

# Impact of TCV on Antimicrobial Usage – Data from Malawi RCT

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The Typhoid Vaccine Acceleration Consortium (TyVAC) is led by the Center for Vaccine Development and Global Health at the University of Maryland School of Medicine, the Oxford Vaccine Group at the University of Oxford, and PATH. TyVAC is funded by the Bill & Melinda Gates Foundation.



World Health  
Organization

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# Weekly epidemiological record Relevé épidémiologique hebdomadaire

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<http://www.who.int/wer>

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2018

## Typhoid vaccines: WHO position paper – March 2018

### Introduction

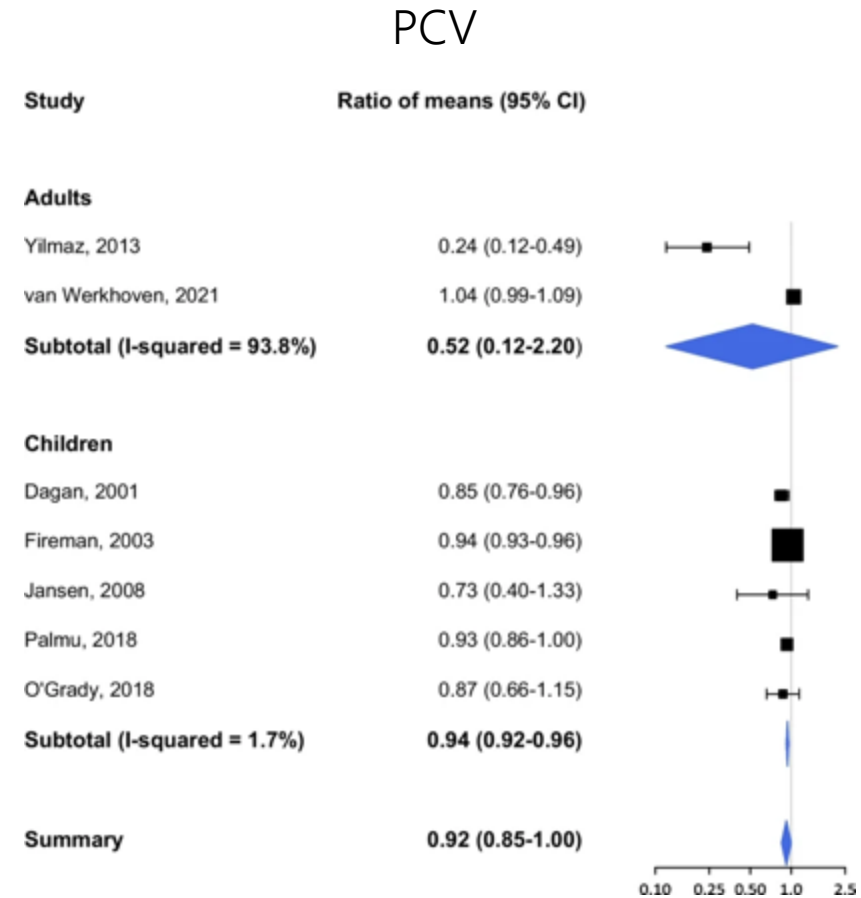
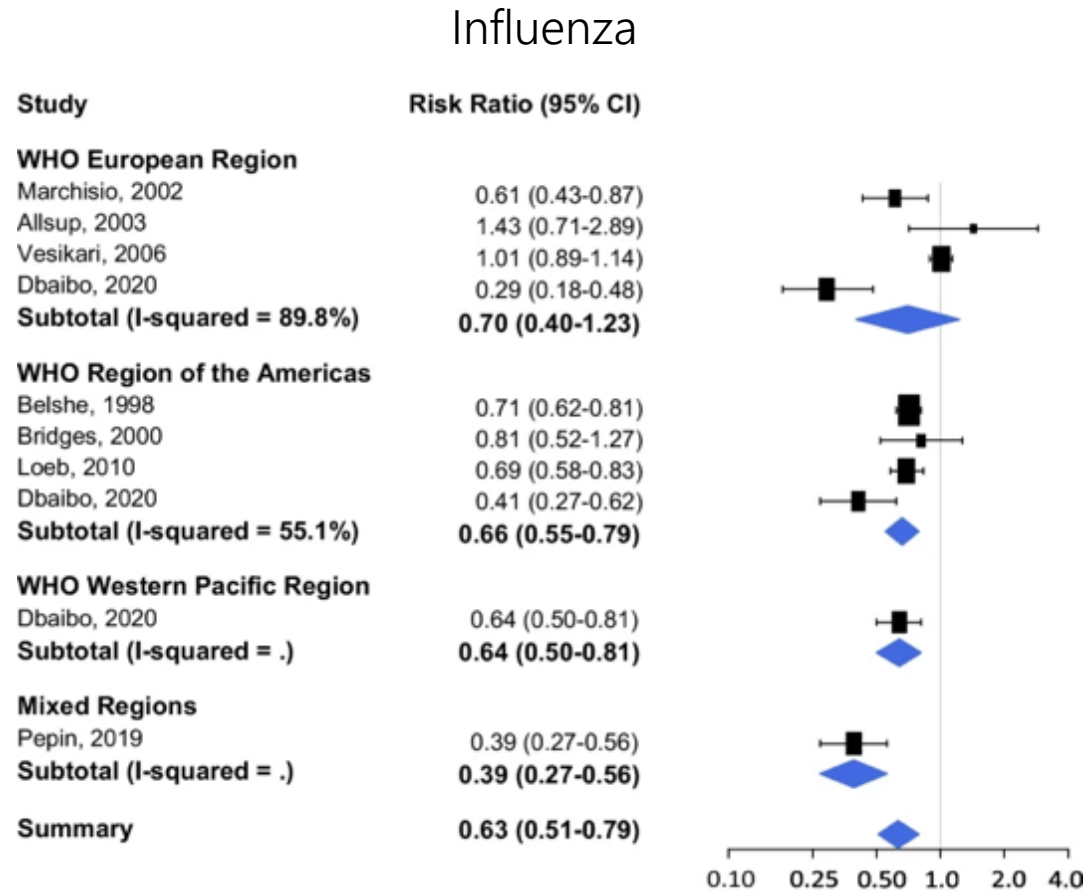
In accordance with its mandate to provide guidance to Member States on health policy matters, WHO issues a series of regularly updated position papers on vaccines and combinations of vaccines against diseases that have an international

