

Swiss TPH



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Digital Health Tool for Antibiotic Stewardship

A Cluster Randomized Controlled Trial in Tanzania

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Photo: Magali Rochat

Drivers of antibiotic prescription



High mortality & morbidity¹⁻²



Diagnostic and prescribing uncertainty³⁻⁶



Patient expectations^{3,4}

Ref: ¹You, Lancet, 2015; ²Hug, Lancet GH, 2019; ³Lopez-Vazquez, J Eval Clin Practice, 2011; ⁴Rodrigues, Int J Antimicrobial Agents, 2013; ⁵Tonkin-Crine, J Antimicrobial Chemotherapy, 2011; ⁶Rezal, Expert Rev Anti Infect Ther. 2015;

Antibiotic prescription in children: LMIC

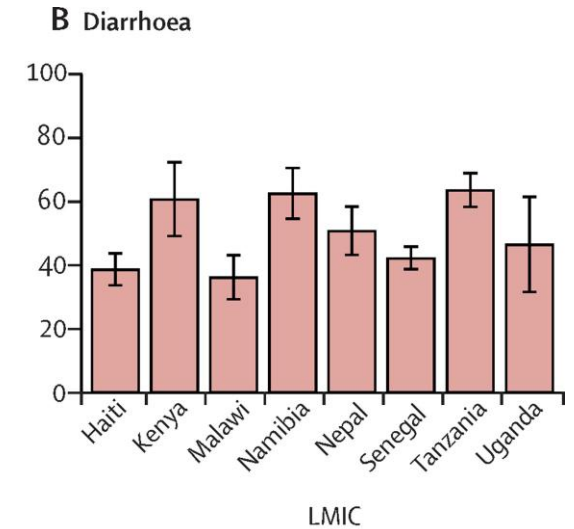
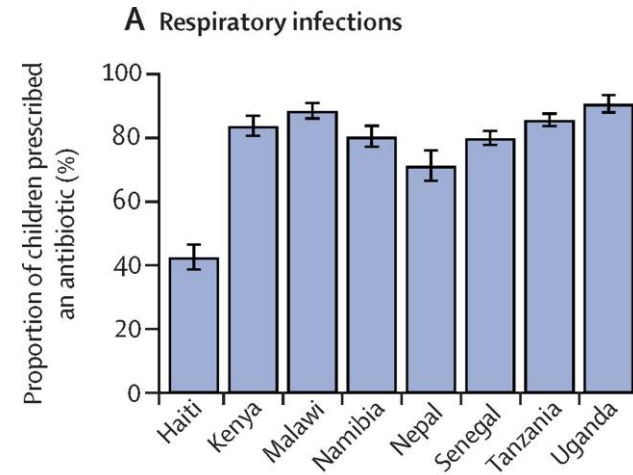
54%

