



**American  
Red Cross**

## **Transfusion Options for the Patient Refractory to Platelet Transfusions**

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# Overview:

- Testing algorithms for patients
- Strategies for product selection
- Challenges and obstacles
- What lies ahead

# Acknowledgments

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American Red Cross Blood Services

*“Support Options for the Patient Who is Refractory  
to Platelet Transfusion”*

ASCP Teleconference, May 10, 2011

# Acknowledgments

## Platelet Testing: ASHI/AABB Joint Program AABB Annual Meeting, October, 2011

- Patricia Kopko, MD, Blood Source, Mather, CA  
*“Strategies for Platelet Support of the Refractory Patient”*
- Lesley Kresie, MD, Carter BloodCare, Bedford, TX  
*“Clinical Outcomes Using HLA Matched Platelets”*
- Karen Nelson, PhD, D.ABHI, Puget Sound Blood Center, Seattle WA  
*“Survey Results: HLA Antibody Testing for Platelet Selections”*

# What testing are we talking about?

- Testing available at ARC SED:
  - Platelet Crossmatching
  - HLA antigen typing
  - HLA antibody screening and identification
  - HPA antigen typing
  - HPA antibody screening

# Platelet Crossmatching

- Performed via commercially available kit
  - Donor units selected from those already in inventory
  - Can detect anti-HLA or –HPA, minor ABO
  - TAT can be quicker as products are in inventory
  - Can utilize the plasma from same sample sent for HLA antigen typing
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# HLA antigen typing

- Only necessary to test HLA-A, B (Class I)
- Test methods have substantially changed in last decade (molecular-based)
- Can utilize the buffy coat from same sample sent for Platelet Crossmatching
- Longer product TAT as matched donor must be recruited and scheduled; product must undergo processing prior to release

# HLA antibody screening and identification

- Cause of refractoriness usually HLA antibodies
- HLA allo-antibodies can form within 2-4 weeks
- PRA can be gained and lost
- Identification of abs specificities aids in selection of matched platelets
- Test sensitivity- are all abs identified by Luminex based testing clinically relevant?



# HPA testing

ELISA based screening for HPA antibodies but limited to those associated with GPIIb/IIIa, GPIa/IIa, GP1b/IX and GPIV

ELISA based screening limited to pooled HLA Class I

Platelet genotyping addresses HPA antigens 1-6 and 15.  
Currently best predictor of PLA-1 phenotype

## Which Testing to Choose?

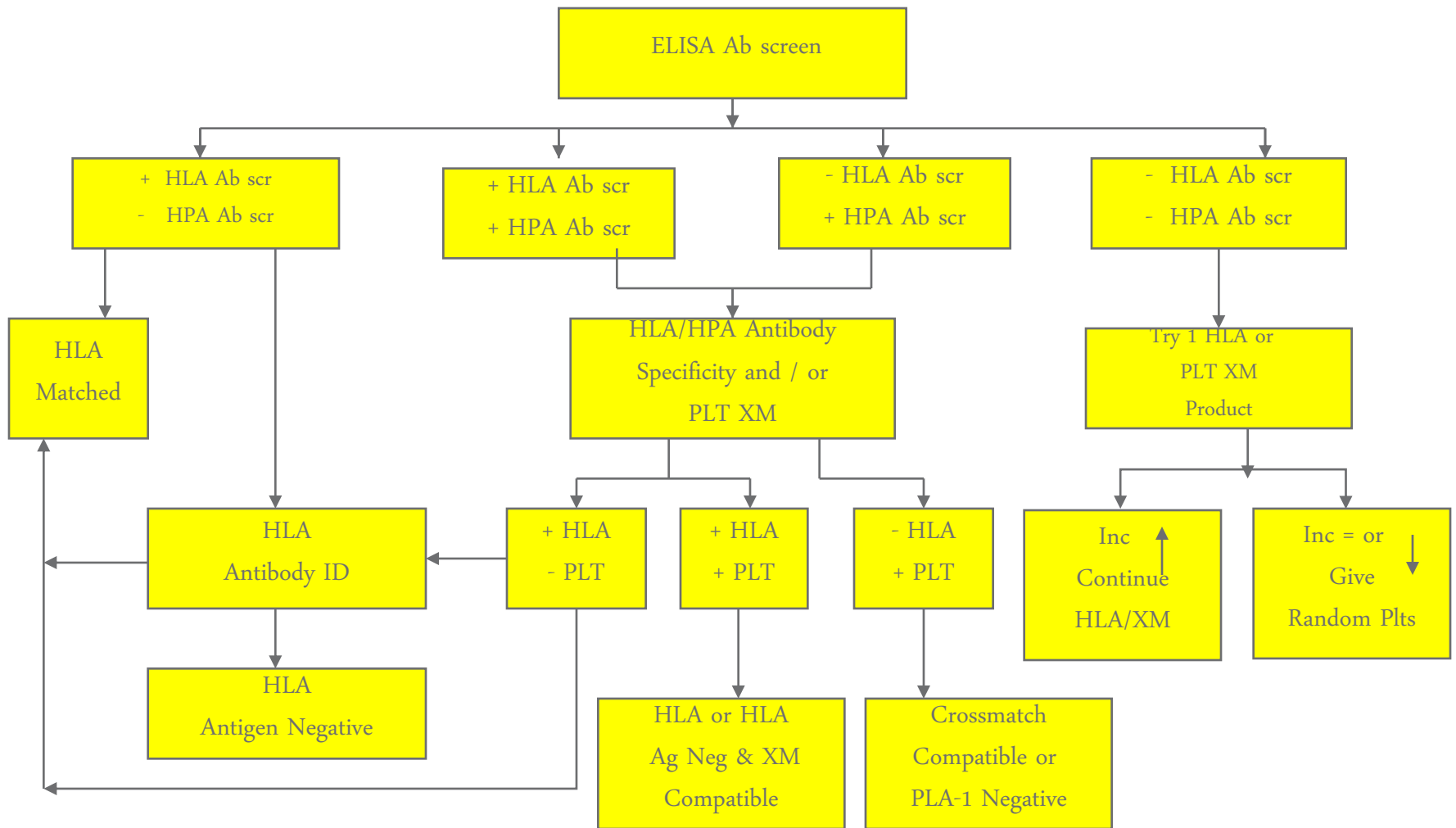
Three suggested strategies:

