



**MULTI-COUNTRY STUDY OF THE ECONOMIC BURDEN OF INTS AND COST-EFFECTIVENESS ANALYSIS FOR A HYPOTHETICAL INTS VACCINE:  
BURKINA FASO, GHANA, AND MALAWI**

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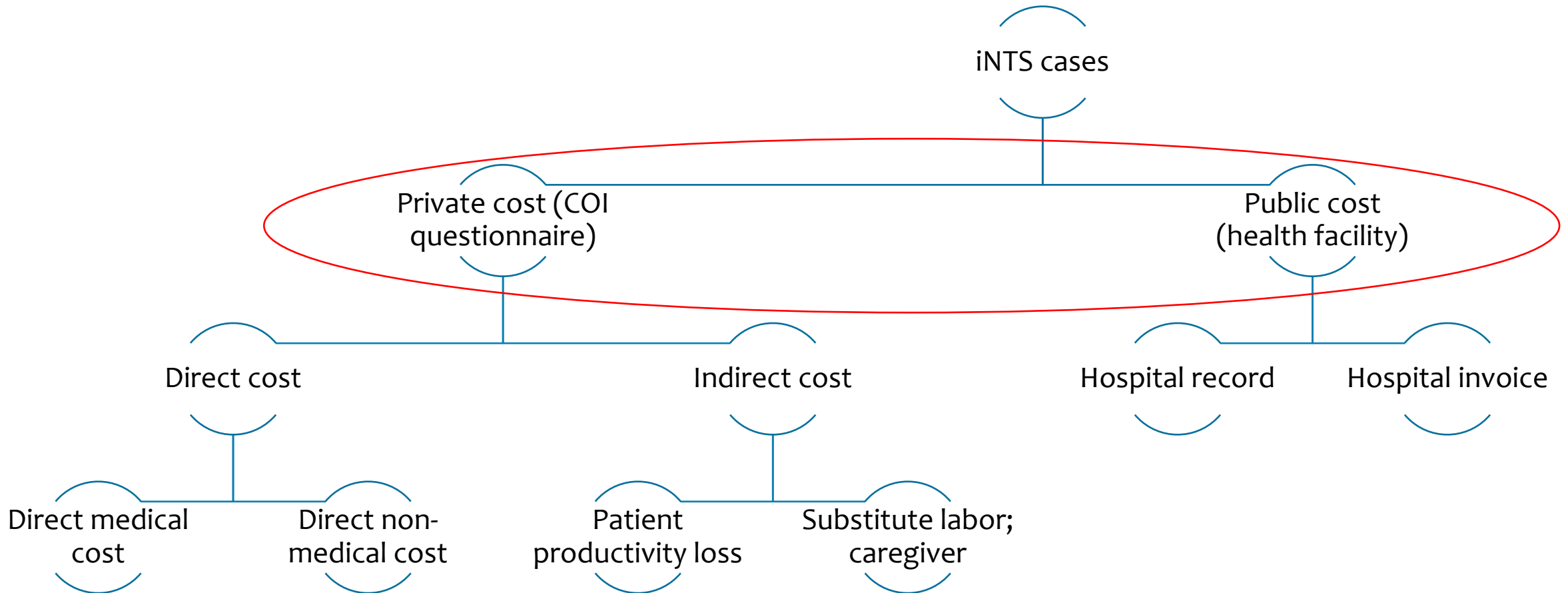
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# Cost Of Illness (COI) Study Objectives

- Implement patient-level COI surveys in Burkina Faso, Ghana, and Malawi
- Capture all costs during the entire period of illness
- Standardized surveys across countries
- Various types of cost items
- Average cost per episode
- Critical input values to be fed into a cost-effectiveness analysis

