

Innovations for MRSA control in a NICU population Harry Collins Award

Introduction

Healthcare-associated infections result in significant morbidity and mortality while adding avoidable treatment costs.

During an outbreak investigation involving neonates, mothers and healthcare workers in Neonatal Intensive Care Unit (NICU), Methicillin-resistant Staphylococcus aureus (MRSA) isolates were characterised by a binary typing system, targeted infection control interventions were implemented, and the use of vaporised hydrogen peroxide pioneered to decontaminate the environment.

Aim

To reduce or eradicate healthcare-associated MRSA colonisation in NICU population and ultimately hospital-wide, reducing the risk to patients of potentially serious infection.

Method

- 31 MRSA-colonised babies were identified between May 2011 and April 2012
- all babies admitted, their mothers, staff and the environment were screened. Routine genotyping of MRSA isolates allowed identification of transmission and environmental contamination with the outbreak strain
- genotyping demonstrated several circulating (non-outbreak) strains and the primary virulent, outbreak strain
- colonised babies were placed on contact precautions and cohorted until discharge; zoning of patient areas was implemented; a unit-wide review of hand hygiene practices, education on '5 Moments of Hand Hygiene' and enhanced environmental cleaning of the MRSA-colonised patient rooms using vaporised hydrogen peroxide were implemented

Conclusion

The environment has long been underestimated as a potential transmission risk; this rapid, highly discriminatory, inexpensive MRSA typing system has redefined the role of environmental sampling in establishing links between environmental contamination and patient colonisation.

The use of vaporised H₂O₂ (Deprox) greatly increases the reduction in microbial load in the environment. As the premier hospital in Australia for this technology we are leading the way in incorporating the Deprox system into normal cleaning processes to avoid any future outbreak situations. Routine procedures now incorporate linking strain types of MRSA among patients, identifying possible transmission events and any causal links with environmental contamination.