- 1- HLA/HPA antibody screen via ELISA
- 2-Platelet Crossmatch via SPRCA
- 3-HLA type and screen via Luminex

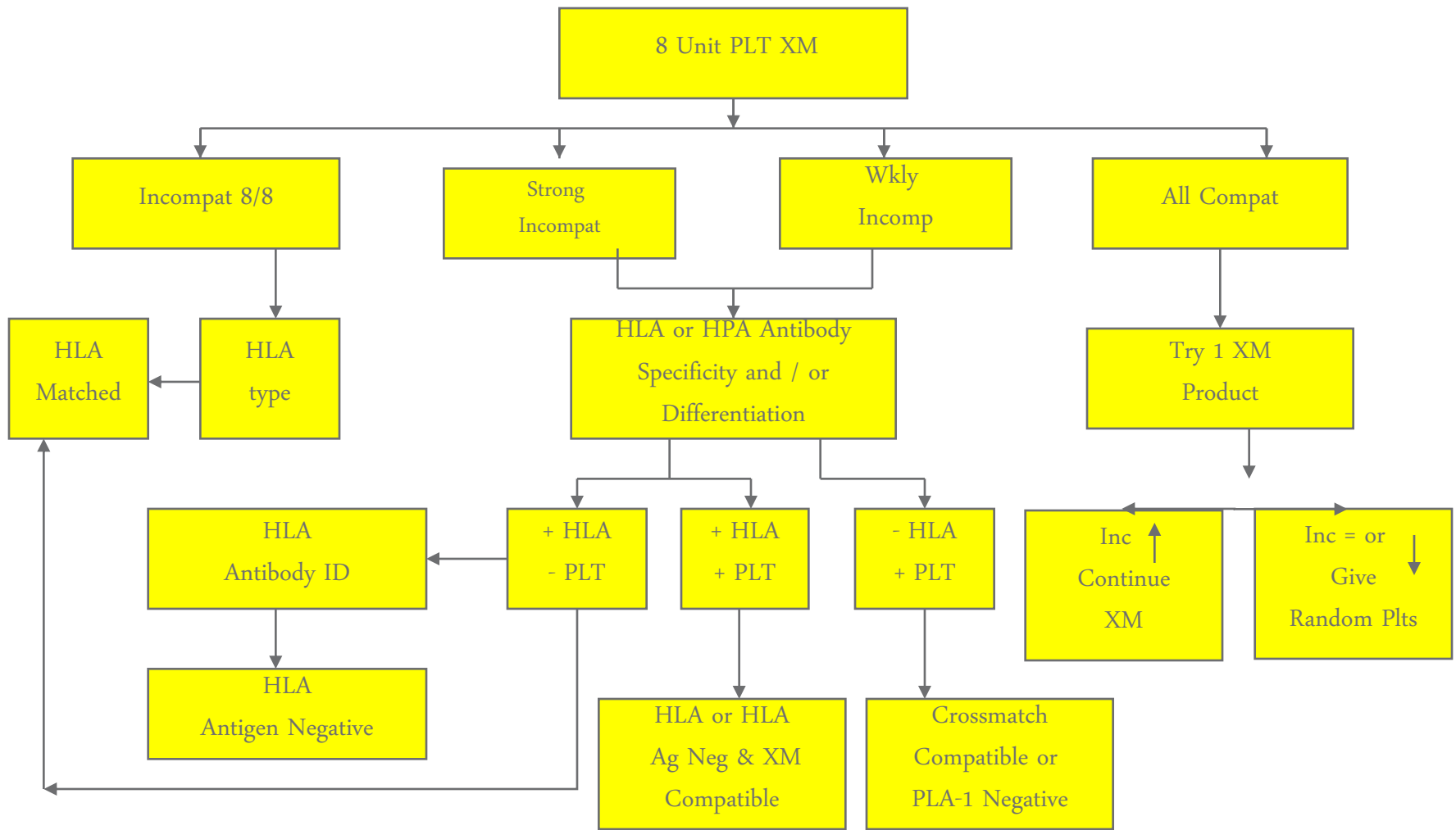
## What do these tests tell me?

