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Measles, Rubella and Congenital Surveillance in the Era of Elimination (including WHO verification framework)

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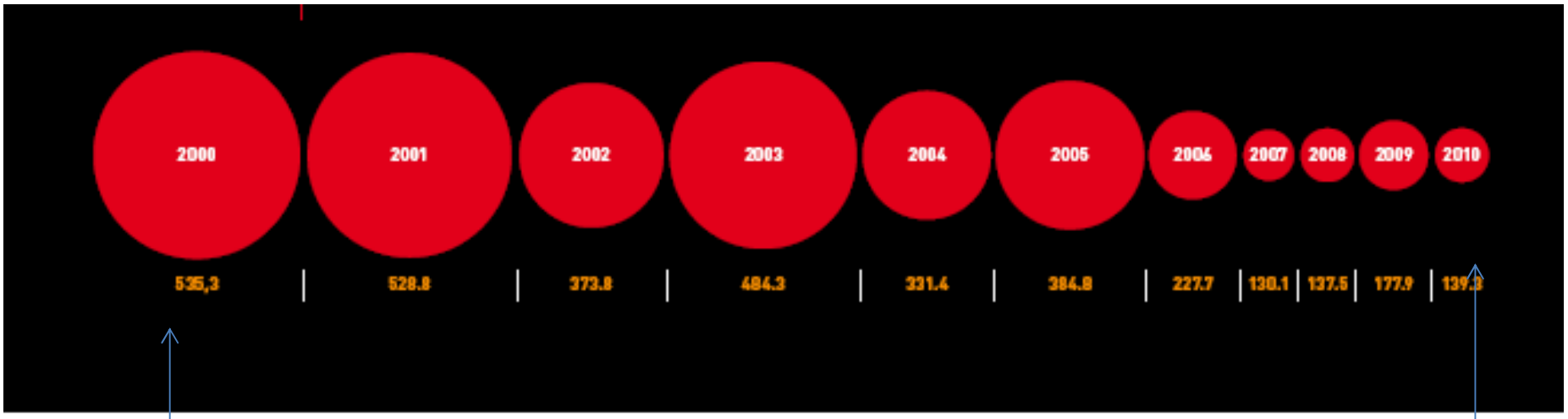
Scope of Presentation

- Measles and Rubella Elimination
  - Verification framework (WHO)
  - Criteria and performance indicators
- Current Irish epidemiological situation
- Performance monitoring
- Strengthening surveillance and control
  - Case investigation, contact tracing
  - Laboratory diagnosis/genotyping
  - Demonstrate immunity > 95%

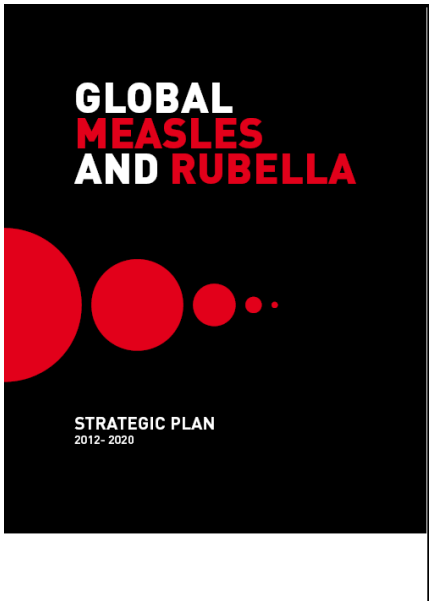
Number of measles deaths (thousands) globally 2000-2010



535,300 deaths in 2000

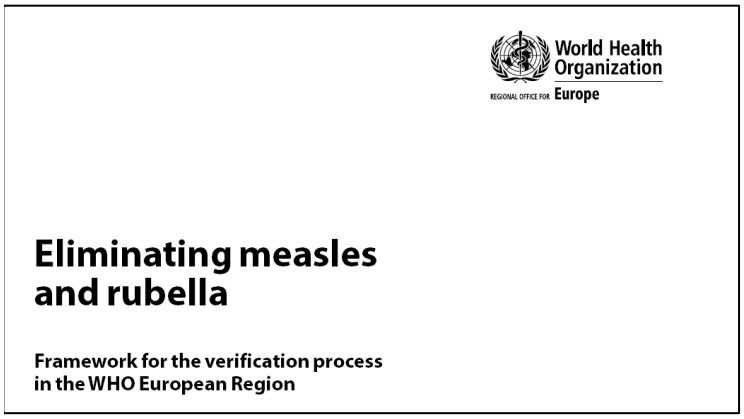
139.300 deaths In 2010

In 2010, World Health Assembly committed to reduce measles deaths by 95% of the 2000 levels by 2015.

