

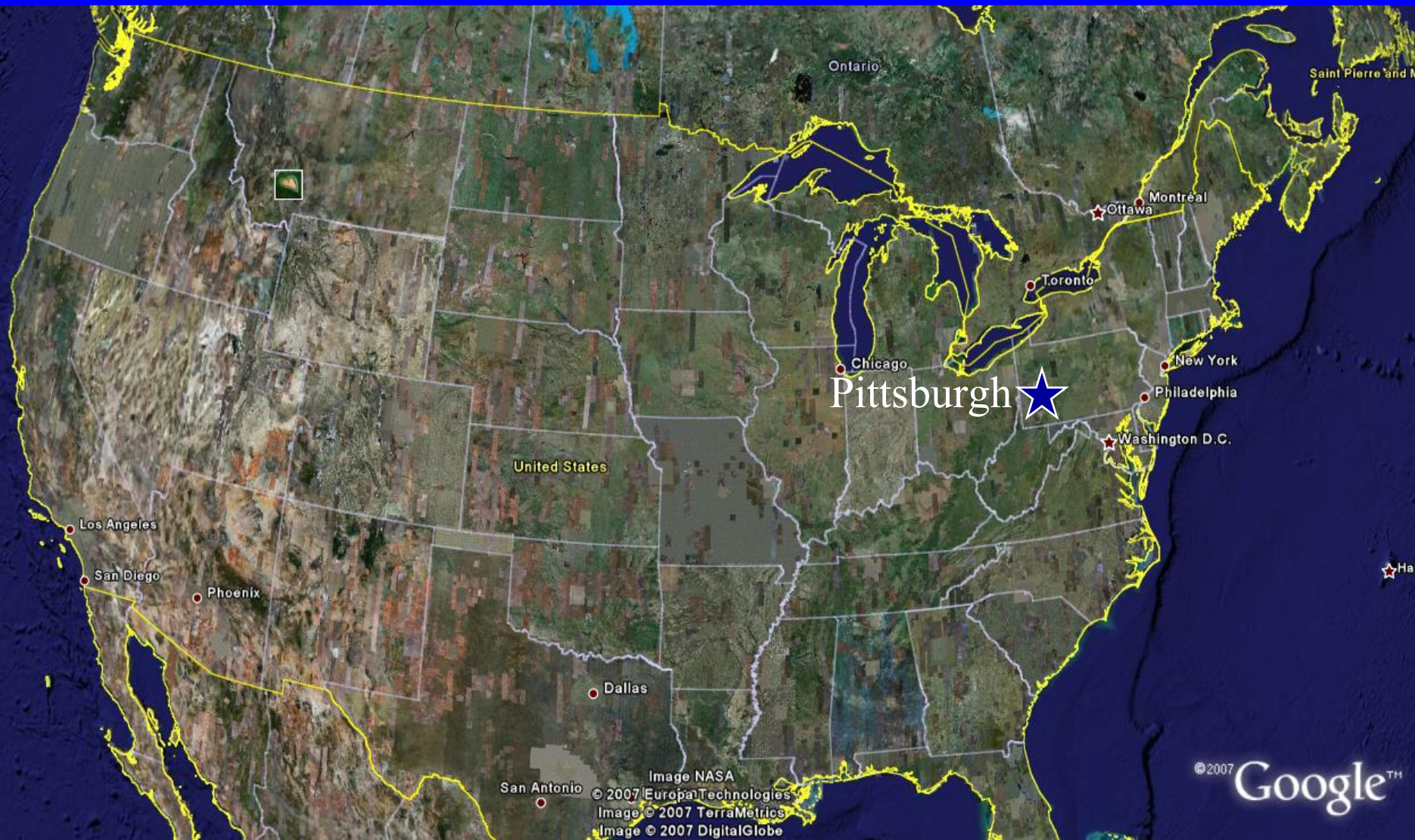
# Medical Aspects of the Pittsburgh Centralized Transfusion Service

---

**Mark Yazer, MD FRCPC**

The Institute For Transfusion Medicine

Department of Pathology, University of Pittsburgh



Pittsburgh

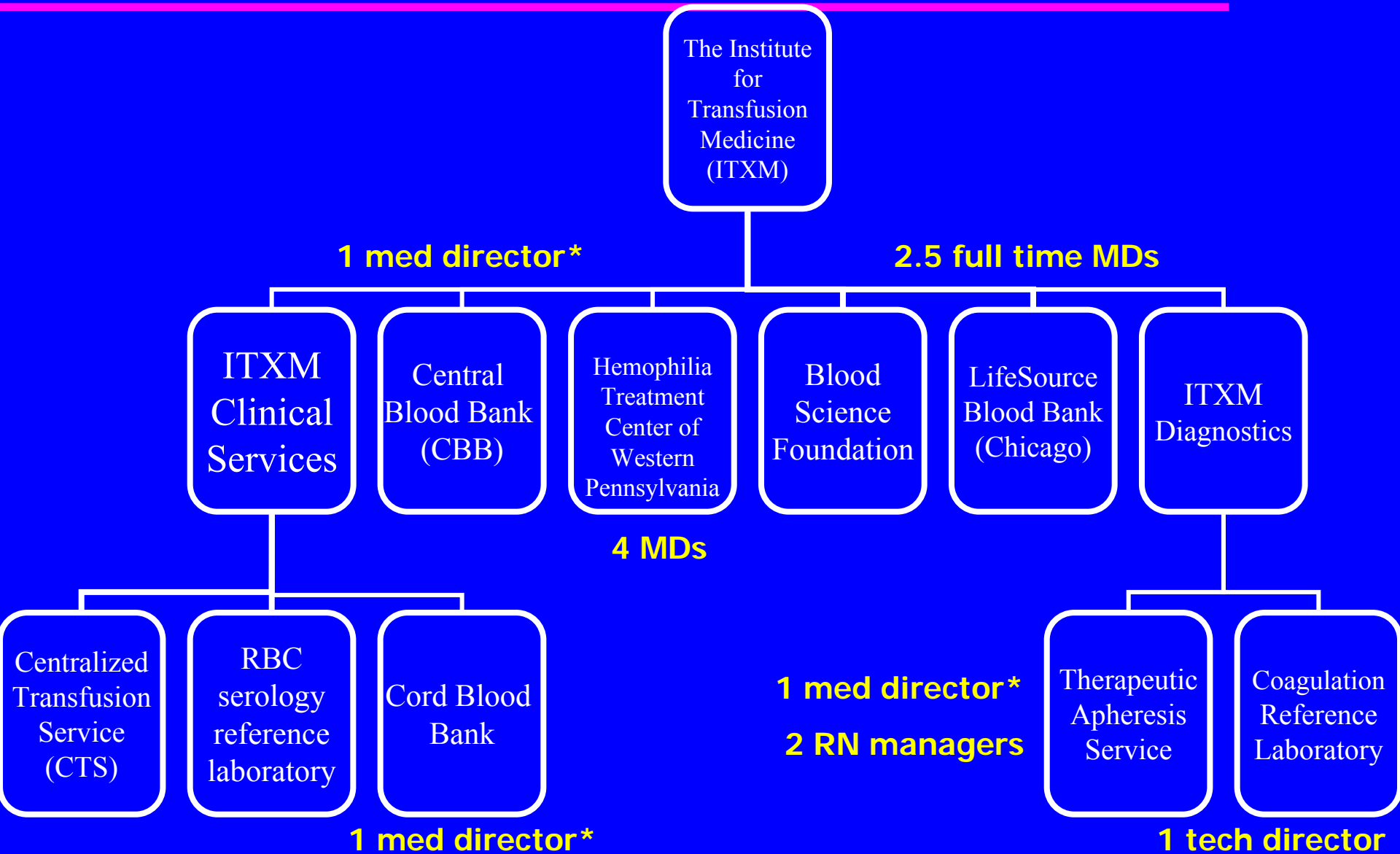


United States

© 2007 Google™

Image NASA  
© 2007 Europa Technologies  
Image © 2007 TerraMetrics  
Image © 2007 DigitalGlobe

