HIV EQAS - Novel Perspectives

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for the staff of the National Serology Reference Laboratory, Australia and Indonesian Collaborators

Objectives of an EQAS

- **Monitoring of laboratory and assay performances**
  - **To compare results between participants**
  - **To review testing processes**
- **Facilitation of information exchange between participants**
  - **On assays and testing strategies used**
- **To identify problems and their possible causes**
- **To obtain information to offer advice, solutions and targeted training.**

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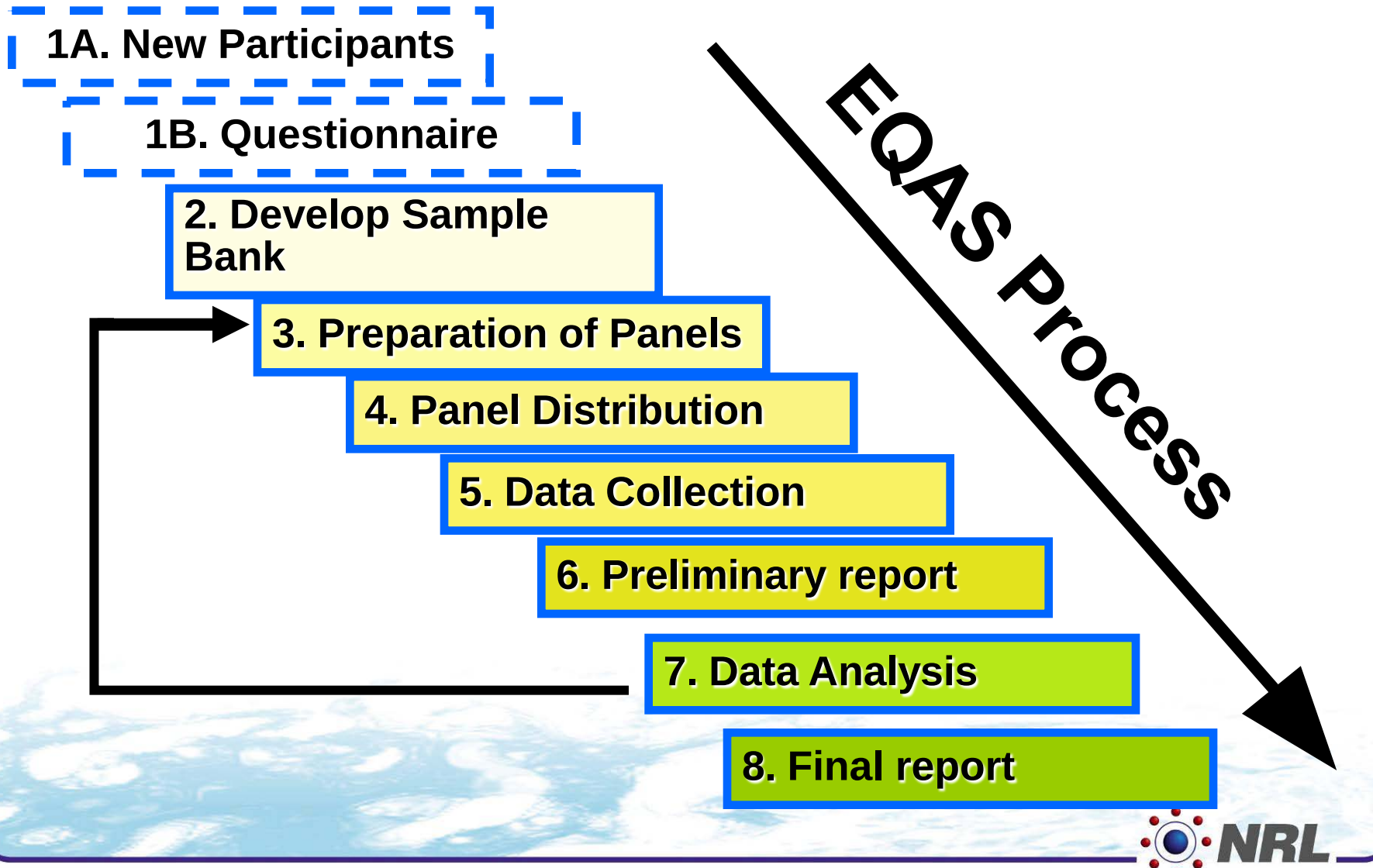
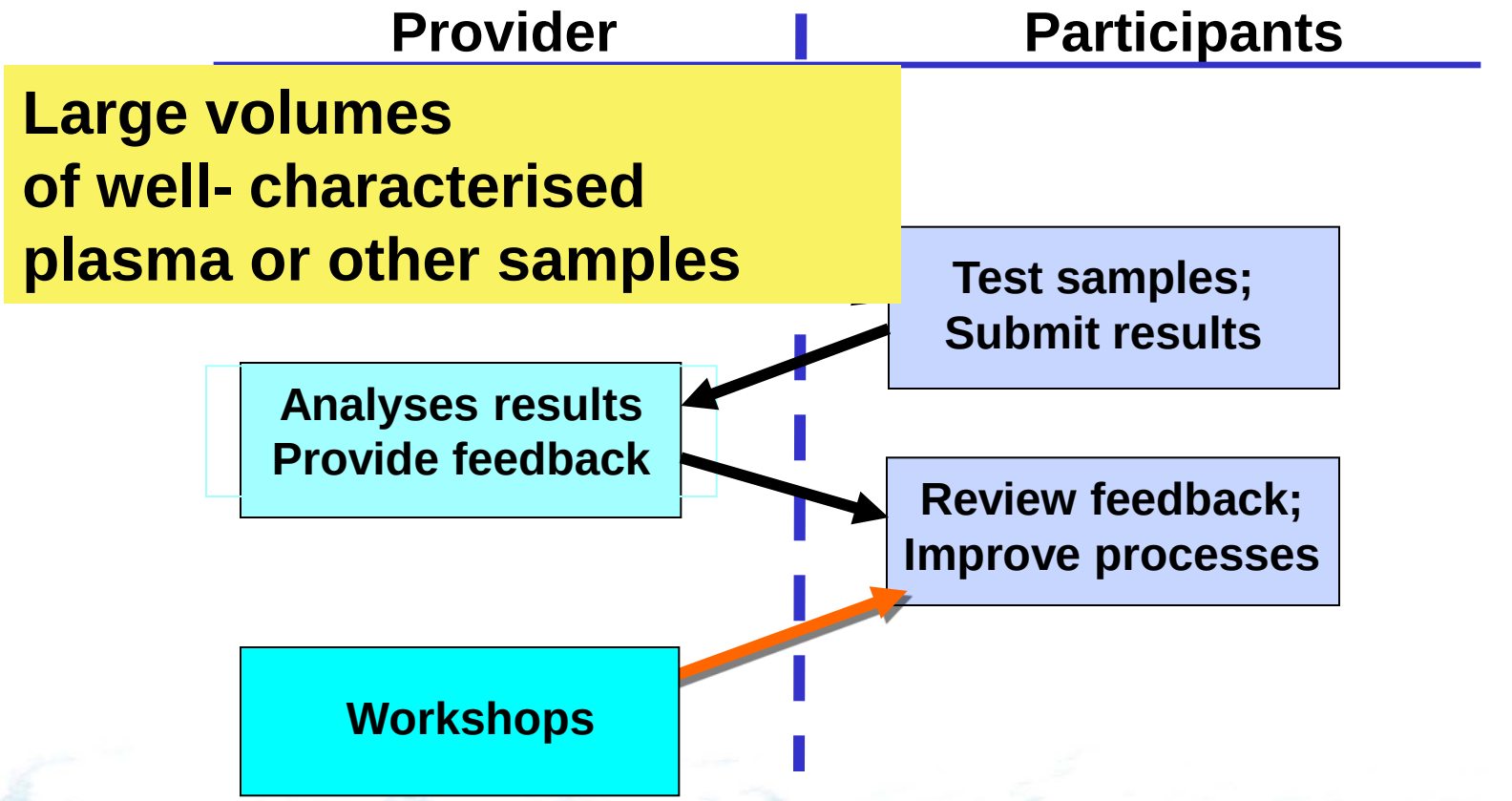
Participants Gain...

