Queensland Health

pathology queensland

Mistakes - Unexpected Learning Experiences

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Disclaimer - Contains grammatical errors, unreferenced pictures, and too many words per slide

Queensland Government

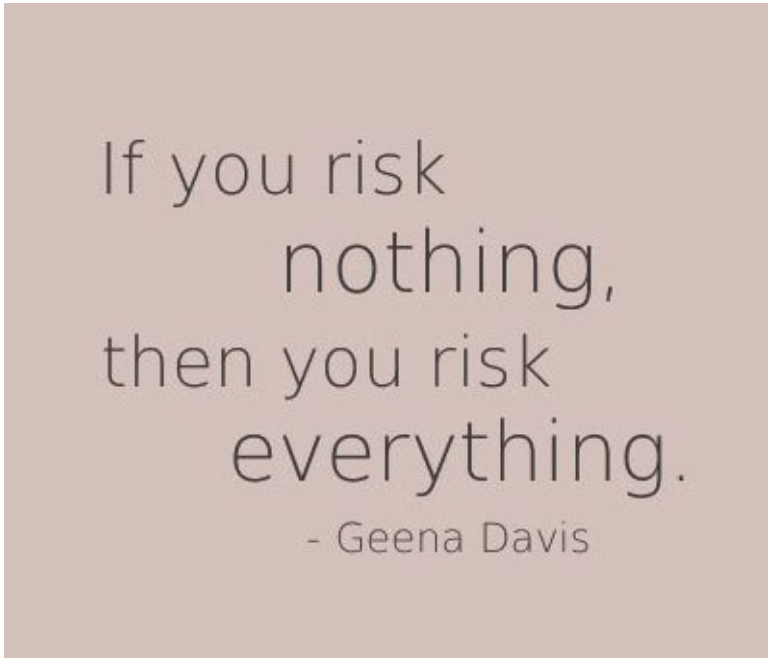
Some Definitions

- **Mistake:** an act or judgement that is misguided or wrong.
- **Learn:** to gain or acquire knowledge or skill of something by study, experience, or being taught.
- **Root cause:** a factor that caused a nonconformance and should be permanently eliminated through process improvement.
- **Root cause analysis:** a collective term that describes a wide range of approaches, tools, and techniques used to uncover causes of problems.
- **Balls up:** a bungled or badly carried out task or action; a mess.
- **Massive balls up:** when you realise you've made a massive mistake and find yourself in an undeniable tight squeeze without possibility of escape.

Risky Business

- Pathology Queensland prides itself on;
  - Providing expert clinical support
  - Ensuring accurate, timely and appropriate patient results
  - Continual learning
  - Quality improvement

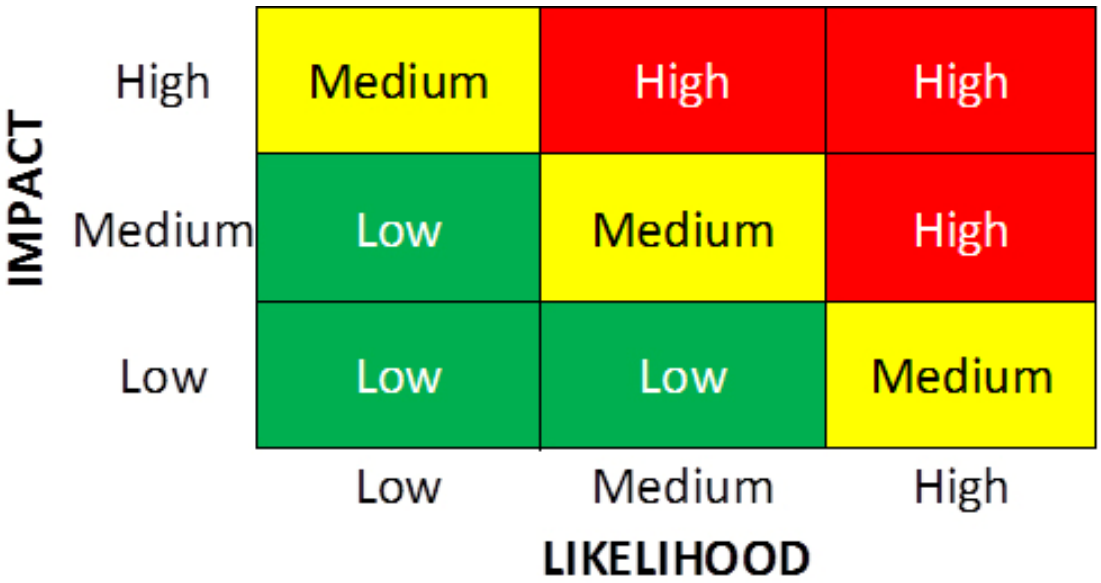
- But…Blood Banking is risky!
  - Requires communication and coordination with external organisations e.g. ARCBS, Theatre
  - Mixed staffing skill level/experience
  - Variety of blood and blood products
  - Unexpected results and urgent situations



