IFH Newssheet (www.ifh-homehygiene.org)

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1. Latest from IFH

New IFH fact/advice sheet: How to avoid getting sick at the office this winter

Once someone in the office goes down with a cold, the flu, or the winter vomiting norovirus, the infection can spread very quickly to others. We tend to accept this as inevitable, but by understanding how these viruses spread, and by following common sense hygiene measures, we can do a lot to reduce the risks of these infections spreading.

IFH has produced an advice sheet on how these viruses spread and the simple measures we can use to reduce the risks of spread in the office environment. It is for those who work in healthcare professions, the media, those with responsibility for giving guidance to the public, and for the public themselves.

The fact sheet can be found at: http://www.ifh-homehygiene.org/factsheet/how-avoid-getting-sick-office

2. Other news and new research

New study: Reducing risks of Salmonella infection from kitchen cleaning clothes

Increasingly there is demand for data which directly quantifies the impact of hygiene interventions on infection rates. In the domestic setting, infection transmission involves a number of interrelated pathways, which makes it impossible to quantify relative infection risk of individual critical control points such as high frequency contact surfaces and clothes. In recent years, Professor Gerba, Dr Chaidez and colleagues have developed Quantitative Microbial Risk Assessment methods to estimate the impact of domestic hygiene procedures such as hand and laundry hygiene on infection rates.

This latest study, carried out in urban Mexican homes, evaluates infection risk due to hand-to-mouth exposure to Salmonella sp. in kitchen cleaning clothes using a dynamic exposure model.

Occurrence of Salmonella was studied in clothes taken from 60 homes over six weeks. In half of these homes, clothes were disinfected with a sodium hypochlorite disinfectant cleaner. Overall, Salmonella was absent in 1.1% and 3.89% of test and control group households, respectively, with bacterial counts up to 10^5 (MPN) in control clothes and 10^3 in treated clothes.

The survey used published estimates of transfer rates of Salmonella from clothes to hands and from hands to lips, surface touch rates, infectious doses, etc. On this basis, it was calculated, using standard QMRA methods, that yearly risks of infection for the kitchen cleaning clothes for the control group ranged from 0.0023 to 0.096 depending on the number of surfaces touched before touching the mouth. This is higher than the guidance for acceptable risk of waterborne Salmonella infection, defined as 1:10,000 (0.0001) per year.

In the USA, the yearly risk of clinical illness from Salmonella for both reported and unreported cases is estimated at 0.0045. A reduction greater than 98% of the probability of Salmonella infection was observed between cleaning clothes used by non-disinfectant users and disinfectant users under all scenarios of number of clean surfaces touched on yearly basis. The authors conclude that the risks of infection could be further reduced by developing more effective procedures for reducing Salmonella in cleaning clothes.

The study can be found in Letters in Applied Microbiology. 2014;59:487–492.

Almost waterless laundering of domestic laundry – but what about hygiene?

This article features an interesting new approach to sustainable laundering. The new formulation contains about 1.5 million small, white nylon beads which are added to the machine wash load. The beads rub against the clothes in up to 70% less water – just enough moisture for the water to dissolve the stains on clothing and temporarily alter the molecular structure of the polymer beads.

The researchers say “stains are just charged molecules that you want to get rid of, and this polymer [bead] has the ability to attract stains, then absorb them and lock them away." The bead technology also needs about half the amount of detergent to work – and uses up to 50% less energy – than a conventional commercial washing machine. It is claimed to clean as effectively as a hot cycle, but in cold. However there is no mention of whether and to what extent microbes are removed, relative to normal wash cycles.

The article can be found at: http://www.cbsnews.com/news/almost-waterless-washing-could-come-to-american-homes/

Freezing chicken can cut risks of campylobacter food poisoning

UK food safety experts say that freezing chickens could significantly reduce the chances of people catching the food poisoning bug campylobacter. In the UK the number of reported cases of campylobacter infections is 60,000, but the real figure is thought to be closer to half a million as people often choose not to visit their doctors when they are ill.

A study has now shown that freezing chickens contaminated with campylobacter can bring about a 90% reduction in the number of campylobacter cells. A survey carried out by the UK Food Standards Agency (FSA) previously found that campylobacter was present in 59% of birds tested, and in 4% of samples it was identified on the outside of the packaging. Freezing does not happen in the UK, partly because customers prefer chilled or fresh chicken, rather than frozen produce. However processors are also looking at other methods of intervention, such as using steam, ultrasound and "quick-blast chilling", which are known to reduce the number of campylobacter cells on chickens.

More details can be found at: http://www.telegraph.co.uk/health/11239631/Freezing-chicken-can-cut-risks-of-food-poisoning-bug-say-scientists.html

https://www.food.gov.uk/science/research/foodborneillness/b14programme/b14projlist/fs101025

ESBL – producing *E. coli*: a threat from the kitchen

A growing body of evidence indicates the presence of antibiotic resistant ESBL-producing Enterobacteriaceae in retail meat and food animals worldwide. During 2011 and 2012, cutting boards used in the kitchen of Basel University Hospital, Switzerland were examined after handling raw poultry and before being cleaned. Cutting boards from private households in Switzerland, France, and Germany were also tested.

