

The Survey on Biological Specimen Transportation System in Human and Animal Health Sector

12th July, 2022



Slide 3

SY1

Sokchea YANN, 5/30/2022

SY2

changed 6 to 3

Sokchea YANN, 5/30/2022

Objective

This survey aims at gathering some information to improve the biological sample transportation components (sample flow, transportation mapping, Packaging and transportation control system) within the national medical laboratory network in Cambodia by first conducting a pilot phase study on 3 provinces, Battambang, Kampong Cham, and Takeo province.



Methodology

- Survey method: Descriptive Cross- Sectional Study.
- Survey sample: There are 37 laboratories which participated in the survey, 30 laboratories are from provincial hospitals, national hospitals, national programs, NGO laboratories, and research/specialized laboratories and 7 laboratories from animal health sector.
- Survey timeline: This survey was conducted in May 2021.
- Data collection technique: Self-administered questionnaire.



Of the 30 participating labs from HH, >50% were CPA-3 laboratories

Laboratory Level	Name
NGO Labs	1. Komar Angkor Hospital Laboratory
	2. Medical Laboratory of Sonjakkil Memorial Hospital
	3. Sihanouk Hospital Center of Hope Laboratory
CPA-3	1. Cheychumneas Referral Hospital Laboratory
	2. Kampong Chhnang Provincial Hospital Laboratory
	3. Steung Treng Provincial Hospital
	4. Battambang Provincial Referral Hospital
	5. Svay Rieng Provincial Referral Hospital Laboratory
	6. Kampong Cham Provincial Hospital Laboratory
	7. Takeo Provincial Hospital Laboratory
	8. Mongkultborey Provincial Hospital Laboratory
	9. 16MAKARA RHP-Preah Vihear/Laboratory
	10. Ratanakiri Provincial Hospital Laboratory
	11. Prey Veng Referral Hospital Laboratory
	12. Siem Reap Provincial Referral Hospital
	13. Kompong Thom Provincial Hospital Laboratory
	14. Pursat Provincial Hospital laboratory
	15. Kampong Speu Referral Hospital Laboratory
	16. Kampot referral hospital laboratory



National and specialised laboratories were included to understand quality of samples arriving at facilities

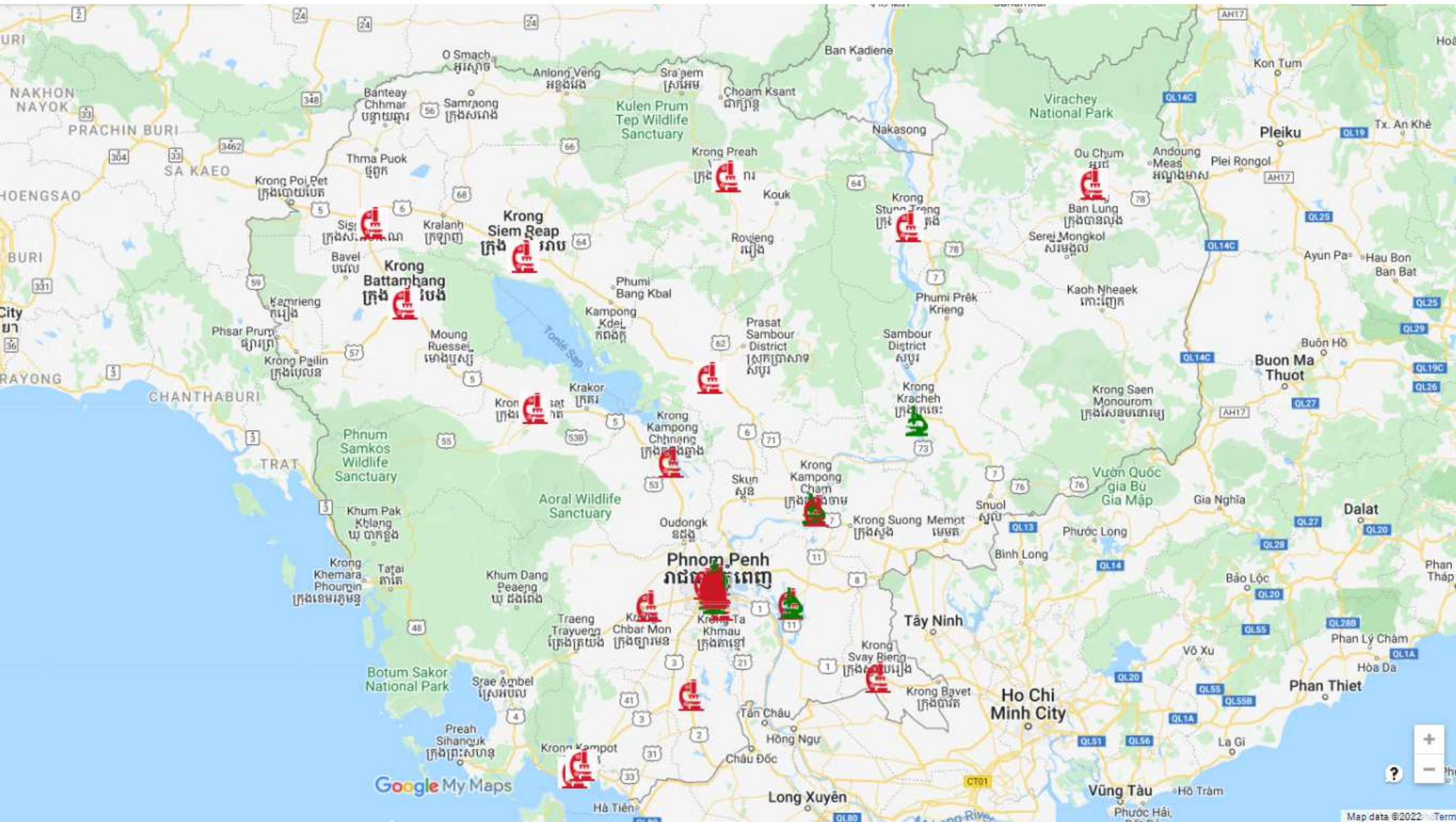
Laboratory Level	Name
National hospital	1. Khmer Soviet Friendship Hospital Laboratory
	2. Preah Angduong Hospital laboratory
	3. Cambodia-China Friendship Preah Kossamak Hospital Laboratory
	4. Calmette Hospital Laboratory
	5. National Pediatric Hospital Laboratory
Specialized/Research Laboratory	1. NCHADS Laboratory (HIV and STI Laboratory)
	2. CNM Lab (National Center for Malaria Control) Lab)
	3. Rodolphe Mérieux Laboratory of UHS
	4. National Institute of Public Health Laboratory
	5. National Center for Tuberculosis and Leprosy Control
	6. Institut Pasteur du Cambodge