# COI Study Structure



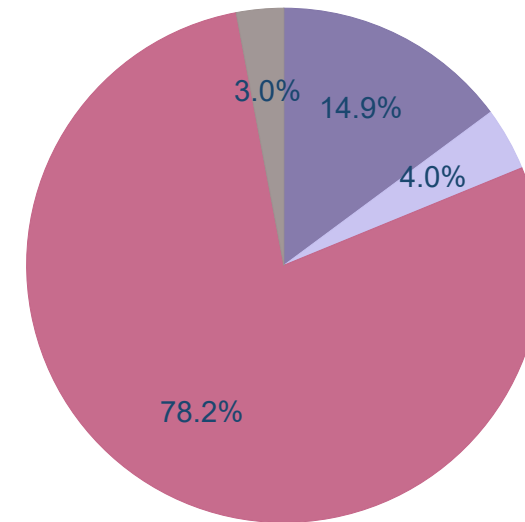
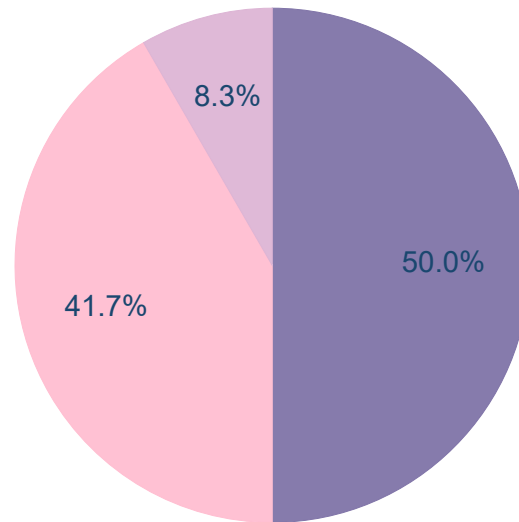
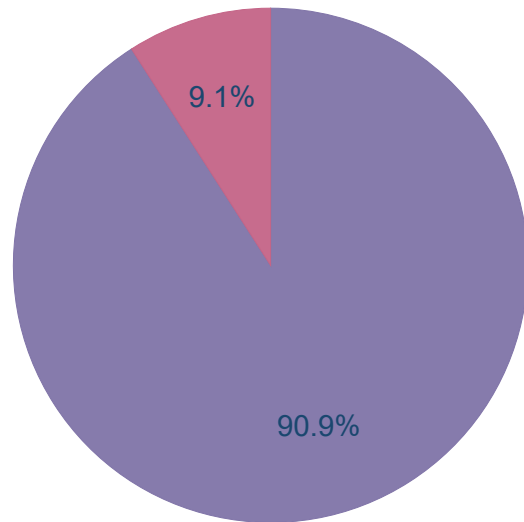
# Descriptive Statistics

Item	Burkina Faso	Ghana	Malawi
N	13*	19*	43
Age	5.1 (5.8)	3.7 (3.6)	6.4 (13.3)
% Male	31% (0.5)	53% (0.5)	74% (0.4)
Ave. total sick days	15.1(15.1)	16.5 (8.9)	15.3 (6.9)
Ave. number of no activity days	10.5 (10.1)	8.7 (6.9)	7.6 (5.0)
% Patient with wage loss	8% (0.3)	32% (0.5)	44% (0.5)
% Patient with caregivers	54% (0.5)	84% (0.4)	81% (0.4)
% Patient with substitute labor	13% (0.4)	22% (0.4)	8% (0.3)

\*Due to the low case enrolment rates, iNTS episodes identified through SETA were combined, taking advantage of the same surveillance sites and similar survey design developed by IVI

