



**Asia-Pacific
Economic Cooperation**

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Economics of Blood Testing

Submitted by: Indonesian Red Cross



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Safe and Sustainable Blood Supply Chain
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ECONOMICS OF BLOOD TESTING

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INTRODUCTION

- Blood transfusion is an essential part of health services
- Patient safety depends on both the safety of blood products and the clinical transfusion process
- The BTS should develop and maintain a national strategy for the testing of blood, using the most appropriate and effective tests
- The new technology on blood services is developed to increase safety of blood

BLOOD TESTING

- To safe blood, all blood should be tested towards TTIs, blood grouping and compatibility testing
- Strategy and algorithm of the testing is determined by the country situation
- Serology with or without molecular testing is directed by the residual risk of blood
- The automation system is offered to decrease the human error
- The cost effectiveness should be considered in implementing the new method or system of the testing

CHALLENGES & OBSTACLES TO INCREASE BLOOD SAFETY IN INDONESIA

Challenges:

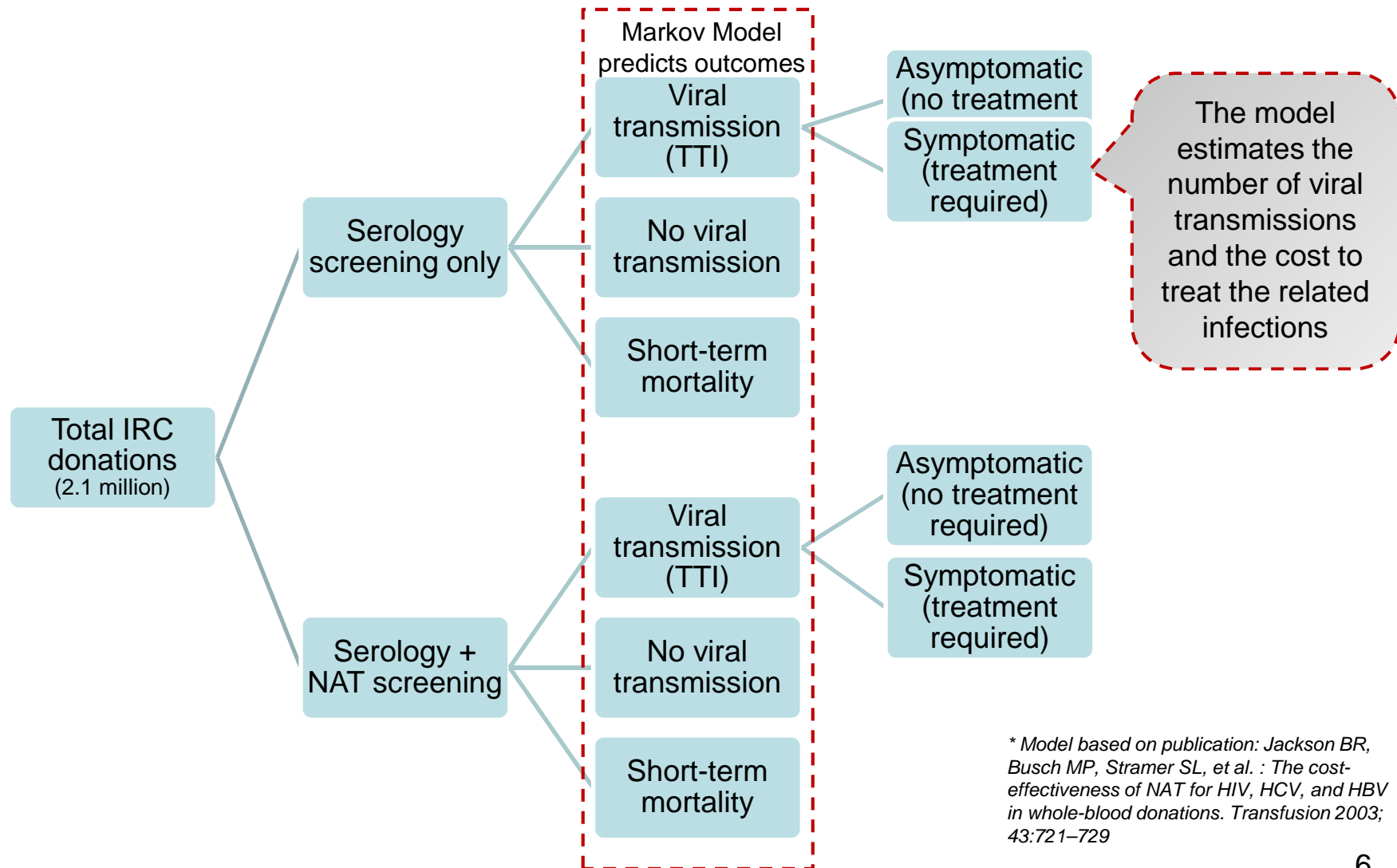
- Indonesia has moderate to high prevalence of hepatitis B → impact to high residual risk of hepatitis B on blood
- Availability of NAT testing

