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# HERCULES - Heparin Review Consultation Liaison and Education Service

Initiative Type

Service Improvement

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Deliver

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## Summary

HERCULES is a heparin quality improvement project that aims to improve safety, care and experience of patients on IV heparin through a holistic, evidence-based approach. Every aspect of

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patient's care in their heparin therapy journey is enhanced with the support of the HERCULES multidisciplinary team.

### Key dates

Mar 2022

Mar 2024

### Implementation sites

Queen Elizabeth II Jubilee Hospital (Metropolitan hospital in Brisbane)

### Partnerships

QEII Intensive Care Unit ICU outreach and QEII Pharmacy Department

## Key Contacts

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## Aim

HERCULES is a collaborative multidisciplinary team (ICU outreach medical, nursing and pharmacy) which aims to improve safety of patients on IV heparin infusion with the following objectives: • reduce episodes of supratherapeutic activated partial thromboplastin time (APTT) - a blood test that indicates the level of heparin in the blood

- decrease time to therapeutic APTT
- increase percentage of time in therapeutic range
- improve continuity of care (especially after-hours)
- improve education on IV heparin
- improve on documentation for IV heparin review
- to troubleshoot problems resulting in low APTT prior to rate adjustment
- monitor for heparin induced thrombocytopenia and thrombosis syndrome (HITTS).

## Benefits

A 24/7 round the clock management of patients on IV heparin by a dedicated team using existing resources to improve quality and continuity of care, provide closer monitoring, identify and troubleshoot issues and prevent over-anticoagulation.

## Background

Heparin is an anticoagulant (blood thinner) used to treat major clotting disorders in the hospital setting. Like most anticoagulants, heparin is a high-risk medication with complex pharmacology that requires close monitoring. Under-dosing will lead to worsening of clotting disorders while over-dosing leads to bleeding complications. Junior doctors are often the ones prescribing and monitoring heparin therapy. Unfortunately, most do not have the experience with this complex medication, and most do not use it frequently enough to acquire the necessary volume of practice to be proficient in its use. Multiple incidents and near misses with IV heparin have been reported locally and at health service level. These include dosing errors, over-anticoagulation, bleeding, requirement for transfusion and poor efficacy as a result of fluctuating APTT level. These incidents occurred despite adherence to the existing Statewide Heparin protocol. Thus, there was an urgent need for a different approach.

## Solutions Implemented

1. Review and modification of statewide protocol based on root cause analysis, newly published evidence and sound pharmacological principles - HERCULES protocol
2. Multidisciplinary review team: Heparin dashboard pharmacist (case identification, dosing advisory), ICU outreach registrar (clinical review, vascular access, dosing advisory, liaising with home team), ICU outreach nurse

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(vascular access, administration support for ward nurses, clinical review).3. Awareness and education program: Intern orientation, RMO teaching, ICU registrar training4. Engagement of all specialty teams: ED, surgical specialties, medical specialties and general medicine5. Case reviews, audits, data analysing and feedback6. Design and establishment of digital heparin early warning system

## **Evaluation and Results**

The key performance indicator for this project is the percentage of APTT more than 200 seconds (which indicates over-anticoagulation and increases the risk of bleeding). Components of this project were implemented separately from 2018 with the project formalised in 2022. There has been a steady and progressive decrease in percentage of APTT exceeding 200 secs from 6.41% in 2018 to 0.98% in 2024. This is achieved with earlier attainment of therapeutic target and more time in therapeutic range. Overall patients have safer and more effective heparin therapy with fewer blood tests and fewer bleeding complications.

## **Lessons Learnt**

1. Clinician engagement is paramount.2. Clear demonstration of improvement fosters team confidence, clinician engagement and executive support.3. Improving patient experience with better care and fewer blood tests is key to the project.4. There are unmet needs in the management of other anticoagulants5. Deeper analysis is required to assess sustainability and scalability of the HERCULES concept.

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