

# **Surveillance Strategies for Vaccine-Preventable Diseases**

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# Stages of Surveillance

## Control

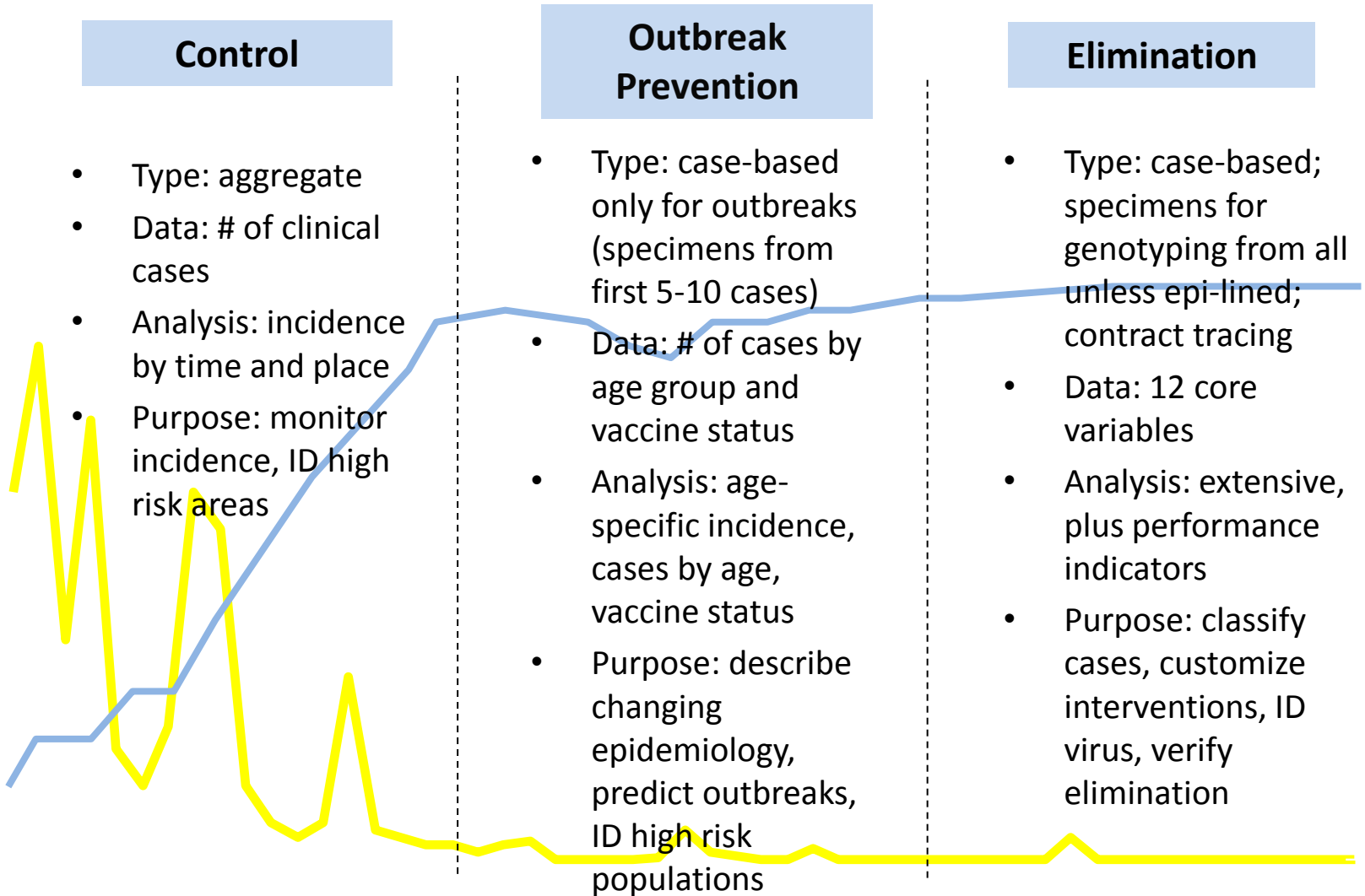
- Type: aggregate
- Data: # of clinical cases
- Analysis: incidence by time and place
- Purpose: monitor incidence, ID high risk areas

