

# The impact of measles immunization campaigns in India using a nationally representative sample of 27,000 child deaths

Release Date: *eLife*, March 5, 2019

13:00 GMT (UK), 08:00 EST (Toronto), 18:30 IST (Delhi)

[www.cghr.org/measles](http://www.cghr.org/measles)

 @CGHR\_org and @countthedeath



UNIVERSITY OF TORONTO  
DALLA LANA SCHOOL OF PUBLIC HEALTH

**St. Michael's**  
Inspired Care.  
Inspiring Science.

# Background

- Measles remains a major killer of children under five years old globally, with much of the remaining burden residing in Africa and Asia
- India was one of the last countries to adopt two doses of the measles vaccine as part of routine immunization schedule
- In 2010, the Indian government implemented second-dose measles vaccines alongside mass immunization campaigns in regions with low immunization rates

# Key Messages

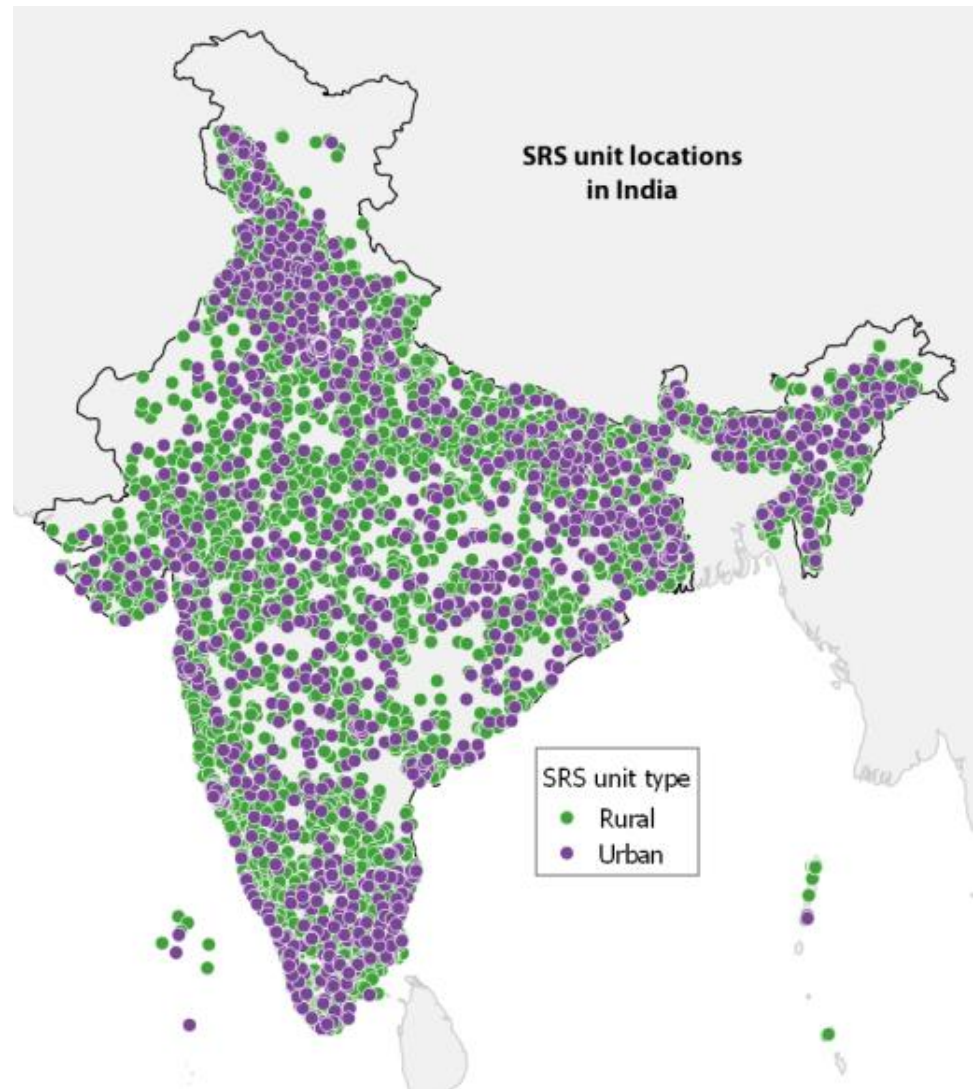
- The measles immunization campaign saved 41,000 to 56,000 children in India during 2010 to 2013, or 39%-57% of the expected deaths nationally
- 1–59-month measles mortality rates fell more in the campaign states following launch versus non-campaign states
- Elimination of measles deaths among children in India is feasible

# What's New about this Research?

- The impact of the measles immunization campaign on declines in measles deaths in India was previously unknown.
- This study compared changes in measles mortality trends among children before and after the immunization campaign.
- We provide important evidence for the effectiveness of the measles vaccine in reducing measles mortality.