Prescribed antibiotics

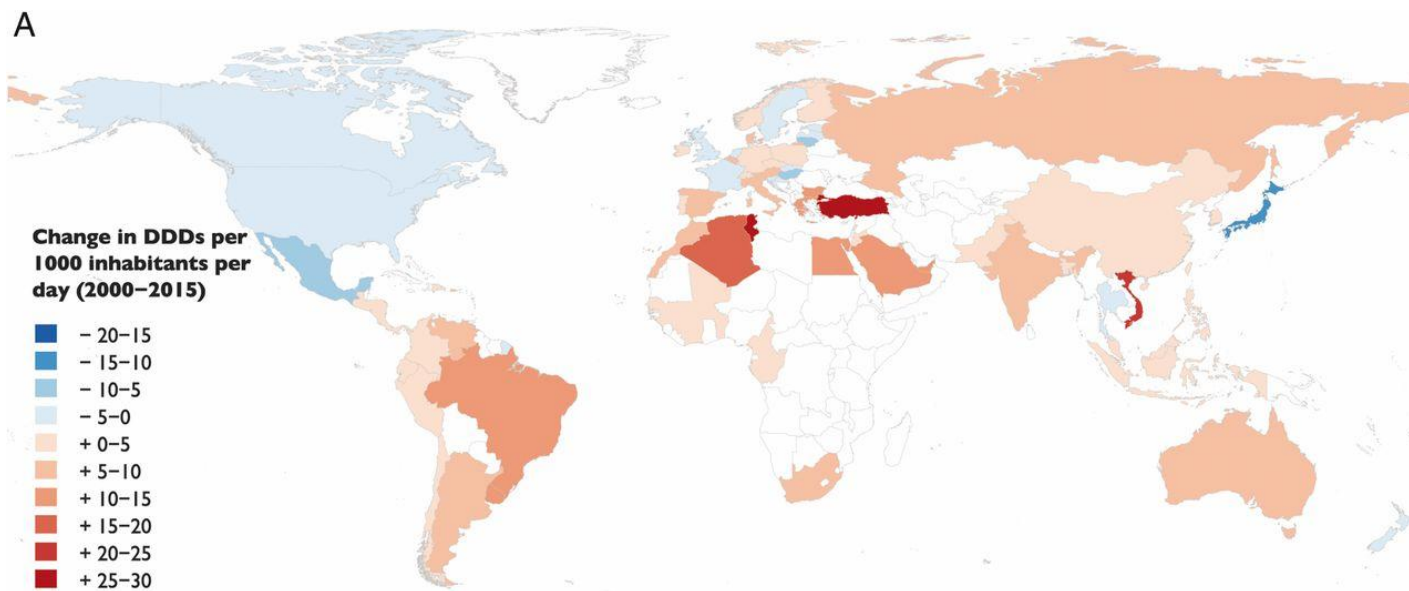
18.5x

Cumulative antibiotic exposure

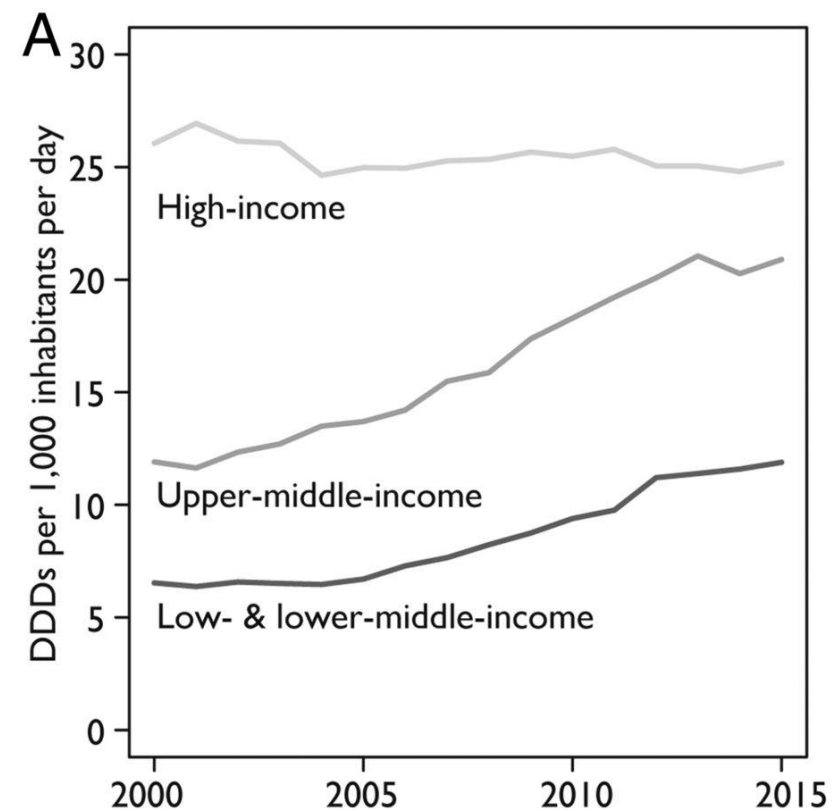
Children 0-5 years (n=438,140)
45 Low-Middle Income Countries



Children 0-5 years (n=68,826)
8 Low-Middle Income Countries



65% increase between 2000 to 2015
Projected 200% increase by 2030

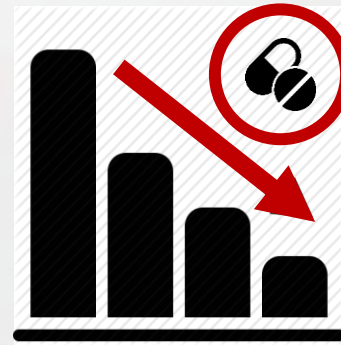




Benefits of Digital CDSAs



**Improved quality
of care** ¹⁻⁶



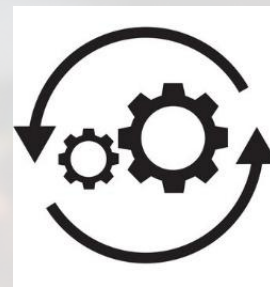
**Reduction in
antibiotics** ^{2-3, 7-8}



