Linking household and health facility data

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Definitions

Coverage

The proportion of individuals in need of an intervention who receive the intervention

Structure quality

The service environment of a provider, including the material and human resource attributes of the provider

Process quality

The quality of the actual processes of care, including the patient's activities, the provider's activities, and the interactions between the two

Quality-adjusted coverage

The proportion of individuals in need of an intervention/service who receive the intervention/service from a health facility or provider with high service quality

Approaches to linking household and health facility data

Exact-match linking

Each care-seeking episode in a household survey is linked to information about the quality of care of the specific provider(s) visited during that episode

Ecological linking

Each care-seeking episode in a household survey is linked to an average quality of care score of the providers within certain administrative or geographical boundaries, or the quality score of the nearest provider(s)

Research questions

1. What is the feasibility of linking household surveys to assessments of health service provision to produce measures of coverage of appropriate care? What modifications would be needed to scale this approach to national level?
2. Are coverage estimates produced through an ecological linking approach equivalent to those produced through an exact-match linking approach?

Study design

Setting	Zambia (5 HFCAs)	Cote d'Ivoire (1 region)
Services	Sick child	ANC, L&D, PNC, sick child
Source of quality data	Census of facility and non-facility providers (n=83)	Census of facility and non-facility providers (n=315)
Source of HH data	Study survey (n=747 HHs)	MICS (n=1007 HHs)
HH geodata	HH location	Cluster location (undisplaced)
Linking methods	Exact match (by provider name)	Exact match (by provider name)
	Aggregate (by provider type, 5km buffer)	Aggregate (by district and/or provider type, 10km buffer)
	Geo-linking (nearest provider)	Geo-linking (nearest provider)
	Kernal density estimation	

Data analysis

- Each care-seeking episode reported in the household survey was assigned structure and process quality scores using exact-match and ecological approaches
- If multiple providers were visited, their quality scores were averaged
- No care-seeking or care sought from unqualified provider (e.g., trad. healer) → assigned score of 0
- Mean facility scores weighted by service-specific caseload
- Sensitivity analyses: no facility weighting, include only public sector facilities

