

Improving the Safety of Heparin Usage

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Introduction:

Heparin is an anticoagulant that has been used for a variety of indications from treatment of thromboembolic events to the unblocking of central venous catheters. As such, this drug is used by various disciplines in the hospital. Medication errors are amongst the commonest healthcare adverse events. Heparin, a high alert medication carries a high risk of patient injury if not used appropriately due to its inherent bleeding risk which could lead to increased hospitalization/disability or even death in severe cases.

A detailed review of all heparin related incidents and near misses was conducted in the National University Hospital, an academic medical centre providing tertiary & quaternary team-based care with 1200 beds and 70,000 inpatient admissions annually.

Objective:

We aimed to reduce heparin errors by standardising protocols and practices to achieve Zero Patient Harm.

Actions Taken:

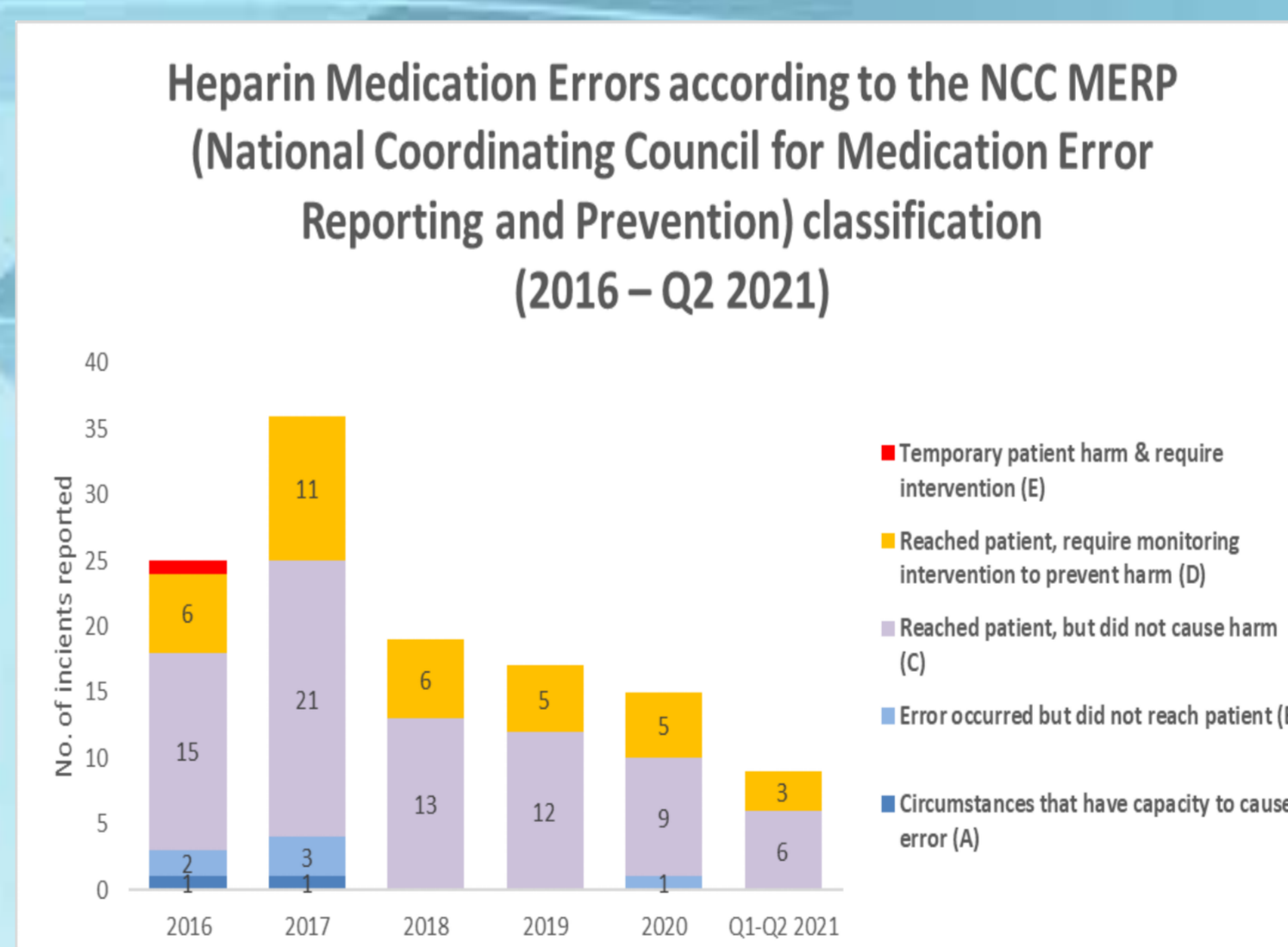
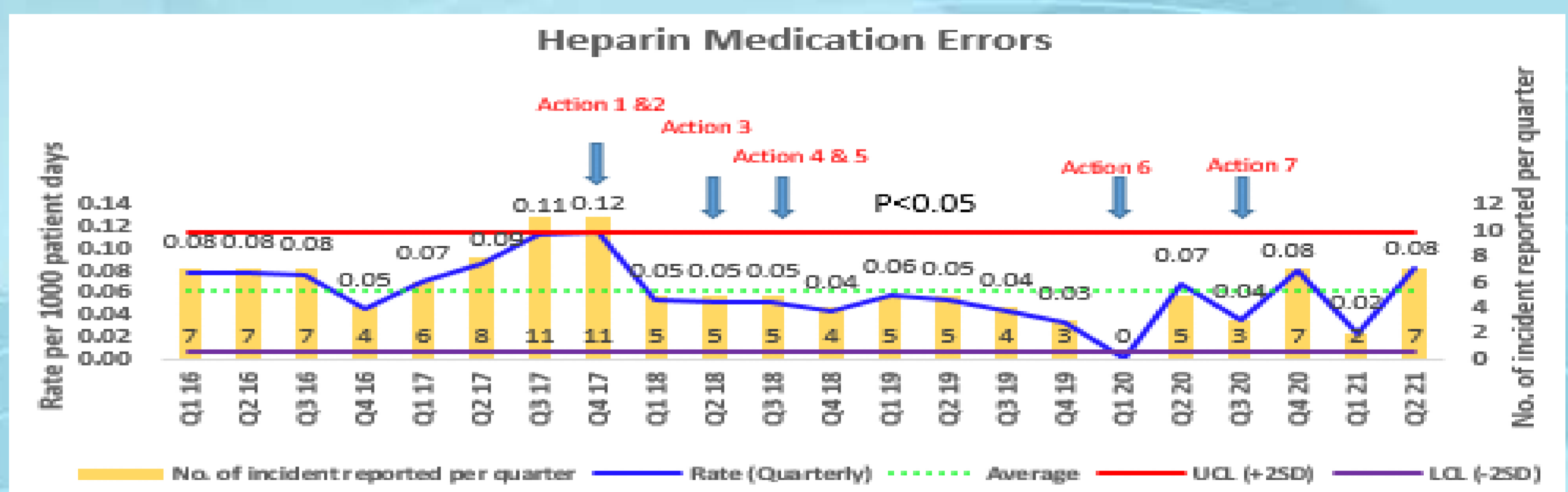
The Anticoagulation Steering Committee (ASC) comprising physicians from Haematology, Cardiology, Cardiac Thoracic & Vascular Surgery, Neurology & Internal Medicine departments, Anticoagulation Clinic (ACC) pharmacists, nurse clinicians and quality professionals reviewed all 80 medication errors (overall rate of 0.07 errors per 1,000 patient days (95% CI, 0.02 to 0.12)) related to Heparin reported in the electronic hospital occurrence reporting system from 2016 to 2018. Of all the errors, 8.7% had the potential to cause injury to the patient and 91.3% had reached the patient. 82.5% of errors occurred most commonly in the administration stage; 8.8% of errors in prescribing, 5% in preparation, 1.2% in supply and 2.5% were due to documentation error. The most common type of error reported was incorrect heparin infusion rate followed by wrong dose and omission.

