

# Madagascar Country Profile

Service Delivery Indicators – Medical Vignettes



**WORLD BANK GROUP**

# Acknowledgements

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The data used for this analysis can be found <https://github.com/worldbank/SDI-Health>. Additional documentation on the Service Delivery Indicators can be found <https://www.sdindicators.org/>.

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# Demography Summary

SDI – Madagascar

# Demography Summary

## Facility characteristics

Facilities were selected to provide a representative assessment of service delivery quality in public and private facilities located in rural and urban areas, where applicable.

Facilities were grouped into a common set of categories. Health posts were considered the lowest tier of health facility available, often staffed by a single individual and are without in-patient services. Health centers are larger, serving a greater population, but lack surgical services. Finally, hospitals are the top level of the health care system, typically able to provide all services an individual would seek.

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### *Rural vs. Urban<sup>1</sup>*

Rural	220 (48%)
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Urban	238 (52%)
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### *Public vs. Private<sup>2</sup>*

Public	293 (64%)
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Private	165 (36%)
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### *Facility Level<sup>3</sup>*

Hospital	38 (9%)
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Health Center	316 (71%)
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Health Post	91 (20%)
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<sup>1</sup> All data is present.

<sup>2</sup> All data is present.

<sup>3</sup> Data is missing for 3 facilities.

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# Demography Summary

## Provider characteristics

Multiple providers were selected within a particular facility to complete the vignette module of the SDI survey. If the facility only had a single provider, that provider completed the module.

A common set of categories for medical education and profession were applied to allow for better comparison among countries. Responses given as “other” were converted to missing values for the purposes of analysis for the level of medical training.

### *Rural vs. Urban<sup>1</sup>*

Rural	282 (44%)
Urban	360 (56%)

### *Public vs. Private<sup>2</sup>*

Public	416 (65%)
Private	226 (35%)

### *Facility Level<sup>3</sup>*

Hospital	72 (12%)
Health Center	454 (73%)
Health Post	95 (15%)

<sup>1</sup> All data is present.

<sup>2</sup> All data is present.

<sup>3</sup> 21 providers were missing data on facility level.

### *Medical Education<sup>4</sup>*

Advanced	378 (59%)
Diploma	239 (38%)
Certificate	18 (3%)
None	1 (0%)

### *Profession<sup>5</sup>*

Medical Officer	373 (58%)
Clinical Officer	-
Nurse	256 (40%)
Other	13 (2%)

<sup>4</sup> 6 providers were missing data on medical education.

<sup>5</sup> All data is present.

# Medical Vignettes IRT Methodology

SDI – Madagascar

# Medical Vignettes IRT Methodology

## Vignette Structure

The actor delivers the initial script and providers are asked to proceed as though the actor were a real patient.

The enumerator has pre-scripted responses providing:

- 1) answers to history questions the provider could ask;
- 2) descriptions of what the provider would observe for a given physical exam, and;
- 3) the results of a medical test the provider orders.

Providers are then asked to make a diagnosis and may offer treatment recommendations but are not required to.

Vignettes in different countries vary in the treatment options the enumerator can check off in the survey instrument.

Script of Opening Statement		Treatment (Correct if any one of the options is given, unless specified)
1. Child Diarrhea + Severe Dehydration	"I am a mother of a 13 month old boy. His name is Noel. My son has diarrhea."	IV fluid rehydration, nasogastric tube rehydration, or referral to another clinic if lower level facility.
2. Child Pneumonia	"I am the mother of this 5 year old girl. Her name is Sia. She has a cough."	Amoxicillin (or dosage), benzylpenicillin, or cotrimoxazole.
3. Diabetes (Type II)	"My name is Jack. I am worried that something is wrong with me. I feel weak and without energy even though I feel hungry often and eat frequently. I am 48 years old and work as a clerk."	Oral hypoglycemic or referral to specialized clinic.
4. Tuberculosis	"My name is Bakari. I am 40 years old and I have been suffering from a fever and cough for some time."	Combination therapy (with or without correct dosage, drug names, and timing) or referral to TB clinic. Sputum test/ chest x-ray are allowed in cases where test results were not reported back to clinician.
5. Child Malaria + Anemia	"I am the mother of this 4-year old boy. His name is Sangeti. He has had a fever for some time. Now he is worse, so I have come to you for help."	Artemether-lumefantrine (with or without correct dosage), artemisinin combination therapy (with or without correct dosage), or artesunate-amodiaquine. Treatment must include zinc and folic acid supplements to be considered correct.
6. Post-Partum Hemorrhage	"My name is Fatuma. I am 26 years old and I have vaginal bleeding 24 hours after delivery in a health facility."	IV line, uterine massage, and some type of uterotonic or prostaglandin must all be specified to be considered correct.
7. Neonatal Asphyxia	"A mother gives birth to a baby. The newborn is not crying. The newborn fails to establish regular breathing and appears pail and slightly blue. What do you do?"	Some action to warm and/or dry the baby, clear the airway, and provide ventilation must all be taken to be considered correct.



# Medical Vignettes IRT Methodology

## Inputs Derived From Vignettes

In a vignette, a provider's diagnostic behavior consists of the questions asked during history taking and the physical exams the provider performs.

Based on each individual's diagnostic behavior pattern across all vignettes, item response theory (IRT) estimates a "theta ability score" or "knowledge score" for each provider in the survey.

### Module 3: Case Simulations

#### Section G: Case Study Patient 5<sup>12</sup>

##### Case study patient [enumerator reads]

Good morning (afternoon) doctor. I am the mother of this 4-year-old boy. His name is **Sangeti**. He has had a fever now for some time. Now he is worse, so I have come to you for help.

##### [All other information is provided only if the clinician asks!]

	Question Asked	Enumerator Response	Yes = 1 No = 2	Notes/other questions
<b>History Taking</b>				
1.	Duration of fever	One week	<input type="checkbox"/>	
2.	Pattern of fever/Presence or history of fever	Some days fine, some days very sick	<input type="checkbox"/>	
3.	Shiver or sweat	Yes	<input type="checkbox"/>	
4.	Convulsions	No	<input type="checkbox"/>	
5.	Vomiting	Yes, sometimes	<input type="checkbox"/>	
6.	Appetite	He eats, but not as much as usual, and sometimes he will vomit	<input type="checkbox"/>	
7.	Diarrhoea	No	<input type="checkbox"/>	
8.	Cough	Yes	<input type="checkbox"/>	
9.	Severity of cough	Not severe	<input type="checkbox"/>	
10.	Difficulty in breathing	No difficulty in breathing	<input type="checkbox"/>	
11.	Type of cough (productive or dry)	The cough is dry	<input type="checkbox"/>	
12.	Type of medication given	I started to give him Paracetamol	<input type="checkbox"/>	
13.	Amount	One dose two days ago, one yesterday and one this morning	<input type="checkbox"/>	
14.	Vaccinations	He has taken all vaccinations.	<input type="checkbox"/>	
<b>Physical Examination</b>				
15.	Hands (palmar pallor)	The nail beds are pale	<input type="checkbox"/>	
16.	Tongue	The tongue is pale	<input type="checkbox"/>	
17.	Eyes, sunken?	The eyes are not sunken	<input type="checkbox"/>	
18.	Eyes, pale colour?	The eyes are pale	<input type="checkbox"/>	
19.	Responsiveness / general condition	He is awake but lethargic	<input type="checkbox"/>	
20.	Skin condition	The skin is normal	<input type="checkbox"/>	
21.	Temperature	Temperature is 37.6 degrees (Celsius)	<input type="checkbox"/>	
22.	Pulse	Pulse is 95 per minute	<input type="checkbox"/>	
23.	Neck stiffness	Neck is not stiff	<input type="checkbox"/>	
24.	Puffy face	Face is not puffy	<input type="checkbox"/>	

# Medical Vignettes IRT Methodology

## Generating Knowledge Scores

Item response theory fits a predicted relationship for each survey item between the knowledge score and the likelihood of completing the item correctly.

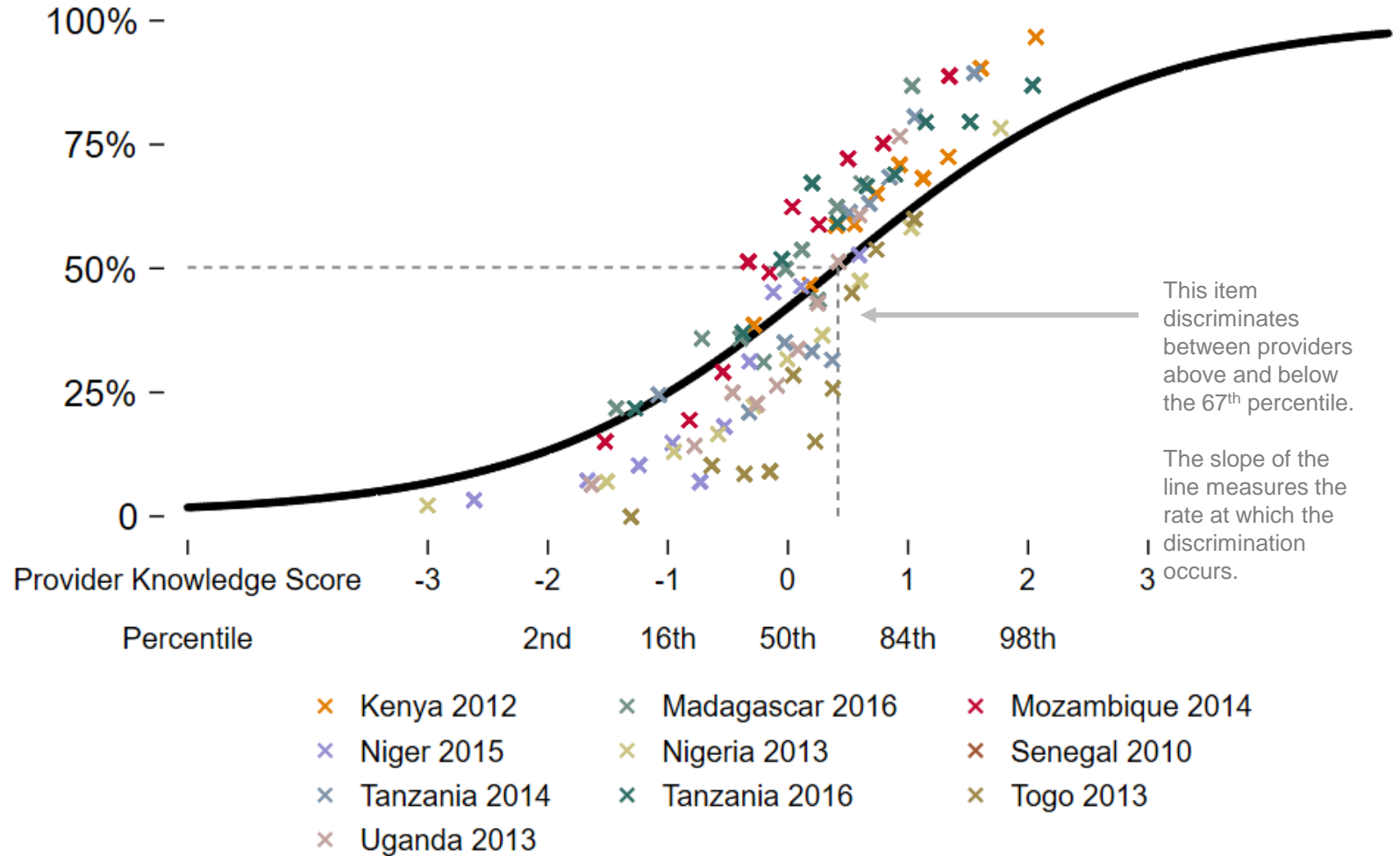
A given provider's knowledge score is predicted based on the parameters established for all questions and the provider's responses to those questions.

Using IRT, providers across slightly different surveys (completed in different countries) can be compared.

The predicted response curve and actual decile performance rates for a single item are illustrated here.

## Diabetes Type 2

History: Urinary output



# Diagnostic Knowledge Assessment

SDI – Madagascar

# Diagnostic Knowledge Assessment

## Summary of Performance Across Vignettes

For each vignette, enumerators are only able to check off the questions and exams already listed in the survey instrument.

As a result, the “fraction of questions” and “fraction of exams”, rather than the raw number of questions and exams, are used in subsequent analysis.