- Risk Management
- Determination of the accuracy of results
  - Comparison of results
- Review of performances of assays in use
- Information to minimise their errors
- Self appraisal
- Objective evidence of quality
- Identification of training needs
- Continual improvement

Process of EQAS



External Quality Assessment Scheme (EQAS)



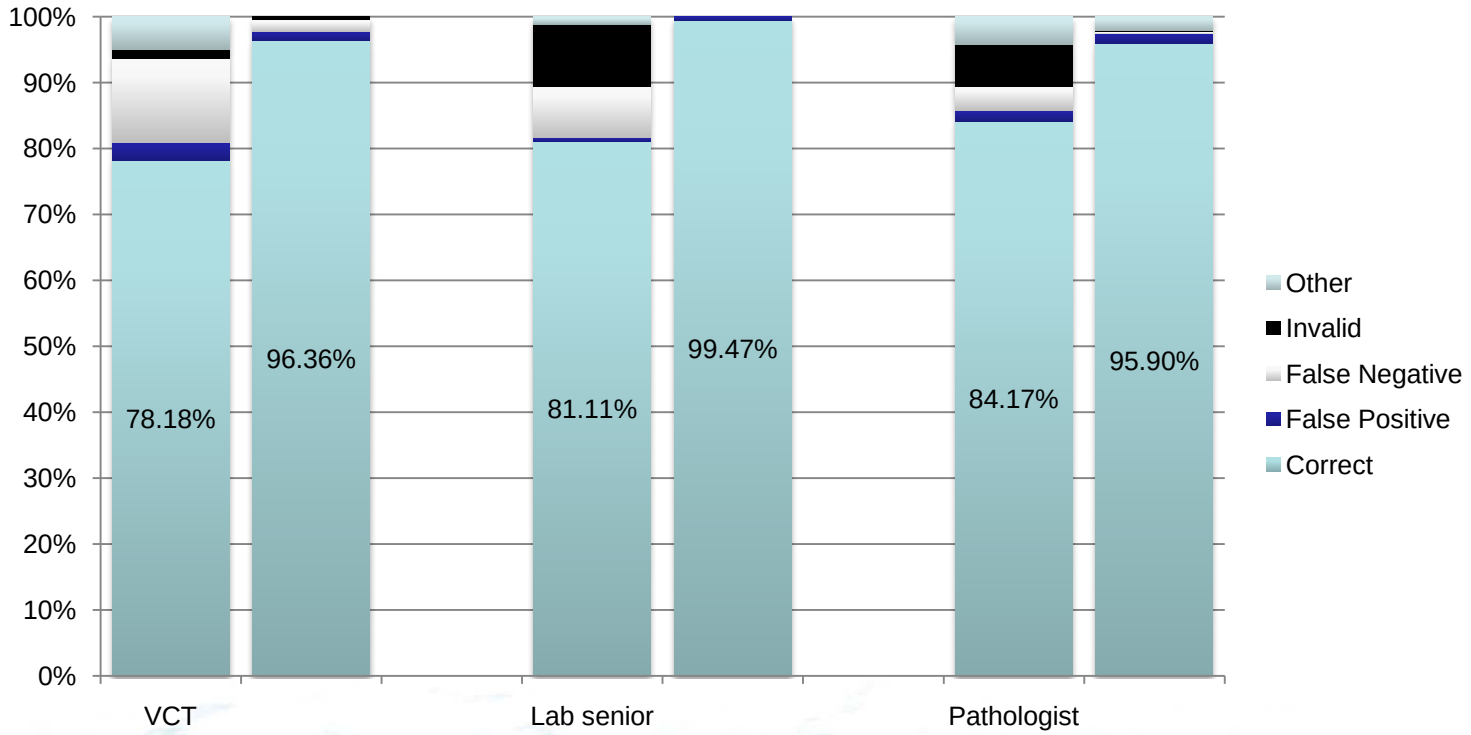
Chris Chiu

Pathologists, N=34

Laboratory (trained), N=22

VCT staff (trained) N=19


LOT 68
