



# WHO's experience with Maternal Mortality and Global Health Estimates

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# WHO and UN Global Health Estimates & Reports

Population/births	UN PopDiv, Biennial	Globocan 2012 (IARC Dec 2013)
Life tables/ mortality	UN PopDiv , Biennial	Unsafe water and sanitation report (2014)
	WHO, Annual/Biennial	Health for the world's adolescents (2014)
Child mortality	UN-IGME, Annual	World suicide report (April 2014)
Maternal mortality	MMEIG, Biennial / Annual	Global report on alcohol & health (May 2014)
HIV	UNAIDS/WHO, Annual	Global status report on noncommunicable diseases 2014
Tuberculosis	WHO, Annual	Global Tuberculosis Report 2014
Malaria	WHO, Annual	Global Malaria Report 2014
Child causes of death	WHO/CHERG, Annual/Biennial	Global status report on violence prevention (December 2014)
Cancers	IARC/WHO, Biennial	World Health Statistics 2015 (May 2015)
Specific causes	WHO, Biennial/Irregular	Global status report on road safety 2015
Specific risks	WHO/Interagency, Various	
Causes of death – all ages	WHO, 2002, 2004, 2008, 2012	
Disease burden	WHO, 2002, 2004, 2012	
Global health risks	WHO, 2000, 2004	

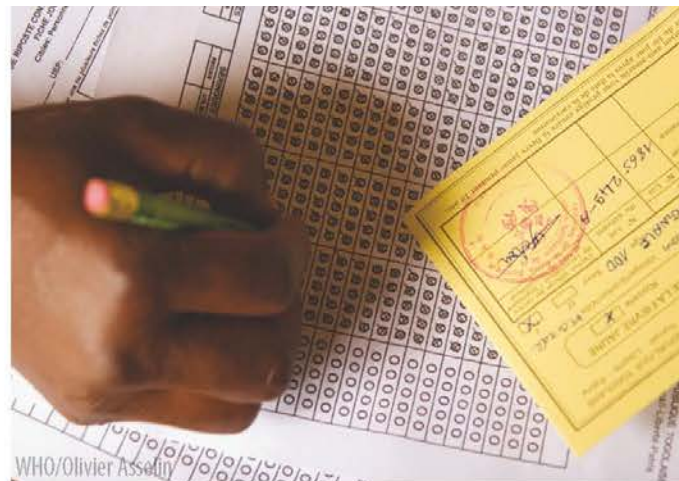


## WHO's Role in Global Health Estimates

- **WHO is constitutionally mandated to**
  - "establish and maintain ..... epidemiological and statistical services" and
  - "assist in developing an informed public opinion among all peoples on matters of health" (WHO Constitution 1947)
- **WHO reform process – defined 5 core functions, including:**
  - Collection, analysis and dissemination of evidence on health trends and determinants
  - Setting targets, monitoring progress, measuring impact in terms of lives saved, risks averted and coverage of essential services (EBSS/2/2)
- **World Health Assembly Resolutions provide mandates for:**
  - Many specific global strategies and plans of action
  - Setting of targets and monitoring progress, e.g. NCD targets
  - Regular reporting on key indicators – e.g. tobacco, alcohol

## WHO Global health estimates 2015-16

- Neonatal, infant and child mortality 1990-2015 (UN-IGME) Sep 2015
- Neonatal and child causes of death 2000-2015 /(WHO/MCEE) Sep 2015
- Maternal mortality 1990-2015 (MMEIG) Nov 2015
- Stillbirths Dec 2015
- Life tables and all-cause mortality
  - UN WPP 2015 July 2015
  - WHO 1990-2015 Dec 2015
- Road injury deaths 2000-2013 Oct 2015
- Causes of death 2000-2015 Draft estimates by early 2016
- WHO DALYs Draft estimates by early 2016
- WHO estimates for risk factor trends and burden
  - Selected environmental risks various
  - Metabolic risks (BMI, inactivity, BP, chol, blood glucose) Late 2015
  - Smoking mid 2015
  - Alcohol and Illicit drugs 2016



