SYMPOSIUM 13

UPDATE ON VACCINE PREVENTABLE DISEASES LABORATORY NETWORKS IN AFRICA

Presenters:

1. Mick Mulders (WHO/Geneva): Global Laboratory Networks for Vaccine-preventable Diseases
2. Josephine Bwogi (UVRI/Entebbe): Roles, responsibilities and challenges of the Uganda Measles Regional Reference Laboratory
3. Berhane Beyene (ENHRI/Addis Ababa): Laboratory surveillance of poliomyelitis in Ethiopia
4. Linda De Gouveia (NICD/Johannesburg): Ensuring good quality data for vaccine-preventable bacterial diseases

Global Laboratory Networks for Vaccine-preventable Diseases (the Measles example)

Dr Mick N. Mulders

Expanded Program on Immunization; Department of Immunization, Vaccines and Biologicals; World Health Organization – Geneva

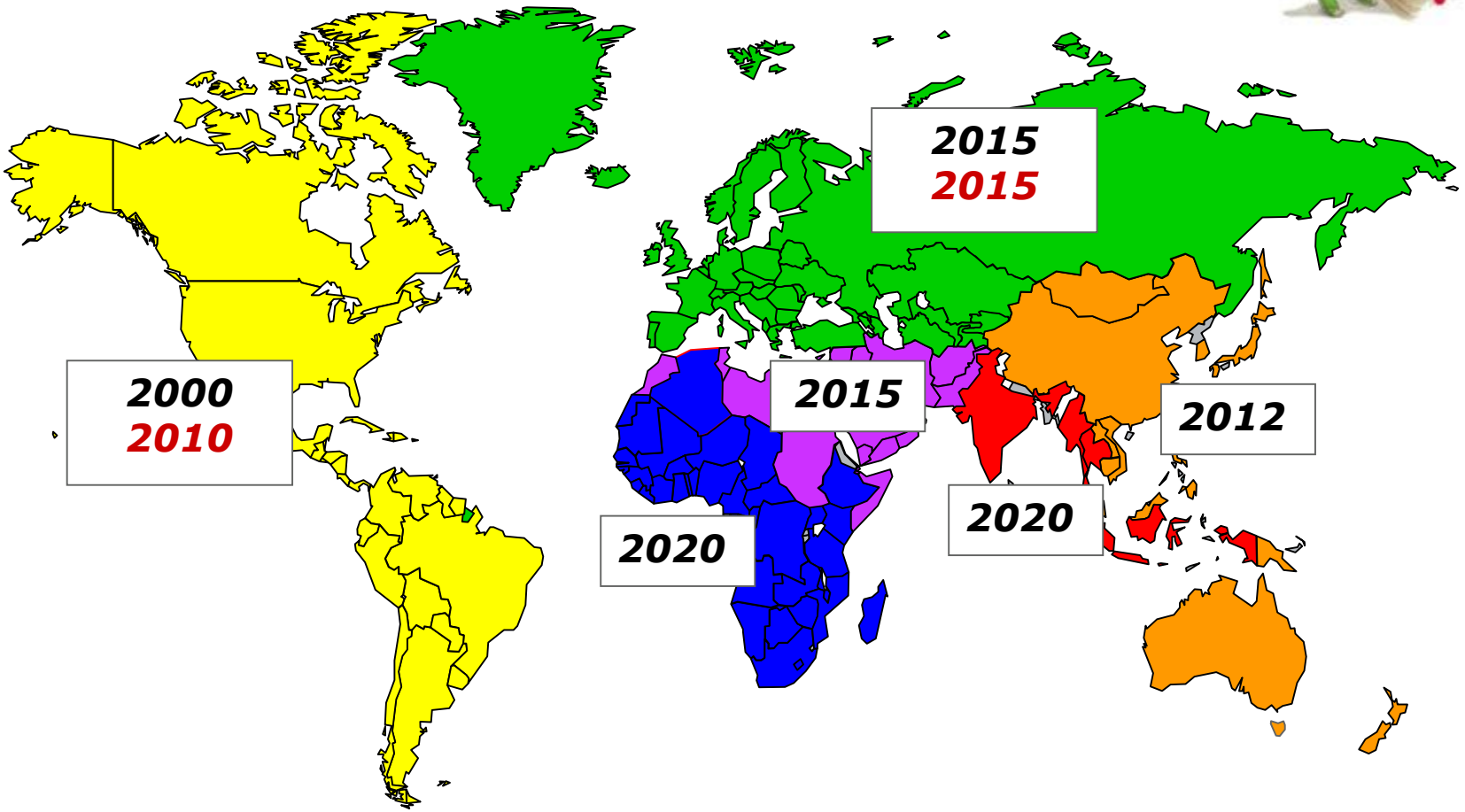
2nd International African Society for Laboratory Medicine (ASLM) Conference
Cape Town, South Africa
30 November – 4 December 2014

Global Vaccine Action Plan (GVAP) – Vision

Achieve and maintain a world without measles, rubella and congenital rubella syndrome