## Outbreak Prevention

- Type: case-based only for outbreaks (specimens from first 5-10 cases)
- Data: # of cases by age group and vaccine status
- Analysis: age-specific incidence, cases by age, vaccine status
- Purpose: describe changing epidemiology, predict outbreaks, ID high risk populations

## Elimination

- Type: case-based; specimens for genotyping from all unless epi-lined; contract tracing
- Data: 12 core variables
- Analysis: extensive, plus performance indicators
- Purpose: classify cases, customize interventions, ID virus, verify elimination



# Case Definitions

- Critical that case definitions are standardized within and across countries
- Allows for confidence in reported data
- Without accurate data:
  - trends cannot be accurately monitored
  - unusual occurrences might be missed
  - Intervention effectiveness cannot be easily evaluated

# Measles Case Definitions\*

## **Clinical case definition = suspected case**

- fever & maculopapular rash AND
- cough and/or conjunctivitis and/or coryza

## **Lab-confirmed case:** clinical case with

- Positive measles IgM antibody
- Substantial rise in measles IgG antibody in paired sera
- Measles viral RNA detection by RT-PCR
- Measles virus isolation

\* WHO EURO. Surveillance Guidelines for Measles, Rubella and Congenital Rubella Syndrome in the WHO European Region. Update 2012

# Confirming Measles by Epidemiologic Linkage or Clinical Criteria - EURO

**Epi-Link:** clinical case not adequately tested by lab who had “contact” with a lab-confirmed or epi-linked case 7-18 days before rash onset

**Clinically Compatible:** clinical case that was not adequately tested by lab and could not be epidemiologically linked to a confirmed case

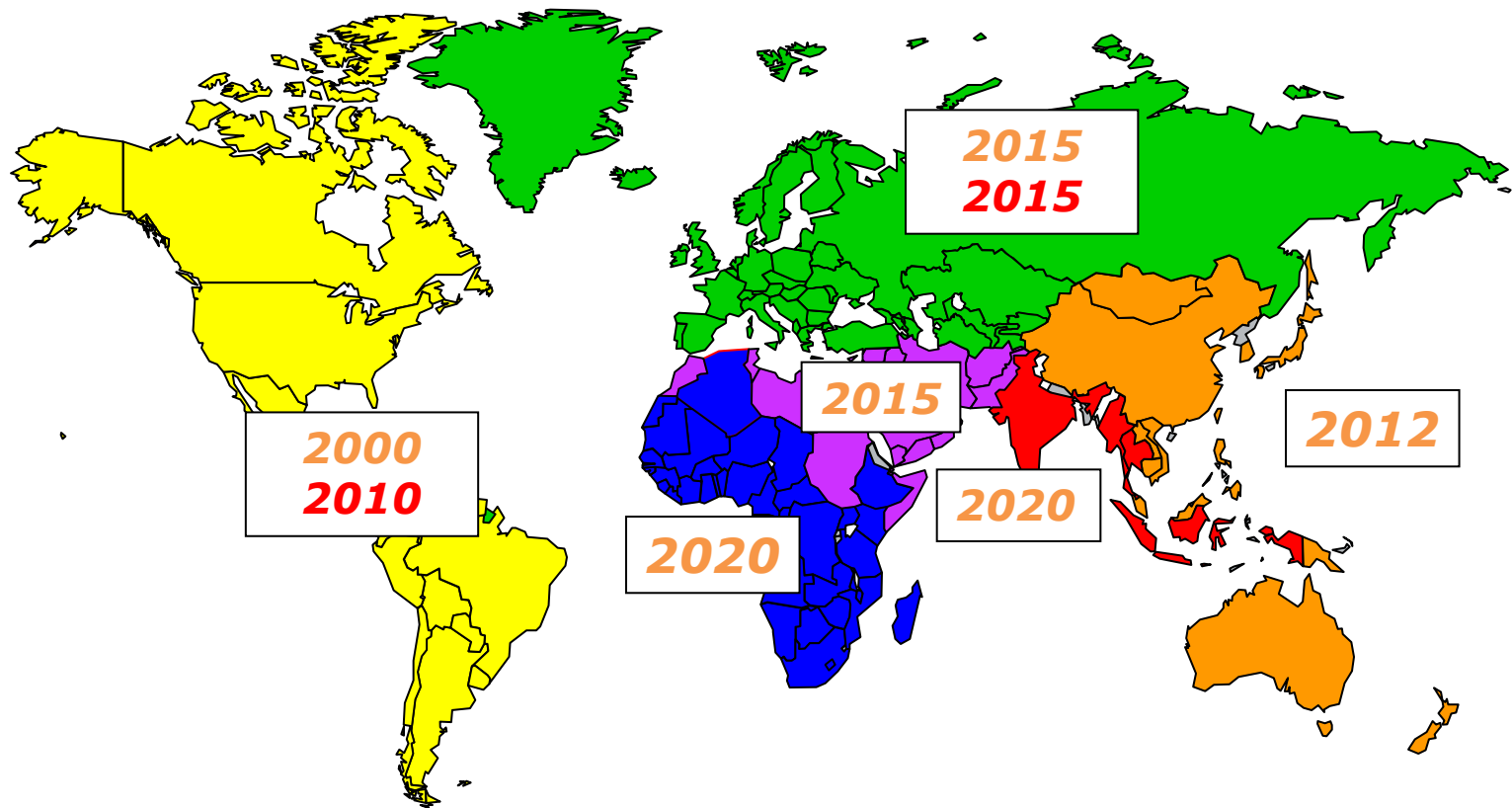
NB: clinically confirmed/compatible cases are considered failures of surveillance