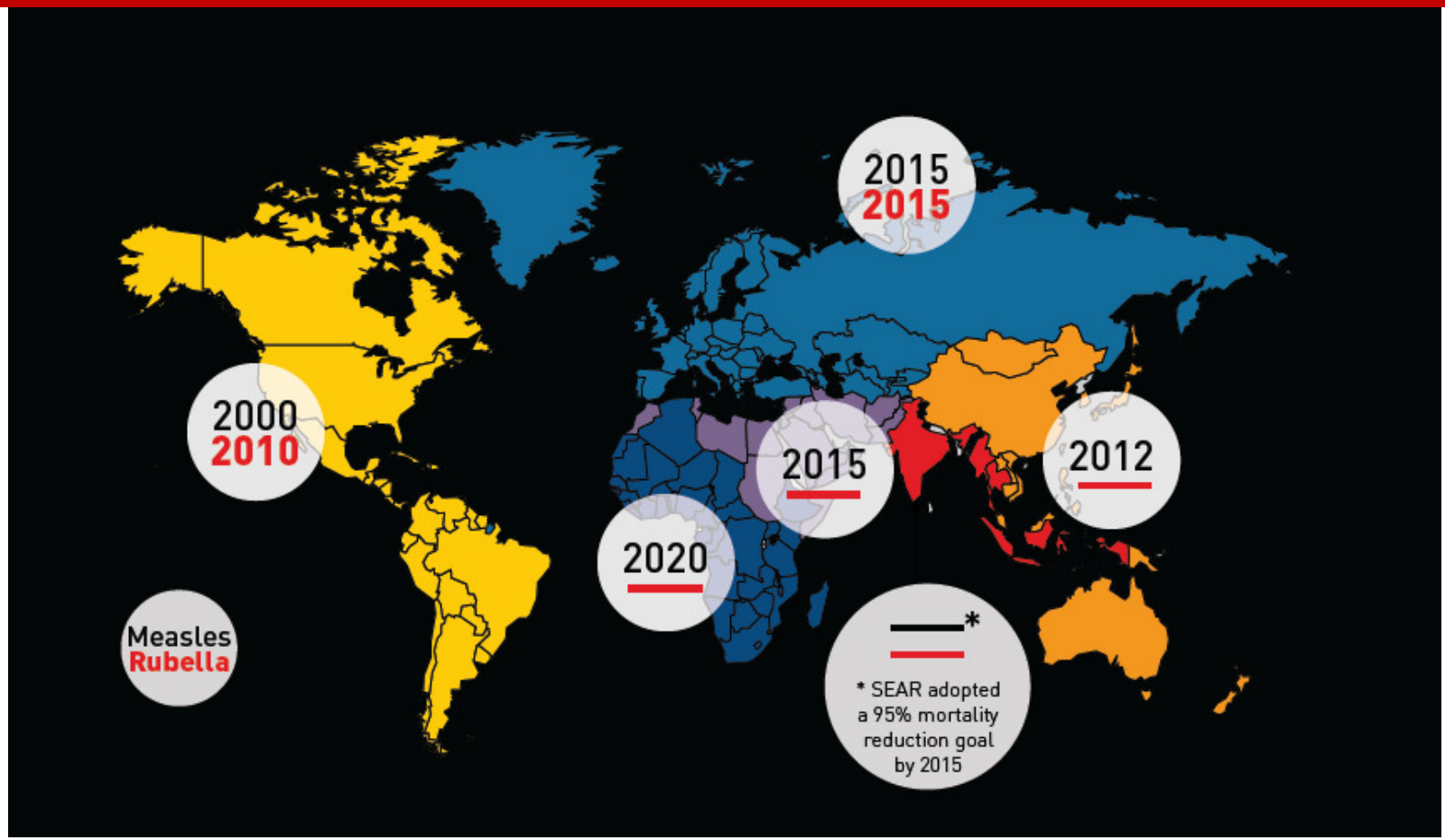


WHO Measles and Rubella Strategic plan 2012-2015

- Elimination of measles and rubella in at least 5 WHO regions
- Guidance on framework to monitor progress and verify elimination (endorsed Nov 2012)



Measles Rubella Elimination Goals by WHO region



Current WHO Regional Measles and Rubella Elimination/Control Goals

Note: 3 of 6 WHO regions have set control or elimination targets for rubella.

Criteria for elimination

Definition of elimination:
"the absence of endemic measles transmission in a defined geographic region for ≥ 12 months in the presence of a well performing surveillance system"

- Absence of endemic **measles** and **rubella** cases in all Member States,
  - resulting from complete interruption of endemic virus transmission, and
  - in the presence of high quality surveillance for a period of at least 3 years from the last known case
- Demonstrated ≥95% of all population is protected against measles and rubella

WHO Targets

- At least 95% coverage annually with both MMR1 and MMR2 in all areas and at national level

- Less than 1 measles/rubella case per million population, excluding imported cases

MCV - Measles containing vaccine
RCV – Rubella containing vaccine

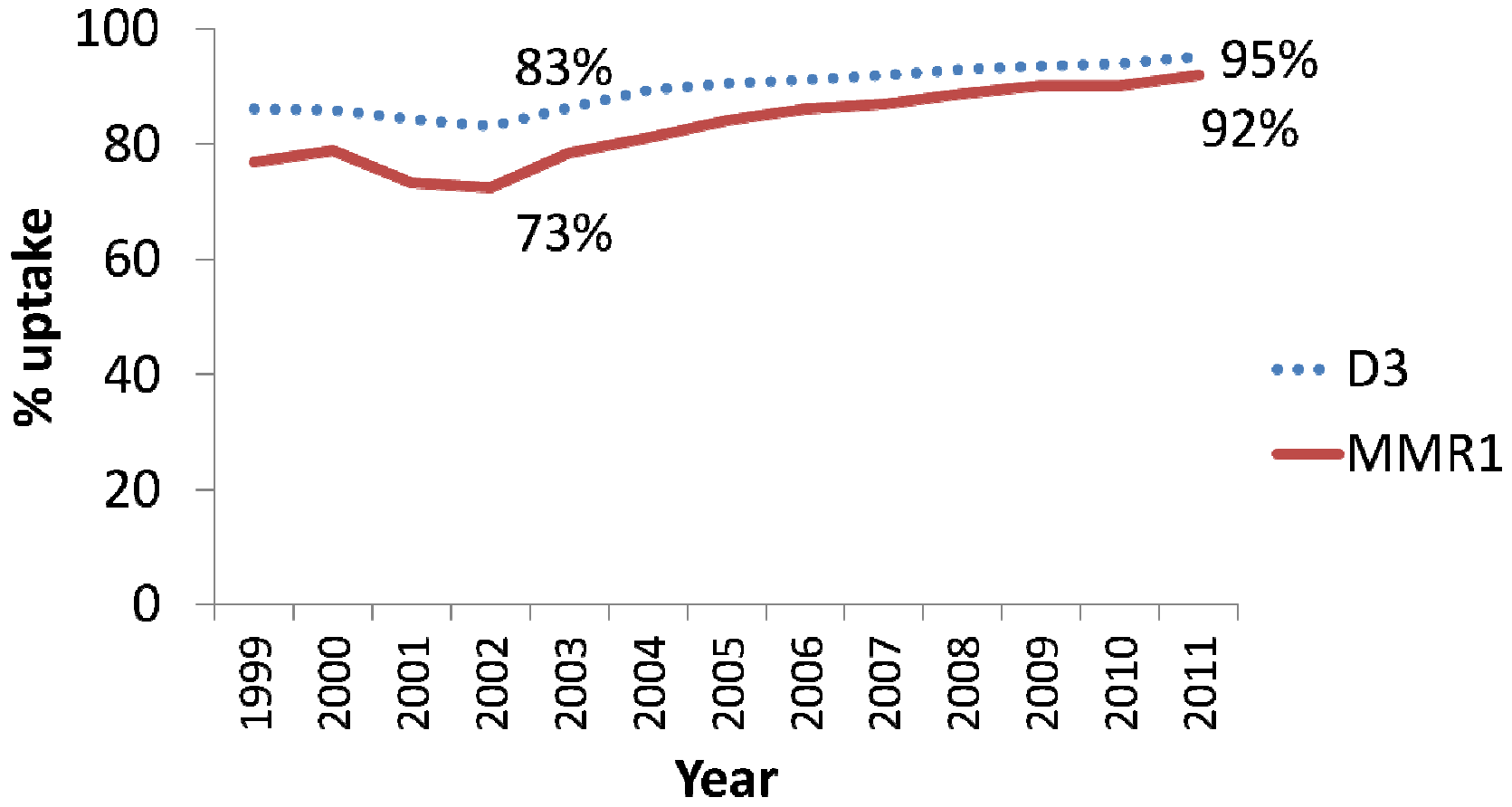
WHO Indicators

- Vaccination coverage of MMR1, MMR2 whether delivered through routine or SIA*, as per national schedule

- Measles and rubella incidence (laboratory confirmed, epidemiologically-linked and clinical cases)