Customer's demand on safer blood is increasing:

- Patients/hospitals/clinicians demand
- Clinical requirement to decrease transfusion reaction
- Demand for product consistency
- Government regulation on standardized blood product
- Implementation of National Health Insurance System

- **Obstacles to increase blood safety:**
 - Skilled labor shortages
 - Rising labor cost
 - Capacity constraints
 - Donor availability
 - Poor infrastructure
 - High cost of new technology
- The economic study on NAT was run in 2012 to evaluate cost-effectiveness of NAT + serology screening vs. simple serology screening

HEALTH ECONOMIC MODEL LOOKS AT THE TOTAL COST OF SCREENING & TREATMENT

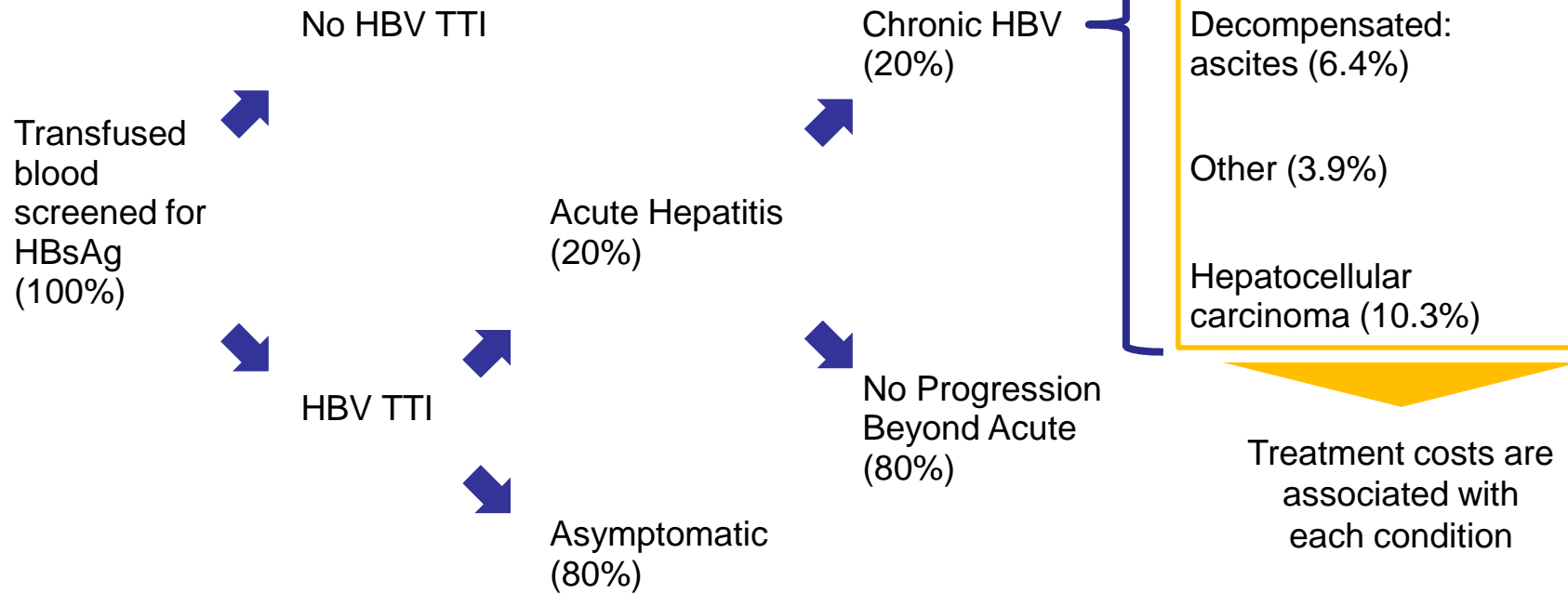


Markov METHOD

- Random variables that changes through time
- Predicts the probability of an outcome based on a chain of outcomes and defined transition probabilities
 - Number of donations
 - Epidemiologic data
 - Population data
 - Disease progression (age, acute, chronic, etc.)
 - Cost of care and treatment
 - Life tables