**Improved knowledge
& skills** ^{5,9-11}



**Cost-effective / net
savings** ¹²



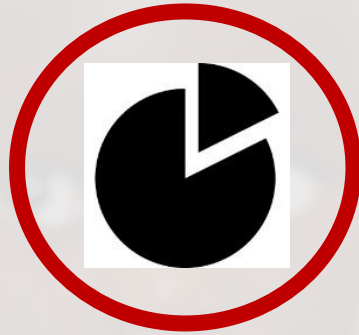
Simplifies work ^{5, 9-11, 13}



**Improved clinical
outcomes** ^{7,8,14}

Ref: ¹Mitchell, BMC Med Inf & Dec, 2013; ²Rambaud-Althaus, AJTMH, 2017, ³Bernasconi, PLoS One 2018; ⁴Bernasconi, PLoS One 2019; ⁵Finette, AJTMH, 2019; ⁶Sarrasat, BMC Health Serv Res, 2021; ⁷Shao, PLoS One 2015; ⁸Keitel, PLoS Med, 2017; ⁹Bessat, BMC PH, 2019; ¹⁰Mitchell, J Health Com, 2012; ¹¹Jensen, Ped Int Child Health, 2020; ¹²Cousens, LSHTM, 2018; ¹³Shao, BMC Health Serv Res, 2015; ¹⁴Shmitz, BMJ Open, 2022