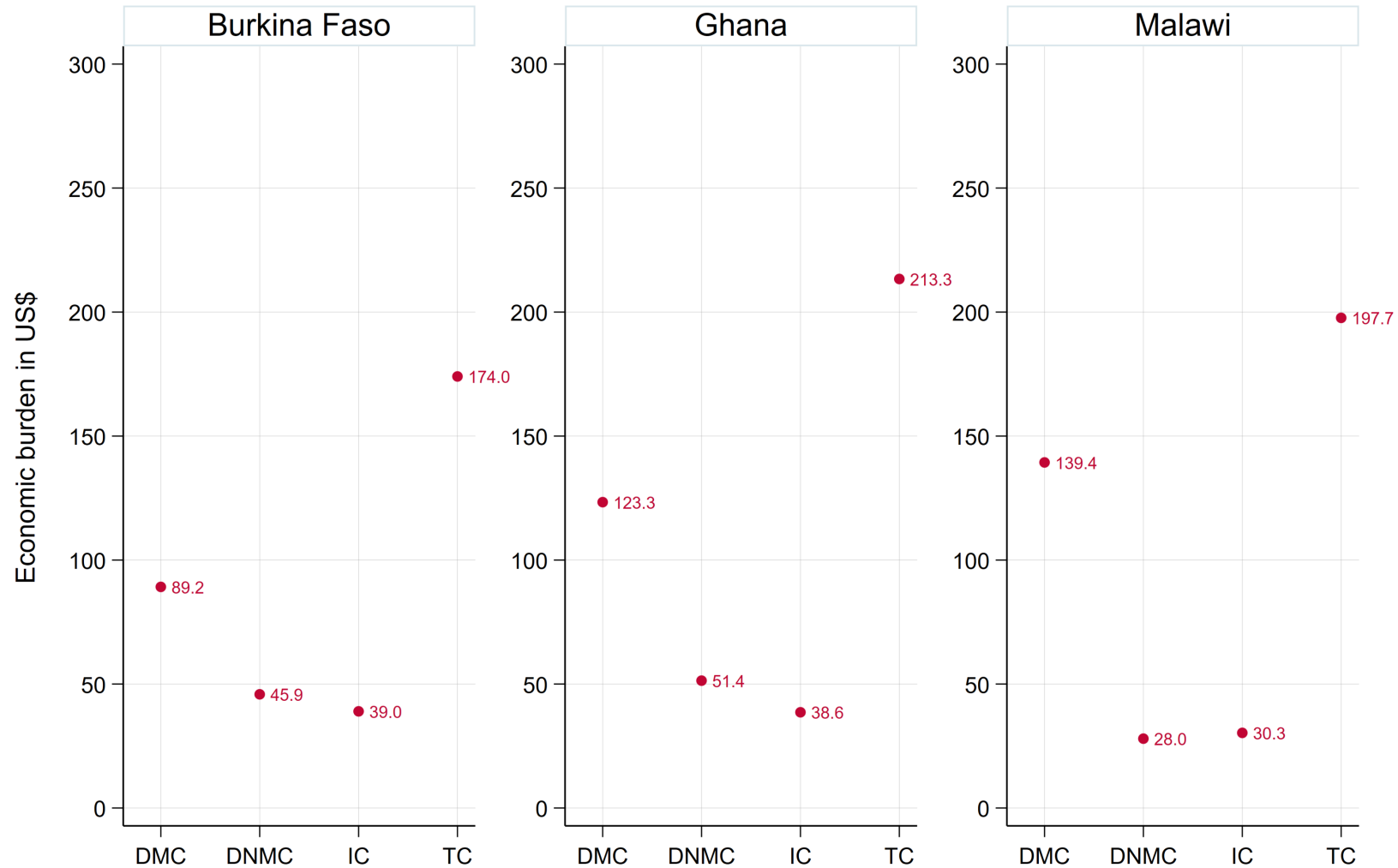
# Who covered medical expenditure (DMC)?

Burkina Faso                      Ghana                      Malawi



- Completely OOP
- Completely by insurance
- Completely by health facility
- Insurance & OOP
- Health facility & OOP
- Health facility & Insurance
- OOP & Health facility & Insurance
- Other
- Don't know

