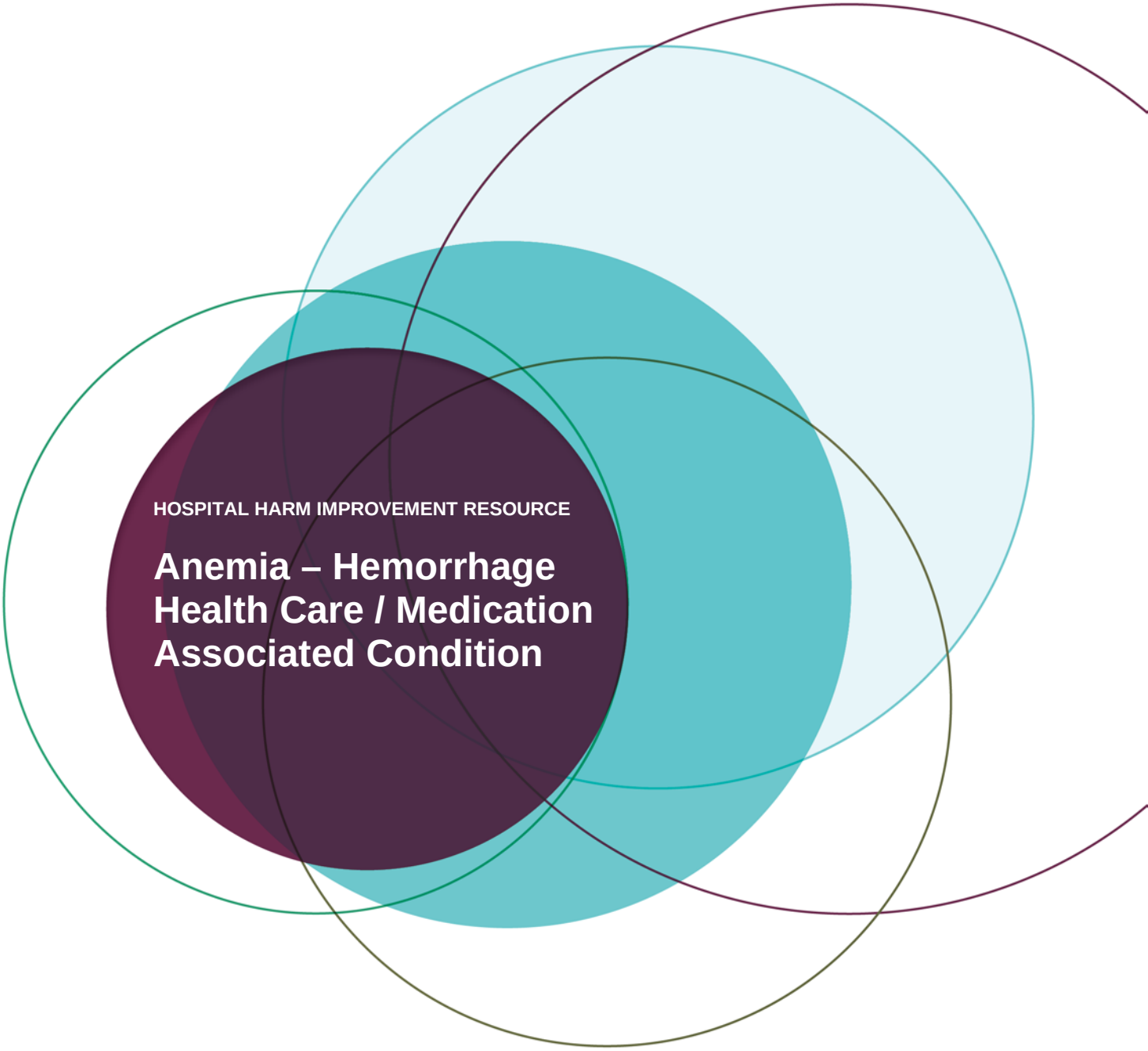

HOSPITAL HARM IMPROVEMENT RESOURCE

# Anemia – Hemorrhage Health Care / Medication Associated Condition

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# ACKNOWLEDGEMENTS

The Canadian Institute for Health Information and the Canadian Patient Safety Institute have collaborated on a body of work to address gaps in measuring harm and to support patient safety improvement efforts in Canadian hospitals.

