
Aminoglycoside Desktop Calculator App

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Service Improvement

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Deliver

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Summary

The Sunshine Coast Hospital and Health Service (SCHHS) Antimicrobial Stewardship (AMS) team, in a joint initiative with the SCHHS ICT Software Development team developed a desktop application (App) to facilitate dosing of high-risk antimicrobials called aminoglycosides. The App is accessible to all HHS clinicians across all facilities and ensures safe and accurate dosing recommendations

individualised to our patients.

Key dates

Sep 2020

Aug 2021

Implementation sites

Sunshine Coast University Hospital, Nabour General Hospital, Gympie General Hospital, Maleny Soldier's Memorial Hospital

Partnerships

The collaboration between the clinical and digital teams was essential to the App development. The Antimicrobial Stewardship Team, who detailed the clinical specifications of the App and performed validation and user-acceptability testing worked cohesively

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Aim

To develop, validate and implement a desktop calculator based upon the Queensland Statewide Aminoglycoside May 2018 guidelines. The calculator would remove the need for multiple manual calculations required to ensure patients receive the correct dose of aminoglycoside antibiotics by calculating ideal body weight and adjusted body weight, the correct dosing calculation and frequency of dosing based upon the individualised patient parameters entered into the platform by the user. This strategy would minimise risk of incorrect dosing, aid in highlighting contra-indications and ensure adequate dosing and administration in patients with sepsis and septic shock.

Benefits

The calculator has been used more than 2,000 times since launching at SCHHS at the end of 2020. The launch campaign coupled with mandatory Learning Management System (LMS) module for all clinical staff serves to enhance the messaging of risk associated with aminoglycosides and the need to prescribe accordingly.

A study measuring the impact of the calculator on doses of gentamicin at SCUH will be published in 2021. The high uptake of the calculator by prescribers demonstrates that there was a clinical need to assist with aminoglycoside dosing even despite the ongoing competing demands of a pandemic.

Background

The aminoglycosides are broad-spectrum, bactericidal antibiotics that are commonly prescribed for children, primarily for infections caused by Gram-negative pathogens.

However, they have a narrow therapeutic window necessitating therapeutic drug monitoring for safe and effective use.

Solutions Implemented

The Aminoglycoside Calculator was built to the specifications of the Aminoglycoside Statewide Guidelines (May 2018) and the HHS Antimicrobial Stewardship team by the Software Developers in the SCHHS ICT department. Working collaboratively, the teams worked to hone and refine the calculator to the exact required specifications before performing user acceptability testing. Once signed off by the appropriate AMS, medicine committees and ICT committees, the calculator was

launched using a campaign facilitated by the communications department in September 2020. In conjunction with the launch, the AMS team worked with the ICT trainers and LMS team to produce a mandatory introductory module for all prescribers and pharmacists commencing in SCHHS to familiarise both existing and new staff with the application.

Evaluation and Results

The Aminoglycoside Calculator App was successfully deployed to all clinical desktops across SCHHS in September 2020. The calculator has been used more than 2,000 times since the launch in September 2020.

In addition to this, the Antimicrobial Stewardship team is currently reviewing data as part of a study to review the impact the calculator has had on the dosing of patients compared with those where the calculator was not used and gentamicin doses were prescribed. This data will be available in 2021. Data pertaining to the number of clinicians who have completed the mandatory LMS calculator introduction module can also be obtained from SCHHS HR Application Specialist team.

Lessons Learnt

Both AMS and ICT teams involved in the development of the calculator had not embarked upon such an innovation before. Both teams adapted to navigate both the clinical and digital governance processes necessary for SCHHS to approve publication of the calculator. In addition to this, all of the involved parties, as well as those from the legal and governance teams were required to liaise with and understand the technicalities of TGA Software Device legislation which was not deemed to be a requirement of this particular calculator.

References

Aminoglycoside Dosing in Adults, Department of Health May 2018. State of Queensland (Queensland Health) Antibiotic Expert Group. Therapeutic Guidelines: Antibiotic. Version 16. Melbourne: Therapeutic Guidelines Limited; 2019 Australian Commission on safety and Quality in Healthcare (ACSQHC), Antimicrobial Stewardship Advisory AS18/08 version 1.0. Sydney: ACSQHC;2018 Ahmed, R.M., et al., Gentamicin ototoxicity: a 23-year selected case series of 103 patients. Med, 2012