Of the 7 participating labs from AH, 4 are national and university institutes and 3 are provincial labs.

No.	Laboratory Level	Name
1.	National Level	- National Animal Health and Production Research Institute
2.	Agricultural University and Institutes	<ul style="list-style-type: none"> - Royal University of Agriculture (RUA) - Kampong Cham National Institute of Agriculture - Prek Leap National Institute of Agriculture
3.	Vet Provincial Laboratories	<ul style="list-style-type: none"> - Prey Veng Production and Veterinary office - Kampong Cham Production and Veterinary office - Kratie Production and Veterinary office
TOTAL		7

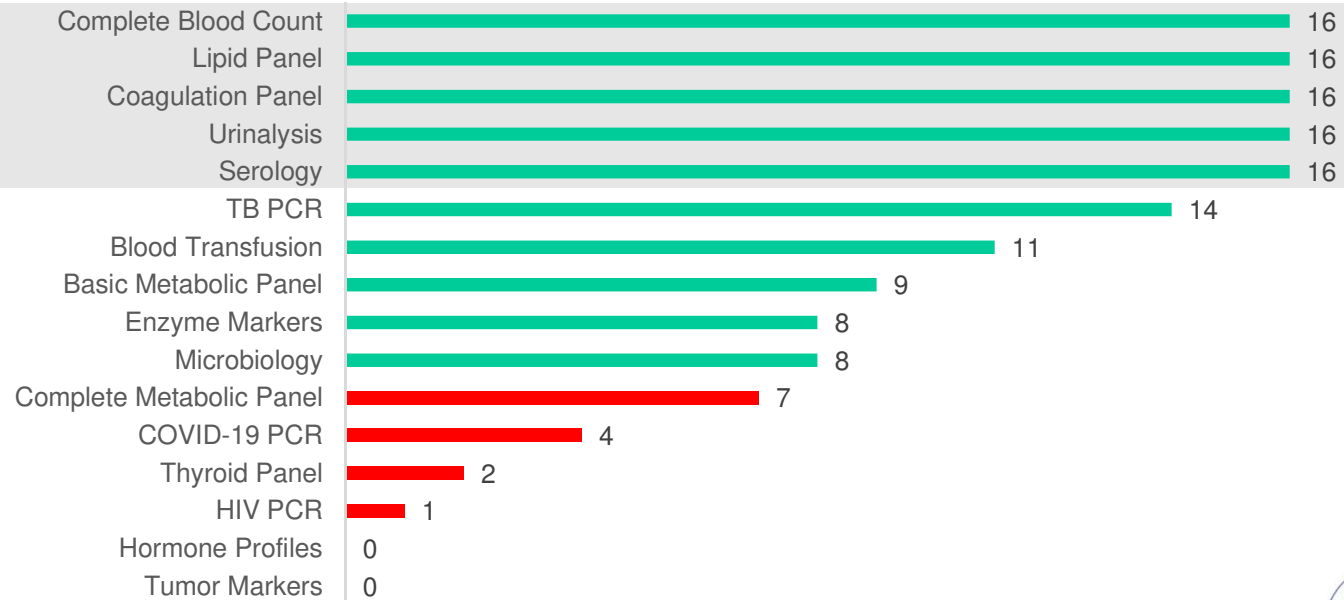




Tests available on-site: CPA-3 Hospitals

5 test types can be performed by all surveyed CPA-3 labs – all other test types require transportation to another lab

Test types performed by 16 surveyed CPA-3 Labs



Tests available on-site: National Hospitals

National hospitals have to refer samples to specialized labs for at least 6 test types

Test types performed by *5 surveyed national hospitals*



Tests performed by Surveyed Specialised Labs for HH

IPC and NIPH perform the most diverse tests, which NCHADS, CNM and CENAT specialising in their disease areas

Types of lab tests done at each specialised lab

Test	IPC	NIPH	NCHARDS	CENAT	CNM
Complete Blood Count	X	X		X	Malaria microscopic exam, Malaria PCR, G6PD
Basic Metabolic Panel	X	X		X	
Complete Metabolic Panel	X	X			
Lipid Panel	X	X			
Thyroid Panel	X	X			
Enzyme Markers	X	X			
Coagulation Panel	X	X			
Urinalysis	X	X		X	
Serology	X	X	X	X	
Microbiology	X	X			
Hormone Profiles	X	X			
Tumor Markers	X	X			
TB PCR	X	X		X	
HIV PCR	X		X		
COVID-19 PCR	X	X			