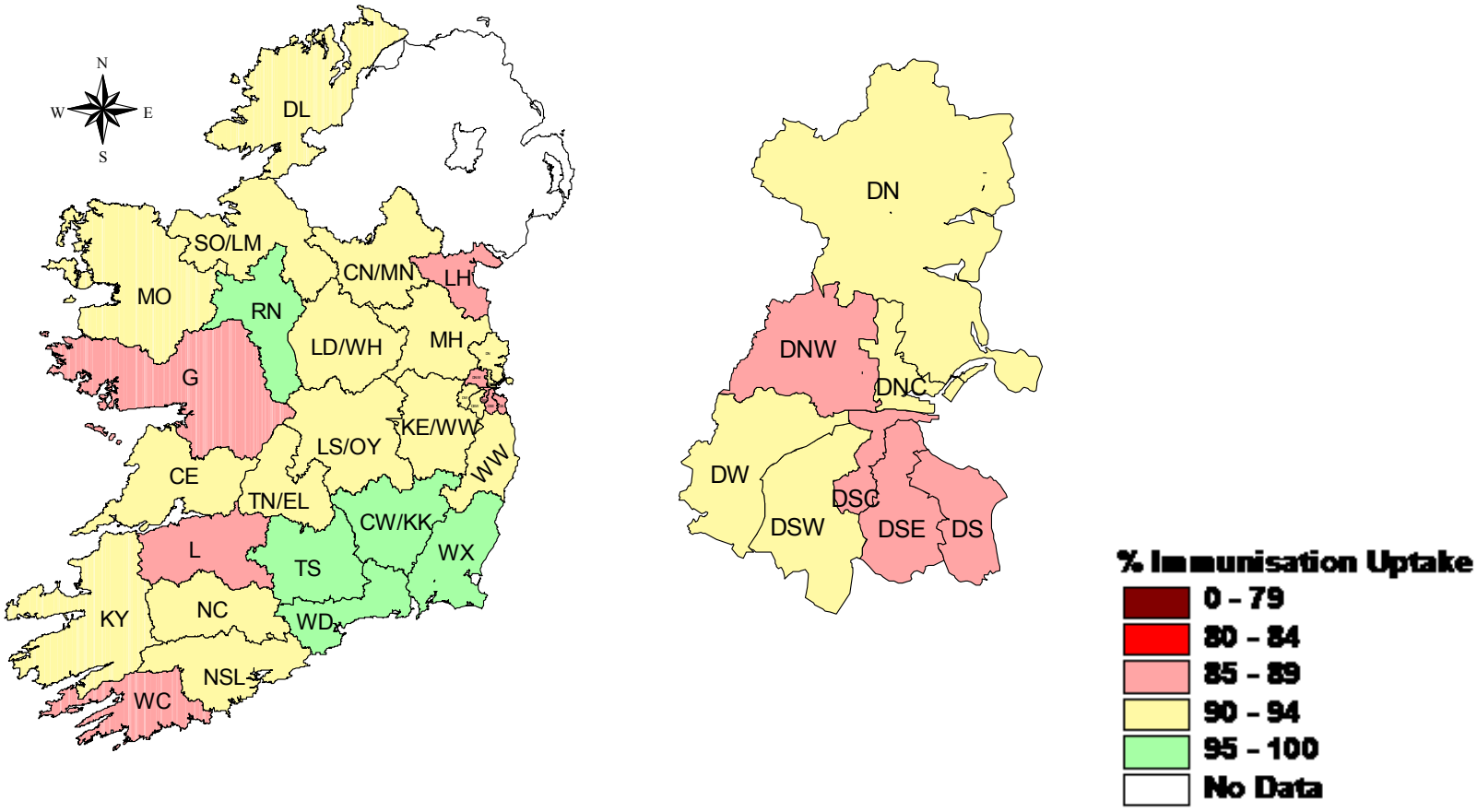
*SIA= supplementary immunization activity

Progress in MMR1 vaccination uptake at 24 months of age, 1999-2012



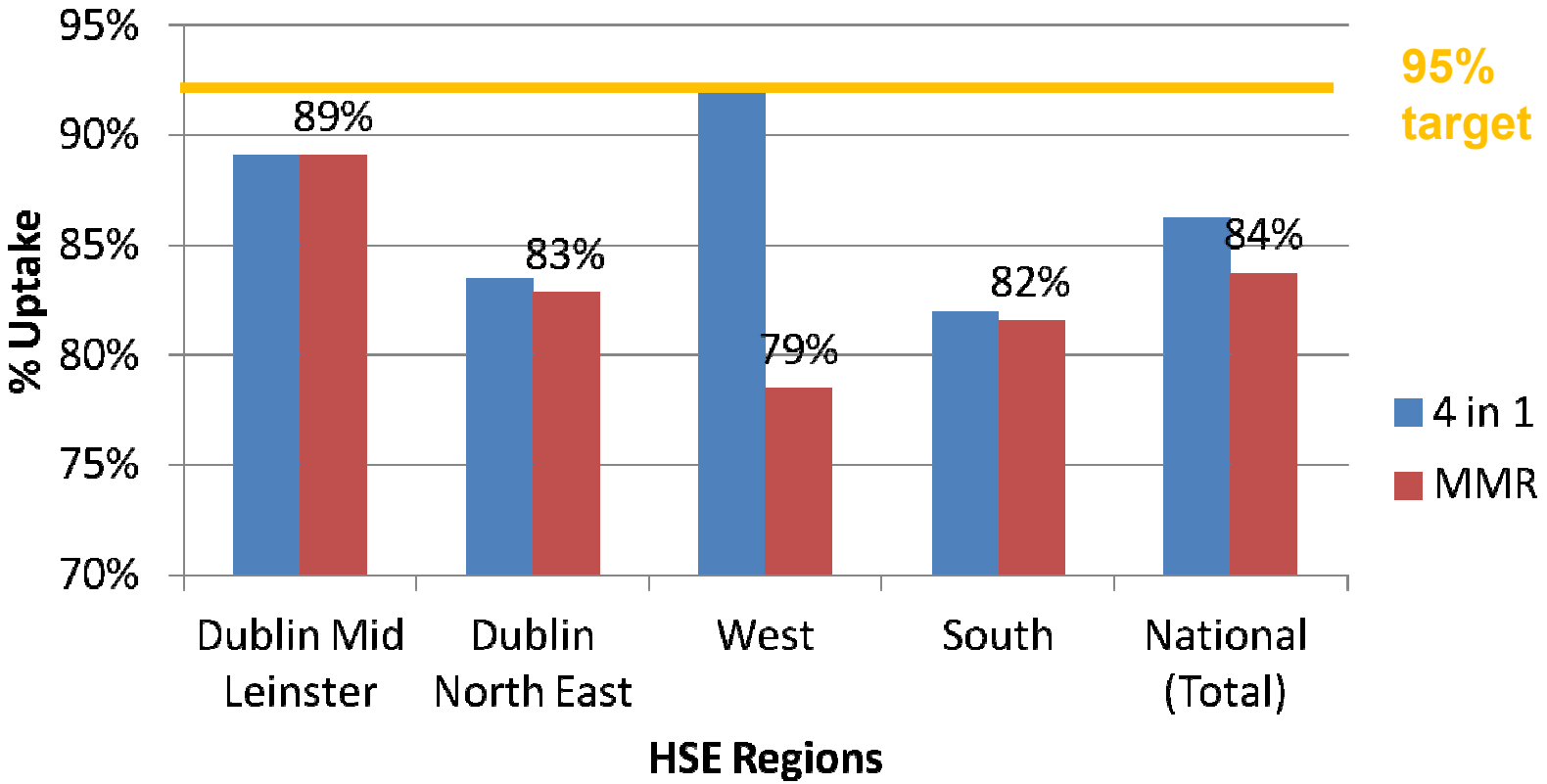
D3= 3 doses Diphtheria containing vaccine
MMR1= 1 dose Measles, Mumps Rubella vaccine