# ITXM is the parent company of CTS



# CBB vs. CTS

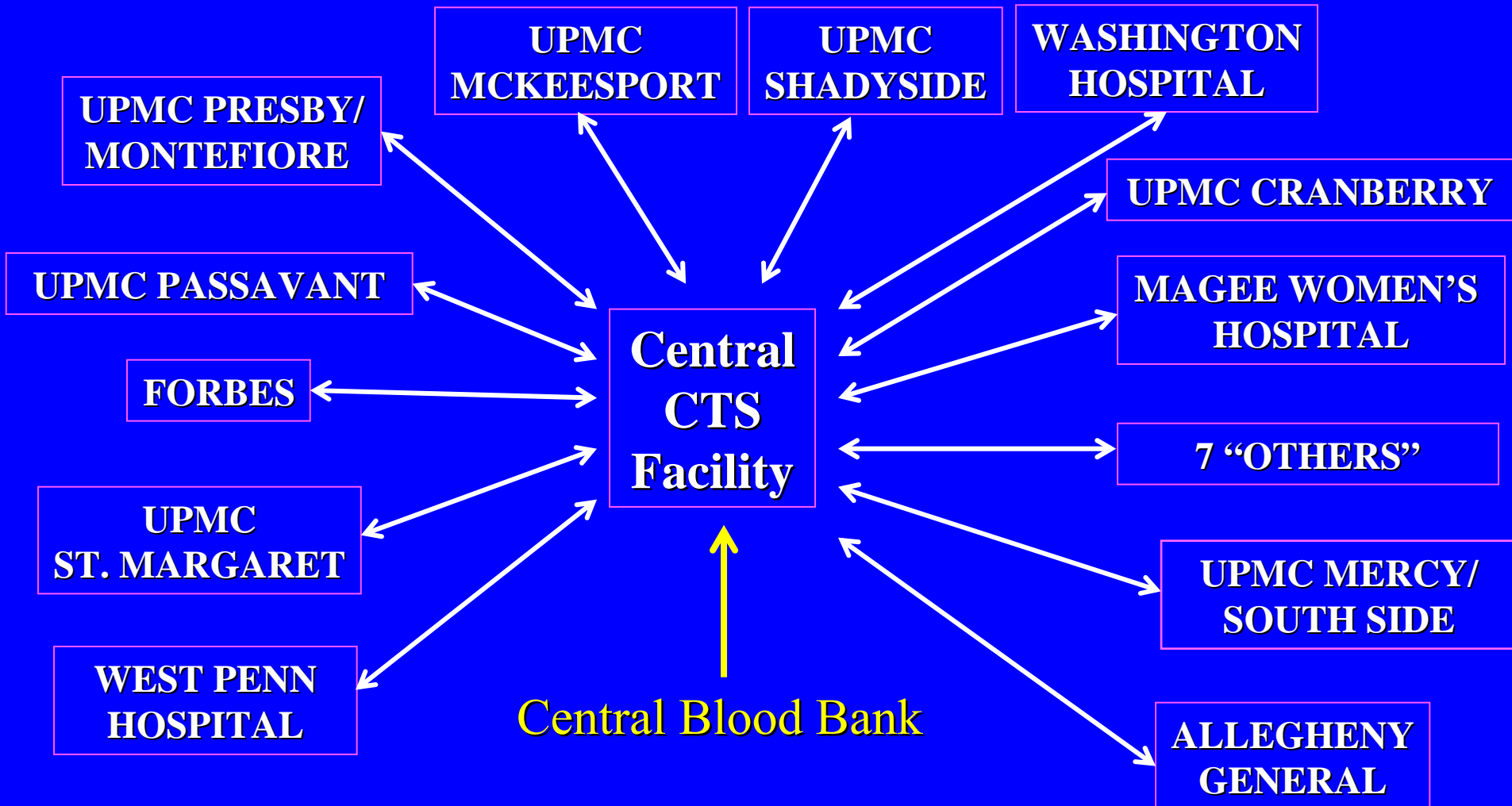
	<u>CBB</u>	<u>CTS</u>
Parent Company	ITxM	ITxM
Role	Collect donations, prepare components	Provide medical and technical services to member hospitals
# full time physicians	1	4
# hospitals serviced	~ 45	16
Patient/physician interactions	Minimal	Daily
Community visibility	High	Low

# Centralized Transfusion Service...

---

A network of integrated hospital transfusion services that are supported by BOTH on-site and central laboratory facilities