# iNTS Economic burden per episode

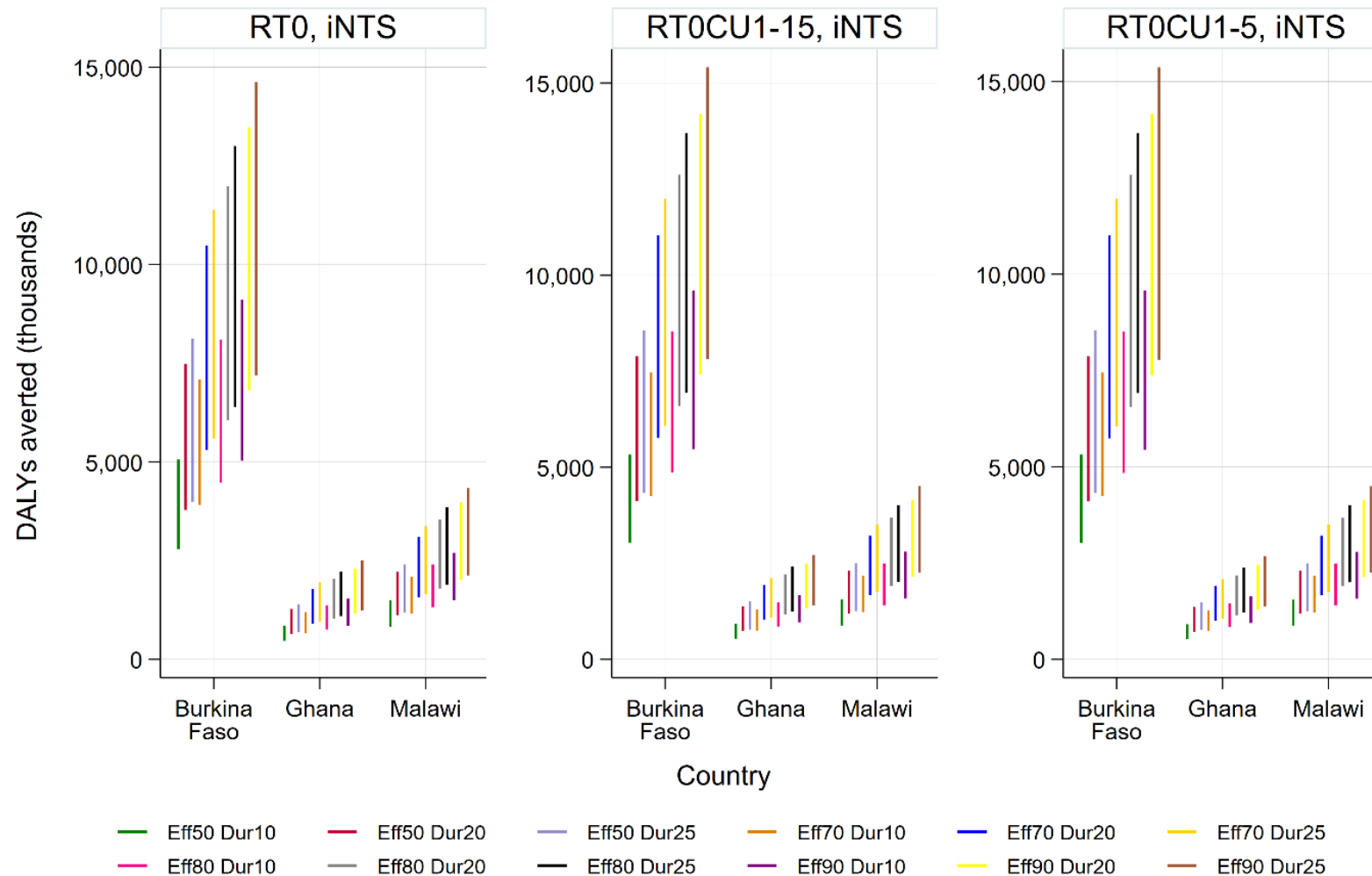


# Cost-Effectiveness Analysis

- Static cohort model based on field-based data and existing literature

Parameter	Value
Vaccination strategies	RT <sub>0</sub> ; RT <sub>0</sub> CU <sub>1-15</sub> ; RT <sub>0</sub> CU <sub>1-5</sub>
Vaccination coverage	MCV <sub>1</sub> for RT; 75% of MCV <sub>2</sub> for CU
Vaccine efficacy	50%, 70%, 80%, 90%
Duration of protection	10 yrs, 20 yrs, 25 yrs
Efficacy waning	Exponential waning (decay constant of 0.00402 per month); Linear waning over the course of each duration of protection scenario
Cost per fully vaccinated person	\$0 - \$200
Discounting	3% discounting for costs and health outcomes (default); 0% discounting for health outcomes (sensitivity analysis)
Wastage factor	10% (default); 5% and 20% (sensitivity analysis)
Cost-effectiveness threshold	1 x GDP per capita (default); health opportunity costs (conservative threshold)