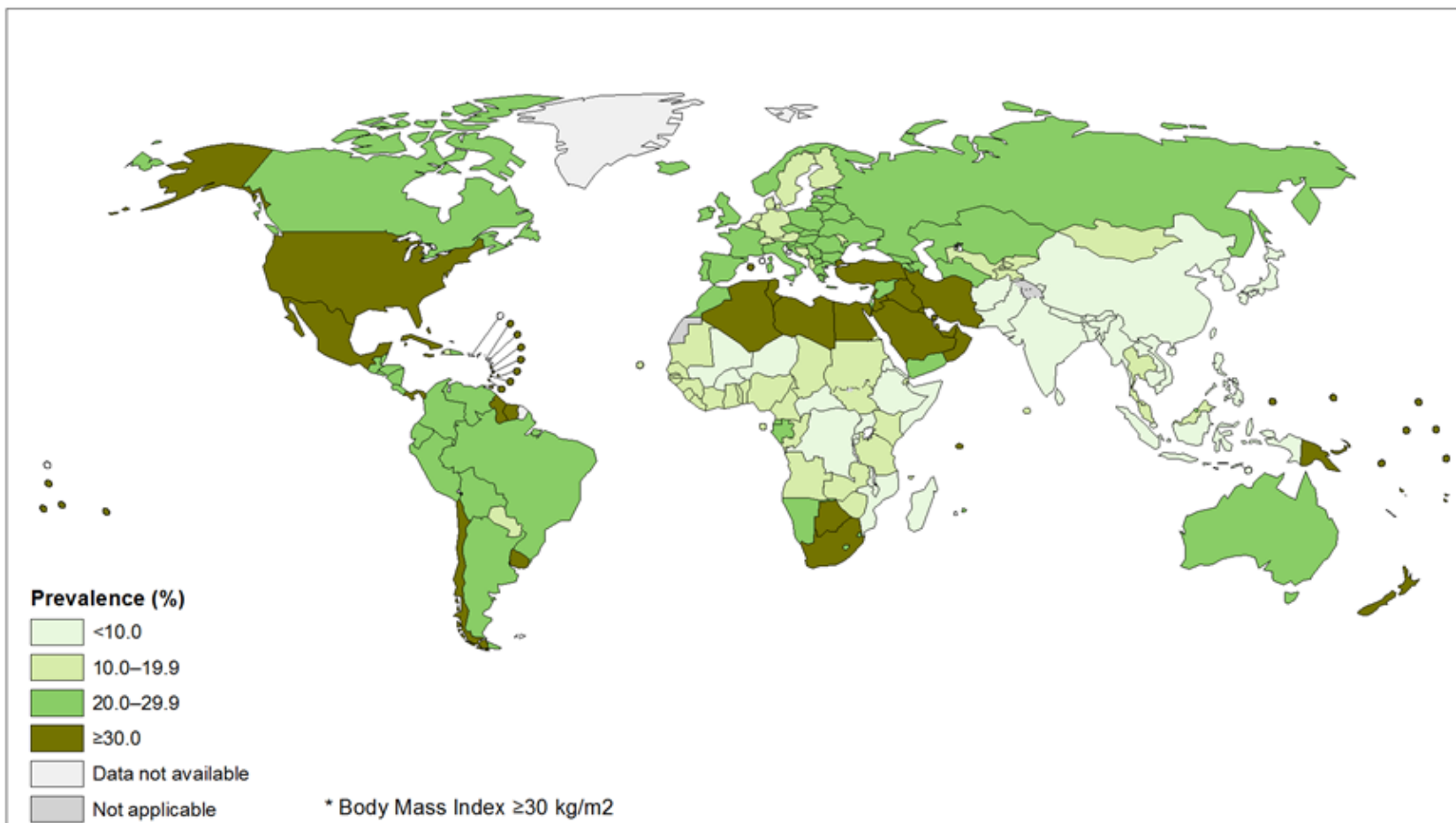
# *Global Health Observatory*

Monitoring the global health situation and trends

[www.who.int/gho/](http://www.who.int/gho/)

