Blood Banking in India: Ten Years Later

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Objectives

- Describe the Indian Immunohematology Initiative.
- Explain the transition in pretransfusion testing practice in India over the last 10 years.
- Discuss the successes and challenges of implementing a program

Indian Immunohematology Initiative

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Indian blood bankers soaking up U.S. know-how

Anne Ford

During his trips to India, where he has given several blood banking talks and workshops for health professionals over the past 15 months, Jim Perkins, MD, refuses to assume a preachy attitude. "I didn't want to go someplace and say, 'You should be doing this—that's the way *we* do it,'" he says. "Because who am I to say, 'This is an appropriate health priority at your stage of development'?" Dr. Perkins is director of Evanston Northwestern Healthcare Blood Banks, headquartered in Evanston, Ill., and assistant professor of pathology at Northwestern University's Feinberg School of Medicine, Chicago.

As it turns out, however, he and the medical professionals he has met there share one of the same priorities: to improve the safety of the Indian blood supply, particularly in regard to blood group antibody testing, which few blood centers there perform. "The typical pretransfusion testing sequence in India is an ABO and Rh type on the donor and recipient, and then a crossmatch," he says. "If they have a positive crossmatch, most places just simply keep crossmatching additional units, without identifying the cause of the positive crossmatch, and that's a limited approach. They can't deal with autoantibodies. If your crossmatches are positive with everyone, you don't know, 'Is this a clinically significant antibody against

"I wanted to set up a situation where I could go back and do wet workshops on group antibody identification."

Jim Perkins, MD

knew they wanted to do this. When a technologist sits in a laboratory and is getting positive crossmatches and has to issue incompatible blood, that's a terrible thing. They're afraid for the patient. And that provides a tremendous incentive for them to want to be able to solve these problems. So we have had a tremendously positive reception everywhere we've gone."

Dr. Perkins' interest in the topic stems from a visit to Pakistan in January 2004. During the trip, he and his blood banking colleagues Mohammed Pothiawala, MS, MT (ASCP)SBB, technical director of the blood bank at the University of Chicago Hospitals, and Syed Arif Azeem, MT(ASCP)SBB, administrator of radiation oncology at Edward Hines Jr. VA Hospital, Hines, Ill., who had arranged the trip, gave lectures to health professionals in the city of Karachi. "We talked about everything from antibodies to transfusion reactions, hemolytic disease of the newborn, and indications for transfusion,"

Bhawan hospitals in Indore, India, offered to help arrange a similar trip to India. The result: a 17-day visit in November and December 2005, during which Dr. Perkins gave talks at the Indian Society of Blood Transfusion and Immunohematology meeting in the city of Udaipur, the Prathama Blood Centre in Ahmedabad, the Choithram Hospital in Indore, and (in the neighboring country of Nepal) the South Asian Association of Transfusion Medicine meeting in Kathmandu.

"As in Pakistan, I talked about everything," Dr. Perkins says. "My primary talk at the ISBTI meeting was on setting up a peripheral blood stem cell transplant program. In Ahmedabad I talked about transfusion reactions, in Kathmandu I did case studies—i.e., told stories—and talked about antibodies, and in Indore I talked about antibodies, HDN, and indications for red blood cell transfusion."

"His visit was a grand success," Dr. Singhvi says. "I can still remember how he singlehandedly gave a nonstop three-hour talk at a symposium on blood banking and blood group antibodies that I had arranged at my institution. All my colleagues here were literally glued to their seats during that presen-

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Indian Immunohematology Initiative

Indian
Immunohematology
Initiative

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Indian Immunohematology Initiative

- The goal of III is to improve the safety of blood transfusion in India by promoting implementation of up-to-date immunohematologic testing methods.

Indian Immunohematology Initiative

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Indian Immunohematology Initiative

- Conduct hands-on (“wet”) workshops
- Provide and support immunohematology instruction at the annual ISBTI meeting
- Perform consultations and support for implementation of improved testing at Indian blood centers and hospitals
- Host Indian immunohematologists for technical training in members’ laboratories

Indian Immunohematology Initiative

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India - Demographics

	2006	2016
Population, est.	1,111,713,910	1,326,801,576
Birth Rate/1,000	22	20
Infant Mortality Rate/1,000	54.6	41.8
Life Expectancy	64.7	68