MMR1 uptake by LHO, 24 months of age, Q3 2012



HPSC Q3 2012 report

HSE school booster (MMR2, 4 in 1) uptake at 4-5 years of age, by region, 2012*



**HSE Schools programme only academic year 2011-2012*

Population immunity through analysis of MR vaccinated population cohorts

Immunization coverage (≥95%)

- Administrative reports
  - MMR1 and MMR2, SIA*
- Rapid coverage monitoring and survey
  - national and sub national levels
- Historic data
  - year of vaccine introduction , changes in vaccination strategies/calendar, coverage
- Additional information sources
  - specific population groups, vaccination dropout rate, modelling accumulation of susceptible,… - to triangulate data

**SIA- Supplementary immunisation activity*

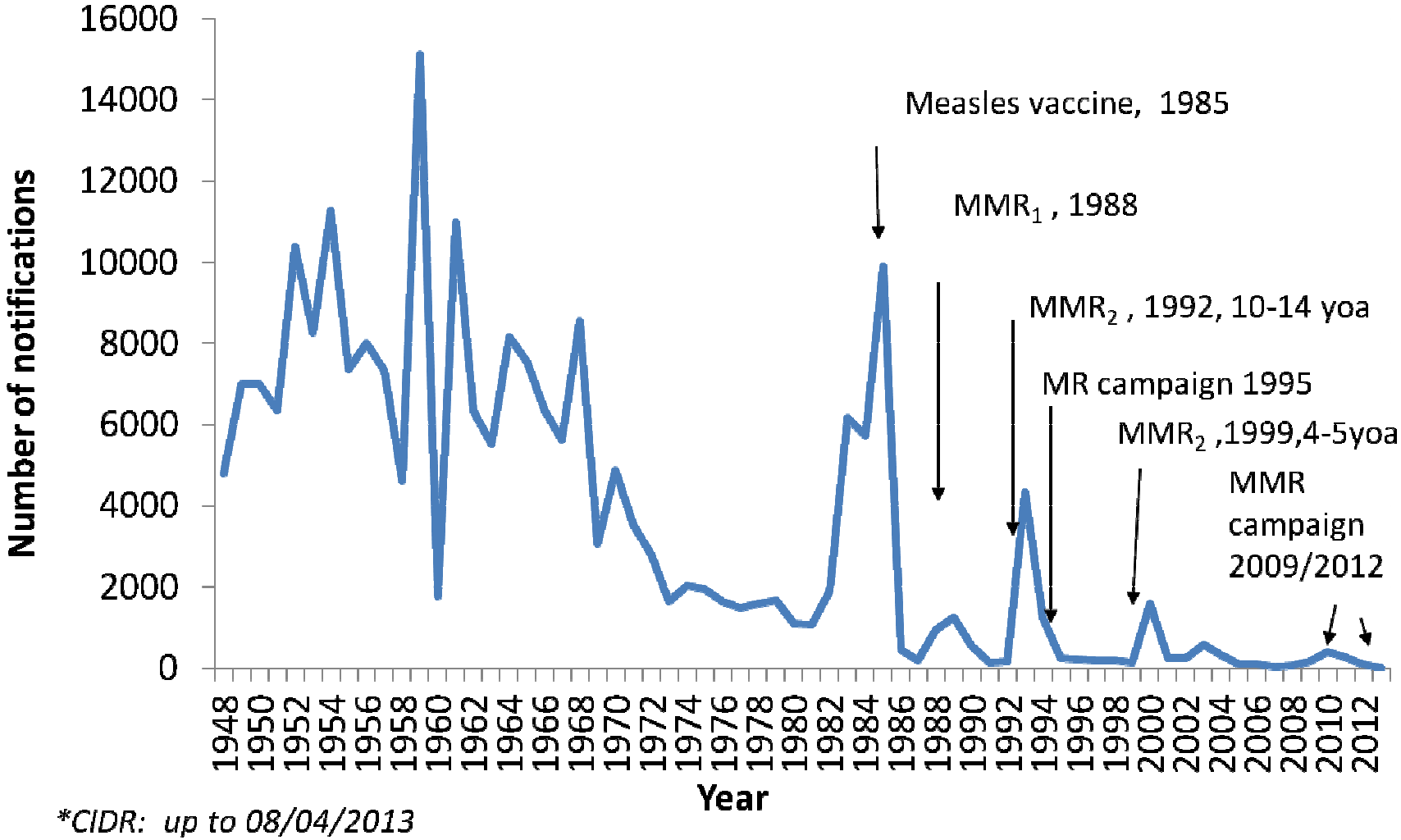
Indicators

- Vaccination coverage of MMR1, MMR2 whether delivered through routine or SIA, as per national schedule

- Measles and rubella incidence (laboratory confirmed, epidemiologically-linked and clinical cases)