IV-1/2 HIV-1/2
A 18
CONTROL
CONTROL
PATIENT
PATIENT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30%
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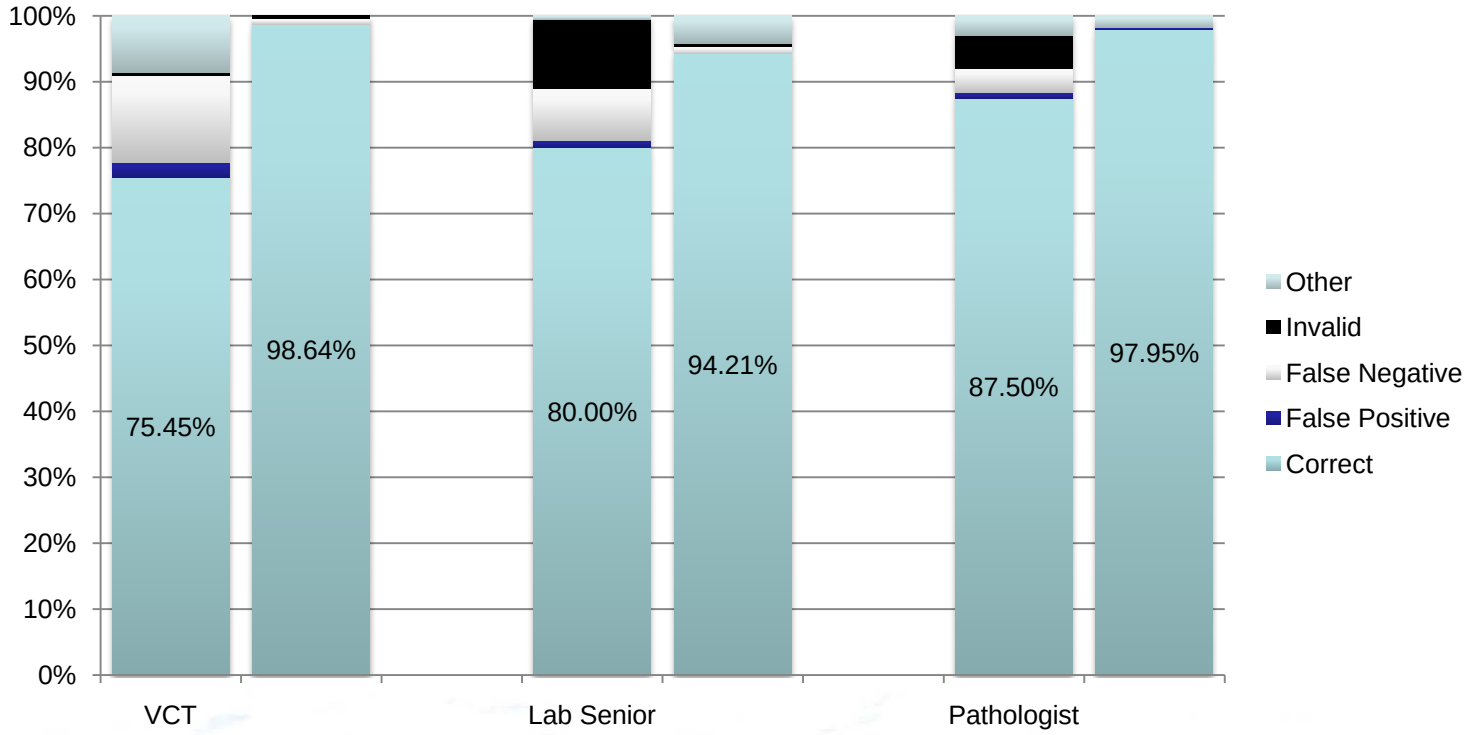
78.18%
96.36%
81.11%
99.47%
84.17%
95.90%
VCT
Lab senior
Pathologist
Other
Invalid
False Negative
False Positive
Correct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80.00%
94.21%
87.50%
97.95%
VCT
Lab Senior
Pathologist
Other
Invalid
False Negative
False Positive
Correct