World Health Organization has 6 Regions

Measles **and** ***Rubella*** **Elimination Goals**

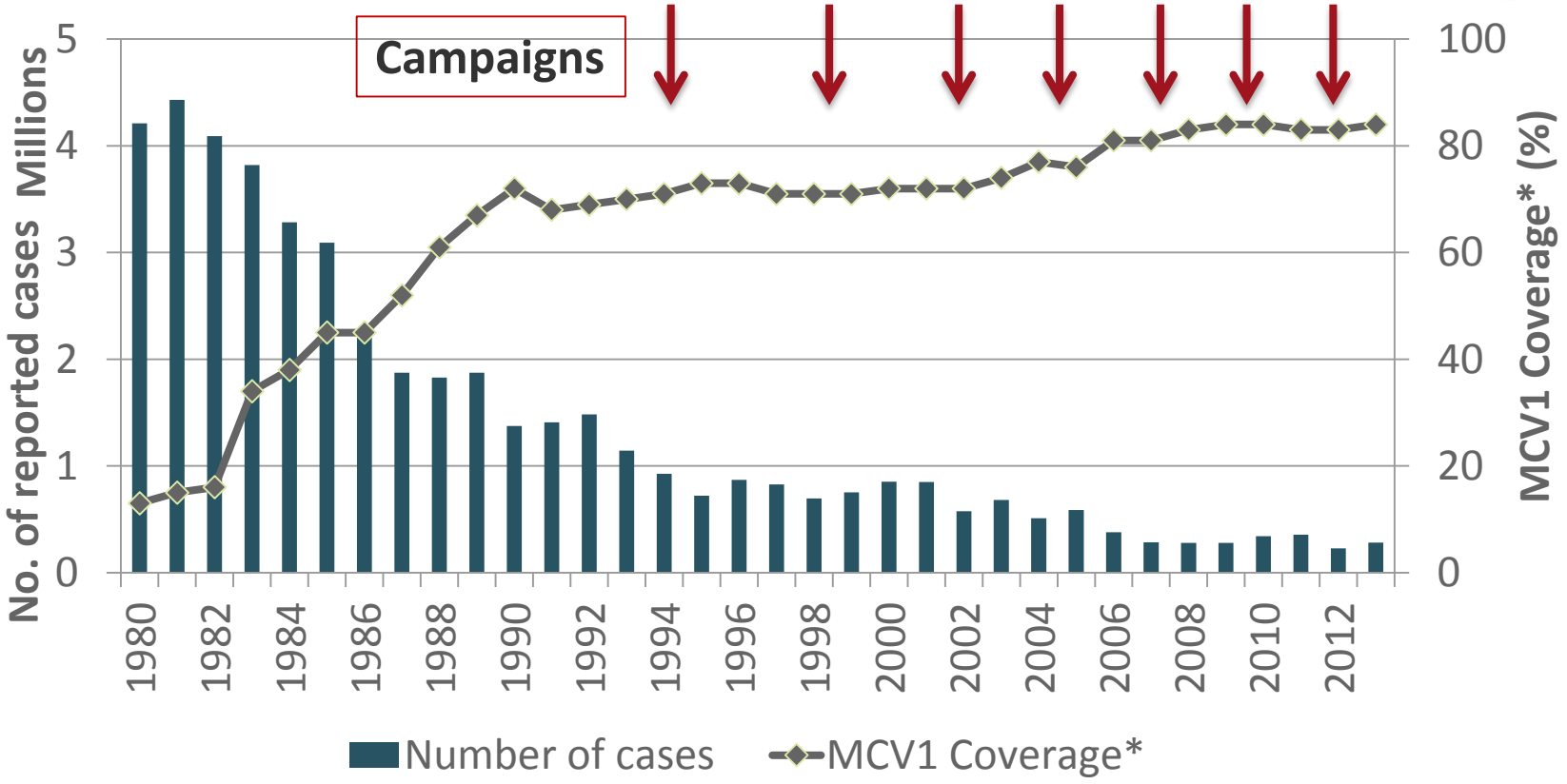


MEASLES & RUBELLA INITIATIVE

American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

93% Reduction in reported measles cases

Measles global annual reported cases and MCV1 coverage*, 1980-2013



MEASLES & RUBELLA INITIATIVE

** MCV1 coverage: coverage with first dose of measles-containing vaccine as estimated by WHO and UNICEF*

American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

Measles Incidence Rate* 2014

Reported Measles Cases in 15 Large Outbreaks since Jan 2014

Russia: 1,558 in 2013
3,062 in 2014

Ukraine: 3,308 in 2013
2,111 in 2014

Georgia: 7.830 in 2013
3,018 in 2014

Pakistan†: >25,000 in 2013
1,277 in 2014

Italy: 2,216 in 2013
2,458 in 2014

China: 27,825 in 2013
45,234 in 2014

Turkey: 7,371 in 2013
516 in 2014

Philippines: 3,094 in 2013
17,893 in 2014

Nigeria: 55,335 in 2013
3,391 in 2014

Dem Rep Congo†: 89,108 in 2013
31,474 in 2014

Viet Nam: 1,102 in 2013
5,291 in 2014

Angola: 6,505 in 2013
5,023 in 2014

Ethiopia: 3,982 in 2013
8,183 in 2014

Indonesia: 8,147 in 2013
1,051in 2014

India: 13,822 in 2013

Somalia†: 2,848 in 2013
3,950 in 2014

<1	(85 countries or 44%)
≥1 - <5	(27 countries or 14%)
≥5 - <10	(16 countries or 8%)
≥10 - <50	(38 countries or 20%)
≥50	(16 countries or 8%)
No data reported to WHO HQ	(12 countries or 6%)
Not applicable	

*Rate per 1'000'000 population
Outbreaks represent cases reported to WHO Regional offices through end Sep 2014 except where noted †:

- DRC through Week 43 2014
- Somalia through 31 May 2014
- Ethiopia through Week 43 2014

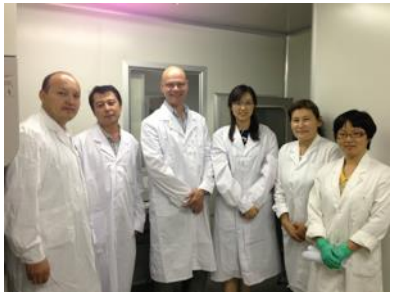
MEASLES & RUBELLA INITIATIVE

American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

Data in WHO HQ as of 6 October 2014

Roles and responsibilities GMRLN*

*(*Global Measles Rubella Laboratory Network)*



- Laboratory confirmation suspect cases
- Molecular epidemiology (MeaNS, RubeNS)
- Standardization of laboratory testing
- Develop, improve and evaluate methods
- Quality assurance (proficiency testing, confirmatory testing, implementation of QC, accreditation)
- Capacity building (on-site training, workshops)
- Coordination (meetings, laboratory coordinators)

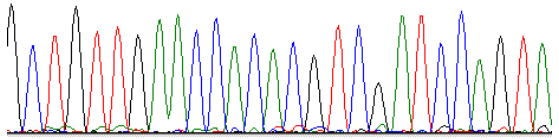
- **Increasing role of GMRLN as MS/Regions approach elimination in surveillance and verification**

Laboratory indicators to meet criteria for verification of elimination

1. Testing to be done at WHO accredited laboratory
2. Absence of endemic transmission (>12 mo) with well-performing surveillance system and with genotype evidence
3. All suspect cases should be laboratory confirmed or epidemiologically linked and origin defined
4. Surveillance quality indicator rate of reporting discarded non-measles non-rubella cases (2:100,000)
5. Assessing immunity levels of population (serosurveys)
6. Maintain high quality laboratory diagnosis even with decreasing PPV at final stages of elimination

Role of WHO Global Measles Rubella Laboratory Network

- To ensure throughout the Laboratory Network
  - Well-validated, standardized laboratory procedures
    - For confirmation of suspect cases (serologic and molecular)
    - Molecular epidemiology to document interruption of virus transmission (endemic vs. imported)
- Provide laboratory surveillance data to assess progress of elimination and verification