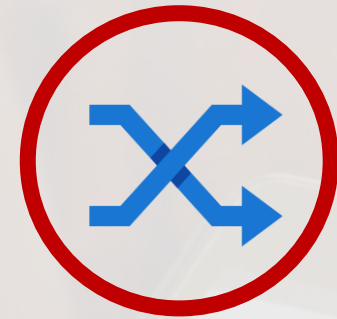
Challenges with Digital CDSAs



Limited scope¹⁻⁴



IT software usability and interoperability^{2,4,5}



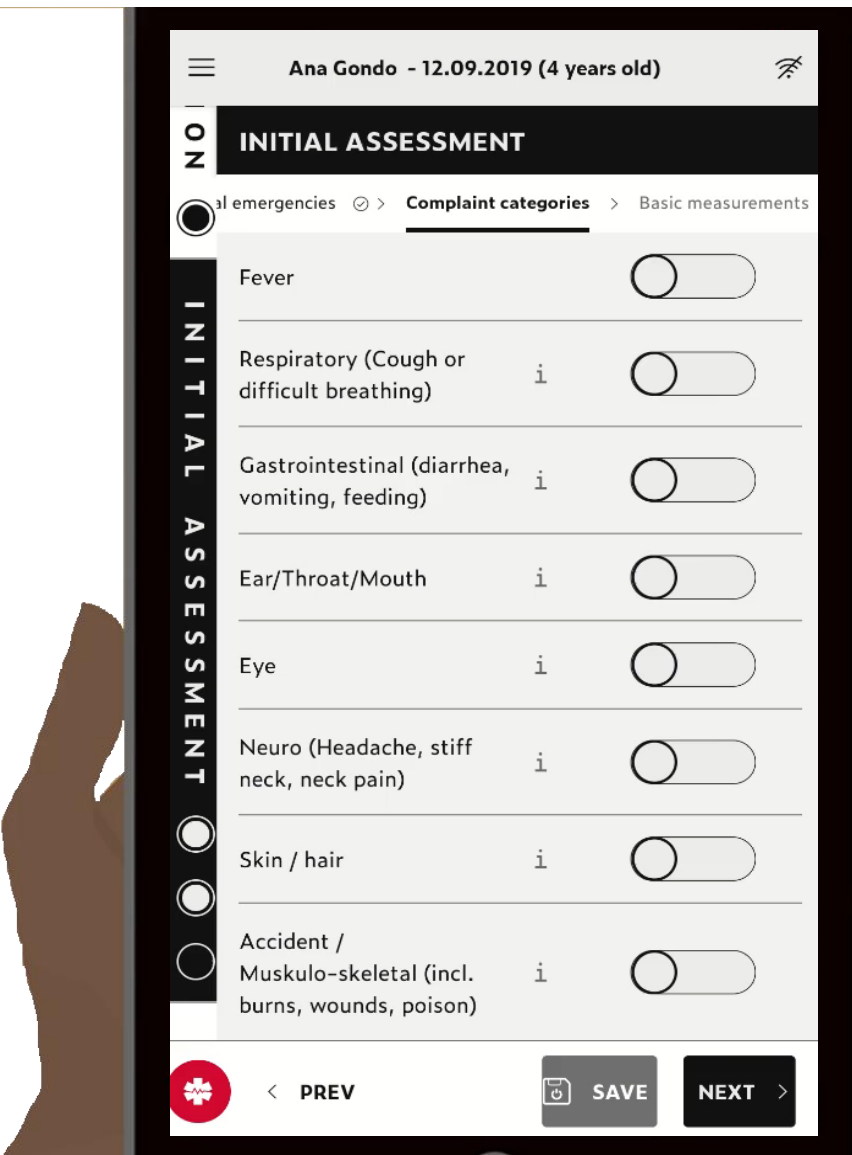
Methodological limitations



Uptake^{2,4}



No or little reduction in antibiotic prescription⁶⁻⁸



ePOCT+

Clinical Decision Support Algorithm

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Dynamic



C-Reactive Protein & Hemoglobin point-of-care tests



Pulse Oximeter



Dashboard on quality of care indicators

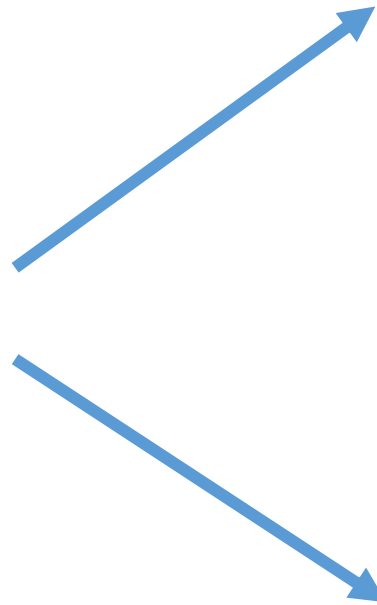


Mentorship support

Ref: Tan, PLOS Digital Health, 2023



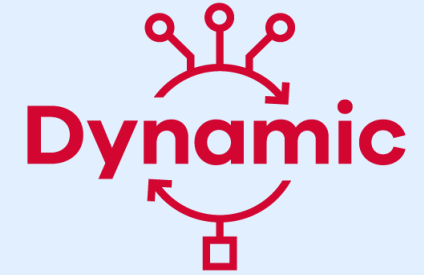
Tanzania



20 Health Facilities



20 Health Facilities



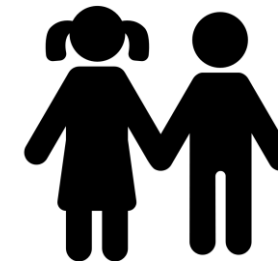
- 1 Dec 2021 to 31 Oct 2022
- Sick children
- Age 1 day to 15 years