Tests performed by Surveyed Veterinary Labs

Test	NAPHRI	Prek Leap institute	KNIA (Kg. Cham)	RUA (university)	Kampong Cham	Kratie	Prey Veng
Direct Parasite Examination	✓	✓		✓	✓	✓	
Parasitology	✓	✓	✓	✓			
Hematology	✓		✓	✓			
Sedimentation	✓	✓		✓	✓		
Flotation	✓	✓					
Animal Feed	✓						
Biochemistry	✓			✓			
Pathology	✓			✓			
Bacteriology	✓			✓			
Outopsy	✓			✓			
Microscopic Examination	✓	✓					
Smear Examination	✓						
Serology ELISA	✓			✓			
Agglutination	✓			✓			
Bacteriology Culture	✓			✓			
Other animal test	✓						
Bird Flu	✓						
Animal Genetic	✓			✓			
Toxicology	✓						
Vet drug and Drug Residue	✓						
Virology	✓						
Fungi Culture							



Number of samples sent by surveyed labs from AH

3,200 samples were received in just 1 month by the 7 surveyed labs. More than half are high-risk such as swabs, blood, and carcasses.

Total number of samples received by 7 surveyed labs in May 2021

High Risk sample	Number
Blood	947
Swab	694
Carcasses	48
Total	1,689
Low Risk sample	Number
Feces	1096
Other Specimen	440
Total	1,536



Number of samples received by each lab categories in HH

Of the samples reported in May 2021, 59% were received by the 5 specialised labs and 40% by the 16 surveyed CPA-3 laboratories

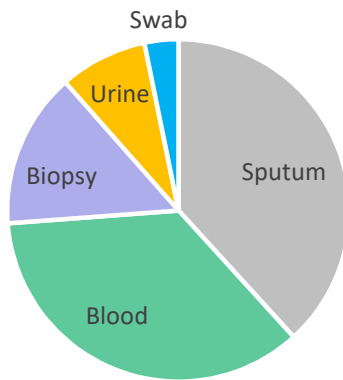
Number of samples received by laboratory categories

NGO labs
Received: 374

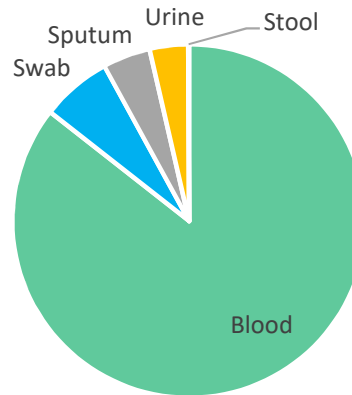
CPA-3 Received: 24,210
(40%)

Specialized/Research
Received: 35,455 (59%)

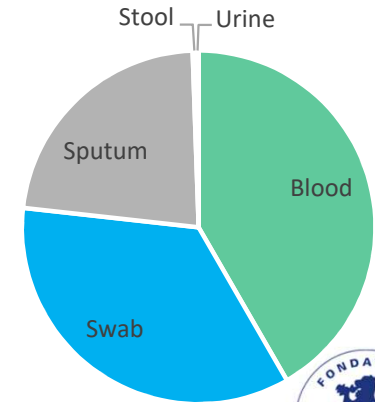
Sample types received by NGO Labs



Sample types received by CPA-3 Labs



Samples types received by specialised labs



Note: data does not specify what tests are done on each sample

Number of samples received by each lab type in AH

Of the samples reported in May 2021, 42% were received by NAPHRI lab alone, and 58% by the National and University Institutes.

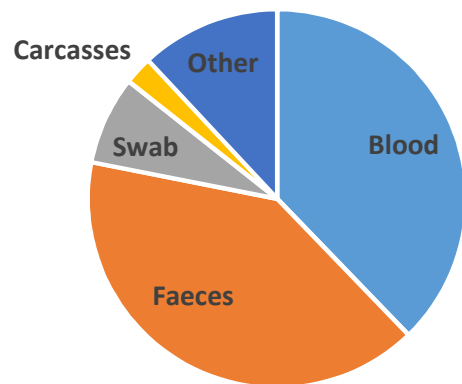
Number of samples received by laboratory type

National and University Institutes Received: 1,985 (58%)

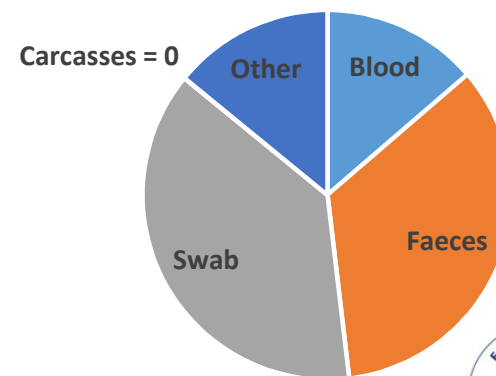
Veterinary Provincial Laboratory Received: 0

Central Laboratory Received: 1,440 (42%)