http://data.worldbank.org/indicator/SP.DYN.LE00.IN

Countries Ranked by Population: 2016

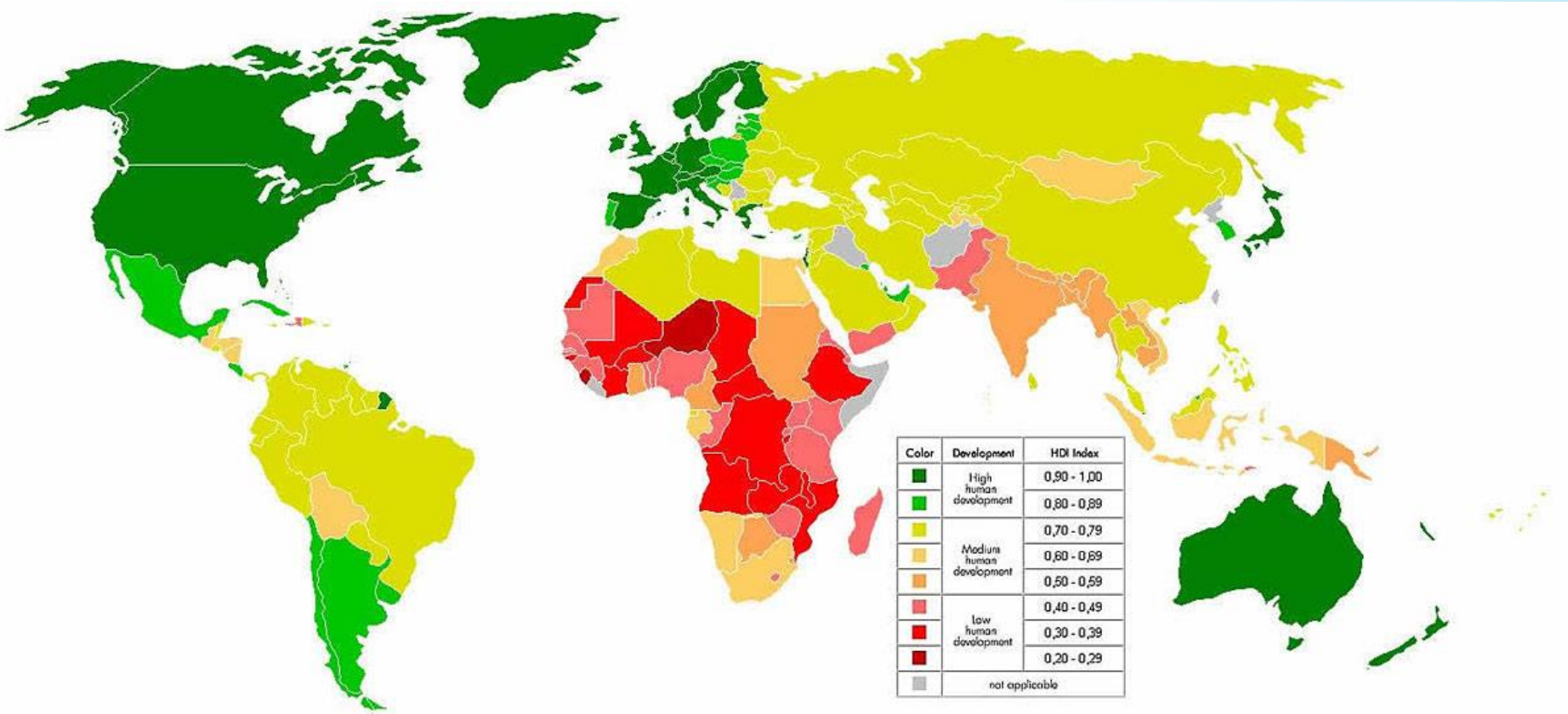
1	China	1,373,541,000
2	**India**	**1,326,801,000**
3	United States	323,996,000
4	Indonesia	231,820,243
5	Brazil	205,824,000

Data updated 08-24-2016 Source:
U.S. Census Bureau, International Data Base

Human Development Index (HDI)

- Life Expectancy Index
- Life expectancy at birth (in years)
- Education Index (EI)
- Mean years of schooling (in years)
- Expected years of schooling (in years)
- Income Index
- Per capita income

