

Why is hygiene important?

Developing a risk-based approach to hygiene in home and everyday life

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Why is hygiene in home and everyday life important?

- Infectious disease circulating in the community - heavy burden on health
- Much preventable by good hygiene in homes and everyday lives – GI, RT, skin, eye infections
- ID issues usually considered in isolation – only when looked at together the extent of hygiene preventable ID burden can be seen



Infectious intestinal disease

- Foodborne disease
 - remain at unacceptable levels
 - Europe - about 40% of foodborne infections occur in the home
 - “Foodborne illness almost 100% preventable” (WHO)
- Food is by no means the only cause of IID
 - norovirus – mostly non foodborne
 - 19% of *Salmonella*, >50% of *E. coli* O157 outbreaks are “non-foodborne”
- UK data from community-based studies (Tam et al 2011) suggests
 - UK - 17 million cases of IID pa, 1 in 4 people
 - UK norovirus – 3 million

Respiratory tract infections

- Common cold - most frequent, infectious illness in humans.
 - rhinovirus (cold viruses), RSV
- Influenza - more serious - less prevalent
- Increasing evidence of spread via hands and surfaces
 - promotion of good respiratory hygiene
 - Catch it, bin it, kill it campaign
- Common respiratory and intestinal infection are mainly viral - not treatable by antibiotics, prevention is key

Common RT and GI infections in the community

- tend to be regarded as merely a “nuisance” - but
 - significant burden on economy through absence from work/school
 - serious/fatal for “at risk” groups - may need hospitalization
- IDs can act as co-factors in other diseases that manifest at a later date
 - cancer, chronic degenerative diseases
 - Campylobacter – Guillame Barre
 - trigger for asthma.



ID risk in the community is increasing

- Increasing “at risk” groups needing special care
 - Up to 1 in 5 people in the European community
 - Including - otherwise healthy - elderly, very young, pregnant
 - underlying disease: HIV/AIDS, diabetes
- Increasing healthcare at home /in community
 - shorter hospital stays
 - home-based treatments: chemotherapy, dialysis etc
 - Much of healthcare is by family members who thus need good knowledge of hygiene
 - food hygiene, respiratory hygiene are also important

Emerging infections/ new strains

- Prior to 1980 – Campylobacter, norovirus, Legionella, *E. coli* O157 unheard of
- Constant emergence of new strains. e.g.
 - SARS
 - Influenza “pandemic” strains
 - *E. coli* O104
- Hygiene seen as the first line of defense before other measures e.g vaccines can be put in place
- Campylobacter – up to 60% chickens contaminated/UK 280,000 cases pa - hygiene still a “first line of defense”!
- Antibiotic resistant strains emerging in the community
 - Community MRSA strains
 - ESBL-producing enterobacteria

Antibiotic resistance and domestic hygiene

- Hygiene now seen as a central strategy to reducing AR
- Prevention through hygiene:
 - reduces the need for antibiotic prescribing
 - Reduces “silent” spread of AR strains such as MRSA, NDM-1



The cycle of infection

- Health agencies now accept that reducing infection in healthcare etc settings cannot be achieved without also reducing circulation of pathogens (norovirus, MRSA etc) in the community.
- To be effective and sustainable – hygiene must involve everybody – must be a shared responsibility



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

- Established 1997 - not-for profit, non-government organisation.

Primary objective:

- Developing and promoting hygiene in home and everyday life settings based on scientific principles

IFH Website offers:

- Scientific reviews, guidelines, training resources, fact/advice sheets available from IFH website