# Global Measles Goals, Targets, Milestones

- Millennium Development Goal (MDG) # 4
  - Reduce child deaths by 2/3 among <5 year old children by 2015 (vs. 1990)

NB: MCV1 coverage is an indicator for MDG 4
- Global Vaccine Action Plan
  - eliminate measles in at least 4 WHO Regions by 2015
  - eliminate measles in 5 WHO Regions by 2020
- SAGE milestones towards measles eradication by 2015
  - achieve MCV1 coverage of 90% (national) and 80% (every district)
  - reduce mortality reduction by 95% compared with 2000
  - decrease incidence to <5 cases per million

# Regional Measles and Rubella Elimination Goals, by WHO Region, 2013



All Regions have measles elimination goals  
Americas and Europe have rubella elimination goals

# Regional Committee Guidance on Eliminating Measles & Rubella by 2015

The Regional Committee URGES Member States to achieve measles and rubella elimination by:

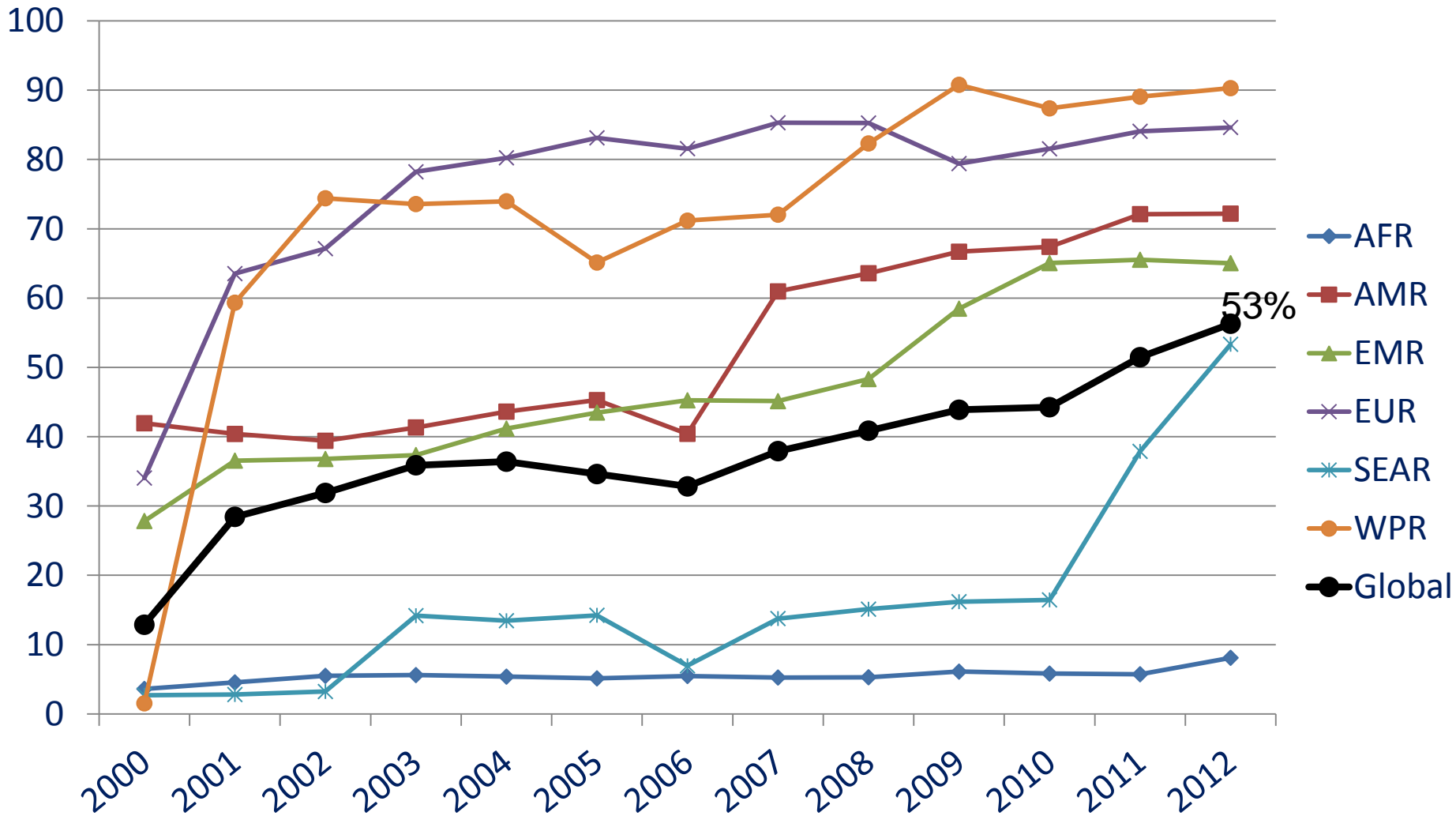
- i. implementing and strengthening case-based surveillance using the existing WHO-accredited laboratory network for measles, rubella and congenital rubella syndrome, in order to monitor indicators for verifying attainment of the elimination goals
- ii. developing or revising national elimination plans to address all components of the measles and rubella elimination strategy, especially immunization of susceptible populations, and conducting supplementary immunization activities as required to ensure two doses of a measles-containing vaccine; and
- iii. establishing a national measles and rubella elimination verification committee to document progress towards measles and rubella elimination and report to a regional verification commission....



