



International Scientific Forum on Home Hygiene (www.ifh-homehygiene.org)

Newsheet: April 2015

CONTENTS

1. Latest from IFH
2. Other news and new research
3. Hygiene promotion in Denmark
4. e-Bug: a European school health education resource
5. Hygiene in developing countries
6. “Hygiene hypothesis” and hygiene
7. Antibiotic resistance and hygiene

Get the latest news & research as it happens – Follow IFH on Twitter @IFH_homehygiene



1. Latest from IFH

Upcoming conference: The Hygiene Hypothesis and implications for hygiene

IFH is partnering with the Royal Society of Public Health to organise a conference on December 3rd 2015 in London. Experts now agree that the “hygiene hypothesis” is a misnomer. This doesn’t mean that the concept of a link between reduced microbial exposure and the rise in allergic diseases is wrong. It now seems likely that the important microbe exposures are the largely non-harmful species that inhabit our bodies and our environment rather than those which cause infectious diseases.

As a result of the widespread publicity given to the hypothesis, the public has lost confidence in hygiene in recent years. This in turn fostered a tendency to relax hygiene standards. Newer evidence indicates that our loss of exposure to vital microbes is the combined impact of a whole range of lifestyle and other changes over the last 2 centuries. The question now is “How can we reintroduce this beneficial exposure whilst at the same time promoting good hygiene practice to protect us from infectious diseases”.

This conference will explore the new and more plausible explanations about the link between reduced microbial exposure and the 20th century explosion of allergic diseases. It will also examine the likely causes and the measures that are being researched to overcome this problem. It will also look at why hygiene and cleanliness are still so important and how we can develop and promote approaches to hygiene that focus on protecting us from infection, whilst maximising the exposure to the microbes we need.

More details will be posted soon on RSPH website <https://www.rsph.org.uk/>

New publication: Lesser-known or hidden reservoirs of infection: always expect the unexpected.

In developing hygiene strategies, in recent years, the major focus has been on hand hygiene as the key route of infection transmission. In December 2014, IFH Board members Professor

Exner and Professor Bloomfield, together with other European Experts were invited by the Rudolf Schulke Foundation, Hamburg, Germany to take a wide-ranging look at the multitude of lesser-known and underestimated reservoirs of microorganisms which are known to act as sources of infection. These range from water reservoirs such as sink drains, fixtures, decorative water fountains and waste-water treatment plants, frequently touched textile surfaces such as private curtains in hospitals and laundry.

We tend to overlook the fact that, in some instances, the causative organisms of an outbreak are not identified because they are concealed in biofilms or in a state referred to as viable but non-culturable, which eludes conventional detection methods. The authors conclude that new and emerging pathogens, novel pathogen detection methods, and hidden reservoirs of infection should be given special consideration when designing the layout of buildings and medical devices, but also when defining the core competencies for health professionals, establishing programmes for patient empowerment and education of the general public, and when implementing protocols for the prevention and control of infections in medical, community and domestic settings.

The review is published in *GMS Hygiene and Infection Control* 2015 and can be downloaded from: <http://www.egms.de/en/journals/dgkh/2015-10/dgkh000247.shtml>

Reducing the risk of pet-associated zoonotic infections – new review

This new review by Stull and co-workers evaluates human infections acquired from pets (i.e., dogs, cats, fish, birds, amphibians, reptiles, rabbits and other rodents) and their risk factors. It also sets out some guidelines for infection prevention with specific emphasis on high-risk groups.

Stull et al say "Although pet ownership can have health, emotional and social benefits, pets can serve as a source of infections. Surveys suggest that the general public and people at high risk for pet-associated disease are not aware of the risks associated with high-risk pet practices or recommendations to reduce them. One study showed that 77% of households that obtained a new pet following a cancer diagnosis acquired a high-risk pet. Studies suggest physicians do not regularly ask about pet contact, nor do they discuss the risks of zoonotic diseases with patients, regardless of the patient's immune status".

The review can be found in the *Canadian Medical Association Journal* 2015. DOI:10.1503/cmaj.141020

2. News and new research

Frequent face touching is a habit that has implications for hand hygiene and infection

Infections including colds, influenza and other infections may be transmitted by self-inoculation when contaminated hands make contact with the mouth, nose or the eyes. *Staphylococcus aureus* is carried in the nasal mucosa in approximately 25% of the community and can be picked up by the fingers and inoculated into the eyes and into skin cuts and wounds.