Human Development Index by Country

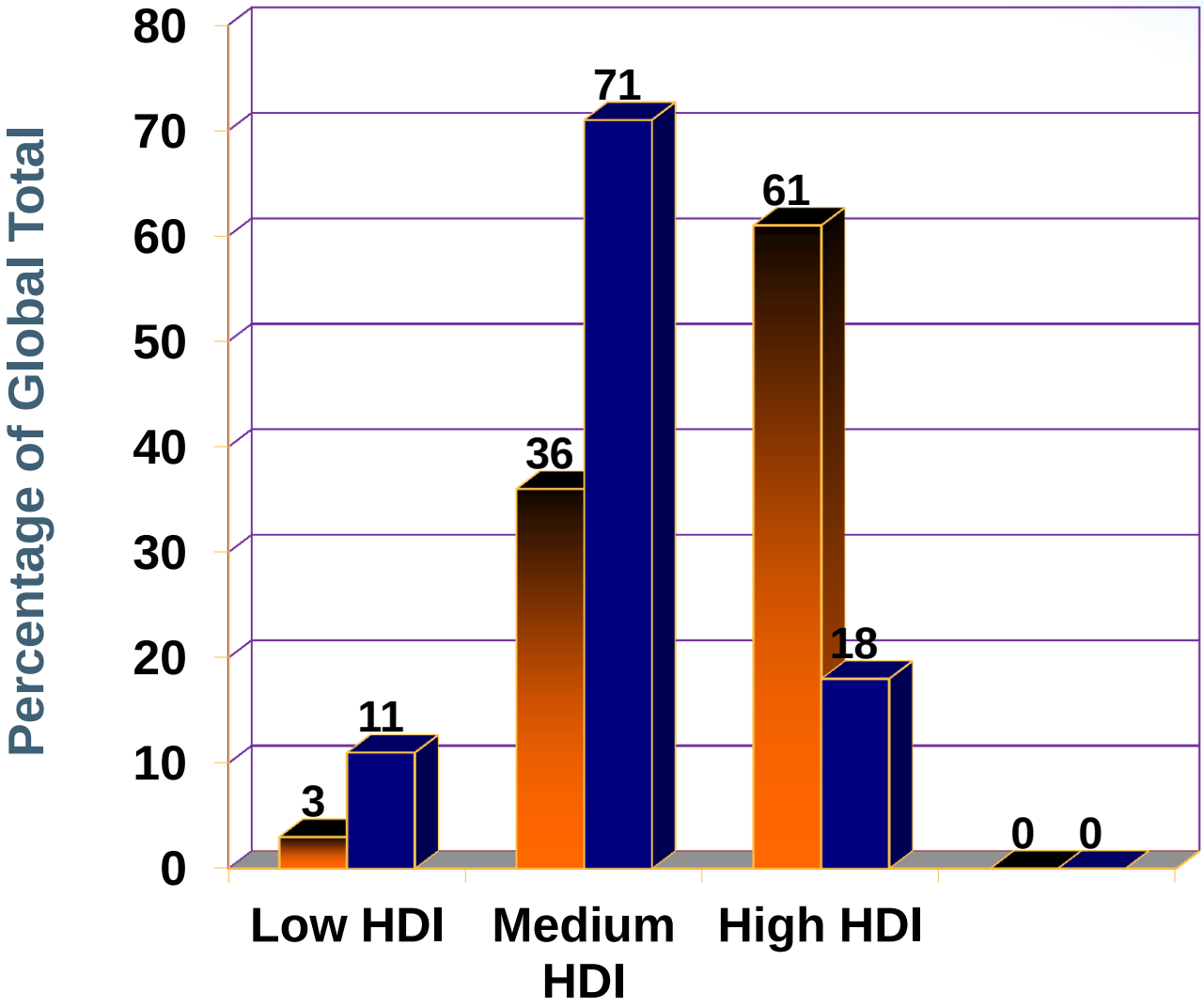


http://www.nationsonline.org/oneworld/human_development.htm

Developing Countries Blood Usage

- In low-HDI countries, up to 65% of blood transfusions are given to children under 5 years of age
- Childbirth
  - Globally ½ million women die from hemorrhage in childbirth
- Trauma

Blood Supply Worldwide – 2001/2002



2001/2002 Data –
Total WB Donations
81 million

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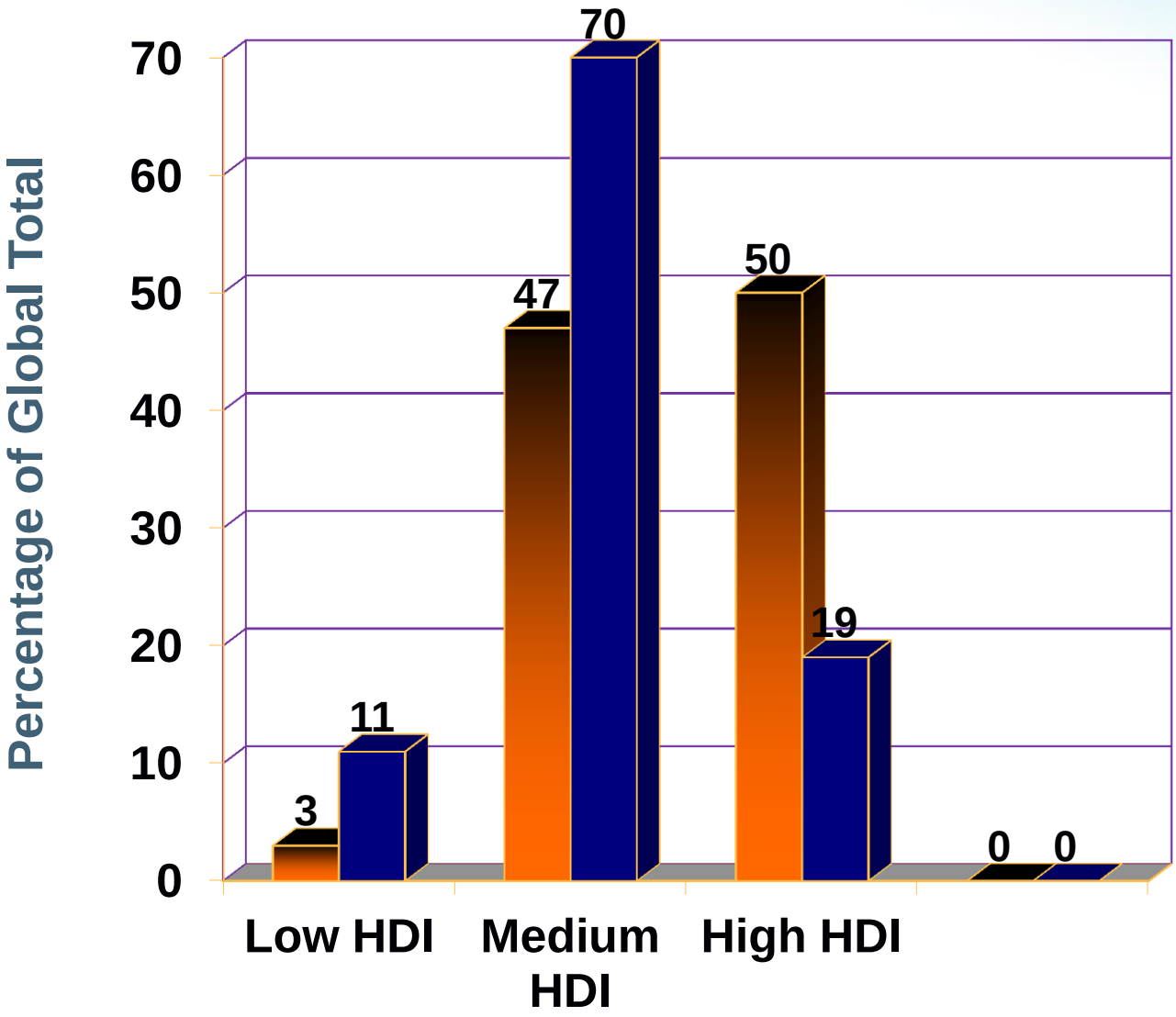
Blood Supply Worldwide - 2016