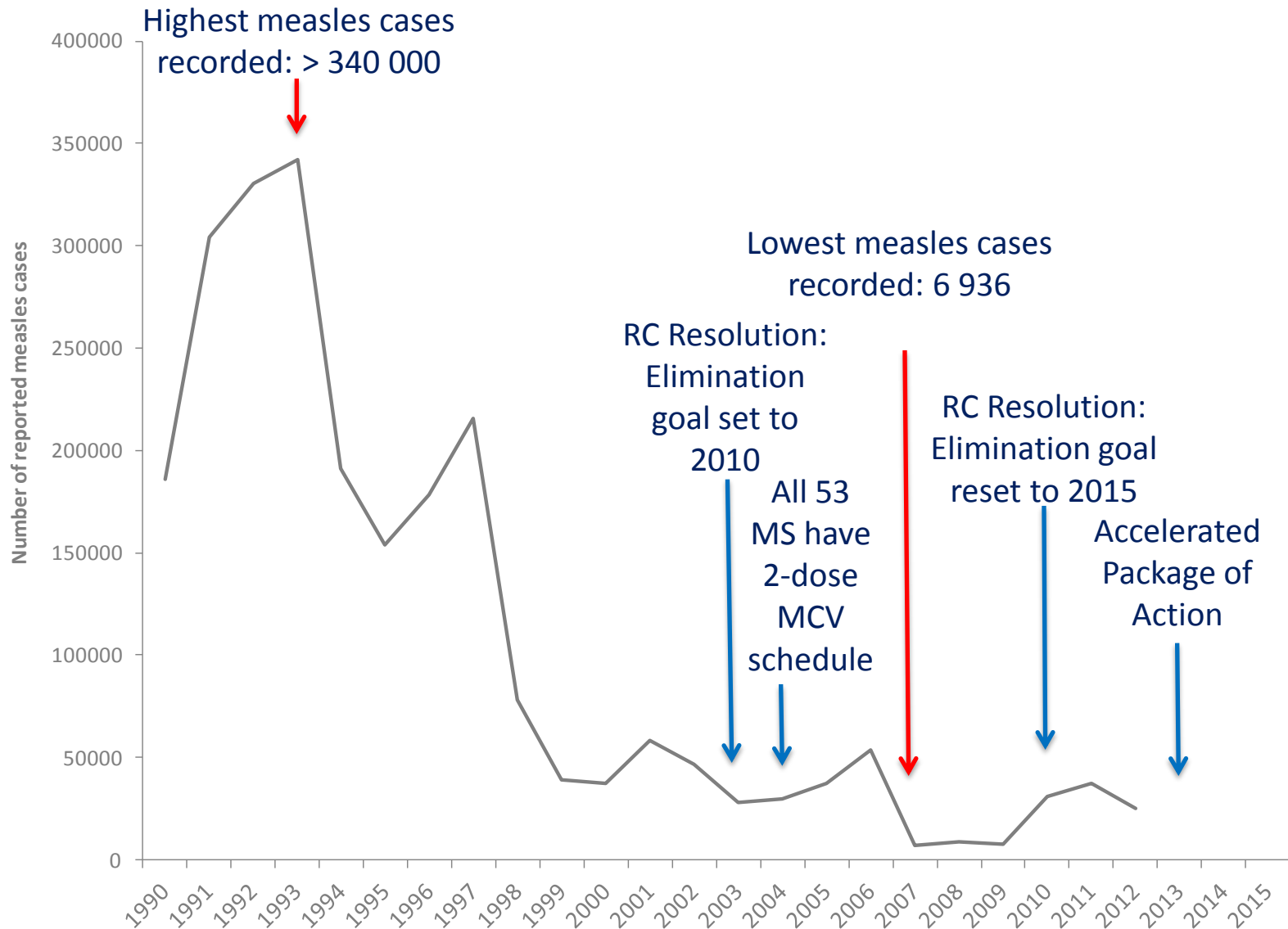
# Global Measles and Rubella Strategic Plan, Strategies

