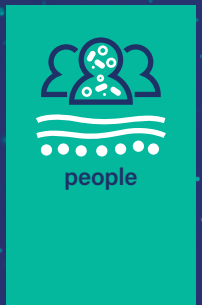
Inivos®

Are Infections Impacting Your Patient Flow

How Sunderland Hospital reduced their length of stay by 18%



Key Facts About Infections

Hospital Acquired Infections (HAIs) are an increasing challenge to both the quality of patient care and hospital performance.

Infections seriously impact a patient's quality of life and significantly increase mortality and co-morbidity rates, while studies from around the world demonstrate that infections considerably increase the cost of patient care and lengthen hospital stays.

Carbapenem-resistant Enterobacteriaceae (CRE), for example, have been cited to increase mortality rates by 40-50%[i]. Surgical site infections for cardiothoracic patients has been reported to increase length of stay anywhere from 48% up to 310%[ii].

The cost to the NHS of infections is estimated to be £1 billion per year [iii], enough to pay 46,000 Band 5 nurses [iv].

* See back page for references

Infections and the environment:

Why is decontamination so important?

- Environmental contamination plays a significant role in the transmission of HAIs, resulting in constant pressure to improve cleaning compliance and quality.
- Rooms previously occupied by a patient with a C. difficile infection (CDI) significantly raises contamination levels, increasing the risk of the next patient in the room contracting a CDI[v].
- Bacterial endospores, vegetative bacteria, and some viruses are able to survive on environmental surfaces for up to 5 months[vi].
- Manual cleaning alone has demonstrated a reduction of less than half of the environmental contamination on surfaces, according to several studies[vii].
- Deep cleaning in conjunction with automated decontamination has demonstrated significant long-term reductions of infection acquisition in acute hospitals[viii] with measurable improvements in patient outcomes, length of stay and cost of care.

In this Booklet

NSW GOVERNMENT Health
South Eastern Sydney Local Health District

Case Study:
ICU average patient length of stay reduced by 18%
Sutherland Hospital, Sydney, Australia

Background

The Sutherland Hospital Intensive Care Unit (ICU) developed an action plan in response to observance of anecdotal and equivocal increases in the level of multi-resistant organisms (MROs). The ICU is a 14 bed unit with only four single rooms. Before interventions, the Unit had an average patient stay of 4.9 days, and an MRO acquisition rate of 15.8/1000 occupied bed days (OBD).

Methods

In reaction to an increase in MRO acquisition, Sutherland Hospital used a number of intervention strategies, each of which has evidence-based support within the current educational and infection control literature. These included:

- A full manual environmental clean of every surface
- Education on the personal protective equipment (PPE) and hand hygiene
- Compliance with the new PPE requirements for all visiting medical teams
- ICU staff provided with education on single use equipment, PPE compliance and discharge cleaning protocols
- Use of ProXcide hydrogen peroxide decontamination on identified “hotspot” areas

Each strategy was implemented with staff education to enhance effectiveness through conscious cognitive understanding of each strategy’s importance, and was delivered with evidence-based literature supporting each intervention. Additionally, most interventions were implemented with two-way feedback before, during and after to improve staff comprehension and compliance with the intervention, as well as to implement their feedback and recommendations on how to improve it.

The endpoint measure of success for these interventions was not only to reduce the MRO acquisition rate or OBDs, but also improve the cost-effectiveness of the unit as measured in length of stay (LOS).

Results And Discussion

Initial manual environmental cleaning was effective in reducing MRO acquisitions/1000 OBD by 20, falling from 23 to 3, but incidences of cross-infection rose after this period and after subsequent manual cleaning programmes. The hospital resources were insufficient to prevent cross-infection through ongoing manual deep cleaning programmes. It proved impossible for cleaning staff to effectively decontaminate every surface or to effectively sterilize an environment using manual methods alone. The attitude taken by the hospital was that manual deep cleaning was not efficient or cost effective.

