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The Potential Impact of Investments in Supply Chain Strengthening

(Retrospective analysis)



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and the TLO Modelling Team**

Representation of consumable availability in the TLO model

- Consumable availability is measured as the **probability that a consumable is available during a health system interaction**
- Estimates of consumable availability are based on facility reports which record the **number of days of stock-outs of consumables recorded each month** (OpenLMIS, 2018).

Our analysis focuses on two levels of care where most Health care is delivered

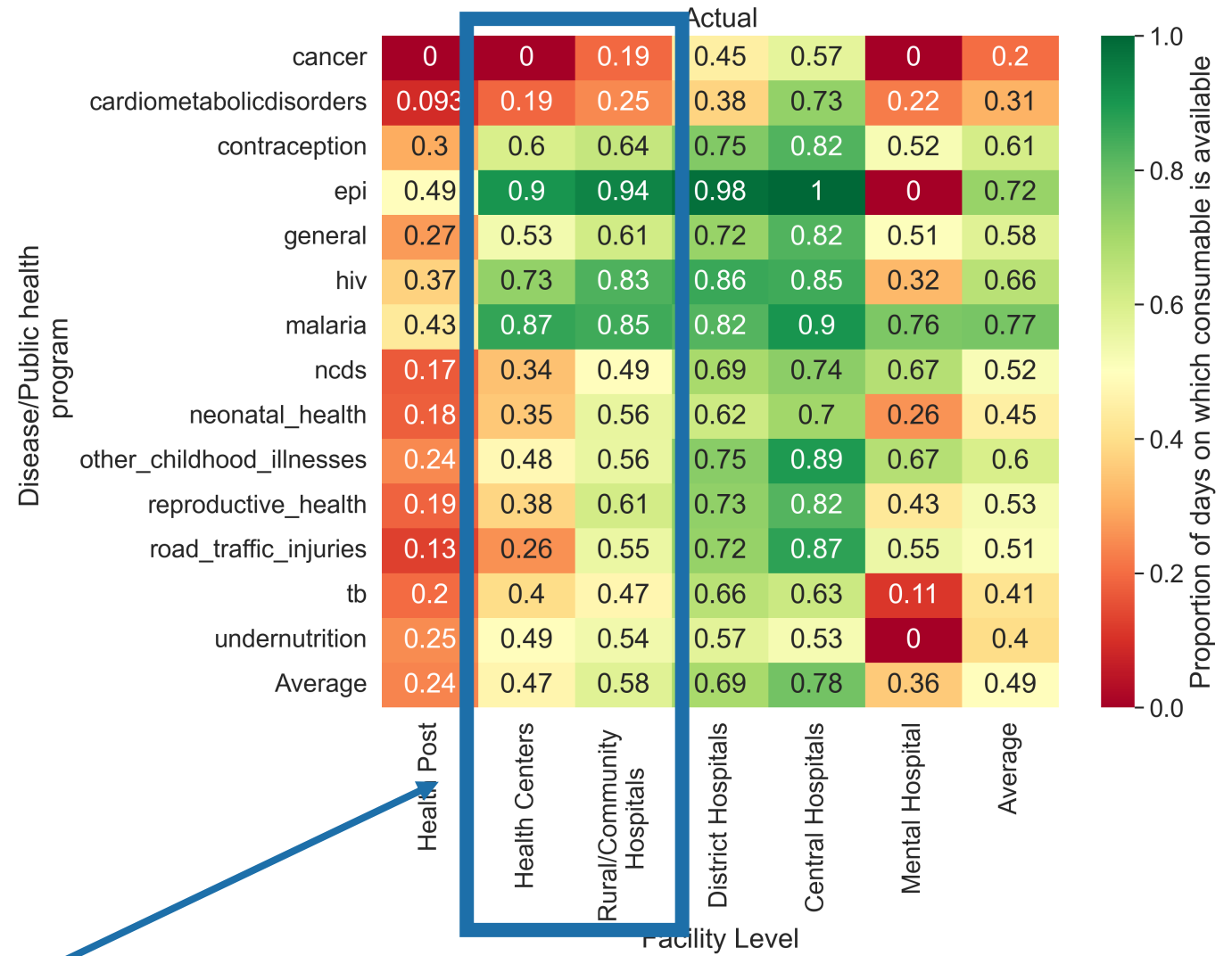
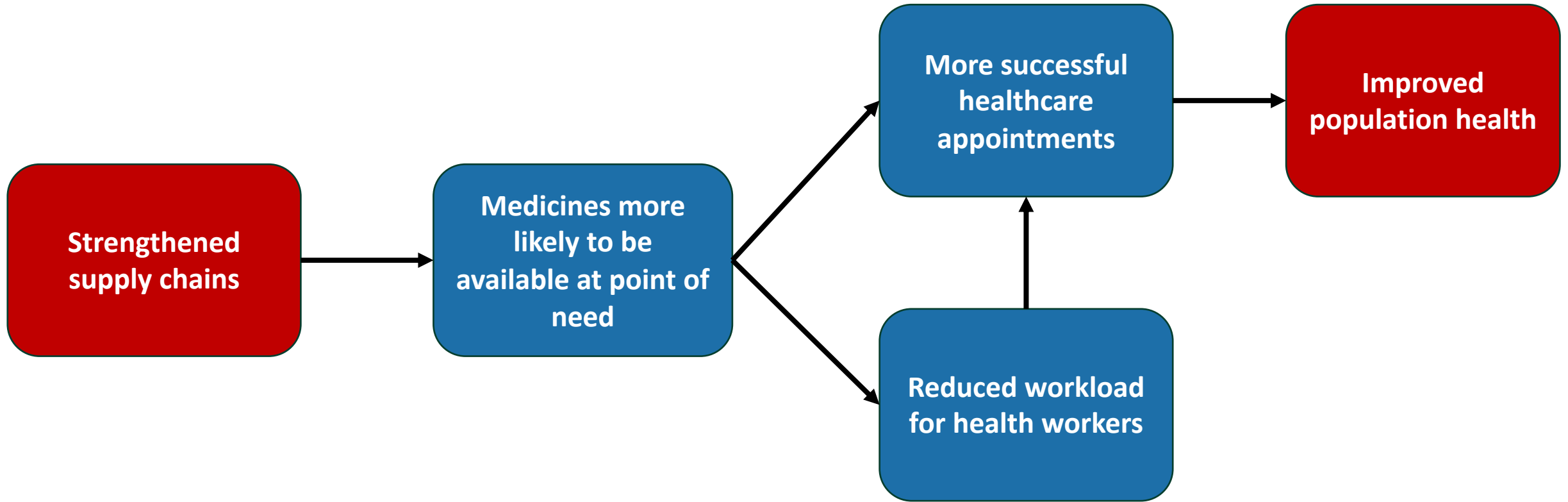