# The Centralized Transfusion Service Concept in Pittsburgh



## Hospital laboratory

>80% plasma thawing

90% Cryoprecipitate thawing & pooling

5% STAT ABO typing

## Central laboratory

80% PLT pooling

85% Irradiation

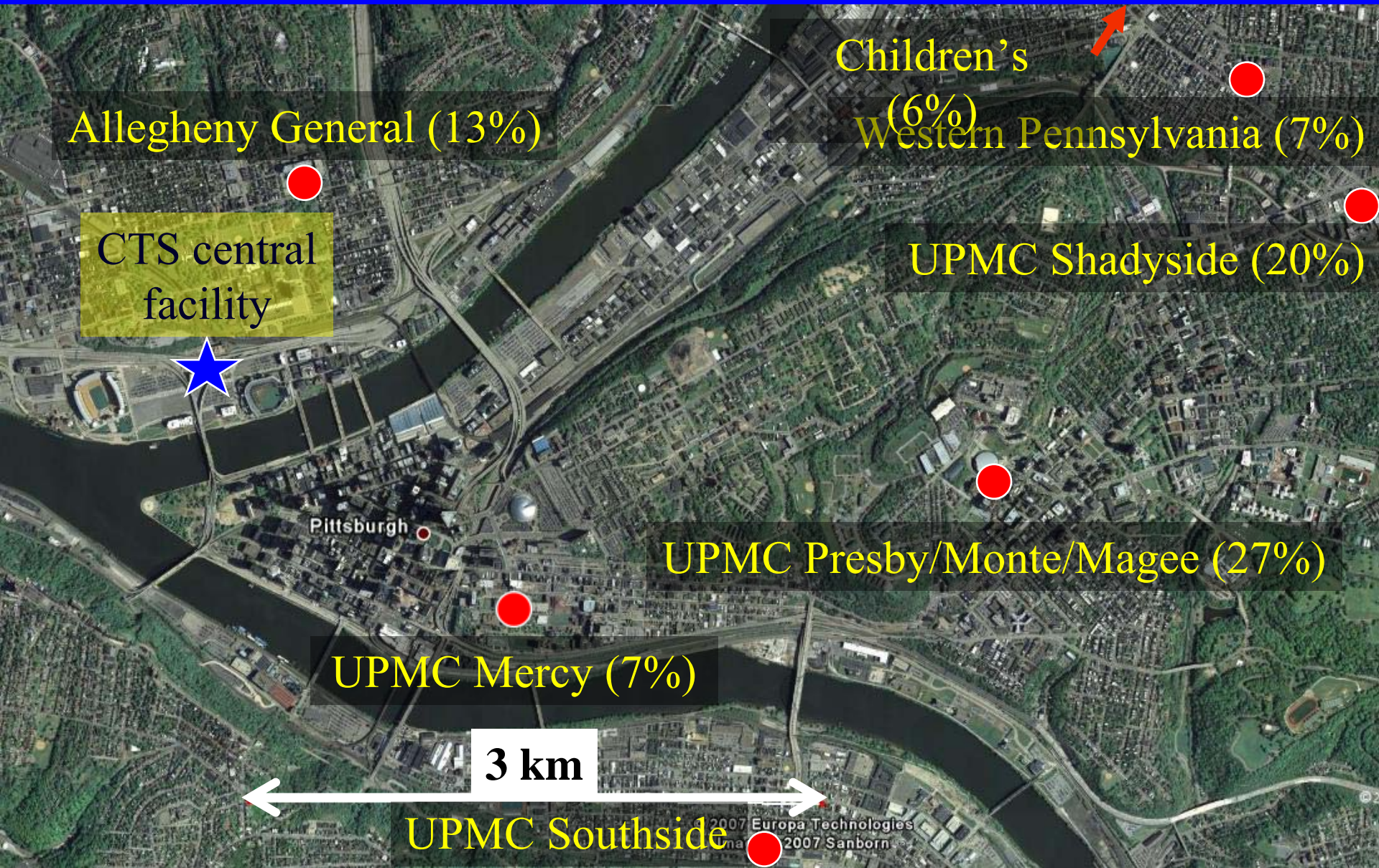
> 85% Leukoreduction

95% Washing/deglycerolization

95% Pretransfusion testing

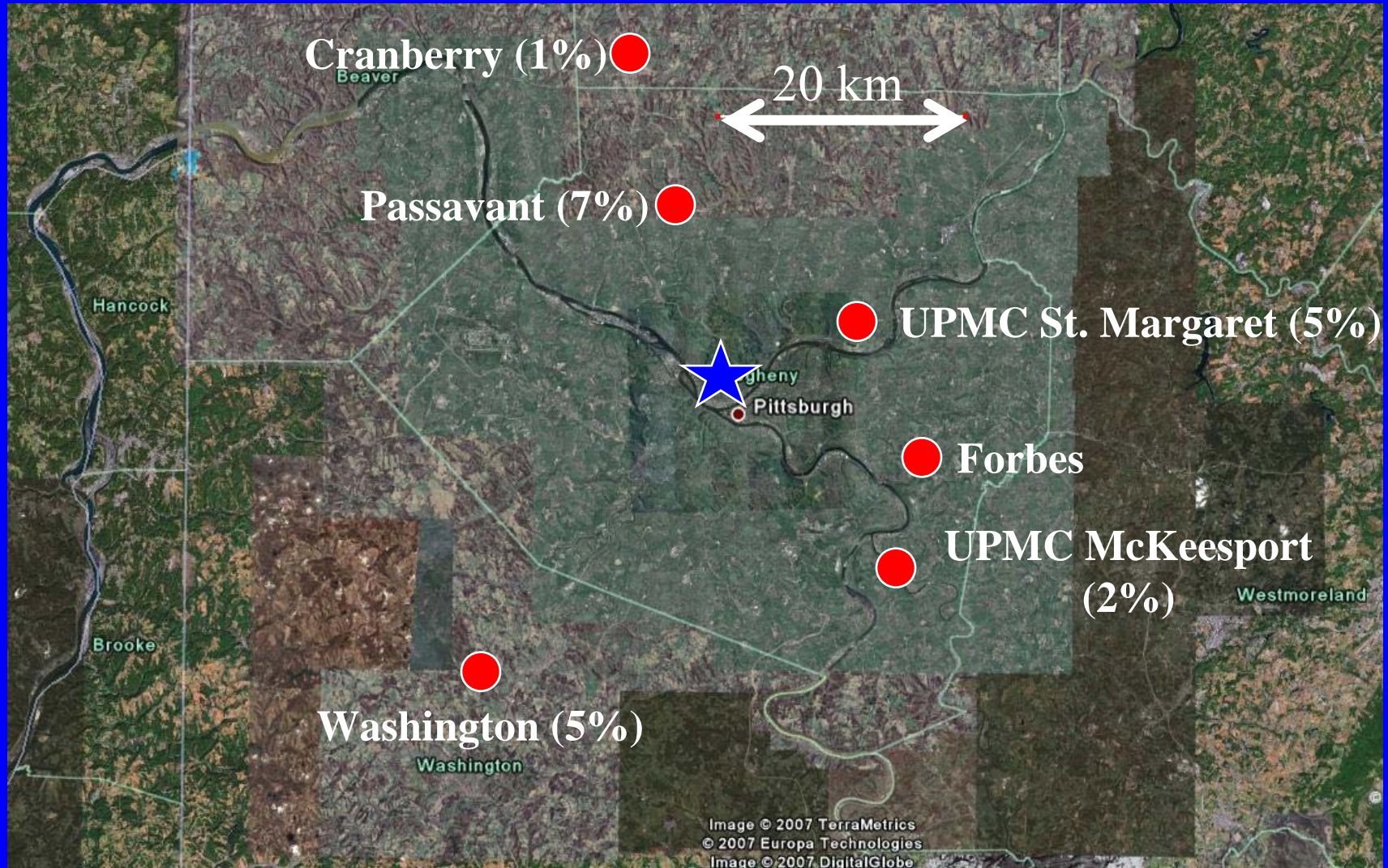
99% Immunohematology