	Child Diarrhea + Dehydration	Child Pneumonia	Diabetes (Type II)	Tuberculosis	Child Malaria + Anemia	Post-Partum Hemorrhage	Neonatal Asphyxia
<b>Number Who Did Vignette</b>	640	639	638	638	637	634	596
<b>Did Not Do Vignette</b>	2	3	4	4	5	8	46
<b>History Taking</b>							
<b>Mean Questions Asked</b>	6.7	5.0	4.1	5.8	4.5	2.6	n/a
<b>Fraction of Available Questions</b>	29.1%	23.9%	17.8%	26.4%	21.7%	13.7%	n/a
<b>Physical Examination</b>							
<b>Mean Exams Done</b>	3.1	3.1	1.9	1.6	2.1	3.2	1.2
<b>Fraction of Available Exams</b>	17.1%	22.1%	15.7%	19.9%	9.8%	24.7%	20.7%

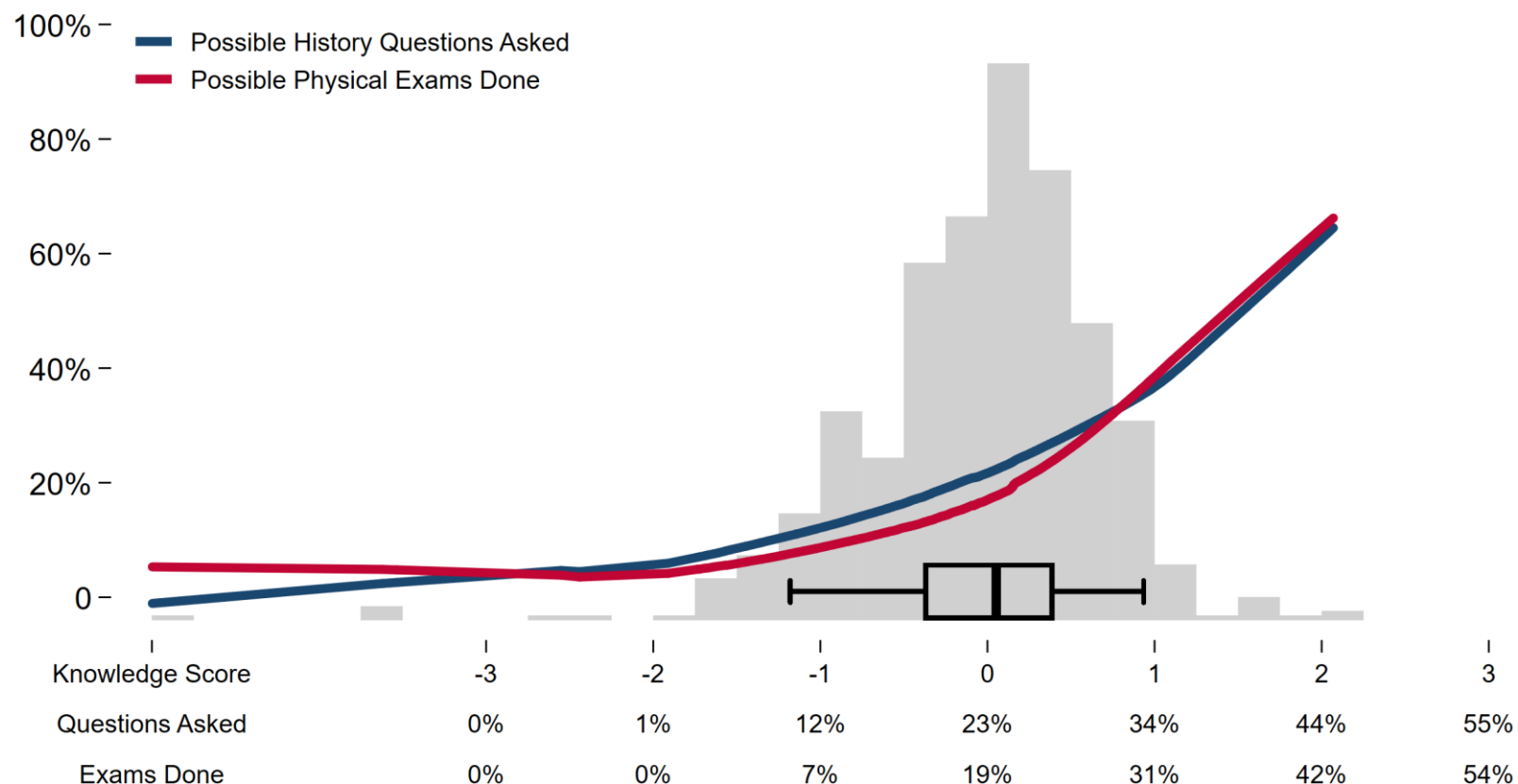
# Diagnostic Knowledge Assessment

## Knowledge Score Distribution and Measures of Effort

The distribution of knowledge scores obtained from IRT analysis is approximately normal.

The knowledge score is a good predictor of the fraction of history questions asked and physical exams done by providers.

The box plot shows the 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentiles for reference.

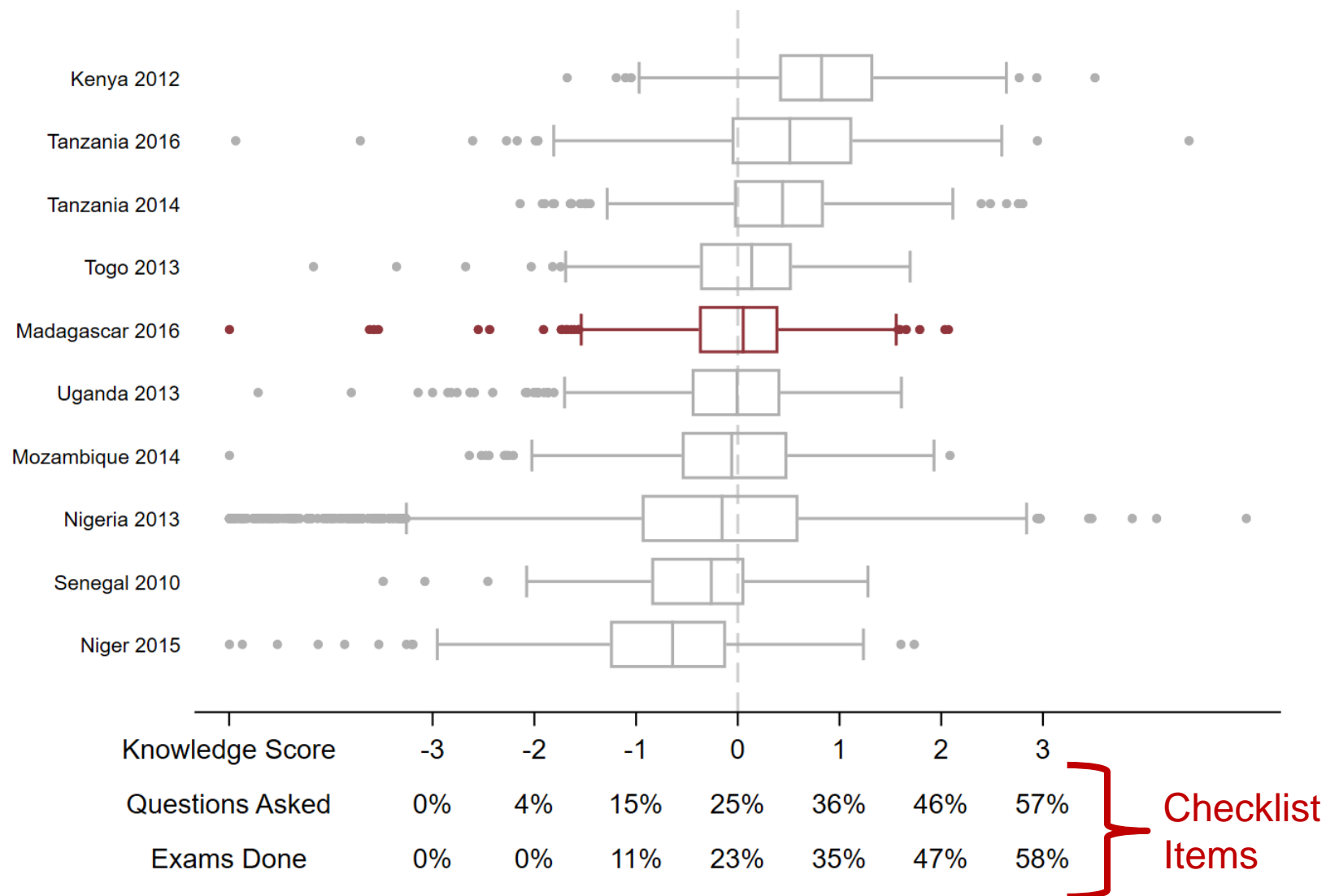


"Possible history questions asked" includes diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.  
 "Possible physical exams done" includes neonatal asphyxia, diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.

# Diagnostic Knowledge Assessment

## Knowledge Score Distribution Compared to Other Countries

The boxplot shows the distribution of provider knowledge in Madagascar as compared to the distribution of provider knowledge in other countries. The countries are ranked by their median knowledge score.



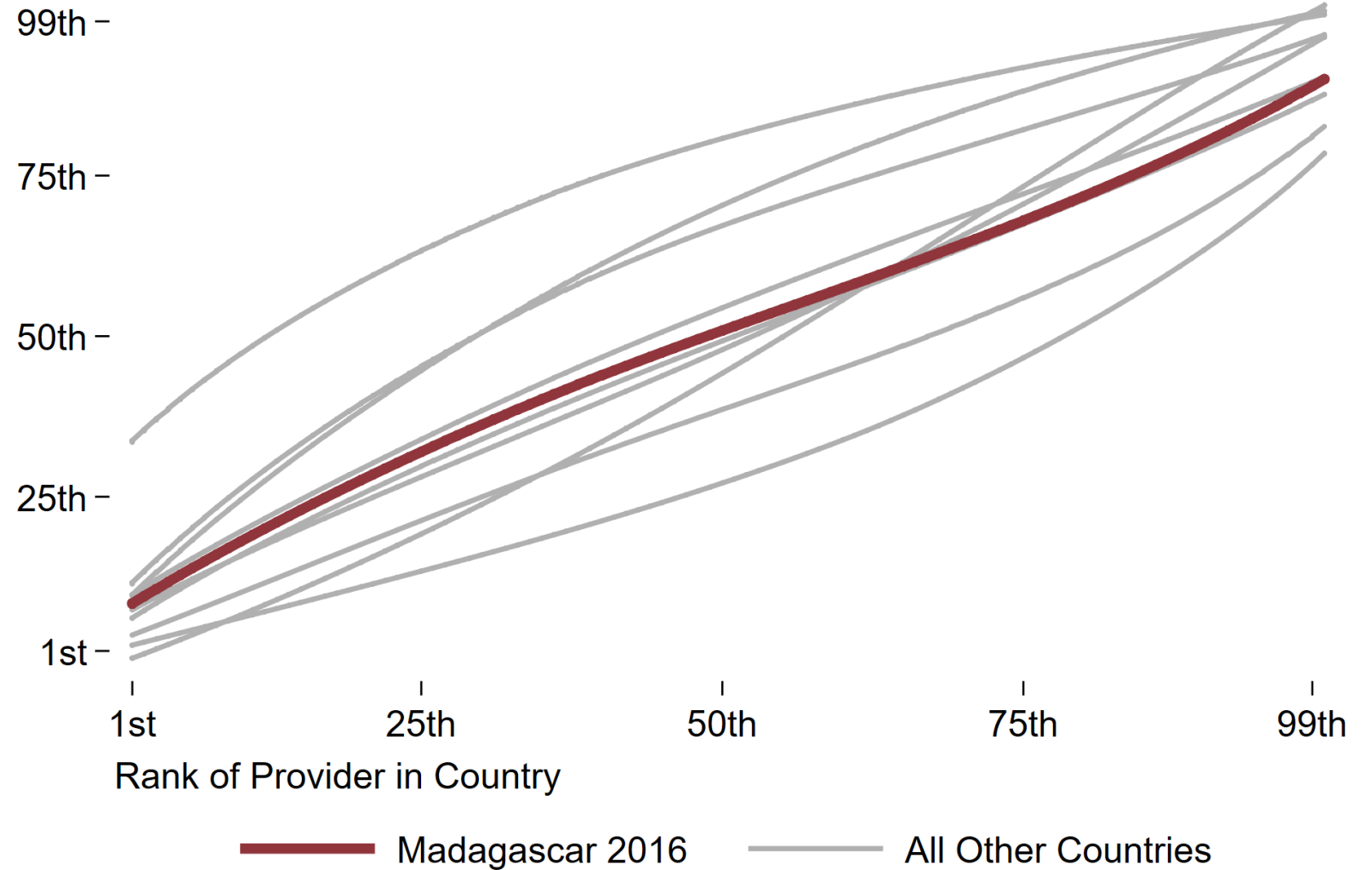
# Diagnostic Knowledge Assessment

## Providers' Percentile Ranking

In the following figure, one can see how the median provider in Madagascar compares to the global distribution.

In addition, one can see where the median provider in the global distribution is in the Madagascar rankings. In other words, is the median provider one of the best providers, one of the worst, or average.