- 1-HLA or HPA antibody presence
- 2-Incompatibility rate
- 3- Antigens to match; Antibodies to avoid

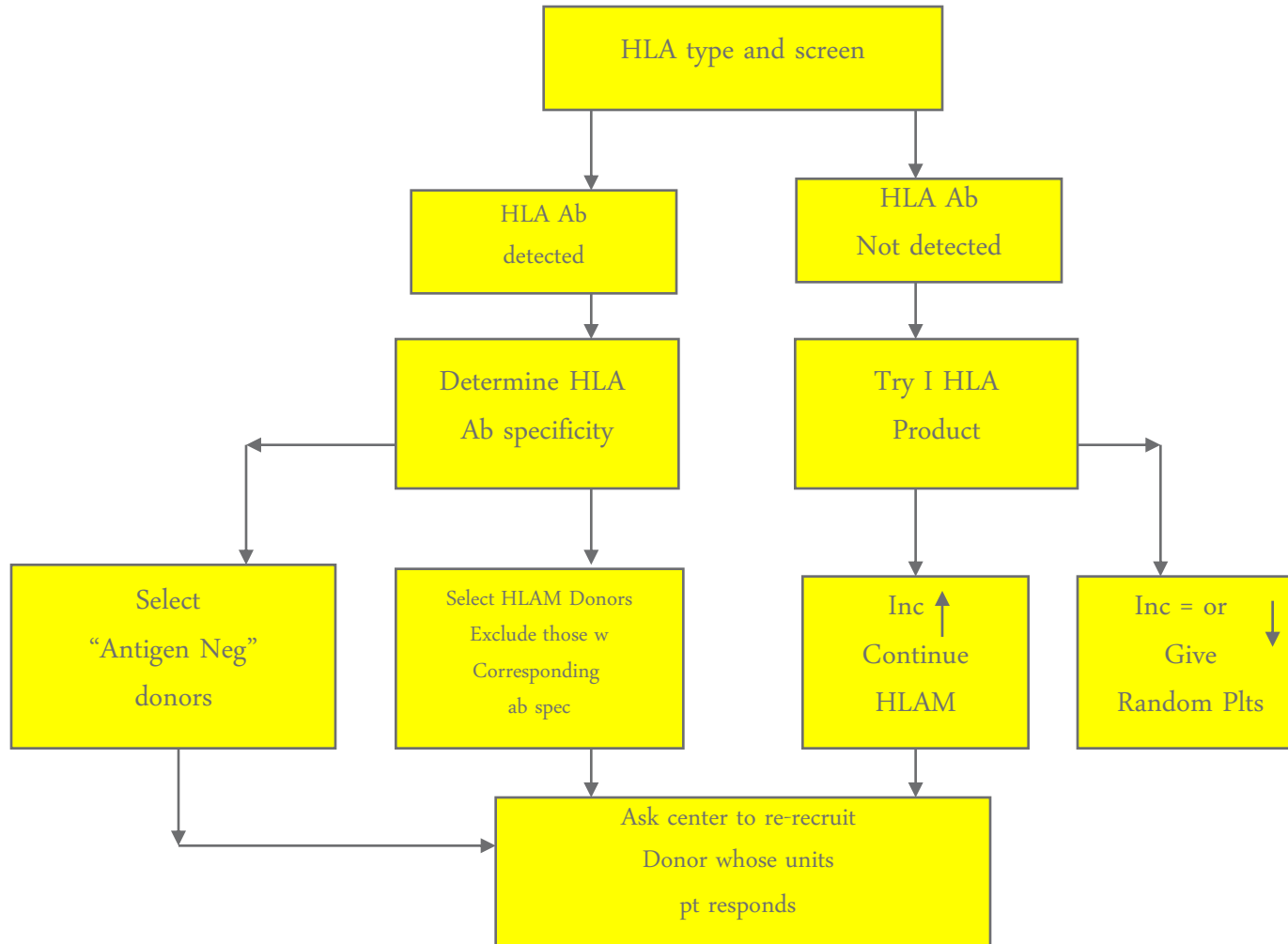
# Suggested Testing Algorithm



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# Suggested Testing Algorithm



# Strategy 1 - Unit selection: HLA type only

Search of unrelated donors for identical HLA-A&B - most centers have some type of computerized donor base search or search of inventory; Isn't necessary to repeat HLA

>35% have no match in most donor bases; >80% no match in inventory

Matching donor must be recruited and scheduled; product must undergo manufacturing process = longer TAT

Matching includes blanks and cross-reactive or CREG antigens; if no HLA ID has been performed CCI can be affected

**Has 30-75%(~50%) success rate depending on the grade of match**

*Ralph R Vassallo; "Support Options for the Patient Who is Refractory to Platelet Transfusion"*

# Strategy 2 - Unit selection :

## Platelet Crossmatching

Best option for STAT

Best TAT for products as units are selected from inventory

Can be \$\$\$ for those patients with ↑ PRA

Must resubmit sample for XM following any sensitizing event

Testing must be repeated for each day of desired transfusion

**Has 50-75% (~55%) success rate**

*Ralph R Vassallo; "Support Options for the Patient Who is Refractory to Platelet Transfusion"*

# Strategy 3 - Unit selection:

## HLA Type with Screen/ID

Better TAT because if no matching HLA type in inventory then unit can be selected to avoid antibody specificities

Use of “Antigen Negatives” ↑ likelihood of compatible units particularly for patients with “rare” HLA types or extensive antibodies to avoid

Can be difficult to stay in-group ABO; can still require donor recruitment which can ↑ TAT