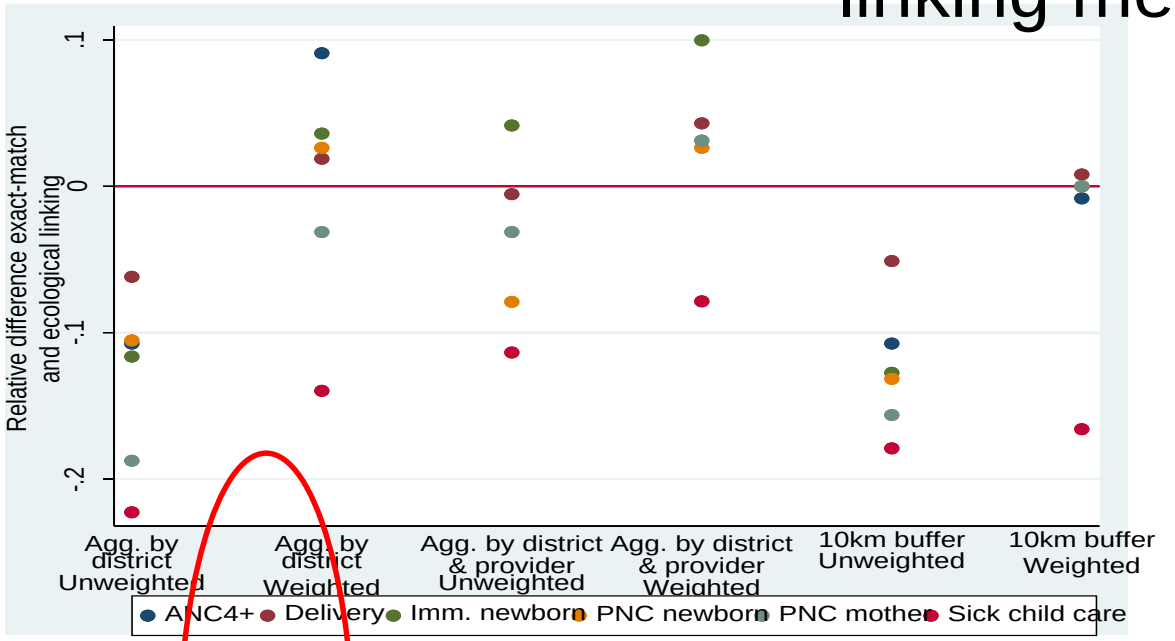
Results: Exact-match linking

- In Zambia, 99% of children in rural areas and 93% in urban areas were linked to the named provider
- In Côte d'Ivoire, 93% of care-seeking episodes were linked to the named provider
  - Similar across service areas except for PNC (88%) – but very small n

Zambia: Quality-adjusted coverage of management of child illness, by linking method

Linking Method	Rural				Urban			
	%	[95% CI]	Diff	Sign	%	[95% CI]	Diff	Sign
Exact-Match	**60.3**	**[55.6 - 65.1]**	**REF**		**49**	**[43.6 - 54.5]**	**REF**	
Single Match								
Nearest - Absolute Distance	61.1	[56.3 - 65.9]	0.8	ns	49.1	[43.7 - 54.6]	0.1	ns
Nearest - Road Distance	58.8	[54.1 - 63.5]	-1.5	ns	48.7	[43.2 - 54.1]	-0.3	ns
Aggregate Match								
Radius - 5 km	59.4	[54.8 - 64.1]	-0.9	ns	49.2	[43.7 - 54.7]	0.2	ns
Administrative unit - HFCA	59.8	[55.1 - 64.5]	-0.5	ns	49.1	[43.6 - 54.6]	0.1	ns
Administrative unit - Total	57.9	[53.4 - 62.4]	-2.4	ns	49.4	[43.9 - 54.9]	0.4	ns
KDE								
Single Highest	55	[50.4 - 59.6]	-5.3	*	71.8	[69.3 - 74.2]	22.8	***
Weighted Aggregate	54.9	[50.4 - 59.5]	-5.4	*	74.3	[73.2 - 75.5]	25.3	***

Cote d'Ivoire: Relative difference between exact match and aggregate linking methods



Limitations

- Simple quality score used (unweighted average of items)
- Relatively straightforward care-seeking practices dominated by public sector
  - Likely generalizable to many other SSA settings
  - However, methods may not work as well in settings with complex care-seeking patterns, including bypassing, sequential care-seeking, and significant use of private providers
- Small n in Zambia
- Exact match estimates are imperfect, esp. in Côte d'Ivoire

Conclusions

- Absolute differences between exact match and ecological linking methods were small
- Adjustments for provider category and weighting by service-specific utilization generally resulted in better agreement between ecological and exact match estimates
  - Willey et al also found that adjusting for facility level improves ecological linking estimates
- Ecological linking may be a feasible and valid approach for estimating quality-adjusted coverage when a census of providers is used
  - More research is needed to assess performance of ecological methods when a sample survey of facilities is used or in more complex care-seeking environments

