2. SUMMARY OF PBM MODULES

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RECOMMENDATIONS AND PRACTICE POINTS

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| PBM strategy/techniqueR = RecommendationPP = Practice point = recommended or suggested strategy = NOT recommended or suggested | Critically bleeding patientPBM Guidelines: Module 1 | Perioperative patientPBM Guidelines: Module 2 | Medical patientPBM Guidelines: Module 3 | Critical care patientPBM Guidelines: Module 4 |
| Pillar one – optimise blood volume, especially red cell mass (anaemia management) |
| Identify, evaluate and manage anaemia |  | Assess as early as possible prior to surgery (R2, R3, PP1, PP4, PP5) | Reversible causes in cancer patients (PP8) |  |
| Iron therapy |  | If iron deficient; or suboptimal iron stores; or with ESAs (R4, R5, PP6, PP7)Oral iron not for use in immediate post-op period (R6) | If iron deficient; or with ESAs; or in absolute and functional iron deficiency in patients with CHF; (R3, PP4, PP12, PP14)IV iron may be required inIBD (PP15) |  |
| Erythropoiesis stimulating agents (ESAs) |  | May be indicated in anaemia of chronic disease (PP7)Where ESAs are indicated, they must be combined with iron therapy (R5) | In anaemic patients with CKD (R4, R5, R6, R7, PP13, PP14)Not for routine use in cancer patients (R2) | Not for routine use in critically ill (R2) |
| Preoperative autologous donation (PAD) |  | Routine use not recommended (R11) |  |  |

CHF = chronic heart failure CKD = chronic kidney disease IBD = inflammatory bowel disease

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| Pillar two – minimise blood loss (haemostasis management and blood conservation modalities) |
| Assess bleeding risk | Values suggestive of physiological derangment: PLT < 50 x 109/LPT > 1.5 x normalINR > 1.5APTT > 1.5 x normalfibrinogen < 1.0 g/L | In general, can undergo invasive procedures with PLT ≥50x109 /L or INR ≤ 2 (PP17)Seek haematology advice as per PP18 |  |  |
| Manage medications inhibiting coagulatione.g. aspirin, warfarin, NSAIDs, SSRIs, complementary medicines (continue/cease/bridge) |  | Refer to module for guidance on if, how, when to cease:Clopidogrel (R7, PP9) Aspirin (R8, PP8) NSAIDs (R9)Warfarin (R10, PP10) |  |  |
| Consider medications enhancing coagulation Tranexamic acid (TXA) DesmopressinAprotininƐ –aminocaproic acid (Ɛ-ACA) | TXA ( CRASH 2 trial) | TXA in cardiac surgery (R17)TXA in non-cardiac surgery(R18)Desmopressin - routine use not supported (PP16)Note: evidence of beneficial effects of aprotinin andƐ-ACA, but aprotinin withdrawn, and Ɛ-ACA not marketed in Australia and New Zealand (PP14, R19, PP15) |  | Within 3 hours of injury(R3,PP14, PP15)Upper GI bleeding (R4, PP15) |

NSAIDs = Non-steroidal anti-inflammatories GI = gastrointestinal SSRIs = selective serotonin reuptake inhibitor

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| rFVIIa | Routine use not recommended (R2)MTP to include advice on administration of rFVIIa (note: not licensed for this use) (PP8,9) | Prophylactic or routine use not recommended (R22)Consider in life threatening haemorrhage (PP20) |  |  |
| Prevention of hypothermia | Aim for temperature >350C (PP1,2) | Measures should be used(R12) |  |  |
| Appropriate patient positioning |  | Avoid excessive venous pressure at surgery site (PP11) |  |  |
| Deliberate induced hypotension |  | Radical prostatectomy or major joint replacement (R13) |  |  |
| Acute normovolaemic haemodilution |  | Surgery where substantial blood loss anticipated (R14, PP12) |  |  |
| Cell Salvage - intraoperative |  | Surgery where substantial blood loss anticipated (R15, PP13) |  | Critically ill trauma patients(PP13)Patients undergoing emergency AAA surgery (PP13) |