groups

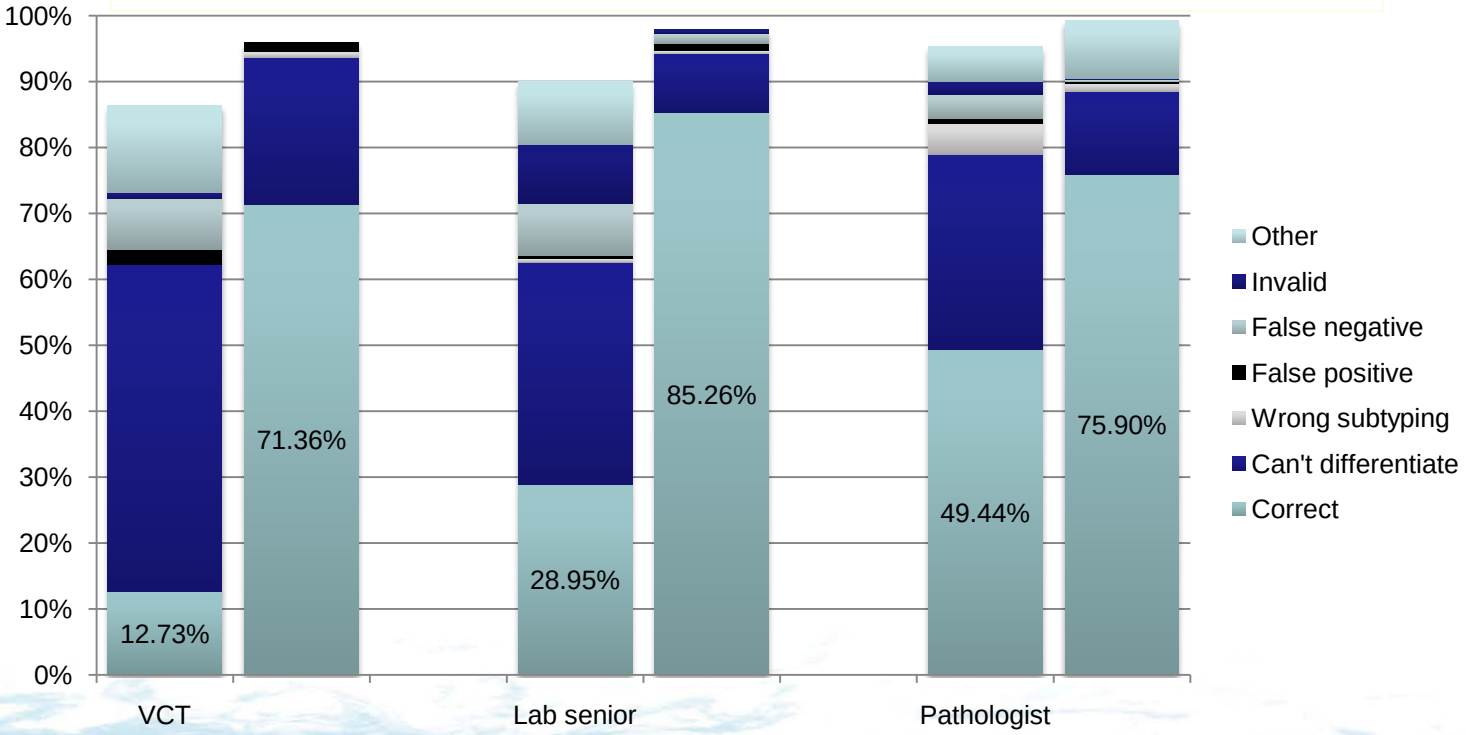
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

72.73%
98.64%
79.44%
100.00%
91.94%
97.44%

VCT
Lab senior
Pathologist

Other
Invalid
False Negative
False Positive
Correct


HIV-1/2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20%
10%
0%
12.73%
71.36%
28.95%
85.26%
49.44%
75.90%
VCT
Lab senior
Pathologist
Other
Invalid
False negative
False positive
Wrong subtyping
Can't differentiate
Correct