### Rank of Provider Overall



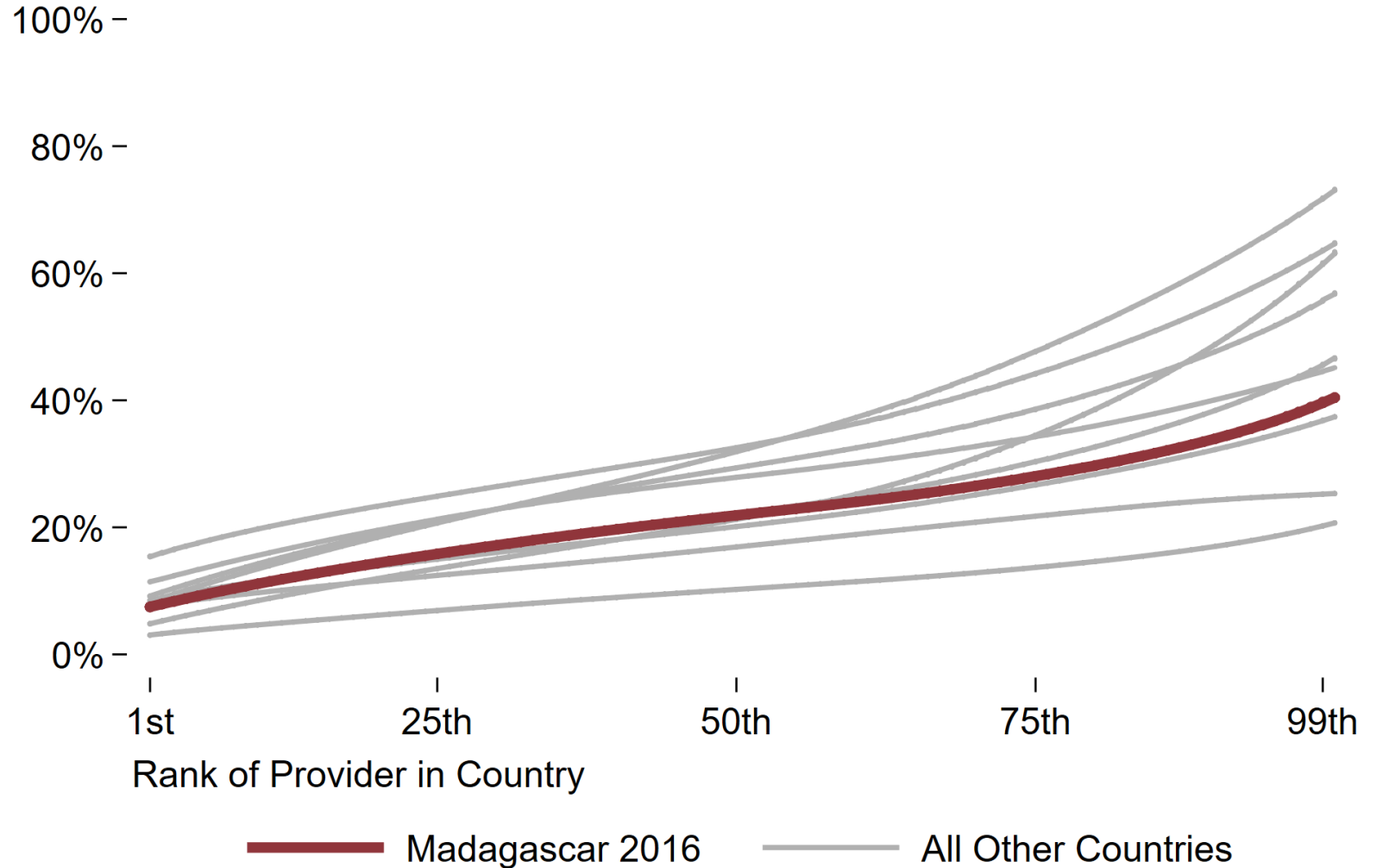
# Diagnostic Knowledge Assessment

## History Taking Behavior in Madagascar Compared to Other Countries

Here, one can compare the most and least knowledgeable providers in Madagascar to see whether the best performing providers ask more of the items on the history taking checklist.

In addition, the figure shows how the best and worst providers in Madagascar compare to the best and worst providers in other countries with regard to how much of the history checklist they complete.

### Fraction of Possible History Questions Asked



History questions include diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.

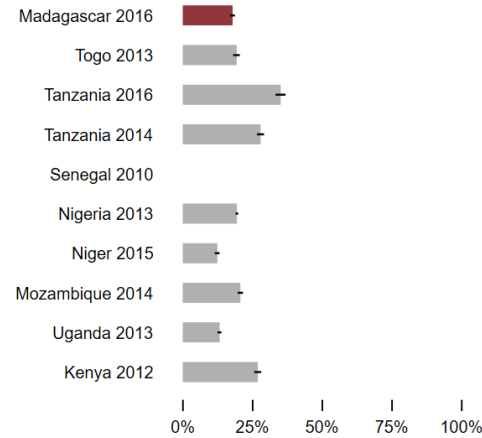


# Diagnostic Knowledge Assessment

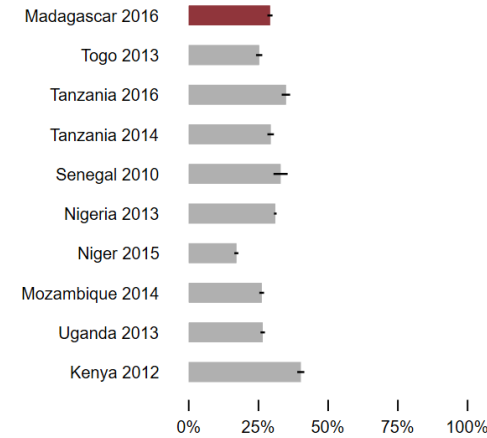
Vignette-Specific History Taking Behavior Compared to Other Countries

## Fraction of Possible History Questions Asked

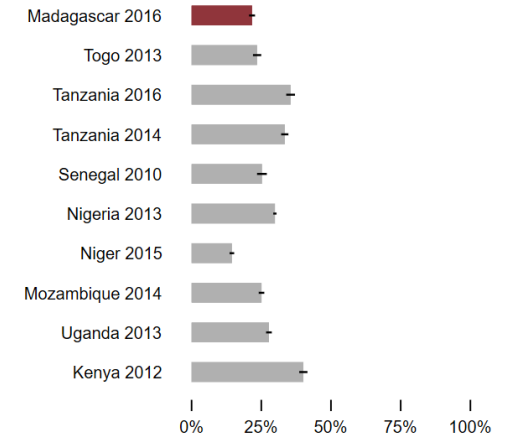
Diabetes Type 2



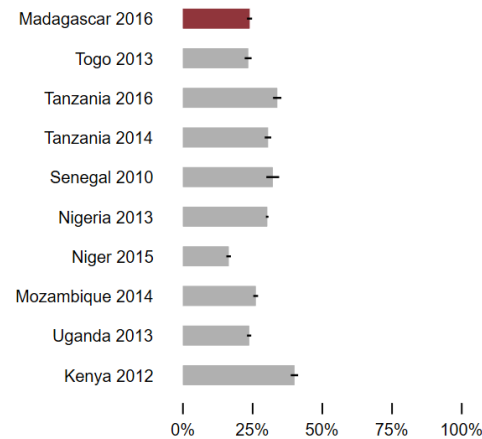
Diarrhea+Dehydration



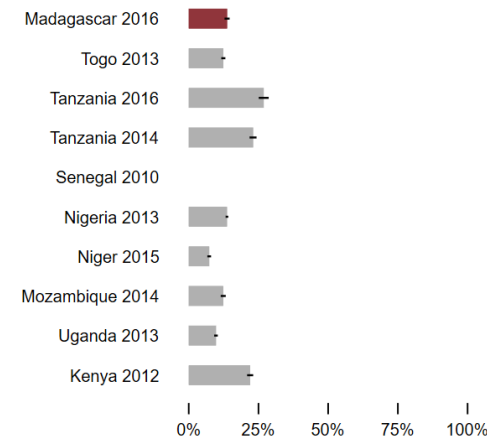
Malaria+Anemia



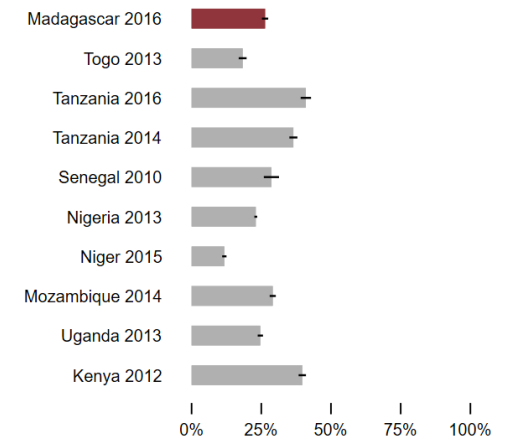
Pneumonia



Post-Partum Hemorrhage



Tuberculosis

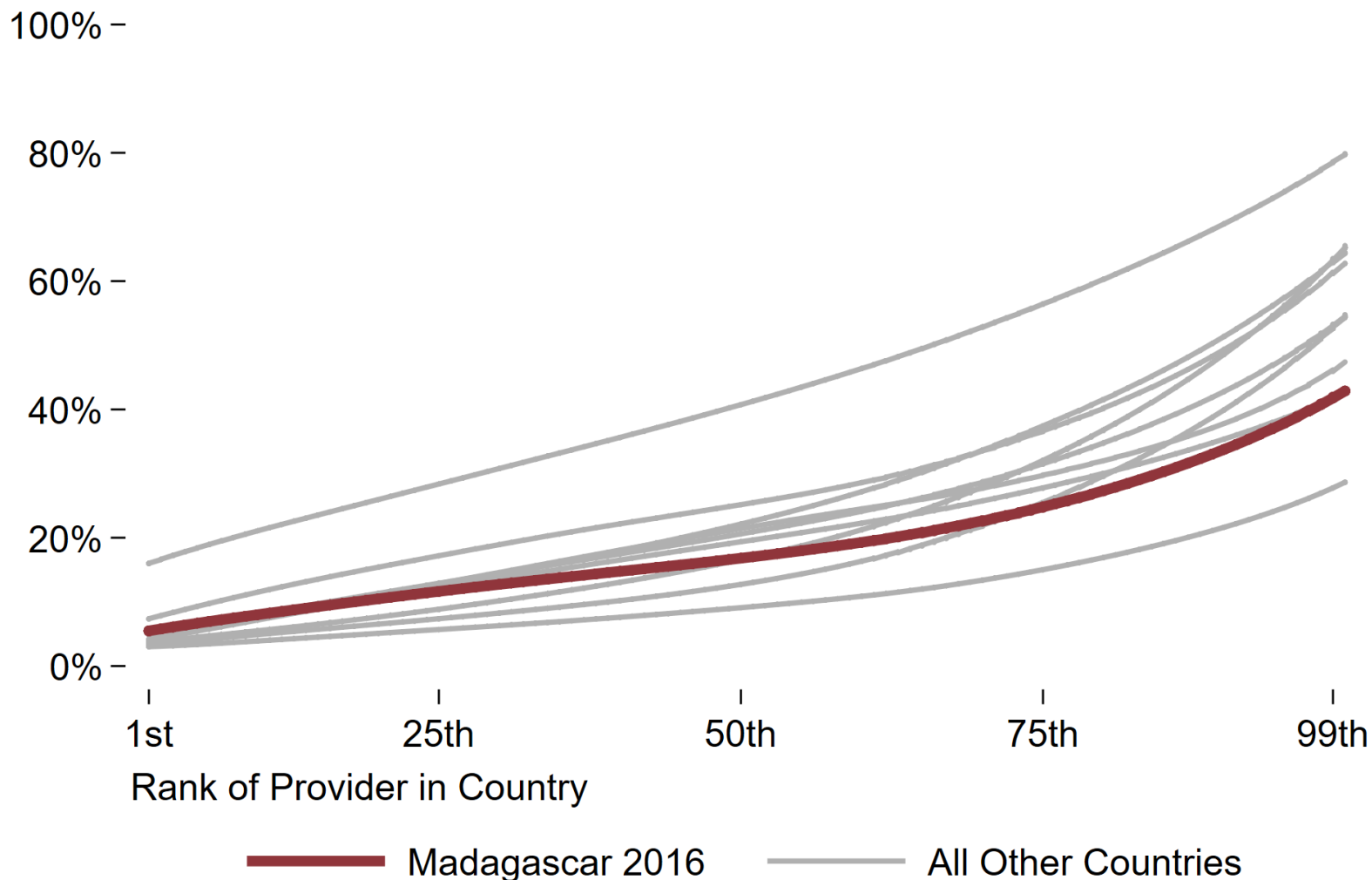


# Diagnostic Knowledge Assessment

## Physical Examination Behavior in Madagascar Compared to Other Countries

As with history taking, the following figure allows one to compare physical examination choices across the spectrum of provider knowledge. This helps answer the question: do the best performing providers do more physical exams?

Fraction of Possible Physical Exams Done



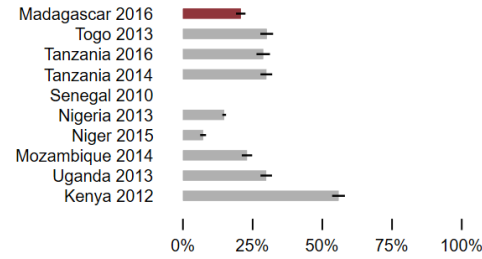
Physical exams include neonatal asphyxia, diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.

# Diagnostic Knowledge Assessment

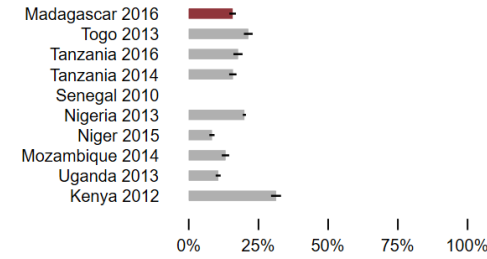
Vignette-Specific Physical Examination Behavior Compared to Other Countries

## Fraction of Possible Physical Exams Done

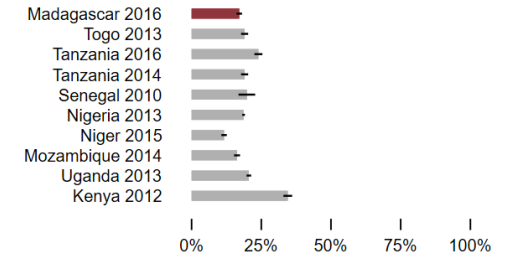
Neonatal Asphyxia



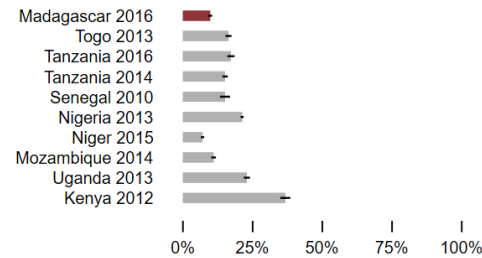
Diabetes Type 2



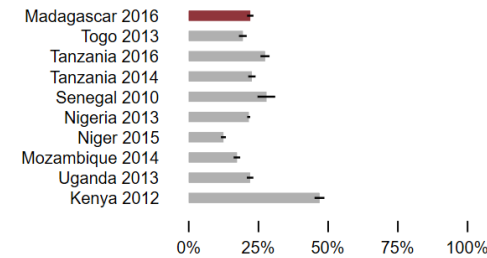
Diarrhea+Dehydration



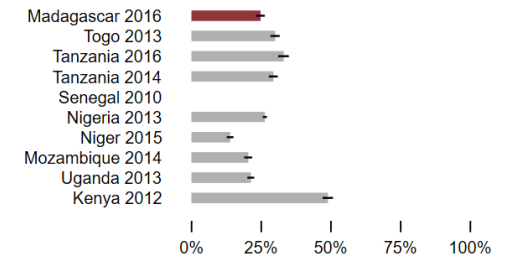
Malaria+Anemia



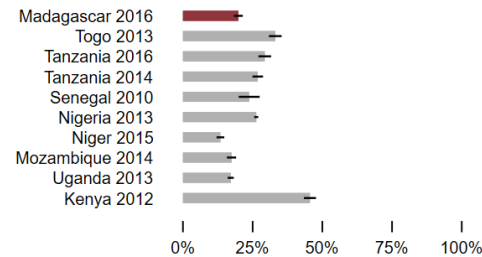
Pneumonia



Post-Partum Hemorrhage



Tuberculosis



# Diagnostic – Treatment Linkages

SDI – Madagascar

# Diagnostic – Treatment Linkages

## Summary of Performance Across Vignettes

In the case of vignettes that presented comorbidities, a provider only received credit for a correct diagnosis when he or she specified each morbidity.