Samples types received by National and University Institutes



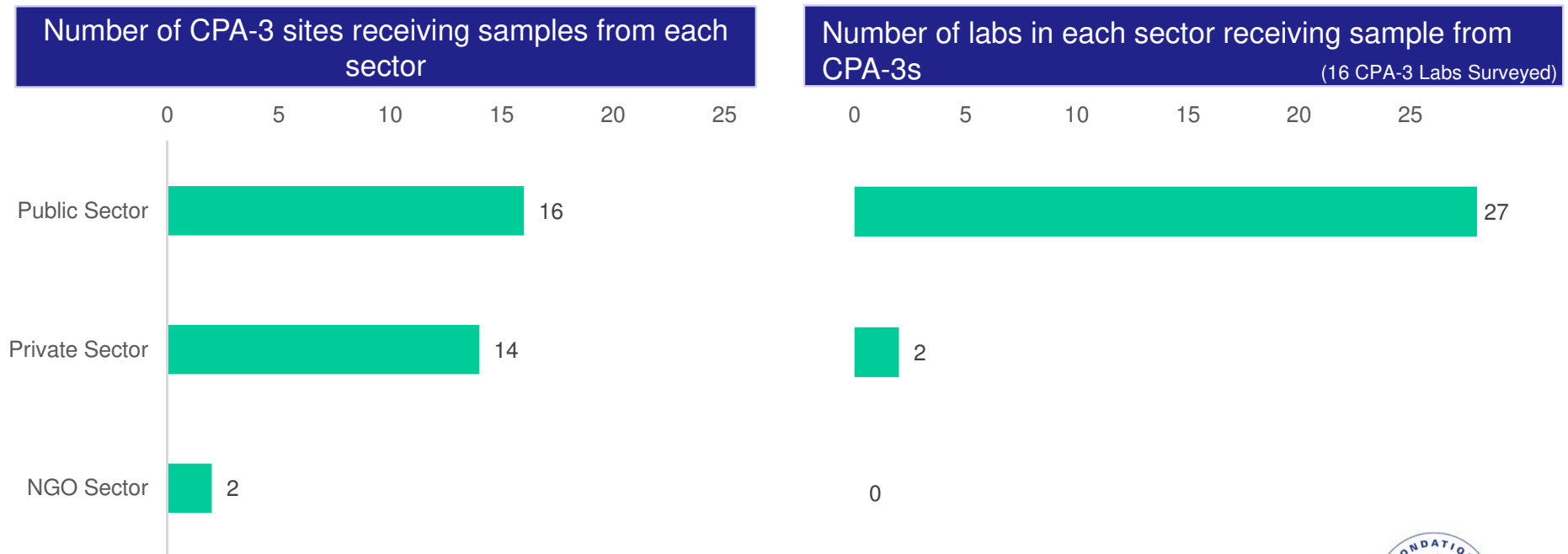
Sample types received by Central Lab (NAPHRI)



Note: data does not specify what tests are done on each sample

Samples sent to and sent by CPA3 labs for each public, private and NGO sector.

CPA-3 labs reported mostly receiving and sending samples to other public sector labs.



Transportation times to/from CPA-3 labs

Samples received by CPA-3 labs have longer transportation times from public sector compared with the private sector.

Samples sent from CPA-3 have longest transportation times, as they often go to Phnom Penh.

Average travel time for specimens sent from and received by *16 surveyed CPA-3 Labs*

	Samples received	Samples sent
Public Sector	02h 52mn	05h 23mn
Private Sector	00h 20mn	02h 07mn
NGO Sector	00h 10mn	N/A



Note: data does not specify which samples types are transported, sample result turn around time, or frequency of transportation

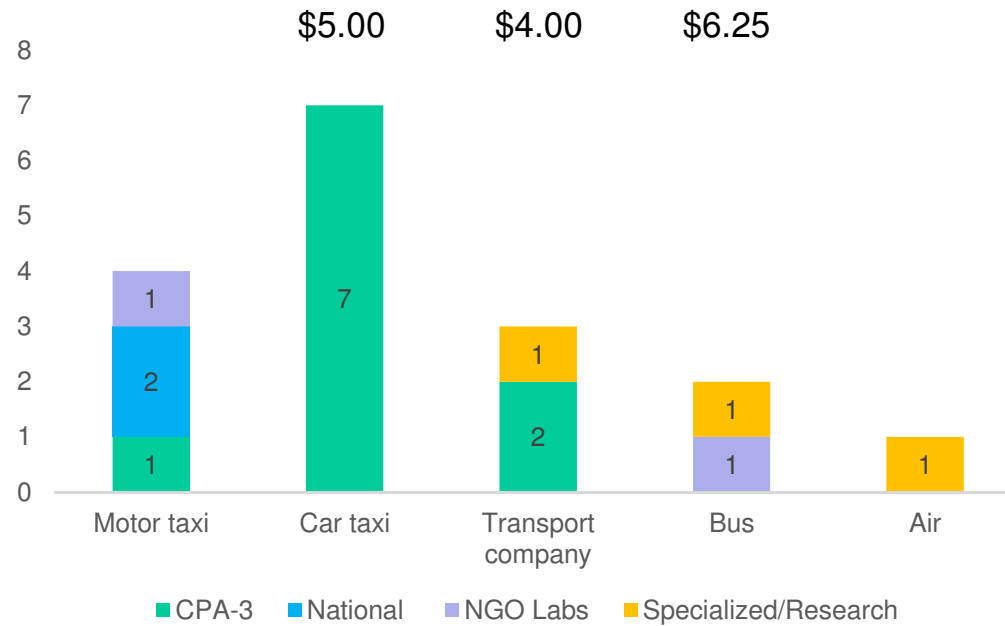
Transportation method

Provincial labs more often use car taxis, even though the cost of a transport company may be lower

Number of surveyed labs reporting frequently using transportation mode

(16 CPA-3 Labs Surveyed)

Estimated avg cost per trip:



Transport planning considerations for HH

Overall coordination between sending and receiving labs is good, and could be improved by sending more information about the shipment to the receiver and working more on the logbook records data.

