ARTICLE

At the recent Oxoid Infection Control Seminar, a keynote lecture focused on hospital-acquired infection and the lessons that might be learned from the food industry. Here, Professor Chris Griffith provides a resumé of his presentation.

Nosocomial infection
Are there lessons from the food industry?

Hospital cleaning and healthcare-associated (nosocomial) infection continue to command public attention and a high media profile. Agencies with an interest in the healthcare community have responded with a wide range of reports (Table 1). Table 2 compares two sets of media headlines, and despite some initial similarity, there are two key differences between columns A and B. Both report concerns about cleaning and particular pathogens; however, column A refers to the food industry and the headlines are from the late 1980s and early 1990s, while column B refers to hospitals and the headlines were written within the past 18 months.

Since those headlines appeared, the food industry, while by no means perfect, has developed a range of strategies to improve cleaning and reduce the risk of exposing consumers to pathogens via ready-to-eat foods. So, can healthcare establishments learn anything from the approaches used by the food industry?

Precautionary principle

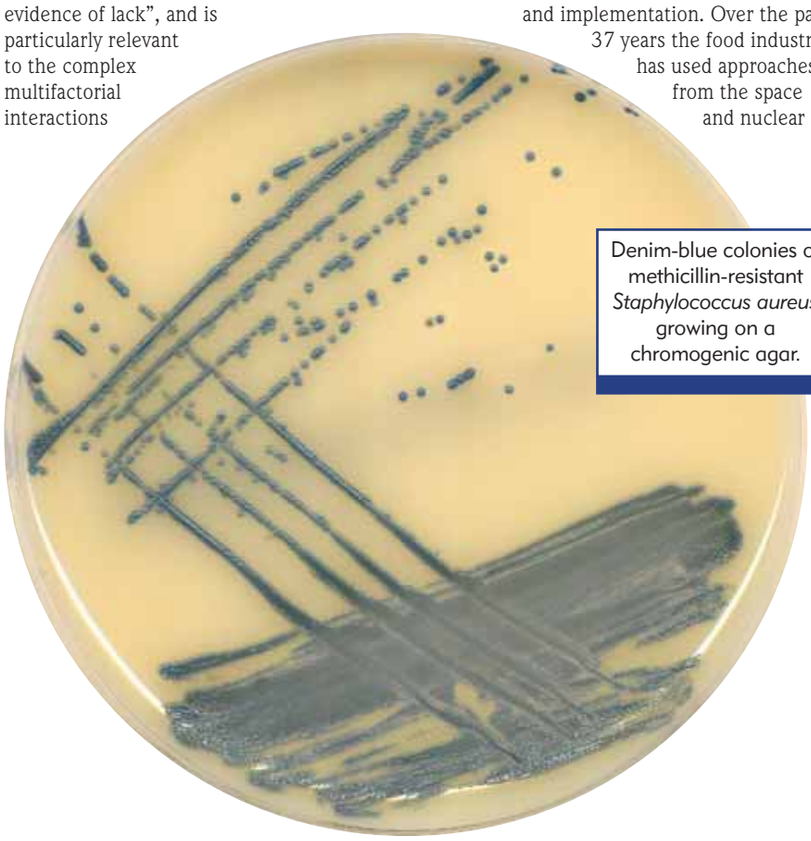
The fundamental philosophy underlying food safety legislation relies on the 'precautionary principle'. Tickner *et al.*[1] defined this principle as follows: "When an activity raises threats to human health or the environment, precautionary measures should be taken, even if some cause-and-effect relationships

'There is worldwide interest in better cleaning and the possible application of HACCP in infection control'

'The food industry has developed a range of strategies to improve cleaning and reduce the risk of exposing consumers to pathogens'

are not fully established scientifically". This can sometimes conflict with the evidence-based approach adopted by healthcare researchers. The dilemma can be described more trivially as "lack of evidence is not evidence of lack", and is particularly relevant to the complex multifactorial interactions between cleaning and other infection control procedures in relation to infection rates.

At a more practical level, both sectors have tried to adopt a risk-based approach to similar problems, although these differ in structure and implementation. Over the past 37 years the food industry has used approaches from the space and nuclear



Denim-blue colonies of methicillin-resistant *Staphylococcus aureus* growing on a chromogenic agar.

Table 1. A selection of cleaning and infection control reports by source and year.