# Geographic distribution of hospitals in the CTS system



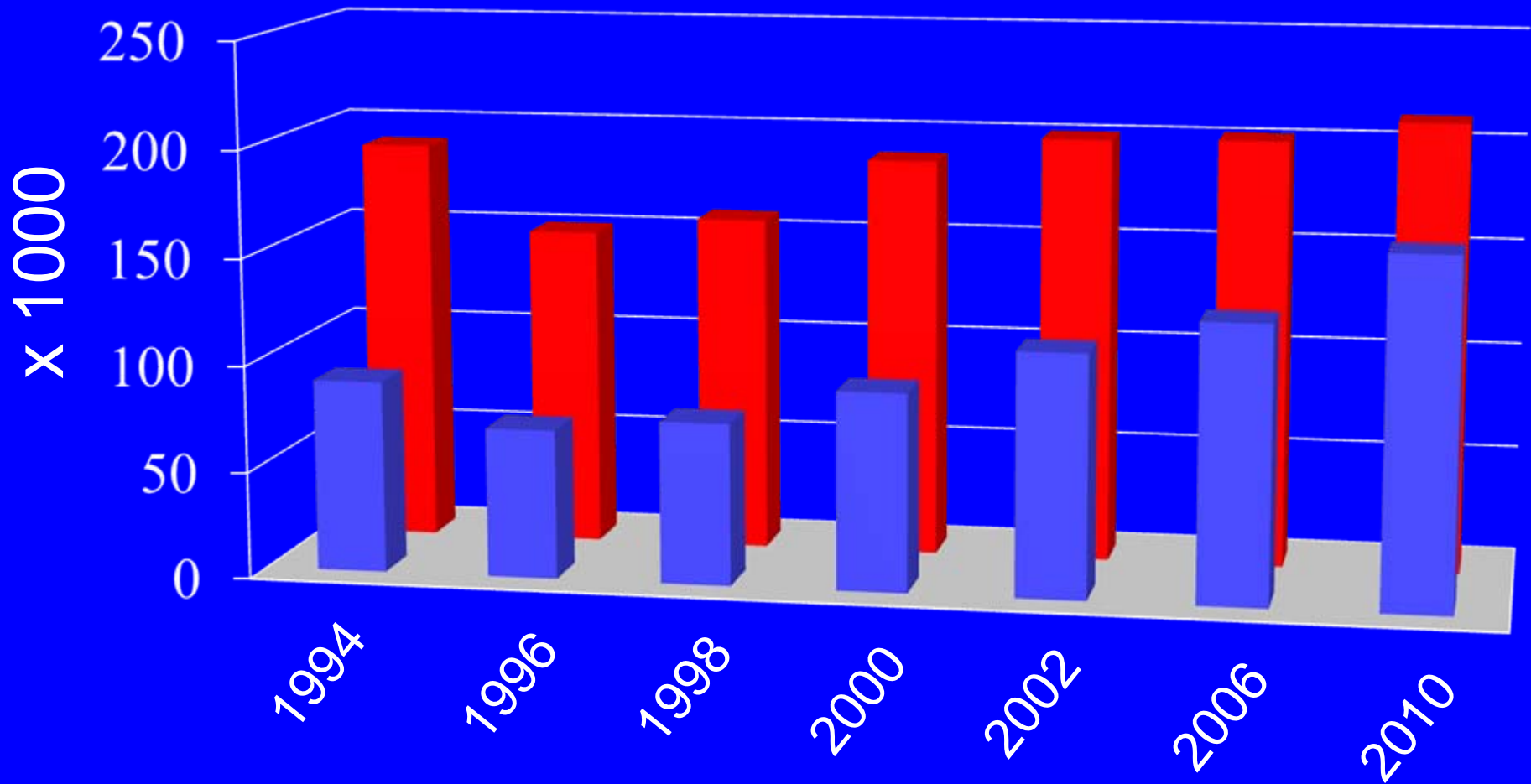


# Geographic distribution of hospitals in the CTS system



# The Pittsburgh CTS by the numbers

■ Crossmatches      ■ Types & Screens

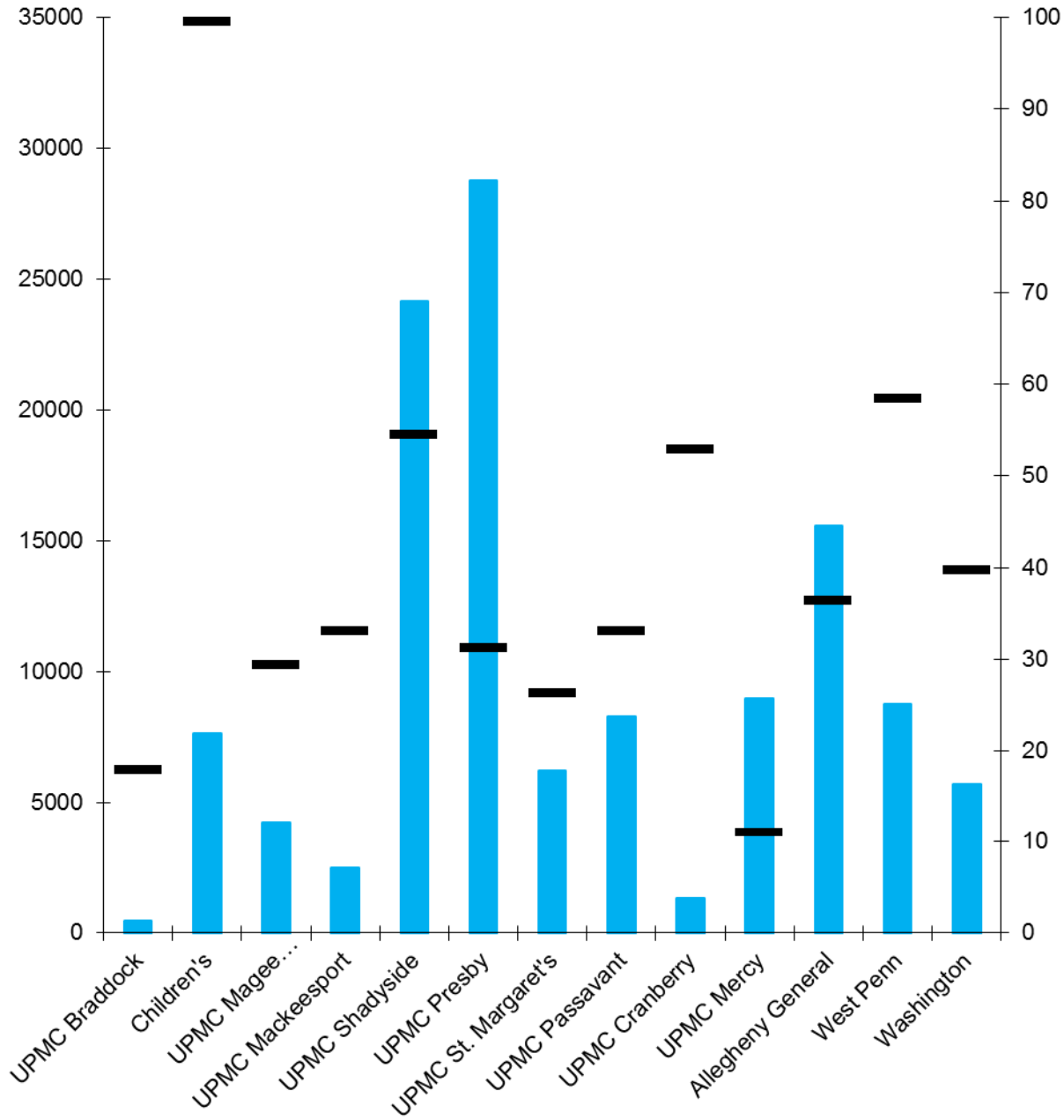


# The Pittsburgh CTS by the numbers: FY 10

---

- ❑ RBC: 123,000 (42% leukoreduced)
  - ❑ PLT: 112,000 WBP Eq (10% apheresis)
  - ❑ Plasma: 71,000 (including thawed plasma)
- » About half of these products went to 3 hospitals

