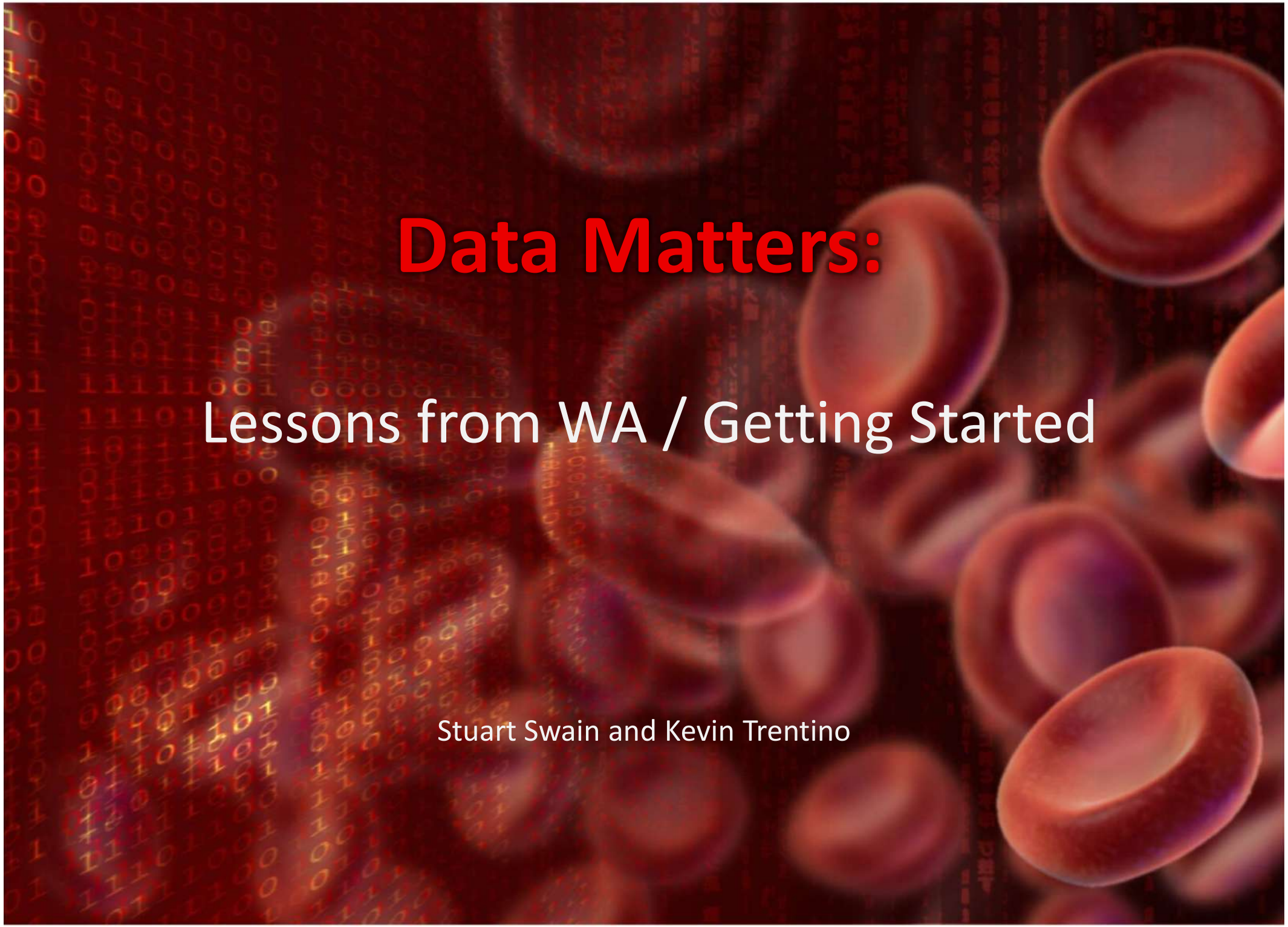