20 Health Facilities



23,593 enrolled



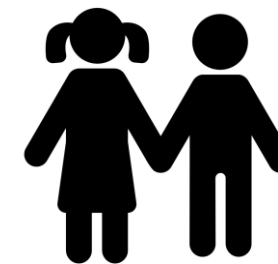
17,985 using ePOCT+
76% Uptake



20 Health Facilities

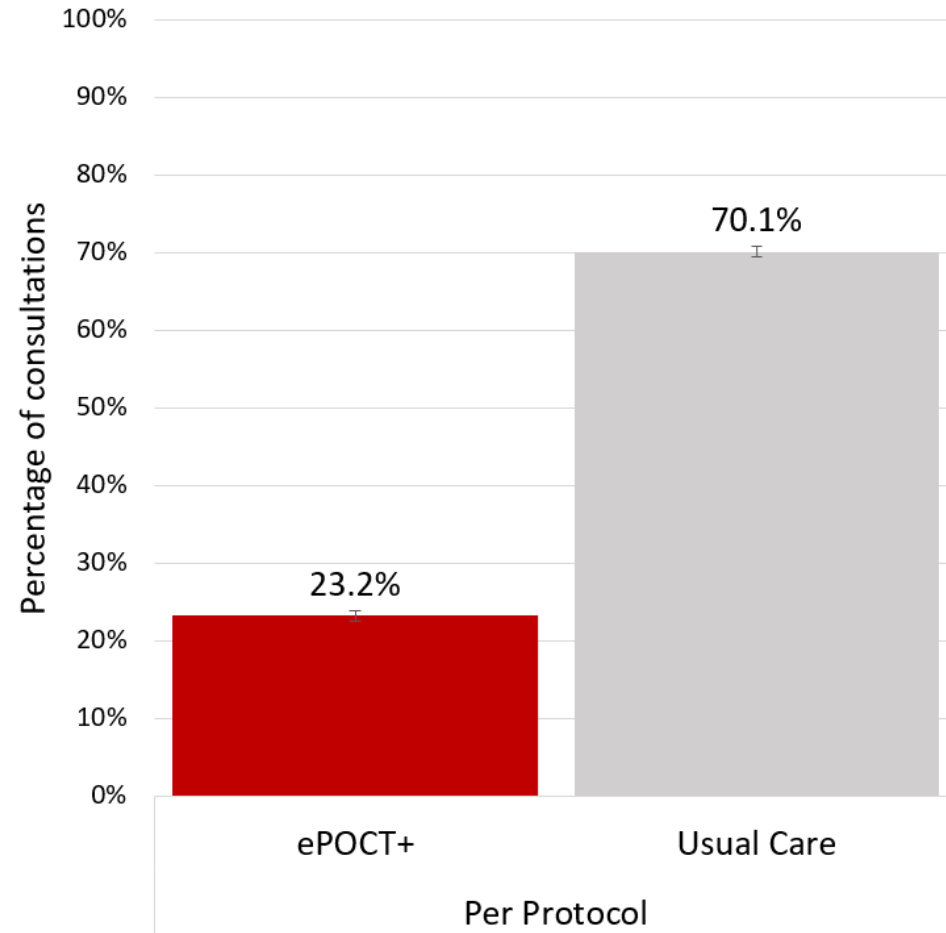


20,713 enrolled



18,937 using eCRF
91% Uptake

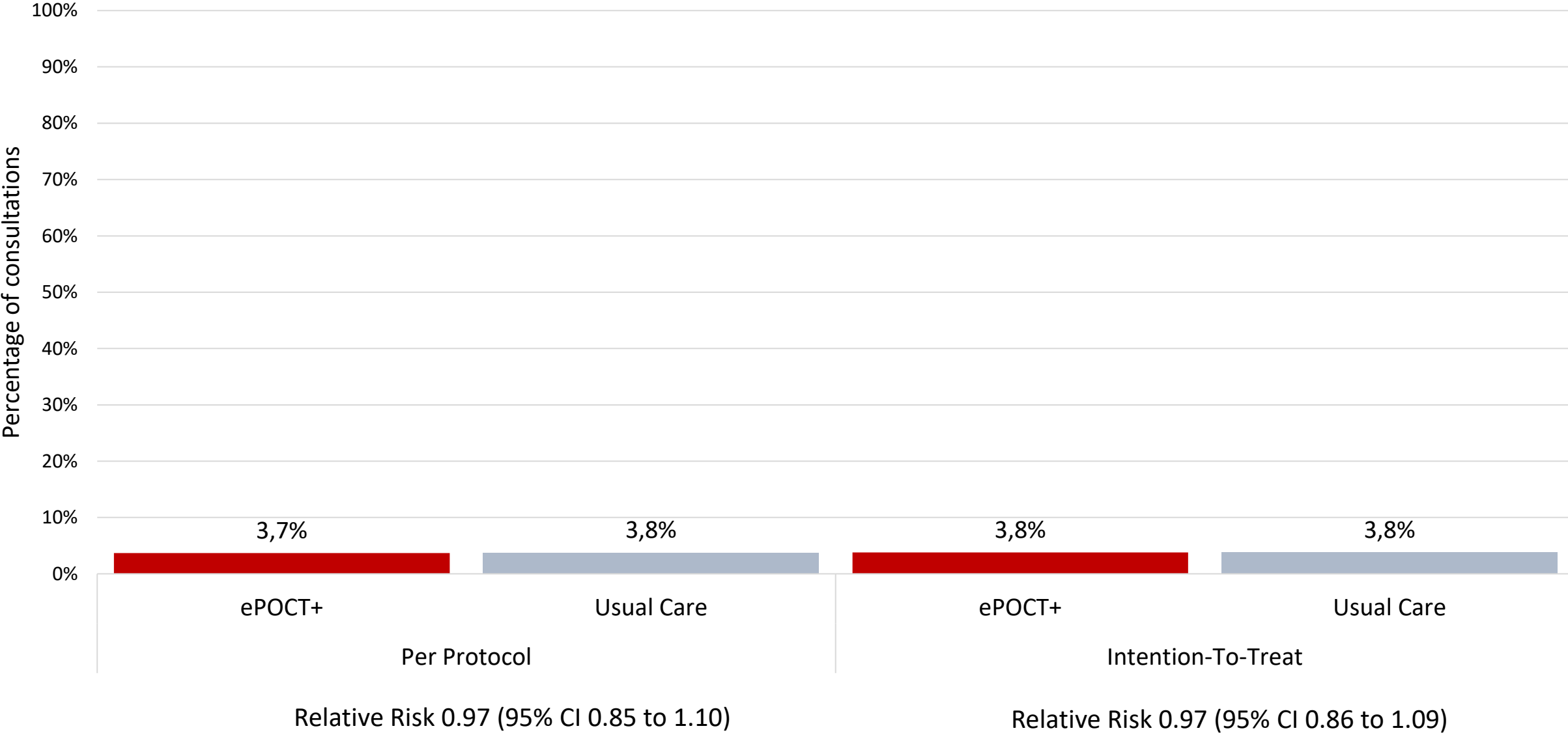
Co-Primary Endpoint: Day 0 Antibiotic Prescription