July 2016 Data –
Total WB Donations
112.5 million

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Indian Blood Banks

- 2006 – 1,850 blood banks
  - 52% of donors are volunteer

- 2016 – 2,760 blood banks!

Indian Blood Donors

- 2006
  - “Professional Blood Sellers”
    - Pose as replacement donors
    - Majority of public sector and physicians “buy” blood
  - Easier to “hire” a professional blood seller
  - ~50% volunteer
- 2016
  - ~30-100% volunteer (~65%)

Accreditation

- The National Accreditation Board for Hospitals and Healthcare Providers (NABH), an arm of Quality Council of India (QCI), launched its accreditation standard programme for blood banks and transfusion services on January 25, 2008.

Standards & Accreditation

- *Standards for Blood Banks and Transfusion Services – 1st ed. 2008*
- National AIDS Control Organization (NACO), Ministry of Health and Family Welfare, Government of India
- U.S Centers for Disease Control and Prevention (HHS/CDC) Division of Global HIV and TB (DGHT), India grant
  - Christian Medical College, Vellore & Christian Medical Association of India (CMAI), New Delhi

NACO

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Assessment of NACO Supported Blood Banks 2016

- 1,126 NACO, Ministry of Health and Family Welfare (MoHFW) supported blood (~39.8% of total blood banks)
  - 79% (867) owned by public sector
  - 21% (234) owned by non-profit sector such as non-governmental/non profit, charitable trusts, societies, foundations

NACO

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Assessment of NACO Supported Blood Banks 2016

- Component Separation
  - 39% (427) had components lab (most non-government)
- 70% of blood collected from blood banks have component lab (427)
  - Annual collection was 6,828,055 units ~ 60% of blood requirement based on WHO requirements (1% of population)

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Crossmatch Laboratory - 2006

- Samples to BC from the area
- Pretransfusion Testing
  - ABO, Rh Forward type on slide
    - -A, -B, -A,B, -D
    - One tech performs and a second interprets
  - Reverse Type in tubes
  - Gel Crossmatch on IgG card

No routine Antibody Detection Test (Screen)!

Positive Crossmatch 2006

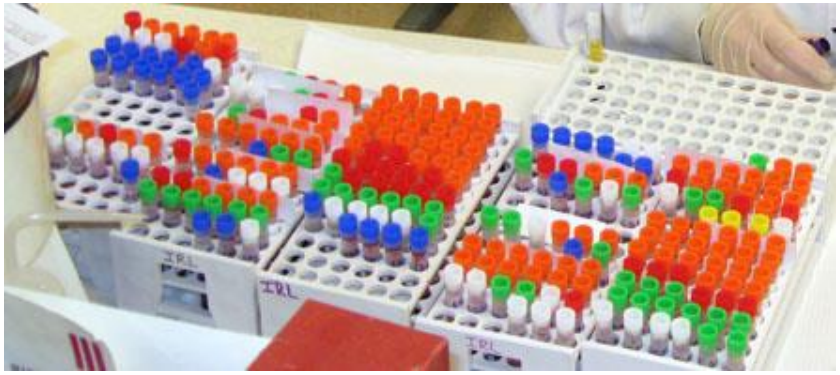
- Repeat crossmatch in saline IAT & albumin 37C and IAT test tube
  - 1 minute centrifugation at 1,000 rpm
  - Very few small, benchtop centrifuges available
- No antibody detection test (screen)

Positive Crossmatch 2006

- Switch to O Rh Negative blood and crossmatch with all 3 methods
  - Gel
  - Saline IAT
  - Albumin IAT

Getting Ready to Leave

- Procure workshop samples
  - Known antibody positive donors
- Identify donors with antibodies that could be used for typing
- Label and aliquot tubes
- Pack cooler/suitcase

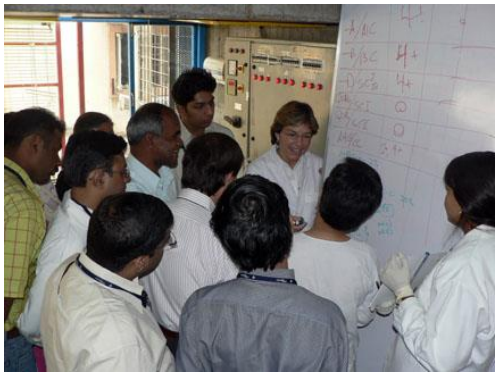


Curriculum

- Reading agglutination reactions: anti-A titration
- Method comparison; positive antibody screen due to anti-E
  - 2 drops/AHG, 4 drops/AHG, LISS /AHG, Gel
- Antibody I.D. panel & RBC selected cells; anti-E
- Reagent QC