## Vaccins antityphoïdiques: note de synthèse de l’OMS – mars 2018

### Introduction

Conformément à son mandat, qui prévoit qu’elle conseille les États Membres en matière de politique sanitaire, l’OMS publie une série de notes de synthèse régulièrement mises à jour sur les vaccins et les associations vaccinales contre les maladies ayant une incidence

# Evidence from other vaccines



Number of antimicrobial prescriptions or days of antibiotic use after vaccination

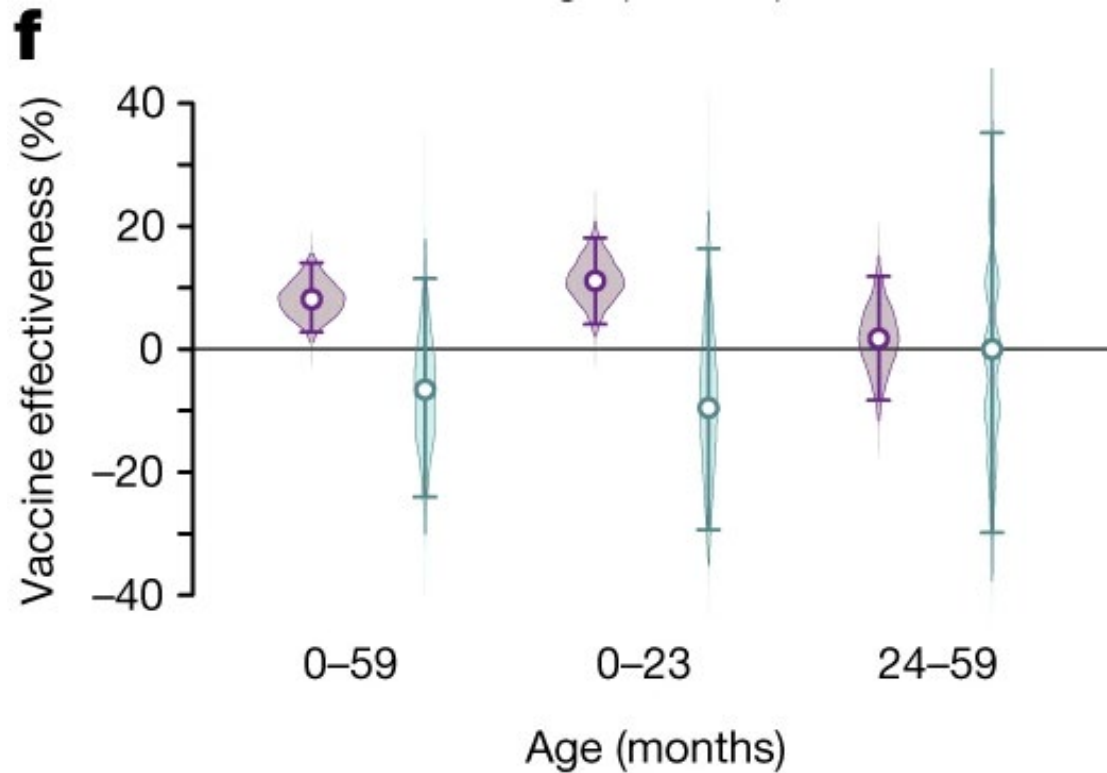
\*VE for IIV + LAIV 30 – 60% \*VE for PCV 70-95%

Van Heuvel, L et al (2023), Antimicrob Resist Infect Control, DOI: 10.1186/s13756-023-01272-6