Of the cutting boards from the hospital kitchen, 15.6% (10/64) were positive for ESBL-producing *E. coli*, and 50% of gloves used during poultry handling were also contaminated. In addition 8.3% of cutting boards from private households were contaminated. The results reflect reports of detection of CTX-M-1 ESBLs in up to 78% of chicken meat. The fact that none of the cutting boards used for preparation of other raw meats in this study tested positive mirrors the absence of ESBL-producing strains in meat from pigs and cattle. The results indicate the importance of strict hygiene measures during handling and preparation of raw poultry in the kitchen.

Risks are highlighted by a recent food-borne nosocomial outbreak due to ESBL-producing *K. pneumoniae.* Up to 35% of the screened hospital kitchen surfaces or foodstuffs were found to be contaminated, and 14% of food handlers were revealed as rectal carriers.

The report can be found in Infection Control and Hospital Epidemiology. 2014;35(5):581-584.

Adenovirus and norovirus on surfaces within the healthcare environment

A new study shows that adenovirus (AV) and norovirus (NV) can be found on hospital ward surfaces even in the absence of an outbreak. Screening was carried out (using PCR methods) weekly for six months in two paediatric wards in a London Children's Hospital. Over this time 13 (2.4%) of samples were positive for adenovirus (AV) (four samples) or norovirus (NV) (nine samples). Ten of the positive samples were floor swabs. Nonfloor positive samples were NV recovered from a filing cabinet, sluice door handle, and notes trolley.

Further sampling in rooms occupied with AV-infected children showed that all cubicle screening sites and almost all swabs were contaminated with AV. Sampling in a day unit showed that 13% of samples were positive. Of 90 samples taken, 11 were AV positive, and one was NV positive. Positive sites included a clinical waste bin lid, surfaces of toys, two chair arms, two door handles, one fan, two clinical surfaces and one waste bin.

The authors concluded that cleaning and environmental interaction strategies must therefore be designed to control nosocomial transmission of viruses outside of outbreak scenarios. The study can be found at: American Journal of Infection Control 42 (2014). 1229-32.

A report in Lancet Infectious Diseases (2014;14:664-5) concluded that norovirus infection is associated with 14% of all cases of gastroenteritis worldwide. It is estimated that the global prevalence of norovirus in the healthy population is about 7%. In developing countries, estimates suggest that 200,000 deaths in children under five years old are due to norovirus.

Door handles and microbial transmission

A study of door handles and push plates in two hospital intensive care units showed a significant correlation between the frequency of movements through the door and the degree to which it was contaminated ($p = 0.01$). The study showed that the door's location, design and mode of use all influenced contamination. When compared to push plate designs, pull

handles revealed on average a fivefold higher level of contamination; lever handles, however, displayed the highest levels of bacterial contamination when adjusted for frequency of use.

The authors conclude that, whilst door handle design may appear trivial at the design stage of a building, and be largely ignored, it is one of many ‘‘trivial’’ design features that might silently undermine microbial transmission control. The study can be found at: PLoS ONE 2012; 7(10): e40171. doi:10.1371/journal.pone.0040171

3. “Hygiene hypothesis” and hygiene

As our understanding of the so-called “hygiene hypothesis” increases, new knowledge about the microbial world we live in and interact with is beginning to show how we can sustain the interaction with our microbial world which is important for gut health and our immune system, whilst at the same time protecting ourselves from pathogens which cause diseases.

How microbes live and build stable ecosystems in public washrooms

After scanning four public restrooms in San Diego recently, a team of researchers found a diverse mix of microbes that persisted for months despite regular cleaning of the facilities. At the start of the study four restrooms were thoroughly cleaned with bleach solution, which killed any existing germ communities.

During the following hours, days, weeks and months of human use, the researchers periodically sampled soap dispensers, floors and toilet seats for microbes using genetic sequencing technology. Within one hour, restrooms were recolonized with microbes. Fecal bacteria dominated, including on toilet seats and on soap dispensers. About 45% of the bacteria there were of fecal origin. In all, genetic traces of more than 77,000 distinct types of bacteria and viruses were found.

Patterns of regrowth and succession, as some species waned and others replaced them, were surprisingly similar from bathroom to bathroom; within just five hours the population mix in each room stabilised.

When the team tried growing cultures from different surfaces in each room, they found one set of live bacteria in overwhelming abundance: *Staphylococcus*. Even after some of the bathrooms were closed, these human-generated communities of microbes continued to thrive.

‘Staphs’ are common on human skin and inside the nose and other orifices; they generally cause no problems, or trigger only minor skin infections. The authors noted that none of the live Staph strains were antibiotic-resistant. Although restrooms that were left open for use for up to two months were cleaned regularly with soap and water, the communities of microbes found there remained relatively unchanged throughout the study.