The Hospital Harm Improvement Resource was developed by the Canadian Patient Safety Institute to complement the Hospital Harm measure prepared by the Canadian Institute for Health Information. It links measurement and improvement by providing resources that will support patient safety improvement efforts.

# DISCHARGE ABSTRACT DATABASE (DAD) CODES INCLUDED IN THIS CLINICAL CATEGORY:

## A01: Anemia – Hemorrhage (Health Care/Medication Associated Condition)

| | |
|---|---|
| **Concept** | Hemorrhagic anemia or hemorrhagic disorders that require(s) blood transfusion, identified during a hospital stay, related to the health care delivered or therapeutic use of anticoagulants |
| **Notes** | 1. This clinical group excludes obstetric hemorrhage (refer to A02: Obstetric Hemorrhage and D02: Obstetric Hemorrhage) and hemorrhage or hemorrhagic anemia associated with a medical or surgical procedure (refer to D01: Anemia — Hemorrhage).<br>2. The blood transfusion indicator is optional to code in British Columbia. |
| **Selection criteria** | |
| D62 | Identified as diagnosis type (2) AND Y44.2 in the same diagnosis cluster |
| **Exclusions** | Y60–Y84 in the same diagnosis cluster |
| **Codes** | **Code descriptions** |
| **D62** | Acute posthemorrhagic anemia |
| **D68.3** | Hemorrhagic disorder due to circulating anticoagulants |
| **Additional Codes** | **Inclusions** |
| Y44.2 | Drugs, medicaments and biological substances causing adverse effects in therapeutic use, anticoagulants |
| **Additional Codes** | **Exclusions** |
| Y60-Y84 | Complications of medical surgical care (refer to Appendix A of the Hospital Harm Indicator General Methodology Notes) |

# OVERVIEW AND IMPLICATIONS

Anemia is a decrease in the number of red blood cells (*RBCs)*, *hematocrit* (*Hct*), or hemoglobin (*Hb*) content. Anemia is not a diagnosis; it is a manifestation of an underlying disorder. Anemia can occur as the result of one or more of three basic mechanisms; blood loss, deficient erythropoiesis, and excessive hemolysis (Lichtin, 2017). The focus of this resource is on anemia related to acute blood loss (acute posthemorrhagic anemia) and hemorrhagic disorders due to circulating anticoagulants.

## Acute post-hemorrhagic anemia secondary to Gastrointestinal (GI) Bleeding

Patients may have acute blood loss from GI bleeding. Nosocomial GI bleeding is source of preventable hospital morbidity and mortality (Herzig et al. 2013). Causes of upper GI bleeding include peptic ulcers, gastritis and inflammation of the GI lining from ingested materials. Ulcers are localized erosions of the mucosal lining of the digestive tract and they usually occur in the stomach or duodenum. Breakdown of the mucosal lining results in damage to blood vessels, which causes bleeding. Gastritis and inflammation of the GI lining may be caused by non-steroidal anti-inflammatory drugs (NSAIDs) and steroids (Lanza et al. 2009; Narum et al. 2014). In the ICU, stress-induced mucosal lesions are a risk factor for bleeding (McEvoy & Shander, 2013).

Acute GI bleeding will appear as vomiting of blood, bloody bowel movements or black, tarry stools. Vomited blood may look like coffee grounds. Other symptoms include fatigue, weakness, shortness of breath, abdominal pain, and pale appearance.

Risk Factors for nosocomial GI bleeding in ICU patients (Guillamondegui et al. 2008; Weinhouse, 2019):

- Universally accepted risk factors stress ulceration:
    - Mechanical Ventilation for more than 48 hours
    - Coagulopathy

- Other risk factors identified:
    - shock
    - sepsis
    - spinal cord injury
    - multiple trauma
    - head trauma
    - burns over 35 per cent of the total body surface area
    - acute renal failure
    - hepatic failure
    - history of peptic ulcer disease
    - history of upper GI bleed
    - Organ transplantation
    - Glucocorticoid therapy (when combined with other risk factors)

## Hemorrhagic disorder due to circulating anticoagulants

Anticoagulation is the mainstay of medical treatment, prevention and reduction of recurrent venous thromboembolism, acute ischemic limbs, acute stroke, stroke prevention in patients with non-valvular atrial fibrillation, and it reduces the incidence of recurrent ischemic events and death in patients with acute coronary syndrome (Christos & Naples, 2016). Unfortunately, however the use of these medications carries significant risk of bleeding or hemorrhage.