EPIC project	DoH	2001
NHS Plan: clean hospitals	NHS: Estates	2001
Winning ways	CMO	2003
Standards of cleanliness in the NHS	NHS: Estates	2003
Infection control: prevention of healthcare-associated infection in primary and community care	NICE	2003
Audit tools for monitoring infection control standards	DoH	2004
Towards cleaner hospitals and lower infection rates	DoH	2004
A Matron's Charter: an action plan for cleaner hospitals	NHS: Estates	2004
Improving patient care by reducing the risk of HAIs: a progress report	NAO	2004
NHS healthcare cleaning manual	NHS: Estates	2004
Revised guidance on contracting for cleaning	NHS: Estates	2004
NHS Scotland National Cleaning Services Specification	NHS: Scotland	2004
Hospital contract cleaning and infection control	Unison	2005
A snapshot of hospital cleanliness in England	Healthcare Commission	2005
Healthcare-associated infections	BMA	2006

industries and has evolved dual system based on the equation PRP + HACCP = SF, where PRPs are prerequisite programmes (general risk management), HACCPs are hazard analysis critical control points (specific risk management) and SF is safe food

There is evidence that this dual approach leads to food of a better microbiological quality, and it is now a legal requirement for all food businesses in the EU to have a documented food safety management system, based on HACCP principles. However, how this is implemented within individual business can vary considerably.

Some differences between PRPs and HACCPs are seen in Table 3. The HACCP approach is a specific risk management approach originally devised for food manufacturing. It is still evolving and being adapted for use in different sectors of the food chain, including retail and catering. It is also being adapted for use in healthcare,[2] and it is even possible to map the dual strategy of the food industry against elements of Winning Ways and Healthcare Commission Standards.

General environmental cleaning, following the food analogy, would be considered a prerequisite programme. The presence of pathogens (eg Listeria, Salmonella etc) on environmental surfaces in a food plant would be greeted with great concern. However, the presence of methicillin-resistant *Staphylococcus aureus* (MRSA) or *Clostridium difficile* might be greeted with a far less robust response if the publication *Control of HI: A Practical Handbook* (4th edn, 2000) is anything to go by, when suggesting that the inanimate environment of the hospital has little importance in the spread of endemic hospital infection, but occasionally may have a role in outbreaks.

'The NHS in Scotland recognised that observational evidence in judging cleaning efficacy is subjective and of questionable validity'

Effect of the environment

It is beyond the scope of this article to review the evidence linking the role of a contaminated environment to infection rates, and in any case this is likely to vary between different pathogens. However, numerous papers over the years have explored this link, and several published since January this year are perhaps evidence of a shift in opinion regarding its importance.[3–5]

'It is a legal requirement for all food businesses in the EU to have a documented food safety management system'

Infection rates apart, proper cleaning is important for other reasons not least of which are those that relate to public perceptions and value for money. Hospital cleaning costs a significant amount of money and trusts need to know they are getting value for money.

Differences in approaches to monitoring cleaning efficacy between the two sectors are summarised in Table 4. One key difference is the use and value of visual assessment of surface cleanliness, which drives most of the inspections and audit approaches used in healthcare. For example, the Revised Guidance on Contracting for Cleaning sets out a revised national specification for cleaning within a risk framework, and places great emphasis on how to use visual assessment in technical and managerial audits. The latter are inspections rather than audits, as highlighted by the fact that they "focus more on cleaning outcomes (albeit visual) rather than the method by which they are achieved".

The NHS in Scotland recognised that reliance on observational evidence in judging cleaning efficacy is subjective and may be of questionable validity. While useful as an initial stage, a wealth of data from the food industry, and some from healthcare, indicate visual assessment in isolation can be very misleading and can seriously overestimate cleaning efficacy. In recognition of this, the food manufacturing industry has attempted to

Table 2. Media headlines.

HEADLINES A	HEADLINES B
"Premises closed due to dirt and filth"	"I was shocked at hygiene standards"
"Manager imprisoned for hygiene failures"	"Domestics only cleaned the parts visitors could see"
"Politician resigns over Salmonella"	"Hospital cleanliness an election issue"
"Danger of deadly disease – Listeria: Hysteria"	"MRSA superbug league tables"

Table 3. PRPs versus HACCP.

PRP	HACCP
Indirectly with food safety (patient health)	Directly with food safety (patient health)
General	Process-specific (procedure-specific)
Lower-risk food poisoning (HCAI)	High-risk food poisoning (HCAI)

define the term 'clean' more pragmatically using a more structured approach to managing cleaning, and uses a range of strategies and protocols for surface sampling and verification.[6] These are used as part of a strategy to prevent pathogen contamination of food.

Conclusions

The food and healthcare sectors show similarities and differences. Whether or not the approach used by the food industry can/will be adapted by healthcare remains to be seen; however, there is worldwide interest in achieving better cleaning and the possible application of HACCP in infection control. Ultimately, whether, how or when similar approaches will be adopted for healthcare will depend on their perceived benefits as well as the receptiveness of hospital administration, infection control and clinical staff.

Table 4. Comparison of approaches to monitoring cleaning efficacy between food and healthcare industries.

FOOD	HEALTHCARE
Isolation of pathogens from environmental surfaces causes concern	Isolation of pathogens from environmental surfaces may or may not cause concern
Environmental surface sampling in food manufacturing used as part of a preventative strategy	Environmental surface-sampling only likely to be used in response to an outbreak
Range of surface-sampling techniques used, including visual, microbiological and rapid methods in coordinated and integrated approaches	Assessment of cleaning efficacy dominated by visual inspections (ICNA, PEAT, Healthcare Commission etc)

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