# 15% of women worldwide are obese

**Prevalence of obesity\*, ages 18+, 2014 (age standardized estimate)  
Female**



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 and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization  
Map Production: Health Statistics and Information Systems (HSI)  
World Health Organization

 **World Health Organization**  
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## Features of Global Health Estimates

- Aim to synthesize data to obtain comparable estimates
- Data are often not comparable across time, populations and data collection mechanisms (requires adjustment)
- Data are often sparse (use modeling)
- Increasing demand from countries and international organizations for frequent, timely and accurate estimates

## Technical Challenges

- Demand for country-level estimates
- Demand for time trends
- Need to systematically report uncertainty ranges for estimates
- Need to find and appropriately include all relevant data
- Need to take appropriate account of improvements in methods while maintaining a balance with stability and acceptance of modelling methods
- Transparency and replicability, data in public domain
- Consultation but not clearance by Member States



## GATHER: Reporting Guideline for Global Health Estimates

- WHO Reference Group on Global Health Statistics
- Checklist of reporting items (18 items)
- Statement+checklist for publication (Lancet and PLoS)
- "Explanation & Elaboration" document that explains for each reporting item:
  - Rationale for including the information
  - Scientific background and evidence of bias associated with conduct/reporting, if any
  - Examples of good practice
  - Evidence that current reporting is inadequate, if any

## Country consultation on estimates

- Put into place in 2001 in Executive Board resolution following the World Health Report 2000
- Estimates, with methods and input data, are sent (web) for consultation to country focal points: 3-4 weeks minimum (6 weeks preferred)
- Consultation, NOT clearance (in most cases)
- Usually leads to 40-50 countries responding: new data, questions, arguments etc. This year **considerably** more interest from countries
- Some major challenges: MDG, but also when the data presented become too granular by age, sex and cause (e.g. child homicide)
- Continuous discussion on difference between WHO best estimate and country reported / best estimate OR latest DHS report estimate
- Estimates are only changed if new information or data provided – that meets inclusion criteria
- Unprecedented political pressure this year around end of MDG assessments for maternal mortality

## Data challenges for monitoring SDG targets

- **A closer look at maternal mortality**

Rare event, significant measurement issues, sensitive

- **Do we actually need more and better data?**

*Chris Murray on SDG monitoring in the latest Lancet:*

“No extra resources are required beyond the investments already made in the annual GBD updating process, which reflects the contributions of more than 1300 investigators in 114 countries. For 17 of the 24 indicators, the GBD can provide a ready solution for sound and useful measurement.”

## Maternal mortality: Concepts and definitions

- Maternal death:

The death of a woman while pregnant or within 42 days of termination of pregnancy, from any cause related to or aggravated by the pregnancy or its management

- Maternal mortality ratio (MMR)

= number maternal deaths/100 000 live births

- Proportion maternal (PM)

= number maternal deaths/deaths to women 15-49 years

## Sources of maternal mortality data

- Confidential enquiries ("gold" standard)
- Civil registration systems with cause of death assigned by attending physician
- Sample vital registration systems
- Reproductive Age Mortality Surveys (RAMOS)
- Household surveys with sibling histories
- Population censuses with questions on household deaths
- Hospital- or facility-based studies
- Other

## Input data for the estimates: PM

- PM is considered less subject to under-reporting than MMR (maternal and non-maternal deaths likely to be under-reported to similar degree)
- Maternal deaths as defined by ICD is difficult to capture – often surveys report all deaths in pregnancy
- Efforts have been made to adjust for:
  - Underreporting
  - Definition (pregnancy vs maternal)
- For the estimates, the HIV-maternal component was taken out from the PM; the HIV-maternal component is added back after the model fitting