# Averted DALYs due to vaccination

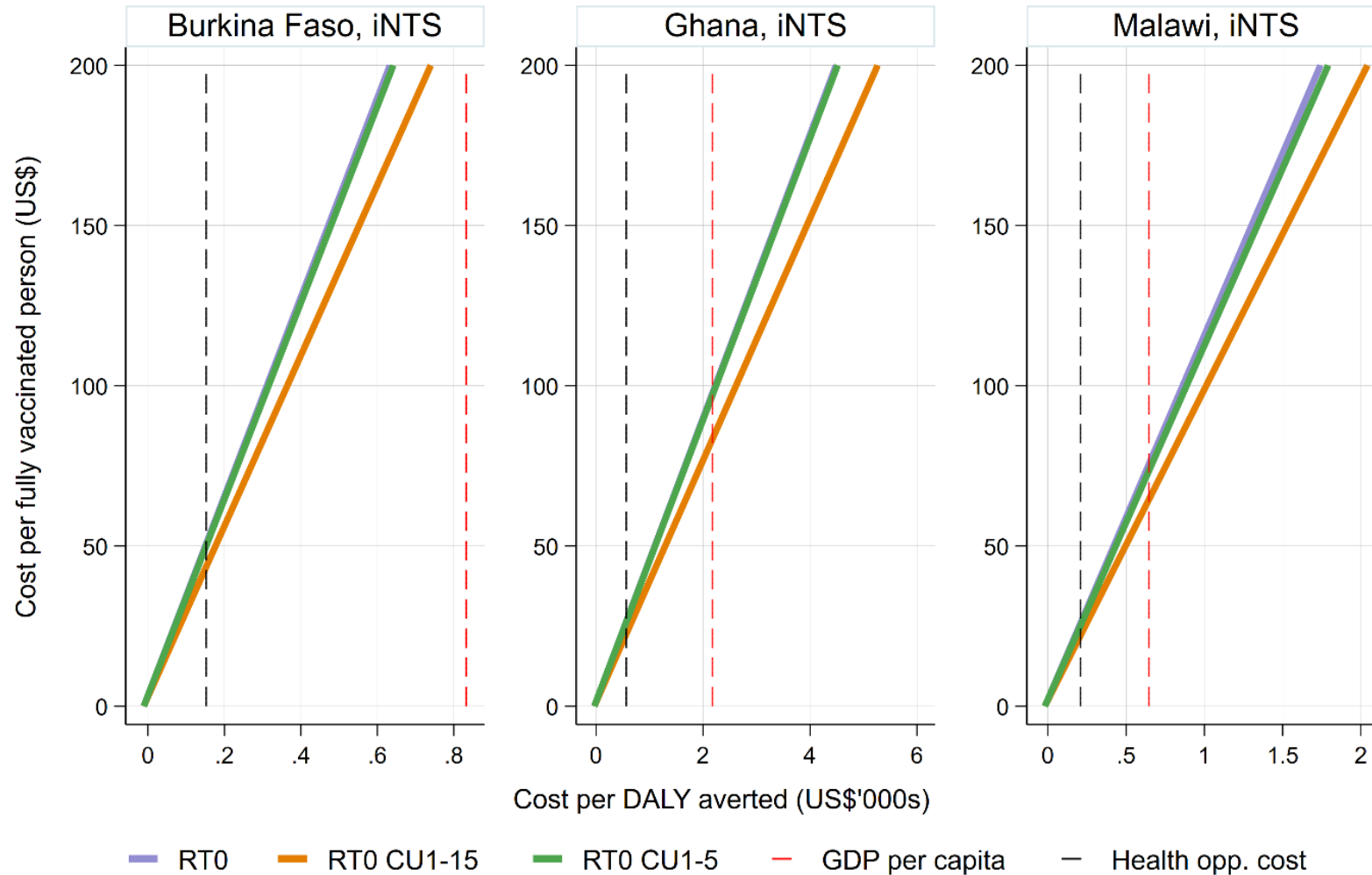


**Averted DALYs by scenario, vaccination strategies, and country.**

*The upper bound of each bar shows health outcomes with no discounting (0%), whereas the lower bound estimates are based on the discount rate of 3%*