Figure: Average probability of consumables being available by program and Facility level

Theory of Change



This analysis uses the TLO model to propagate this series of consequences to quantify the health impact of realistic/achievable levels of improvement in the availability of medical consumables at the point of care

Method

- We defined *realistic* alternative scenarios of consumable availability in Malawi based on –
 1. Previous regression analysis on the factors associated with higher consumable availability in Malawi
 2. Benchmark facilities in the country (75th, 90th, 99th percentile)
 3. The performance of parallel supply chains (HIV, EPI)

1. Scenarios based on regression analysis

- Mohan et al (2024) demonstrated that:

1. Drugs had a 79% lower odds of being available than **medical disposables and diagnostics/non-therapeutic supplies** (eg. gloves, syringes, tests)
2. Consumables which were classified as **‘Vital’** in the Ministry of Health’s *Essential Medicines List* as had 225% higher odds of being available than other consumables
3. Consumable supply being managed by **pharmacists** led to 85% higher odds of consumables being available

1. ‘General consumables’

2. ‘Vital medicines’

3. ‘Pharmacist-managed’

(applied cumulatively)

2. Scenarios based on benchmark health facilities

- For each consumable modelled, we found the benchmark facility which represented the n^{th} percentile in terms of the probability of availability of that consumable.
4. Matching consumable availability to that of the facility at the **75th percentile** (corresponding to the same facility level)
 5. Matching consumable availability to that of the facility at the **90th percentile** ("")
 6. Matching consumable availability to that of the **best facility** in the country

4. '75th percentile facility'

5. '90th percentile facility'

6. 'Best facility'

3. Scenarios based on parallel supply chains

- These scenarios will update the availability of consumables to match that of programs with parallel vertically managed HIV/EPI supply chain
- 7. Matching consumable availability to that of the average availability of consumables in the **HIV program** (corresponding to the same district and facility level)
- 8. Matching consumable availability to that of the average availability of consumables in the **EPI* program** (corresponding to the same district and facility level)
- 9. For comparison, we also include a final scenario which assumes 100% availability of all consumables at all facilities

7. 'HIV supply chain'

8. 'EPI supply chain'

9. 'Perfect'