## Statistical estimation method

- Bayesian maternal mortality estimation model (BMaT)
  - To improve consistent trends across countries
  - Balances covariate driven trends to drive estimates where limited data while capturing observed trends in countries with observations
  - Accounts for differences in stochastic and sampling errors
- Interagency Group (WHO, UNICEF, UNFPA, UNPD, World Bank)
- Statistical consultant – Leontine Alkema (U Singapore / Amhurst)

## Other data inputs – 1990-2015 "final" estimates

- WHO life tables (all-cause deaths D)
  - WHO, 2013 revision
- HIV/AIDS mortality (HIV-maternal)
  - UNAIDs, 2013 revision
- Live births data (MMR denominator)
  - UN Population Division, 2015 revision

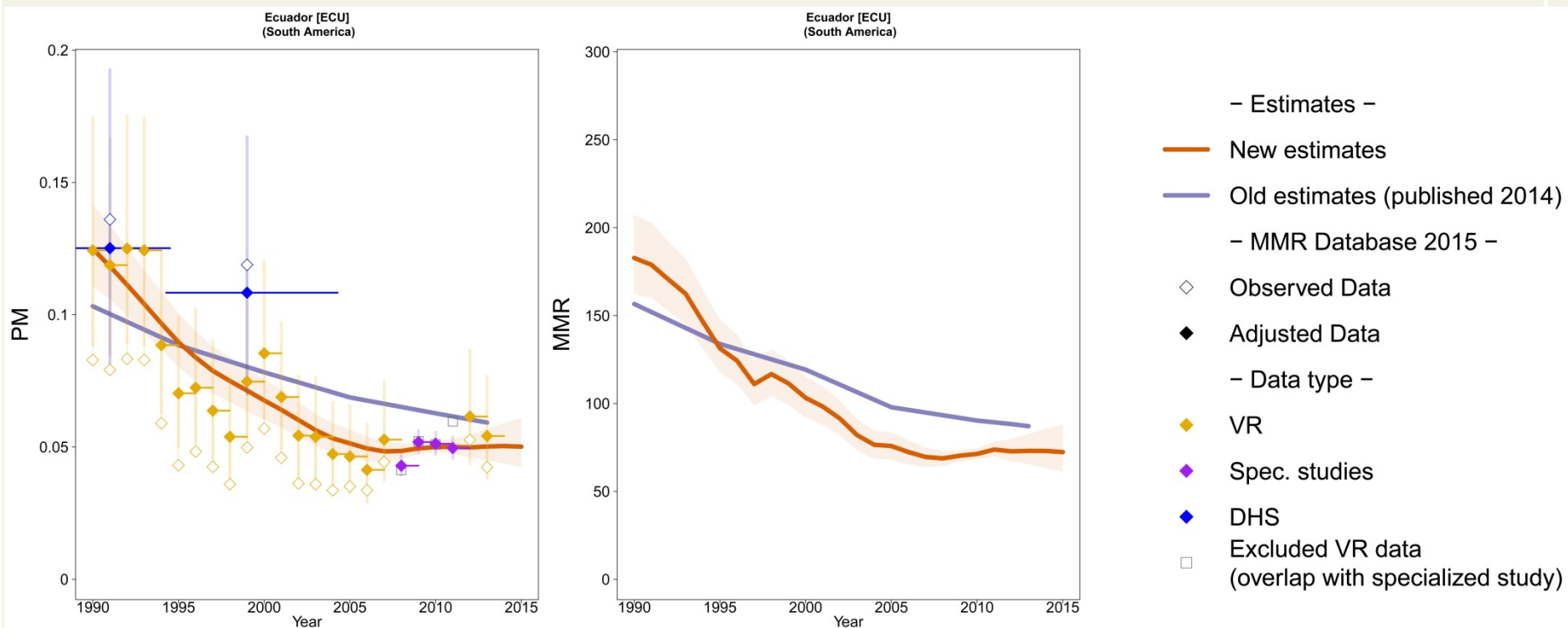
$$\text{MMR} = \text{PM} * \text{D} / (\text{LB}/1000000)$$



