

# **Transfusion Medicine: Analysis of Resident Calls**

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# INTRODUCTION

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- ❖ **Knowledge of TM Practices**
  - **Improves clinical care**
  - **Reduces health care costs**
- ❖ **On-call experiences can be**
  - **Educational tool**
  - **Quality assurance tool**

# AIM

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- ❖ **To evaluate calls for appropriateness of blood component transfusion**
- ❖ **To analyze calls for**
  - **Further education**
  - **Patient care**
  - **Health care cost-reduction**

# Materials and Methods

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- ❖ **Performed between 10/2003 and 2/2005 (16 mo.)**
- ❖ **Requests not meeting BURC (Parkland Hospital) transfusion guidelines for blood components included**
- ❖ **Request for special products and calls for transfusion reactions included**

# Blood Component Guidelines

<b>Blood product</b>	<b>Transfusion Level</b>
<b>RBC</b>	<b>Hb &lt;8 g/dL</b>
<b>PLT</b>	<b>&lt;20.000/dL, or &lt;50.000 + Bleeding/invasive procedure</b>
<b>CRYO</b>	<b>Fibrinogen &lt;115 mg/dL</b>
<b>FFP</b>	<b>PT&gt;16s, INR&gt;1.5, aPTT&gt;35s</b>

# Irradiation Guidelines

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- ❖ Immunocompromised patients
- ❖ Hematological malignancies
- ❖ Neonates
- ❖ Recipients of blood from
  - 1<sup>st</sup>-degree relatives
  - HLA-matched donors

# Leukoreduction Guidelines

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- ❖ **Patients on chronic transfusion**
- ❖ **Patients with more than two documented febrile non-hemolytic transfusion reaction**
- ❖ **Solid-organ transplant candidates**
- ❖ **Patients needing CMV(-) blood**

# Blood Bank Evaluation Requests

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- ❖ **When blood components are requested**
  - **BB technician first checks all laboratory results to determine whether the requests meet the guidelines**
- ❖ **The technician refers to on-call resident**
  - **any requests for blood components not meeting transfusion guidelines and**
  - **any inquiries requiring physician input**



# TMR On-call Evaluations

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- ❖ Calls presented at daily rounds
- ❖ Determination made of call
  - **Appropriateness**
  - **Completeness**
  - **Accuracy**
- ❖ Resident or attending gives complete and accurate information for all inappropriate requests received

# Request Categories

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- ❖ Requests divided into 3 groups
  - **Approved**
  - **Partially approved**
  - **Denied**
- ❖ Other products recommended are recorded

# Results

- ❖ **~45,000 total units of blood components transfused during time period**
  - **RBCs = 25,000 units**
  - **FFP = 10,000 units**
  - **PLT = 5,000 units**
  - **CRYO = 3,000 units**
  - **Whole Blood = 1,000 units**
  - **Neonatal aliquot = 1,000 units**

# Request Categories

Total of **1304** calls; **1326** requests

<b>Requests</b>	<b>n</b>	<b>%</b>
<b>Blood components not meeting transfusion guidelines</b>	<b>1159</b>	<b>87.4</b>
<b>Special products</b>	<b>116</b>	<b>8.8</b>
<b>Transfusion in patients with antibodies</b>	<b>27</b>	<b>2.0</b>
<b>Transfusion reactions</b>	<b>15</b>	<b>1.1</b>
<b>Transfusion in neonate</b>	<b>9</b>	<b>0.7</b>

# Requested Component Characteristics

Component	N (1159)	%
<b>Single</b>	<b>1100</b>	<b>94.9</b>
PLT	646	55.7
FFP	430	37.1
CRYO	23	2.0
Whole blood	1	0.1
<b>Multiple</b>	<b>59</b>	<b>5.1</b>
FFP+PLT	43	3.8
FFP+CRYO	4	0.3
FFP+CRYO+PLT+RBC	4	0.3
FFP+CRYO+PLT	3	0.3
CRYO+PLT	3	0.3
CRYO+ Factor-VII	2	0.1