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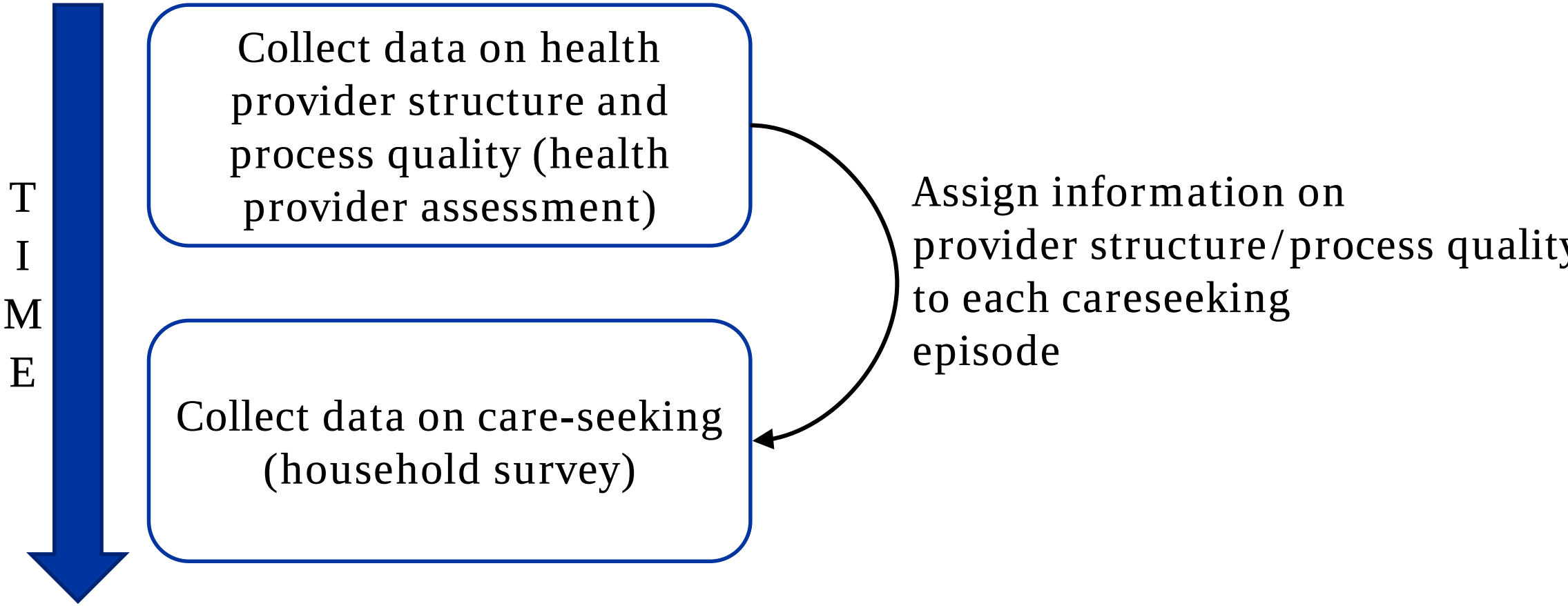