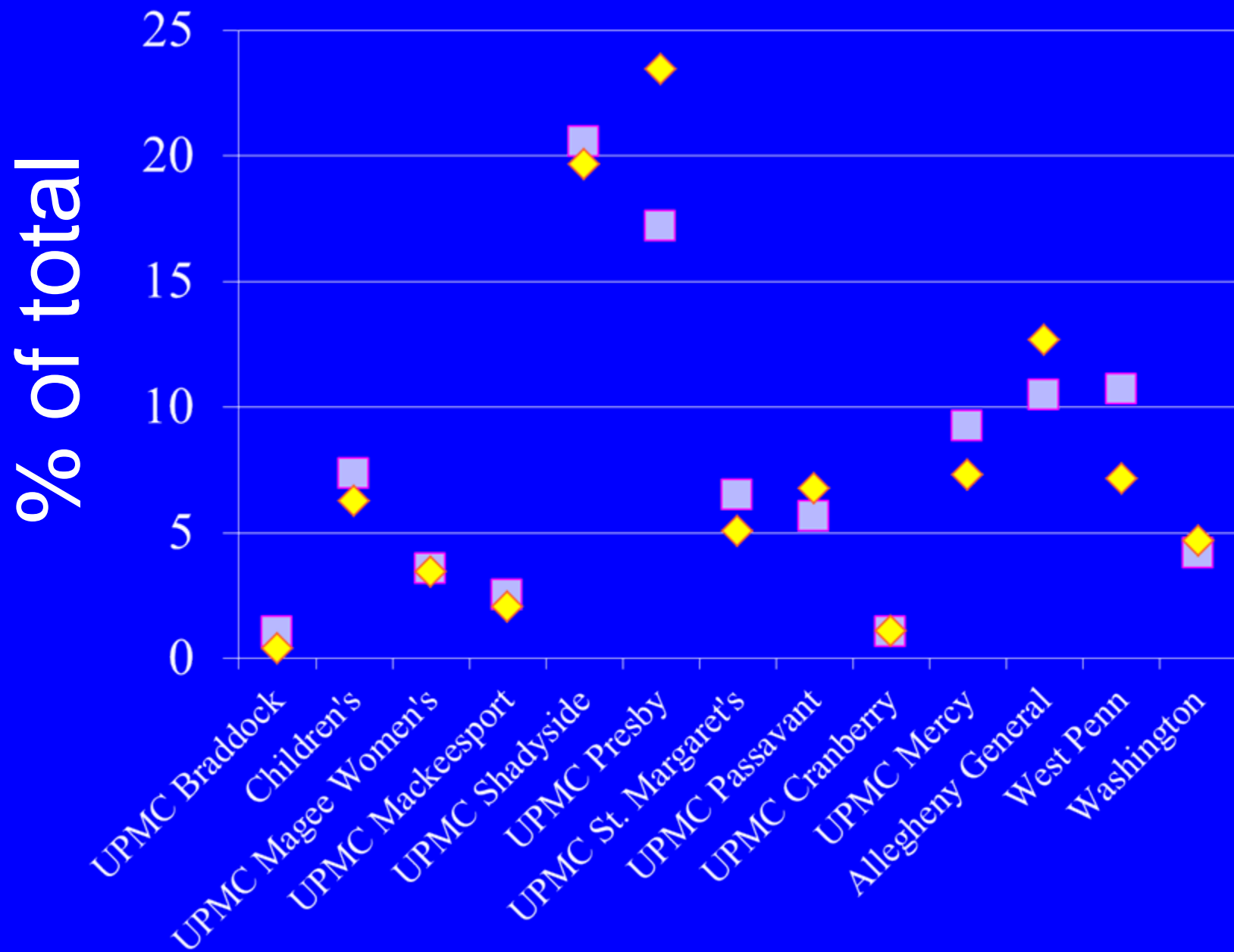
# RBCs transfused in 2010



% Leukoreduced RBCs

■ Transfusion reactions

◆ RBCs transfused



# Essential Operational Features

---

- ❑ Information Systems
- ❑ Medical Expertise
- ❑ Automated testing

# Essential Features Of The CTS: Information Systems

---

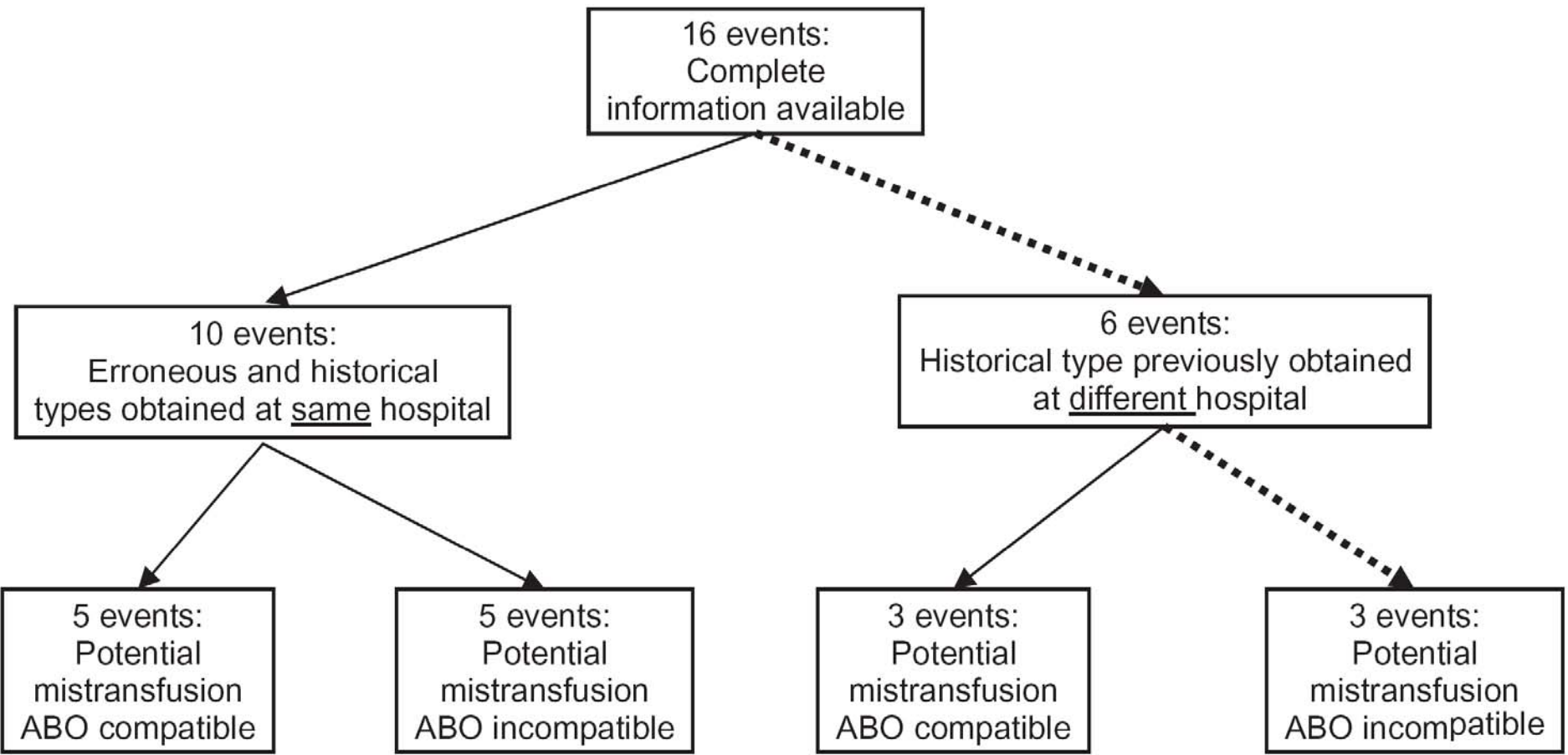
- Tracking and storing patient special needs information
  - » Patients can visit different hospitals
  - » Essential component modification details follow them
  - » Eliminates the need to re-investigate special needs with every admission
  - » Permits anticipation of daily blood needs

# Essential Features Of The CTS: Information Systems

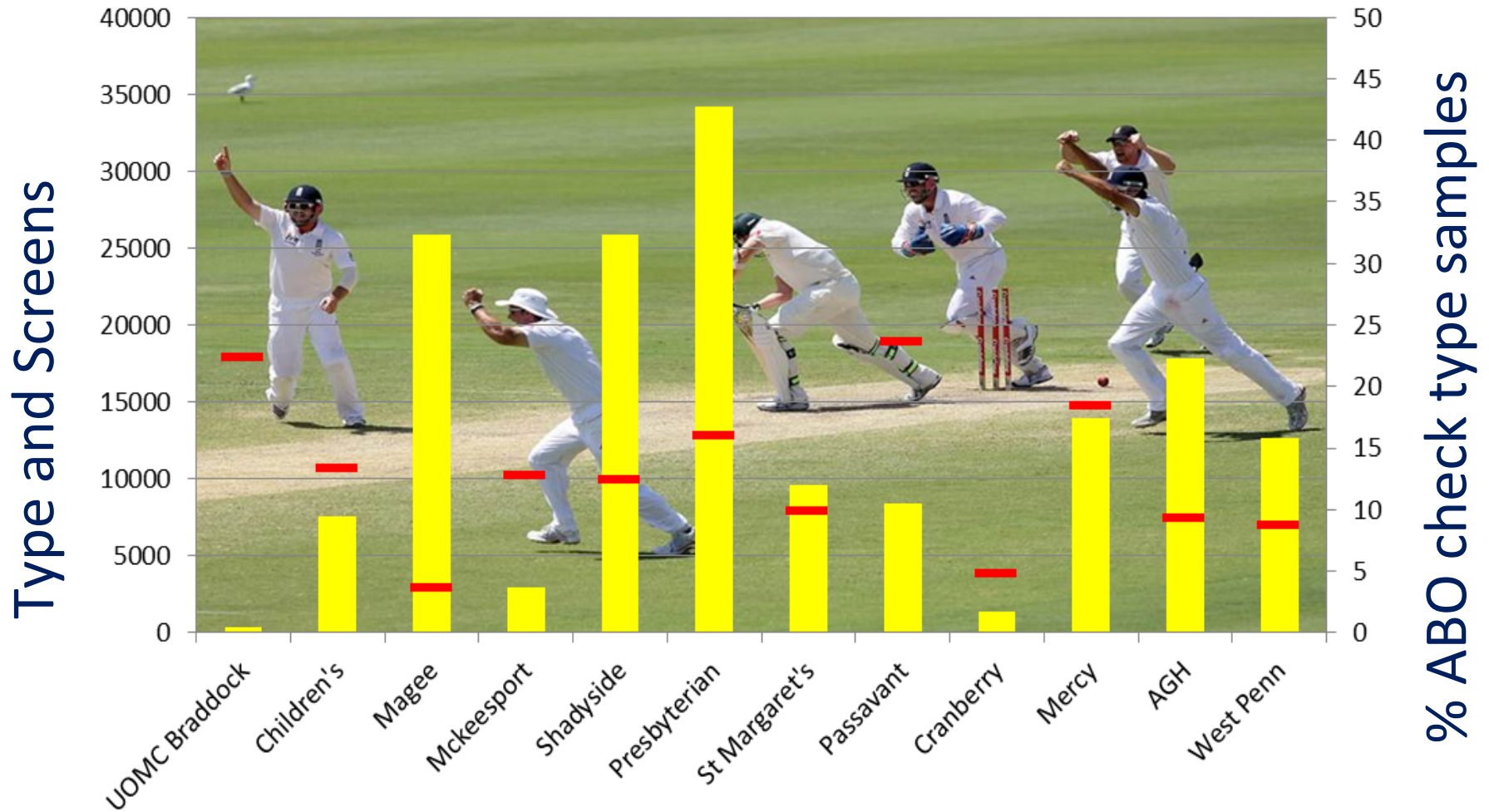
---

- ❑ Serological history follows recipients
  - » Easy to view recipients' entire in-network transfusion history
  - » Transfusion reaction history is also readily available (guides component modifications)
  - » Can reduce extent of repeat serological investigations
  
- » **Historical ABO type is maintained on file!**





# ABO check type sample quickly implemented in 2010



# Essential Features Of The CTS: Information systems

- ❑ Central databank facilitates regional utilization review
  - » Helps to identify sources of product wastage and “non-evidence based” transfusion practice
  - » Can rapidly implement corrective measures; preserves the city’s blood inventory
  - » Allows for benchmarking between similar hospitals