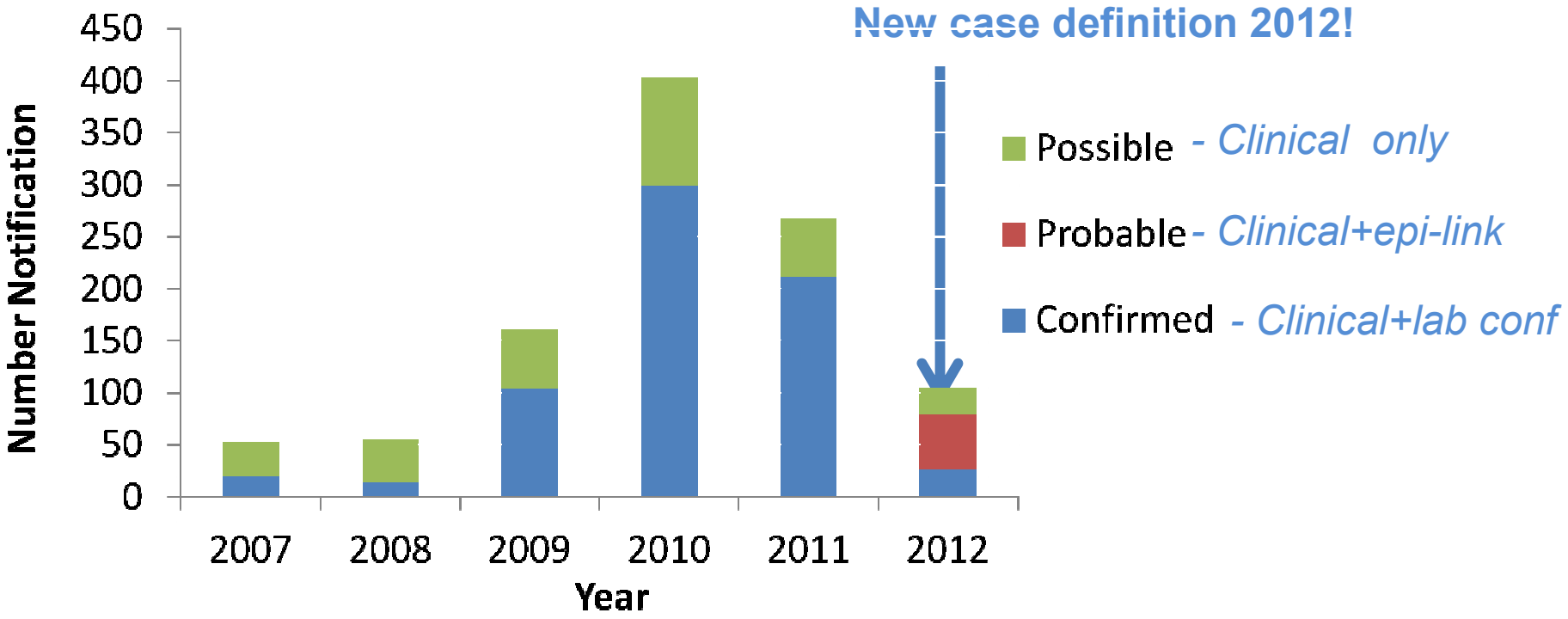
*SIA= supplementary immunization activity