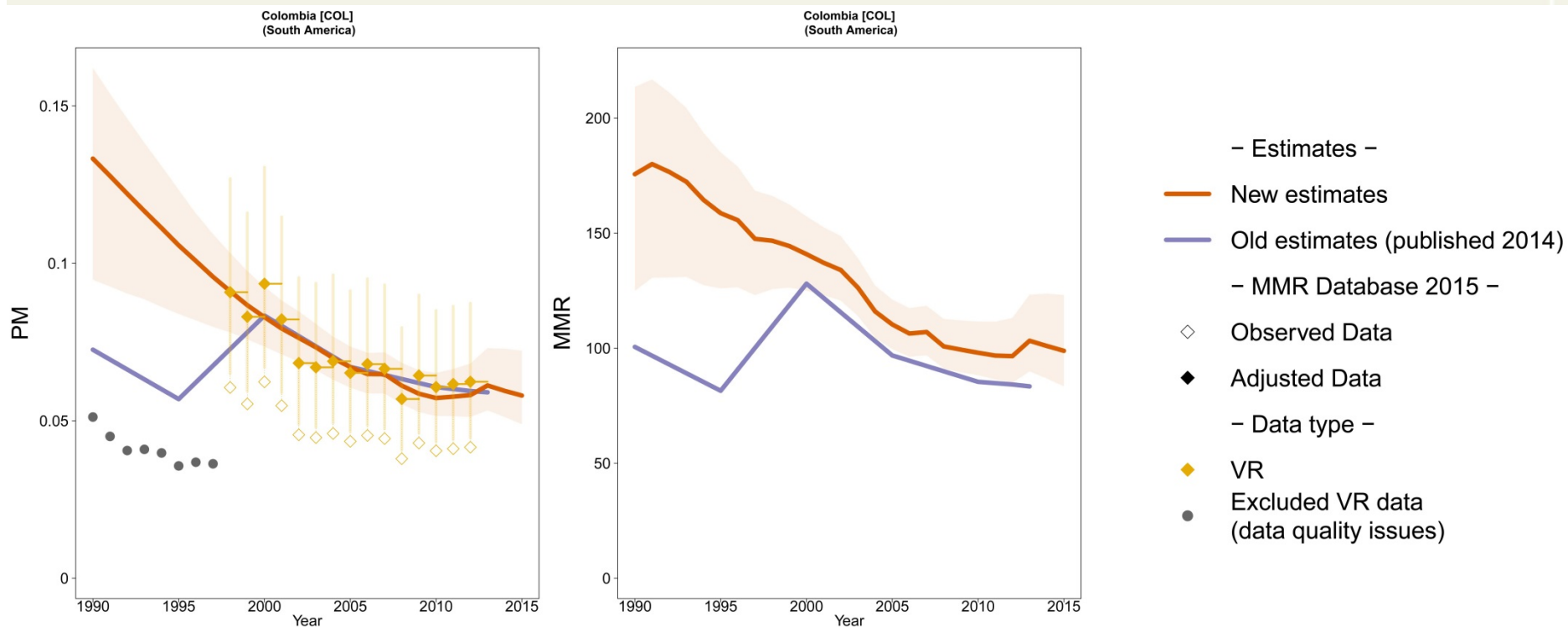
## Brief digression: WHO Life Tables

- WHO own analysis and model LT system till ~2012
- Now aligned with and drawing heavily on WPP biennial revisions of UN life tables
- Imputation from five year periods to annual LT
- Consistency with death registration data / completeness
- Consistency with UNAIDS/WHO estimates of HIV mortality (version synchronization not yet achieved)
- Mortality shocks (conflict and natural disasters)