Based on the findings from the root cause analysis, various strategies were implemented to achieve the objective.

- ❖ Revised Heparin infusion form for nursing to standardise the documentation and handover of aPTT monitoring and infusion rate.
- ❖ Concentrated Heparin 25,000 units /5 mL vials were removed . Heparin 1,000 units per ml made available in all patient care areas.
- ❖ There were numerous aPTT ranges and therefore ASC obtained a consensus from all the stakeholders and standardised Heparin Protocols to only 2 aPTT ranges :
 - a. Heparin Infusion Therapeutic Dose (Target aPTT 55-80s)
 - b. Heparin Infusion Low Dose (Target aPTT 45-60s)
- ❖ Online Heparin Calculators for the 2 aPTT ranges
 - a. Heparin Initiation Calculator
 - b. Heparin Titration Calculator (Therapeutic and Low doses)
- ❖ Training for Nurses.
- ❖ Compulsory E-learning module on Anticoagulation for Clinicians and Pharmacists.

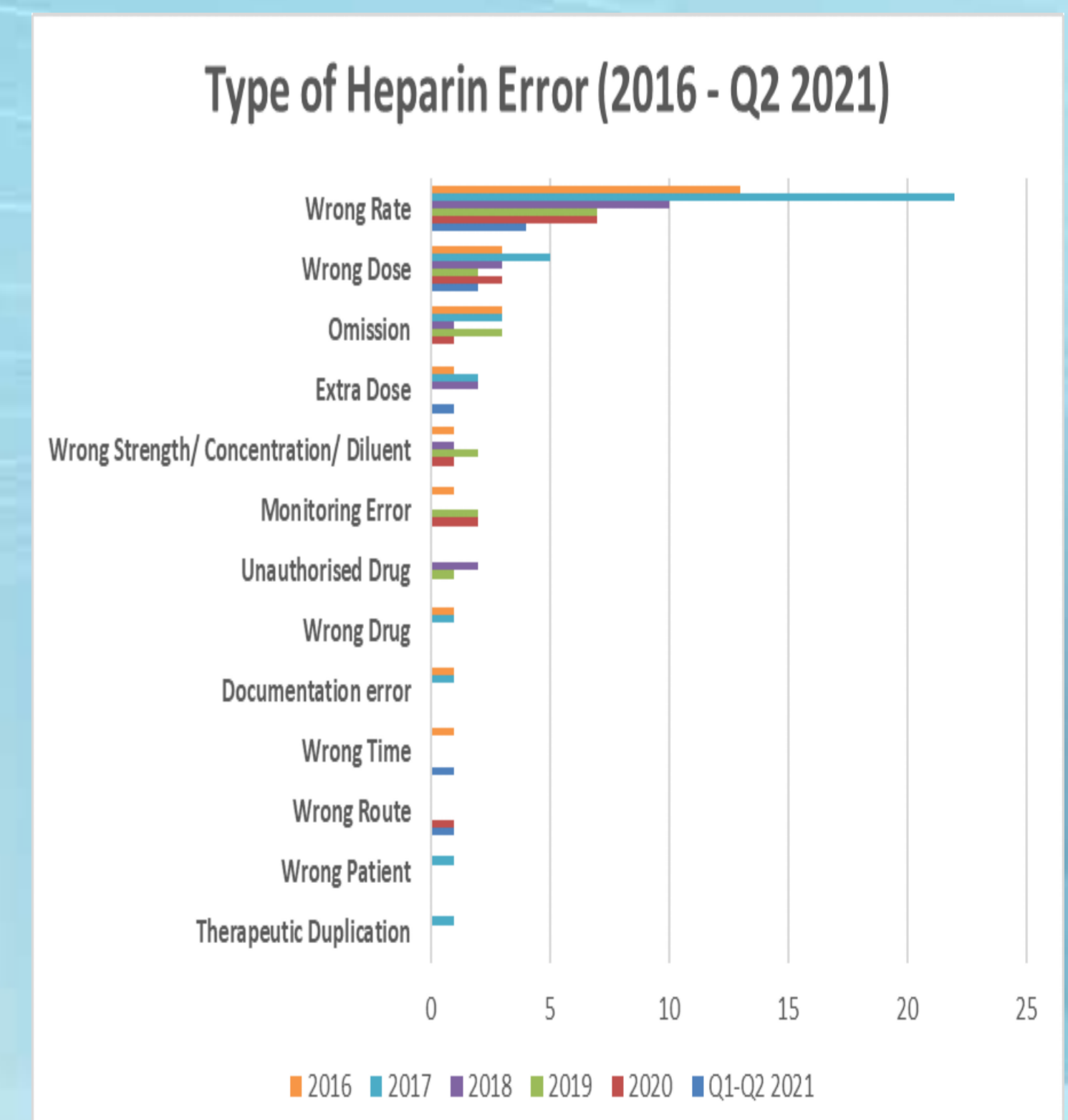
Results:

Implementation of the above-mentioned strategies led to a significant reduction in heparin errors. There was a decreasing trend observed over 5 years' period. Incident Rate Ratio (IRR 0.81) estimated that the rate of heparin errors decreased by approximately 19% with every one calendar year increase.



According to the NCC MERP classification, the total number of Heparin Errors had reduced in all categories after the implementation in 2018.

Heparin calculator has helped to reduce administration errors. The highest number of drop in error can be found in the administration stage due to wrong rate from 22 errors in 2017 to 10 in 2018 and 7 in 2019 & 2020 and only 4 errors in 2021 (Q1 to Q2).



Lessons Learnt:

This project highlighted the importance of teamwork, buy-in from stakeholders and support from senior management in achieving patient safety and working towards zero preventable harm.

Despite many challenges faced, the team persevered and continued to work towards the goal. Regular sharing of incident review findings and getting feedback from the ground played an important role in achieving this outcome.