In reaction to the increase in MRO acquisition following the manual cleaning programme, Sutherland Hospital attempted a number of distinct intervention strategies, identifying firstly the mandating of PPE and strict changing protocols, and secondly the application of ProXcide hydrogen peroxide vapour decontamination to isolated bed areas. The objective of the hospital was to attain a consistent 0% acquisition rate. Having identified that three beds within the unit were serving as ‘hotspots’ for transmission and resulting in 6-8 acquisitions every month, it was deemed that inaction would be negligent.

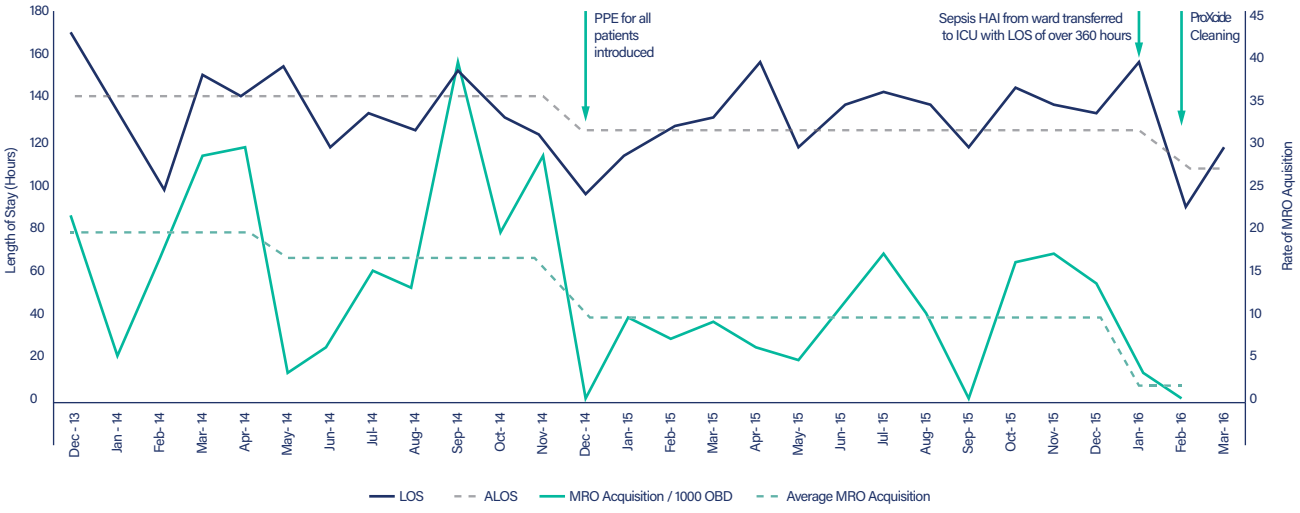
Results And Discussion Continued

MRO acquisitions were the most pressing issue prior to intervention, with 15.8 acquisitions per 1000 OBD. This ratio was reduced to 3:1000 following the introduction of PPE protocol, and subsequently reduced to a modal average of zero following the application of ProXcide, with 0 acquisitions in January and February, 2 in March and 0 in April, May and June 2016. Previously the highest incidence of MRO acquisition had been 31 during September 2014.

The introduction of PPE protocols resulted in a significant reduction in cross-infection, but after 12 months, hotspots were identified in which patients were acquiring MROs without having had any contact with previous patients or nurses. Before ProXcide decontamination, two consecutive months of acquisition at a rate of 13/1000 OBD were recorded. The combined effect of the strategies implemented by Sutherland Hospital was a reduction in MRO acquisition from 15.8 to 1.3 per 1000 OBD.

In terms of cost-benefit, in the calendar year of 2014, the number of MROs acquired was 60; while in 2015, this sharply reduced to 33. Demonstrated reduction in ICU LOS [Figure 2] (25 hours) also strengthens the cost benefit of implementing these MRO reduction strategies. The upfront investment is clearly beneficial.