Curriculum, cont'd

- Type & screen x2 & ISXM; 1 xm pos mislabeled unit
- Type & screen/ABO discrepancy due to anti-M
- Antibody Identification - anti-c
- Antibody Identification - anti-K + anti-Fya
- Warm autoantibody; panel, DAT, eluate



ABO, Rh TYPE FREQUENCY IN GUJARAT

B Pos	26%
O Pos	25%
A Pos	20%
O Neg	2-4%*

*** We'll call you when we need you!**

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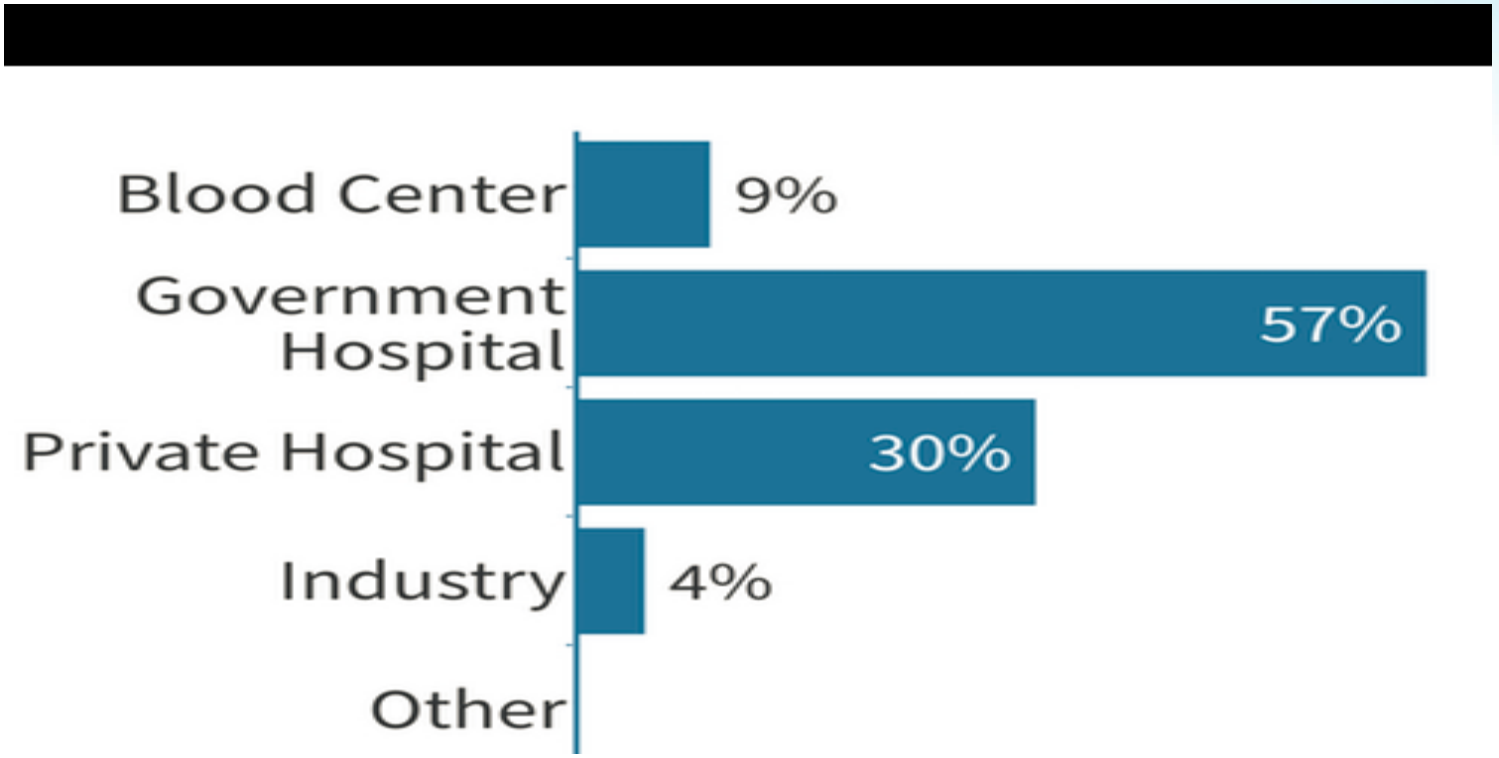
AABB AATM Meeting - Bangalore 2016