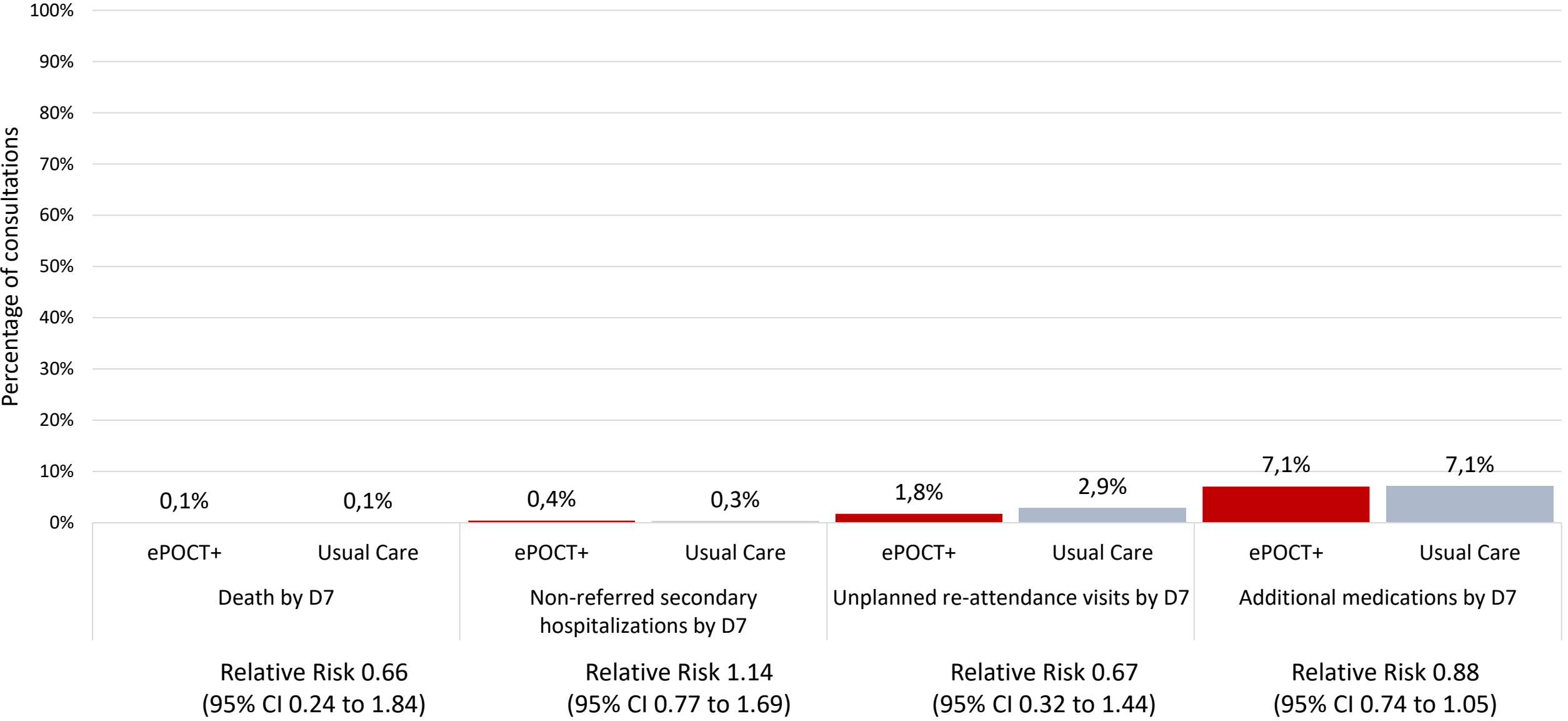
Difference -46.4% (95% CI, -57.6% to -35.2%)