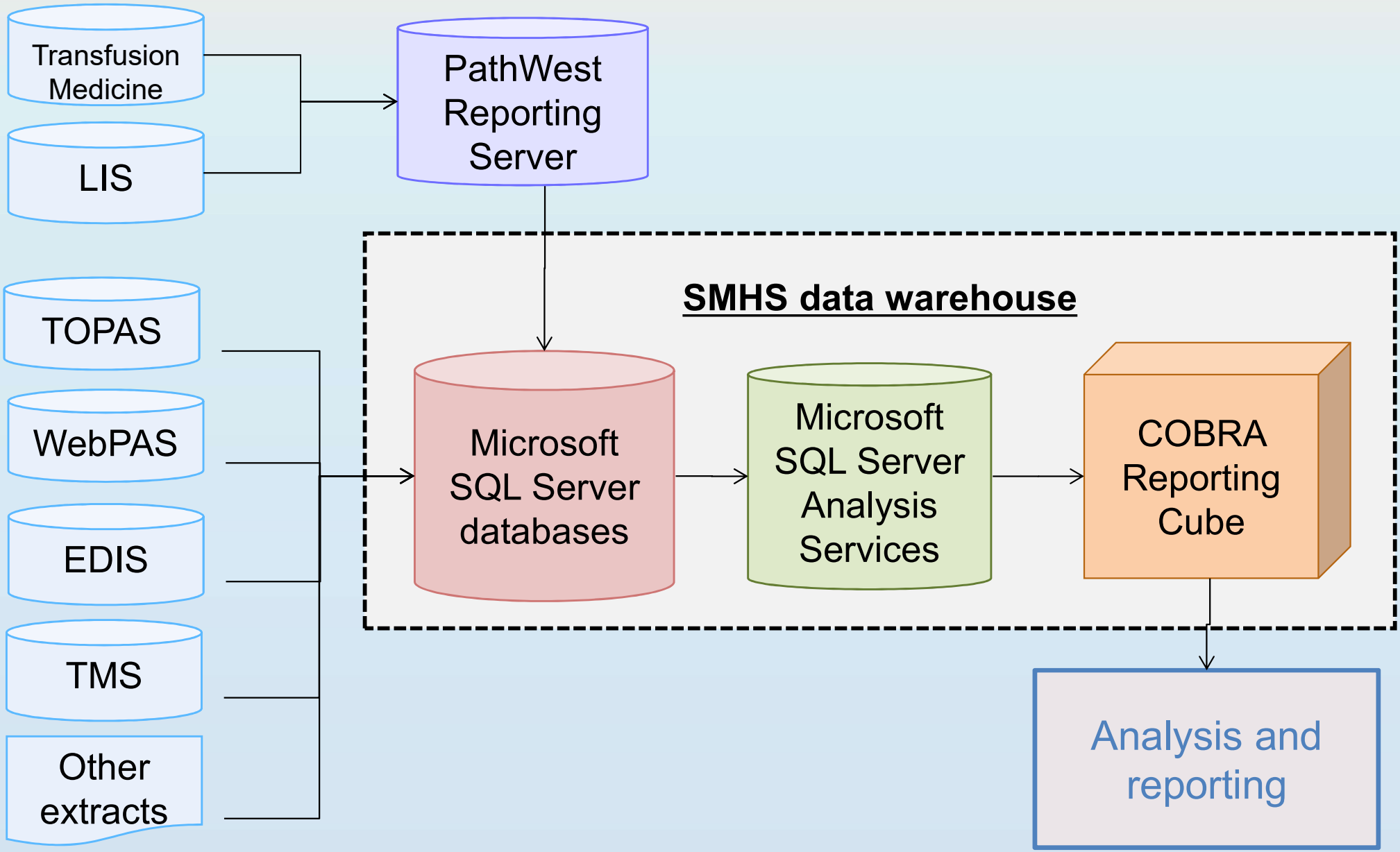