Fig 1: Infection Prevention Bundle for control of MRSA

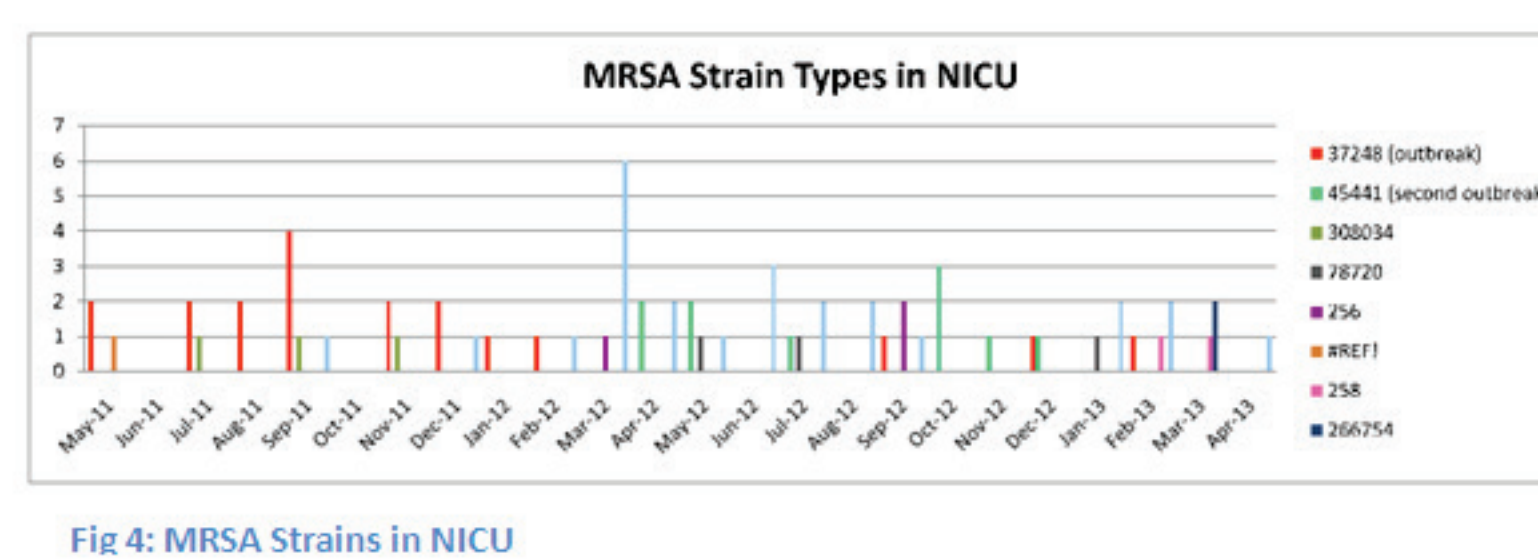
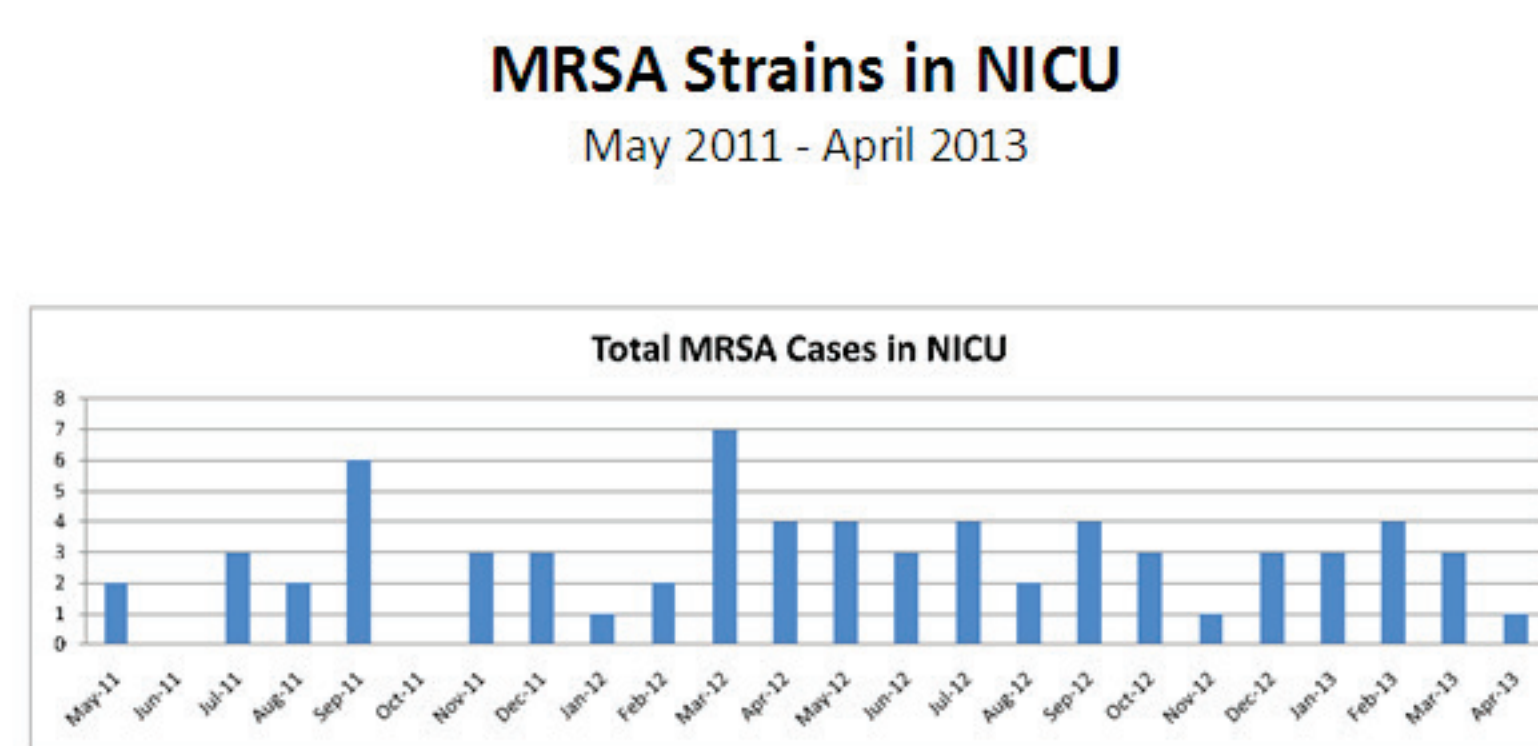
Staphylococcus aureus Typing Report