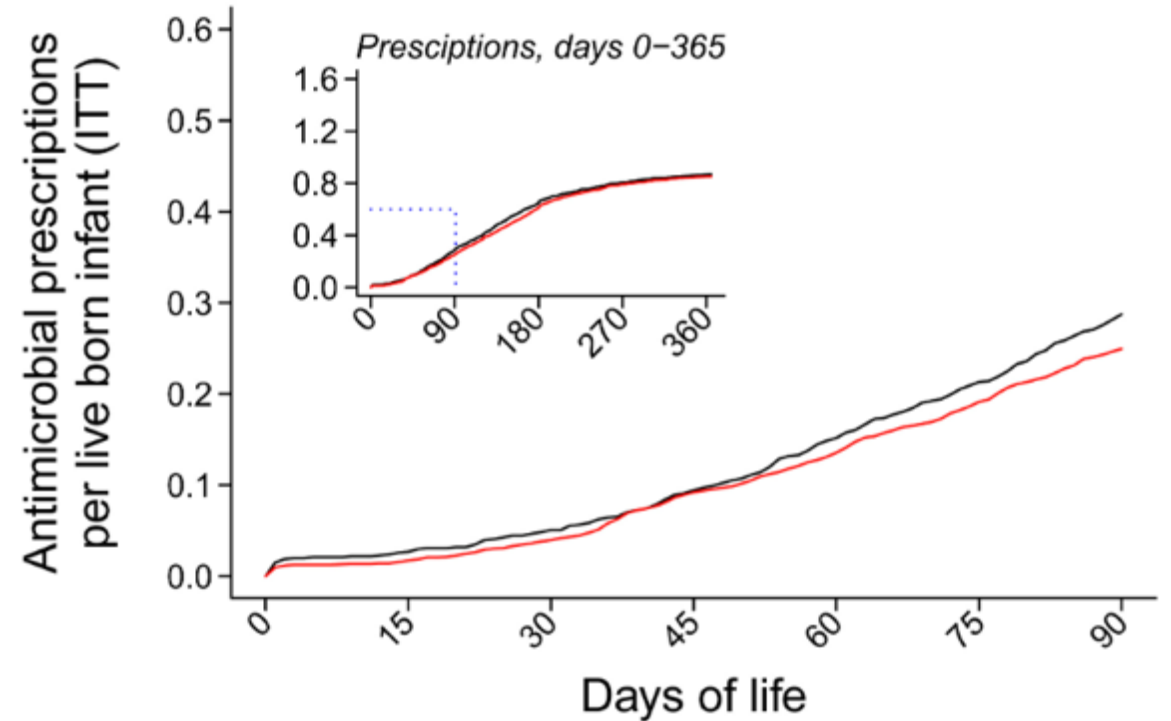
# Evidence from other vaccines

Rotavirus



RSV

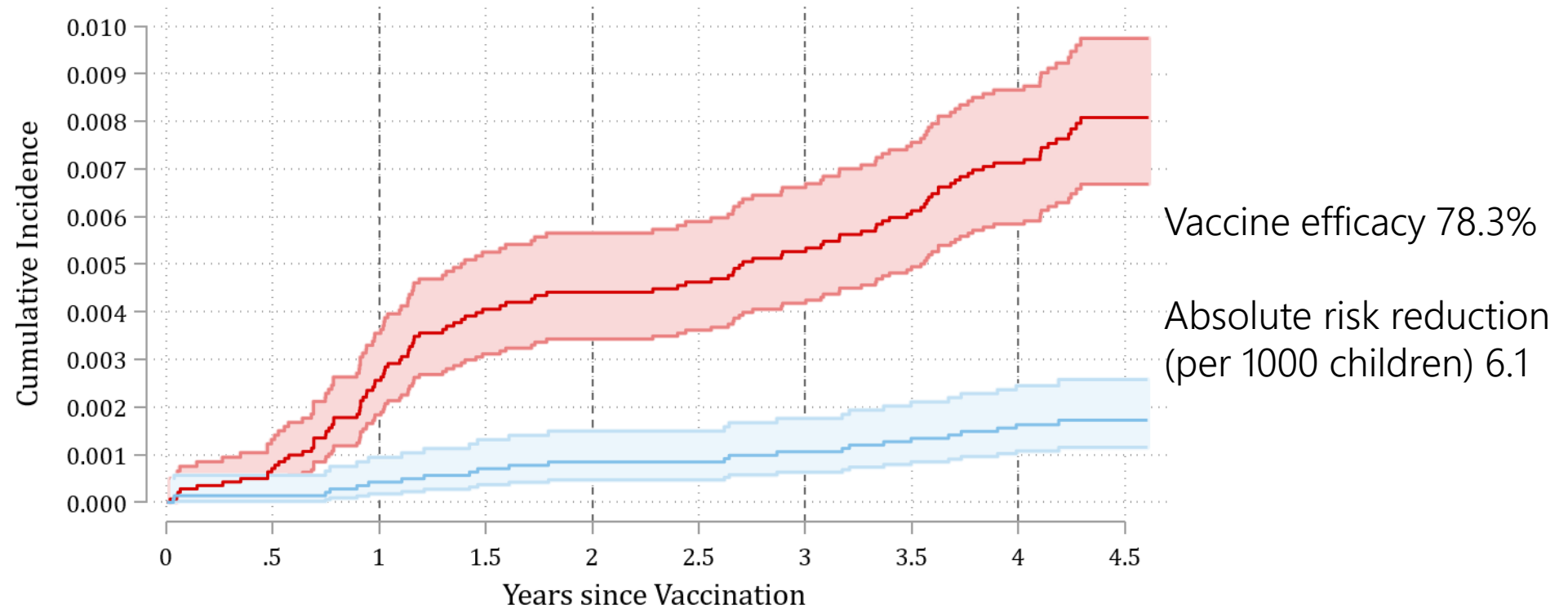
**F. LRTI diagnosis, low and middle income settings**



Lewnard, J et al (2022), PNAS, DOI: [10.1073/pnas.2112410119](https://doi.org/10.1073/pnas.2112410119)

Lewnard, J et al (2020), Nature, DOI: [10.1038/s41586-020-2238-4](https://doi.org/10.1038/s41586-020-2238-4)