# Calls: Blood Components

Call Stratification	FFP n = 430	PLT n = 646	CRYO n = 23	Multiple n = 59	Total n=1159
Approved	183 42.5%	409 63.3%	15 65.2%	25 42.4%	632 54.5%
Denied	220 51.2%	202 31.3%	6 26.1%	11 18.6%	440 38%
Partially approved	27 6.3%	35 5.4%	2 8.7%	23 39%	87 7.5%

# Calls: Recommended Blood Products

<b>Products recommended</b>	<b>FFP</b>	<b>PLT</b>	<b>CRYO</b>	<b>Multiple</b>	<b>Total</b>
<b>Approved, additional products recommended</b>	<b>12 2.8%</b>	<b>24 3.7%</b>	<b>0 0%</b>	<b>2 3.9%</b>	<b>38 3.3%</b>
<b>Denied, other products recommended</b>	<b>24 5.6%</b>	<b>15 2.3%</b>	<b>2 8.7%</b>	<b>1 1.7%</b>	<b>42 3.6%</b>
<b>Partially approved, other product recommended</b>	<b>5 1.2%</b>	<b>4 0.6%</b>	<b>1 4.3%</b>	<b>3 5.1%</b>	<b>13 1.1%</b>
<b>Total</b>	<b>9.5%</b>	<b>6.7%</b>	<b>13%</b>	<b>10.2%</b>	<b>8%</b>

# Recommended Blood Products

Recommended Products	n = 93	%
CRYO	49	52.7
PLT	8	8.6
Coag Factors (3 - rVII; 2 – FVIII)	5	5.4
CRYO + DDAVP	5	5.4
DDAVP	4	4.3
Vit K	4	4.3
IVIG (all had ITP)	4	4.3
Anti-D globulin (2 - Rh+ tx; 1 - ITP)	3	3.2
FFP	3	3.2
Protamine	3	3.2
Other	5	5.4



# Blood Component Requests by Department

Departments (n=1159)	Approved n=632		P. Approved n=87		Denied n=440	
	n	%	n	%	n	%
ICU (All) (n=581, 50.1%)	311	53.6	49	8.4	221	38.0
MEDICINE (n=301, 26%)	166	55.1	19	6.3	116	38.6
ER (n=110, 9.5%)	46	41.8	11	10.0	53	48.2
SURGERY (n=96, 8.3%)	59	61.5	5	5.2	32	33.3
OR (n=42, 3.6%)	28	66.7	2	4.8	12	28.5
TRAUMA (n=16, 1.4%)	13	81.2	0	0	3	18.8
RADIOLOGY (n=7, 0.6%)	3	42.9	1	14.2	3	42.9

# ICUs Request Breakdown

SICU and MICU (n=581)	Approved (n=311, 53.6%)		Partially approved (n=49, 8.4%)		Denied (n=221, 38%) S=80, M=128, B=13	
	n	%	n	%	n	%
<b>CRYO</b> (n=12, 2.1%)	7	58.3%	2	16.7%	3	<b>25%</b>
<b>FFP</b> (n=232, 39.9%)	100	43.1%	16	6.9%	116	<b>50%</b>
<b>Multiple</b> (n=34, 5.9%)	14	41.2%	15	44.1%	5	14.7%
<b>PLT</b> (n=303, 52.1%)	190	62.7%	16	5.3%	97	<b>32.0%</b>

# Surgery Request Breakdown

(n=383)	Approved (n=217, 56.7%)		partially approved (n=31, 8.1%)		Denied (n=135, 35.2%)	
	n	%	n	%	n	%
<b>CRYO</b> (n=8, 2.1%)	5	62.5%	1	12.5%	2	<b>25%</b>
<b>FFP</b> (n=166, 43.3%)	80	48.2%	9	5.4%	77	<b>46.4%</b>
<b>Multiple</b> (n=25, 6.5%)	10	40%	10	40%	5	<b>20%</b>
<b>PLT</b> (n=183, 47.8%)	122	66.7%	11	6.0%	50	<b>27.3%</b>

# Medicine Units Request Breakdown

(n=575)	Approved (n=312, 54.2%)		Partially approved (n=40, 7.0%)		Denied (n=223, 38.8%)	
	n	%	n	%	n	%
<b>CRYO</b> (n=15, 2.6%)	10	66.7 %	1	6.6%	4	<b>26.7%</b>
<b>FFP</b> (n=165, 28.7%)	62	37.5%	11	6.7%	92	<b>55.8%</b>
<b>Multiple</b> (n=21, 3.7%)	10	47.6%	8	38.1%	3	14.3%
<b>PLT</b> (n=374, 65.0%)	230	61.5%	20	5.3%	124	<b>33.2%</b>