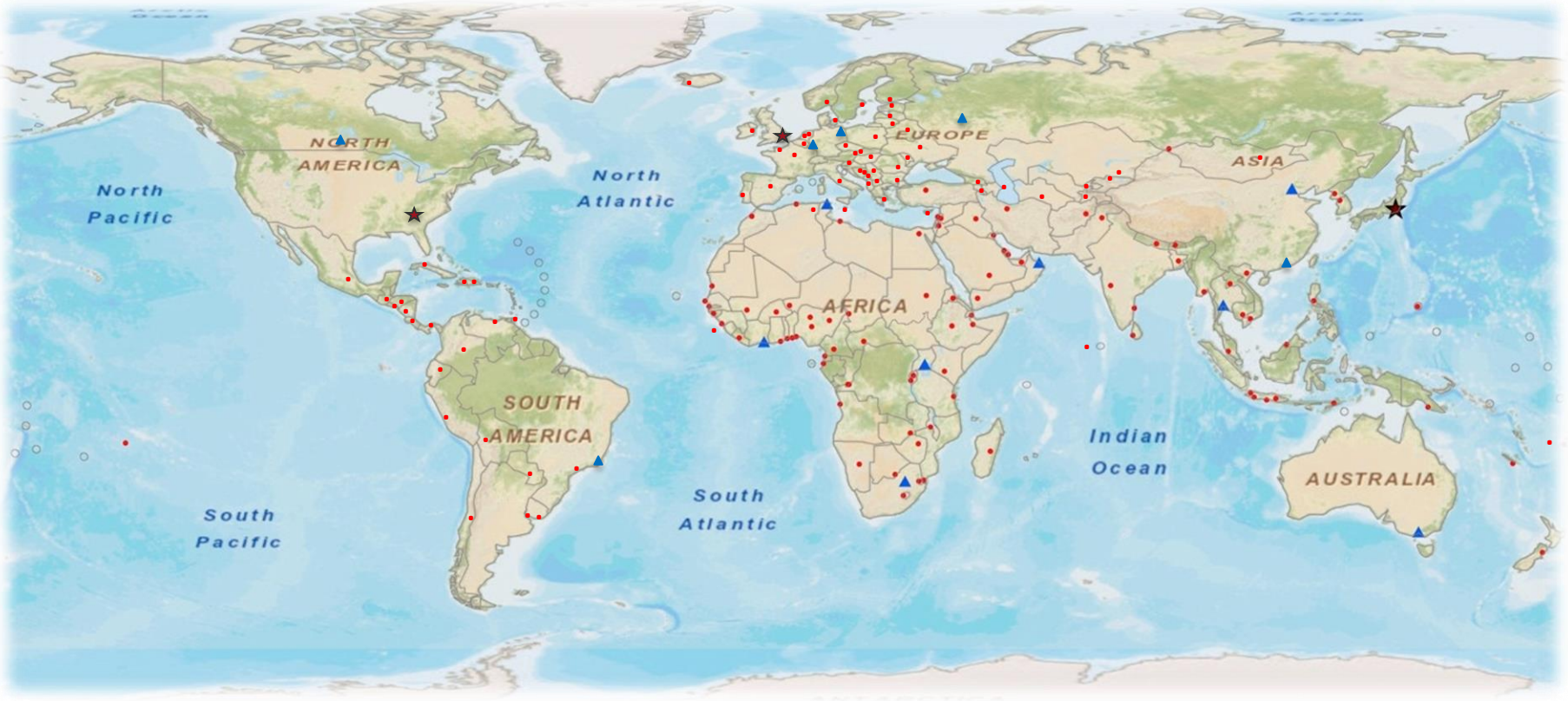


High quality laboratory investigation

- Achieved and maintained through
  - Capacity building (on-site training, workshops)
  - Provision of reference materials/reagents
  - Quality assurance
    - Proficiency, and confirmatory testing, implementation of QC
  - Collecting and disseminating laboratory-based surveillance data
  - Develop, improve and evaluate laboratory methods
- Annual accreditation and EQA are critical components

- **Increasing role of GMRLN as MS/Regions approach elimination in surveillance and verification**