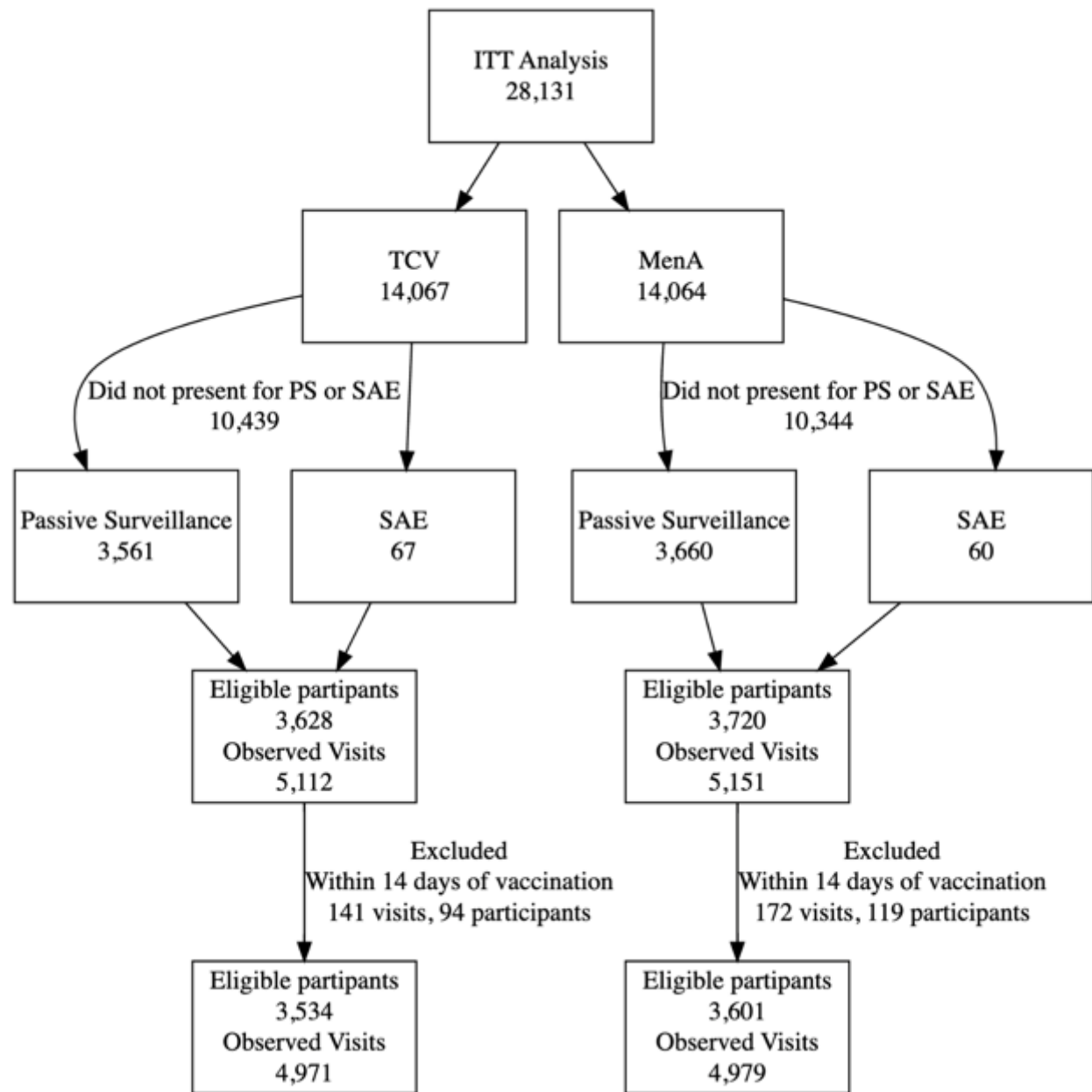
# Reminder



## Maximum number at risk

|       |       |       |       |       |       |       |       |       |       |      |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| MenA: | 14061 | 14035 | 14006 | 13982 | 13976 | 13971 | 13929 | 13907 | 13893 | 1616 |
| TCV:  | 14069 | 14057 | 14050 | 14045 | 14043 | 14041 | 13996 | 13985 | 13980 | 1655 |