# RGI's MILLION DEATH STUDY IN THE SRS

- The Registrar General of India implemented the Million Death Study within the Sample Registration System.
- ~ 7500 randomly-selected villages or census enumeration blocks from the preceding census are chosen every ten years.
- ~ 2.4 million homes have been monitored for births and deaths from 2001-13.



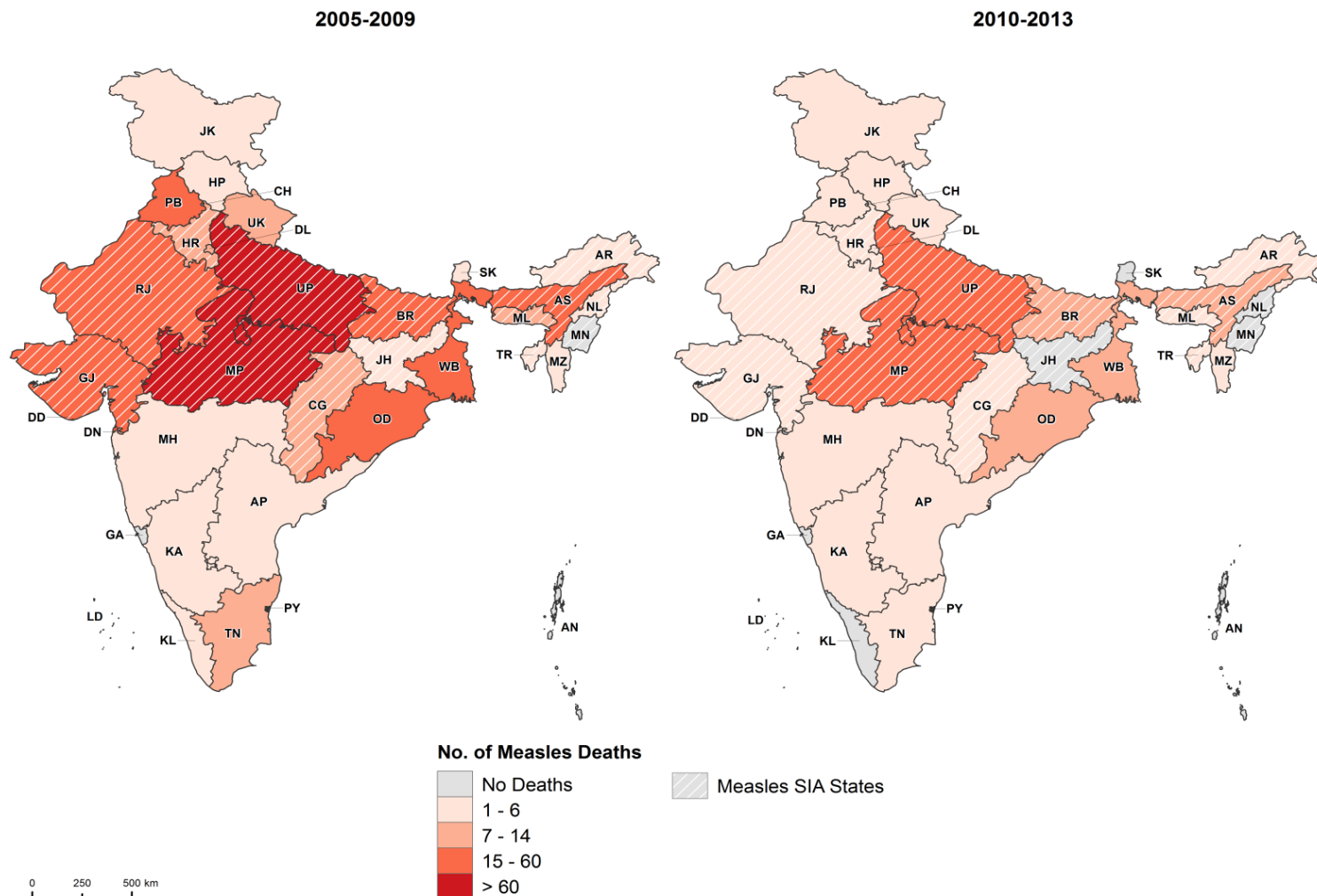
# Nationwide Mortality Studies: Indian Million Death Study (MDS)