% of received samples reported by surveyed labs to meet the requirements

Transport planning considerations	73%
Agreement made with receiving lab	75%
Arrangements made with transporter	77%
Information sent to receiving lab about shipment	60%
The parcel arrives directly to the lab	74%
Lab arranges collection upon arrival outside working hours	81%
Someone responsible 24/7 to receive samples	75%
A logbook records data on transportation/reception	69%

Do these scores reflect what you are seeing in your labs?



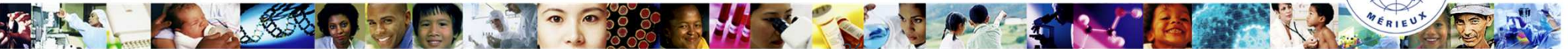
Transport planning considerations for AH

Overall coordination between sending and receiving labs is very good.

% of received samples reported by surveyed labs to meet the requirements

Transport planning considerations	97%
Arrangements made with receiving lab	100%
Arrangements made with transporter	100%
Information sent to receiving lab about shipment	100%
The parcel arrives directly to the lab	100%
Lab arranges collection upon arrival outside working hours	100%
Someone responsible 24/7 to receive samples	82%
A logbook records data on transportation/reception	100%

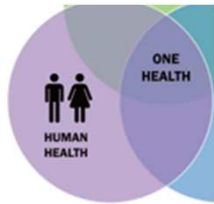
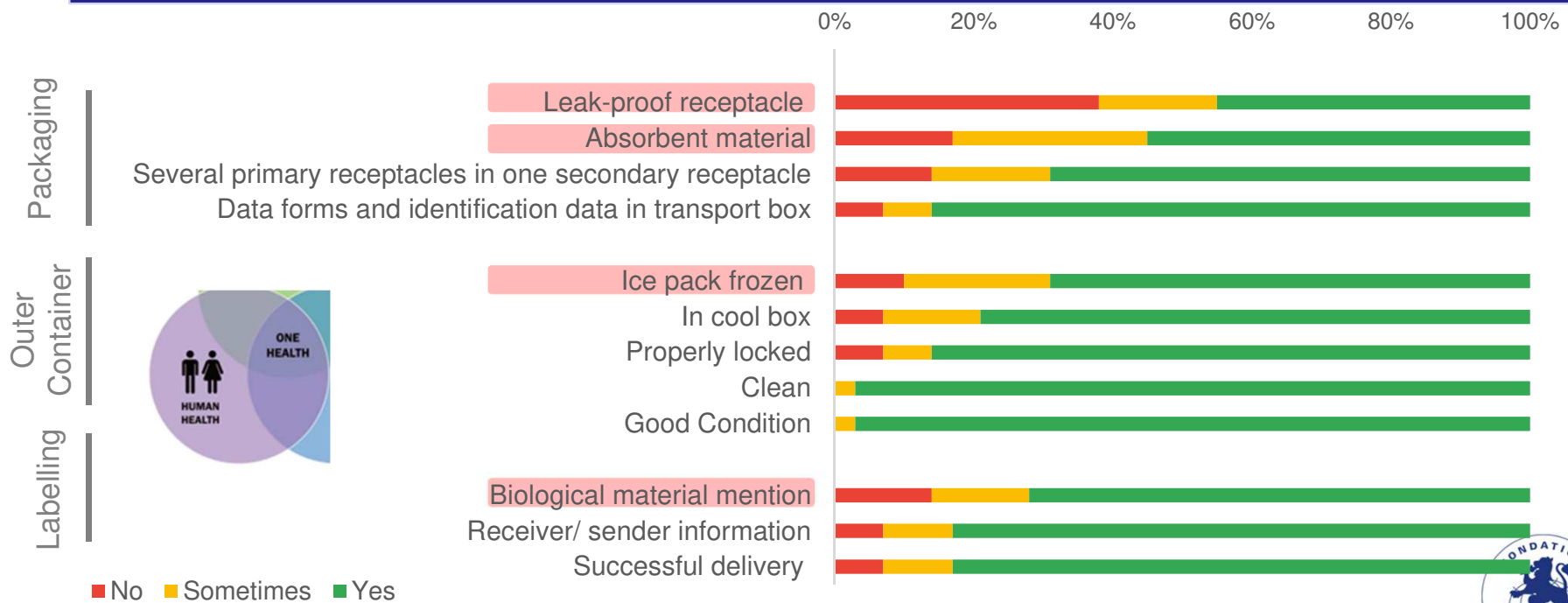
Do these scores reflect what you are seeing in your labs?