Correct management was decided by comparing the providers' choices to international guidelines as much as possible given that the presentation of treatment options varied from country to country.

Several vignettes listed antibiotics as a treatment option although prescribing antibiotics for the particular vignette go against clinical management guidelines. These were identified separately to see whether providers are doing more unnecessary treatment.

	Child Diarrhea + Dehydration	Child Pneumonia	Diabetes (Type II)	Tuberculosis	Child Malaria + Anemia	Post-Partum Hemorrhage	Neonatal Asphyxia
<b>Number Who Did Vignette</b>	640	639	638	638	637	634	596
<b>Did Not Do Vignette</b>	2	3	4	4	5	8	46
<b>Identifying Condition Presented</b>							
<b>Correct Diagnosis</b>	104 (16%)	234 (37%)	92 (14%)	561 (88%)	1 (0%)	327 (52%)	238 (40%)
<b>Incorrect Diagnosis</b>	536 (84%)	405 (63%)	546 (86%)	77 (12%)	636 (100%)	307 (48%)	358 (60%)
<b>Prescribing Appropriate Treatment</b>							
<b>Correct Treatment</b>	48 (7%)	398 (62%)	379 (59%)	269 (42%)	8 (1%)	39 (6%)	202 (34%)
<b>Incorrect Treatment</b>	592 (93%)	241 (38%)	259 (41%)	369 (58%)	629 (99%)	595 (94%)	394 (66%)
<b>Inappropriate Antibiotics Usage</b>							
<b>Gave Incorrect Antibiotics</b>	188 (29%)	88 (14%)	n/a	52 (8%)	n/a	n/a	n/a
<b>Did Not Give Incorrect Antibiotics</b>	442 (71%)	551 (86%)	n/a	586 (92%)	n/a	n/a	n/a
<b>Ordering Tests</b>							
<b>Number of Tests Ordered</b>	0.1	0.5	0.9	1.0	1.0	0.2	n/a

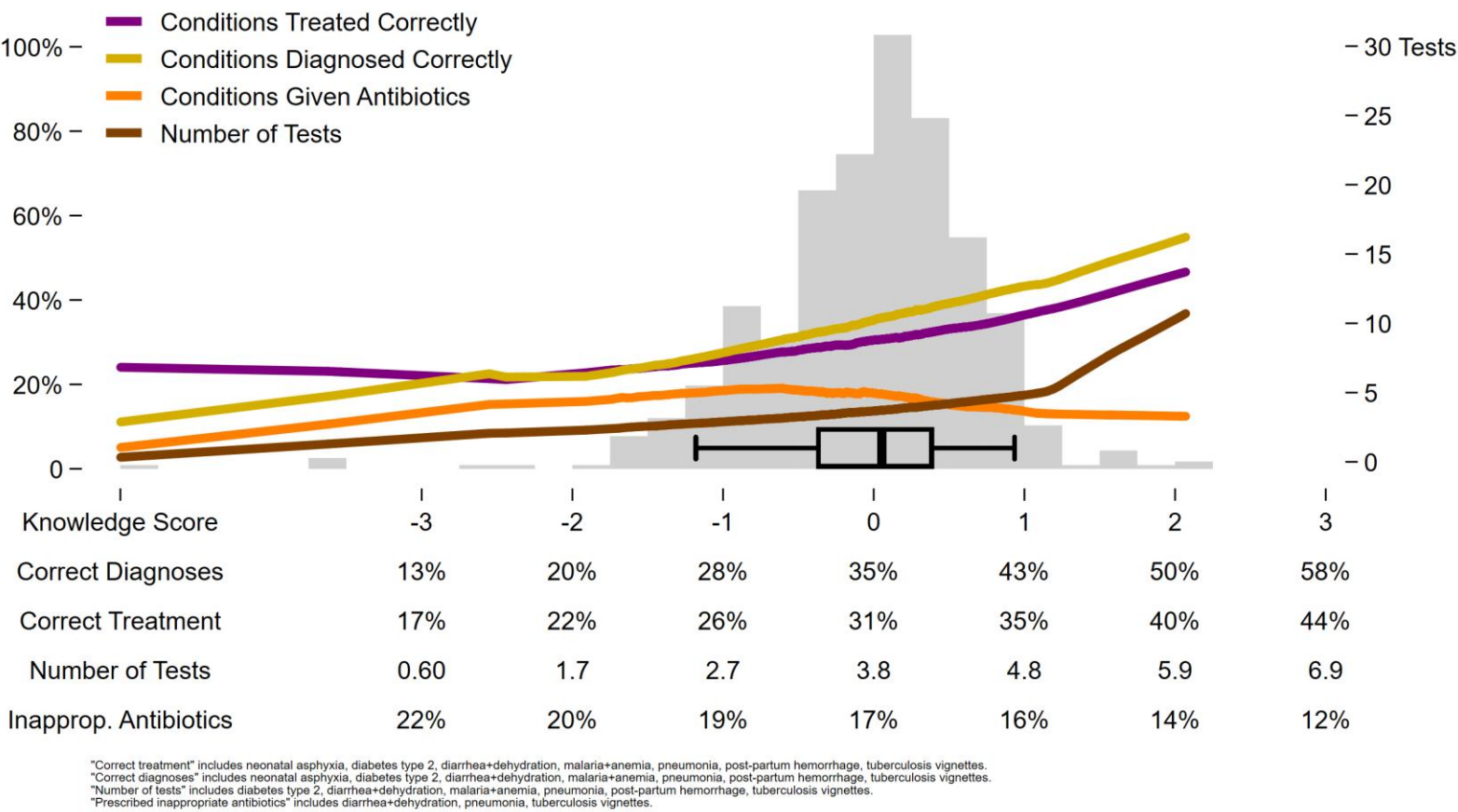
# Diagnostic – Treatment Linkages

## Knowledge Score Distribution and Measures of Quality

The knowledge score is a good predictor of the whether providers correctly treat the given conditions, correctly diagnose the given conditions, and order more tests.

The relationship between whether more knowledgeable providers also prescribe more inappropriate antibiotics is presented in the figure.

The box plot shows the 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentiles for reference.

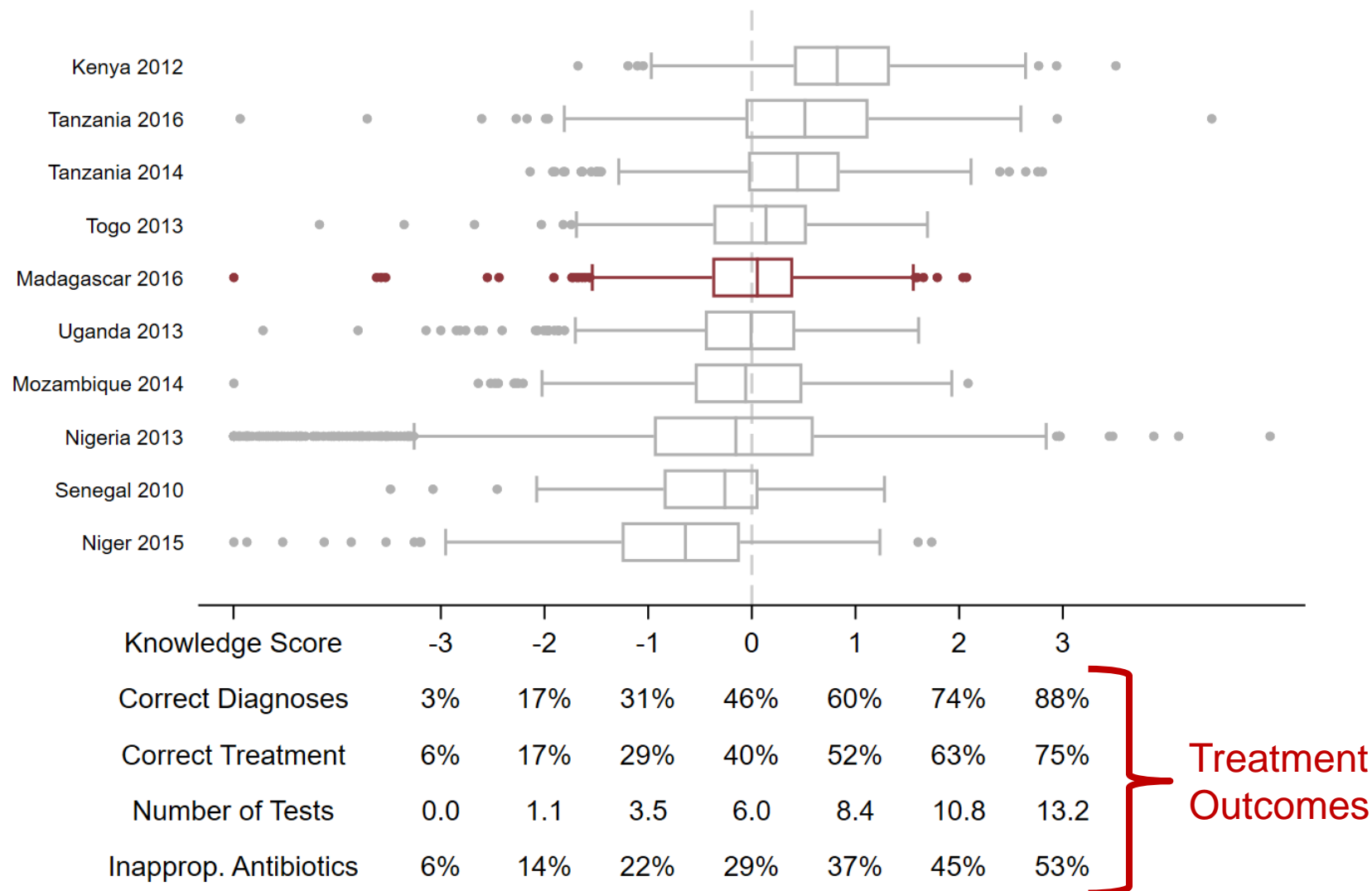


# Diagnostic – Treatment Linkages

## Knowledge Score Distribution Compared to Other Countries

Again, the distribution of provider knowledge in Madagascar is compared to the distribution of provider knowledge in other countries. The countries are ranked by their median knowledge score.

From the figure, one can also see how many more diagnoses, treatments, and tests are ordered as a provider's knowledge score increases by one standard deviation.