1. Visit 1.4 M homes (“true snapshot” of India) in the “SRS” with a recent death & ask standard questions and get a local language narrative (*adapted* WHO tool)
2. 900 non-medical surveyors (now electronic entry + GPS)
3. Web-based double coding by 400 doctors (guidelines, + adjudication and other strict quality control)
4. Study all diseases, work with RGI/census dept, keep costs <\$1 per home
5. Indian totals to date: ~0.8M deaths

Statistical Alliance for Vital Events (SAVE) to expand to Sierra Leone, Ethiopia, Mozambique and elsewhere

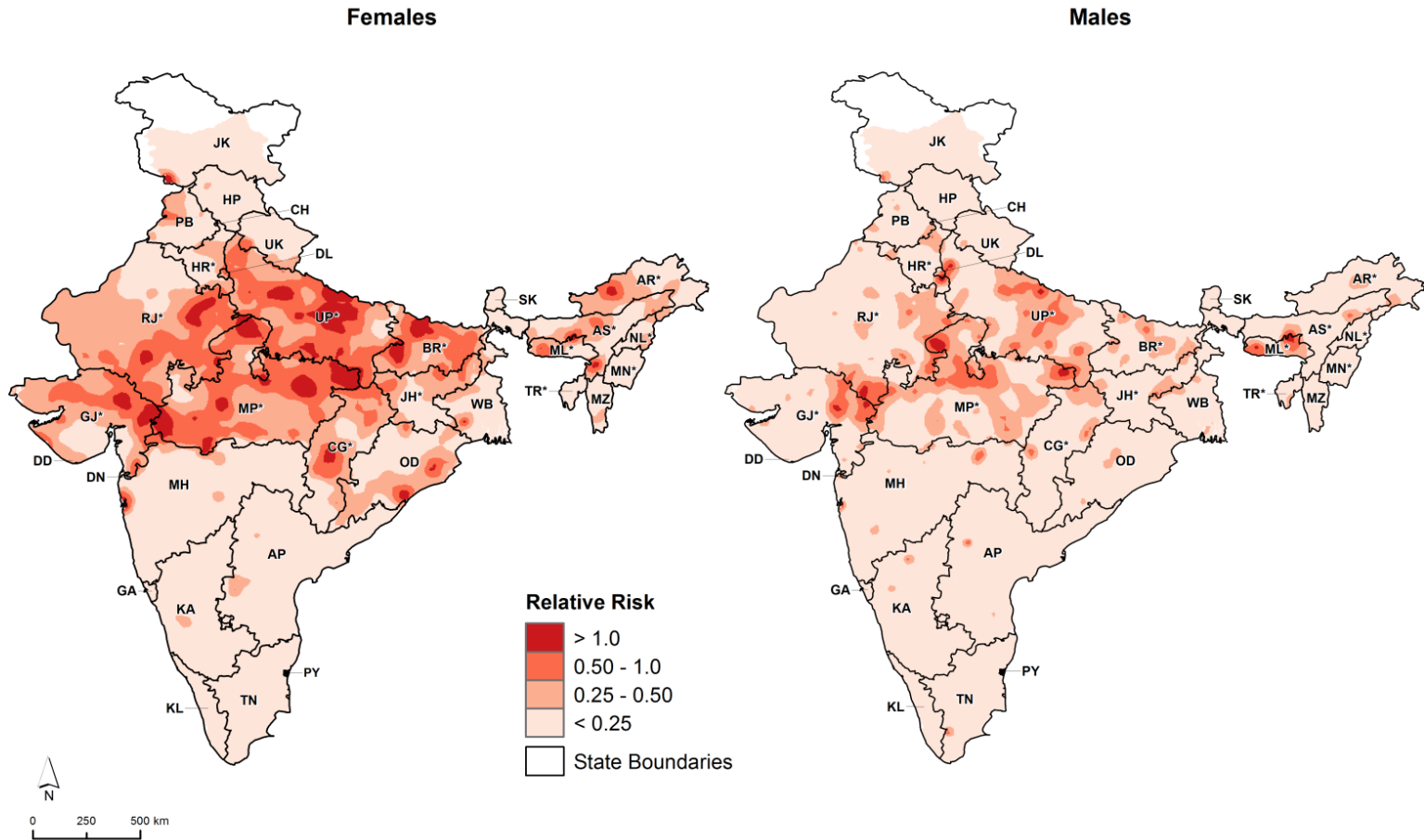


# Campaign states saw substantial decreases in child measles deaths following campaign launch



**Figure 1 – Supplement 1. State-level distribution of 1–59-month measles deaths before and after measles campaign launch, India, 2005–2013.**