# Benefits of a CTS: Medical expertise

---

- ❑ On average only 39 candidates/year write the TM board
- ❑ That's barely enough for each hospital in Pittsburgh!
  - » What about the rest of the country!?
- ❑ All CTS hospitals have the benefit of 24/7 expert MD coverage, even the smaller-volume sites
- ❑ In Pittsburgh, 4 physicians can manage 19 hospitals thanks to:
  - » Centralization
  - » Thorough SOPs
  - » Competent and motivated technologists
  - » Knowledgeable managers

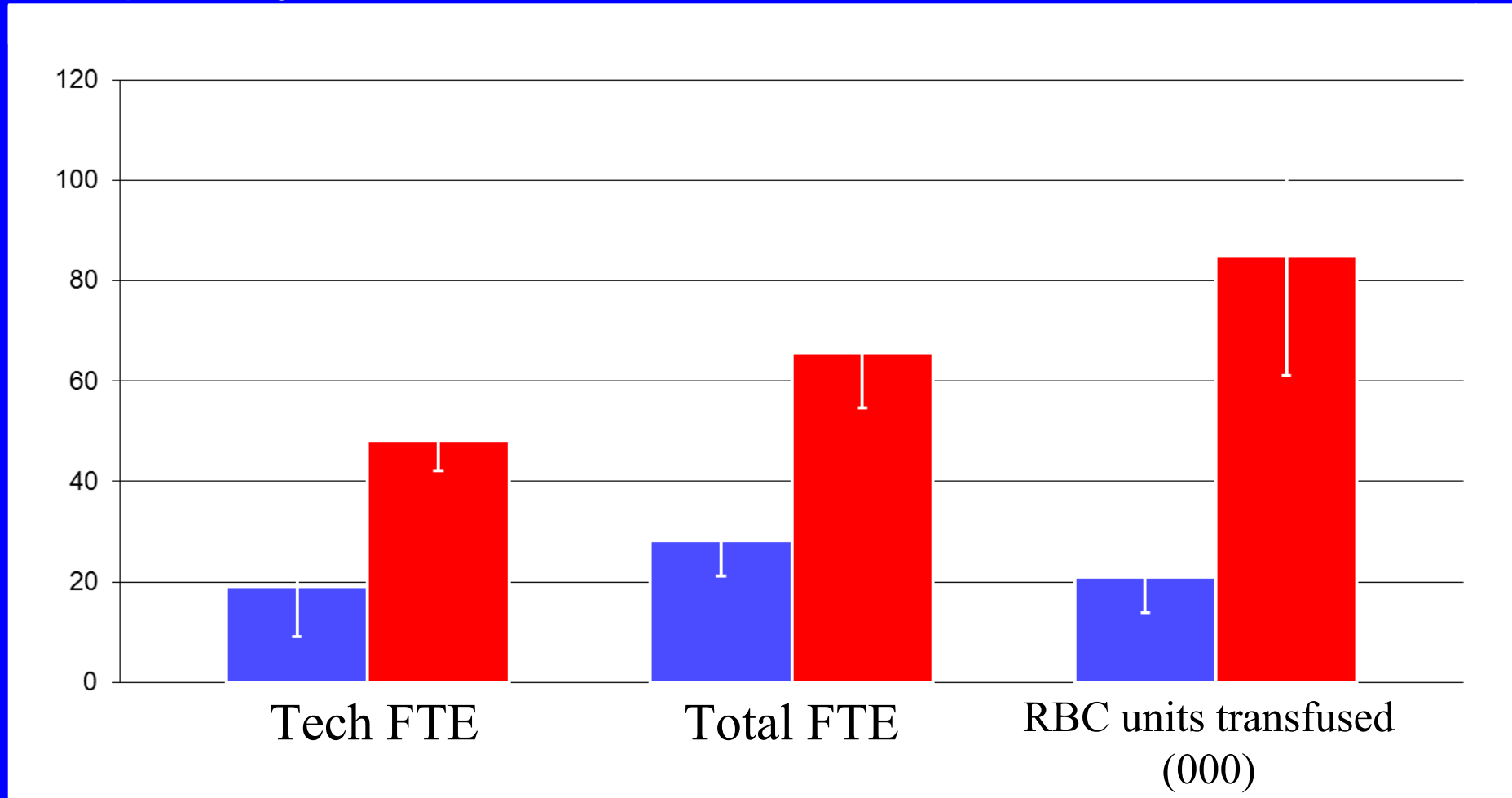
# Benefits of a central laboratory: Antibody investigations

---

- ❑ Technologists skilled in blood group serology are hard to find
- ❑ It takes 20 years to become a 20 year veteran
- ❑ There are 16 hospitals in our CTS network
  - » There aren't that many serologists in Pittsburgh!
- ❑ It is logical to pool this expertise in one laboratory

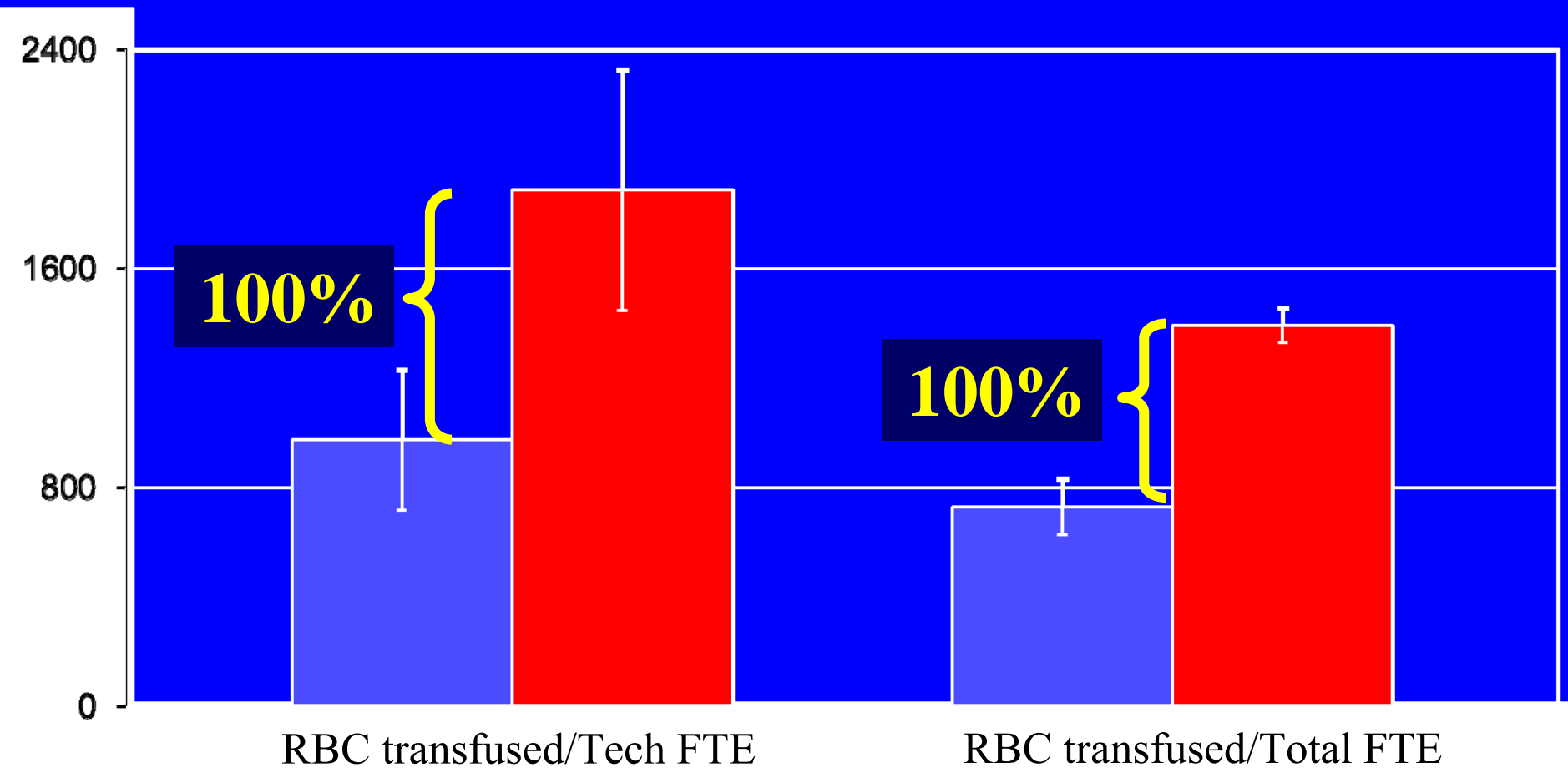
# Benefits of a central laboratory: Higher efficiency

