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COSTS AT SCALE – A COST FUNCTION FOR **HIV** & **TB** SERVICES TO SUPPORT ALLOCATIVE EFFICIENCY ANALYSIS

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CAPTURE
Cost Analysis for Prioritizing TB & HIV Resources Efficiently

Background

- Simple transparent methods to transfer TB & HIV cost from one setting to another, particularly at scale
- Recent significant investments in developing cost models and datasets to support local analyses
- Do not account for the capacity of health systems when generating cost functions
  - rely on assume constant average costs when modelling scaling services
  - ignores economies of scale and scope

Aim

- We introduce a **mechanistic cost function designed to estimate the marginal costs of adding or integrating TB or HIV interventions within PHC**; explicitly accounts for capacity constraints
- Inform priority setting and resource allocation questions in time and data constrained settings
  - **Adding a new intervention onto the existing primary care platform**
  - **Scaling up any existing interventions**
  - **Integrating existing primary care services**

- Builds on published work that disaggregates site- and above-site level costs to capture effects of scale and scope
- Comprises terms differentiated by input type according to their behavior at scale
- Further disaggregates costs traditionally classified as fixed into fixed and semi-fixed
- Semi-fixed, remain constant until n reaches their respective maximum capacities, at which point costs increase to account for the additional facility or input required at that scale
- So, how does it work?

$$C = FP + \sum_i \left(\frac{n}{max_i}\right) FF_i + \sum_{i,k} \left(\frac{n}{max_k}\right) FK_{ik} + \sum_i VF_i \; x \; n$$

FP – fixed program costs
FF – fixed facility costs
FK – fixed input costs
VF – variable costs
n – level of output/scale
max_i – maximum output per facility
max_k – maximum output per type of input

Max visits per facility

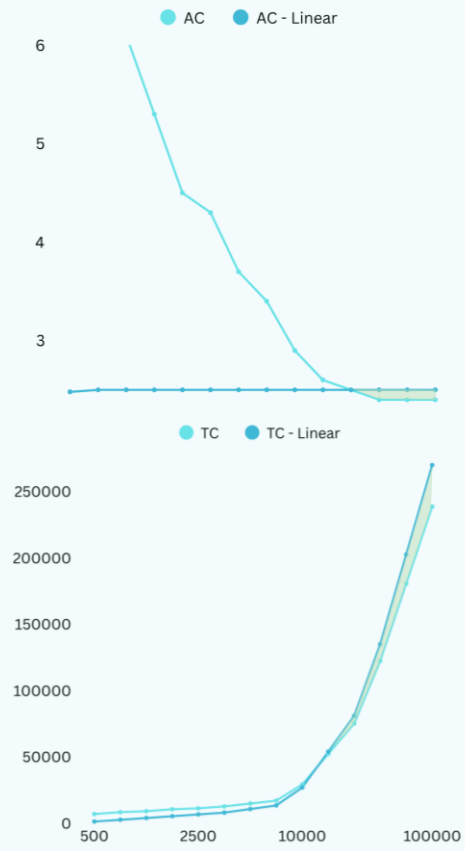
Max visits per staff

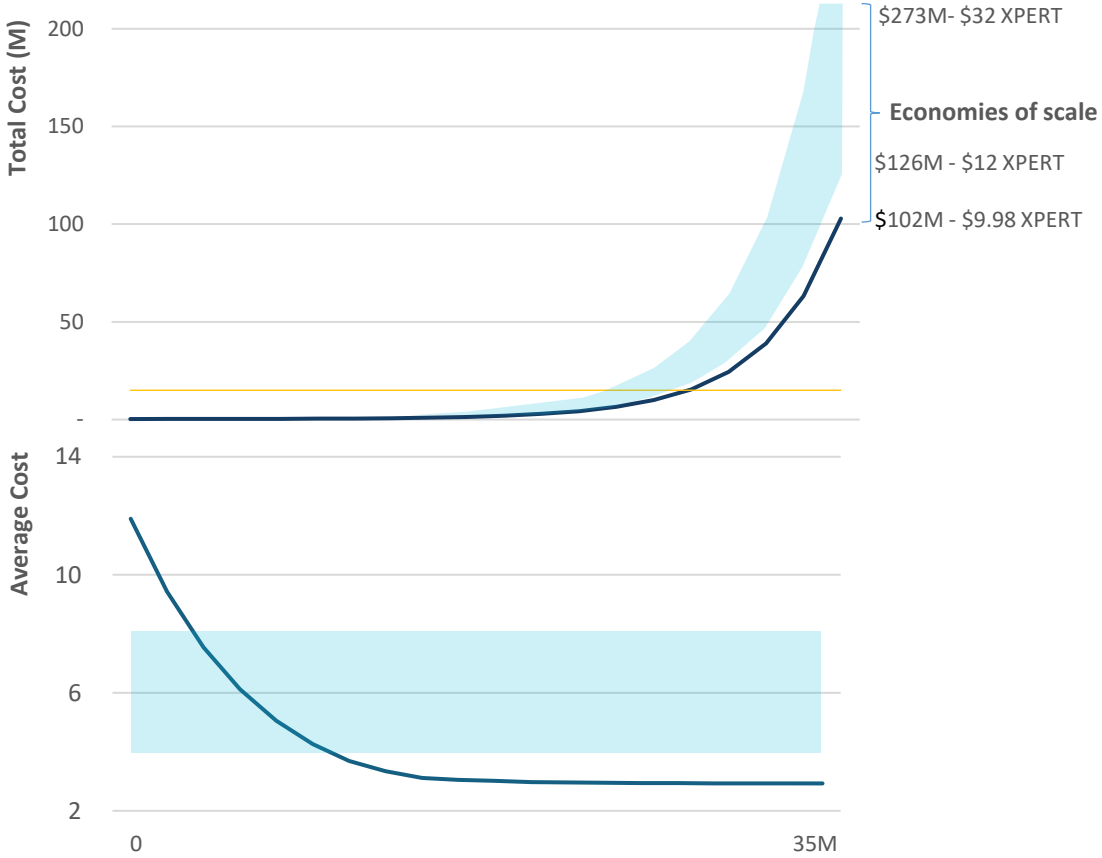
Facility level costs

Fixed Program (FP)- $5,000
Fixed Facility (FF) - $537
Fixed Staff (FS) - $723
Variable - $1.45

