An Innovative Antimicrobial Stewardship Program for Children in Remote and Regional Areas

Initiative Type

Redesign

Status

Deliver

Added

03 March 2022

Last updated

07 July 2022

URL

https://test.clinicalexcellence.qld.gov.au/improvement-exchange/innovative-antimicrobial-stewardship-program-children-remote-and-regional

Summary

This quality improvement study, conducted in remote and regional paediatric inpatient facilities, was associated with an increase in the proportion of antibiotics switched from intravenous (IV) to oral

therapies, as well as a reduction in duration of IV therapy and incidence of adverse events. Seven facilities were in scope: Toowoomba, Redcliffe, Caboolture, Redland, Mount Isa, Hervey Bay and Gladstone. The baseline phase included semi-structured interviews to review resources, tailoring of tools, and retrospective data collection. The intervention phase included: education, tools, and retrospective data collection. The post-implementation phase included semi-structured interviews and data analysis.

Key dates

Mar 2022

Mar 2022

Implementation sites

Hervey Bay; Gladstone; Toowoomba; Mt Isa; Caboolture; Redlands and Redcliffe hospitals

Partnerships

Australian Centre for Health Services Innovation, Centre for Healthcare Transformation, School of Public Health and Social Work, Queensland University of Technology

Key Contacts

Dr Minyon Avent

2315

william.vanheerden.ced

Antimicrobial Stewardship Pharmacist

Metro North Hospital and Health Service

0472828301

minyon.avent@health.qld.gov.au

Aim

To evaluate the benefit of timely IV to oral conversion of antibiotic therapy in remote and regional areas following the implementation of a multifaceted package of interventions.

Benefits

It is expected that by upscaling the program to at least 22 sites in Queensland (a cohort of at least 100 patients annually) 164 line-associated complications would be prevented and an extra 7 per cent of patients would be discharged at two days compared to three days representing additional occupied bed days saved attributed to the intervention. Also prescribing appropriateness increased by a relative 32 per cent in the intervention period, a core antimicrobial stewardship (AMS) key performance indicator important for accreditation We also upskilled the local clinicians which facilitated the sustainability of the program. We have obtained the endorsement of the Directors of Paediatrics and Pharmacists Forum for the model of care.

Background

There has been a need for evidence-based intervention n the proportion of antibiotics switched from IV to oral therapy in children in rural and remote areas of Queensland. Research has shown that one in three children in remote facilities are less likely to receive the correct antibiotic. This is significant because 50 per cent of children in hospitals are on antibiotics. It highlights the lack of resources or targeted education for remote facilities.

Solutions Implemented

We developed a package of intervention tools to promote the IV to oral conversion of antibiotic therapy for children with Community Acquired Pneumonia and Skin and Soft Tissue Infections. Clinicians could tailor the tools to their practice setting and patients requirements, which is more realistic of a real-world situation. Onsite training during the implementation period and continued telehealth support for the intervention phase were provided to participants by the multi-disciplinary research team from the Queensland Statewide Antimicrobial Stewardship Program and the Antimicrobial Stewardship Program based at the Queensland Children's Hospital. In addition, the uptake of the intervention materials was supported by onsite paediatric clinical champions (doctors, pharmacists and/or nurses) at each facility.

Evaluation and Results

There were 357 patients enrolled in the study with 178 in the baseline and 179 in the intervention phase. Patients were reviewed at 24 to 48 hours. The proportion of antibiotics switched from IV to oral therapy increased from (133/178) 74.7 per cent (baseline) to (151/179) 84.4 per cent (intervention) ($p = 0.03$). The median patient length of stay was two days for both phases. The average number of extra IV days decreased from 0.45 days in the baseline period to 0.18 days in the intervention period ($p < 0.005$). The only adverse events recorded were line-associated infiltrates, with a decrease from 34.3 per cent (61/178) (baseline) to 17.9 per cent (32/179) (intervention) (RR 0.52 with 95 per cent CI: 0.36¬-0.76, p. The antibiotic compliance per guidelines increased from 43 per cent at baseline to 51 per cent post intervention. Readmission to hospital and recommencement of IV therapy did not significantly change post intervention. Results have shown that an extra seven per cent of patients would be discharged at two days compared to three days. The prescribing of appropriate antibiotics increased by a relative 32 per cent.

Lessons Learnt

The importance of the engagement with local clinicians, including onsite visits by the research team, as well as appointing appointment of local champions at each facility. These factors have been identified as being key strategies to promote the sustainability of Antimicrobial Stewardship Programs in remote hospitals. Adapting evidence-based intervention resources based on feedback from the clinicians and parents/caregivers who will be utilising the tools in their daily practice. This facilitates the uptake of the implantation package. The affect of high turnover of staff.