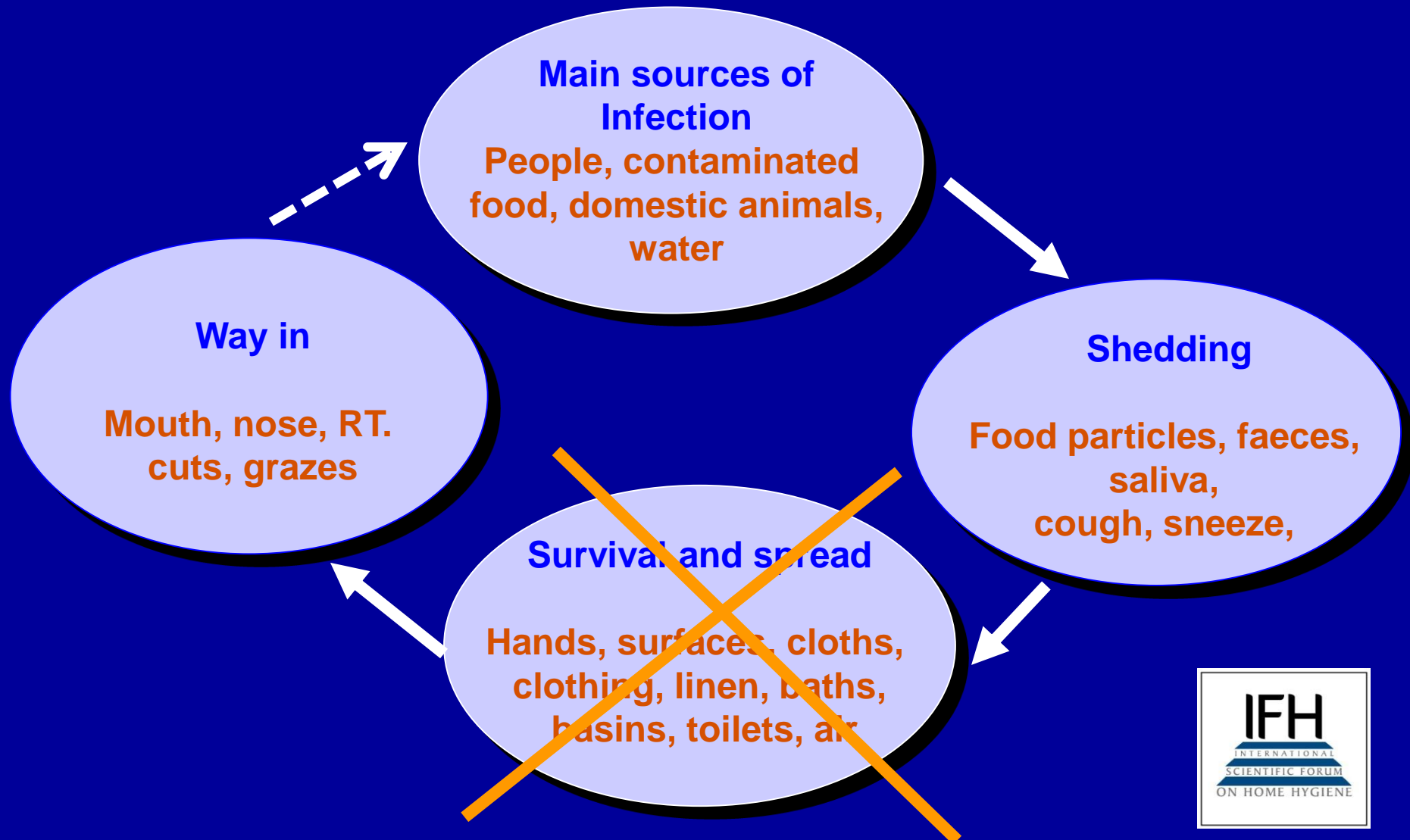
IFH targeted approach to hygiene

- IFH has developed a “new” approach to hygiene in the home and community
- Based on risk management approaches - now the standard approach to control microbial risks in food and pharmaceuticals
 - means identifying critical points and targeting hygiene at these risk points
- Known as “targeted hygiene”.