Tough Days in the Office

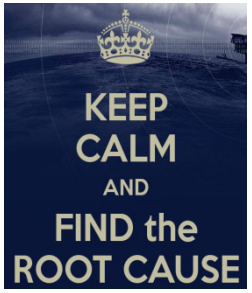
- TPCH handles many complex cases with multifactorial issues
- Treating teams are traditionally very successful and had become accustomed to ‘winning’
- Over a period of a few months, there were a number of patients that were ‘lost’ which had a terrible effect on morale
- Though challenging, this led to an opportunity to assess the way things were done and opportunities to improve

Preventing Mistakes - Risk Assessment

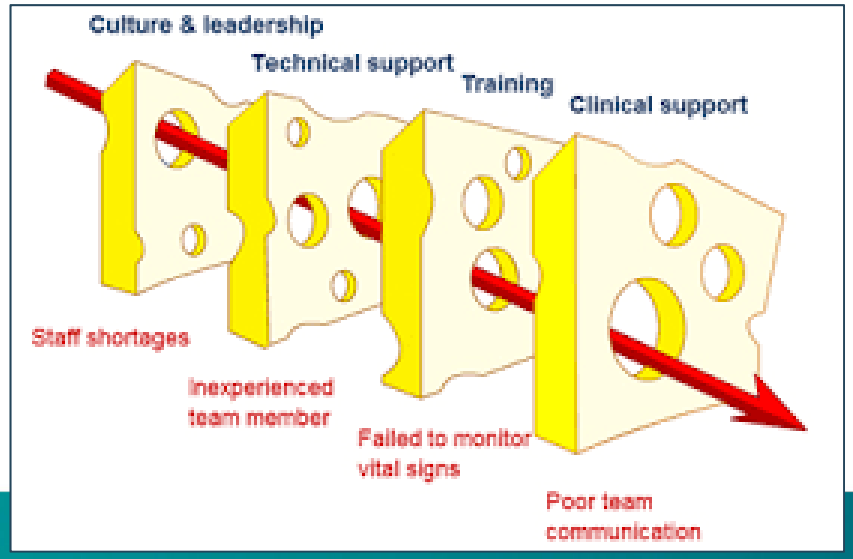


- A risk matrix is used to assess and define the level of risk
- Increases visibility of risks and assists risk mitigation decision making
- Used in a variety of organisations; hospitals, construction and schools

Root Cause Analysis



- Whenever a mistake or near miss is identified it **must** be reported;
  - Localised to Pathology Queensland – Opportunity for Quality Improvement (OQI)
  - Involves external organisations – AIMS/PRIME/RISKMAN
  - Detailed account of events leading up to error
- Investigator performs the root cause analysis;
  - Focuses primarily on systems and processes NOT individual performance
  - Analysis should be thorough and credible e.g. 5 why's, ishikawa diagrams, cause/effect




So then they skipped root cause analysis and jumped right to solutions
and were suprised when the problem kept occurring..

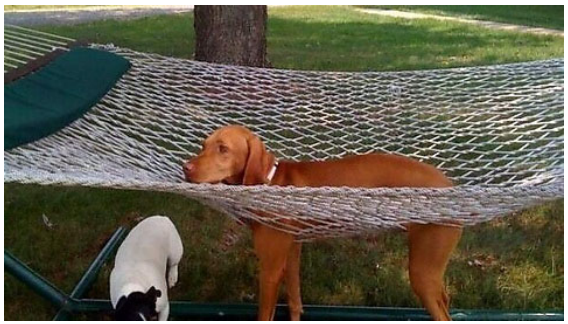
Root Cause Analysis Outcomes

- Focus on prevention not blame
  - The blame and punish approach teaches others that if they make a mistake, they should make sure no one finds out
  - 'Human error' is not the conclusion of an investigation, it is the starting point
- Corrective and preventative action is required
- Aim for error reduction strategies with high power where possible

Error-Reduction Strategy	Power (leverage)
Fail-safes and constraints	High ↑
Forcing functions	
Automation and computerization	
Standardization	
Redundancies	
Reminders and checklists	
Rules and policies	
Education and information	
Suggestions to be more careful or vigilant	Low

Table 1. Rank order of error-reduction strategies

Balls Up One



- Patient 1 is a 7F requiring cardiac surgery
- Congenital cardiac defect due to DiGeorge deletion on chromosome 22
- 22q11.2 deletion may also cause a deficiency in the immune mediated T cell response
  - Patients require irradiated products that are as fresh as possible
  - Usually <24 hours irradiated
- MTP activated at 16:05 and ceased at 16:38
- Blood usage – 6 PC, 3 PLT, 5 CRYO, 2 FFP, 1 Ria, 2 PTV
- Medevac grabbed from blood fridge and spiked
  - Not transfused because irradiated units required
- Haematologist approval required during MTP to issue 2-3 day old IRR units
- Patient survived and feedback to the lab was very positive