# Leukocyte Reduction & Irradiation Requests

<b>n=51</b>	<b>Approved</b>	<b>Partially approved</b>	<b>Denied</b>
<b>Irradiation</b> (n=15, 29.4%)	6 40%	4 26.7%	5 33.3%
<b>Leukocyte reduction</b> (n=11, 21.6%)	2 18.2%	1 9.1%	8 72.7%
<b>Leukoreduc+Irradiation</b> (n=25, 49%)	3 12%	16 64%	6 24%

# Transfusion Reaction Calls

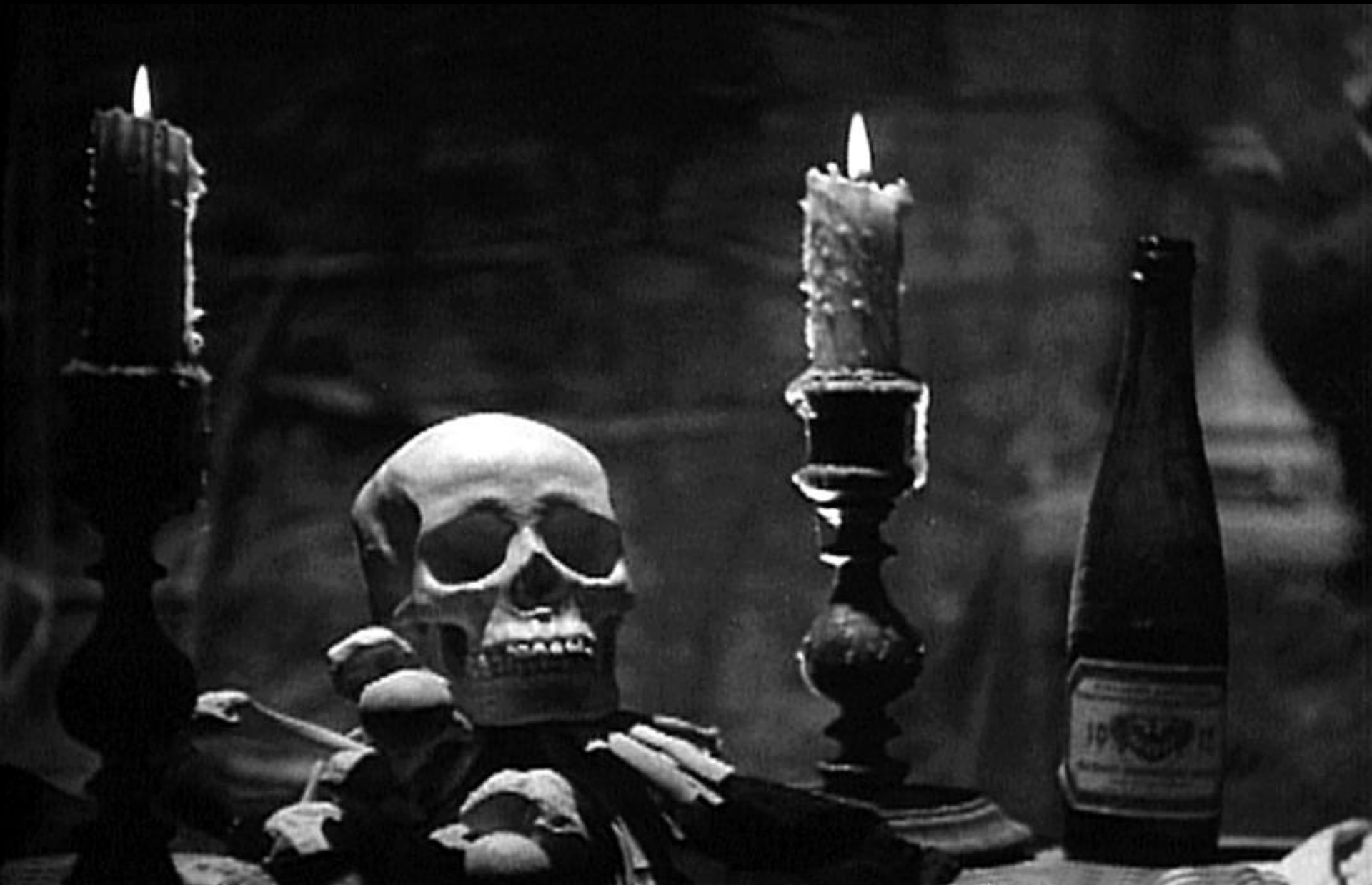
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- ❖ **15 (1.1%) calls related to transfusion reactions**
  - Allergic reactions = 5
  - Febrile reactions = 4
  - Delayed hemolytic transfusion reactions = 3
  - Suspected transfusion-related acute lung injury = 1
  - Volume overload = 1
  - Unidentified = 1