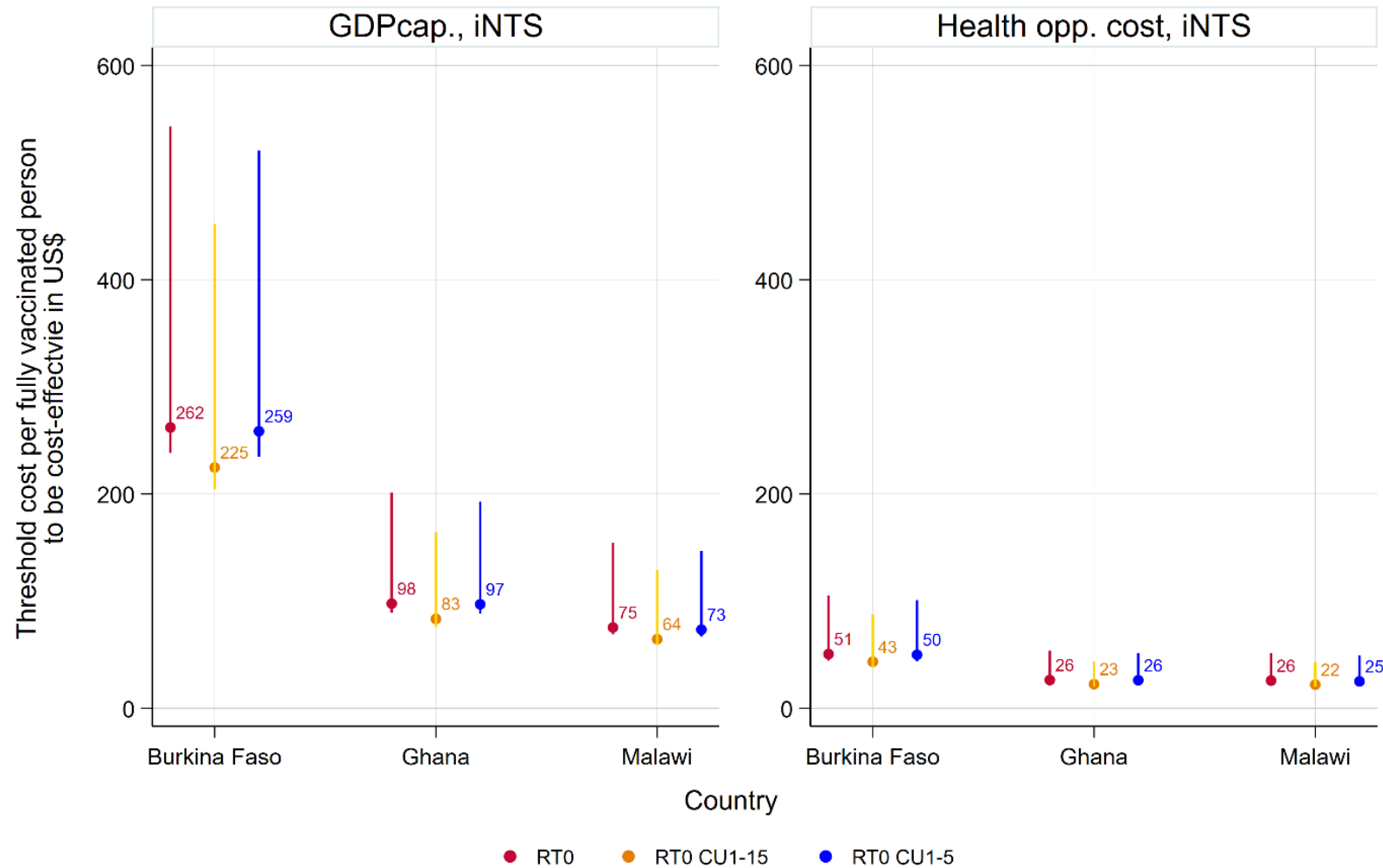
# Incremental Cost-Effectiveness Ratios (ICERs)



## ICERs by country.

The default scenario used for the figure is Eff90Dur20 with the exponential waning assumption. Interventions are considered to be cost-effective if the total cost per fully vaccinated person is located on the left side of varying threshold costs (1xGDP per capita or health opportunity costs) per DALY averted.

# Maximum cost per fully vaccinated person



**Threshold cost per fully vaccinated person to be cost-effective by country.**

The default scenario used for the figure is Eff90Dur20 with the exponential waning assumption. The lower bounds are for the least favorable scenario: 20% wastage rate, lower bound of economic burden, and 3% discounting of health outcomes. The upper bounds are based on the most favorable scenario: 5% wastage rate, upper bound of economic burden, and 0% discounting of health outcomes.

- Substantial economic burden for iNTS in Burkina Faso, Ghana, and Malawi
- Important in the context of iNTS given high scarcity of primary data points
- Cost-effective if a threshold cost per fully vaccinated person is properly set
- Sensitive to vaccine characteristics
  - Efficacy, waning, duration of protection, etc.
  - Absence of iNTS vaccines – various efficacy and waning scenarios
  - Updates required as clinical trials for potential vaccine candidates advance
- Low case enrollment rates
  - COVID – affecting the operations for study hospitals
  - Increased awareness of hygiene and sanitation practices – overall reduction in disease infections
- Considered a vaccine against iNTS only
  - Cost-effectiveness vaccination strategies may change by considering the availability of a trivalent vaccine
  - Currently being investigated under the FVVA project

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Thank you!