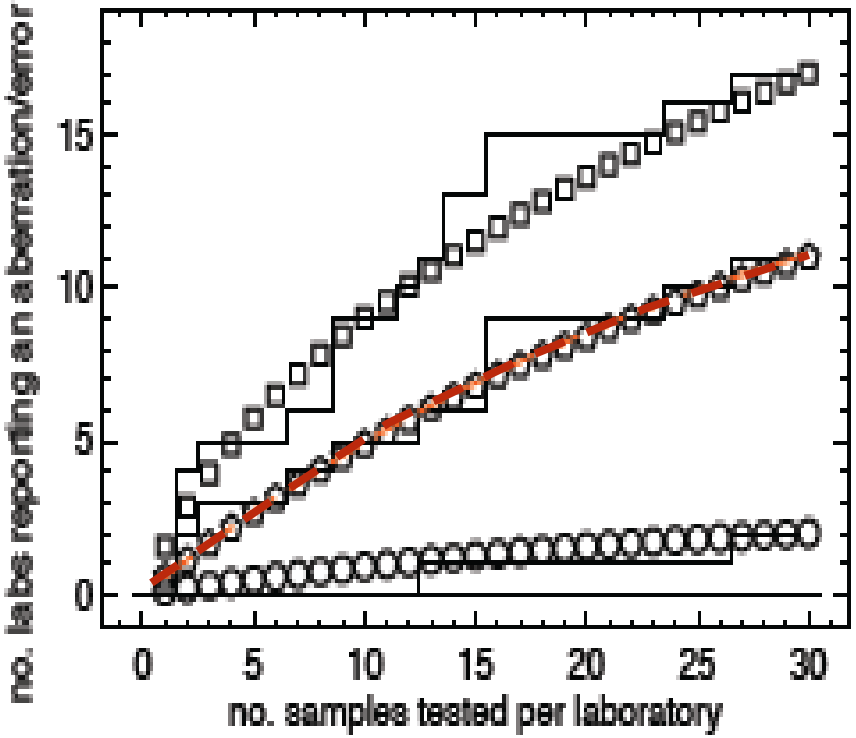
Bottom Line

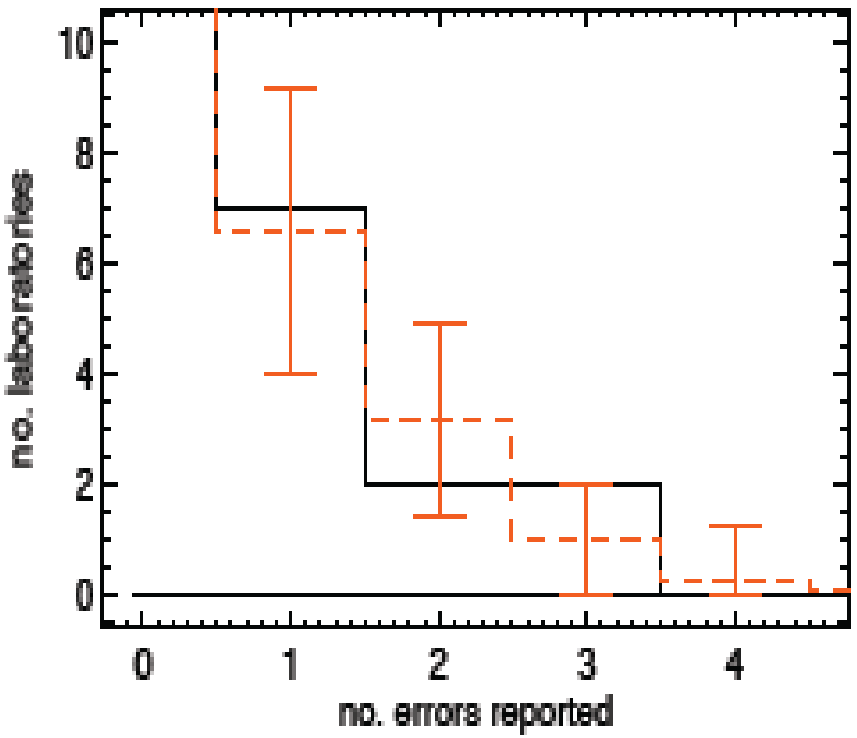
- **Photographs may be used to assess operators' interpretation skills**
- **May be used for training**
- **Self Appraisal was enabled and was revealing**

How effective is EQAS?

