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### The Potential Impact of Investments in Supply Chain Strengthening

(Retrospective analysis)

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www.tlomodel.org

#### Representation of consumable availability in the TLO model Actual 0.57 0.19 0.45 0.2 0 0 cancer 0

- 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

program and Facility level

Data Sources: OpenLMIS 2018, Harmonised Health Facility Assessment 2018/19





This analysis uses the TLO model to propagate this series of consequences to quantify the health impact of <u>realistic/achievable</u> 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 (75<sup>th</sup>, 90<sup>th</sup>, 99<sup>th</sup> percentile)
  - 3. The performance of parallel supply chains (HIV, EPI)

## 1. Scenarios based on regression analysis

- Mohan et al (2024) demonstrated that:
- Drugs had a 79% lower odds of being available than medical disposables and diagnostics/nontherapeutic 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

Source: Mohan et al. Factors associated with consumable stock-outs in Malawi: Evidence from a facility census. Lancet Global Health, 2024. DOI: <u>10.1016/S2214-109X(24)00095-0</u>



(applied cumulatively)

# 2. Scenarios based on benchmark health facilities

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

4. '75<sup>th</sup> percentile facility'

5. '90<sup>th</sup> 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



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

		Availability across scenarios									
	cancer	0.096	0.12	0.12	0.12	0.096	0.1	0.11	0.78	0.92	1
(	cardiometabolicdisorders	0.22	0.29	0.29	0.3	0.25	0.3	0.35	0.78	0.92	1
	contraception	0.62	0.7	0.7	0.73	0.7	0.79	0.87	0.78	0.92	1
	epi	0.92	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	1
	general	0.57	0.59	0.6	0.61	0.62	0.69	0.77	0.78	0.92	1
	hiv	0.78	0.79	0.79	0.79	0.82	0.83	0.85	0.78	0.78	1
evel	malaria	0.86	0.88	0.91	0.91	0.92	0.95	0.98	0.78	0.92	1
IITY L	ncds	0.42	0.52	0.52	0.53	0.47	0.54	0.63	0.78	0.92	1
raci	neonatal_health	0.46	0.53	0.53	0.54	0.49	0.56	0.71	0.78	0.92	1
0	ther_childhood_illnesses	0.52	0.61	0.61	0.62	0.59	0.67	0.79	0.78	0.92	1
	reproductive_health	0.5	0.59	0.61	0.62	0.54	0.59	0.7	0.78	0.92	1
	road_traffic_injuries	0.4	0.49	0.49	0.5	0.46	0.58	0.69	0.78	0.92	1
	tb	0.44	0.55	0.56	0.57	0.49	0.55	0.65	0.78	0.92	1
	undernutrition	0.51	0.6	0.6	0.61	0.59	0.67	0.75	0.78	0.92	1
	Average	0.52	0.59	0.59	0.6	0.57	0.63	0.7	0.79	0.91	1
		Actual	General consumables	Vital medicines	Pharmacist- managed	G 75th percentile a facility	soi. 90th percentile facility	Best facility	HIV supply chain	EPI supply chain	Perfect

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### Result: Health impact of consumable availability scenarios



#### Result: Monetary value of consumable availability scenarios

Net monetary value<sub>i</sub> = 
$$\Delta H_i * k - \Delta C_i$$

 $\Delta H_i$  = Incremental health impact of a scenario  $\Delta C_i$  = Incremental cost of a scenario k = Cost-effectiveness threshold (assumed to be \$61, Ochalek et al (2018)) This gives us the <u>maximum</u> <u>ability to pay</u> to achieve various levels of consumable availability

The maximum ability of pay for the 'Pharmacistmanaged 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 costeffectiveness ratio (ICER) of these interventions.





#### tlomodel.org

### The TLO Model

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