A behavioural study, using videotape recording, of medical students at the University of New South Wales showed that, on average, each of 26 observed students touched their face 23 times per hour. Of all face touches, 44% (1,024/2,346) involved contact with a mucous membrane, whereas 56% (1,322/2,346) of contacts involved non-mucosal areas. Of mucous membrane touches observed, 36% involved the mouth, 31% involved the nose, 27% involved the eyes, and 6% were a combination of these regions.

The authors concluded that hand hygiene programmes aiming to improve hand hygiene compliance should include a message that mouth and nose touching is a common practice and could transmit disease. The study can be found at: *American Journal of Infection Control* 43 (2015) 112-4.

Antimicrobial resistance in household and small farm chickens in Vietnam

Antibiotics are widely used in farming to treat and prevent animal diseases and promote growth. The province of Tien Giang (Vietnam) is home to 1.67 million people and 5.96 million chickens. Household and small farms showed frequent antimicrobial usage associated with a high prevalence of resistance to the most commonly used antimicrobials. Given the weak biocontainment, the high prevalence of resistant *E. coli* could represent a risk to the environment and to humans.

The study population consisted of 208 chicken farms, divided into two groups according to the number of chickens per farm: ≥ 10 –200 ('household' farms) and 200–2000 ('small' farms). Isolates from chickens were tested for susceptibility to 11 antimicrobials and for ESBL production. *E. coli* resistant to gentamicin, ciprofloxacin and third-generation cephalosporins was detected on 96.6%, 91.8% and 37.0% of the farms, respectively. Of 895 *E. coli* isolates, resistance to gentamicin, ciprofloxacin and third-generation cephalosporins was detected in 19.9%, 32.5% and 3.2% of the isolates, respectively. The study can be found at: *J Antimicrobial Chemotherapy*, 2015, doi:10.1093/jac/dkv053

Studying household spread of influenza

Household data were to study human-to-human transmissibility of the avian influenza A (H7N9) virus in China. Household contact information was collected for 125 index cases during the spring wave (February to May 2013), and for 187 index cases during the winter wave (October 2013 to March 2014). Using a statistical model, the workers found evidence for human-to-human transmission, but such transmission is not sustainable. They estimated that the household secondary attack rate (SAR) among humans to be 1.4% (range 1.3% to 2.2%). There was no significant change in the human-to-human transmissibility of the virus between the two waves, although a minor increase was observed in the winter wave. No sex or age difference in the risk of infection from a human source was found. The authors concluded that human-to-human transmissibility of H7N9 continues to be limited, but needs to be closely monitored for potential increase via genetic reassortment or mutation.

The article can be found at: *Euro Surveill.* 2015;20(10):pii=21056.
<http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=21056>

MRSA contamination of mobile phones of hospital healthcare and non-healthcare workers in Ethiopia

This study examined bacterial contamination of mobile phones of healthcare workers (HCW) compared with non-healthcare workers (e.g. admin staff) at Jimma University Hospital. A total of 71.2% (94/132) of mobile phones showed evidence of bacterial contamination. Contamination levels were higher among HCW mobile phones. A total of 112 bacterial organisms were isolated with 33 *Staphylococcus aureus*, 61 coagulase negative staphylococci, 12 *Bacillus* species, 4 *Micrococcus* species, 1 *Serratia* species and 1 *Klebsiella pneumoniae*.

The study showed that 39.40% (13/33) of *S. aureus* isolates were methicillin resistant, of which 38.50% (5/13) were vancomycin resistant. A higher number of MRSA isolates were found on the mobile phones of HCWs compared to non-HCWs' mobile phones with 6 MRSA

from nurses, 2 MRSA from doctors, 2 MRSA from scrub nurses and 1 MRSA from laboratory technologists' mobile phones. All isolates of *S. aureus* from surgical wards and more than half of the isolates of *S. aureus* from ICU, OR and paediatrics wards were MRSA. The majority of vancomycin resistant *S. aureus* isolates were from the mobile phones of HCWs.

Mobile phones of HCWs were more contaminated with MRSA and MRCoNS than non-HCWs mobile phones. None of the study participants washed their hands after mobile phone use and 75.80% (50/66) of the HCWs answered that they used their mobile phones while attending patients. Fifty percent (50%) of HCWs did not wash their hands before attending to their patients. Only 51.50% (34/66) of HCWs and 37.90% (25/66) non-HCWs cleaned their mobile phones.