# Girls had higher measles mortality risk through 2005 to 2013



**Figure 7. Distribution of 1–59-month measles mortality risk (relative to all-cause mortality) by sex, India, 2005–2013.**



# How did we measure the campaign's impact?

- We compared measles mortality rates among children between two time periods: before and after the measles campaigns launched in 2009/2010
- Using the pre-campaign trend, we calculated the expected number of deaths in 2013 had the campaigns not occurred
- We compared the expected deaths with the actual observed deaths to determine the number of lives saved by the campaign

# Declines in measles mortality rates accelerated following campaign launch in campaign states compared to non-campaign states

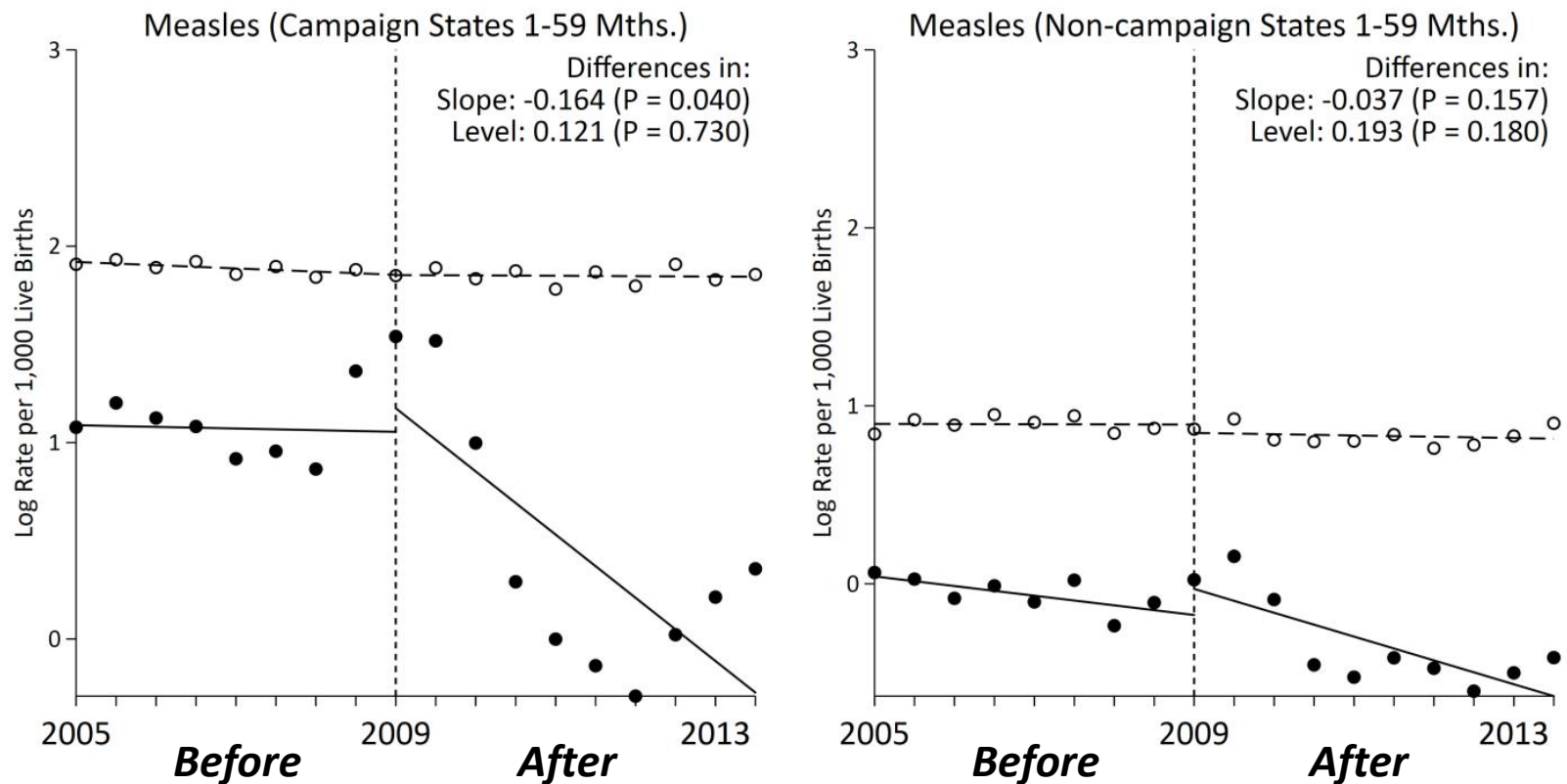
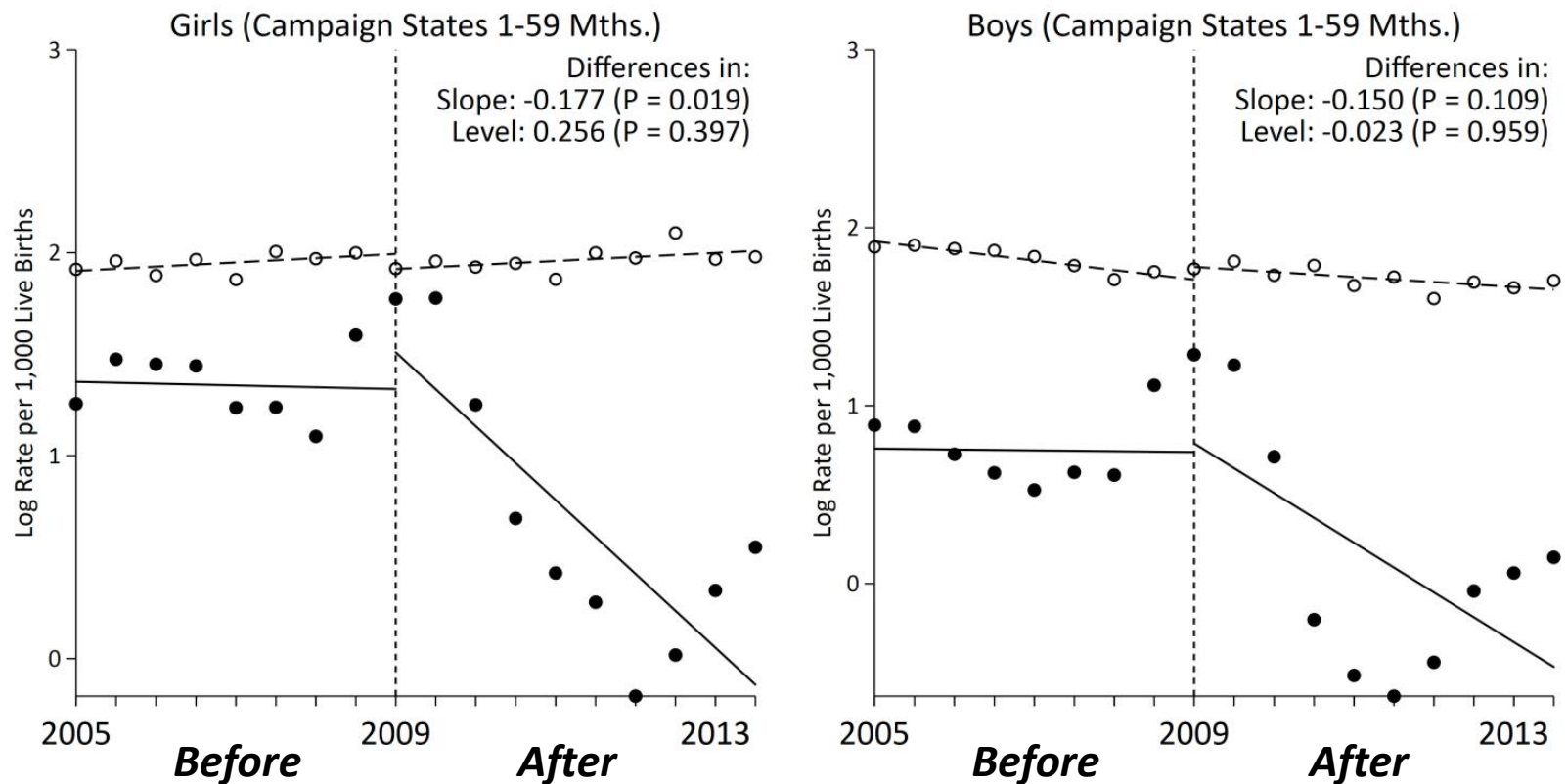


Figure 2. Interrupted time-series analysis on measles mortality (black) and control mortality (white) among 1-59-month-old children during the measles campaign in India, 2005–2013.