- high population immunity with two doses of M and R containing vaccines through
  - routine immunization
  - supplementary immunization activities (SIAs)
- effective surveillance, monitoring and evaluation
- outbreak preparedness, response and case management
- communication to build confidence and demand
- research and development

# Global and Regional MCV2 Coverage



# Measles Timeline of Events in the WHO European Region, 1990-2013



# Number of Measles Cases, by Country, WHO European Region, 2009 – 2012

Country	2009	2010	2011	2012	Total
Bulgaria	2545	21664	155	1	24365
France	1541	5019	15214	856	22630
Ukraine	24	42	1313	12508	13887
Romania	8	187	4172	3565	7932
Italy	173	864	5186	636	6859
United Kingdom	1176	397	1083	1684	4340
Spain	43	285	3508	424	4260
Germany	572	805	1600	163	3140
Russian Federation	101	152	783	1935	2971
Switzerland	999	81	636	60	1776
<b>Total</b>	<b>7182</b>	<b>29496</b>	<b>33650</b>	<b>21832</b>	<b>92160</b>
% of all cases in the Region	93.08	96.61	89.19	96.78	93.53
WHO European Region	<b>7716</b>	<b>30531</b>	<b>37727</b>	<b>22558</b>	<b>98532</b>

Few countries each year account for most reported measles cases

# EURO-Recommended Measles-Rubella Surveillance Performance Indicators

- Proportion of reporting sites that report (target:  $\geq 80\%$ )
- Proportion of reporting sites that report timely (target:  $\geq 80\%$ )
- Discarded measles (and rubella) cases per 100,000 population/ year at national level (target  $\geq 2/100,000$ )
- % of subnational units with  $\geq 2$  discarded measles (and rubella) cases per 100,000 population/year (target:  $\geq 80\%$ )
- % of suspected cases with adequate investigation\* initiated within 48 hours after notification (target:  $\geq 80\%$ )
- % of suspected cases with adequate specimens collected and tested in a proficient laboratory (target:  $\geq 80\%$ )
- % of lab-confirmed outbreaks with adequate samples tested for virus detection (target:  $\geq 80\%$ )
- % of confirmed cases with origin of infection (i.e., imported, import-related or endemic) identified (target:  $\geq 80\%$ )

# Summary

- High quality surveillance is needed to identify cases (and virus), eliminate residual areas of transmission, and verify measles elimination
- Standard indicators should be used to monitor surveillance quality
- Contact tracing, lab confirmation, virus detection and determining source of virus are critical