The report can be downloaded from: Int J Infect Control 2014, v11:i1 doi: 10.3396/IJIC.v11i1.007.15

World Health Day: Salmonella in Europe: Food hygiene is everyone's responsibility

IFH has always stressed the message "Hygiene must be everyone's responsibility", but it is good to hear this message coming from another source – the WHO.

World Health Day was celebrated on 7 April, with WHO highlighting the challenges and opportunities associated with food safety under the slogan "From farm to plate, make food safe." They said "Risks to food safety arise throughout the food chain, and involves many different sectors – health, agriculture, transport, environment, food service and the food industry". But they also emphasised that if food hygiene is to be effective through the entire food chain, consumers must also play their part and follow basic hygiene advice, to ensure that they handle and prepare food safely.

They report "In 2013, there were over 310,000 reported cases of bacterial foodborne disease in the European Union/European Economic Area alone, of which 322 people died.

Salmonella is one of the most common forms of food poisoning. This represents only the tip of the iceberg regarding the real burden of foodborne disease due to limited surveillance and reporting systems. The burden of foodborne disease in the eastern part of the European Region is likely to be even greater, while, at the same time, there are more challenges with regard to surveillance and reporting." "New threats to food safety are constantly emerging. Changes in food production, processing, distribution and consumption, changes to the environment, new and emerging bacteria and contaminants and antimicrobial resistance all pose challenges to national food safety systems. Increased travel and trade heighten the likelihood that contamination will spread internationally".

Read more about the World Health Day Food Hygiene campaign at:

<http://www.euro.who.int/en/about-us/whd/world-health-day-2015/multimedia/infographic-salmonella-in-europe-reduce-food-safety-risk-through-shared-responsibility>

Cleaning with bleach could be linked to more childhood respiratory infections

A new study has looked at the potential impact of exposure to bleach in the home among more than 9000 children aged 6 to 12, attending schools in The Netherlands, Finland and Spain. Parents completed a questionnaire on frequency of flu, tonsillitis, sinusitis, bronchitis, otitis and pneumonia infections their children had had in the last 12 months, and whether they used bleach to clean their homes at least once a week.

Bleach use was common in Spain (72% of respondents) and rare (7%) in Finland. After taking account of factors, such as passive smoking at home, parental education, presence of household mould, and use of bleach to clean school premises, the findings indicated that the frequency of infections were higher among children whose parents regularly used bleach to

clean the home in all three countries. Differences were statistically significant only for flu, tonsillitis, and any infection.

Since this is an observational study, no conclusions can be drawn about cause and effect. The authors suggest that irritancy of volatile or airborne compounds generated during cleaning may damage the lining of lung cells, making it easier for infections to take hold. Bleach may also potentially suppress the immune system.

This study tends to ask more questions than it answers and is clearly intended to make the case for further research rather than show there is a real effect. By the authors' admission, the reported health effects are rather modest, and were self-reported rather than medically diagnosed. The authors also noted potentially important confounding factors, which could explain the results. For example, they didn't have any information on the use of other cleaning products used in the home, and only basic information on the use of bleach in the home, making it difficult to differentiate between exposure levels. i.e. what concentrations were used, where the product was used, how much was used and how often, all of which would affect the extent of exposure and any response. Importantly, the authors provided limited biological evidence to support their proposal that bleach exposure might lower resistance to infection by damaging the respiratory epithelium.

Set against these findings, we must bear in mind that oxidising microbiocides such as chlorine bleach are used at concentrations ranging from 0.5 up to 50,000 ppm, and are a vital part of our armory to prevent infections in healthcare settings, water treatment, the food and pharmaceuticals industries – and also in the home when used in a targeted manner to prevent the spread of infectious germs. The vital importance of bleach to protect against infection was demonstrated in the recent and ongoing fight against Ebola in West Africa.

The study can be found at: <http://oem.bmj.com/content/early/2015/02/20/oemed-2014-102701>

Can humans get norovirus from their dogs?

A new study in the US shows that human norovirus (nv) may infect our canine companions. This raises the possibility of dog-to-human transmission. The research showed that some dogs can mount an immune response to human nv, which strongly suggests that these dogs have been infected with the virus. Human nv can bind to the cells of the canine gut, which is the first step required for infection of cells.