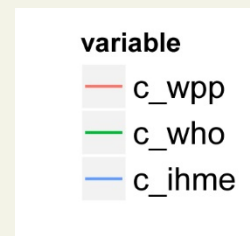
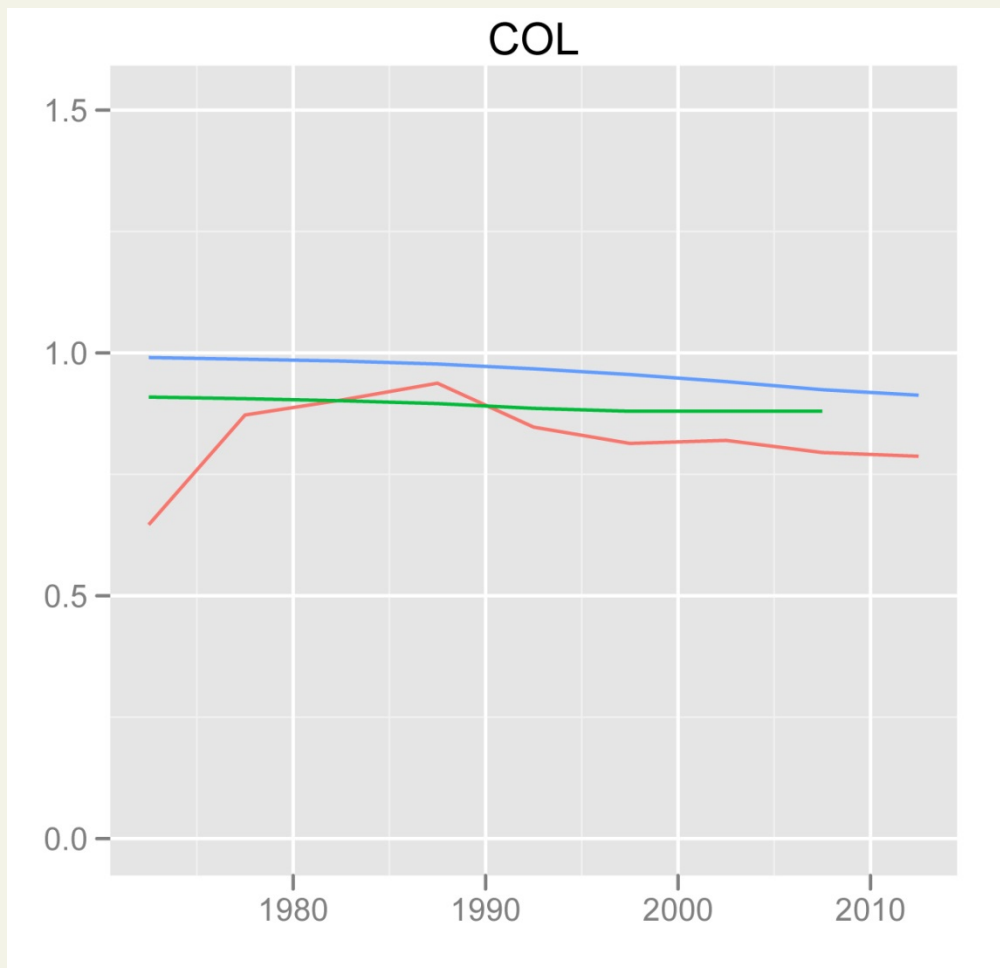
# MMR revision 2015: Ecuador