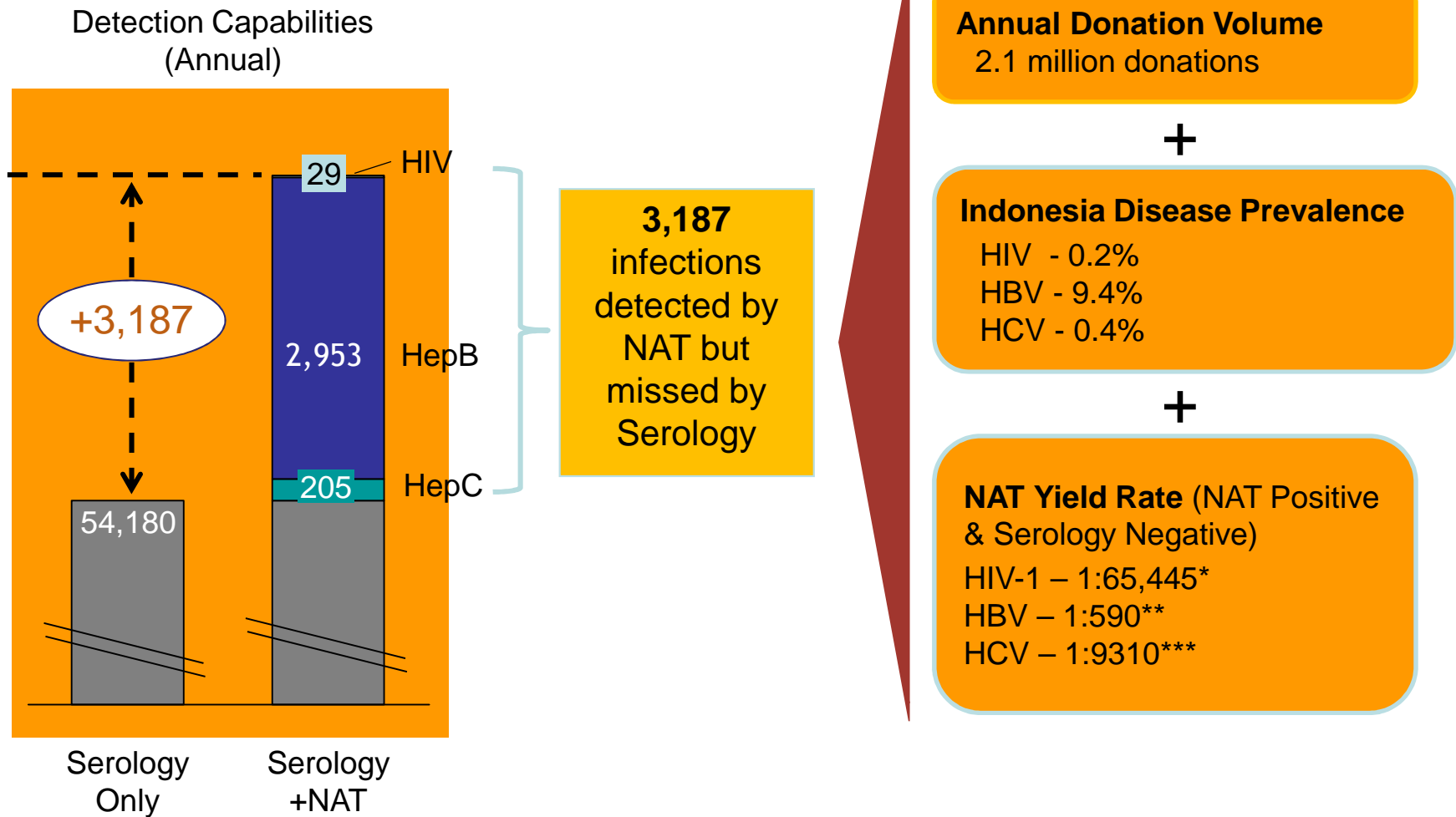
Model Structure – Hepatitis B example

- Outcomes are based on probability of transitioning from one stage to the next
 - Costs are assigned to each outcome