It is not clear just how much of a problem canine infection transmission may represent for humans. Despite dogs' apparent susceptibility, the investigators failed to find nv in canine stools. They found it in serum samples of only about one seventh of 325 dogs tested. Additionally, it is not known whether human nv can cause clinical disease in dogs. Even assuming that dogs become infected with human nv, it remains unknown whether they could shed the virus in quantities sufficient to infect humans – although clinical investigators have estimated that as few as 18 virus particles can cause human infection.

The authors conclude “Until more definitive data is available, sensible hygiene precautions should be taken around pets, especially when gastroenteritis in either humans or dogs is present in a household.” The full study can be found at:

[http://jcm.asm.org/cgi/reprint/JCM.02778-14v1?ijkey=UzdFXaI151jUw&keytype=ref&siteid=asmjournals.](http://jcm.asm.org/cgi/reprint/JCM.02778-14v1?ijkey=UzdFXaI151jUw&keytype=ref&siteid=asmjournals)

Many of the things we do are VITAL to reducing the risk of infection

An article featured recently in msn news makes the statement “almost all the things you do to prevent infection are useless” which is very confusing. You can find it at:

<http://www.msn.com/en-us/health/wellness/almost-all-the-things-you-do-to-avoid-germs-are-completely-useless/ar-AA9VM3r#page=4>

How do we get people to understand risk when it comes to hygiene? We know it's no good saying – I haven't had a car accident for 10 years so I'll stop wearing a seat belt – because we know it may be our turn tomorrow. Hygiene is the same, but the public seem reluctant to grasp it. We can reduce infection risks but never eliminate them. How do we get over the concept of targeted hygiene as the most effective way i.e. applying hygiene practices in the riskiest places at the right time? e.g. cleaning food and hand contact surfaces (including cloths) and washing hands after preparing a raw chicken – or washing our hands after the toilet and keeping touch surfaces like the toilet seat and handle clean and disinfected – and if you're in a public loo, HW and not touching the exit door is the only way. It's common sense. Using a hand sanitiser where there's good reason e.g. after arriving at the office makes good sense, but slathering them on for no reason – or disinfecting surfaces as part of the routine weekly cleaning is not.

And yes – we do need exposure to microbes particularly in early life to reduce the risks of allergies, but research now shows that the microbes we need are the largely non-harmful ones in our bodies and environment. So targeted hygiene makes sense. It minimises the risk of infection but allows us maximum exposure to these non-harmful microbes.

MRSA on public buses in the USA

In a new study MRSA was frequently isolated from commonly touched surfaces in buses from a US metropolitan transportation agency serving both hospital and community routes. The study showed that buses may be effective mixing vessels for MRSA of both community and healthcare-associated origin.

Some 237 surface samples were taken from 40 buses from July–October 2010. Of the buses, 68% (27/40) were contaminated with *S aureus*, and 63% (25/40) contaminated with MRSA. Seats and seat rails were the most frequently contaminated surfaces, followed by the back door and stanchions. Most (62.9%) of the MRSA isolates were community-associated MRSA clones and 22.9% were healthcare-associated MRSA clones. Of the MRSA strains, 65% (5/20) were multidrug resistant.

The study can be found at: Am J Infect Control. 2014;42(12):1285-1290.
<http://www.sciencedirect.com/science/article/pii/S0196655314011250>

Microbial map of New York subway

Increasingly we have become aware that the rich diversity of microbes and other species present in our environment influence human health and disease, especially in cities. In a newly published study genetic sequencing was used to identify microbes on surfaces across the entire New York City (NYC) subway system, the Gowanus Canal, and public parks. Identified organisms included 1,688 bacterial, viral, archaeal, and eukaryotic taxa, which were enriched for harmless genera associated with skin (e.g., *Acinetobacter*). Almost half of the DNA found on the system's surfaces did not match any known organism and just 0.2 percent matched the human genome. It was found that bacterial signatures can reveal a station's history, such as marine-associated bacteria in a hurricane-flooded station. In some cases, the DNA that was found in some subway stations tended to match the neighbourhood's demographic profile. An area with a high concentration of Hispanic residents, for example, yielded a large amount of Hispanic and Asian genes. In another area, the DNA gathered frequently read as British, Tuscan, and Finnish, three groups not generally associated with the particular area. Dr Mason, one of the authors, had an explanation for the finding: Scientists have not yet compiled a reliable database of Irish genes, so the many people of Irish descent who live in the area could be the source of DNA

known to be shared with other European groups. Some evidence of pathogens was found (*Bacillus anthracis*), but a lack of reported cases in NYC suggests that the pathogens represent a normal, urban microbiome.