# Discussion: Inappropriate Use

- ❖ **Studies reveal inappropriate blood products usage**
  - 7-45% of requests for components were inappropriate (according to guidelines)
- ❖ **Our study: 38% of requests denied**
  - No transfusion indications (according to institutional transfusion guidelines)

# Transfusion Complications





# Transfusion Has Risks

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- Acute lung injury (TRALI)
- Hemolytic reactions
- Anaphylactic reactions
- Graft vs host disease (GVHD)
- Transmission of infectious diseases
  - HIV
  - HCV, HBV, other

**In our study, 1.1% of calls were related to transfusion reactions.**

# Inappropriate Usage: Economic Impact

- ❖ **Attendant complications may increase health care costs**

## **Analysis of impact in surgery unit**

- **Mean institutional costs for all transfused components were \$397 ± 224**
- **Cost per pt. for inappropriate transfused components was \$96 ± 89 (24% of cost for all components)**

# Inappropriate Usage: Economic Impact for Parkland

	FFP (\$)	PLT (\$)	CRYO (\$)	Multiple (\$)	Total (\$)
<b>Cost \$</b>	41	486 (apher) 70 (random)	32		
<b>Total \$</b>	~40,000	~100,000	~2,000	~5,000	<b>~150,000</b> + irradiation + leukoreduction

Clearly, improved education regarding TM practice is a highly desirable means of **improving clinical care** as well as **reducing health care cost**

# Lack of Knowledge Regarding TM Practices

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- ❖ **Selection of blood components is most common deficiency (40%) noted for all medical staffs**

Mitchel et al,

- ❖ **Transfusion risks and indications account for widespread deficiencies**

Salem-Schatz et al,

# TM On-Call Deficiencies: Coagulation Issues

- ❖ **Most common inappropriately used blood products: FFP, PLT and CRYO**
  - Mozes B et al. CRYO and FFP were used more inappropriately.
  - Bryant et al. requests for FFP and PLT were denied in ~40% and 29%.
- ❖ **Our study: most common denied requests = FFP (51.2%) and PLT (31.3%).**
  - CRYO was most commonly recommended product (52.7%).
- ❖ **Results = Need for ongoing medical staff education in TM issues, especially in coagulation management.**

# Education of Non-TM Physicians

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**Guidelines exist for TM fellows and residents,**

- **No guidelines for non-TM physicians**
  - **Physicians may not be utilizing blood components appropriately**
  - **Key objectives in TM practice not being met**
- **Responsibilities of on-call physician include**
  - **Resolution and administration of the TM-related issue**
  - **Education of non-TM physicians**

# TM Education

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- ❖ A prudent and efficacious use of TM On-call experiences would be an **educational and quality assurance tool in TM and non-TM**.
- ❖ Audit, guideline and education packages have made major impact on blood products use.
  - Studies indicate that education can substantially improve appropriate and cost-effective blood product use

# Conclusion

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- ❖ **Major considerations for TM units**
  - Safety concerns
  - Increased costs
  - Difficulties in maintaining blood supply
- ❖ **Blood components should be treated like any other medication:**
  - Used only when truly necessary
  - Used at the minimal effective dose and frequency
- ❖ **Best case scenario:**
  - Avoidance of arbitrary transfusion “triggers”



**“No one has a better chance to  
live dangerously than the ill  
who must take their medicine”**

**Temin P., 1980**