic resistance, reducing

*pressure on the NHS, reducing foodborne disease, more healthcare in the community, the growing elderly population etc. – are all considered separately. It is only when viewed together that the extent of this issue is seen.*³

Is home and everyday life hygiene undervalued? The answer again is 'Yes'. In tackling antimicrobial resistance (AMR), the focus is currently on preventing hospital infections, although the new 2019 UK Action Plan on AMR¹⁰ does say '*Health & social care providers can only do so much to prevent infections; when it comes to infections in the community (which requires exposure to antimicrobials), the public have a huge part to play*'. Change is happening, as shown by government investment in projects such as the e-bug¹¹ school and adult hygiene education project and other projects.³

Another call from RSPH and IFH is for action to change public understanding. In my opinion, if we do not also take steps to change consumer understanding of the microbes in their modern world and dispel the prevailing myths, the impact of investment in hygiene promotion will not be realised.

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