Measles Notifications, 1948-2013*



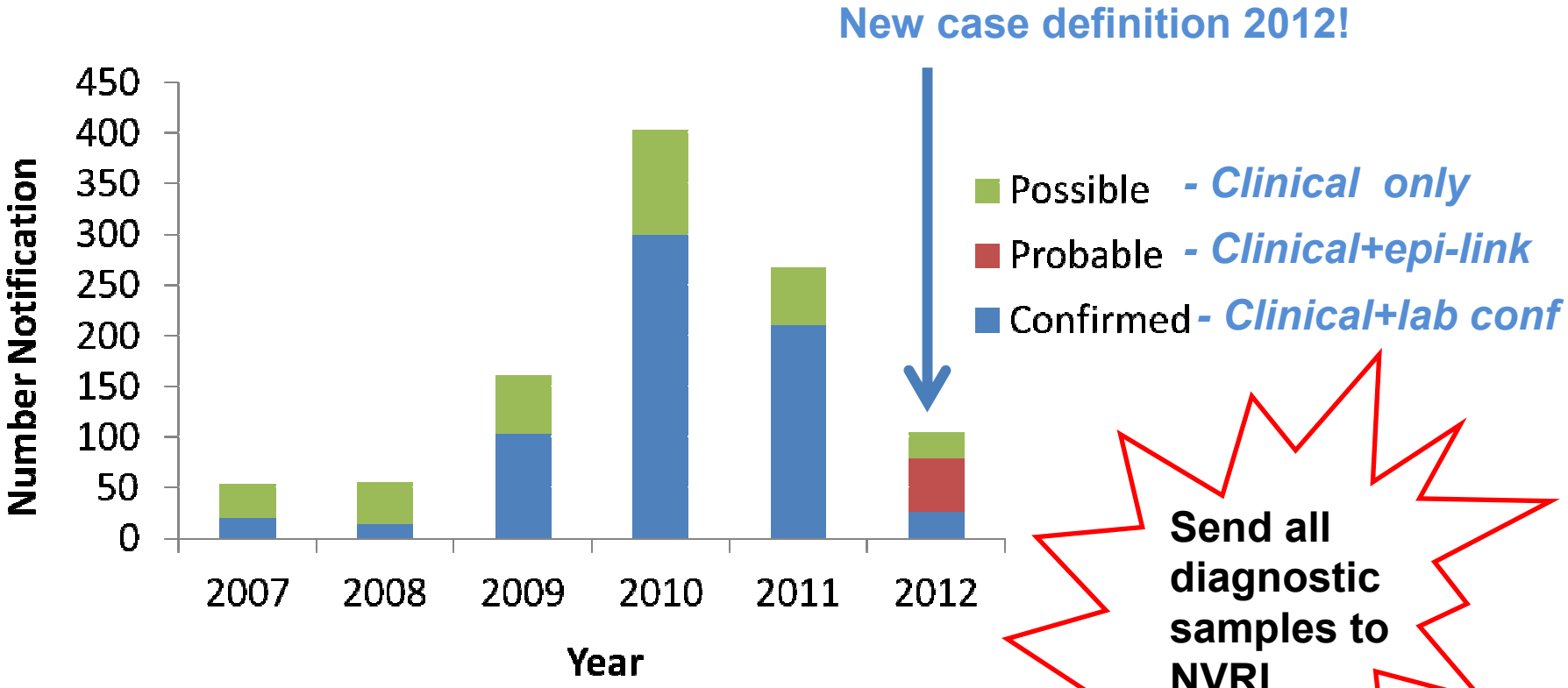
CIDR: up to 08/04/2013

Measles notifications, case classification, 2007-2012



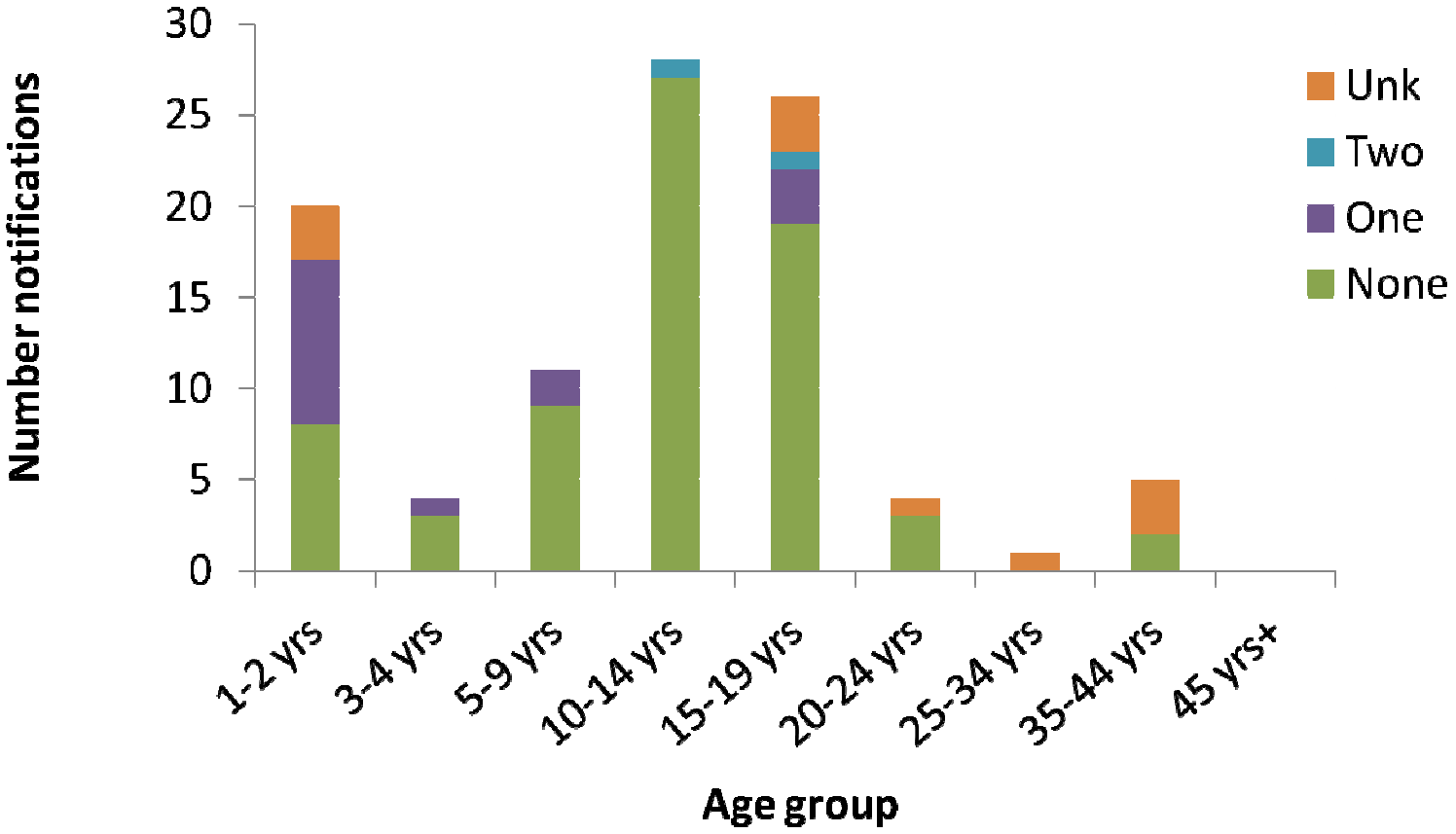
CIDR, as of 12/04/2013

Measles notifications, case classification, 2007-2012



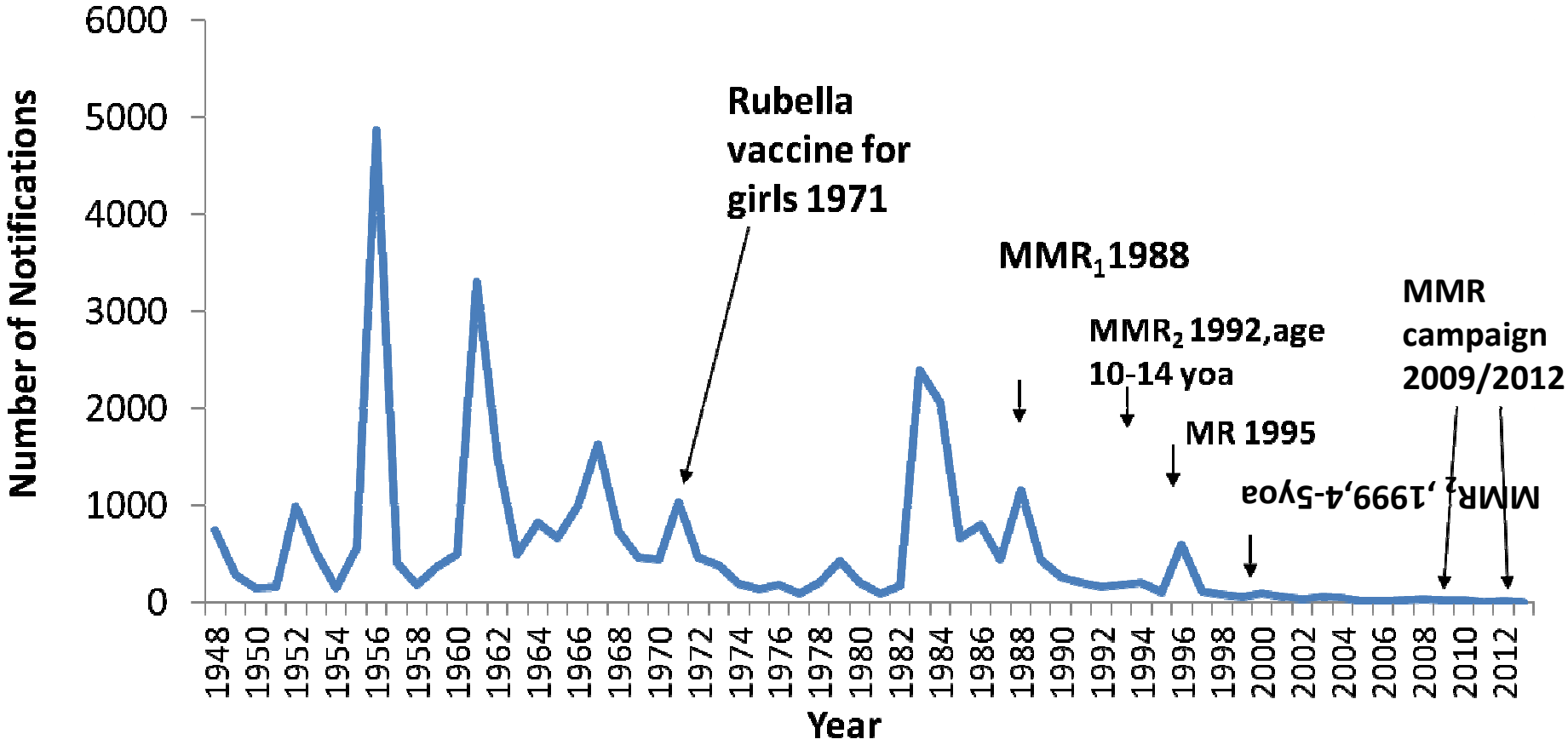
CIDR, as of 12/04/2013

Measles notifications by MMR doses, 2012 (n=99)*



** CIDR, excludes children < 12 months (n=5)*

Rubella notifications, Ireland (1948-2013*)