Sample packaging & labelling for transportation in HH

The 4 main issues faced by labs when they refer specimen to other labs are missing leak-proof receptacle, absorbent material, biological material label and ice pack melt

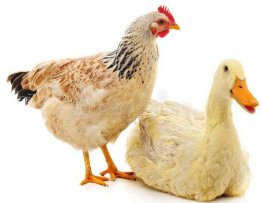
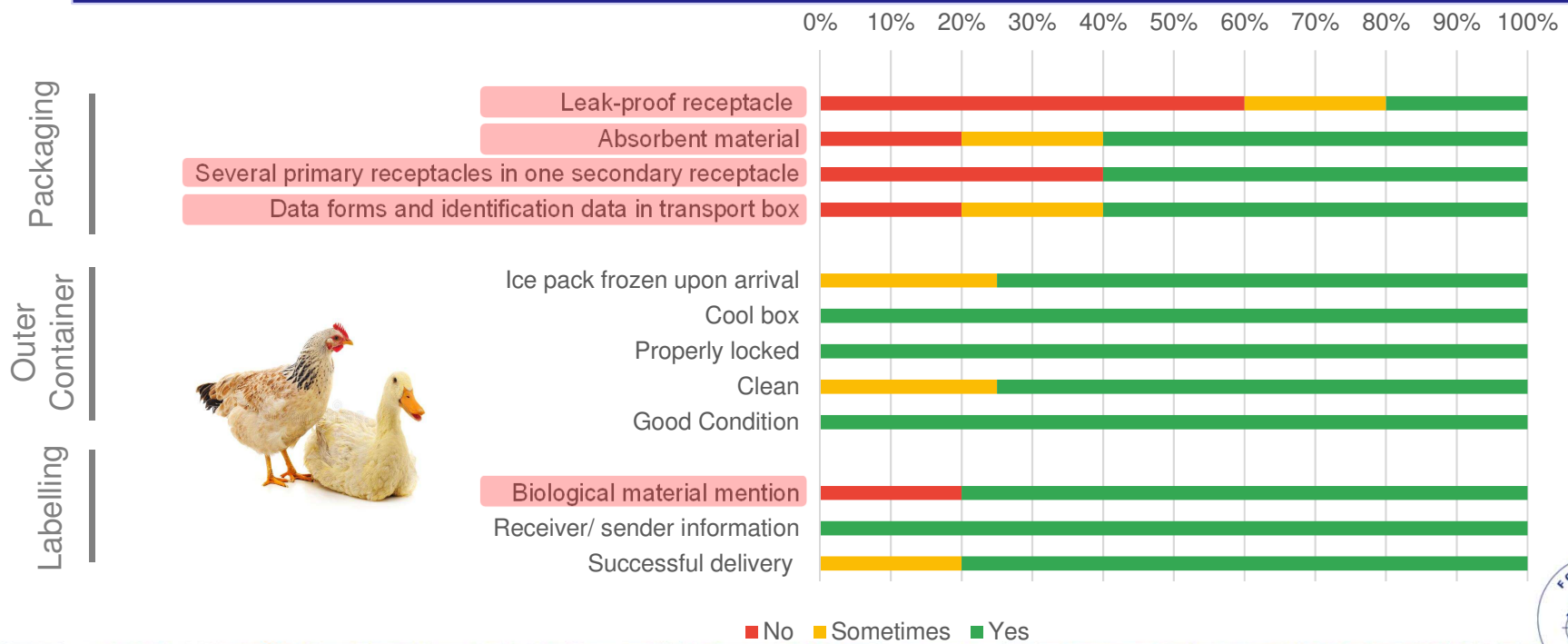
% of surveyed labs reported by referral labs to meet the requirements



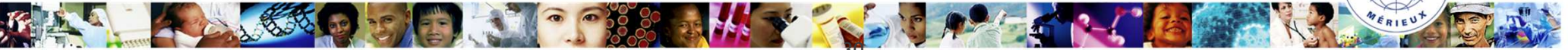
Sample packaging & labelling for transportation in AH

The 5 main issues faced by labs when they refer specimen to other labs are missing leak-proof receptacle, absorbent material, 2nd receptacle, sample information attached, and biological material label.

% of sent samples reported by referral labs to meet the requirements



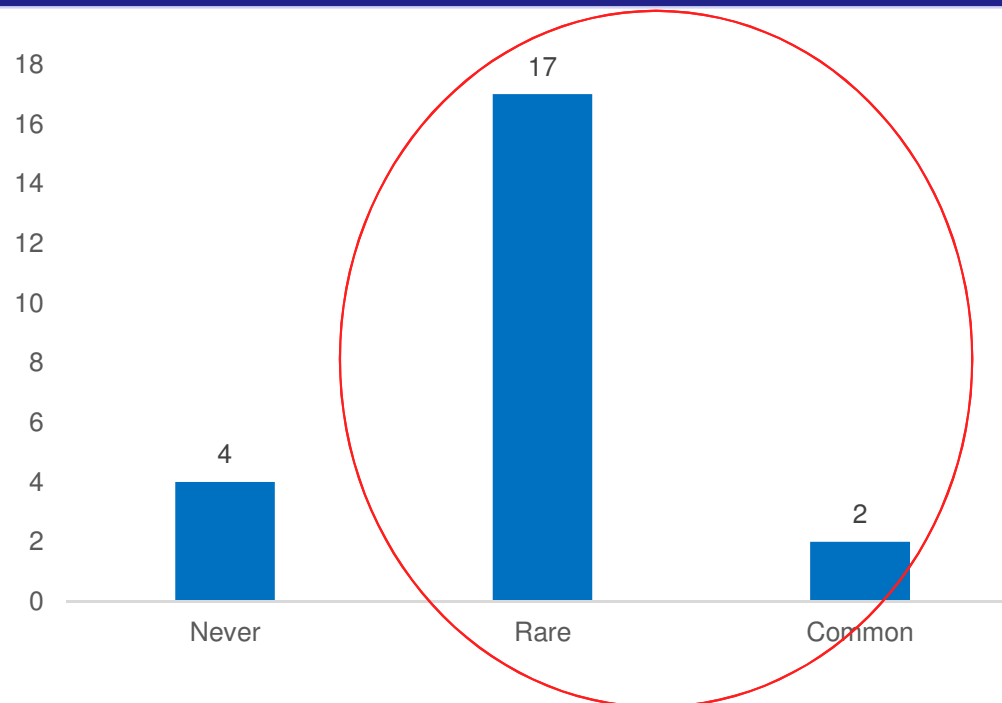
■ No ■ Sometimes ■ Yes



Sample Quality: Sample rejection in HH

Most of surveyed labs rejected sample rarely and there were only two labs that rejected sample commonly: Battambang PH lab and Calmette NH Lab.