**Has 60-75% (~70%) success rate**

*Ralph R Vassallo; “Support Options for the Patient Who is Refractory to Platelet Transfusion”*



# Obstacles

## **Refractoriness-Immune and non-immune**

Need good assessment of patient status

## **TAT from request to receipt of product-**

HLA matched and platelet crossmatched are not “shelf” products

## **Effectiveness Monitoring- the “PlaDo” study**

Post-transfusion platelet counts key

## **Logistics-**

Testing involves getting patient samples to lab

## **Expense-**

Resistance to additional testing due to costs

# What lies ahead?

## Advances in testing methods

**“Complement (C1q) fixing solid-phase screening for HLA antibodies increases the availability of compatible platelet components for refractory patients”** *Magali J. Fontaine, Jenny Kuo, Ge Chen, Susan A. Galel, Evelyn Miller, Flavia Sequeira, Maurene Viele, Lawrence T. Goodnough, and Dolly B. Tyan*

**TRANSFUSION, Volume 51, December 2011, 2611-2618**

# What lies ahead?

Improved Donor Selection methods:  
*HLAMatchmaker*

Rene Duquesnoy improved his original concept of CREG-matching criteria for a computerized selection method based on shared immunogenic amino acid epitopes

# References

- **Vassallo RR.** Recognition and management of anti bodies to human platelet antigens in platelet transfusion-refractory patients. *Immunohematology* 2009;25:119-24.
- **Slichter, SJ.** Factors affecting post-transfusion platelet increments, platelet refractoriness, and platelet transfusion intervals in thrombocytopenic patients. Platelet Transfusion Therapy *Blood* 2005;105:4106-14
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- The Trial to Reduce Allo-immunization to Platelet Study Group *NEJM* 1997; 337: 697-729



Questions?



Thanks!