27 Respondents



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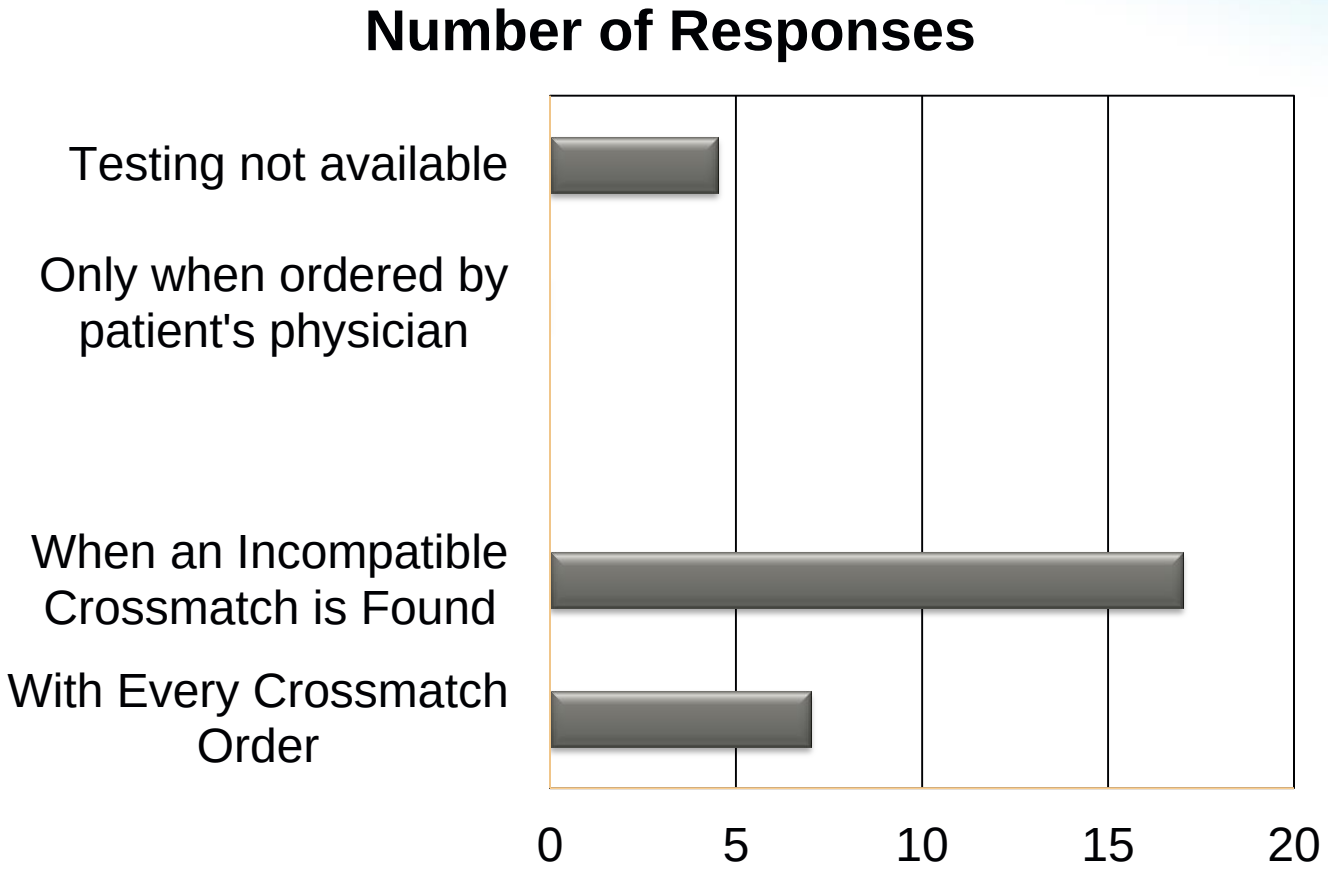
AABB AATM Meeting – Bangalore 2016
How often do you perform antibody detection/screen?



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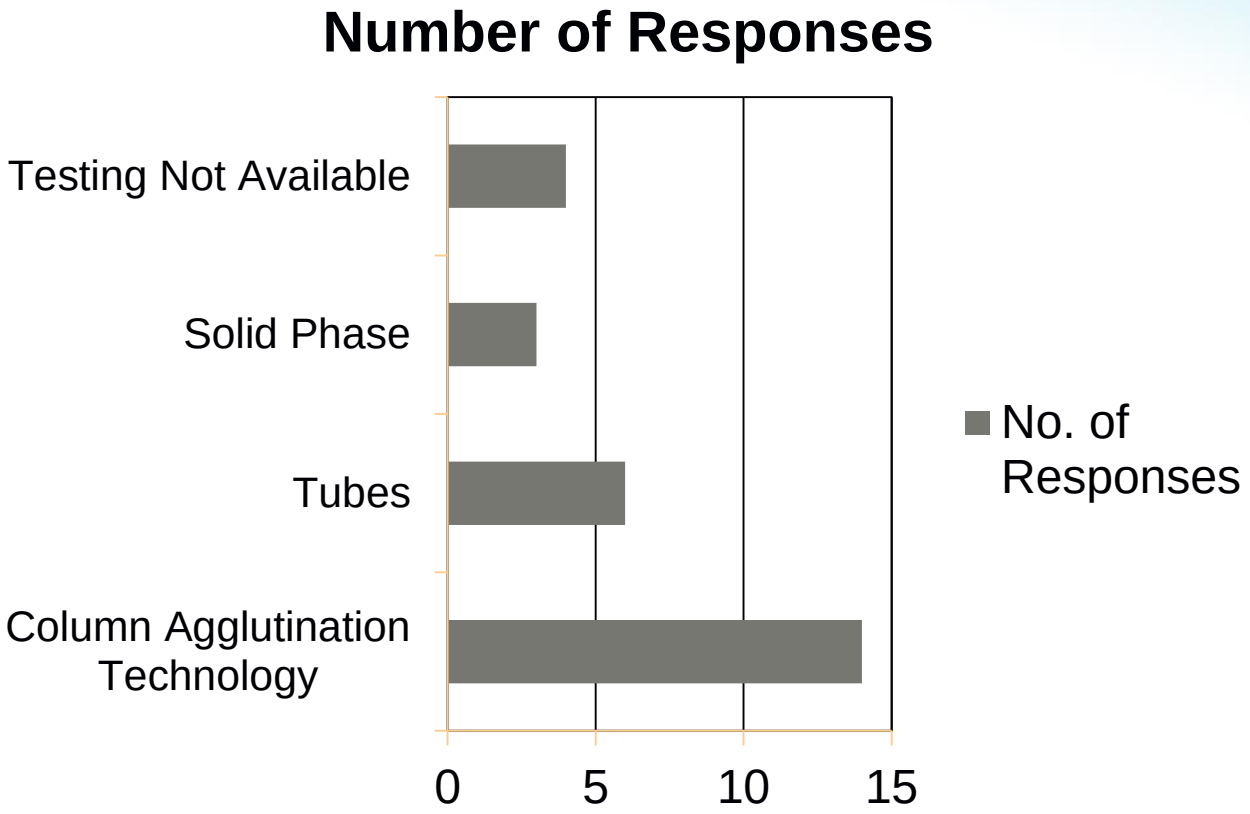
AABB AATM Meeting – Bangalore 2016
What is the routine technique used for antibody detection/screen?