CIDR, as of 12/04/2013

Congenital Rubella Surveillance,

Ireland 1989-2013*

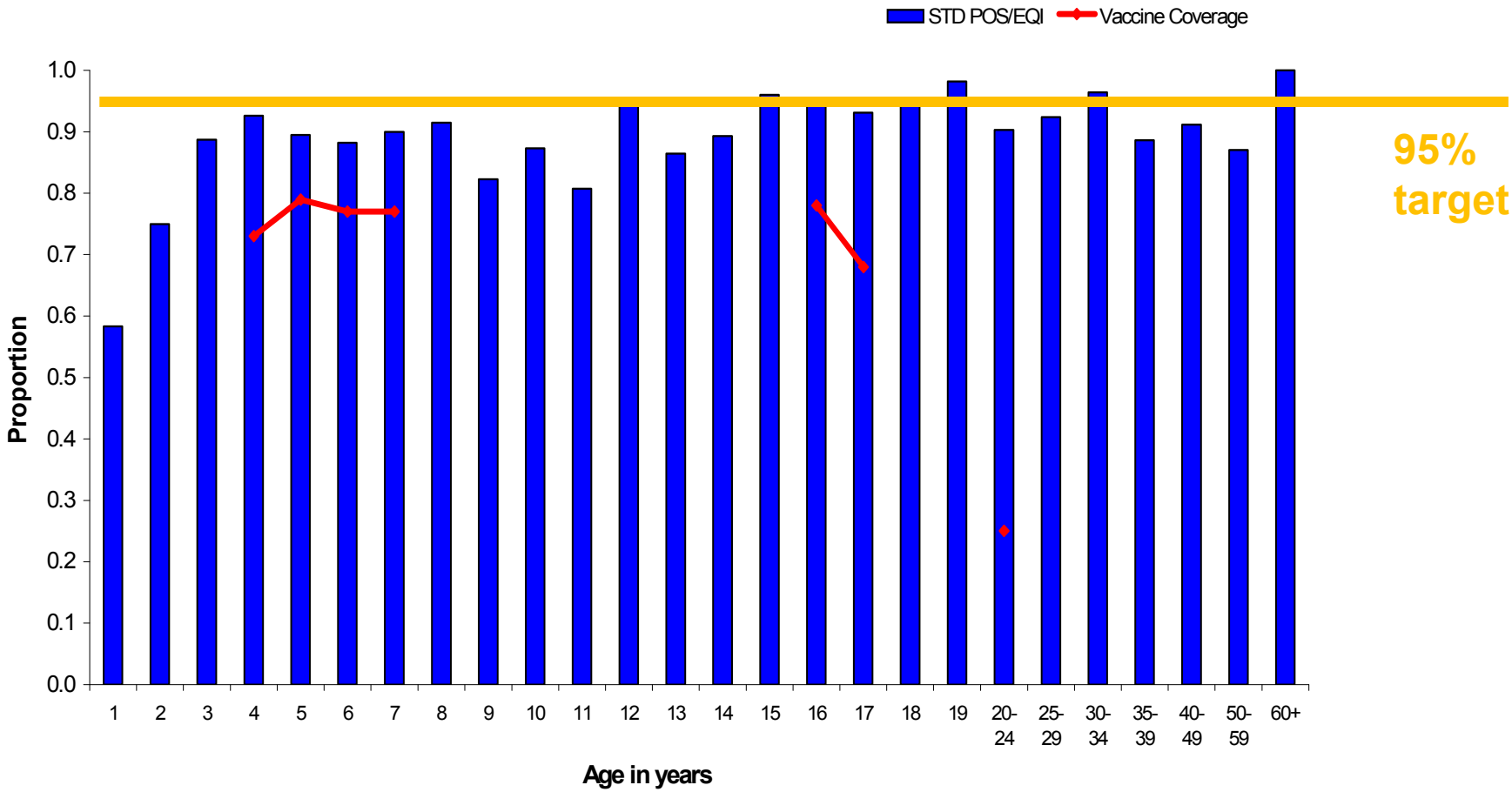
Year	Status	Mother - nationality	Rubella vaccinated	Gestational age at infection	CRS manifestations
1989	Confirmed	Unk	Unk	Unk	Unk
1996	Confirmed	Non-national	Unk	2nd month	Hearing, ophthalmic, neurological problems identified in 1st month of life
1996	Confirmed	Unk	Unk	Unk	Unk
2001	Unk	Unk	Unk	Unk	? stillborn
2004	Confirmed	Non-national	Not	4th-5th month	Microcephaly Deafness Cranial calcifications

*as of 15/04/2013

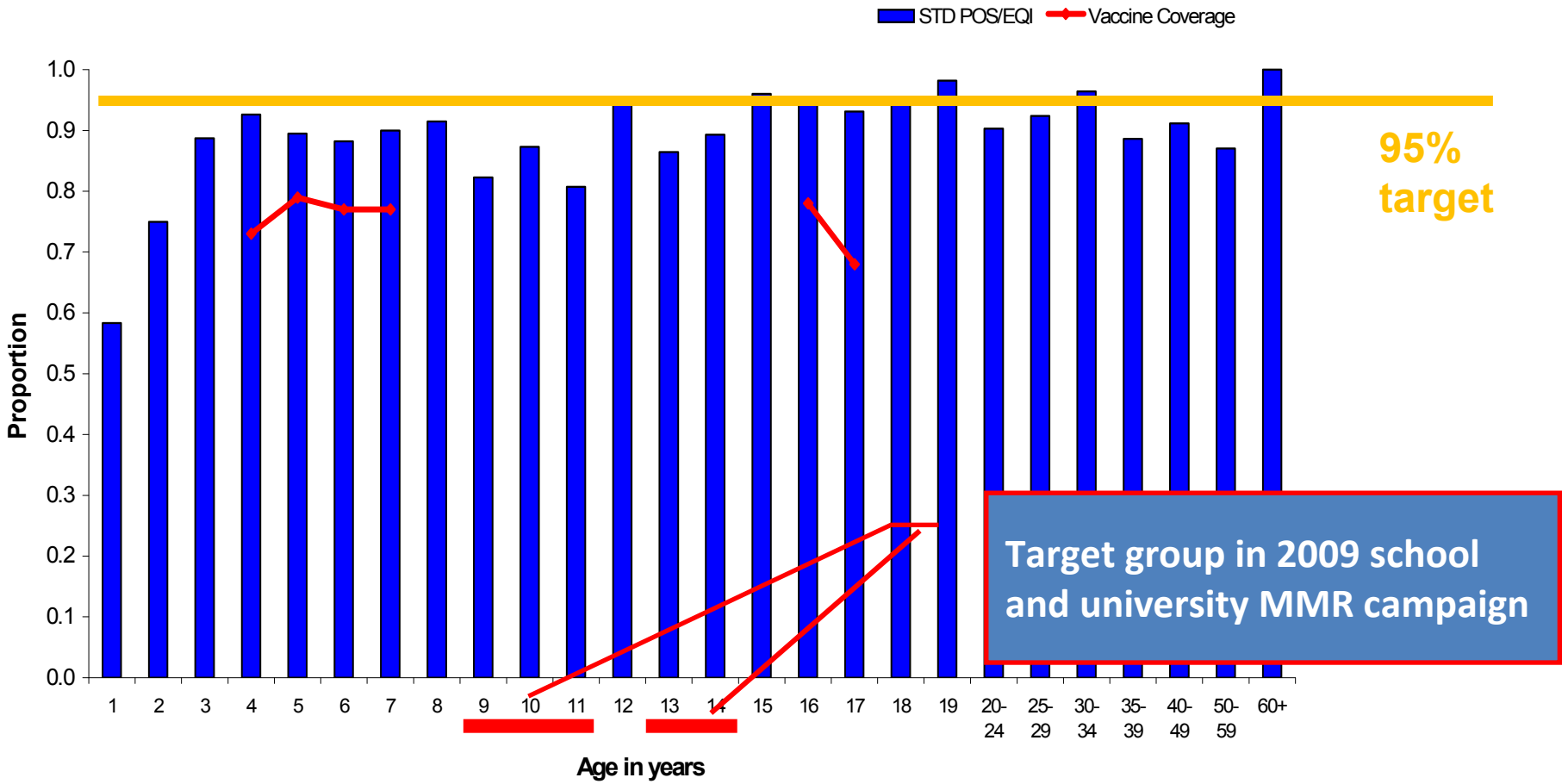
Role of population sero-surveillance studies