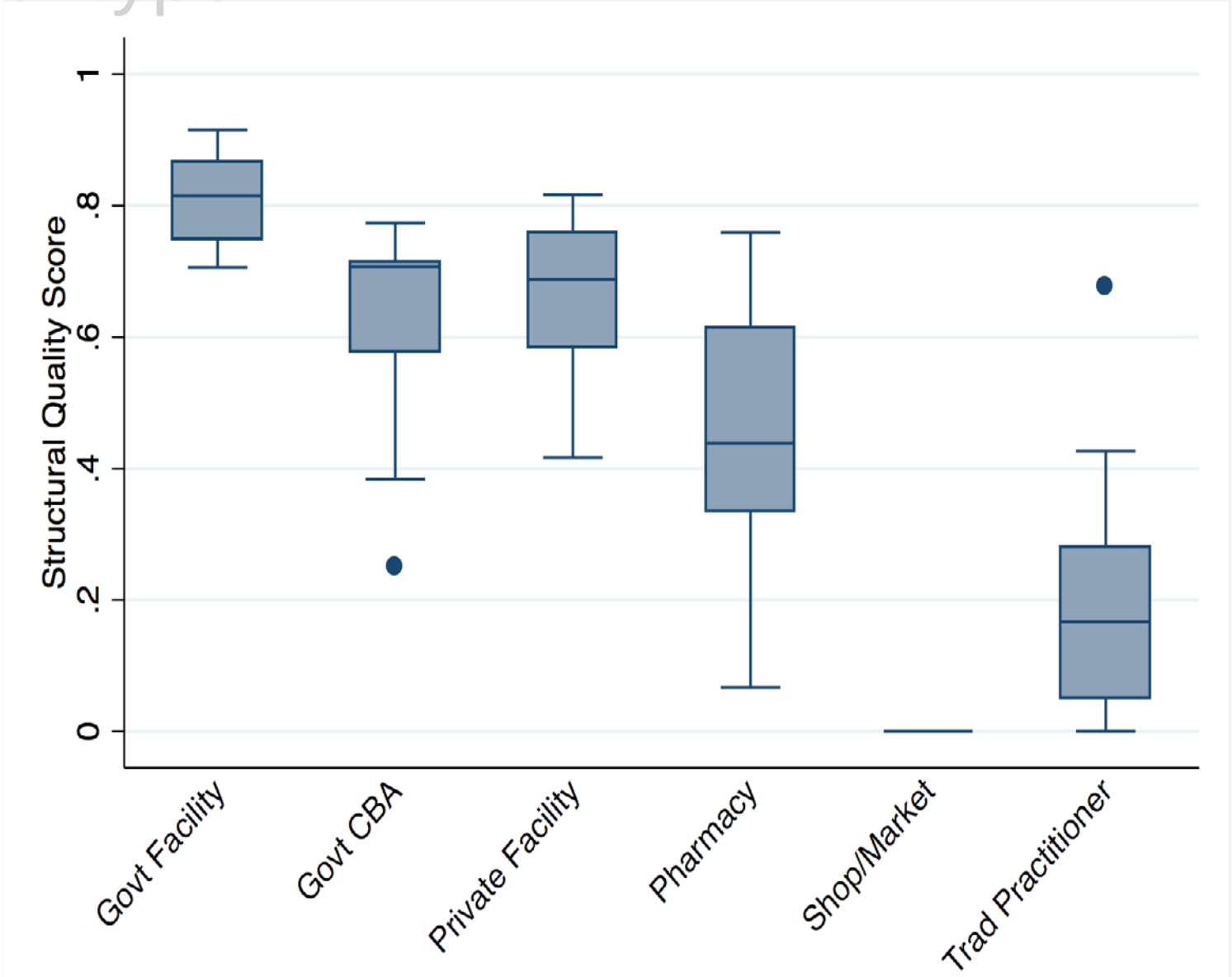
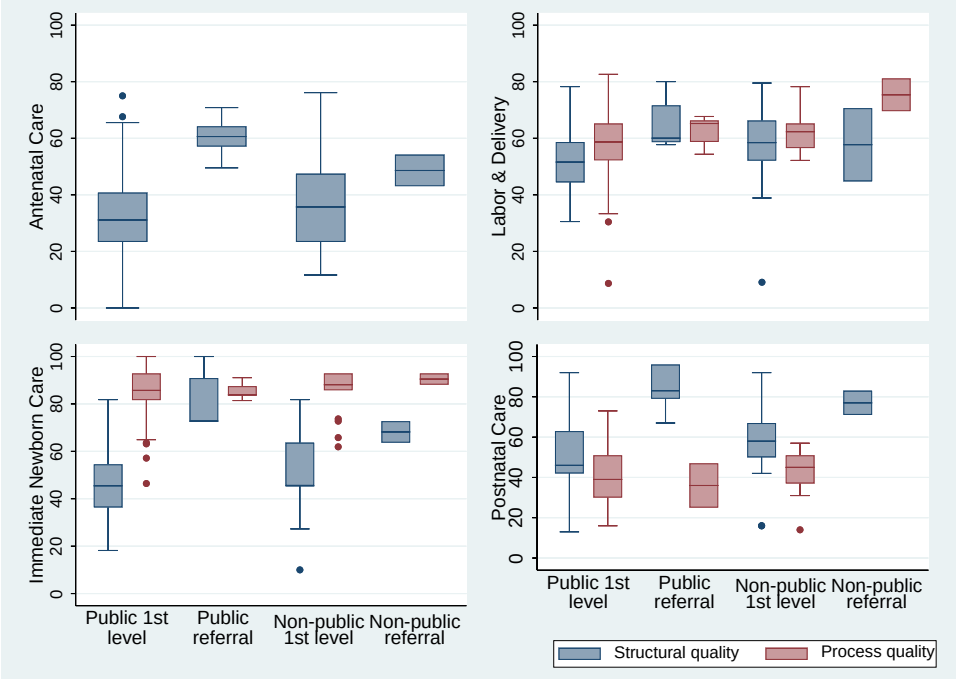
Study design