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Alloimmunization Rates in Thalassemics of Indian Origin

Pahuja S, Pujani M, Gupta SK, et al. Alloimmunization and red cell autoimmunization in multitransfused thalassemics of Indian origin. Hematology 2010;15:74-7

- 3.79% reported
- Rh and K antibodies account for >90% of antibodies
- Anti-c, Anti-E and Anti-K account for 60%

Lions Blood Bank - Delhi
2011 – 2014 Results

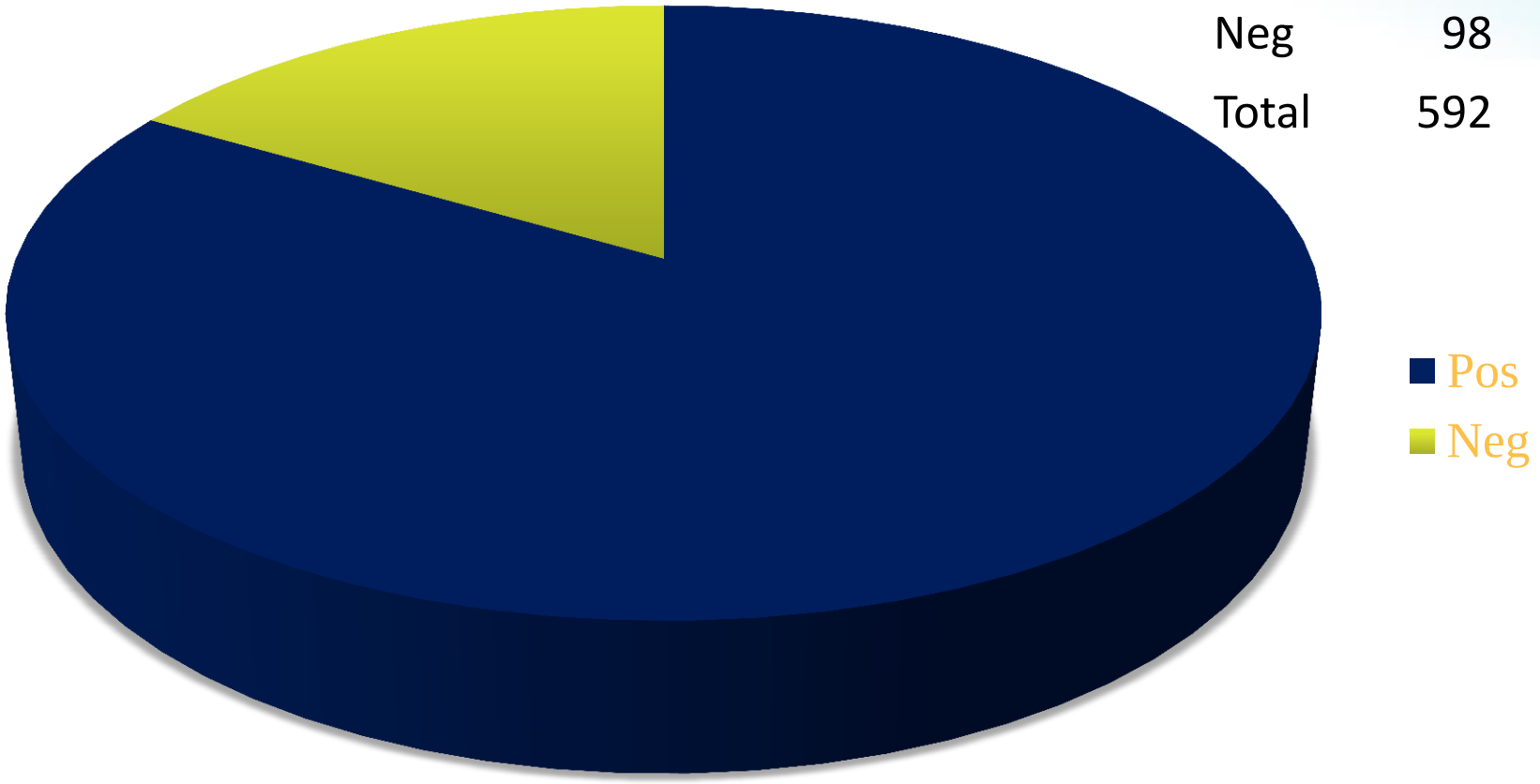
Unpublished Data courtesy of P. Shrivastava