Global Measles Rubella LabNet 2014 – 723 laboratories *



★ Global Specialized Lab ▲ Regional Reference Lab · National Lab

MEASLES & RUBELLA INITIATIVE

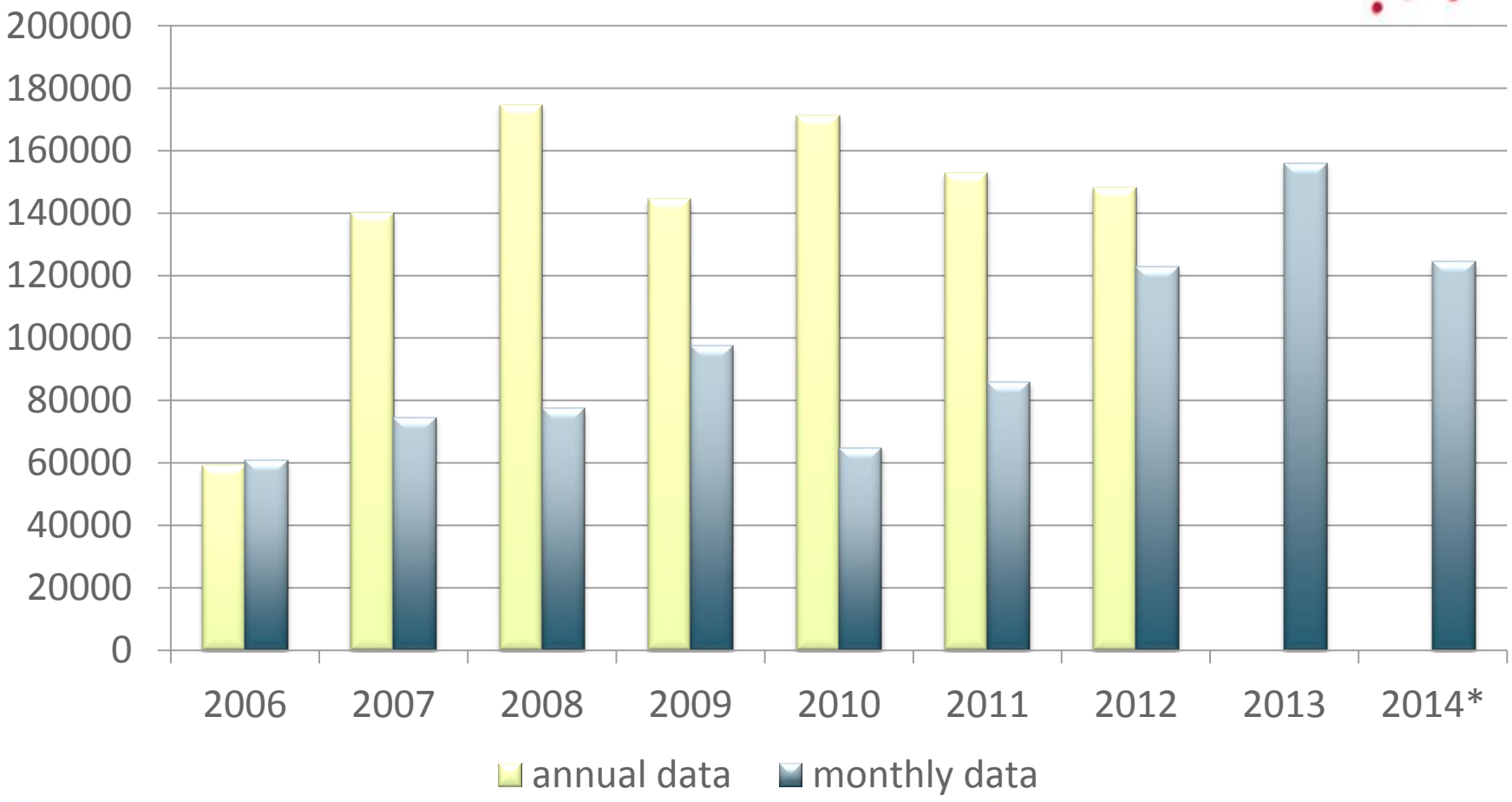
*as of 1 Aug 2014

American Red Cross CDC unicef UNITED NATIONS FOUNDATION World Health Organization

Laboratory performance

WHO Global Measles Rubella Laboratory Network

Specimen tested for measles 2006-2013
reported form monthly and annual data collection

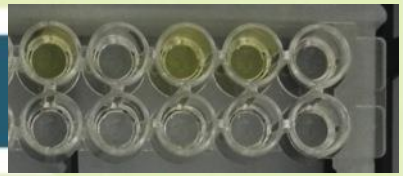


MEASLES & RUBELLA INITIATIVE

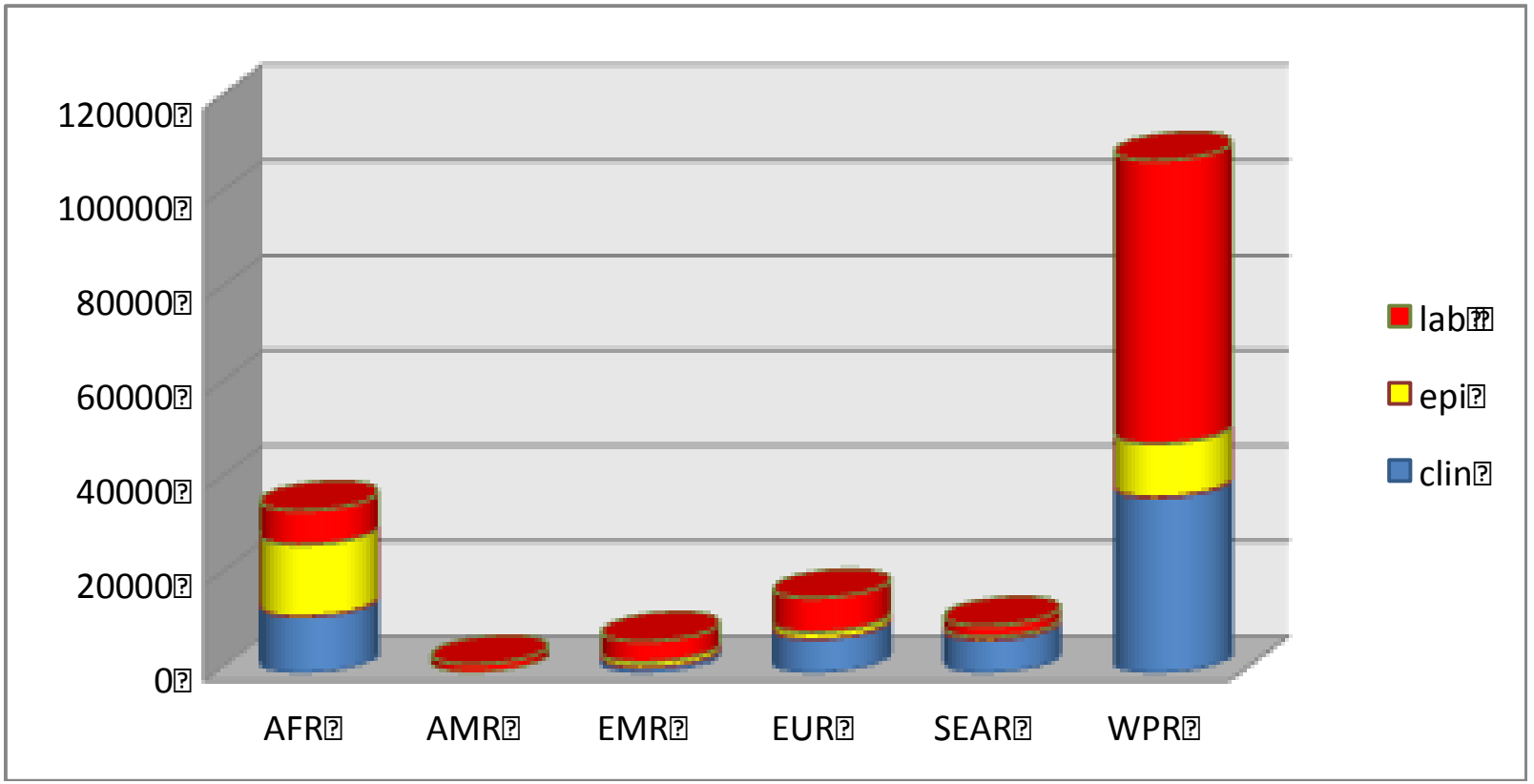
China is not reporting monthly data
Data as of 11 Nov 2014

American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

Laboratory confirmation – 2014*



Global total 303,974 suspect measles cases; 63,448 clin; 29,801 epi; 82,278 lab-conf