Number of surveyed labs reported on sample rejection to meet the acceptable criteria

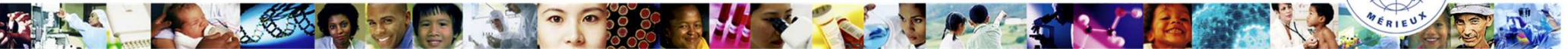
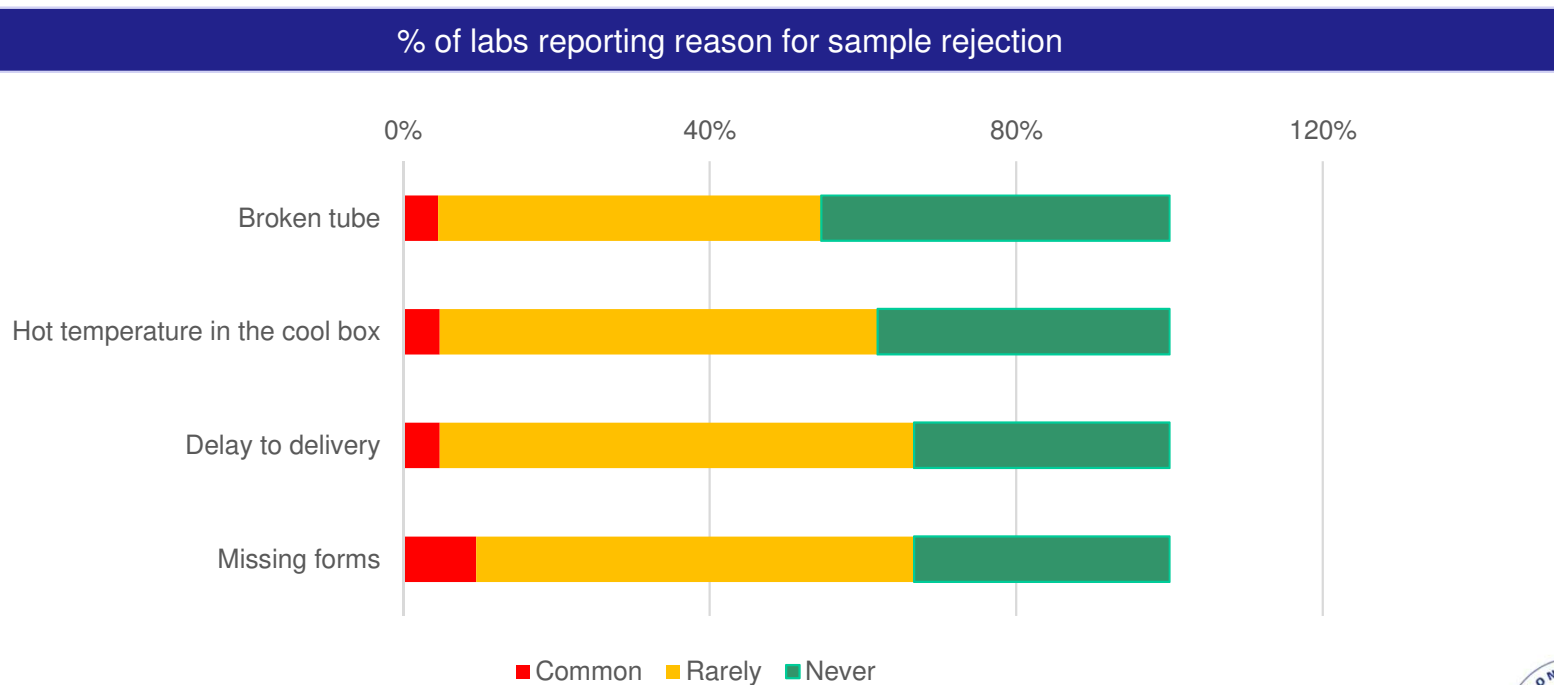


Do you believe that all samples of low quality are rejected in line with SOPs?