- 61,994 patients
- 723 (1.16%) Positive Antibody Screen
  - 131 (0.21%) Autoantibodies
  - 592 (0.95%) Alloantibodies
- Autoantibodies 18.11%
- Alloantibodies 81.88%

Lions Blood Bank Alloantibodies by Rh D Type

Unpublished Data courtesy of P. Shrivastava

Pos	494	83%
Neg	98	17%
Total	592	



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Specificities of Alloantibodies
Lions Blood Bank 2011-2014

Unpublished Data courtesy of P. Shrivastava

	Single Ab N-412	Multiple Ab N-206	Total Ab N-618	% of Total N-618
-D	149	25	174	28.2 %
-C	06	27	33	5.33 %
-c	16	31	47	7.60 %
-E	63	53	116	18.8 %
-e	02	0	02	0.32 %
-K	13	14	27	4.36 %
-Le^a	57	8	65	10.5 %
-Le^b	28	1	29	4.70 %
-Jk^a	04	12	16	2.60 %
-Jk^b	04	03	07	1.15 %

	Single Ab	Multiple Abs	Total	% of Total N-618
-Fy^a	08	04	12	1.94 %
-Fy^b	0	06	06	0.97 %
-M	32	08	40	6.47 %
-N	09	04	13	2.10 %
-S	08	04	12	1.94 %
-s	04	0	04	0.64 %
-C^w	0	05	05	0.80 %
-Xg^a	01	00	01	0.16 %
-H	04	0	01	0.64 %
others	06	0	06	0.96 %

Points to Ponder

- Indian Studies on alloantibodies few, mainly focused on Thalassemia, multi-transfused or antenatal patients
- This study covers the general patient population of Delhi and alloantibody prevalence is ~ 1%
- Need for improving IH practices

Points to Ponder

Dr. Poonam Shrivastava's Thoughts

- A Robust Rh D Immunisation Programme is needed

- *Clinically significant antibodies identified and the problems of **many patients who had been denied transfusion** earlier from other facilities, were solved!*

Bombay Incidence

- Frequency estimated as 1 in 13,000 in Bombay (Bhatia and Sanghvi 1962)
- In 1974 (Bhatia & Sathe) estimated the incidence to be 1 in 7600 in Bombay.
- A systematic screening of Ratnagiri and Sindhudurg districts of Maharashtra, showed the incidence to be 1 in 4500.
- Incidence is 1 in 2500 among Marathas of Ratnagiri and Raigad districts and Goa.


AB0624921
CONCENTRATE OF HUMAN RBC
ADENINE - SALINE ADDED
04210
Store at 1° to 6°C
Instruction for Use
1. Refrigerate continuously at (2° to 6° C.)
2. Do not dispense without prescription.
3. Transfuse only cross matched blood.
4. Do not add other medication to this bag.
5. Do not warm before administration.
6. Shake gently before use.
7. Use sterile transfusion set with filter.
8. Do not infuse if contents show visible signs of deterioration.
9. Check blood group on lable and recipient's group before administration.
10. Tally donation number on bag & issue report.
PRATHAMA BLOOD CENTRE
ADVANCED TRANSFUSION MEDICINE RESEARCH FOUNDATION
CONCENTRATE OF HUMAN RBC
O+
Store at:4 c
Negative for HIV 1&2, HCV
Malaria, Syphillis, HepBsAg
EXPIRY DATE:-
Donation Dt:-03-NOV-06
PRATHAMA BLOOD CENTRE
Vasna,Ahd-7 India Ph: + 91-79-
00051
O
Rh Positive


Bombay Group
AB0622704
CONCENTRATE OF HUMAN RBC
ADENINE - SALINE ADDED
04210
Store at:4 c
Negative for HIV 1&2, HCV
Malaria, Syphillis, HepBsAg
EXPIRY DATE:-
PRATHAMA BLOOD CENTRE
00051
O
Rh Positive

Dr. Joshi discovered Indian Blood Group! In^a & In^b

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Indian Immunohematology Initiative

Challenges Over 10 Years

- Building resources in country
- High speed, bench top centrifuge
  - To teach advanced problem solving you need test tubes!
- Shipping samples
  - Improvement with new challenges
- Slow in moving to routine pretransfusion antibody detection (screen)

Challenges Today

- Too many blood banks
- Resources
  - Expense of reagents
- Physician education
- Laboratory Scientist clinical training
- Politics in business
- Enforcement of standards for sustainable improvement

Opportunities

- Increase in volunteer donations
- CDC grant
- NACO moving toward inspection
- Working with AABB to develop accreditation
- Professional Organizations
- Scientific Journals
  - Asian Journal of Transfusion Science
- Education
- Collaboration

Indian Immunohematology Initiative

ISBTI

ISBTI

Indian society of Blood Transfusion and Immunohaematology

Asian Association of Transfusion Medicine

ISBT

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