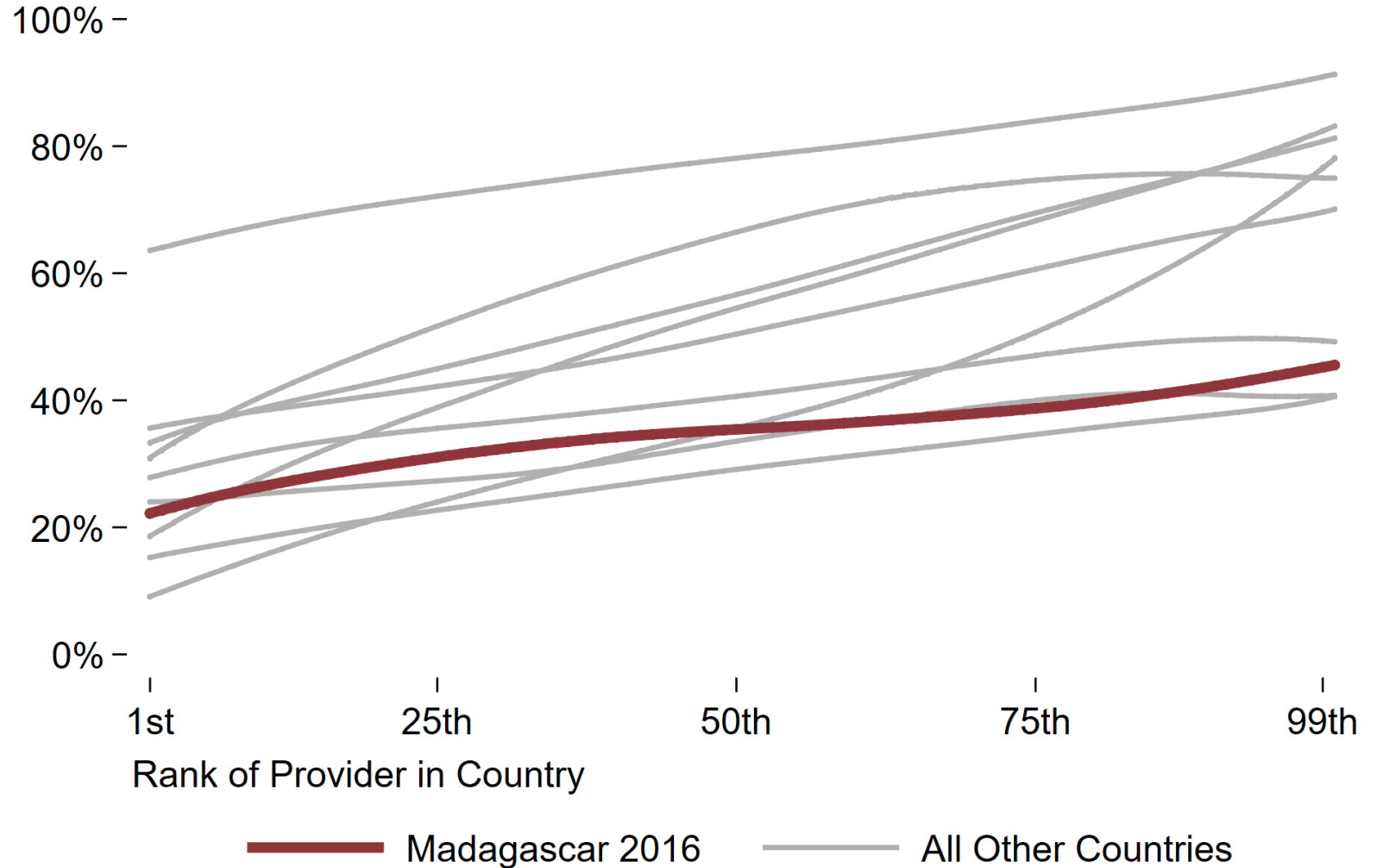
# Diagnostic – Treatment Linkages

## Diagnosis Behavior in Madagascar Compared to Other Countries

In the figure, one can determine whether the best performing providers are able to diagnose more conditions correctly compared to the worst providers in Madagascar.

The figure also shows how the diagnostic ability of the best providers in Madagascar compares to that of the best providers in other countries.

### Fraction of Conditions Diagnosed Correctly



Correct diagnoses include neonatal asphyxia, diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.

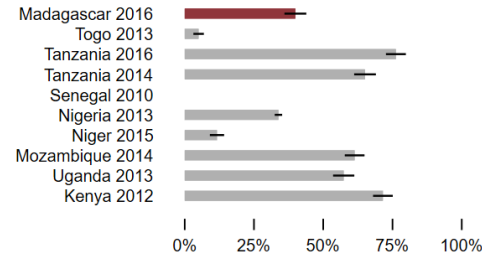


# Diagnostic – Treatment Linkages

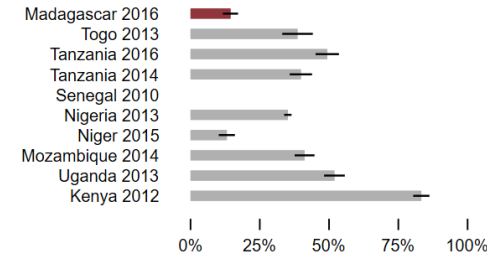
Vignette-Specific  
Diagnosis Behavior  
Compared to Other  
Countries

## Fraction Who Correctly Diagnosed Condition

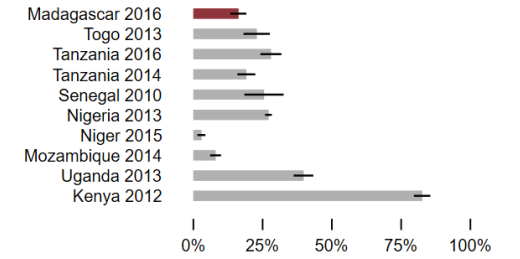
### Neonatal Asphyxia



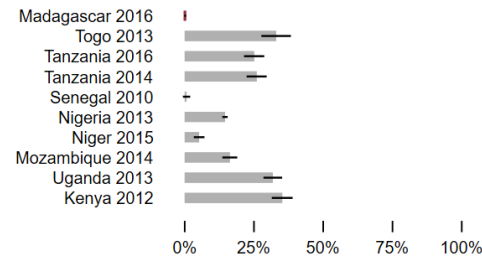
### Diabetes Type 2



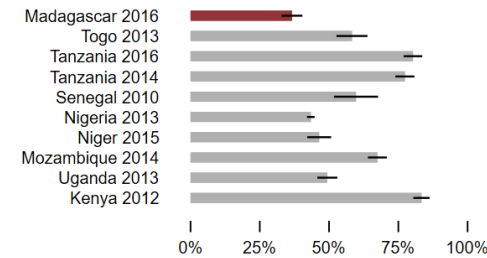
### Diarrhea+Dehydration



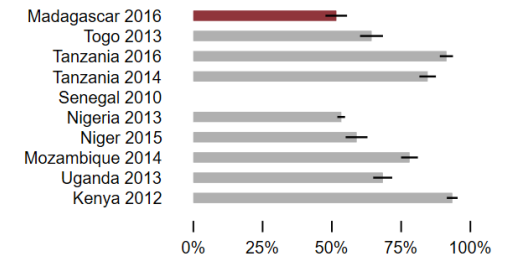
### Malaria+Anemia



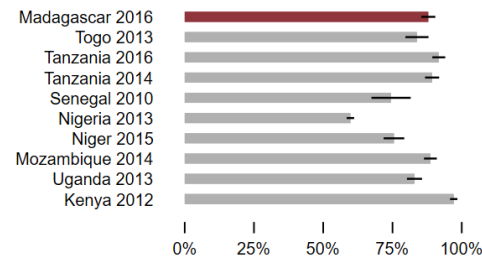
### Pneumonia



### Post-Partum Hemorrhage



### Tuberculosis



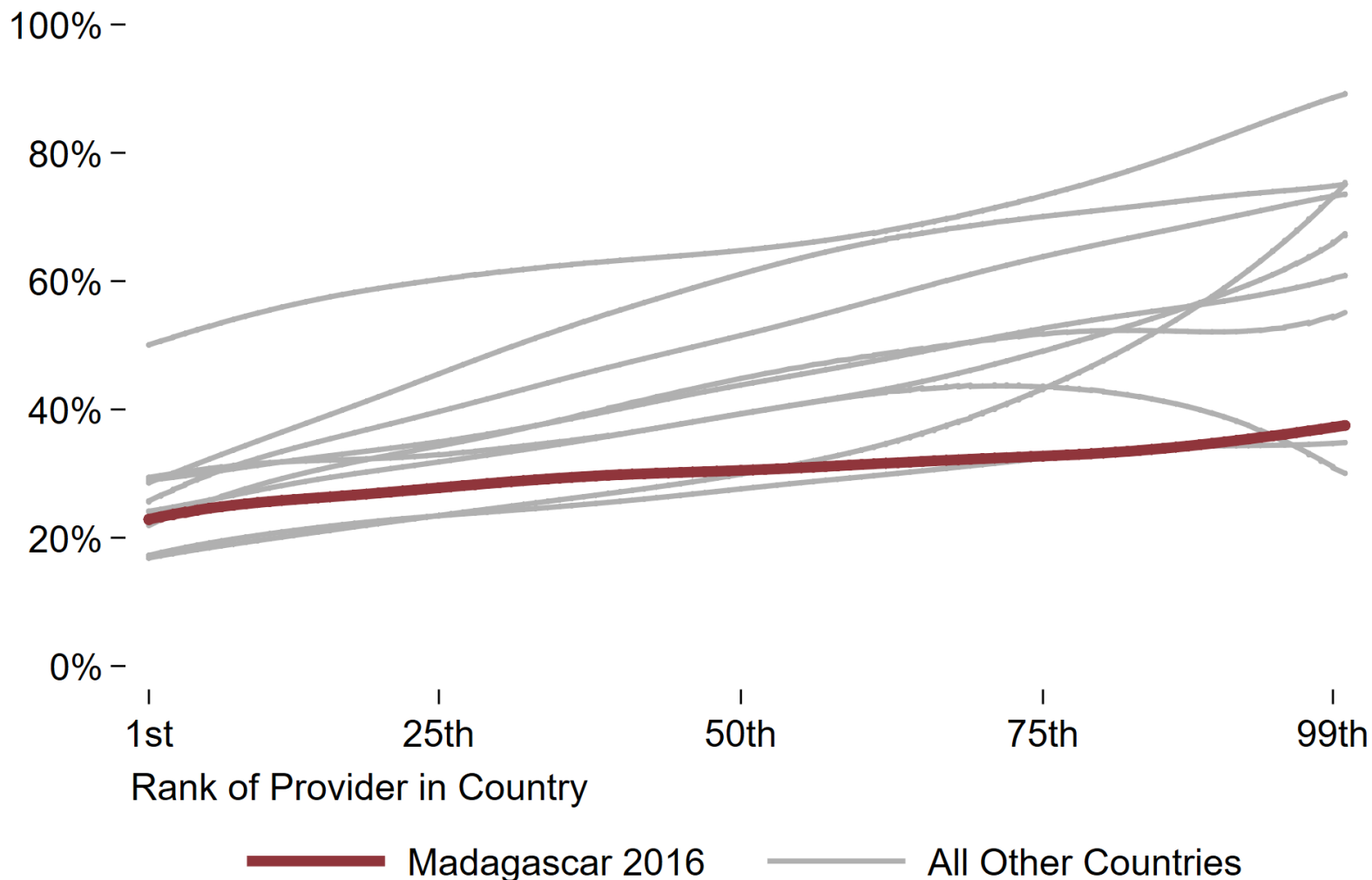
# Diagnostic – Treatment Linkages

## Treatment Behavior in Madagascar Compared to Other Countries

Here, one can see how a provider's ability to manage the vignette conditions correctly changes as the provider's knowledge increases.

In addition, one can see whether the difference in treatment accuracy between the best and worst provider in Madagascar is comparable to the differences observed in other countries.

### Fraction of Conditions Treated Correctly



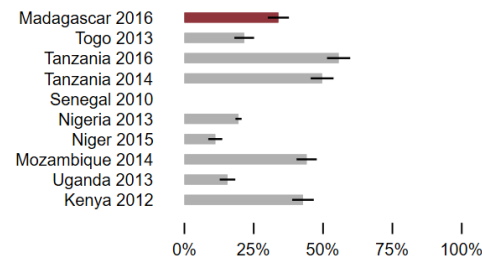
Correct treatments include neonatal asphyxia, diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.

# Diagnostic – Treatment Linkages

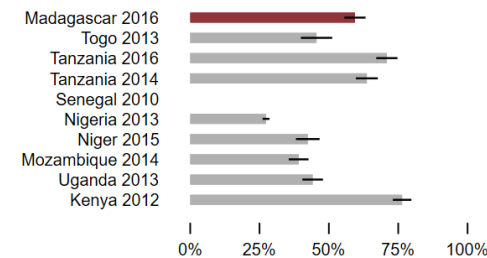
Vignette-Specific Treatment Behavior Compared to Other Countries

## Fraction Who Correctly Treated Condition

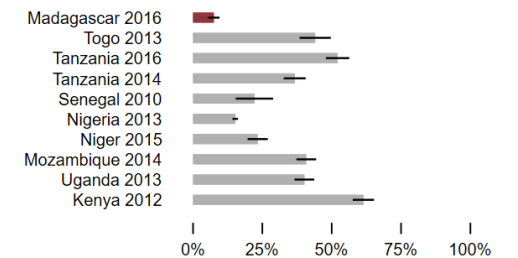
### Neonatal Asphyxia



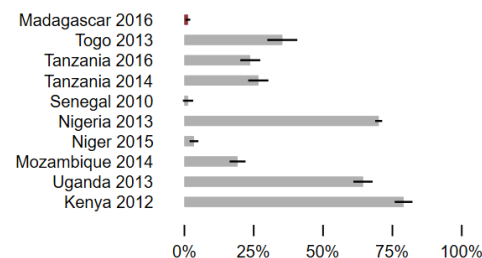
### Diabetes Type 2



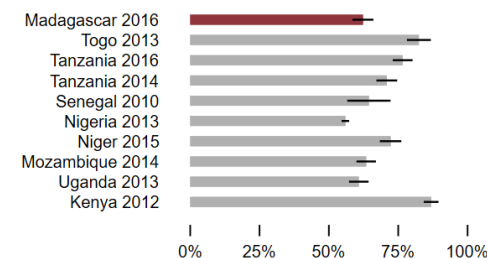
### Diarrhea+Dehydration



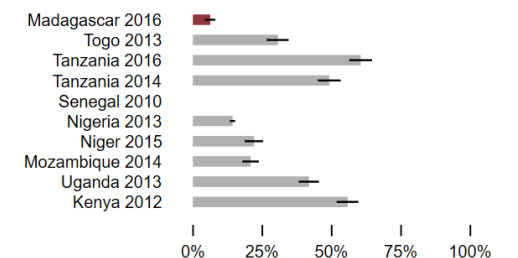
### Malaria+Anemia



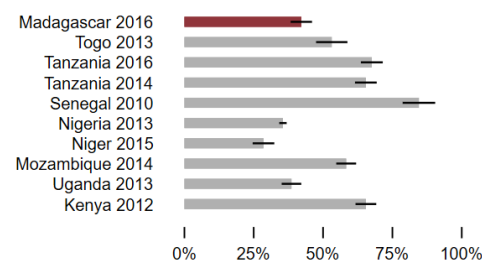
### Pneumonia



### Post-Partum Hemorrhage



### Tuberculosis



# Diagnostic – Treatment Linkages

## Test Ordering Behavior in Madagascar Compared to Other Countries

In the figure, one is able to determine the average number of tests ordered by a given provider as he or she moved from the lowest rank in the country to the highest rank.