95% CI     MenA  
 95% CI     TCV



# Overview

Surveillance from 21/02/2018

|  | TCV           | MCV           | Total         |
|--|---------------|---------------|---------------|
| Total Vaccine population                                 | 14,067        | 14,064        | 28,131        |
| Unique participants presenting for passive surveillance* | 3,574 (25.4%) | 3,677 (26.1%) | 7,251 (25.8%) |
| Total No of unique participants prescribed Antibiotic*   | 3,561 (99.6%) | 3,660 (99.8%) | 7,221 (99.6%) |
| Total No Antibiotic prescriptions                        | 4,971         | 4,979         | 9,950         |
| Prior Antibiotic   | 329           | 336           | 665 (0.7%)    |
| Today Antibiotic   | 4,642         | 4,643         | 9,285 (99.3%) |

\*SAEs removed for this comparison



# Antibiotic Prescriptions

| Characteristic        | MCV, N = 4,387 <sup>1</sup> | TCV, N = 4,348 <sup>1</sup> |
|-----------------------|-----------------------------|-----------------------------|
| Cotrimoxazole         | 2,125 (48%)                 | 2,132 (49%)                 |
| Amoxicillin           | 1,055 (24%)                 | 1,102 (25%)                 |
| Ciprofloxacin         | 470 (11%)                   | 420 (9.7%)                  |
| Metronidazole         | 191 (4.4%)                  | 181 (4.2%)                  |
| Benzylpenicillin      | 116 (2.6%)                  | 128 (2.9%)                  |
| Ceftriaxone           | 110 (2.5%)                  | 72 (1.7%)                   |
| Flucloxacillin        | 71 (1.6%)                   | 71 (1.6%)                   |
| Benzathine Penicillin | 50 (1.1%)                   | 59 (1.4%)                   |
| Gentamicin            | 53 (1.2%)                   | 56 (1.3%)                   |
| Erythromycin          | 48 (1.1%)                   | 49 (1.1%)                   |
| Coamoxiclav           | 31 (0.7%)                   | 21 (0.5%)                   |
| Cloxacillin           | 30 (0.7%)                   | 20 (0.5%)                   |
| Azithromycin          | 8 (0.2%)                    | 7 (0.2%)                    |

| Characteristic | MCV, N = 4,387 <sup>1</sup> | TCV, N = 4,348 <sup>1</sup> |
|----------------|-----------------------------|-----------------------------|
| Prescribed     |                             |                             |
| today_type_1   | 4,027 (92%)                 | 4,000 (92%)                 |
| today_type_2   | 279 (6.4%)                  | 289 (6.6%)                  |
| today_type_3   | 57 (1.3%)                   | 43 (1.0%)                   |
| today_type_4   | 18 (0.4%)                   | 13 (0.3%)                   |
| today_type_5   | 4 (<0.1%)                   | 2 (<0.1%)                   |
| today_type_6   | 1 (<0.1%)                   | 1 (<0.1%)                   |
| today_type_7   | 1 (<0.1%)                   | 0 (0%)                      |

# All Antibiotic Use

IRR: incidence rate ratio (TCV/MCV)

|            | Incidence rate (per 1000 person-years)<br>(95% CI) | Vaccine efficacy (1-IRR)×100%<br>(95% CI) |
|------------|--|---|
| All ages   |  |   |
| TCV        | 308.8 (300.0, 317.7)                               | -0.5%<br>(-4.7%, 3.5%)                    |
| MCV        | 307.2 (298.5, 316.1)                               |   |
| 0-4 years  |  |   |
| TCV        | 345.7 (333.1, 358.7)                               | 0.3%<br>(-5.0%, 5.4%)                     |
| MCV        | 346.8 (334.3, 359.7)                               |   |
| 5-9 years  |  |   |
| TCV        | 271.8 (258.1, 286.1)                               | -3.2%<br>(-11.1%, 4.1%)                   |
| MCV        | 263.3 (249.8, 277.4)                               |   |
| > 10 years |  |   |
| TCV        | 243.6 (219.8, 269.2)                               | 3.9%<br>(-10.4%, 16.4%)                   |
| MCV        | 253.6 (230.5, 278.3)                               |   |
| Female     |  |   |
| TCV        | 303.4 (291.2, 316.0)                               | 0.7%<br>(-5.2%, 6.2%)                     |
| MCV        | 305.4 (293.3, 317.9)                               |   |
| Male       |  |   |
| TCV        | 314.2 (301.7, 327.1)                               | -1.7%<br>(-7.7%, 4.0%)                    |
| MCV        | 309.0 (296.7, 321.8)                               |   |