Targeted hygiene: the chain of infection

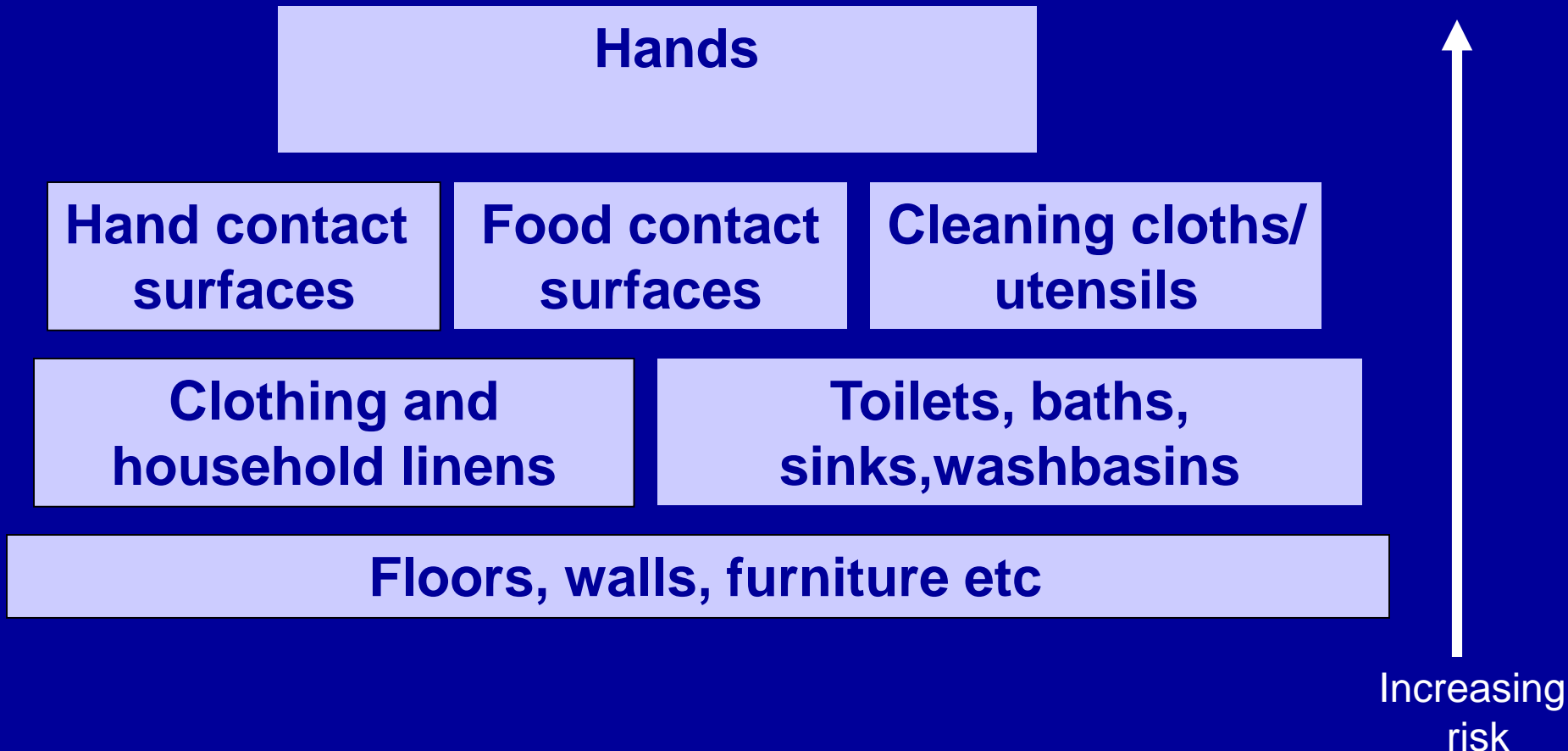
Breaking the chain of Infection



Developing a “targeted” approach to home hygiene

- Critical control points identified by assessing microbiological data for each site or surface to determine:
 - Is it likely to be contaminated with pathogens/harmful microbes?
 - Are the pathogens likely to be spread from the site or surfaces such that family members become exposed to “infectious dose”?

Identifying critical points



Hygiene for the 21st Century

- Hygiene in our homes and everyday life is **NOT** about
 - getting rid of the germs that “lurk” in our homes
 - unfocussed “once weekly deep down clean”

But about intervening in the placers and at the times that matter to **stop the spread of germs**

e.g food hygiene, respiratory hygiene, hygiene associated with using the toilet, pet hygiene, disposal of refuse

Targeted hygiene: breaking the chain of infection

means “hygienic cleaning” to eliminate
pathogens from critical sites before
they can spread further

What methods are available for “hygienic cleaning”