*EPI: Expanded programme on immunization

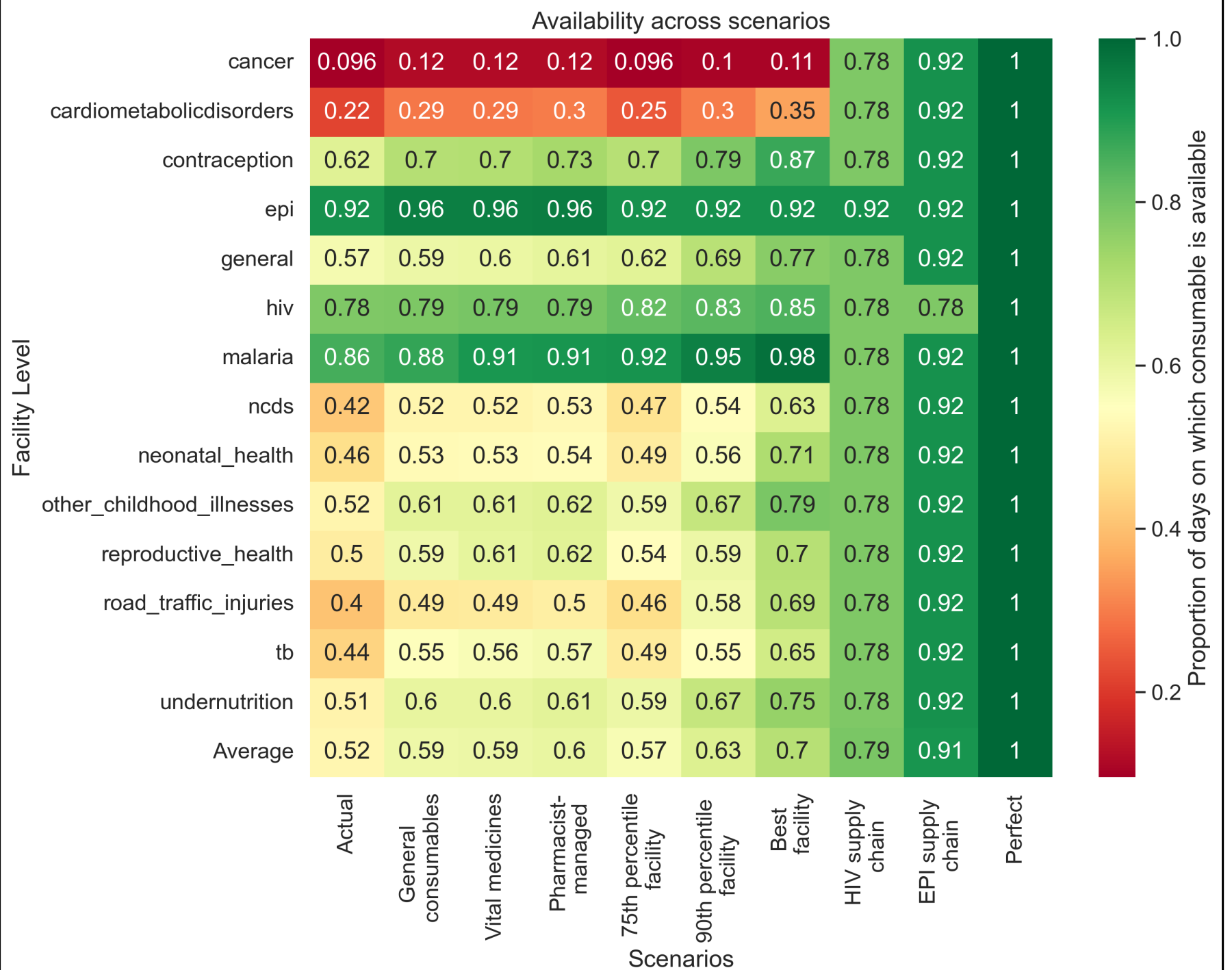
Average consumable availability by program for health centers and rural/community hospitals