Bleeding, or hemorrhagic disorder, is a possible side effect of anticoagulation therapy. (Carnovale et al. 2015). Anticoagulation therapy includes the use of warfarin (Coumadin), a Vitamin K antagonist, as well as the newer direct oral anticoagulants (DOACs) (Fernandez, 2015). Hemorrhage secondary to the use of vitamin K antagonists varies from one to 12 per cent per year, and is related to other risk factors. The risk of bleeding is highest in the initial few weeks of anticoagulation therapy (Cairns, 2011). As a drug category, anticoagulants are one of the top five drug types associated with patient safety incidents (Cousins, 2006).

Antithrombotic agents* are included on the Institute for Safe Medication Practice's (ISMP, 2018) high alert medication list due to the significant risk of causing life-threatening bleeding or thrombosis if the appropriate safe practices are not in place. This high risk is due to the complexity of administering this therapy:

- Selecting the appropriate agent and determining the appropriate dose
- Individual patient variability in response to therapy
- Timing of and use of the appropriate laboratory measures to monitor response
- Proper adjustment of dose based upon the laboratory parameters and/or clinical response
- The transition of patients from Heparin therapy to Warfarin
- Ensuring patient education and compliance
- Use of these agents in a variety of settings, by various practitioners, and within differing patient populations
- Interdisciplinary coordination needed between lab, pharmacy, nursing, medical staff, and dietary (Purdue University PharmaTAP, 2008)

  *Antithrombotic agents, include:
  - anticoagulants (e.g., warfarin, low molecular weight heparin, IV unfractionated heparin)
  - Factor Xa inhibitors (e.g., fondaparinux, apixaban, rivaroxaban) direct thrombin inhibitors (e.g., argatroban, bivalirudin, dabigatran etexilate)
  - thrombolytics (e.g., alteplase, reteplase, tenecteplase)
  - glycoprotein IIb/IIIa inhibitors (e.g., eptifibatide)

Adverse drug events associated with anticoagulants can be reduced by implementing recognized safe practices in high risk areas such as: Use Programmable Pumps and Independent Double-Checks for IV Anticoagulants, Prepare All Heparin Doses and Solutions in the Hospital Pharmacy, and Provide Coagulation Test Results Within Two Hours or at Bedside (IHI, 2020b).

Patients who are receiving anticoagulant therapy have increased risk of hemorrhage when undergoing medical and surgical procedures (Guidelines and Protocols Advisory Committee 2015). Bleeding that occurs in hospital is associated with increased morbidity, mortality, increased length of stay, increased health care costs and increased hospital readmission (Purdue University PharmaTAP, 2008; Herzig et al. 2013; McEvoy & Shander, 2013).

For additional information regarding anemia – hemorrhage associated with a medical or surgical procedure, please refer to the Hospital Harm Improvement Resource Procedure Associated Conditions: Anemia – Hemorrhage.

## GOAL

Reduce the incidence of hemorrhagic anemia or hemorrhagic disorders identified during a hospital stay, related to the health care delivered or therapeutic use of anticoagulants.

## IMPORTANCE FOR PATIENTS AND FAMILIES

Hemorrhage is understandably alarming to patients and families. Not only may it be life-threatening, it complicates care and prolongs hospitalization. Anticoagulants such as warfarin and heparin are powerful medications that save lives and prevent further harm. This group of medications also has the potential to cause serious harm if not taken carefully. Patients who are knowledgeable about their medication therapy can help to reduce the risk of adverse drug events (IHI, 2020a).

### Patient Stories

#### Dennis Quaid Recounts Twins' Drug Ordeal

[The twins] were supposed to have been given a pediatric blood thinner called Hep-lock to flush out their IV lines and prevent blood clots. But instead, they had been given two doses of Heparin, the adult version of the drug, which is 1,000 times stronger…. "It was ten units that our kids are supposed to get. They got 10,000. And what it did is, it basically turned their blood to the consistency of water, where they had a complete inability to clot. And they were basically bleeding out at that point."

"There was blood oozing out of little blood draws on their feet, and things like that, you know, through band-aids," he adds….