The report in the NY Times can be found at:

http://www.nytimes.com/2015/02/06/nyregion/among-the-new-york-city-subways-millions-of-riders-a-study-finds-many-mystery-microbes.html?_r=0. The report also contains a hyperlink to the full paper.

3. Hygiene promotion in Denmark

The following news items were submitted by Lars Munter of the Danish Hygiene Council. Lars reports "The Council now represents some 180 Danish (as well as few Swedish) hospitals, regions, municipalities, schools, companies, researchers, unions, trade unions, scientific communities, authorities – some 600 professionals in total – and growing every year."

Something rotten in the state of Denmark?

A recent Danish intervention study at two large metropolitan hospitals, based on 10,000 toilet visits showed that only 40% of patients and 60% of staff actually used water and soap after using the toilet. Using advanced audio software in a new type of soap dispenser, the study was able to show that a simple alarm – like a seat belt alarm – has a dramatic impact on hand hygiene compliance. Using the alarm, compliance rose to above 80% for patients and above 90% for staff. The innovation (called Sanalert) by the Danish company Nobak shows huge potential for improving hand hygiene.

Better school toilets

Too few, too poor, too dirty, and too disgusting. This is more or less the status of Danish school toilets where a national survey among Danish pupils showed that only 3% found toilet facilities acceptable. The effects are discouraging – ranging from low hand hygiene compliance, problems with incontinence, higher maintenance costs due to lack of respect, and poor integration of long-term hygienic habits. The Danish Council for Better Hygiene has therefore instituted a national seminar on school toilets – The School Toilet Day – this year on May 4th where teachers, school managers, cleaners, municipalities, researchers, doctors, companies, and other authorities can meet to discuss this complex challenge. The issue has international interest as the challenges are similar in many other countries – the programme in 2015 thus also has Swedish and Norwegian speakers, and presents an EU-project that aims to develop the "School Toilet of the Future". Readers with good Danish skills can read more at www.skoletoittdagen.dk.

Hygiene in the home

The Danish Council for Better Hygiene recently revealed the theme and slogan for the annual Hygiene Week in September. Last last year saw a total of 74 municipalities in Denmark and Sweden working together to promote better hygiene. This year the campaign focuses on hygiene in the home setting – family homes, nursing homes, homecare – and similar areas where interaction between professional expertise and private effort and initiative are needed to ensure good hygiene.

Hygiene Week is also a corner stone in trying to establish stronger, broader cross-sectorial cooperation locally – making sure that municipal departments of health, schools, elderly care, day care, dental care, food services, and cleaning work together with departments for procurement and maintenance to form a holistic effort to improve hygiene in terms of facilities, manpower, training, strategy, and quality.

For more details contact Lars Münter: (raad@bedrehygienje.dk)

4. e-Bug: a European school health education resource.



e-Bug
www.e-bug.eu
Operated by
Public Health England

e-Bug is an exciting, fun and free health education resource for teachers and school aged children. The resources make learning about microbes, antibiotic resistance, and the spread, treatment and prevention of infection fun and accessible for all.

All e-Bug resources are free to download online at: www.e-bug.eu. The website (www.e-bug.eu) includes a teacher section and a student section.

The teacher pages have a variety of resources including **lesson plans, worksheets** and **activities** for KS1, KS2, KS3 and KS4.

The student pages complement the teacher resources by providing **online games, revision pages** and much more for students to continue learning at home.



e-Bug have recently launched resources for young adults (15–18 year olds) about antibiotics and vaccinations including lesson plans, debate kits, animations, interactive slides, case studies and videos.