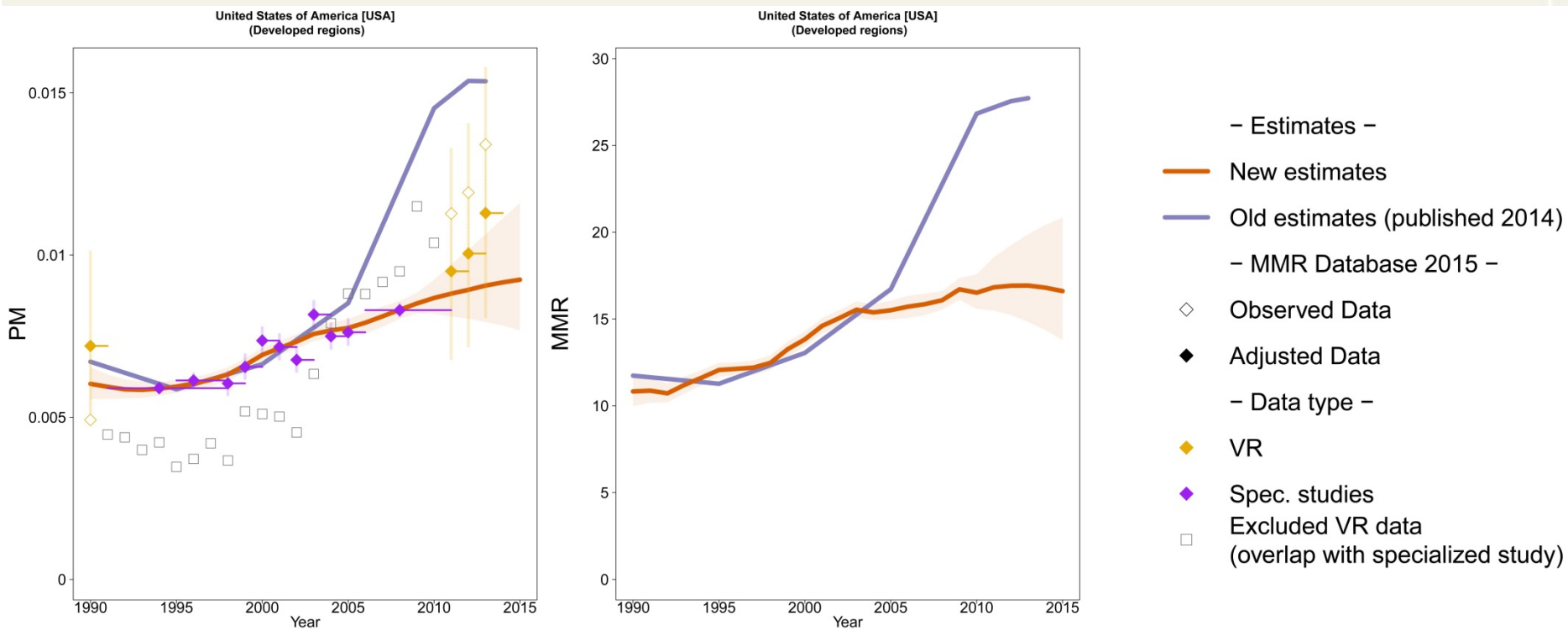
# MMR revision 2015: Columbia



## Columbia: death registration completeness



# MMR revision 2015: USA



## Public and Private "Controversies"

- Different estimates for same indicator from UN and IHME
  - Sometimes large differences: HIV, malaria, maternal mortality, child mortality, death registration completeness, etiology pneumonia etc.
- Convergence of estimates as data inputs and/or models are revised:
  - multiple examples (e.g. child mortality);
  - more global/regional convergence than country level
- Additional results:
  - greater awareness of the need for better country data
  - push for greater transparency in modelling estimates (GATHER)
  - child mortality, etiology pneumonia etc.
- Member State consultations – increasing attention and concern (2015 effect?):
  - Some countries wanting to have estimates suppressed
  - Some countries want WHO to use unadjusted data or their official stats
  - Some countries want involvement in determining analysis methods
  - Constructive dialog with many and a springboard for assessing and improving data quality at national level