Data Matters:
Lessons from WA / Getting Started
Stuart Swain and Kevin Trentino

Data – dire difficulties?

- Too hard basket? (Or bottom of the pile – “it would be nice, but…”)
- Lessons from WA – state-wide URN came in handy…
- PBM Collaborative data – different capabilities, reporting systems, manual collection & reporting, … – but encouraging story
- Volume may be a challenge.
  - Casemix data – 50000 inpatients = 50000 rows
  - Transfusion data – 5% tx rate, avg 2 units = 5000 rows
  - Lab data – avg of 2 FBPs per case x 10 test items = 1000000 rows.
    (And that’s only tests during admission)
- Hypothesis → Issues/Dependencies/Assumptions → Benefits (Data)
  “There are opportunities to improve our services”
  - Or the other way around? “The data says that…”

The WA System – Overview



Getting started?

- Do you already have a data warehouse? (Automated reporting systems)
- Ask your Business Intelligence unit (aka performance unit, business department, MI, IT, …?)
- Some hospitals are very data poor – no automated systems – manual collection only for compliance reporting. Central IT staff?
- Already providing data to HRT – who is responsible? What data sources?
- Department of Health – state-wide reporting solutions. Available for local vs Commonwealth reporting?
- National collections – NHCDC, AIHW
- Update frequency – daily vs monthly? Operational reporting better from other systems (labs). Accuracy of transfusion data for yesterday / last week.

Background

- In 2008 the Western Australian Department of Health initiated a PBM program
- Data considered an important aspect of a successful program
- Problem: no automated system to report transfusion practice to clinicians and hospital executive
- Trouble finding data & who to talk to – really by chance (serendipity)
- Pilot / proof of concept data system around August 2010

What happened??

- Mature / final system went live October 2015

Hurdles & Roadblocks

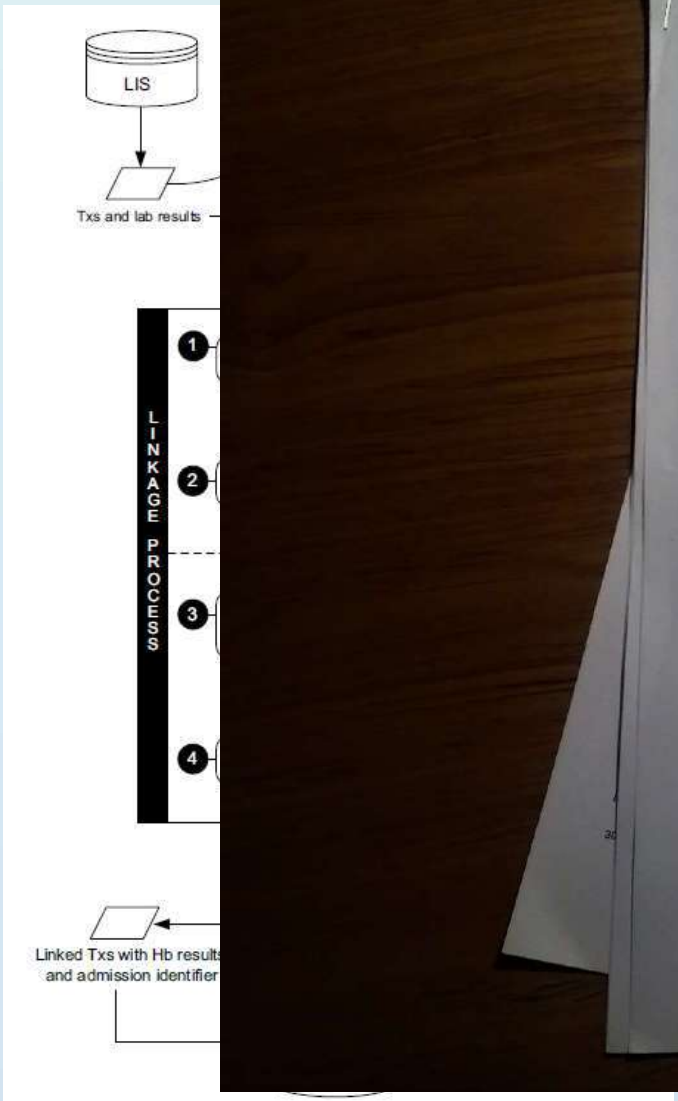
- Lack of understanding of what is possible & the way things should be developed
- Lack of specialist expertise, no modelling, “best guess” approximations
- It provided something, which is a lot better than nothing…
- …however the tendency can be to stop there. “Good enough” attitude, despite immaturity of system, lack of lab data for non transfused patients, security issues, etc.