The lesson plans can be used in PSHE and biology lessons, assemblies and health events. All lesson plans are in line with the National Curriculum. Peer education resources for young adults are also available to increase students' confidence and communication skills. If you would like further information on e-Bug please email:

e-Bug@phe.gov.uk

5. Hygiene in developing countries

Water, sanitation and hygiene in healthcare facilities in low- and middle-income countries and way forward

A new report prepared by WHO, United Nations' Children's Fund presents, for the first time, a global assessment of the extent to which healthcare facilities provide essential water, sanitation and hygiene (WASH) services. Drawing on data from 54 low- and middle-income countries, the report concludes that 38% lack access to even rudimentary levels of water, 19% lack sanitation and 35% do not have water and soap for handwashing. When a higher level of service is factored in, the situation deteriorates significantly. A number of areas require urgent action and WHO will work with UNICEF, Governments and other partners to

develop a global plan to address the most pressing needs and ensure that all health care facilities have WASH services.

The report can be downloaded from:

http://www.who.int/water_sanitation_health/publications/wash-health-care-facilities/en/

6. Hygiene Hypothesis and hygiene

Asthma and the Hygiene Hypothesis – does cleanliness matter?

From the first study to directly evaluate this issue, Erika von Mutius, a highly respected researcher in this field, concludes – No. “Development of allergies and asthma is not related to cleaning activities”.

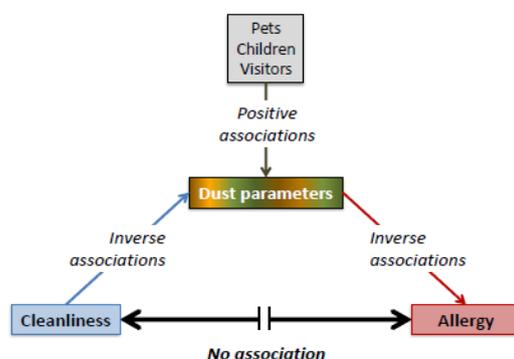
She explains, “The so-called hygiene hypothesis is still widely accepted in the public domain to explain the rapid rise in allergic disorders in affluent populations. Originally conceived as a lack of infections predisposing to allergies, the hygiene hypothesis is still often reduced to concepts such as ‘eat dirt’, ‘too clean is bad’, or ‘sterile homes’. To a lay audience, the U.S. Food and Drug Administration explain the hygiene hypothesis in terms of “the extremely clean household environments often found in the developed world.”

What is overlooked is the fact that the relationship between household or personal cleanliness and development of allergies has never been properly investigated or established.

In this new study information on home or personal cleanliness and allergic health conditions at school age was collected in a birth cohort of 399 families. Bacterial markers were assessed in floor and mattress dust, whilst standards of home and personal cleanliness, and prevalence of asthma and allergic diseases were assessed by questionnaires. Cleanliness variables against indoor dust markers were tested and the protective effects of dust markers on asthma and allergic conditions confirmed.

Bacterial exposure in house dust was found to be associated with reduced risk of childhood asthma and allergies whilst personal cleanliness, such as washing hands, and home cleanliness were objectively reflected by dust parameters in homes. However, neither personal nor home cleanliness were associated with protection from asthma and allergies.

Mutius et al concluded, “Recontamination by hands, skin, or textiles leaves conventional cleaning a Sisyphean labour and dismisses the idea of ‘excessive cleanliness’ and ‘sterile homes’ as a cause of allergy.



Note: Although the results suggest that neither home nor personal cleanliness impact on development of asthma and allergies, cleanliness, in this study, was substantiated by objective, but rather unspecific dust measurements. The findings suggest that allergy protection operates through as yet unknown microbial exposures, which cannot accurately be assessed by unspecific markers. Future studies will require more

detailed microbial exposure analyses capturing identification of species and functional aspects. Whether these are affected by cleaning activities remains to be elucidated; the

findings with unspecific markers, however, suggests that normal cleaning does not affect permanent microbial colonization of indoor environments. The study can be found at: *Am J Respir Crit Care Med.* 2015 Jan 13. [Epub ahead of print]

Do antibiotics increase the risk of asthma? A debate set to continue

In a new paper Dharmage, University of Melbourne review the data on this issue. They summarise their conclusions are as follows:

While epidemiological and other studies suggest a link between antibiotic exposure and asthma and allergies, the findings to date do not provide conclusive evidence for a causal link. To date, researchers have either analysed the existing data within longitudinal studies or used registry-based data. Both these approaches suffer from a lack of comprehensive information with which to tease out confounding by indication. As it is not feasible to conduct randomised controlled trials, population-based longitudinal studies specifically designed to answer this particular question are needed to resolve this debate.