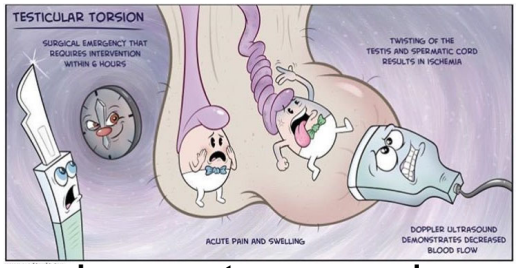
Balls Up One - However…..

- During MTP, patient 2 had deranged coag results which were released before adequate investigation
- Scientist waited to inform the Haematologist because of the MTP
- In that 30 min period, patient 2's Consultant had seen the coag results and was considering treatment options
  - Had a history of vWD
- Once discussed with the Haematologist, further investigation of the coags took place and results had normalised
- Scientist started amending the results in Auslab at the same time the Consultant was viewing the page
- Consultant not happy and demanded an official investigation
- Amended report was issued with corrected coag results

Balls Up One - Investigation

- The main factor was the distraction of the MTP activation
  - Supervising Scientist was assisting another Scientist and consulting with the Haematologist
  - The Scientist handling the coag investigation did not want to distract the Haematologist, so they waited until the MTP had slowed before informing them about the discrepancy
- Initially the Scientist did not notice the clinical notes of the patient querying a previous diagnosis of vW disease, nor the discordant fibrinogen results
- The deranged results occurred due to a bubble in the tube (aliquoted nunc tube)
  - If unexplained results - check for clots, curve, bubbles and repeat
- The requesting Dr was using another Dr's sign on in Auslab
- The Consultant listed on the request form, in Auslab and in ieMR was not correct
  - Therefore we would never have contacted them anyway
- The results should have been removed from Auslab as soon as a discrepancy was identified

Balls Up Two



- 46 yr old male presented with cardiogenic shock, vasculitic rash over torso and limbs
- History – suffered from testicular torsion and enjoys two beers a day
- Suffered multiple cardiac arrests
- ECMO inserted but required 90 mins CPR
- Initial blood products – 2PC, 2PLTS, 8PTV
- Multiple ECMO circuit clots and emergent replacements of oxygenator
  - Further CPR
- Not a surgical candidate because too coagulopathic and DIC
- Vasculitic rash spreading ? antiphospholipid syndrome ? autoimmune/Infective process

Balls Up Two cont….

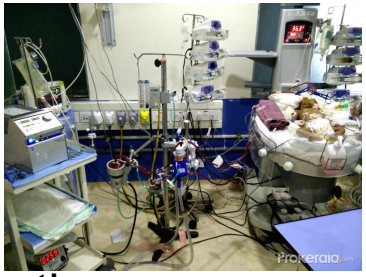
- Despite bolus heparin – Anti Xa activity only 0.03 IU/mL
  - AT3 level reduced resulting in heparin resistance
- Decision to treat with 1000 IU Thrombotrol three times a day
- AT3 level still reduced at 0.48 IU/mL (0.7-1.3)
- Treatment ceased due to further decline, patient passed away
- Product usage – 1 PC, 8 PLTS, 10 CRYO, 1 RiaStap, 5 AT3, 170g Privigen and 2 Prothrombinex (PTV)
  - Phone request received from ICU requesting 2 PTV – form requested
  - Scientist despatched product and product was infused
  - Form arrived some time later with request for Thrombotrol NOT Prothrombinex
  - Wrong product ordered and infused by ICU
  - Hospital wide review of ordering practices

Balls Up Two – Riskman/Actions

- Contributing factors
  - Note in diary saying AT3 treatment was being ceased for patient
  - No recorded details of phone request by dispensing scientist
  - No established processes around dispensing and recording phone requests at TPCH
  - Training – the products issued should have been checked against the request.

- Actions
  - Discussion with Transfusion CNC regarding ordering practices/processes in ICU
  - Discussion at PBMC – Verbal requests for products will only be accepted in cases of critical bleeding.
  - Process implemented to document phone requests in Auslab and to print a check label
  - Despatching Scientist received refresher transfusion training and competency
  - A comprehensive Transfusion competency developed for all staff
  - Improved labelling for identification of manufactured products in the Blood Fridge.