- Regardless of surface (hands, surfaces, fabrics etc) this can be achieved either by:
 - **removal**, using cleaning products (e.g detergents or soap) and cleaning utensils, and running water
 - **Inactivation in situ** using products/processes i.e. heat, UV light, disinfectants, hand sanitizers
 - Using **combined removal and inactivation**, sequentially or together e.g laundering and dishwashing.
- Purpose - to reduce the number of organisms on critical sites/surfaces to acceptable safety target level - to break the chain of infection

Preparing a meal with a chicken contaminated with Salmonella or Campylobacter – study 1

	Percentage of sites contaminated with Salmonella and/or Campylobacter			33% contaminated sites had >1000 cfu/sample area
No of participants in each group = 20	After Meal Preparation	After Cleaning with Soap and Water	After Cleaning with soap and water + hypochlorite disinfectant	
Hands, chopping board, Utensils Dishcloth	17.3%	15.3%	2.3%	
Sink ,taps, Fridge, door handles etc				

Meal preparation using chicken contaminated with Salmonella or Campylobacter – study 2

		Percentage of sites contaminated with Salmonella and/or Campylobacter	
		After food prep. & After cleaning c. soap and water	After food prep. & after cleaning c. soap and water + rinsing
	Hands, chop board, Cloth,	28% (120)	12.5% (120)

Cogan, Bloomfield and Humphries, Letters in Appl.Microbiology 1999, 29,354-358



Contaminated foodstuffs as a source of infection in the home

Prevalence in raw chickens

- UK: Salmonella 10.7%, Campylobacter 60%;
- Europe : Salmonella 2.3-12%, Campylobacter 0-95%

Survival

- 4 - 24hrs on surfaces


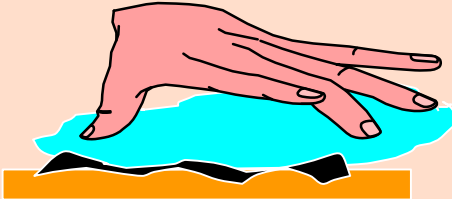
Infectious dose

- *Salmonella*: 10^2 to 10^6 cfu - risk amplified by transfer to food or wet cloths
- *Campylobacter*: 100-500cfu

Outcome

- UK 280,000 cases pa *Campylobacter*, 38,000 *Salmonella*,
- 40% at home

Effectiveness of hygiene procedures in eliminating norovirus from hand & food contact surfaces (N = 14)

Inoculate c. Norovirus in faecal suspension	Wipe c. clean cloth ↓ - sample surface & cloth	Use cloth to wipe another clean surface ↓ Sample surface, cloth, hands
		
Clean x 1	100% +ve	100% +ve
Clean x 2	100% +ve	100% +ve
Clean and disinfect c. bleach	0% +ve	0% +ve

Surfaces sampled using RTP-PCR

Infected family members as a source of norovirus infection in the home

Virus shedding

- Vomiting incident may produce 30 million norovirus particles,
- Continued shedding for 2 or more weeks after infection

Survival

- hours --> days on surfaces

Infectious dose

- norovirus 6-10 particles

Outcome

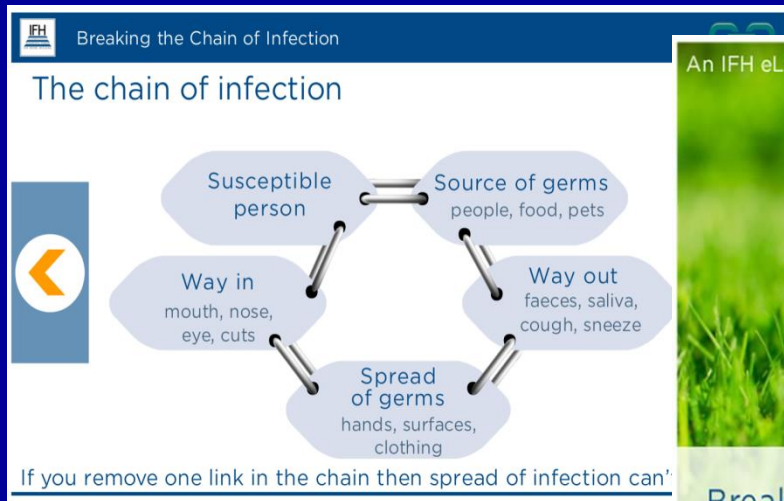
- UK --> 3 million cases pa, mostly person to person

A need to go back to basic principles?