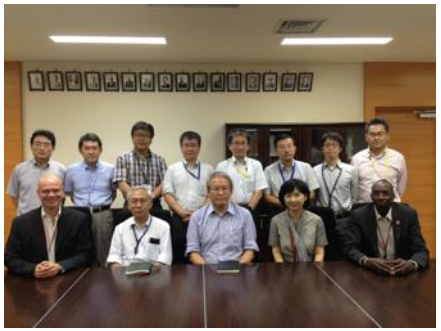
MEASLES & RUBELLA INITIATIVE

Data source: surveillance DEF file
*Data in HQ as of 11 Nov 2014

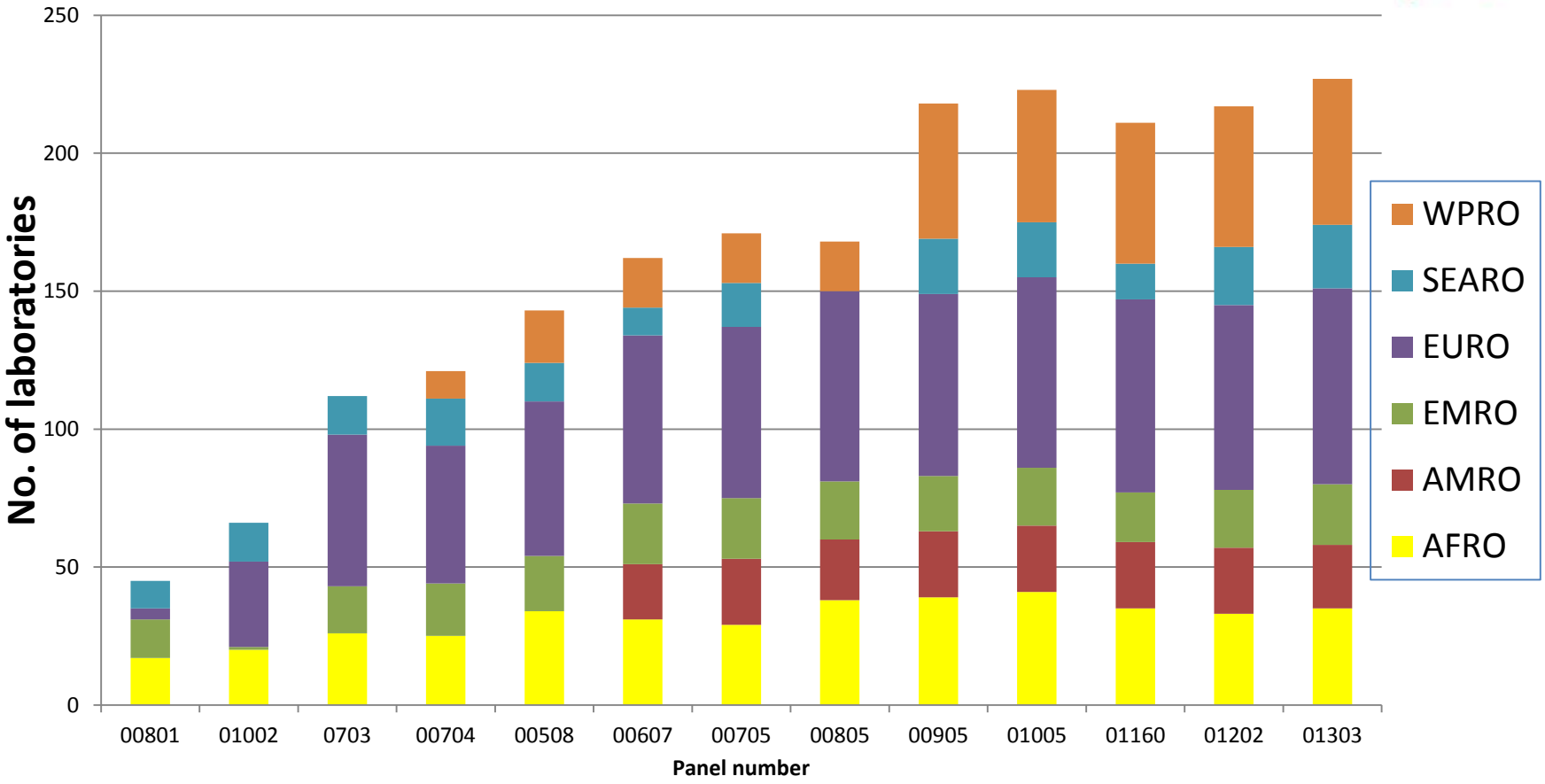
American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

WHO GMRLN QA programme

- To monitor the performance of network laboratories
  - Annual proficiency testing
    - Serologic and new molecular
  - Confirmatory (repeat) testing
  - Implementation of in-house QC measures
  - Annual assessment
    - Incl reporting timeliness and completeness



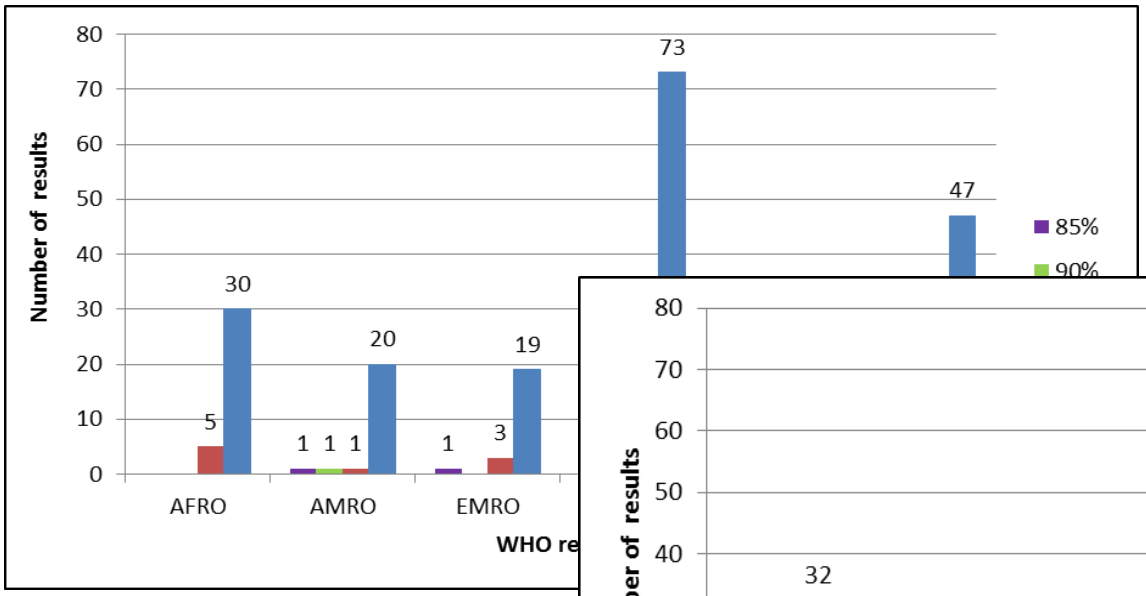
Proficiency test participating laboratories