$$FP + \sum_i \left(\frac{n}{max_i}\right) FF_i + \sum_{i,k} \left(\frac{n}{max_k}\right) FK_{ik} + \sum_i VF_i \; x \; n = C$$

Scale	FP	FF	FS	VC	Total cost	Average Cost	Linear AC	Linear TC
500			723	725	6985	14.0		1240
1,000			1446	1450	8433	8.4		2480
1,500				2175	9158	6.1		3720
2,000		537	2169	2900	10606	5.3		4960
2,500				3625	11331	4.5		6200
3,000	5000		2892	4350	12779	4.3	2.48	7440
4,000			3615	5800	14952	3.7		9920
5,000			4338	7250	17125	3.4		12400
10,000		1074	8676	10150	29250	2.9		24800
20,000		1611	16629	11600	52240	2.6		49600
30,000		2148	24582	13050	75230	2.5		74400
100,000		6981	81699	29000	**238,680**	**2.4**		**248,000**





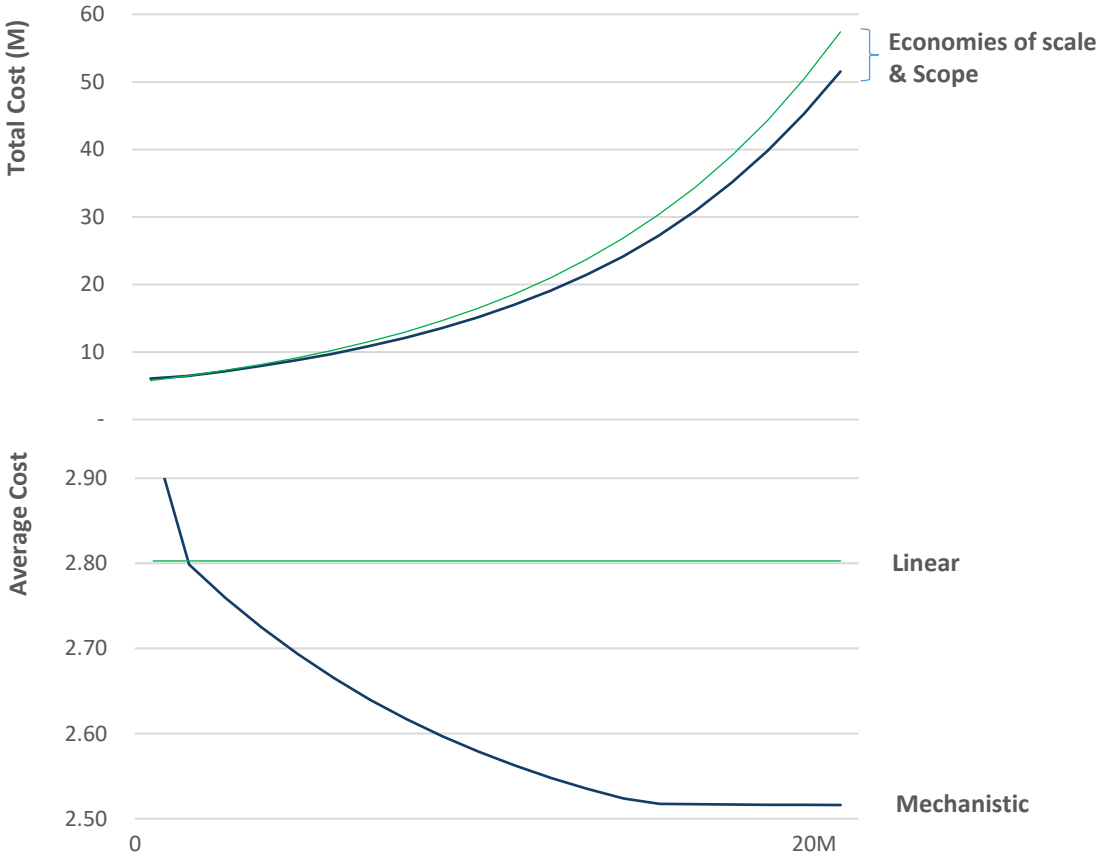
Use Case 1

Scale up of new service within the PHC platform (Xpert + ICF)

- Start from scratch → scale up to 90%
- All PHC visits receive WHO screening tool
- % receive XPERT

Disaggregate PHC and XPERT into fixed vs variable costs

- Max visits per facility, nurse, staff, equipment
- Fixed program costs
- Fixed facility costs
- Training
- Staff
- Equipment
- Variable costs – PHC visits and test



Use Case 2

Integration within PHC platform (Cervical cancer screening integration into Family Planning visits)

- Integrating into existing service – same staff that provides FP
- Coverage – national scale up (90%) given current utilization patterns

Disaggregate Family Planning costs into fixed vs variable costs with lower capacity given additional service times

- Max visits per facility, staff
- Fixed program costs
- Fixed facility costs
- Staff
- Variable costs – Family planning and screening

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