- Summary: gotta get the right people together.
  (Acknowledgement – this can be a big enough hurdle itself!)

Papers Describing PBM Data Linkage

Effectiveness of a patient blood management data system in monitoring blood use in Western Australia

S. A. MUKHTAR, M. F. LEA
V. JEWLACHOW, S. L. FAR



A data-driven approach to patient blood management

BLOOD MANAGEMENT

A data-driven approach to patient blood management

Claudia S. Cohn, Julie Welbig, Robert Bowman, Susan Kammann, Katherine Frey, and Nicole Zantek

BACKGROUND: Patient blood management (PBM) has become a topic of intense interest; however, implementing a robust PBM system in a large academic hospital can be a challenge. In a joint effort between transfusion medicine and information technology, we have developed three overlapping databases that allow for a comprehensive, semiautomated approach to monitoring up-to-date red blood cell (RBC) usage in our hospital. Data derived from this work have allowed us to target our PBM efforts.

STUDY DESIGN AND METHODS: Information on transfusions is collected using three databases: daily report, discharge database, and denominator database. The daily report collects data on all transfusions in the past 24 hours. The discharge database integrates transfusion data and diagnostic billing codes. The denominator database allows for rate calculations by tracking all patients with a hemoglobin test ordered. A set of algorithms is applied to automatically audit RBC transfusions. The transfusions that do not fit the algorithms' rules are manually reviewed. Data from audits are compiled into reports and distributed to medical directors. Data are also used to target education efforts.

RESULTS: Since our PBM program began, the percentage of appropriate RBC orders increased from an initial 70%–80% to 90%–95%, and the overall RBC transfusions/1000 patient-days has decreased by 67% in targeted areas of the hospital. Our PBM program has shaved approximately 3% from our hospital's blood budget.

CONCLUSION: Our semiautomated auditing system allows us to quickly and comprehensively analyze and track blood usage throughout our hospital. Using this technology, we have seen improvements in our hospital's PBM.

Patient blood management (PBM) has become a topic of intense interest for many reasons. Blood is a precious and limited resource that carries inherent risks when transfused. Although infectious disease screening has made blood extremely safe, it has contributed to higher costs, which are straining hospital budgets. The importance of this topic was recently highlighted by the AABB when it produced the "Best Practices for Patient Blood Management" guidance document.[1]

Implementing a robust PBM system in a major university hospital can be a challenge. Many physicians were trained during a time when good evidence-based guidelines for red blood cell (RBC) transfusions were lacking. They were taught to follow the maxim "if you are going to transfuse, why not give two."[2,3] Now, however, there are multiple investigations of RBC[4–11] and platelet (PLT) use,[12–18] which have led to guidelines, published by the AABB and other groups, to help guide practice.[17–19] Nonetheless, some clinicians can be slow to change.

To help foster a good transfusion culture in our hospital, we have developed a three-pronged semiautomated approach to monitor RBC usage. In a joint effort between transfusion medicine and information technology, we have developed three overlapping databases that allow us

ABBREVIATIONS: EMR = electronic medical record; ICD-9 = International Classification of Diseases; LIS = laboratory information system; PBM = patient blood management.

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TRANSFUSION 2014;54:316–322.