The figure also allows one to see how providers in Madagascar compare to providers in other countries with regard to the number of tests they order, on average.

### Number of Tests Done

30 Tests –

25 –

20 –

15 –

10 –

5 –

0 –

1st

25th

50th

75th

99th

Rank of Provider in Country



Madagascar 2016



All Other Countries

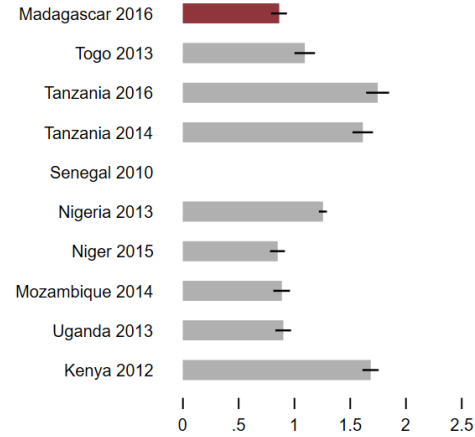
Tests include diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.

# Diagnostic – Treatment Linkages

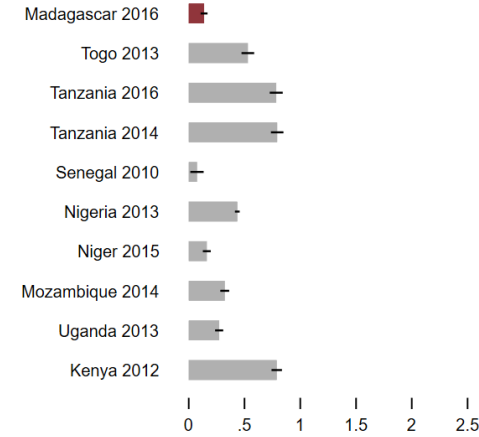
Vignette-Specific Test Ordering Behavior Compared to Other Countries

## Number of Tests Done

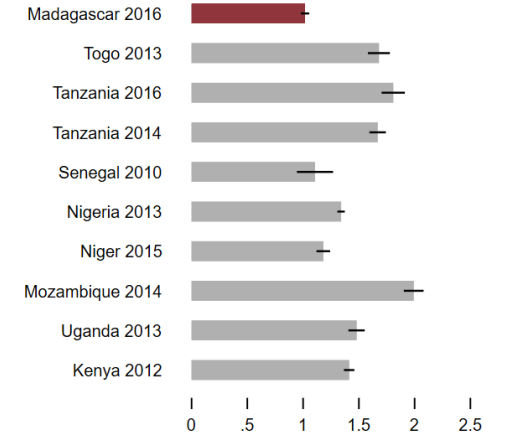
### Diabetes Type 2



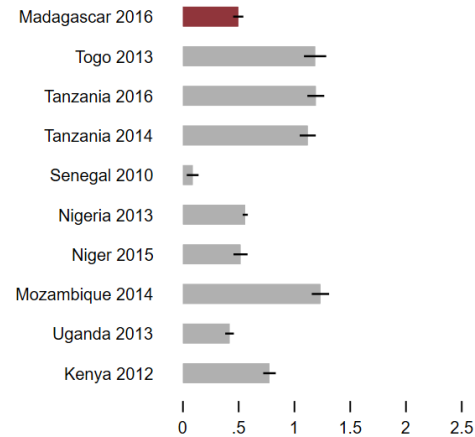
### Diarrhea+Dehydration



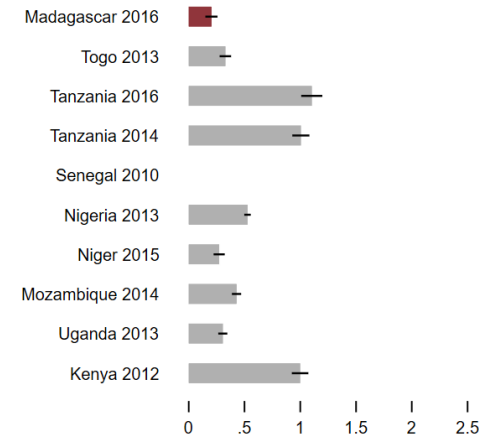
### Malaria+Anemia



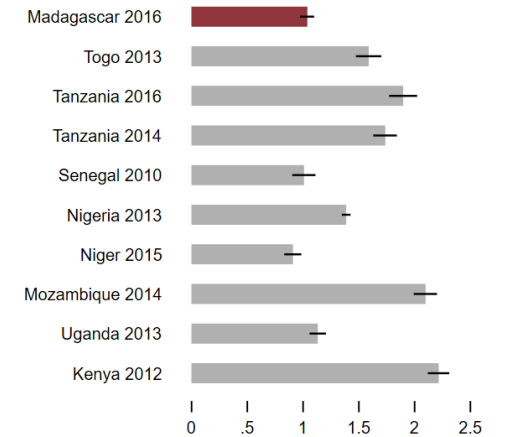
### Pneumonia



### Post-Partum Hemorrhage



### Tuberculosis



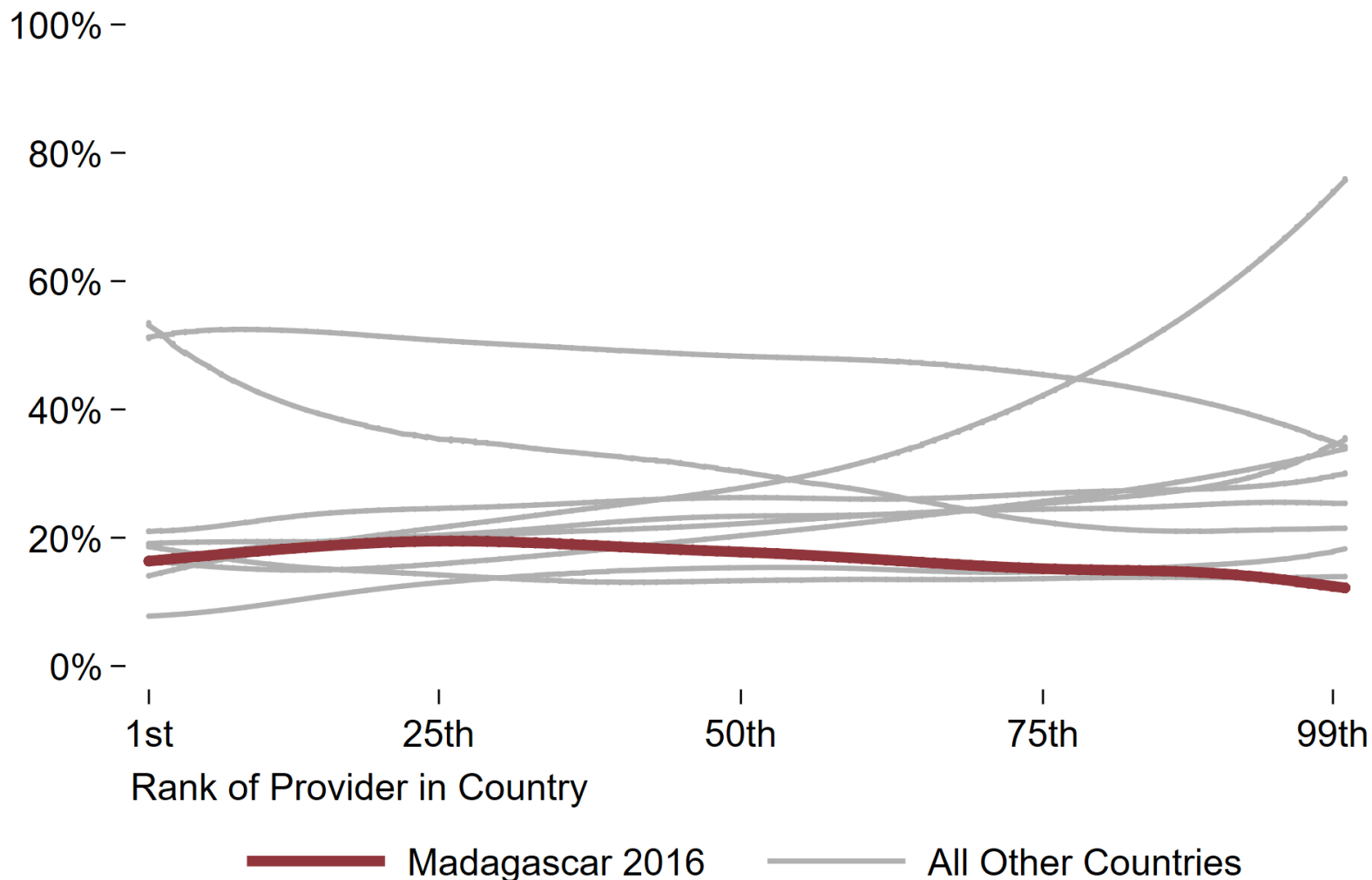
# Diagnostic – Treatment Linkages

## Antibiotic Prescription Behavior in Madagascar Compared to Other Countries

Finally, it is important to determine whether more knowledgeable providers are then more likely to prescribe unnecessary antibiotics.

In the given figure, one can address that question, and additionally compare the antibiotics prescription behavior in Madagascar to that in other countries across the knowledge spectrum.

Fraction of Conditions Given Inappropriate Antibiotics



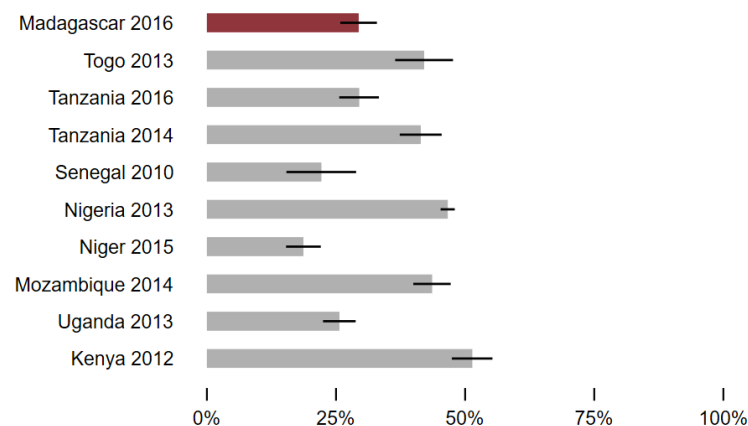
Inappropriate antibiotics include diarrhea+dehydration, pneumonia, tuberculosis vignettes.

# Diagnostic – Treatment Linkages

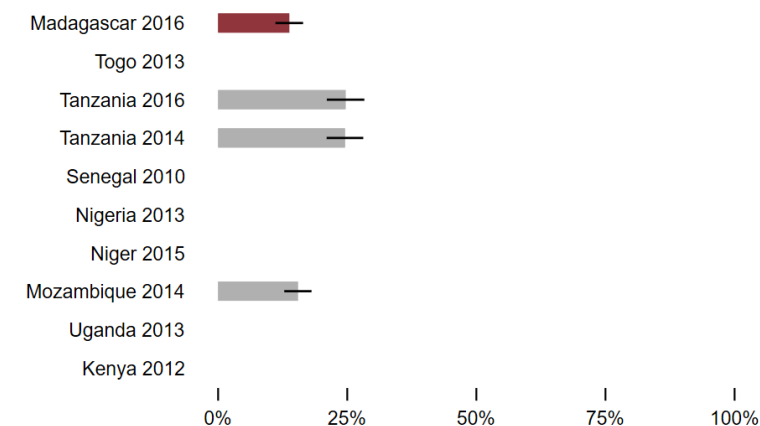
Vignette-Specific Antibiotic Prescription Behavior Compared to Other Countries