The full study can be found at http://aem.asm.org/content/early/2014/11/10/AEM.03117-14.abstract

World’s first museum of microbes opens in Amsterdam

Micropia, the world's first "interactive microbe zoo" opened in Amsterdam on October 7. The generally held view about the invisible micro-world is a negative one. There is a serious knowledge gap between the science and the general public. "We want to display micro-nature," said Haig Balian, the museum’s director, who believes the importance of microbes in our daily lives is largely ignored.

In the public's mind, "Microbes are most often associated with illness, through viruses, bacteria, fungi and algae. The aim of the museum is to show how, in reality, they are also essential for our survival and will play an increasingly important role in human health and the planet's future. Balian said "We want to show visitors how everything in nature is interconnected and how fundamental microbes are as a part of that connection."

The human body carries around 1.5 kilos of microbes, and we would die without them. "A visit to Micropia will forever change the way you see the world," said Balian. For more details go to http://www.micropia.nl/en/

One kiss 'shares 80 million bugs'

A single 10-second kiss can transfer as many as 80 million bacteria, according to Dutch scientists. They monitored the kissing behaviour of 21 couples and found those who kissed nine times a day were most likely to share salivary bugs. Studies suggest the mouth is home to more than 700 different types of bacteria – but the report reveals some are exchanged more easily than others.

The Dutch scientists worked in collaboration with the museum Micropia, the world's first museum of microbes, described above. In its newly opened exhibition, couples are invited to share a kiss and are provided with an instant analysis of the bugs they have exchanged. This is just another example of the growing number of studies which are looking at the human microbiome – an ecosystem of some 100 trillion micro-organisms that live in and on our bodies.

The full article can be found at: http://www.microbiomejournal.com/content/2/1/41

4. Antibiotic resistance and hygiene

Superbugs to kill 'more than cancer' by 2050

A new study on superbugs was recently featured on the BBC. The article said "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 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.

The full BBC article can be found at: http://www.bbc.co.uk/news/health-30416844

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

An article in the New York Times on December 3 looked 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. Doctors say "Five years ago, we almost never saw these kinds of infections… Now, close to 100% 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% 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 France, Japan, Oman and the United States.

The full article can be found at: 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&region=top-news&WT.nav=top-news&_r=0

Promoting respiratory hygiene could reduce the need for antibiotic prescribing

A new European study suggests frequent inappropriate antibiotic prescribing in the treatment of mostly viral respiratory infections. The study, which was carried out in UK, the Netherlands, Denmark, Italy and Germany, showed that antibiotic prescription rates were lowest in July and August, and rose continuously until reaching their peak between December and March of the following year.

The authors concluded that the strong increases of antibiotic prescriptions during winter months in high-utilising countries such as Italy most likely result from frequent antibiotic treatment of mostly viral infections. Prescription rates were highest among children in the age group ≤4 years in all countries, predominantly due to high use of broad spectrum penicillins.

The study suggests that promoting good respiratory hygiene amongst children could reduce the need for antibiotic prescribing. Good respiratory hygiene means:

- Blocking cough and sneezes (preferably with a tissue)
- Disposing of tissues immediately and safely
- Washing your hands

Remember that respiratory viruses are easily spread to others via hands and hand contact with surfaces.

The study can be found at: http://www.biomedcentral.com/1471-2431/14/174

5. New resources

Ebola: what you need to know

Ebola is a serious and potentially fatal disease. Because of this, many people are concerned about the current outbreak despite the fact that in places like the US and Europe, contracting Ebola is very unlikely. Ignorance about a disease, however, tends to foster fear.

This useful fact sheet is part of the American Public Health Association's ongoing “Get Ready” campaign – intended to help Americans prepare themselves, their families and their communities in advance for disasters and hazards should the situation ever arise, including pandemic flu, infectious diseases, natural disasters and other emergencies.

The fact sheet can be found at: http://www.getreadyforflu.org/EbolaFacts.htm

Caring for your PICC line at home

Patients who have a PICC (Peripherally Inserted Central Catheter) line put in their arm need to know some key facts about it. This line is used for intravenous therapy such as medications, blood transfusions, extra fluids, or nutrition that they will need over an extended period of time.

Their healthcare provider will give them specific instructions on how to care for their PICC line, but this fact sheet (produced by the US Association of Practitioners in Infection Control) provides some additional tips:
http://apic.informz.net/informzdataservice/onlineversion/ind/bWFpbGluZ2l...

CHICA-Canada practice recommendations: Cleaning and Disinfection of Non-critical Multi-Use Equipment/Devices in Community Settings

The purpose of this practice review is to provide infection prevention and control recommendations to reduce the risk of transmission of infection from non-critical equipment used in community practice settings (which may include but is not limited to home visits, ambulatory clinics, physician offices, outreach settings, supportive and facility living sites).

The resource can be found at: http://ipac-canada.org/links_non-acute.php