IMPACT OF NAT BLOOD SCREENING

3,187 NAT yield blood units detected per 2.1M annual donations



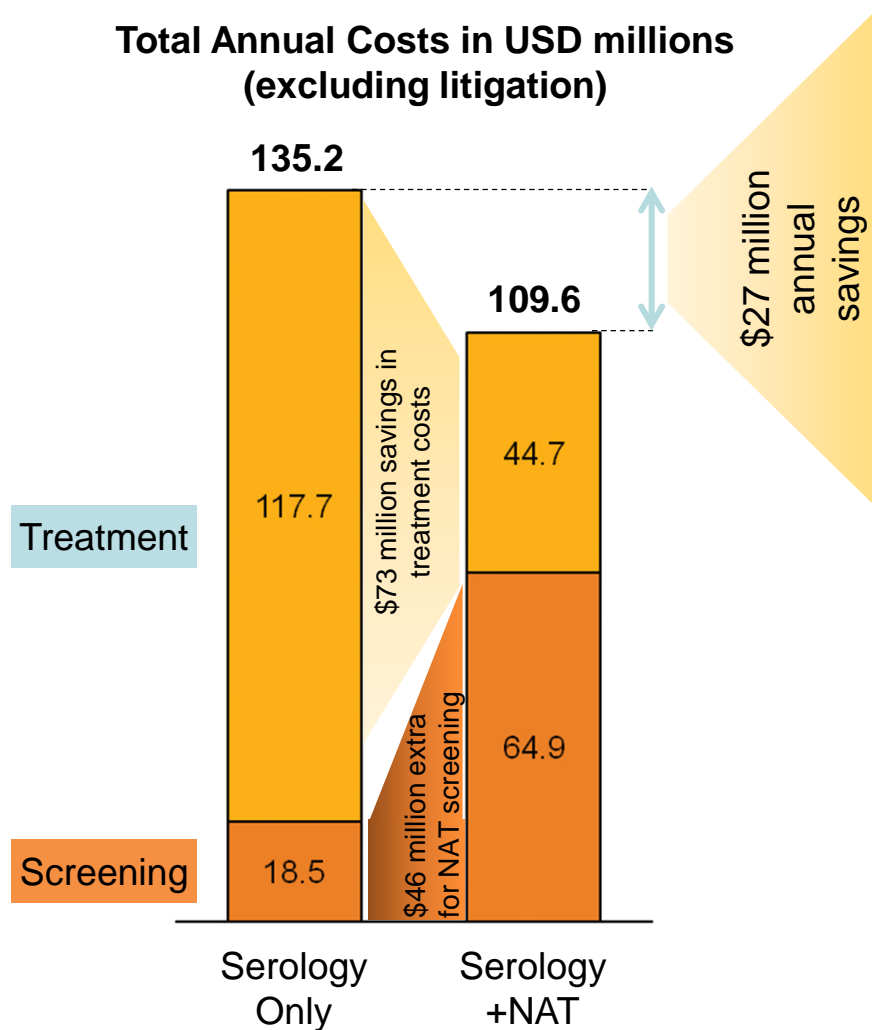
* W.K. Roth et al Vox Sanguinis 2011 (Malaysian data)

** Soedarmono and Lucinanto, Abstract and Poster, ISBT, Cancun 2012

*** Soedarmono, et al. Nucleic Acid Testing of First Time Indonesian Blood Donors. Vox Sanguinis (2005) 89 (suppl.2) : 24

Economics of NAT testing is favorable

NAT reduces Healthcare costs by USD 27M or 20% annually



USD \$27 million or 20% savings* / year

- Transfusion Transmitted Infections result in illness, complications and mortality
- Treatment costs for infections were determined using probabilities for disease progression and complications
- 3,187 infections prevented using NAT screening yield annual healthcare savings of USD 27 million / year or 20% of costs
- This saving excludes costs associated with lost productivity, litigation etc.

* 20% savings = \$27M / \$135M

Economics of NAT testing is favorable

Incremental costs comparison shows IDR 244 billion savings per year

Cost Category	Incremental Costs Serology + NAT	Incremental Costs Serology only
Screening costs NAT USD 22.10/donation, Serology USD 8.83/donation	USD 46,410,000	Baseline
HIV-1 Calculated treatments costs	Baseline	USD 1,739,285
Hepatitis B Calculated treatments costs	Baseline	USD 67,419,069
Hepatitis C Calculated treatments costs	Baseline	USD 3,855,310
Litigation costs	<i>Not included</i>	<i>Not included</i>
Total	USD 46,410,000	USD 73,013,665
Cost-savings with ID-NAT adoption	- USD 26,603,665 - 244 billion IDR (1 USD= 9,200 IDR)	