## Fraction Who Prescribed Inappropriate Antibiotics

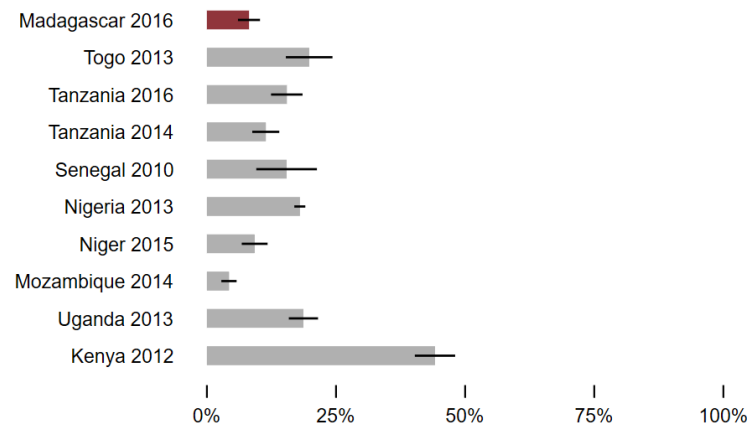
### Diarrhea+Dehydration



### Pneumonia



### Tuberculosis



# Demographic Variation in Diagnostics & Treatment

SDI – Madagascar



# Demographic Variation

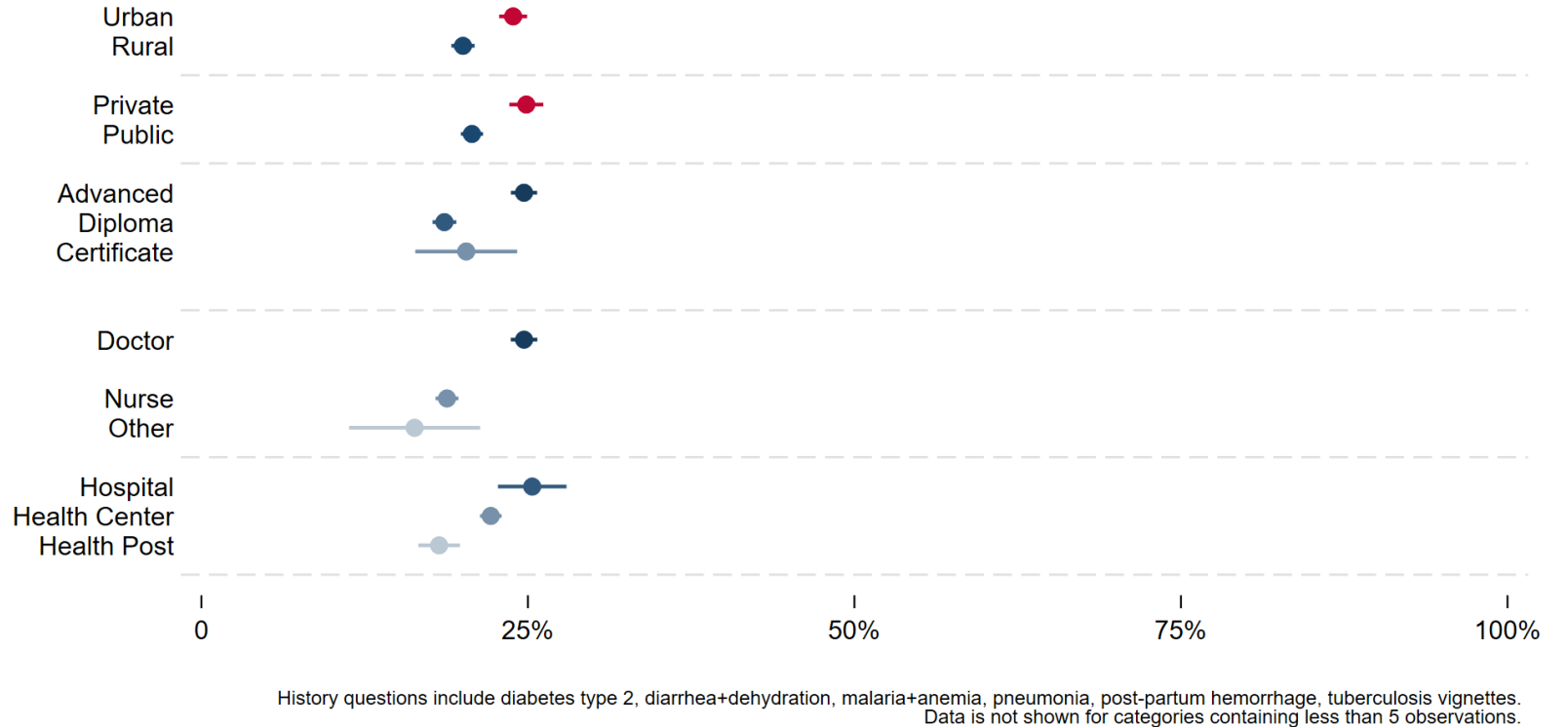
## History Taking Behavior Across Different Provider Characteristics

In the figure, the variation among different groups of providers in the fraction of the history checklist completed is shown.

Thus, one can compare whether providers in one type of facility ask more or less questions. In addition, one can compare whether providers of different medical backgrounds ask more or less questions.

The mean values with a 95% confidence interval are shown.

## Fraction of Possible History Questions Asked



# Demographic Variation

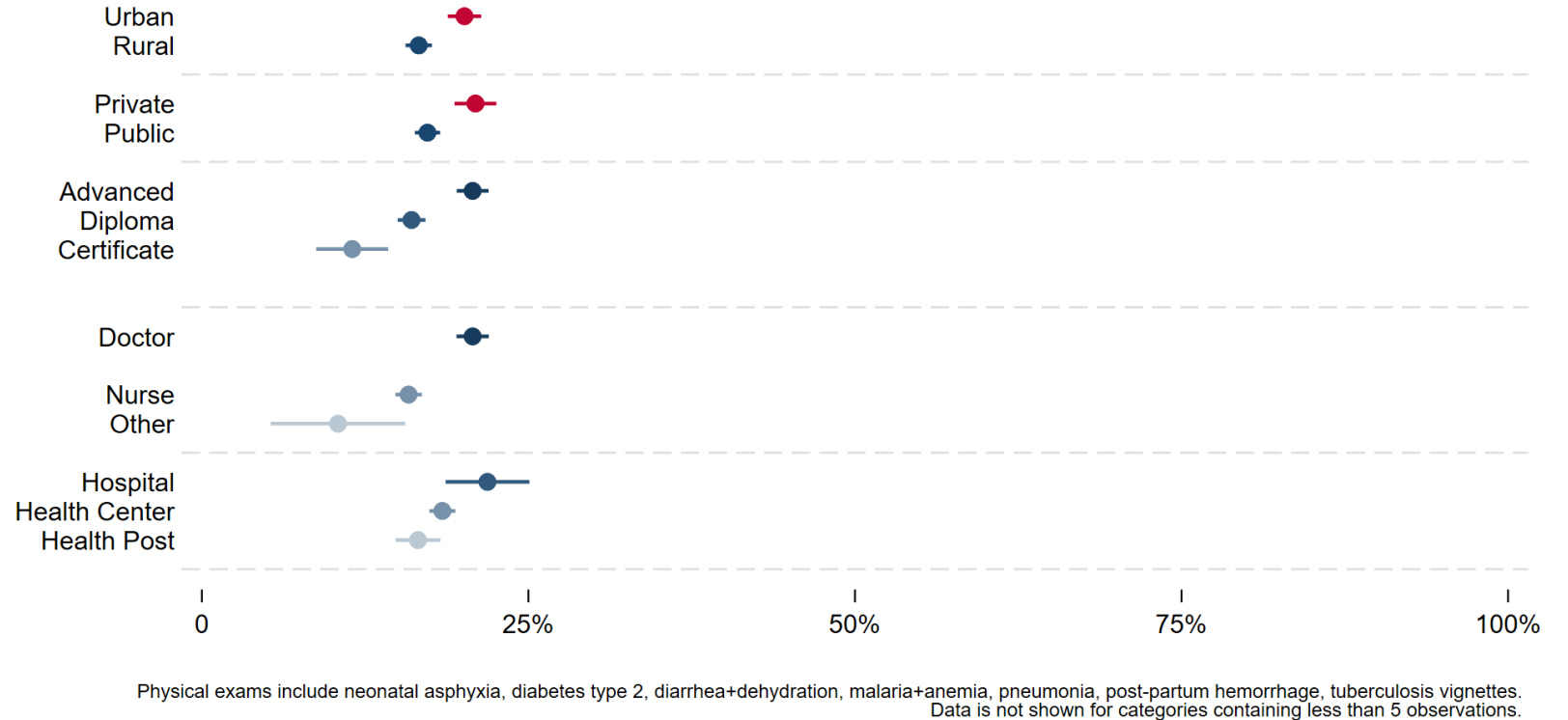
## Physical Examination Behavior Across Different Provider Characteristics

Here, one can see whether providers in particular groups complete more physical examinations than others.

Specifically, providers who work in urban versus rural and public versus private are compared. In addition, providers who work in different tiers of the healthcare system are compared. Finally, providers with different medical backgrounds are compared to see if those with more training perform more exams than their less-trained colleagues.

The mean values with a 95% confidence interval are shown.

## Fraction of Possible Physical Exams Done



# Demographic Variation

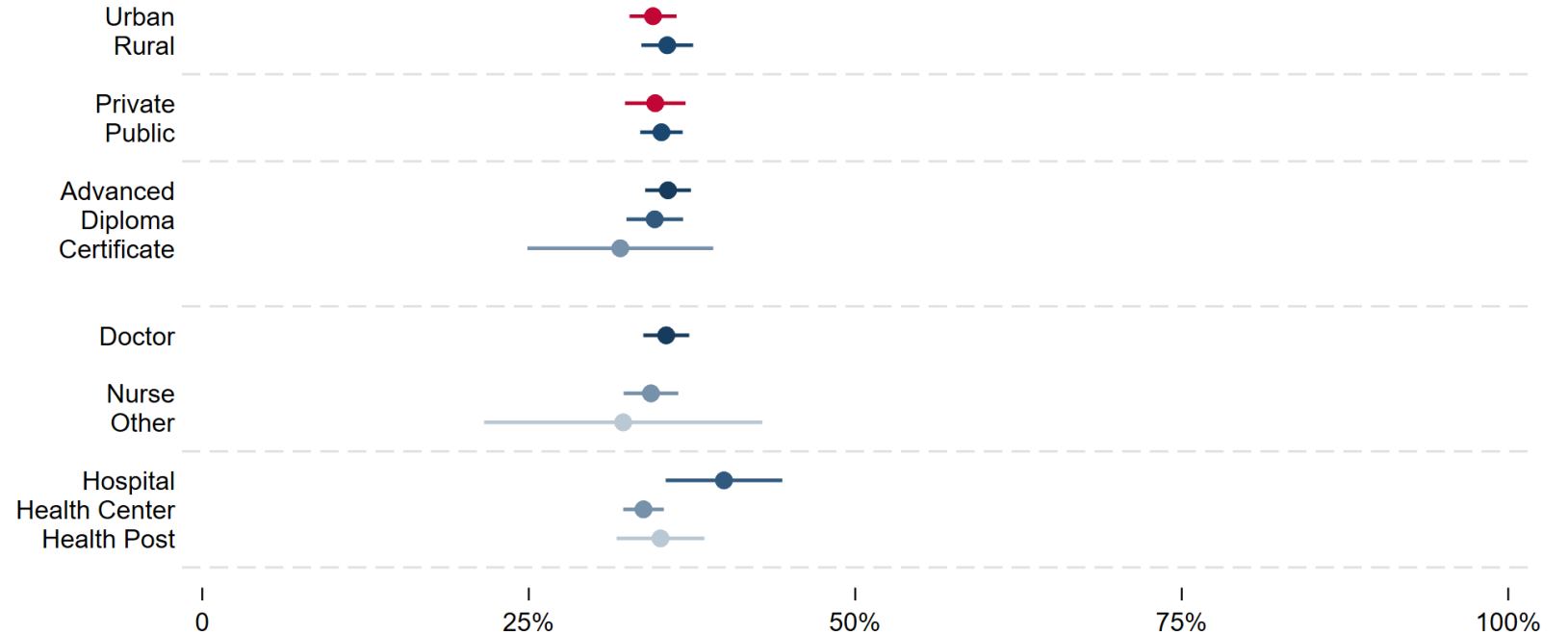
## Diagnosis Behavior Across Different Provider Characteristics

Among other categorizations, the figure shows whether doctors diagnose more conditions accurately as compared to nurses.

In addition, the figure shows whether providers in urban settings are able to identify more of the vignette conditions compared to rural providers.

The mean values with a 95% confidence interval are shown.

## Fraction of Conditions Diagnosed Correctly



Correct diagnoses include neonatal asphyxia, diabetes type 2, diarrhea+dehydration, malaria+anemia, pneumonia, post-partum hemorrhage, tuberculosis vignettes.  
Data is not shown for categories containing less than 5 observations.

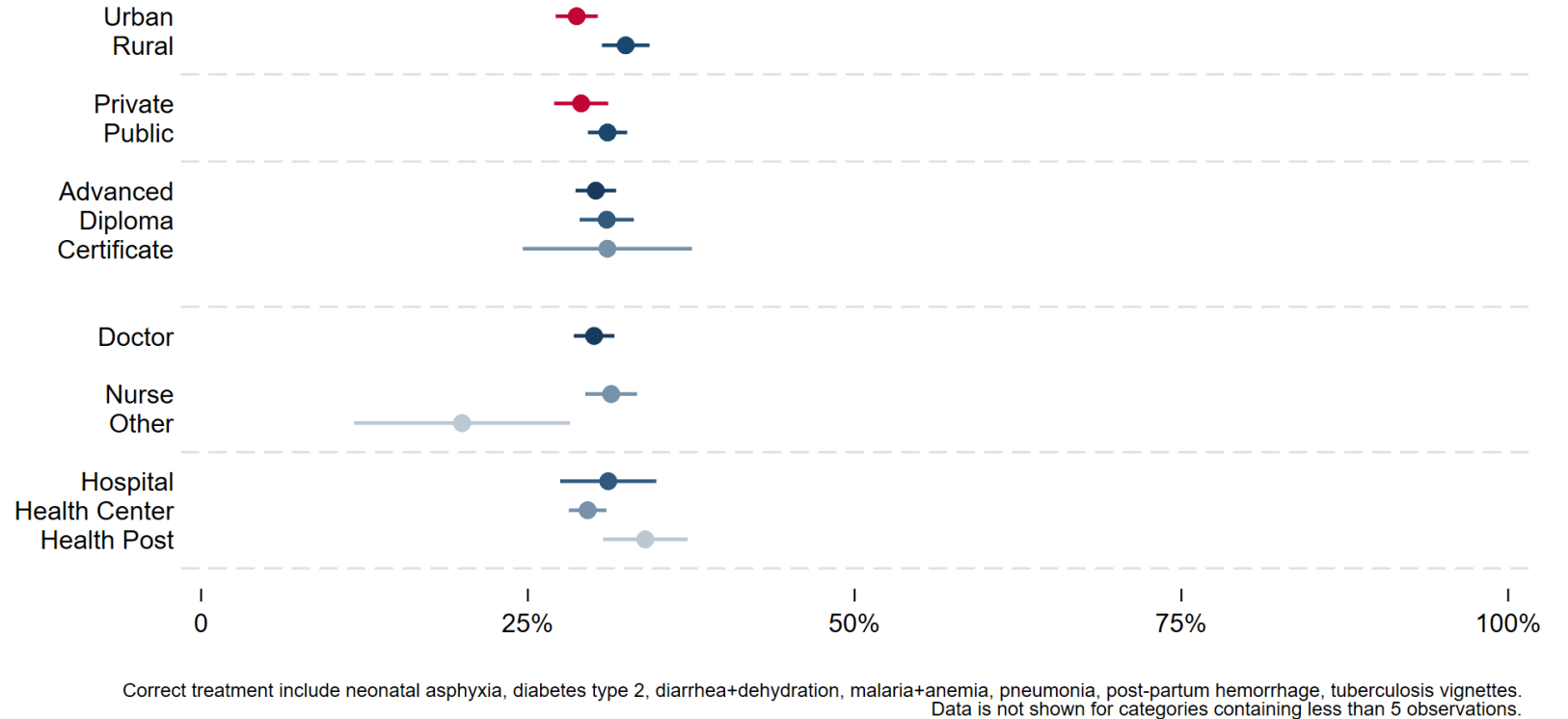
# Demographic Variation

## Treatment Behavior Across Different Provider Characteristics

Here, one can see whether a provider's ability to correctly management the clinical conditions varies when comparing different subsets of providers: urban versus rural, doctors versus nurses, public versus private, for example.