- To break chain of infection - need to ensure hygiene procedures are effective
- Disinfectants and soap & water both have potential to make surfaces hygienically clean, but work differently
- A clean surface is not necessarily hygienically clean – must be cleaned in prescribed manner
- “hot soapy water is all you need” → false sense of security
- Whilst indiscriminate use of antibacterial products is unacceptable
- - microbiocidal products needed in risk situations e.g in domestic food hygiene

IFH online elearning resources

www.ifh-homehygiene.org



Putting targeted hygiene into practice is set out in this simple e-learning resource:

Breaking the chain of infection. https://www.ifh-homehygiene.org/e_learning/breaking_the_chain/story.html

Targeted hygiene and sustainability



Targeted Hygiene and Sustainability

- Protecting health by preventing infection intrinsically more sustainable approach than treatment.
- Hygiene measures must themselves be sustainable
- Issues need to be assessed and managed:
 - Environmental impact & human safety
 - Notion that “we have become too clean for our own good”
 - Continuous exposure to low level micro-biocides may induce biocide and antibiotic “resistance”



microbiocides and antibiotic resistance

- EU SCENIHR 2009 report:
 - “evidence **does** indicate that use of certain types of biocidal products in various settings **may** contribute to increased occurrence of antibiotic resistance”
- IFH/SCENIHR report/s on microbiocides and antibiotic resistance:
 - evidence is lab-based
 - Reduced susceptibility not “resistance”
 - no evidence that microbiocide use has contributed to antibiotic resistance in clinical practice
- Both IFH and SCENIHR reports stress:
 - important role of microbiocides
 - but – appropriate, prudent - targeted - use.



Controlling antibiotic resistance:

- Hygiene seen as a central strategy:
 - Reducing need for antibiotic prescribing
 - Reducing spread of AR strains
- It may be that targeted microbicide use could contribute to **reducing** antibiotic resistance by
 - Reducing need for antibiotic prescribing
 - Reducing spread of AR strains

Targeted Hygiene and Sustainability

- Targeted/HAL approach to hygiene provides a framework for building sustainability into hygiene

Because it:

- Focuses hygiene interventions to maximise infection prevention
 - avoids overuse of hygiene procedures and “overkill”
 - Minimizes impact on environment
 - Ensures prudent/targeted rather than indiscriminate use of antimicrobials
- Sustains “normal” exposure to microbial flora of environment -



Conclusions

Targeted hygiene - a framework for developing, promoting hygiene

- If we are to persuade opinion formers, policy makers regulatory authorities, environmentalists etc to endorse importance of hygiene and promote effective hygiene to the public, we must present them with well argued, scientifically supportable approach
- Targeted hygiene approach provides
 - a framework to do this
 - the framework for addressing sustainability issues



Changing consumer perceptions

- We will have limited success in changing hygiene behaviour - **unless and until** we resolve public misunderstandings about our microbial world and its relationship to health and disease:
- What are germs?
- What's the difference between dirty, clean & hygienically clean?
- The hygiene hypothesis misnomer
- Not just consumers – its endemic – extends to hygiene professionals, opinion formers, public health policy makers



Effective leadership for change

- Need for a lead agency to co-ordinate hygiene in home and everyday life
 - Current approach is too fragmented – advice often conflicting
 - Need to develop integrated approach which looks at hygiene from point of view of the family – e.g
 - hand hygiene is central to all aspects of HEDL hygiene
- Health professionals, environmentalists, immunologists, food agencies, regulatory bodies - public and private sector - need to work together
 - Environmental concerns take precedence over infection i
 - Lobby need for targeted use of disinfectants products
 - Without effective leadership on hygiene we will not achieve appropriate risk:benefit analysis

Hygiene education in schools

- EU-funded e-Bug project
- (www.e-bug.eu)
- Teaching pack for primary and secondary schools
- Aim – ensure all children in Europe leave school with basic understanding of hygiene and antibiotic resistance – chain of infection, hand, respiratory and food hygiene
- Translated into 27 European languages