- Comparison of efficiency of 3 CTS vs. 6 in-hospital transfusion service (HTS) non-supervisory staff



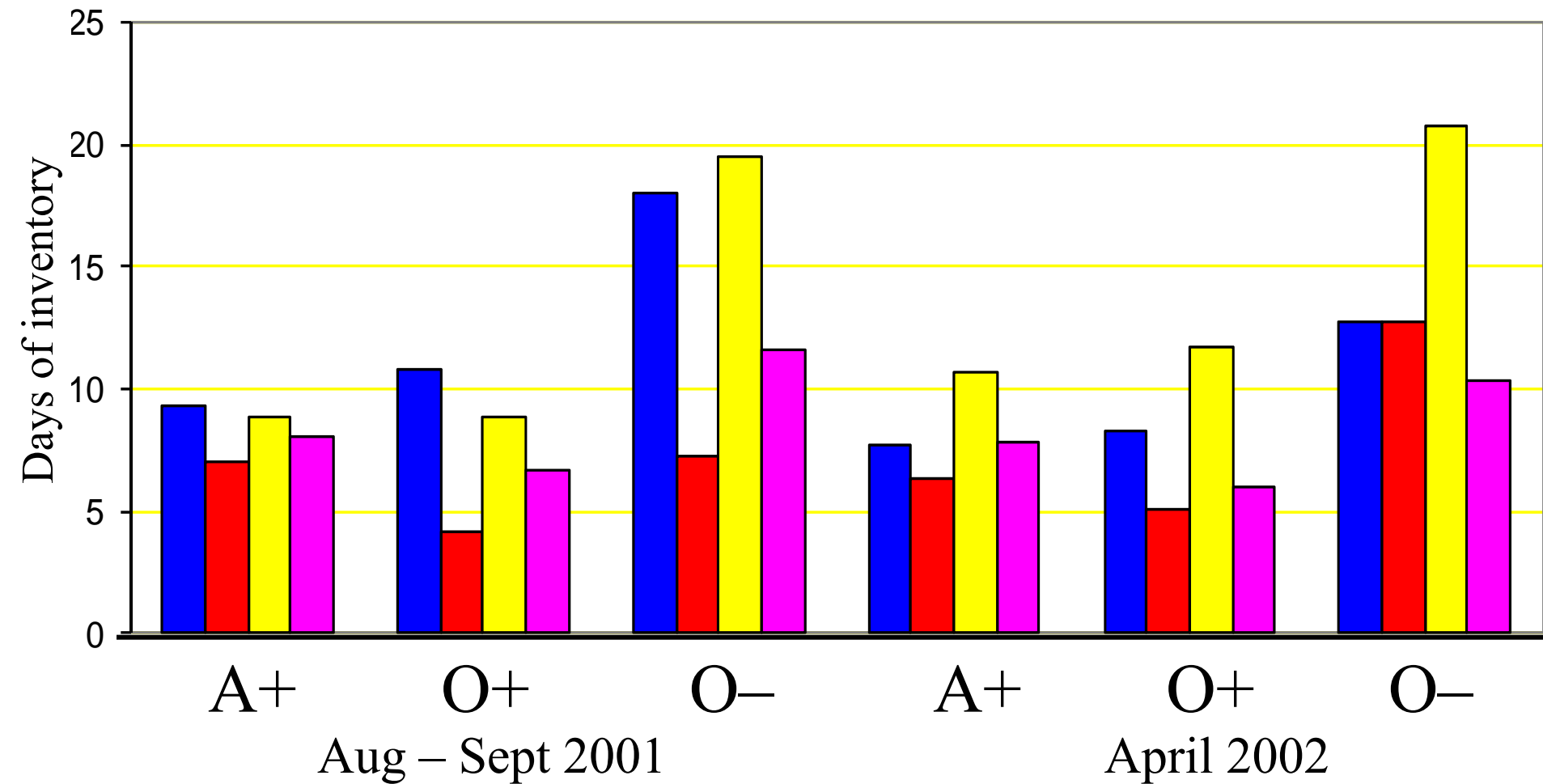
HTS CTS

# Benefits of a central laboratory: Higher efficiency



□ HTS    ■ CTS

# Benefits of a central laboratory: Smaller inventory



□ Tampa CTS    ■ Pittsburgh CTS    ■ Seattle CTS    ■ HTS



# Relationship with blood supplier

---

- ❑ We're all on the same team! (and computer system)
- ❑ Permits close communication during times of shortages
- ❑ Focused donor recruitment campaigns can be conducted if a specific product is low

# Relationship with blood supplier

---

- ❑ Possibility exists to share donor ABO information
- ❑ Close relationship with both clinicians and blood supplier also allows for easier prediction of when rare donors will be needed
- ❑ Greatly simplifies supplier's logistics

# Benefits of a central laboratory: Research

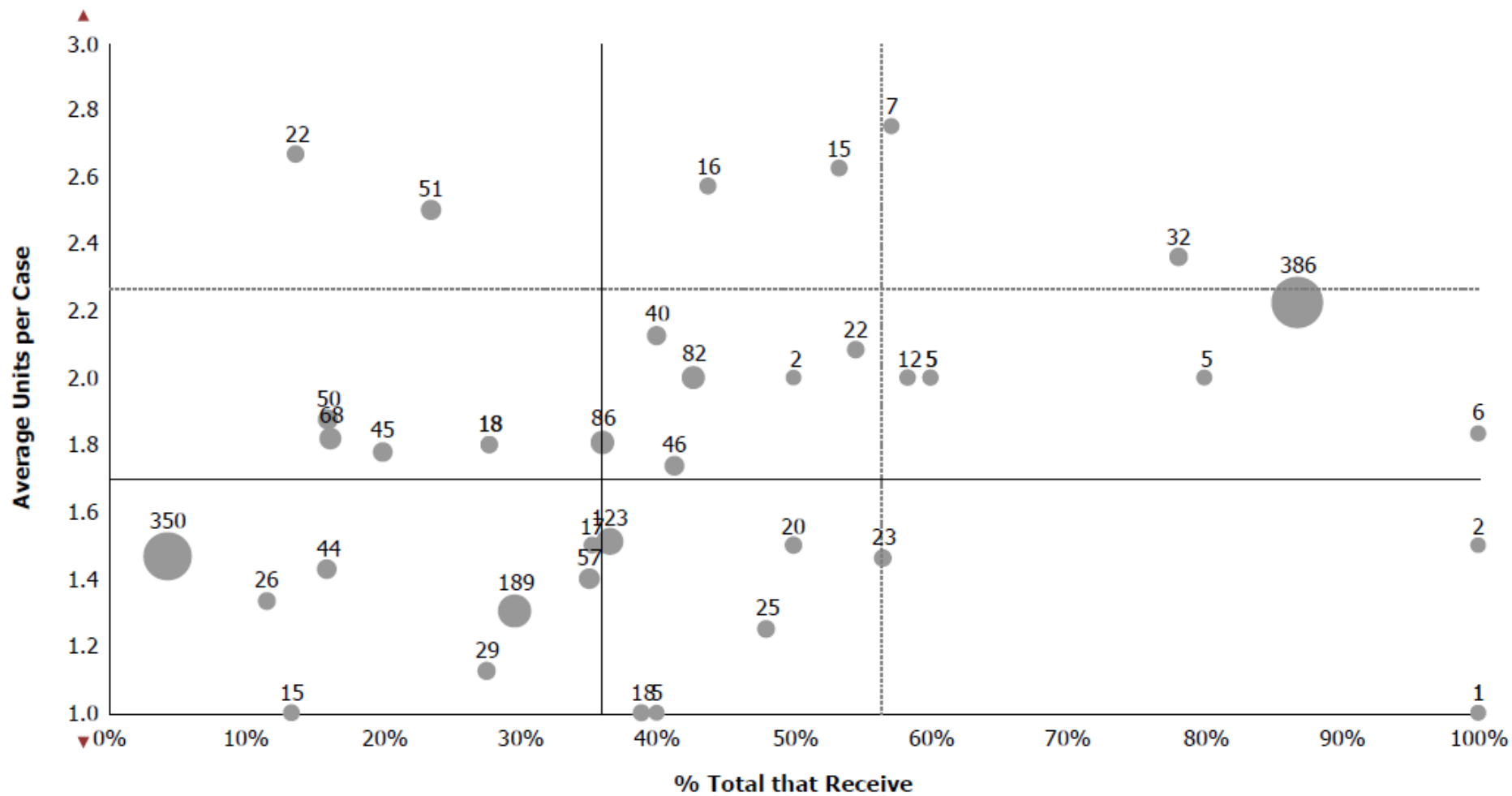
- **Yazer MH**, Hult A, Hellberg Å, Hosseini-Maaf B, Palcic MM, Olsson ML. Investigation into A Antigen Expression on O<sup>2</sup> Heterozygous Group O Labeled Red Blood Cell Units. *Transfusion* 2008;48:1650-1657.
- **Yazer MH** and **Triulzi DJ**. Detection of Anti-D in D- Recipients Transfused with D+ RBCs. *Transfusion* 2007;47:2197-2201.
- **Yazer MH**, **Triulzi DJ**, Cortese Hassett A, Kiss JE. Cryoprecipitate prepared from plasma frozen within 24 hours after phlebotomy contains acceptable levels of fibrinogen and VIIC. *Transfusion* 2010;50:1014-1018.
- **Yazer MH** and **Triulzi DJ**. Messages from national blood utilization survey reports. *Transfusion* 2007;47:366-368.
- **Yazer MH** and **Triulzi DJ**. Receipt of older RBCs does not predispose D- recipients to anti-D alloimmunization. *American Journal of Clinical Pathology* 2010;134:443-447.
- **Grants:** REDS I, II,III, RADAR, TMH network, NBF, NIH, DARPA