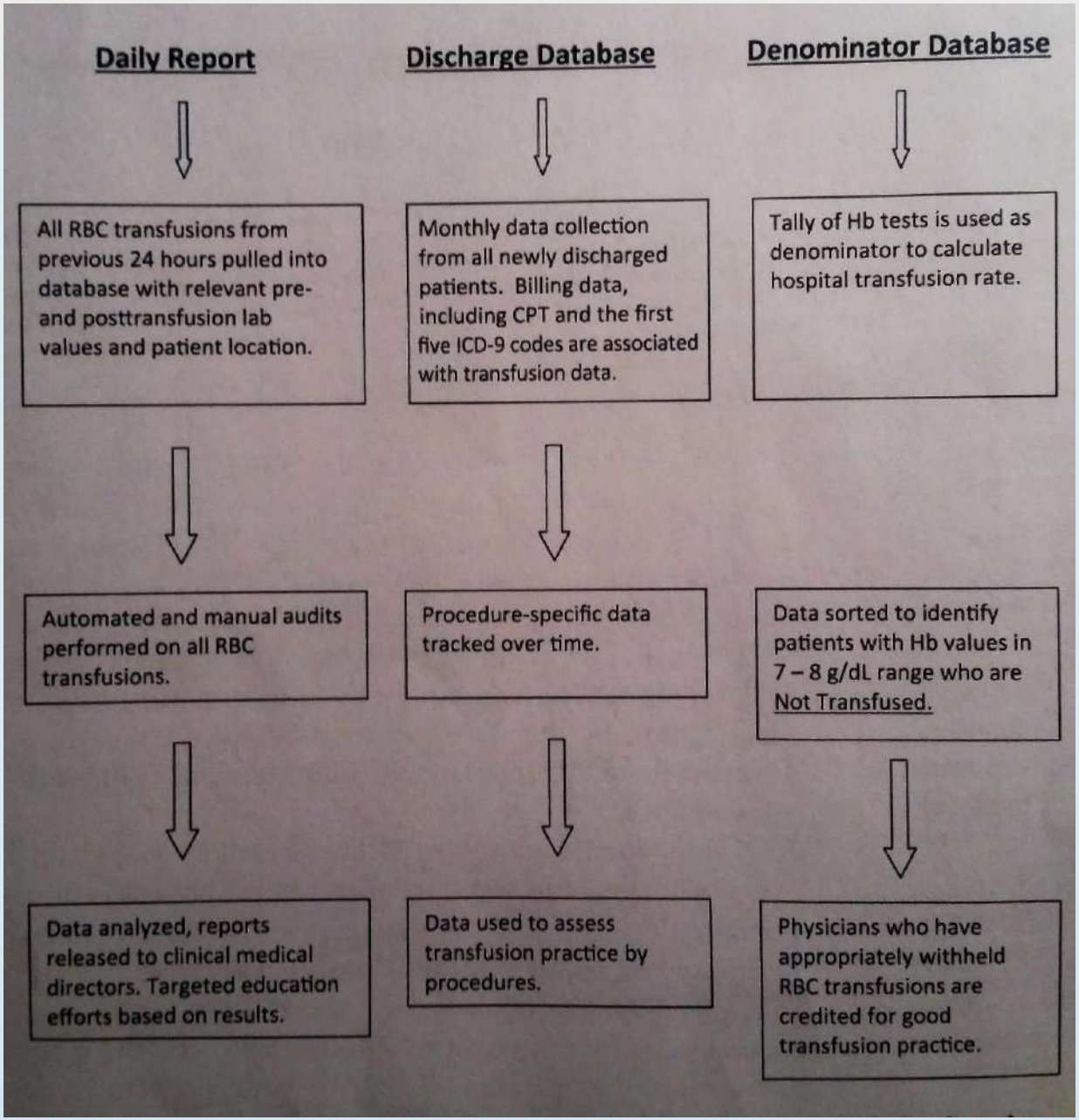
Monitoring compliance with transfusion guidelines in hospital departments by electronic data capture

...en[2], Pär I. Johansson[1]

...identifying the initial patient population
... Commission.

...al ID-number was used to combine
...eate a patient-specific chronology.