- **How often to administer?**
- **How many samples?**

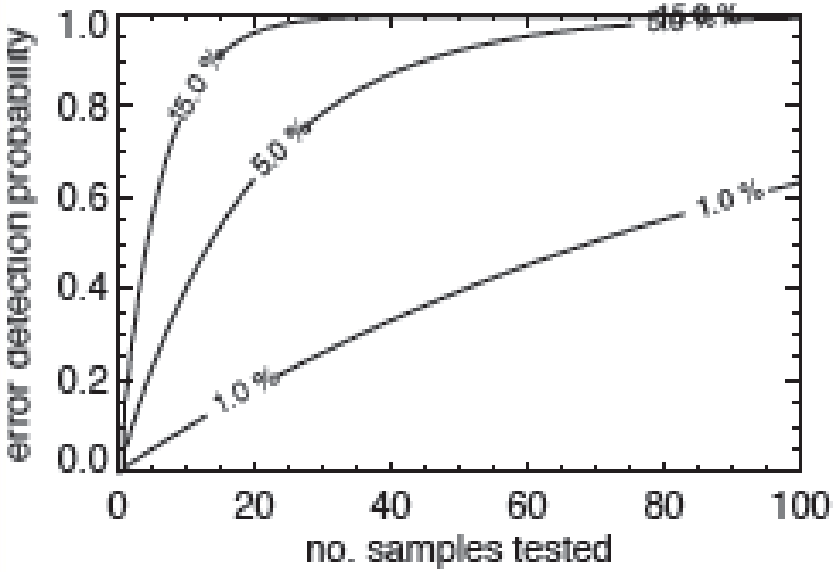
The Model compared with the Data

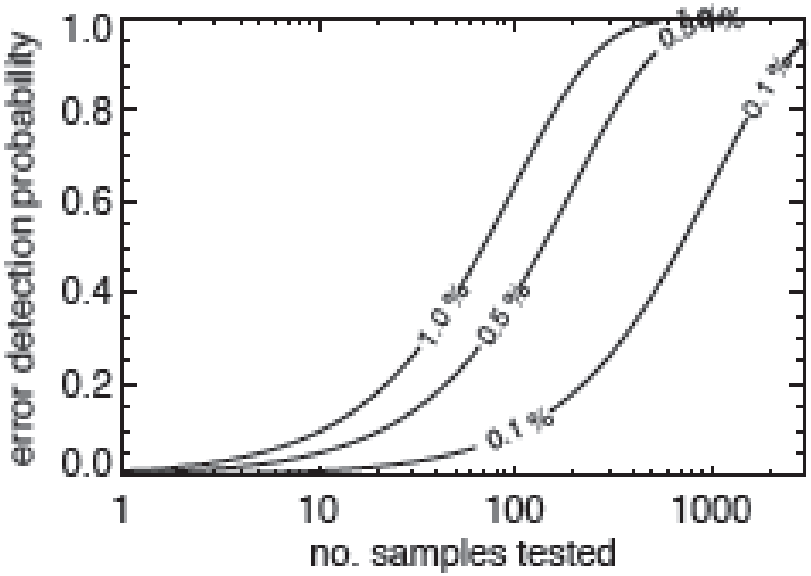




How many samples to detect errors?

Given that a laboratory commits testing errors at a given rate, what is the probability that that laboratory will return an at least one aberrant EQA testing report?