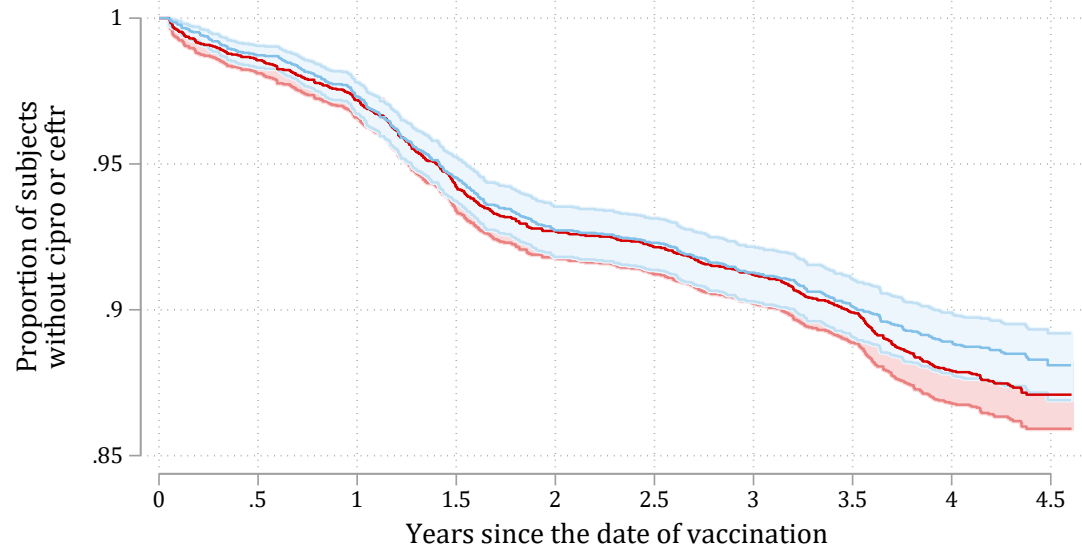
# Typhoid Specific Antimicrobials Ciprofloxacin and Ceftriaxone

IRR: incidence rate ratio (TCV/MCV)  
IRD: incidence rate difference (MCV-TCV)

|            | Incidence rate (per 1000 person-years)<br>(95% CI) | Vaccine efficacy<br>(1-IRR)×100%<br>(95% CI) | IRD (per 1000 person-years)<br>(95% CI) |
|------------|--|--|---|
| All ages   |  |  |   |
| TCV        | 29.6 (27.0, 32.5)                                  | 13.7%<br>(2.0%, 24.0%)                       | 4.7<br>(0.7, 8.7)                       |
| MCV        | 34.3 (31.5, 37.4)                                  |  |   |
| 0-4 years  |  |  |   |
| TCV        | 30.5 (26.8, 34.5)                                  | 13.7%<br>(-2.5%, 27.4%)                      | 4.8<br>(-0.7, 10.3)                     |
| MCV        | 35.3 (31.4, 39.5)                                  |  |   |
| 5-9 years  |  |  |   |
| TCV        | 29.3 (24.9, 34.2)                                  | 13.8%<br>(-7.2%, 30.8%)                      | 4.7<br>(-2.0, 11.4)                     |
| MCV        | 34.0 (29.3, 39.3)                                  |  |   |
| > 10 years |  |  |   |
| TCV        | 26.6 (19.2, 35.9)                                  | 14.0%<br>(-31.1%, 44.0%)                     | 4.3<br>(-7.2, 15.9)                     |
| MCV        | 30.9 (23.2, 40.3)                                  |  |   |
| Female     |  |  |   |
| TCV        | 26.5 (23.0, 30.4)                                  | 23.1%<br>(7.4%, 36.2%)                       | 8.0<br>(2.5, 13.4)                      |
| MCV        | 34.5 (30.5, 38.8)                                  |  |   |
| Male       |  |  |   |
| TCV        | 32.8 (28.9, 37.2)                                  | 4.0%<br>(-14.7%, 19.7%)                      | 1.4<br>(-4.5, 7.2)                      |
| MCV        | 34.2 (30.2, 38.6)                                  |  |   |