# Cost savings associated with CTS

---


- Depends on where the hospital starts
  - Economies of scale
  - Automation
  - Smaller overall workforce
  - Reduced wastage
- Evidence based practice
  - Probably the biggest ongoing savings
    - Rational, evidence based component therapy
    - Implementation and enforcement of transfusion triggers
    - Stewardship of expensive recombinant factors
    - Involvement with peri-operative blood management
    - System-wide benchmarking

# Benchmarking across an entire healthcare system



# Computerized Physician Order Entry Alert

Discern:



## PLASMA TRANSFUSION ALERT

Your patient's most recent INR is 1.3.  
The institutional guideline for plasma transfusion is INR =>1.6.  
The published literature indicates that for an INR <1.6 the risk of a plasma transfusion exceeds its minimal if any hemostatic benefits.  
Please choose the appropriate action below to resolve this alert.

**Alert Action**


- Cancel Plasma Transfusion Order**
- Proceed with Plasma Transfusion Order**

OK

For patients with previous INR < 1.6

# Computerized Physician Order Entry Alert

Discern:

 **TOTAL BLOOD MANAGEMENT ALERT**

The most recent hemoglobin level available for this patient is 13.1 gm/dl.

A transfusion is not consistent with the institutional guidelines for administration of red blood cells. Unless your patient is experiencing an acute ischemic event or acute on-going blood loss, the transfusion will be considered a deviation from evidence-based transfusion recommendations.

**ALERT CANCELS ORDER**

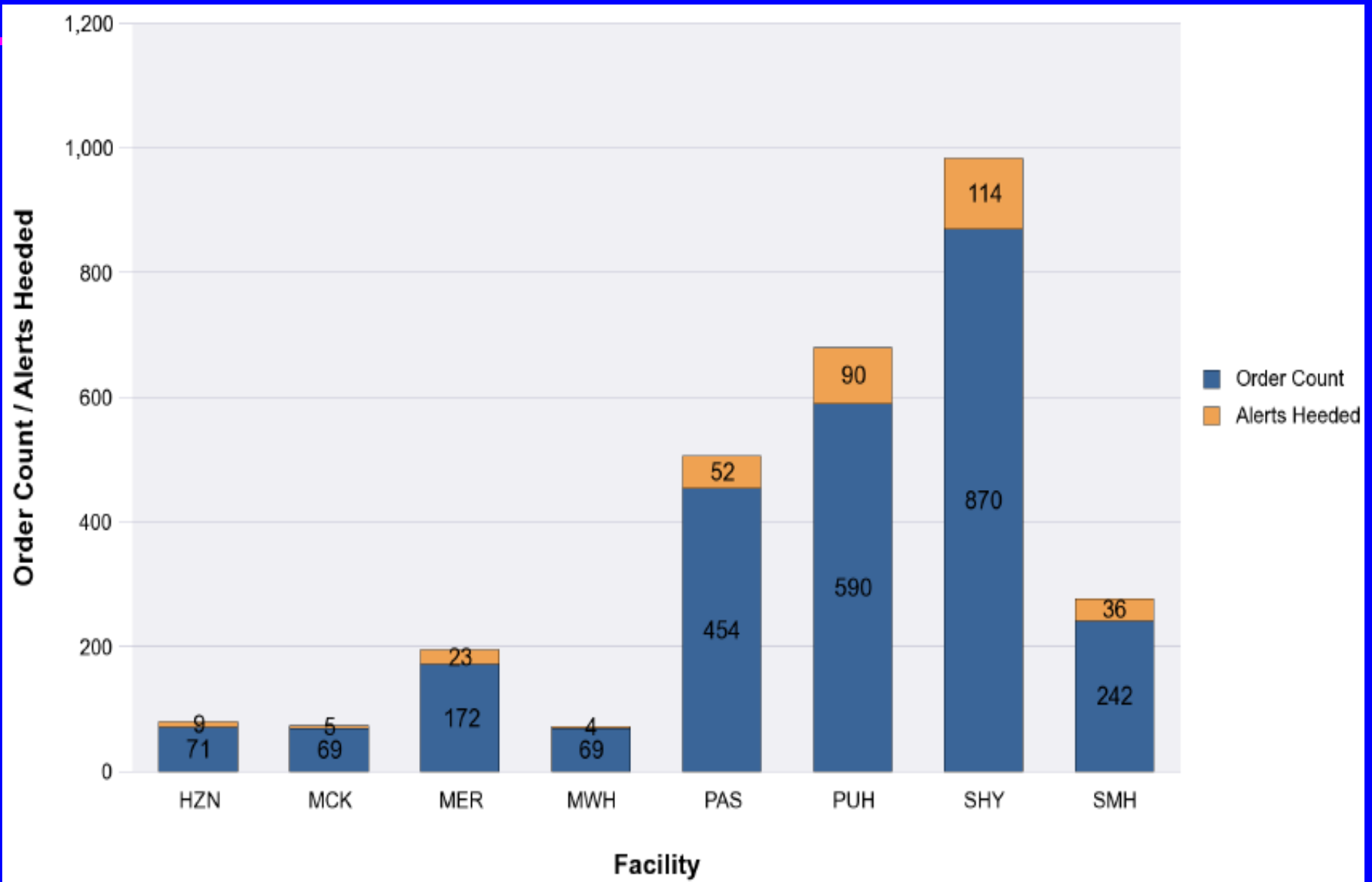
Alert Action

CANCEL

OK

Triggers when Hemoglobin Level is  $\geq 8.5$

# Effectiveness of RBC alert





# Downsides of a CTS

---

- ❑ Blood Supplier
  - » Virtually none
  
- ❑ Hospital
  - » Needs to get used to “outsourcing”
  - » Computer interfaces might need to be developed for patient and billing information sharing
  
- ❑ Transfusion physicians
  - » Can require extensive traveling
  - » “Bread and butter” transfusion issues multiplied by the number of hospitals served
  - » Lots of credentialing, transfusion committees, meetings...