Balls Up Three



- Transferred from RBH in respiratory distress due to muconium aspiration
- Newborn < 12 hours old
- Treating team querying DiGeorge although there were no cardiac indicators
  - Need to provide Fresh CMV- Irr
- To be placed on ECMO
  - PQ document states that for emergency ECMO primes, units with < 7 days irradiated can be used for prime if a sticker indicating this is placed on the unit.
- ICU test donor units for K+ once primed with a target of <6
  - After 2 washes the K+ was still 6.1 but decision made to proceed
- Paediatric ECMO = grossly deranged coags due to heparin and consumption
- Requirement for AT3 replacement
- Blood usage – 3 PC, 1 PLT, 1 CRYO, 1 FFP, 2 AT3.

Balls Up Three - Investigation

- Without suspected cardiac complications DiGeorge should not have been suspected
- Patient was transferred from RBH at 15.00
  - ECMO insertion was around 23.00
  - Plenty of time to prep for insertion but….
  - Lab not informed of possibility of ECMO until they wanted to start priming...now it's urgent
- Transfusion staff queried the requirement for Irradiated products/DiGeorge
  - Confirmed by ECMO team numerous times
- Majority of Scientific staff were unaware of sticker requirement for prime units
- Physiological effect of high K+ in transfused irradiated blood products through an ECMO circuit has inconsistent findings
- Riskman directed to Hospital to review their ordering practices.
- Root Cause – Inappropriate ordering

Catching the Balls in Challenging Circumstances

- RL presented to ED with severe cardiomyopathy
- Progressive worsening cardiac, hepatic and renal function
- Patient placed onto VA ECMO
- Minor issues Day 2 to 5 post insertion
  - Left groin site a bit oozy
  - Plasma Hb increases – starts to haemolyse
  - Liver and renal function improvements
  - Potential ECMO removal planned on Day 6

- Unplanned decannulation of ECMO arterial line
- Massive Transfusion – 9 PC (4 Medevac), 1 PLT, 4 RiaStap
- Catastrophic haemorrhage and loss of cardiac output
- Coroner's case - Patient deceased

Catching the Balls – Lab Problems

- MTP called in the early hours of the morning
  - Only one Scientist on in the Lab
- New ROTEM guided MHP in use at TPCH
- Auslab temporarily corrupted patient UR number
- Quickly issued using the backup Antibody Register program
- Issued PC and PLTS with minimal drama.....but
- RiaStap not listed as a product in Antibody Register
- Hand written label and form for RiaStap

- Emails of thanks received from various members of the treating team for efficiency of product delivery, even though things went really bad.

Other Ball Drops

- Incorrect unit despatched to ward and not checked
- Donor units despatched with incorrect compatibility label attached
- Unvalidated products sent through the PTS
- Compatibility labels falling off bag in PTS
- Phenotyping error leading to Tx reaction
- Biostate issued and administered instead of Advate
- Blood fridge alarm disabled and door left open – products discarded
- Incorrect details scanned in to PTS tracking spreadsheet
- Panel performed and reported as negative when no plasma had been added
- Fya pos unit issued to multiple transfused patient with multiple antibodies
- ETC…..

Less Ball Drops - Improving Our Juggling Skills

- Being more diligent isn't the answer - nobody comes to work to do a bad job!
- Requirement to report incidents using tools available
- Investigate incidents by performing a thorough root cause analysis
- Improving systems and processes the reduced the likelihood of the error reoccurring

Acknowledgements

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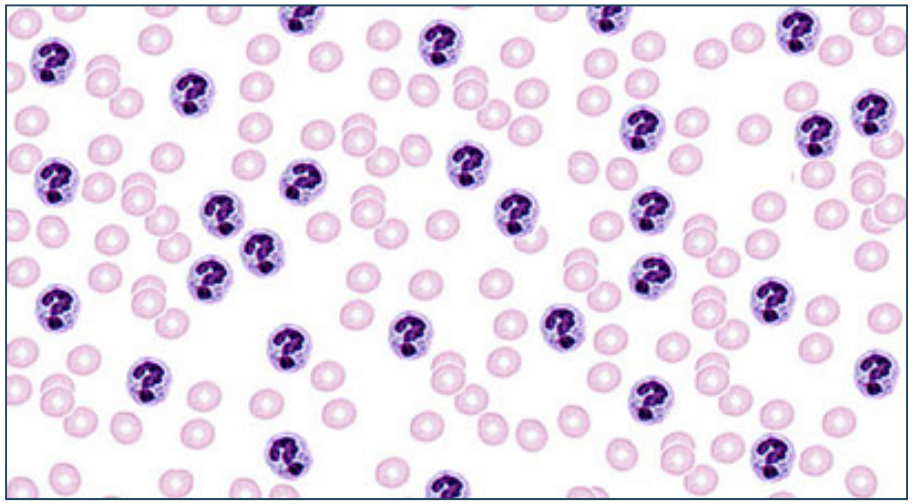
- TPCH Blood Bank Staff



THANKS FOR LISTENING