Three Systems Working Together



Clinician driven automated audit rules

TABLE 1. Example of some rules used for automated audits*

Description	Excerpt of rule
Adult general RBC transfusion	If "adult" RBC and "inpatient" and pretransfusion Hb ≤ 7.4 and posttransfusion Hb ≤ 8.4 then appropriate
Adult cardiology patient	Pretransfusion Hb ≤ 8.4 and posttransfusion Hb ≤ 9.4 and any of the following service lines: a. CSI b. Cardiac catheterization c. Cardiac ICU d. Cardiology e. Cardiothoracic surgery
Bleeding patient	If RBC and posttransfusion Hb ≤ pretransfusion Hb then appropriate
BMT patient	If RBC and "inpatient" and "BMT" location and pretransfusion Hb ≤ 8.4 then appropriate
Neonatal	If RBC and "inpatient" and "Peds" and "NICU" location and pretransfusion Hb ≤ 13.4 and posttransfusion Hb ≤ 14.4 then appropriate
Surgery	If RBC and "operating room transfusion" then appropriate

* These rules are applied as part of an automated algorithm for daily audits of RBC transfusions. All RBC transfusions that do not fit within the rule's variables are automatically marked for further review. A transfusion medicine physician or transfusion safety officer manually audits these transfusions.

BMT = bone marrow transplant; CSI = coronary structure intervention; ICU = intensive care unit; NICU = neonatal intensive care unit; Peds = pediatric.

Important points

Developing an effective PBM program requires the acquisition and analysis of good data to assess transfusion practice. We have developed three databases that serve independent and overlapping functions for a comprehensive and nuanced approach to RBC tracking. While each database provides useful, independent information, it is the three-pronged approach to our data that has created a more dynamic and powerful tool.

including didactic lectures, short in-service talks, and Web-based lectures. We also widely distribute the hospital's transfusion guidelines, using conventional and electronic media for easy access. Abridged, laminated pocket- and wallet-sized cards are also in use. These efforts have led to improvements in transfusion practice, including a decrease in the number of inappropriate RBC units ordered (see Fig. 2A) and a decrease in 2-unit RBC orders (see Fig. 2B).

Data system stages – detailed version

WHO

- Who was transfused? Who wasn't?
- Basic administrative data (all patients)

Example reporting:

- Percentage transfused, by procedure group, department, DRG, age, gender, etc
- Outcome measures: mortality, readmissions
- Activity based funding
- Add costing data for costing vs funding analysis

WHAT & WHERE

- What happened & where?
- What blood products (type, num units)
- What was the patient's Hb (adm, disch, nadir)

Example reporting:

- Transfusions by unit type
- Highest use departments, procedures
- Where transfusions are occurring ("My patients are being transfused in ICU")
- Association with anaemia

WHEN

- When did it happen?
- Longitudinal data: transfusions, lab results
- Expanded "where": bed history, theatre

Example reporting:

- Intra vs post-op units
- Association with ICU length of stay?
- Better pre/post transfusion Hb reporting:
  - Guidelines compliance
  - Identification and exclusion of bleeding patients

WHY

- Why did it happen (or not happen)?
- Lab results for both groups: tx'd & non-tx'd
- Indication for transfusion

Example reporting:

- Measures for anaemia screening / iron therapy
- Assessing transfusion alternatives & outcomes
- Better transfusion reporting:
  - By transfusing/ordering doctor not discharge doctor
  - Based on indication for tx not just Hb trigger

Stages – Simplified Version

- Stage 1 – Coded data (HRT inpatient dataset)
- Stage 2 – Adds transfused units
  - Tx consultant vs discharging
  - Dose dependent relationships
  - Single unit rule reporting
- Stage 3 – Adds lab values
  - Pre/post transfusion – trigger/target reporting
  - Admission / discharge anaemia
- Stage 1 is easy because you already have the data (submitted to HRT).
- "Worst case" scenario = retrospective analysis (3/6/12 months). Variation in care, benchmarking, peer comparison etc.
- Stage 2? If not HRT, or data warehouse? Lessons from Cohn paper.
- Stage 3? Lessons from Cohn, WA, & PBM Collaborative.

questions?