Sample Quality: Feedback on rejection in HH

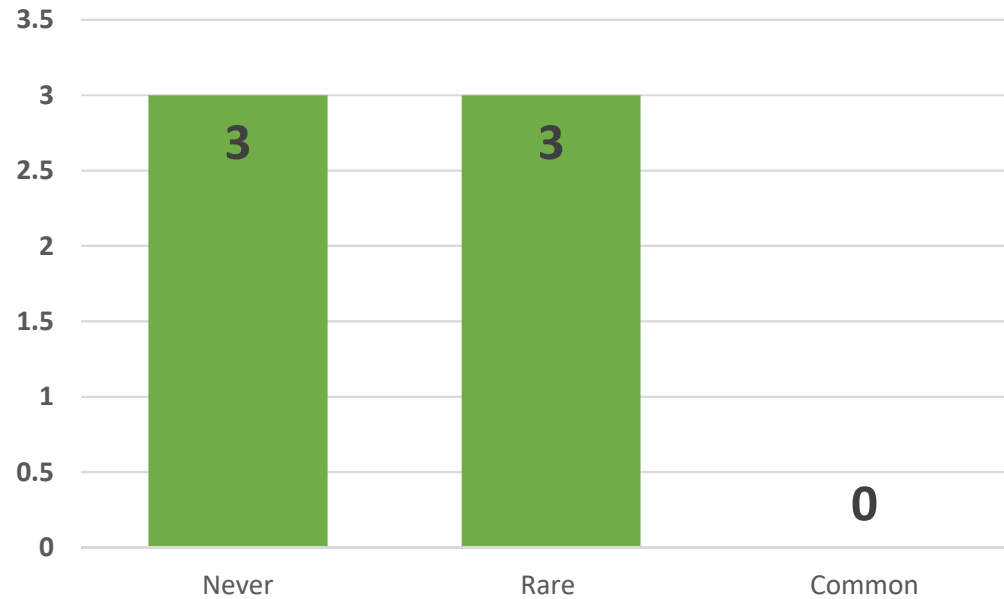
There four common feedbacks identified during the labs received samples: broken tube, hot temperature, delayed delivery, and missing form.



Sample Quality: Sample rejection in AH

Some labs including NAHPRI never rejected samples

Frequency of sample rejection reported by surveyed labs to meet the acceptable criteria

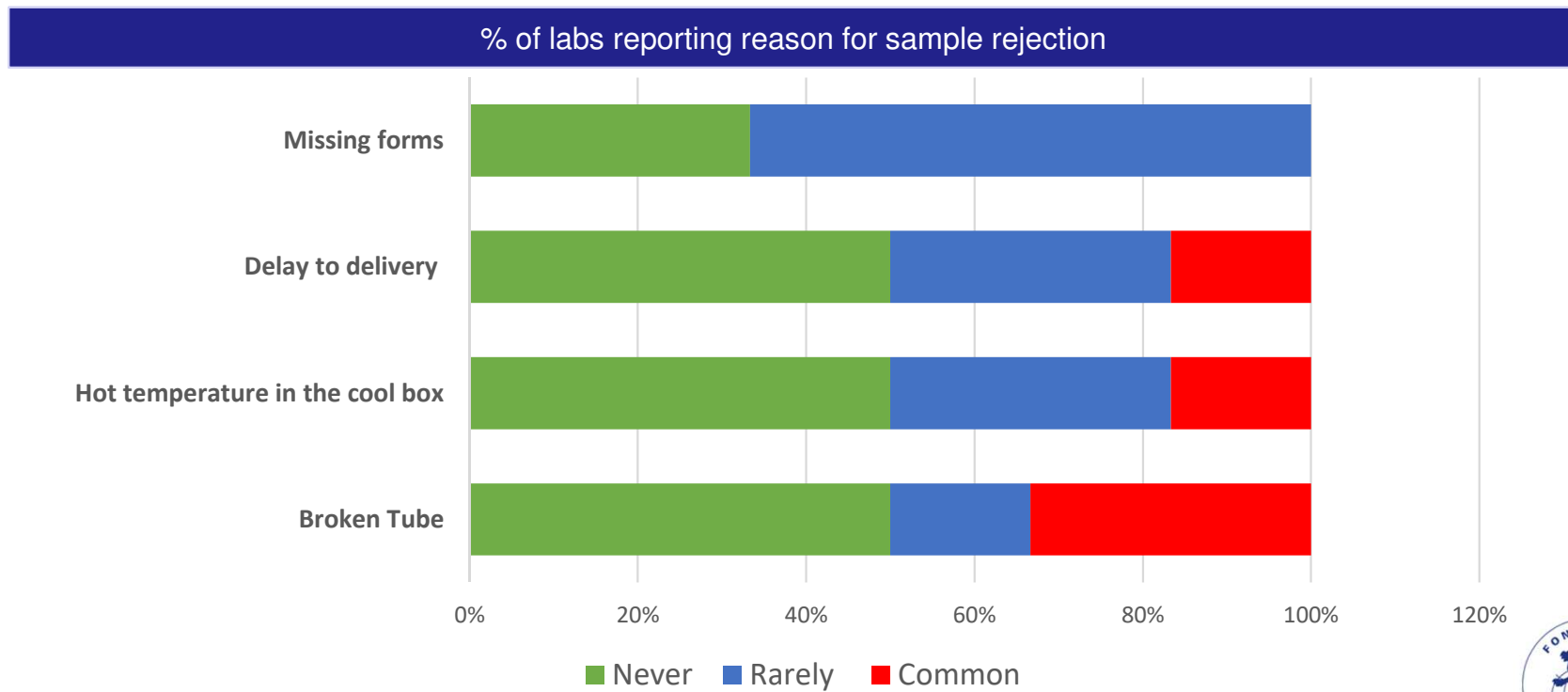


Do you believe that all samples of low quality are rejected in line with SOPs?



Sample Quality: Feedback on rejection in AH

There three common feedbacks identified during the labs received samples: broken tube, hot temperature, and delayed delivery.



Questions for discussions

- What are the issues you face to ensure correct packaging and labelling of biological specimens when referred to other labs? Which have the biggest impact on quality?
- What feedback is provided to sender in case of rejection?
- What practical solutions would help improve the quality of samples?

Suggestions from surveyed labs:

1. Provide poster on sample handling to the carrier of delivery company
2. Organize a workshop to explain the guideline on packaging and transportation
3. There should be complete materials for transportation (icebox, form, packaging materials, label...)



THANK YOU!