Relative Risk 0.35 (95% CI 0.29 to 0.43)

Co-Primary Safety Endpoint: Day 7 Clinical Failure

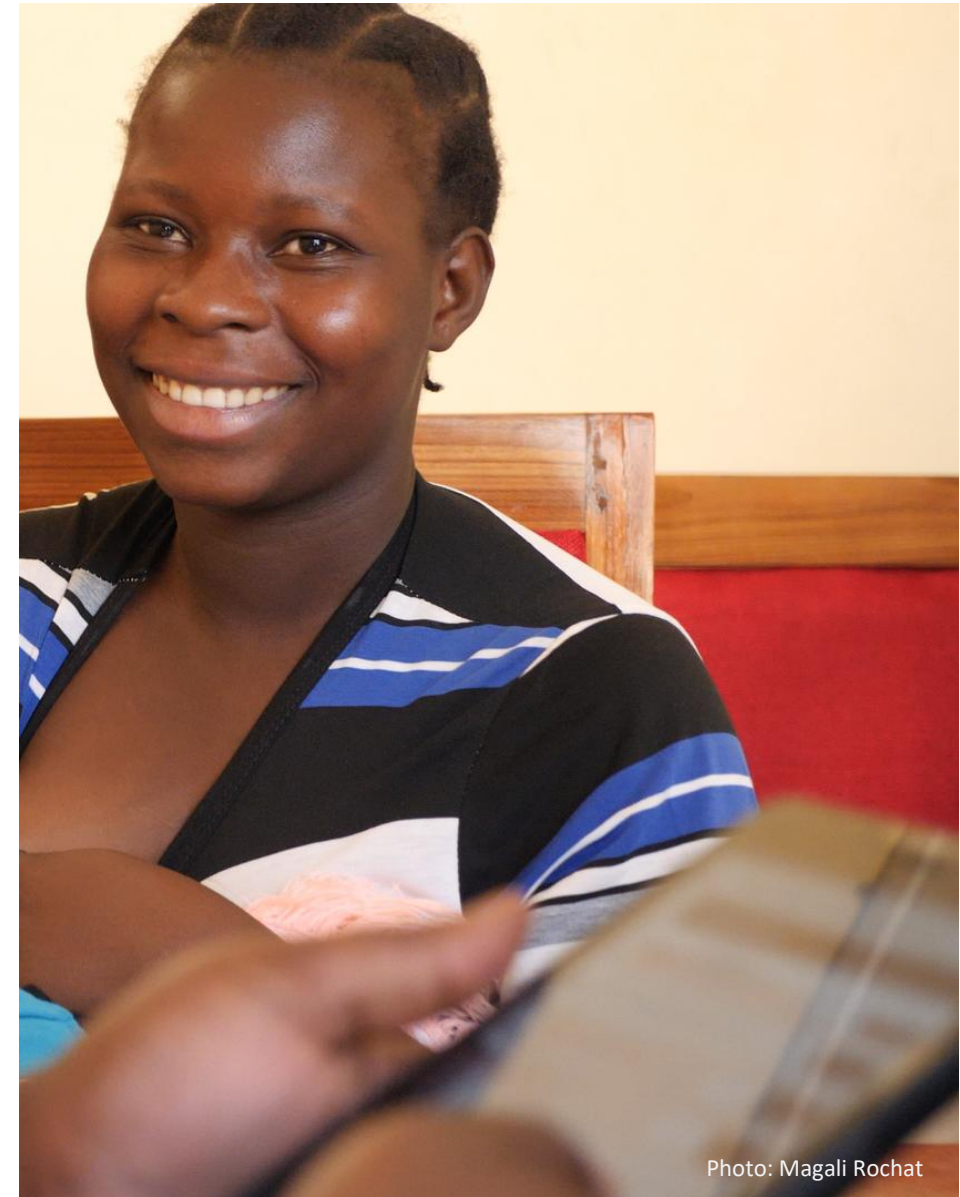


Secondary Endpoints



Limitations

- Study limitations:
 - Documentation of antibiotic prescription
 - 15% lost to follow for day 7 outcome
- Limitations to widespread implementation:
 - Uptake of ePOCT+
 - IT system integration with other digital health tools
 - Expanded clinical scope for patients aged ≥ 15 years