Actual Scenario

1. Regression analysis scenarios

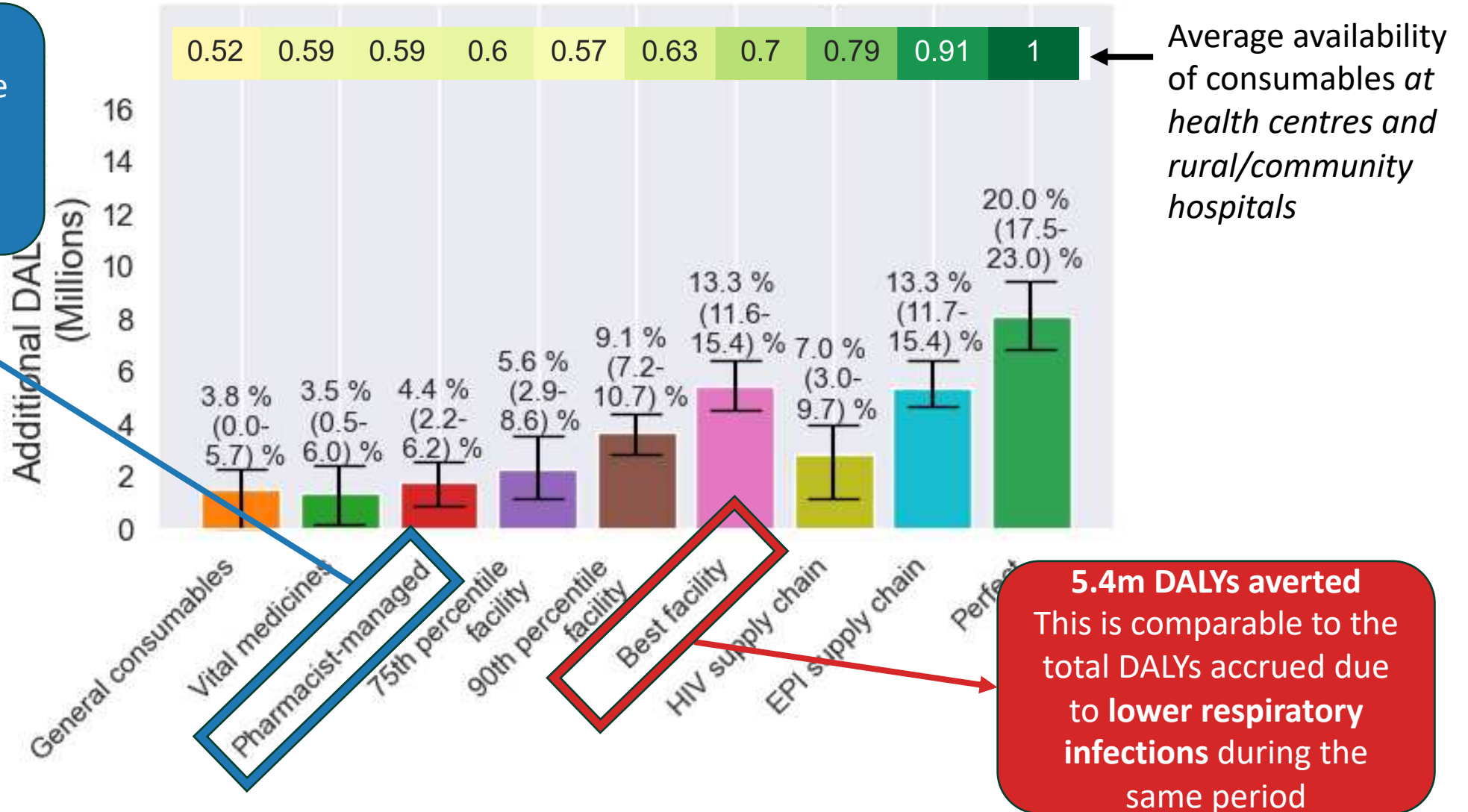
2. Benchmark facility scenarios

3. Parallel supply chain scenarios



Result: Health impact of consumable availability scenarios

Figure: Additional DALYs averted versus 'Actual' scenario (2015-2019)



Result: Monetary value of consumable availability scenarios

$$\text{Net monetary value}_i = \Delta H_i * k - \Delta C_i$$

ΔH_i = Incremental health impact of a scenario

ΔC_i = Incremental cost of a scenario

k = Cost-effectiveness threshold (*assumed to be \$61, Ochalek et al (2018)*)

This gives us the maximum ability to pay to achieve various levels of consumable availability

The maximum ability of pay for the 'Pharmacist-managed scenario' with an incremental health benefit of 1.8 million DALYs is **USD 109 million**

Summary

- **3.8% - 13.3% DALYs** could have been averted through realistic improvements in consumable availability between 2015 and 2019.
- Given the current health system productivity, Malawi had the ability to pay **\$109 million** for modest improvements in consumable availability over 5 years (~3-4% of the total health sector budget during the 5 year period)

Limitations

- We do not model the exact **supply chain interventions** which will allow Malawi to reach various levels of availability under alternative scenarios considered.
- Therefore, we are unable to calculate the incremental cost-effectiveness ratio (ICER) of these interventions.

The TLO Model

Thanzi La Mawa Team

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