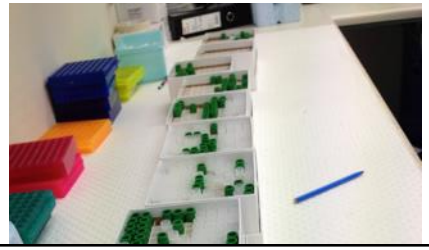


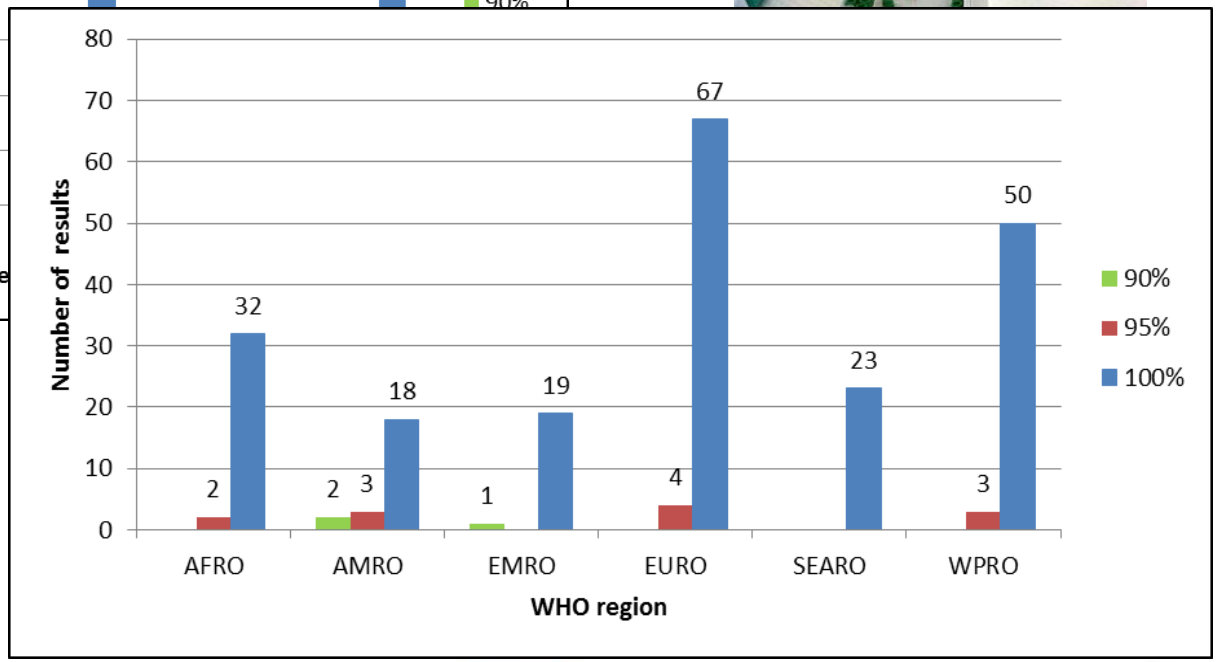
MEASLES & RUBELLA INITIATIVE

American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

PT score by Region Measles and Rubella 2013





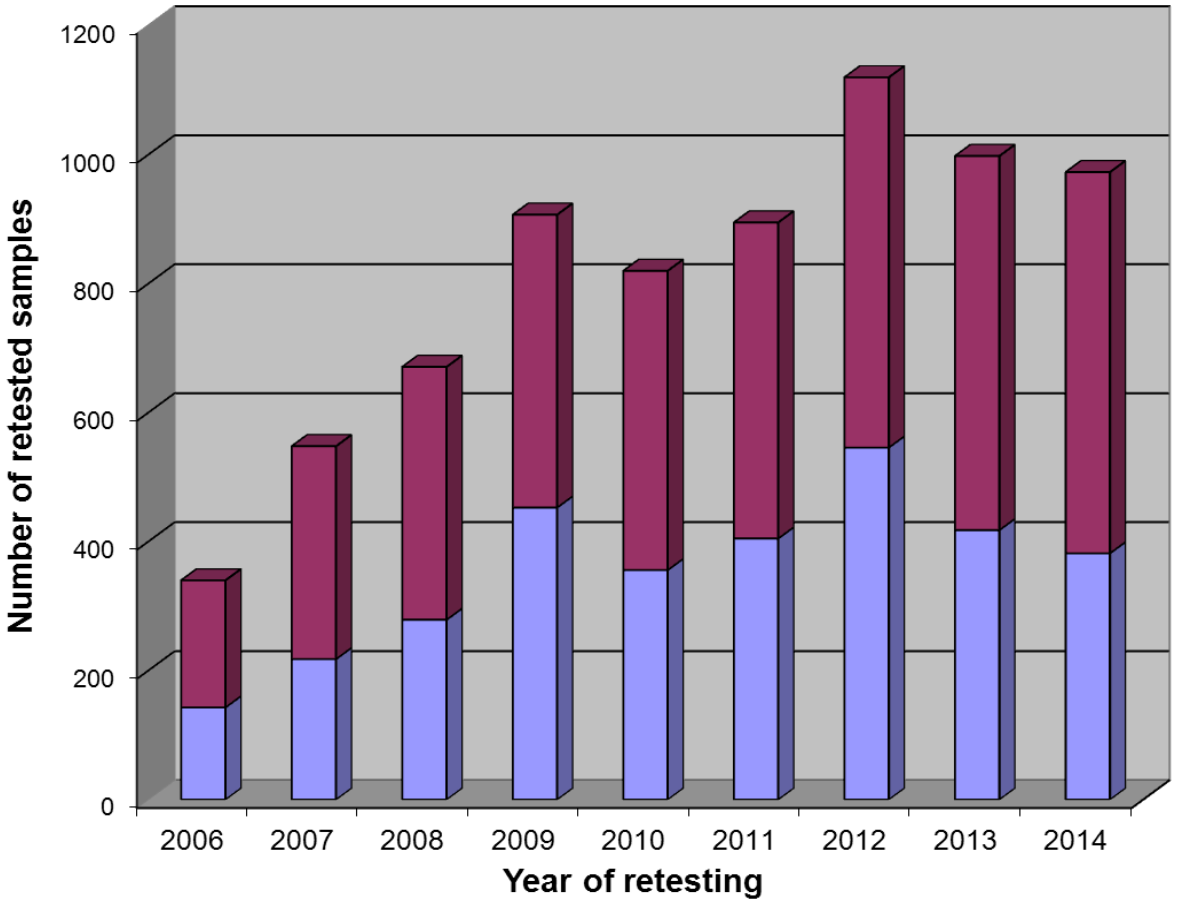


MEASLES & RUBELLA INITIATIVE

American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

Confirmatory testing by RRL – Luxembourg

Number of retested samples from 20 laboratories



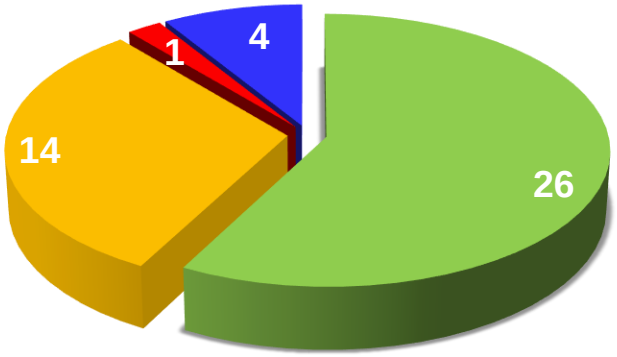
- Sample types
  - Sera
  - Dried serum spots
  - Dried blood spots
  - Oral fluid

- Overall good concordance (>95%) but variation by region

MEASLES & RUBELLA INITIATIVE

American Red Cross · CDC · unicef · UNITED NATIONS FOUNDATION · World Health Organization

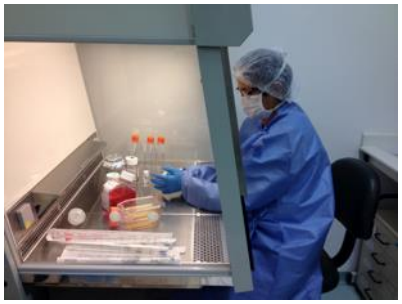
Measles Lab Accreditation – WHO/AFR



- Full
- Prov.
- Not
- Pending

- On site accreditation visit conducted every 3 to 4 years
- Pending 1st accreditation exercise: Guinea Bissau, Liberia, Sierra Leone, South Sudan