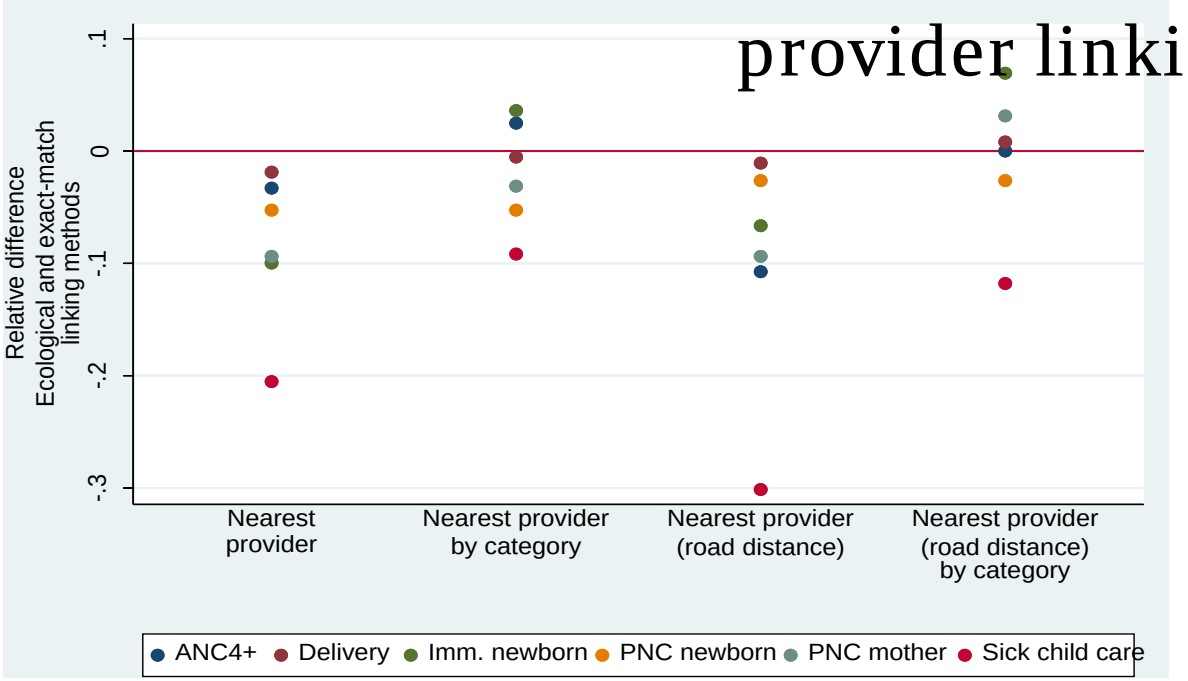
Zambia: Distribution of structural quality scores by provider type



Côte d’Ivoire: Distribution of quality scores by provider type



Cote d'Ivoire: Relative difference between exact match and nearest-provider linking methods



Cote d'Ivoire: % individuals linked to their exact source of care using nearest provider methods

Linking Method	ANC4 n=105	Delivery n=236	PNC n=16	PPC n=12	Sick child n=74
Nearest facility (straight line)	43.8%	53.0%	37.5%	33.3%	29.7%
Nearest facility (straight line) by category	57.1%	53.8%	37.5%	33.3%	50.0%
Nearest facility (road distance)	35.2%	46.6%	31.3%	25.0%	20.3%
Nearest facility (road distance) by category	48.6%	48.7%	31.3%	33.3%	43.2%