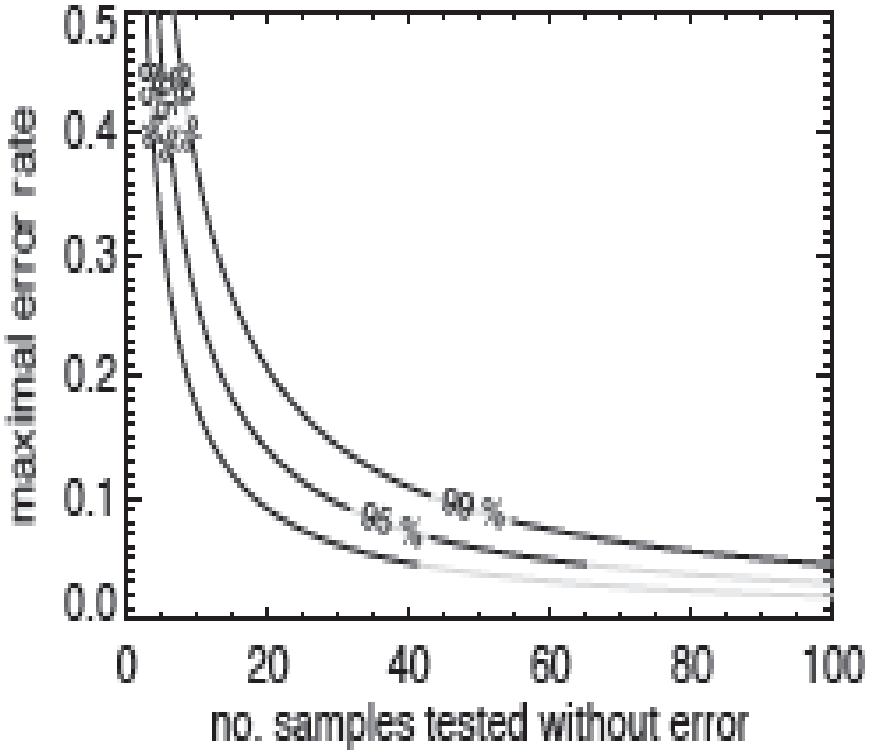


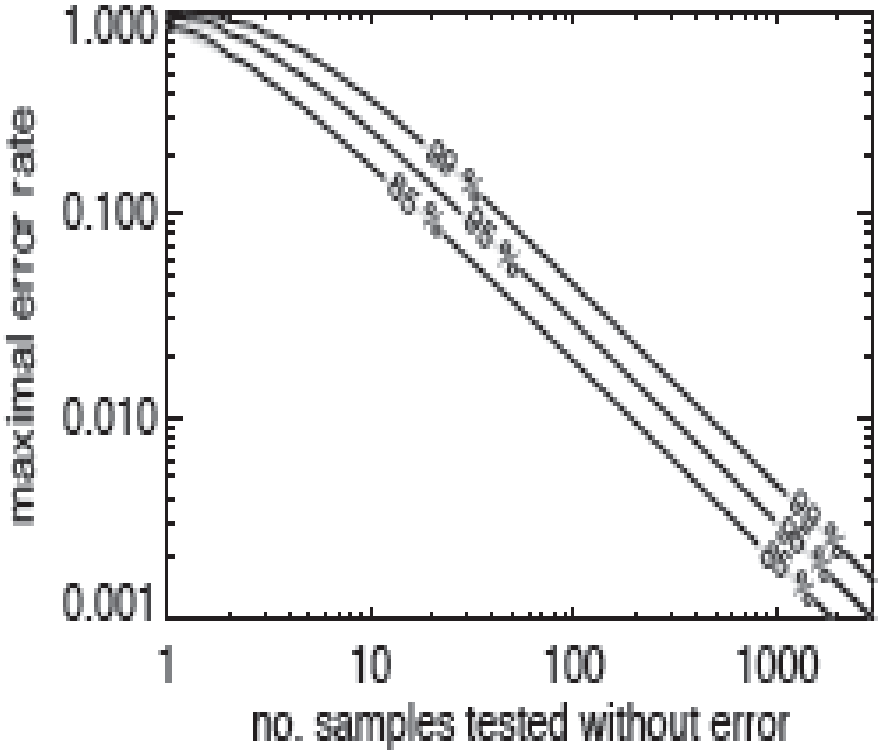


The answer depends on the error rate, and on the number of EQA samples tested: large numbers of samples are required to reliably detect errors which occur at low rates.

For an error that affects 1 % of all samples, the chances that this error would be detected after testing 12 and 30 EQA samples are approximately 10 % and 25 %, respectively. The chances of detecting such an error only reach 50 % or 95 % after the testing of 70 or 300 EQA samples, respectively.

Given that a laboratory has reported on a number of EQA samples without aberration, what limits can be placed on the rates at which that laboratory actually commits errors?





At a fixed level of confidence, the answer depends only on the number of samples tested: small numbers of EQA samples do not provide strong limits on testing accuracy.

At the 95 % confidence level, a laboratory's testing procedure can only be distinguished from a simple coin toss (*ie.* 50 % accuracy) after 5 non-aberrant EQA reports; after 30, 60, and 90 non-aberrant reports, the 95 % limit on the error rate is 10 %, 5 %, and 3 %.

How often to send panels of what size?

EQAS	1 panel	1 year	2 years	3 years
6 x 2 samples	1.0 %	5.0 %	8.3 %	10.7 %
3 x 5 samples	2.4 %	6.0 %	9.6 %	11.9 %
4 x 5 samples	2.4 %	7.4 %	11.3 %	13.3 %
3 x 10 samples	4.3 %	9.6 %	13.3 %	14.6 %

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Conclusions

- According to the described model, large numbers of EQAS samples are required before all errors can be detected with confidence.
- If errors are not detected in a given number of samples, to be 95% confident of the results considerable testing needs to be carried out to detect low error rates.
- Over time, increasingly errors will be detected through EQAS.
- Addition of an ongoing quality assurance tool such as quality control measures will assist in error detection.

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- **Thank you!**