- Serological surveillance
  - To determine population immunity to measles/rubella
  - To identify age/gender immunity
  - Used to target interventions

Measles sero-survey 2003 (ESEN2)



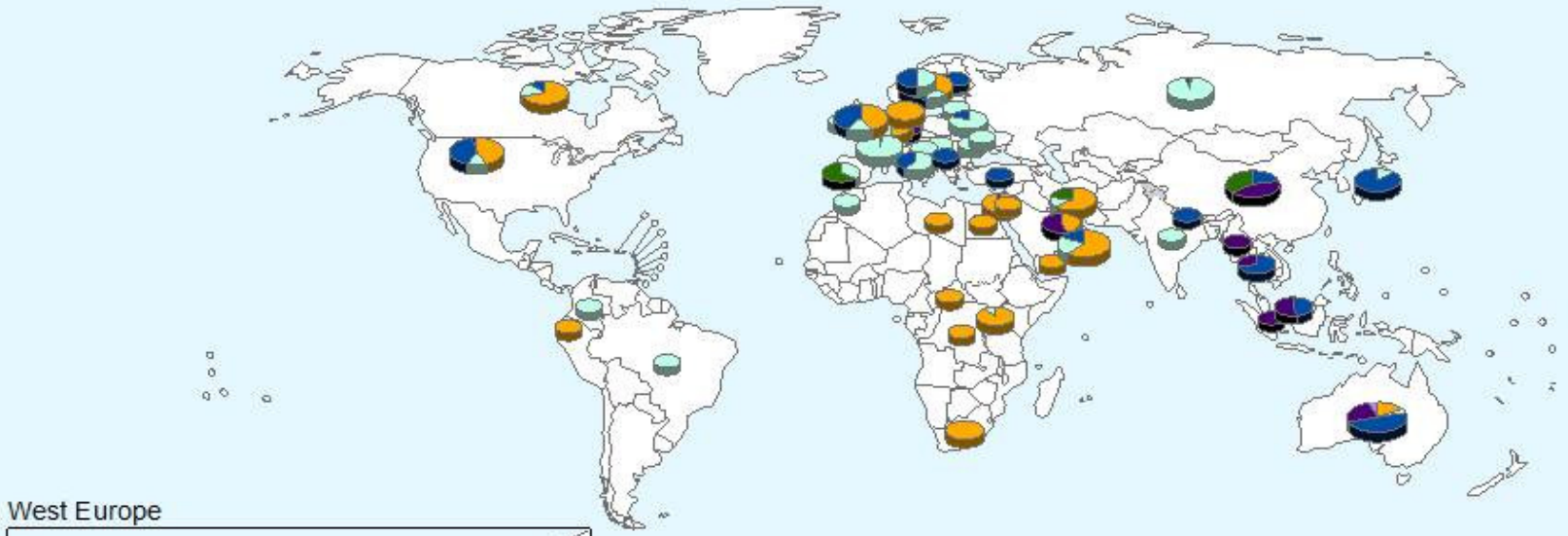
Measles sero-survey 2003 (ESEN2)



Molecular epidemiology of measles and rubella viruses

- Part of surveillance critical for elimination, identify origin of the virus > endemic or imported?
- Linkage of clinical and epidemiological segments by unique case ID
- WHO laboratory network as source of information
- Genetic baseline with genotype map of viruses and follow-up on currently circulating viruses

Distribution of measles genotypes, 2012. Data as of 7 february 2013



West Europe

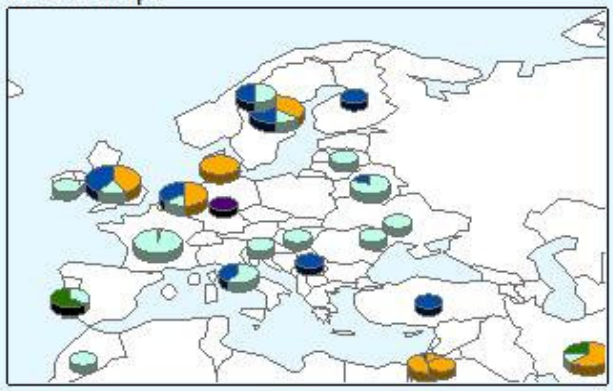


Chart proportional to number of genotypes

5

1

Genotypes:

- B3
- D4
- D8
- D9
- G3
- H1

0 2'500 5'000 Kilometers

Acknowledgement: WHO Measles LabNet.

Overall quality of measles and rubella surveillance

Surveillance performance indicators:

- Timeliness
- Completeness
- Lab confirmation rate
- Detection rate
- Chains of transmission/outbreaks with genotype data
- Source of infection
- Adequacy of investigation

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Performance Indicators, Targets and Perfomance 2012-2015....

WHO Indicator	WHO Target	Ireland 2012
Timeliness reporting	≥80% reports by deadline	Yes
Completeness reporting	≥80% reports	Yes
% cases lab investigated	≥80% cases tested* in a proficient laboratory	38% cases tested
Rate of discarded cases	≥ 2 discarded cases/100 000 population nationwide in 80% of sub-national level	Unknown
Chains of outbreaks investigated for virus genotype	≥ 80% of lab-confirmed chains of transmission tested for virus detection	52% cases epi-linked
Origin of infection identified	≥80% cases with origin of infection identified	68% cases reported
Timeliness of investigation	≥ 80% suspected cases adequate investigation initiated within 48 hours notification	82% - date investigation reported; same day for most

Measles and Rubella Surveillance and Control - Recommendations

IMPROVE :

- MMR 1 and MMR2 uptake (> 95%)
- Diagnosis, investigation and reporting of rash illnesses
- Laboratory confirmation (≥ 80% cases)
- Timeliness & completeness of surveillance indicators

IMPLEMENT:

- Enhanced surveillance for rubella and CRI
- Activities to increase surveillance for CRI

CONSIDER:

- Role of measles and rubella sero-surveys
- Modelling of data

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Summary

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- Well established surveillance and control
  - already in place
- Room for improvement in surveillance and control identified
- National Verification Committee established
- Documentation process begun
- But monitoring will continue

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Acknowledgements

- Departments of Public Health, SPHMs, SMOs, SSs, ICNs
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- WHO- www.who.int and Dr. Dina Pfeifer (WHO-EURO) presentation 2013