Picture 1: Zoning of patient areas
Picture 2: DEPROX system

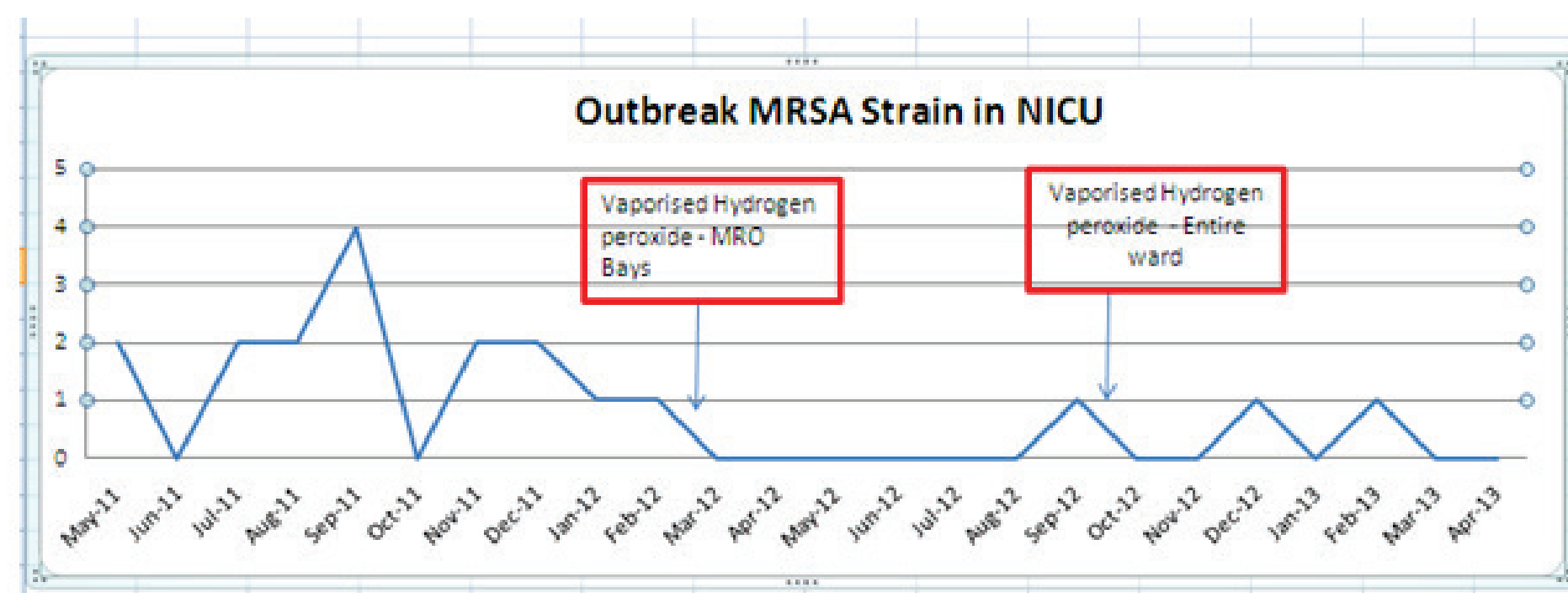
Fig 7: Smart Sheet Scheduling

The Infection Prevention Bundles: strain typing, zoning and vaporised hydrogen peroxide with smart sheet scheduling

