Marc Ziegenfuss
Director: Adult Intensive Care Unit
Chair: Patient Blood Management Steering Committee
The Prince Charles Hospital
1900: Karl Landsteiner first described the ABO blood types
• WW1 & WW11: blood products used as a rescue therapy for severe bleeding
• Compatibility testing
• Anticoagulant solutions
• Preservative solutions
• Refrigeration
• Blood Banks
• Venous access
• Plastic blood bags
• Component administration
‘that in cases of serious or irreversible threats to the health of human beings, acknowledged scientific uncertainty should not be used as a reason to postpone preventative measures’

• Highly risk adverse ‘blood supply system’

• Focus on haemovigilance: ensuring an adequate supply of product, & safe & reliable methods of administration

• This ensures that ‘blood products are safer than ever’.

What is not clear is if blood products are always ‘safe for patients’

Decades of research on blood & management of blood suggest:

- Significant variation in blood transfusion between clinicians, programs and institutions
- Over utilisation is common
- Changes in transfusion practice, improvements in patient safety and outcomes supported by PBM are achievable

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*The Pragmatic Solution for the Problems with Blood Transfusions*

ALLOGENEIC erythrocyte transfusions are associated with increased mortality, major adverse cardiac and noncardiac outcome, and low output failure in cardiac surgery. Transfusion of allogeneic erythrocyte transfu-

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Donat Spahn, Molch Holger, Alex Hoffman, James Isbister
Conventional

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### 3 pillars of patient blood management

**1st Pillar**
**Optimize erythropoiesis**
- Detect anemia
- Identify underlying disorder(s) causing anemia
- Manage disorder(s)
- Refer for further evaluation if necessary
- Treat suboptimal iron stores/iron deficiency/anemia of chronic disease/iron-restricted erythropoiesis
- Treat other hematologic deficiencies
  - Note: Anemia is a contraindication for elective surgery

**2nd Pillar**
**Minimize blood loss & bleeding**
- Identify and manage bleeding risk
- Minimizing iatrogenic blood loss
- Procedure planning and rehearsal
- Preoperative autologous blood donation (in selected cases or when patient choice)
  - Other

**3rd Pillar**
**Harness & optimize physiological reserve of anemia**
- Assess/optimize patient’s physiological reserve and risk factors
- Compare estimated blood loss with patient-specific tolerable blood loss
- Formulate patient-specific management plan using appropriate blood conservation modalities to minimize blood loss, optimize red cell mass, and manage anemia
  - Restrictive transfusion thresholds

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**Preoperative**
- Timing surgery with hematological optimization

**Intraoperative**
- Meticulous hemostasis and surgical techniques
- Blood-sparing surgical techniques
- Anesthetic blood conserving strategies
- Autologous blood options
- Pharmacological blood options

**Postoperative**
- Vigilant monitoring and management of post-operative bleeding
  - Avoid secondary hemorrhage
  - Rapid warming/maintain normothermia (unless hypothermia specifically indicated)
  - Autologous blood salvage
  - Minimizing iatrogenic blood loss
  - Hemostasis/anticoagulation management
  - Prophylaxis of upper gastrointestinal hemorrhage
  - Avoid/treat infections promptly
  - Be aware of adverse effects of medication

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Optimize cardiac output
- Optimize ventilation and oxygenation
- Restrictive transfusion thresholds

Optimize anemia reserve
- Maximize oxygen delivery
- Minimize oxygen consumption
- Avoid/treat infections promptly
- Restrictive transfusion thresholds
Standard 7- Blood and blood products

- TPCH - 1st Public hospital in QLD to undergo accreditation in QLD to 15 Standards.

- **Standard 7- Blood and Blood Products**
  - 2 met with merits
    - 7.1.3 Action is taken to increase the safety and appropriateness of prescribing and clinically using blood and blood products (POCCT)
    - 7.2.2 Action is taken to reduce the risks associated with transfusion practices and the clinical use of blood and blood products (Haemovigilance)
Pre Operative Anaemia Management (Pillar 1 – last implemented)

- Requires multifaceted systems approach with significant support and guidance by Anaemia CNC
- CNC Position supported by competitive grant (BP)
- Anaemia Management CNC
  - Commenced January 2014
  - 6 months of planning and preparation
  - Orthopaedic and General Surgery: Commenced July 2014
  - Cardiac Surgery: Commenced January 2015
Optimising Haemostasis, Minimising Bleeding and Blood Loss (Pillar 2)

‘Bleeding Management’ ............ complex pillar to implement & manage

CNC Position (Bleeding Management) supported by competitive grant:

- Improved recognition of patients at high risk of bleeding
- bleeding management algorithms
- governance for bleeding management strategies
- education
TPCH Bleeding Management Diagnostic Support

Bronwyn’s Lab
Additional Strategies.............
to Address Bleeding Management

- Cell Salvage
- Minimisation of discard volume (ie, VAMP)
- Reduction of blood volume sample collection (ie. Paediatric tube inserts)
- Factor concentrates
- Optimising physiologic patient conditions
- Bleeding risk score
- Procedure and WUG development for bleeding management strategies
Haemovigilance & Blood Product Management - Pillar 3 (primary efforts most commonly directed here)

- Governance - Transfusion Committee maintenance and preparation
- Standard 7 coordination – action plan development
- Clinical audit
- Development of Policies, procedures and guidelines
- Wastage reduction strategies
Haemovigilance & Blood Product Management

- Dissemination and Implementation of the PBM guidelines
- Patient and recurrent staff education
- Development of PBM tools and resources – single unit/ MTP/ Haemovigilance guide (acknowledgment RBWH)
- Haemovigilance reporting (x 2 hospital sites)
- Staff support for the administration of all products (including labile, plasma derived & recombinant products)
Multidisciplinary Blood Management Program
“Actually More Than Three Pillars”

- Blood Management CNCs (Anaemia, Blood Management, Transfusion)
- Very involved & engaged Anaesthetic, Surgical and ICU programs
- Successful relationships with Blood Bank and Haematology
- Significant oversight from the Haematologists
- Perfusion, Nurses, Pharmacy, Anaesthetic technicians
- Management and Finance Teams
- Senior Medical Champions

- TPCH Results ... for Administration and Bean Counters
## PRBC Units Transfused Including Separations

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<th>Years</th>
<th>PRBC Spend</th>
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Data source
DSS Necto ABF module
Retrieved 12/2014
Platelet Units Transfused Including Separations

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Cryoprecipitate Units Including Separations

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Data source
DSS Necto ABF module
Retrieved 12/2014
‘Insanity is doing the same thing over and over again and expecting different results’
- A Einstein

‘Be the change you want to see in the World’
- M Ghandi

‘It always seems impossible, until it is done’
- N Mandela