And to make matters worse the same avoidable mistake had occurred a year earlier at Methodist Hospital in Indianapolis. Six infants were given multiple adult doses of Heparin instead of the pediatric version; three of the infants survived, three did not….

### Popular Blood Thinner Causing Deaths, Injuries at Nursing Homes

Some facilities fail to properly oversee Coumadin. Too much can cause bleeding; too little, clots. Nursing homes are “a perfect setup for bad things happening,” one expert says….

## CLINICAL AND SYSTEM REVIEWS, INCIDENT ANALYSES

Given the broad range of potential causes of anemia - hemorrhage, clinical and system reviews should be conducted to identify potential causes and determine appropriate recommendations.

Occurrences of harm are often complex with many contributing factors. Organizations need to:

1. Measure and monitor the types and frequency of these occurrences.
2. Use appropriate analytical methods to understand the contributing factors.
3. Identify and implement solutions or interventions that are designed to prevent recurrence and reduce risk of harm.
4. Have mechanisms in place to mitigate consequences of harm when it occurs.

To develop a more in-depth understanding of the care delivered to patients, chart audits, incident analyses and prospective analyses can be helpful in identifying quality improvement opportunities. Links to key resources for conducting chart audits and analysis methods are included in the Hospital Harm Improvement Resources Introduction.

If your review reveals that your cases of anemia - hemorrhage are linked to specific processes or procedures, you may find these resources helpful:

- Institute for Safe Medication Practices (ISMP). www.ismp.org
- British Columbia. BCGuidelines.ca
- National Blood Authority Australia. Patient Blood Management.
- NATA, Network for the Advancement of Patient Blood Management, Haemostasis and Thrombosis.
- Thrombosis Canada. Clinical Guides.
- American Society of Health-System Pharmacists (ASHP): Gastrointestinal Stress Ulcer Prophylaxis (pending) https://www.ashp.org/pharmacy-practice/policy-positions-and-guidelines/browse-by-document-type/therapeutic-guidelines
- Stress Ulcers in the Intensive Care Unit: Diagnosis management and Prevention (Weinhouse, 2020) www.uptodate.com

- Institute for Healthcare Improvement (IHI):
    - How-to guide: prevent harm from high-alert medications. 2012. http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventHarmfromHighAlertMedications.aspx
    - Changes: Reduce adverse drug events involving anticoagulants. 2020. http://www.ihi.org/resources/Pages/Changes/ReduceAdverseDrugEventsInvolvingAnticoagulants.aspx
    - Anticoagulant tool kit: Reducing adverse drug events & potential adverse drug events with unfractionated heparin, low molecular weight heparins and warfarin. 2008 http://www.ihi.org/resources/pages/tools/anticoagulanttoolkitreducingades.aspx

- Joint Commission - National Patient Safety Goal to reduce the likelihood of patient harm associated with the use of anticoagulation therapy (Joint Commission, 2018).

## MEASURES

Vital to quality improvement is measurement, and this applies specifically to implementation of interventions. The chosen measures will help to determine whether an impact is being made (primary outcome), whether the intervention is actually being carried out (process measures), and whether any unintended consequences ensue (balancing measures).

In selecting your measures, consider the following:

- Whenever possible, use measures you are already collecting for other programs.
- Evaluate your choice of measures in terms of the usefulness of the final results and the resources required to obtain them; try to maximize the former while minimizing the latter.
- Try to include both process and outcome measures in your measurement scheme.
- You may use different measures or modify the measures described below to make them more appropriate and/or useful to your particular setting. However, be aware that modifying measures may limit the comparability of your results to others.
- Posting your measure results within your hospital is a great way to keep your teams motivated and aware of progress. Try to include measures that your team will find meaningful and exciting (IHI, 2012).

## GLOBAL PATIENT SAFETY ALERTS

Global Patient Safety Alerts (GPSA) provides access and the opportunity to learn from other organizations about specific patient safety incidents including alerts, advisories, recommendations and solutions for improving care and preventing incidents. Learning from the experience of other organizations can accelerate improvement.

### Recommended search terms:

- Anemia
- Hemorrhage
- Gastrointestinal bleeding
- Anticoagulant
- Blood thinners

## ANEMIA - HEMORRHAGE SUCCESS STORIES

We are looking for an improvement success story related to Anemia - Hemorrhage. If you have one you would like to share, please contact the Canadian Patient Safety Institute at info@cpsi-icsp.ca.

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