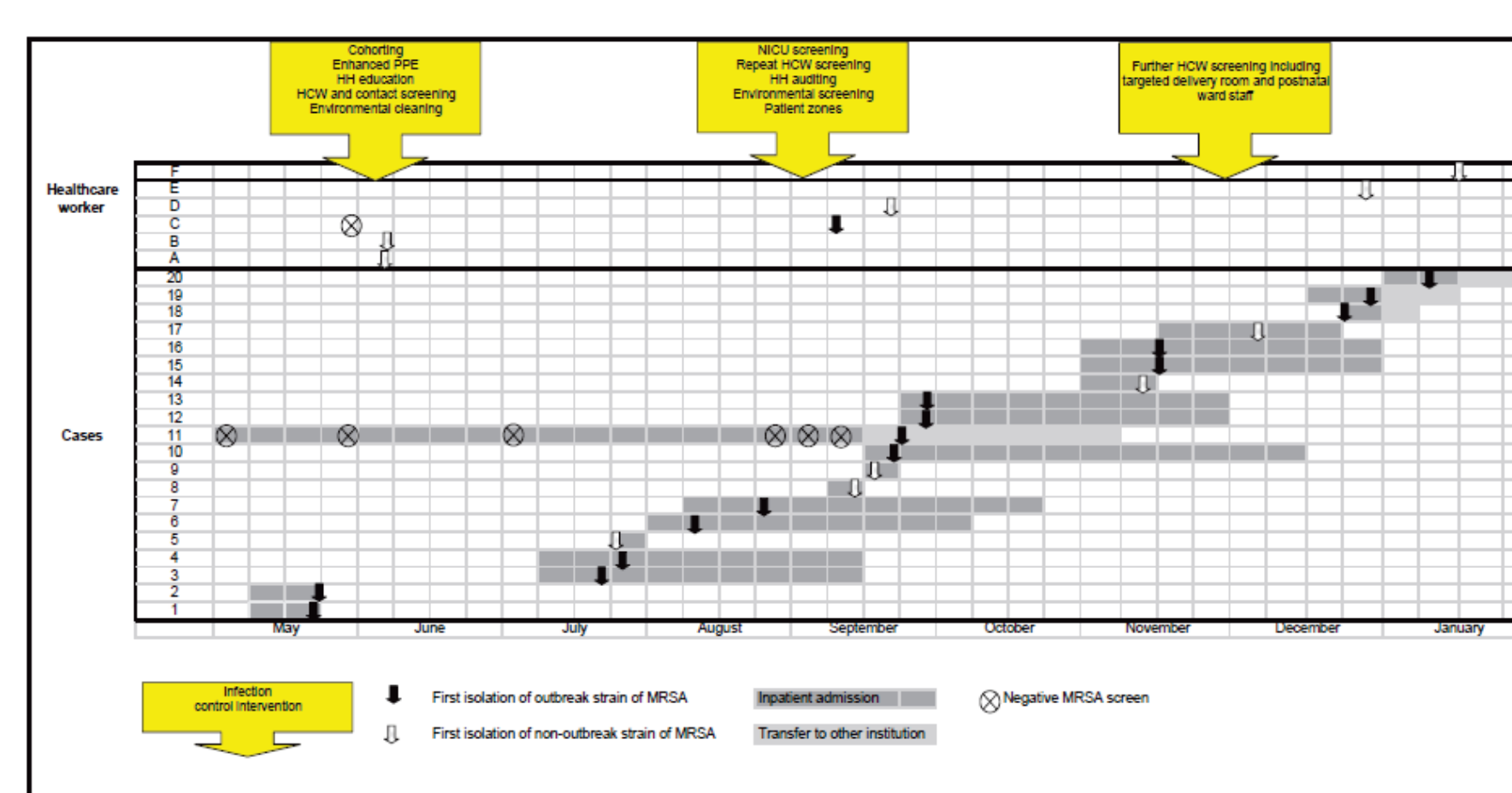
Results



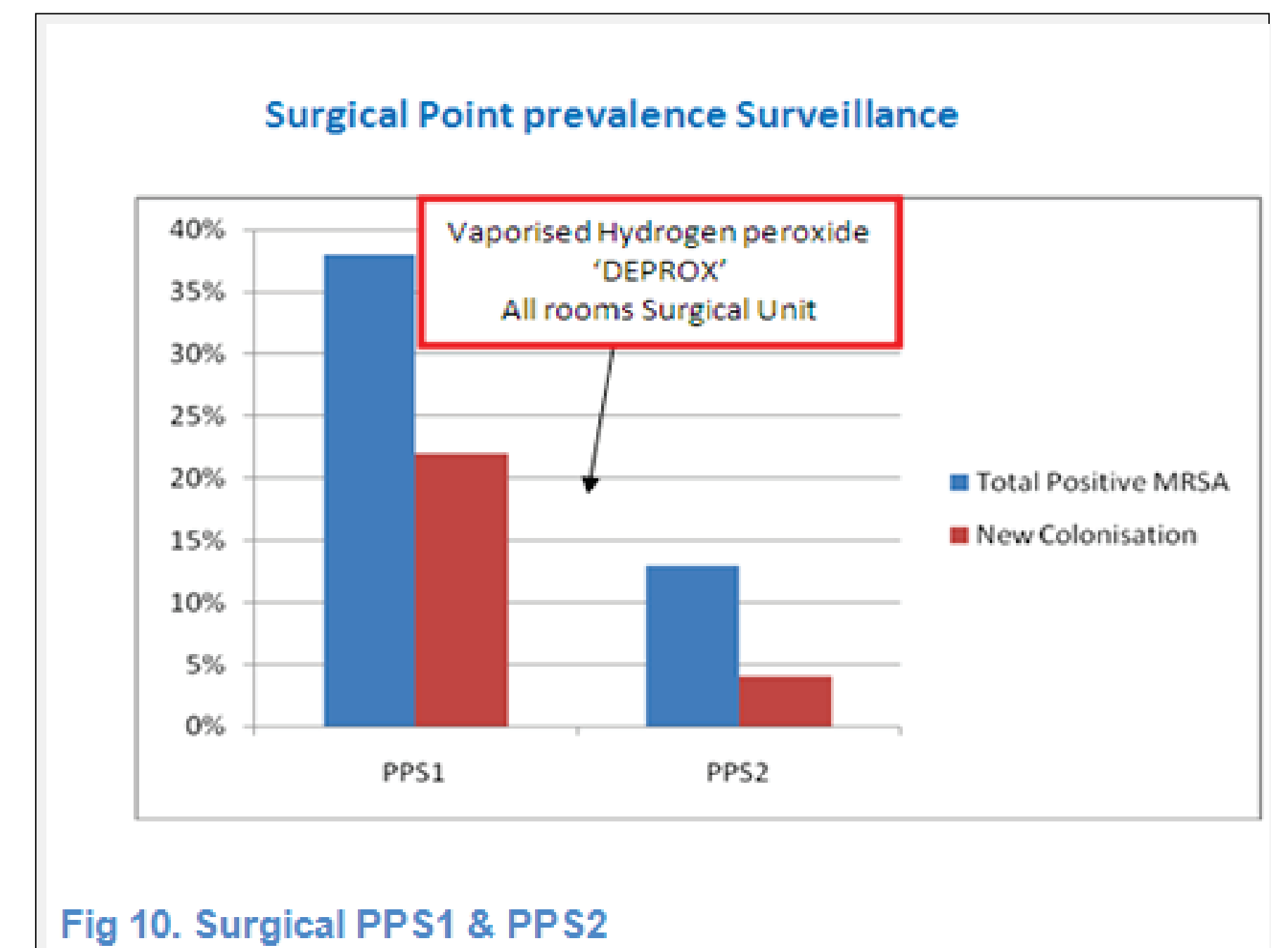
Graphs demonstrating MRSA outbreak and identified strains



Implementation of vaporised hydrogen peroxide and a reduction eradication of virulent outbreak MRSA strain



Outbreak timeline between 18 May 2011 until 23 January 2012. PPE, personal protective equipment; HH, hand hygiene; HCW, healthcare worker.



LOOKING TO THE FUTURE :- Replication of the use of vaporised H₂O₂ to reduce MRSA colonisation rates following high environmental contamination

Collaboration between teams, departments, wards, staff and patients, working together to improve patient outcomes

Openness to patients and all staff around the issue and need to work together

Respect of our environment and the people needed to be engaged for solutions to be effective
Empowerment of the Infection Prevention & Control department

Acknowledgements

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Dr M O'Sullivan, Infection Control Team