# Steeper declines in measles mortality rates were observed in girls than boys in campaign states following campaign launch



**Figure 3. Stratified analysis of interrupted time-series models on measles mortality (black) versus control mortality (white) among 1-59-month-old children, India, 2005–2013.**

# Measles vaccination coverage increased significantly following campaign launch in campaign states compared to non-campaign states

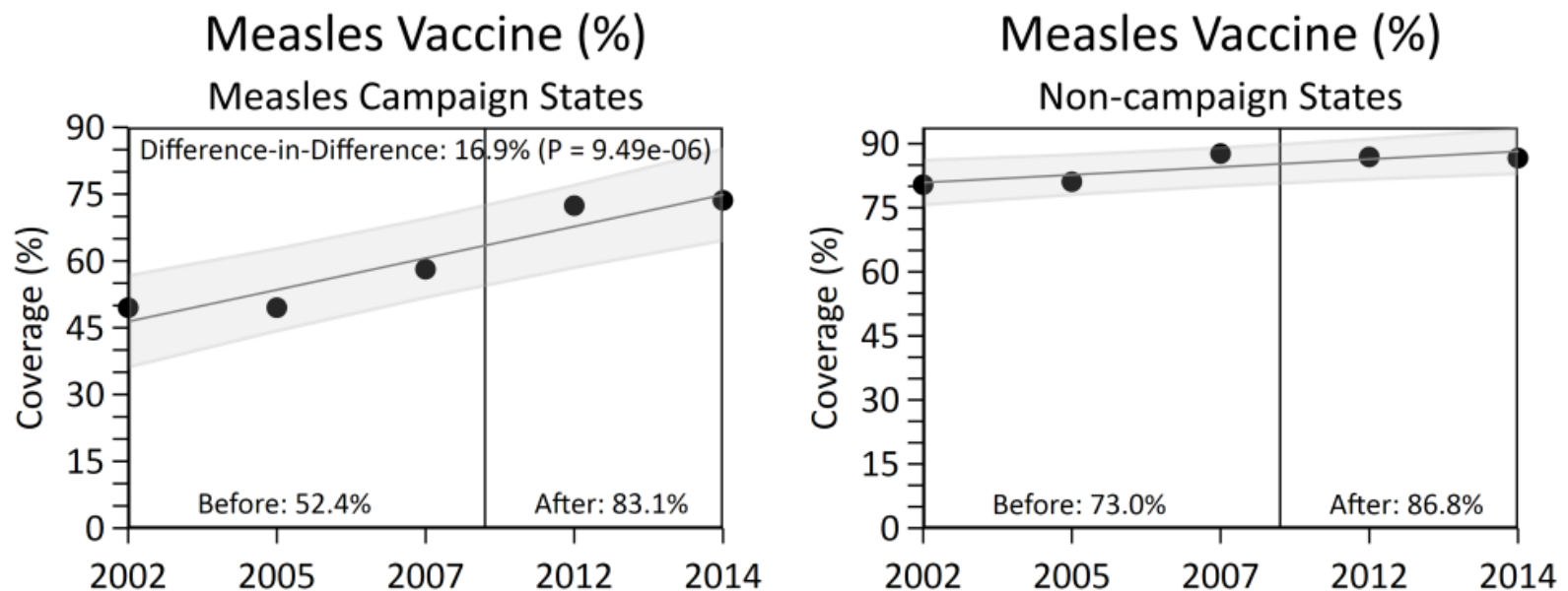


Figure 5. National coverage estimates of child measles immunization, maternal literacy, and oral rehydration supplementation by measles campaign states, India, 2005–2013. \* Only measles vaccination coverage shown.

# Implications for India

- Elimination of measles deaths among children in India is feasible
- The measles vaccine is an effective means of reducing measles deaths among children
- Increased efforts are needed to reduce excess mortality for girls
- Nationwide mortality studies that are representative of the population are an inexpensive and practical way to investigate the impact of health interventions

# Key Messages

- The measles immunization campaign saved 41,000 to 56,000 children in India during 2010 to 2013, or 39%-57% of the expected deaths nationally
- 1–59-month measles mortality rates fell more in the campaign states following launch versus non-campaign states
- Elimination of measles deaths among children in India is feasible

# [www.cghr.org/measles](http://www.cghr.org/measles)

- **Full eLife Paper (free)**
- **Press Release**
- **PowerPoint Presentation**
- **Video Press Release**
- **Links to Other CGHR Research**



UNIVERSITY OF TORONTO  
DALLA LANA SCHOOL OF PUBLIC HEALTH

**St. Michael's**  
Inspired Care.  
Inspiring Science.