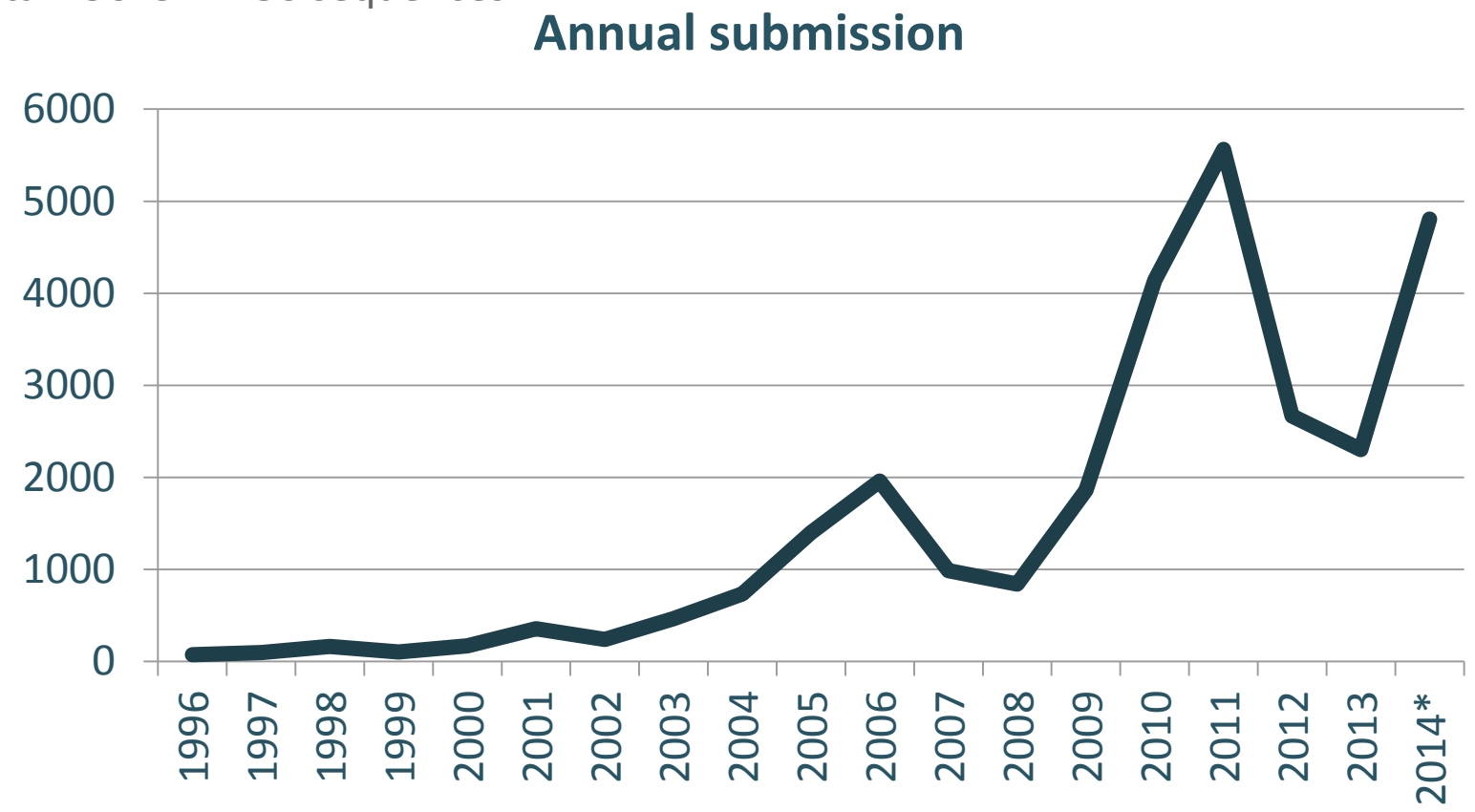


Status as of July 2014

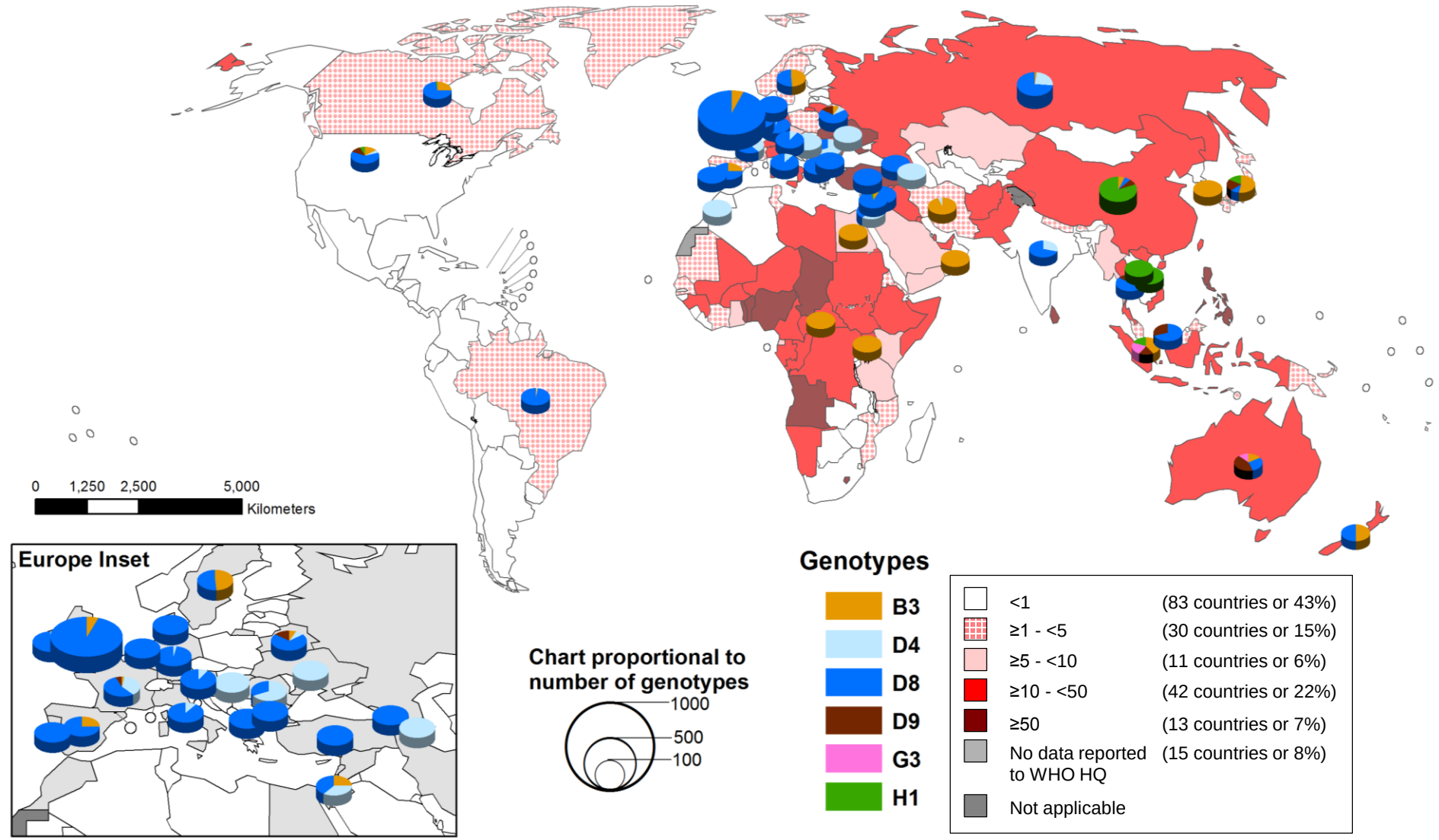
Measles sequences submitted to MeaNS

Total 19649 N-450 sequences*



*Database query 16/10/2014

Reported Measles Incidence Rate*, Mar 2013 to Feb 2014 (12M period) and Distribution of measles genotypes, Jan to Dec 2013



*Rate per 1'000'000 population

Data source: surveillance DEF file
Data in HQ as of 5 May 2014

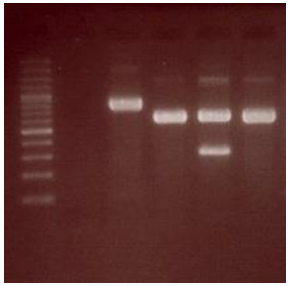
WHO

Constraints and weaknesses

- Surveillance
  - Data timeliness and completeness, incl. discordance and linking laboratory and epidemiological data, insufficiently addressed by national stakeholders
  - Establishing or enhancing case-based surveillance
  - Private laboratories completeness of surveillance data
    - Testing quality, reporting timeliness, inappropriate testing
  - Surveillance insufficiently recognized by donors as critical to MRI
  - Missing genotype data
- Increasing workload in coordination and testing
  - Elimination goals now in all WHO Regions: documenting!
  - Introduction of rubella vaccination increases surveillance demands
  - Need to perform additional laboratory tests in countries with low incidence of measles and/or rubella