If this link is established, including understanding which specific classes of antibiotics are implicated, it provides a plausible mechanism concerning the aetiology of asthma and the allergy epidemic and will inform clinical guidelines on antibiotic prescribing. As evidence mounts concerning antibiotics and their potential role in allergy promotion through disturbance of the gut microbiome and subsequent impairment of immune programming in young children, there is increasing interest in the potential role of pre- and probiotics for treatment and prevention of allergic diseases. This review can be found at: *Clinical & Experimental Allergy*, 2014; 45, 6–8.

7. Antibiotic resistance and hygiene

Superbugs to kill 'more than cancer' by 2050

A new report is featured in recent news: <http://www.bbc.co.uk/news/health-30416844> that says, "Drug resistant infections will kill an extra 10 million people a year worldwide – more than currently die from cancer – by 2050 unless action is taken. They are currently implicated in 700,000 deaths each year. The analysis, presented by the economist Jim O'Neill, said the costs would spiral to \$100tn (£63tn). He was appointed by Prime Minister David Cameron in July to head a review of antimicrobial resistance.

Mr O'Neill told the BBC: "To put that in context, the annual GDP [gross domestic product] of the UK is about \$3tn, so this would be the equivalent of around 35 years without the UK contribution to the global economy." The reduction in population and the impact on ill-health would reduce world economic output by between 2% and 3.5%. The analysis was based on scenarios modelled by researchers Rand Europe and auditors KPMG.

'Superbugs' kill India's babies and pose an overseas threat

An article in the *New York Times*, Dec 3rd looks at the problem of antibiotic resistance in India. A study has shown that, more than 58,000 infants died last year as a result bacterial infections that are resistant to most known antibiotics. While that is still a fraction of the nearly 800,000 newborns who die annually in India, Indian paediatricians say that the rising toll of resistant infections threatens efforts to improve India's infant death rate. Nearly a third of the world's newborn deaths occur in India. Doctor say "Five years ago, we almost never saw these kinds of infections," "Now, close to 100 percent of the babies referred to us have multidrug resistant infections".

The evidence is now overwhelming that a significant share of the bacteria present in India – in its water, sewage, animals, soil and even its mothers – are immune to nearly all

antibiotics. A recent study found that Indian children living in places where people are less likely to use a toilet tend to get diarrhoea and be given antibiotics more often than those in places with more toilet use. Doctors say “In the absence of better sanitation and hygiene, we are forced to rely heavily on antibiotics to reduce infections”.

Besides being desperately crowded, many hospitals are unhygienic. A Unicef survey of 94 district hospitals and health centers in Rajasthan last year found that 70% had contaminated water and 78% had no soap available at hand-washing sinks, while 67 percent of toilets were unsanitary. One doctor said “In Haryana, for instance, almost every baby born in hospitals in recent years was injected with antibiotics whether they showed signs of illness or not”. All those drugs create resistant bacteria that find their way into hospital sewage, which is mostly dumped untreated into rivers, canals and pits in the surrounding community.

While far from alone in creating antibiotic resistance, India’s resistant infections have begun to migrate elsewhere in the world. “superbugs” carrying a genetic code first identified in India – NDM1 (New Delhi metallo-beta lactamase 1) are now found in many countries including in France, Japan, Oman and the United States.

<http://www.nytimes.com/2014/12/04/world/asia/superbugs-kill-indias-babies-and-pose-an-overseas-threat.html?hp&action=click&pgtype=Homepage&module=second-column-region®ion=top-news&WT.nav=top-news&r=0>

Two million reasons India should restrict antibiotics

An article in Business Standard says “Seeking quick, cheap solutions to colds and fevers threatens to place two million Indians at risk of dying every year by 2050”. It also quotes levels of resistant bacteria in poultry in India, which is a concern in relation to home hygiene.

Earlier this year, 40% of poultry samples tested for 6 antibiotics by the Centre for Science and Environment, a Delhi-based advocacy, tested positive for antibiotic residue; 22.9% of the samples contained residues of one antibiotic and 17% had residues of more than one. “Antibiotic-resistant bacteria could develop in the chicken itself and get transferred to humans eating meat,” said Chandra Bhushan, CSE’s deputy director general, “or, it (resistance) could develop in humans ingesting or handling tainted meat, as the body is continually subjected to the antibiotic”. The article can be found at: http://www.business-standard.com/article/beyond-business/2-million-reasons-india-should-restrict-antibiotics-114122600567_1.html