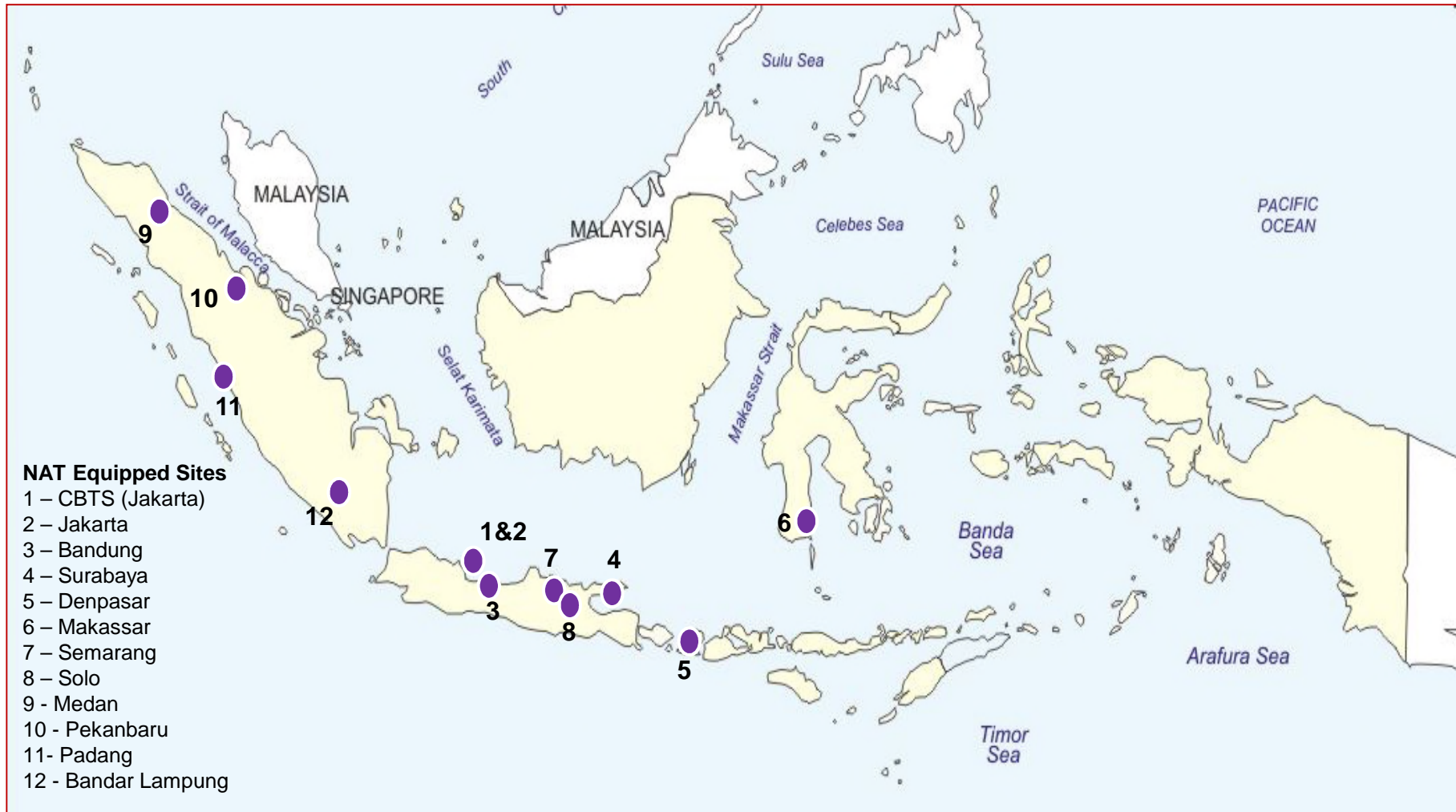
USD 74 M
Cost to treat patients infected by TTIs preventable by ID-NAT*

* Note: Even after screening blood with ID-NAT, a residual risk of TTIs still remains

DISSEMINATION OF INFORMATION

- Economic study of NAT was disseminated to:
 - Ministry of Health
 - Clinicians
 - Hospitals
 - Insurance company
- It create the demand on NAT tested blood & direct the clinician to put the requirement of NAT tested blood for multi transfused and other certain patients

NAT ENABLED LABS ACROSS INDONESIA



OTHER CHALLENGES

- Standardize the quality of blood through centralization:
 - Automation system of blood testing on TTIs and blood grouping
 - Leucodepleted blood component production
- Element to be considered:
 - Space and utilities consume
 - Consumables cost
 - Labor, time and transportation cost
 - Human error cost
 - Treatment cost due to false negative result of TTIs testing and bad quality of blood component
 - Lost productivity and litigation (?)
 - Minimum samples, etc
- Economic study on automation and leucodepleted blood need to be done

CLOSING

- Blood service is an expensive health service that should be run as effective and efficient as possible
- Economic analysis could be the best basis used to considered new technology implementation followed by dissemination to related stakeholders
- Automation of blood testing will be effective and efficient if run based on centralization system
- Mixed system between centralization and decentralization of blood services might be an appropriate for Indonesia that has big burden of geographic and vary of infrastructure