Figure 1: MRO Acquisition and Patient Length of Stay on ICU



Conclusion

The results clearly demonstrate the impact of this strategy. This project has easy reproducibility and effective outcomes for patients and cost-management within the ICU.

Inivos's Technology

ProXcide

- Hydrogen Peroxide Vapour Decontamination (HPV)
- High-level decontamination, independently validated to log^6 reduction of pathogens, including C. Diff spores
- Self-calibrating for effective, validated decontamination every time
- Auto-adjusting to each decontamination environment to ensure the optimum decontamination parameters are achieved with each decontamination process
- Unique ultra-sonic vaporisation method enables high-level efficacy with low-concentration chemical, thereby ensuring compatibility with built environment

Ideal to be used for

- Reactive decontamination following high-risk infectious discharge e.g. C. Diff, CPE & VRE
- 'Project decontamination' of whole areas such as whole wards and speciality departments
- Contaminated patient equipment

Ultra-V

- Ultra-Violet-C Decontamination (UV-C)
- Rapid decontamination – approximately 30 minutes for a side-room and 15 minutes in a sluice
- No requirement for vapour-tight seal or isolation of air-flows on treatment room
- Calibrated, monitored and validated decontamination every time
- Decontamination report generated on every decontamination cycle

Ideal to be used for

- High-throughput areas such as ED, ICU and MAU
- Areas that are difficult to seal for hydrogen peroxide decontamination such as theatres
- Routine decontamination of communal areas e.g. toilets, sluices, kitchens and bathrooms
- As a step-down from hydrogen peroxide decontamination on a reactive basis

How Inivos can support you

On-call decontamination

- Specialist decontamination service delivered by Inivos engineers
- Tailored service for reactive decontamination requirements
- Available 24/7 to decontaminate the patient environment
- On-site within 8 hours of your request
- Supported by 24-hour helpline
- Scalable from single-room to whole-ward decontamination project
- Fully inclusive of all decontamination equipment and consumables

Managed decontamination service

- Long-term on-site service particularly tailored to the dynamics of your organisation
- Service delivered and managed by Inivos's decontamination engineers
- Service provided within agreed hours, available 24 hours per day, 365 days per year
- Full management of proactive decontamination programmes as well as responding to reactive needs
- Inclusive of all decontamination equipment, consumables and reporting

In-house implementation

- Supported implementation of technology in-house
- Full training and auditing provided by Inivos
- Equipment and software maintenance provided by Inivos
- Supported by 24 hour assistance and technical support

24 HOUR RAPID RESPONSE 0800 652 2689

i Vital Signs: Carbapenem-Resistant Enterobacteriaceae, CDC

ii Surgical Site Infections: How High are the Costs, E.C.J. Broex et al

iii Reducing HCAI-What the Commissioner needs to know, NHS England

iv Royal College of Nursing Pay Scales: https://www.rcn.org.uk/employment-and-pay/nhs-pay-scales-2015-16

v Comparison of the efficacy of a Hydrogen Peroxide dry mist disinfection system and Sodium Hypochlorite solution for eradication of Clostridium difficile spores. F. Barbut et al

vi Quarterly Epidemiological Commentary: Mandatory MRSA, MSSA and E.coli bacteraemia, and C. difficile infection data (up to October/December 2012). Health Protection Agency (HPA), 14 March 2013.

vii Effectiveness of deep cleaning followed by hydrogen peroxide decontamination during high Clostridium difficile infection incidence E.L. Best et al

viii Impact of cleaning and other interventions on the reduction of hospital-acquired Clostridium difficile infections in two hospitals in England assessed using a breakpoint model G.J. Hughes et al

ix National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis During Construction/Renovation Activities, NSDC

x Aspergillosis Case-Fatality Rate: Systematic Review of the Literature, L. Swu-Jane et al

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