The Way Forward

- Increase country ownership and investment in network laboratories incl. molecular capacity
- Global migration to (weekly) case-based surveillance with integrated epidemiologic and laboratory-based data
  - Linking private and non-network labs
- Enhancing genotype surveillance (rubella! data not shown)
- Maintaining high laboratory performance through EQA program and strengthening LabNet and capacity
  - National QA programs
  - Expansion of molecular EQA

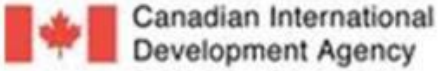


Acknowledgements

- WHO
  - Peter M. Strebel, Alya Dabbagh, Robert Perry
  - David A. Featherstone
  - Ousmane Diop
- CDC
  - Paul A. Rota
  - Joseph Icenogle
- PHE
  - Kevin Brown
- VIDRL
  - Vicki Stambos
- Regional WHO laboratory coordinators
  - Annick Dosseh
  - Charles Byabamazima
  - Myriam Ben Mamou
  - Sirima Pattamadilok
  - Hinda Ahmed
  - Gloria Rey-Benito
- Network Laboratories
- CDC for funding

MEASLES & RUBELLA INITIATIVE

American Red Cross CDC unicef UNITED NATIONS FOUNDATION World Health Organization



Anne Ray Charitable Trust

Japan International Cooperation Agency

Disclaimer

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.