References

Avent ML, Walker D, Yarwood T, Malacova E, Brown C, Kariyawasam N, Ashley S, Daveson K. Implementation of a novel antimicrobial stewardship strategy for rural facilities utilising telehealth. International Journal of Antimicrobial Agents, 2021, 106346, ISSN 0924-8579, https://doi.org/10.1016/j.ijantimicag.2021.106346. Mc Mullan B, Andresen D, Blyth CC, Avent ML et 'Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines. Lancet;2016: Online June 16, 2016 http://dx.doi.org/10.1016/ S1473-3099(16)30024 McMullan BJ, Mahony M, Java L, et al. Improving intravenous-to-oral antibiotic switch in children: a team-based audit and implementation approach. BMJ Open Qual. 2021;10(1). PubMed PMID: 33731484. Epub 2021/03/19.

McMullan BJ, Hall L, James R, et al. Antibiotic appropriateness and guideline adherence in hospitalized children: results of a nationwide study. J Antimicrob Chemother. 2020;75(3):738-46. PubMed PMID: 31697335. Epub 2019/11/08.
Queensland Statewide Antimicrobial Stewardship Program [online] Available at: (https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/antimicrobial-

stewardship)[accessed 11 June 2021].

Bishop JL, Schulz TR, Kong DCM, James R, Buising KL. Similarities and differences in antimicrobial prescribing between major city hospitals and regional and remote hospitals in Australia. Int J Antimicrob Agents. 2019;53(2):171-6. PubMed PMID: 30722961. Epub 2019/02/07.

Elemraid MA, Rushton SP, Thomas MF, Clark J. Changing clinical practice: management of paediatric community-acquired pneumonia. Journal of evaluation in clinical practice. 2014;20(1):94-11.

McMullan BJ, Andresen D, Blyth CC, et al. Antibiotic duration and timing of the switch from intravenous to oral route for bacterial infections in children: systematic review and guidelines. Lancet Infect Dis. 2016;16(8):e139-52. PubMed PMID: 27321363.

James R, Luu S, Avent M, Marshall C, Thursky K, Buising K. A mixed methods study of the barriers and enablers in implementing antimicrobial stewardship programmes in Australian regional and rural hospitals. J Antimicrob Chemother. 2015;70(9):2665-70. PubMed PMID: 26080364. Epub 2015/06/17.

Osowicki J, Gwee J, Noronha J, Britton PN, Isaacs D, Lai T, Nourse C, Avent M, Moriarty P, Francis JR, Blyth CC, Cooper CM, Bryant PA, on behalf of the ANZPID-ASAP group* (Australian and New Zealand Paediatric Infectious Diseases-Australasian Stewardship of Antimicrobials in Paediatrics). Australia-wide point prevalence survey of antimicrobial prescribing in neonatal units: how much and how good? Pediatric Infectious Disease Journal;2015;34:e185Ãƒ Â¢Ã¢â€šÂ¬Ã¢â‚¬Å“e190.

Osowicki J, Gwee J, Noronha J, Palasanthiran P, McMullan B, Britton PN, Isaacs D, Lai T, Nourse C, Avent M, Moriarty P, Clark J, Francis JR, Blyth CC, Cooper CM, Bryant PA, on behalf of the ANZPID-ASAP group* (Australian and New Zealand Paediatric Infectious Diseases-Australasian Stewardship of Antimicrobials in Paediatrics). The impact of an infectious diseases consultation on antimicrobial prescribing. Pediatric Infectious Disease Journal 2014;33(6):669-71.

Osowicki J, Gwee J, Noronha J, Palasanthiran P, McMullan B, Britton PN, Isaacs D, Lai T, Nourse C, Avent M, Moriarty P, Clark J, Francis JR, Blyth CC, Cooper CM, Bryant PA, on behalf of the ANZPID-ASAP group* (Australian and New Zealand Paediatric Infectious Diseases-Australasian Stewardship of Antimicrobials in Paediatrics).Australia-wide point prevalence survey on the use and appropriateness of antimicrobial prescribing in children. Medical Journal of Australia 2014; 201: 657-662.

Avent ML, Hall L, Davis L, Allen M, Roberts JA, Unwin S, McIntosh KA, Thursky K & Buising K, Paterson DL. Antimicrobial Stewardship activities a survey of Queensland Hospitals. Australian Health Review 2014; 38:557-563.