MTP = massive transfusion protocol AAA= abdominal aortic aneurysm

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| Cell Salvage post-operative |  | Cardiac surgery or total knee arthroplasty (R20) |  |  |
| Surgical technique |  | Refer Box 3.1 Surgical haemostasis options |  |  |
| Haemostasis analysis |  | TEG in patients undergoing cardiac surgery (R16) |  |  |
| Blood products to manage coagulopathyFFP, platelets, fibrinogen, cryoprecipitate | Insufficient evidence to support or refute the useof specific ratios of RBCs to components (PP4)Suggested doses in MTP: FFP: 15 mL/kgPlatelets: 1 adult doseCryo: 3-4 g |  |  |  |
| Red Blood Cells (RBCs) | Use of RBCs can be lifesaving, however increased volumes may be independently associated with increased mortality and ARDS (PP6)Use MTP to facilitate timely and appropriate use (PP7) | Red Cell transfusion based on patient’s clinical status, applying a restrictive transfusion strategy, using a single unit followed byreassessment to determine if further unit required (PP2PP3) | Red Cell transfusion based on patient’s clinical status, applying a restrictive transfusion strategy, using a single unit followed byreassessment to determine if further unit required (PP1, PP2). | Red Cell transfusion based on patient’s clinical status, applying a restrictive transfusion strategy, using a single unit followed byreassessment to determine if further unit required (PP1, PP2). |
| Fresh frozen plasma (FFP) |  | Prophylactic use of FFP in cardiac surgery not recommended (R21) | Refer to guidelines for use of FFP in specific patient groups (PP17)Routine use of FFP in medical patients with coagulopathy not supported (PP16) | Routine use of FFP in critically ill not advised (PP5, PP6, PP7) |

TEG = thromboelastography ARDS = adult respiratory distress syndrome MTP = massive transfusion protocol

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| Pillar two – minimise blood loss (haemostasis management and blood conservation modalities) |
| Platelets (PLT) |  | Prophylactic PLT use after cardiac surgery not supported (PP19)In general, can undergo invasive procedures with PLT ≥50x109 /L or INR ≤ 2 (PP17)Seek haematology advice as per (PP18) | Prophylactic PLT transfusion for patients undergoing chemotherapy and haematopoietic stem cell transplant at:< 10x109/L in absence of risk factors;<20x109/L in presence of risk factors (R8)PLT transfusions may be indicated for prevention of haemorrhage in patients with thrombocytopaeniaor PLT function defects(PP20)Patients with chronic failure of PLT production are best managed with expert opinion (PP21)PLT transfusions are not indicated in all causes of thrombocytopaenia and may be contraindicated in certain conditions (e.g. TTP and HIT) (PP20) | PLT transfusion may be appropriate if PLT<20x109/L (PP10, PP11, PP12) |

TTP = thrombotic thrombocytopaenic purpure HIT = heparin-induced thrombocytopaenia

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| Pillar two – minimise blood loss (haemostasis management and blood conservation modalities) |
| Platelets (PLT) continued from previous page |  |  | In patients undergoing chemotherapy and HSCT, there is no evidence to support a lower trigger for prophylactic PLT transfusion for patients with risk factors; or for therapeutic-only PLT transfusions (PP22) |  |
| Fibrinogen, cryoprecipitate |  |  | Refer to guidelines for use of cryoprecipitate or fibrinogen in specific patient groups (PP19)Specialist opinion advised for DIC (PP18)Routine use of cryoprecipitate or fibrinogen in medical patients with coagulopathy not supported (PP18) | Routine use of cryoprecipitate and fibrinogen in critically ill not advised (PP8, PP9) |

HSCT = haematopoietic stem cell transplantation

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| Pillar three – optimise tolerance of anaemia |
| Single unit (RBC) transfusion policy |  | Single unit policy (PP3) | Single unit policy (PP2) | Single unit policy (PP2) |
| Restrictive transfusion thresholds(See document for Hb triggers) |  | Restrictive transfusion strategy (PP2, PP3) | Restrictive transfusion strategy (R1,PP1, PP3, PP5, PP6, PP7, PP9, PP10, PP21)Special care with ACS (R1)and CHF (PP7)In patients withthalassaemia, the evidencedoes not support achange to the currentpractice of maintaining apretransfusion Hb 90-100g/L (PP23)In patients withmyelodysplasia who areregularly and chronicallytransfused, there is noevidence to guide particularHb thresholds. (PP24)Note: New evidenceindicates that a restrictivetransfusion strategy(threshold 7 g/L, target 7-9g/L) significantly improvesoutcomes in patients withacute upper GI bleeding(Villanueva et al, NEJM2013) | Restrictive transfusion strategy (R1. PP1, PP3) |

GI = gastrointestinal

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