# Typhoid Specific Antimicrobials

## Time to first use

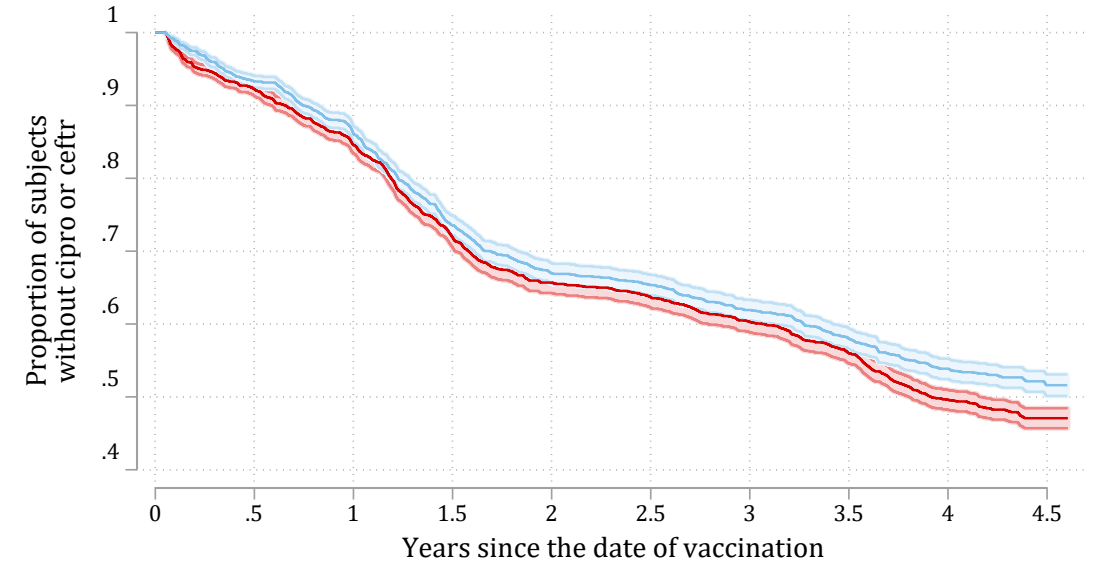


Number at risk

|     |      |      |      |      |      |      |      |      |      |     |
|-----|------|------|------|------|------|------|------|------|------|-----|
| MCV | 3601 | 3542 | 3489 | 3379 | 3324 | 3301 | 3258 | 3210 | 3139 | 394 |
| TCV | 3534 | 3489 | 3436 | 3337 | 3273 | 3256 | 3207 | 3161 | 3118 | 395 |

95% CI MCV  
95% CI TCV

## Recurrent use



Number at risk

|     |      |      |      |      |      |      |      |      |      |     |
|-----|------|------|------|------|------|------|------|------|------|-----|
| MCV | 3601 | 3593 | 3589 | 3586 | 3585 | 3582 | 3572 | 3570 | 3570 | 466 |
| TCV | 3534 | 3534 | 3531 | 3530 | 3530 | 3528 | 3513 | 3508 | 3507 | 460 |

95% CI MCV  
95% CI TCV

# Typhoid Specific Antimicrobials Ciprofloxacin and Ceftriaxone

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| All ages   |  |  |   |
| TCV        | 29.6 (27.0, 32.5)                                  | 13.7%<br>(2.0%, 24.0%)                       | 4.7<br>(0.7, 8.7)                       |
| MCV        | 34.3 (31.5, 37.4)                                  |  |   |
| 0-4 years  |  |  |   |
| TCV        | 30.5 (26.8, 34.5)                                  | 13.7%<br>(-2.5%, 27.4%)                      | 4.8<br>(-0.7, 10.3)                     |
| MCV        | 35.3 (31.4, 39.5)                                  |  |   |
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| MCV        | 34.2 (30.2, 38.6)                                  |  |   |

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- Alfred Muyaya





Learn more at:  
<http://takeontyphoid.org>