Conclusion

- Using ePOCT+ safely reduced antibiotic prescription
- Widespread implementation could help address the urgent problem of bacterial antimicrobial resistance
- Further investigations required:
 - Understanding individual impact of mentorship activities and rapid diagnostic tests
 - Cost and greenhouse gas emission analyses
 - Expanded age range to include adults

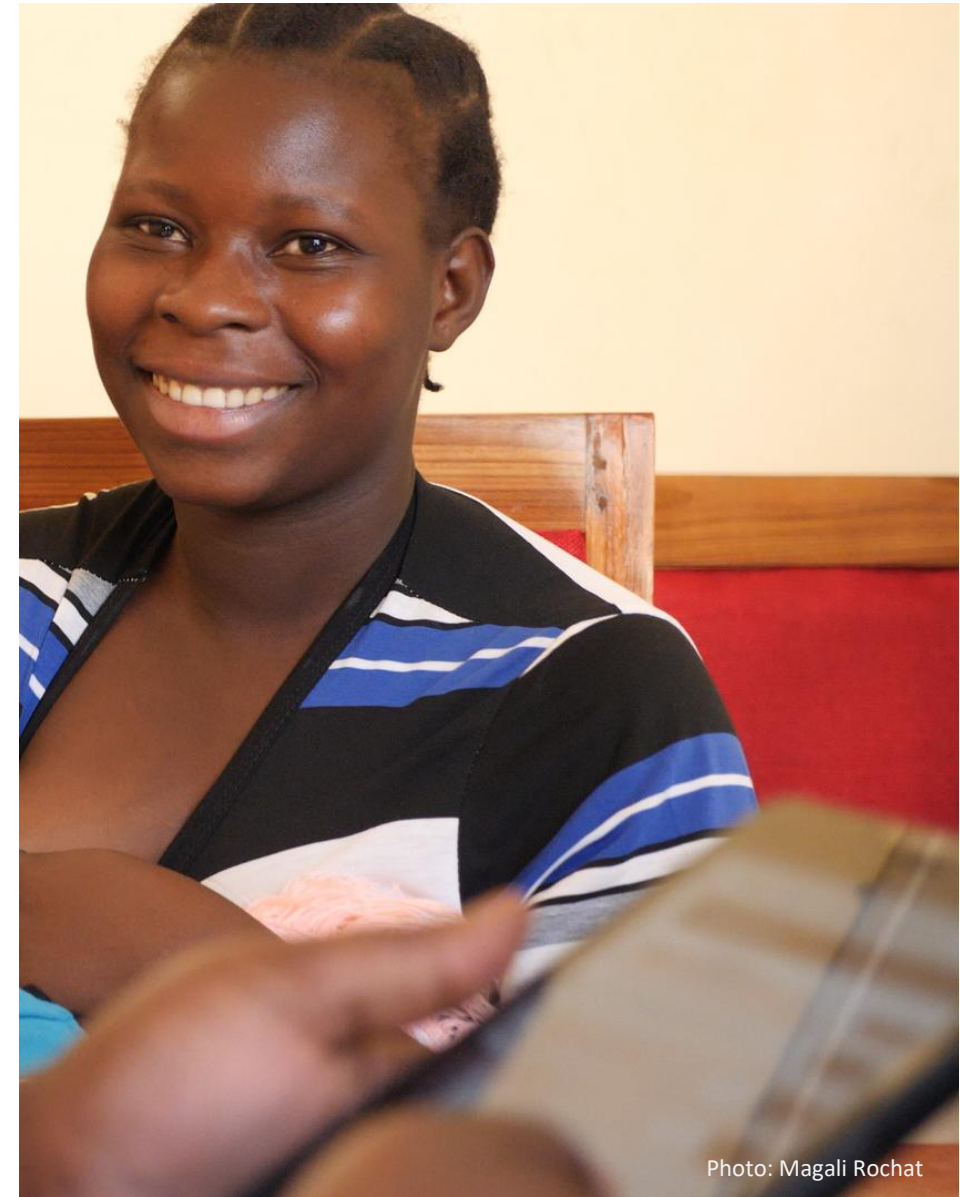


Photo: Magali Rochat

Asante! Thank you! Danke!

ePOCT+ dev team:

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analysis support:**

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