The mean values with a 95% confidence interval are shown.

## Fraction of Conditions Treated Correctly



# Demographic Variation

## Test Ordering Behavior Across Different Provider Characteristics

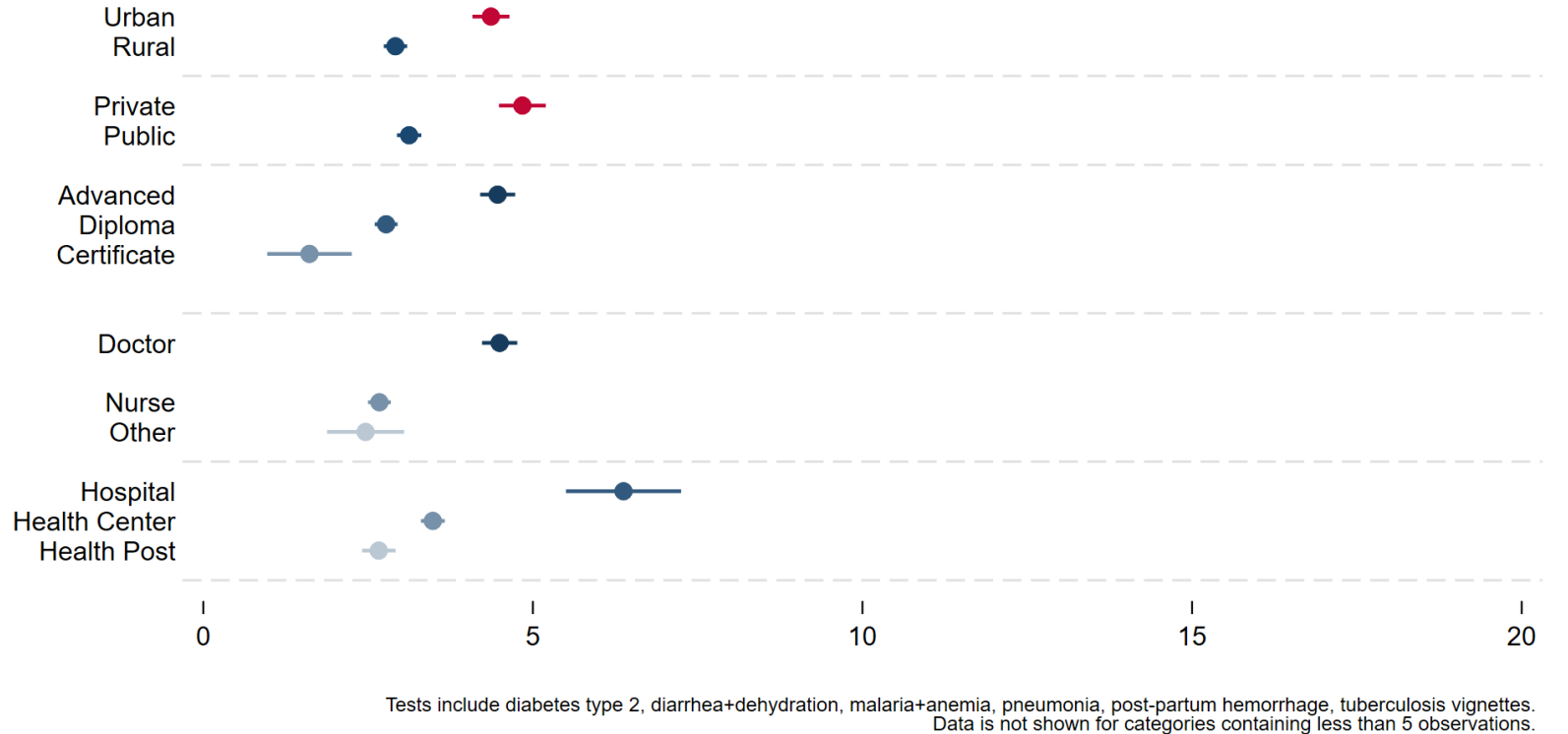
In addition, we can see whether practices around ordering tests change when comparing different types of providers.

For instance, do providers who work in hospitals order more tests than those in health posts?

Or, do providers in private facilities order more tests than those in public facilities?

The mean values with a 95% confidence interval are shown.

## Number of Tests Done



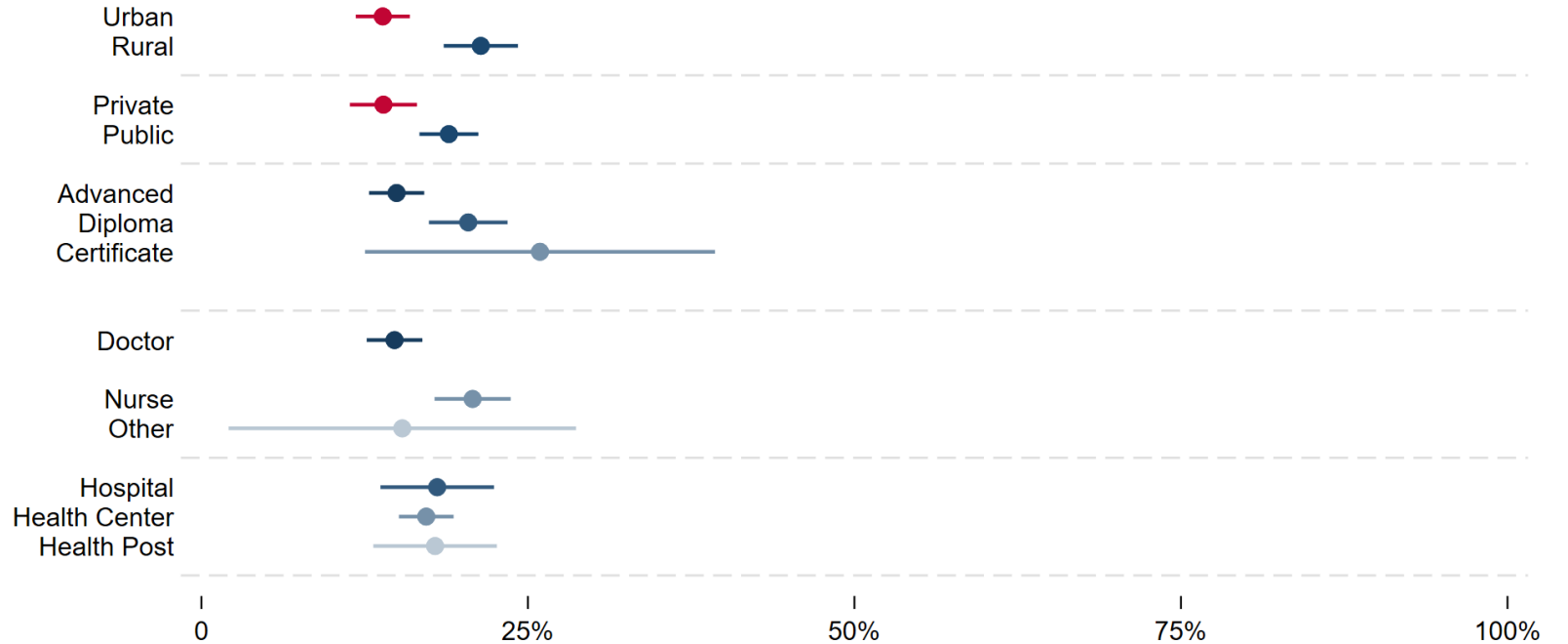
# Demographic Variation

## Antibiotics Prescription Behavior Across Different Provider Characteristics

Finally, we can determine whether providers with a particular set of characteristics are more likely to know when not to prescribe antibiotics.

The mean values with a 95% confidence interval are shown.

### Fraction of Conditions Prescribed Antibiotics



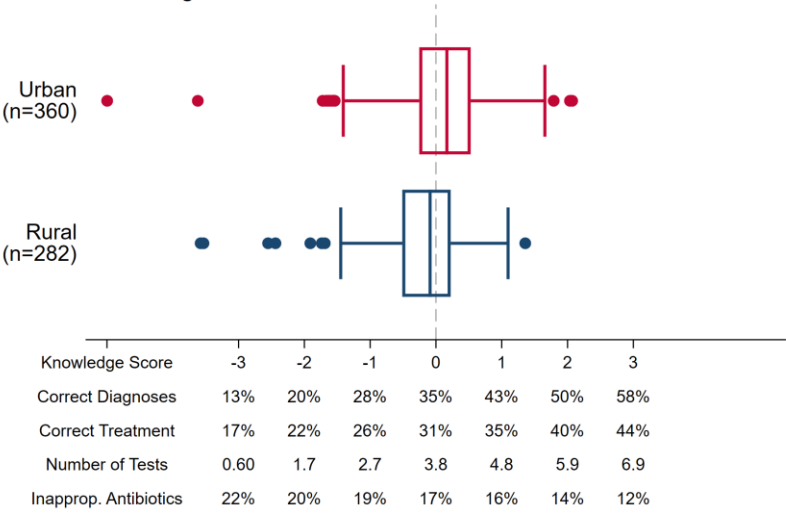
Inappropriate antibiotics includes diarrhea+dehydration, pneumonia, tuberculosis vignettes.  
Data is not shown for categories containing less than 5 observations.

# Demographic Variation

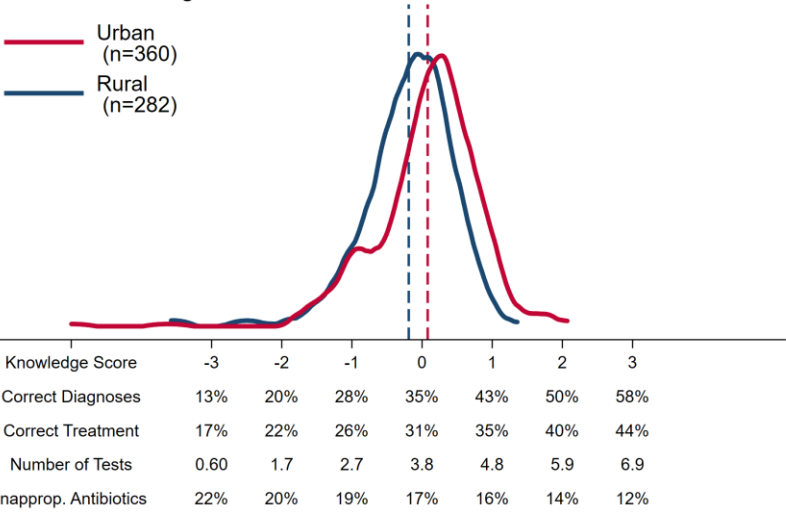
## Rural vs. Urban Providers

The knowledge distribution of health care providers who work in urban facilities is compared to the knowledge distribution of health care providers who work in rural facilities.

Providers in Madagascar 2016



Providers in Madagascar 2016

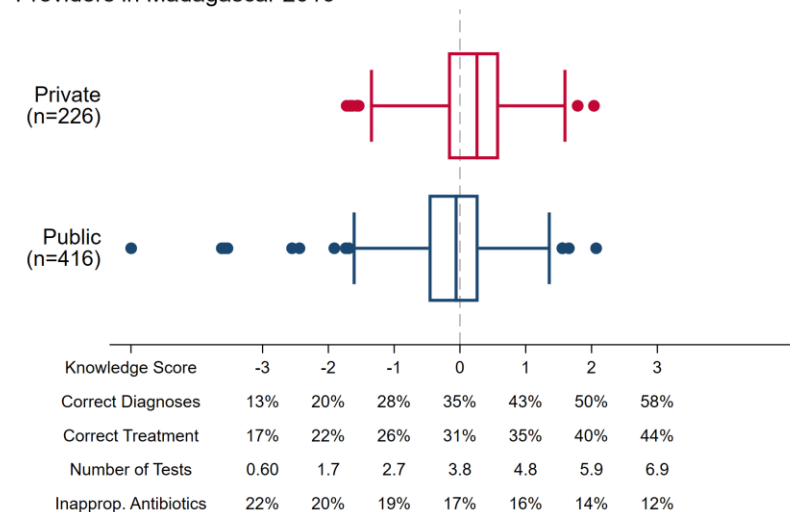


# Demographic Variation

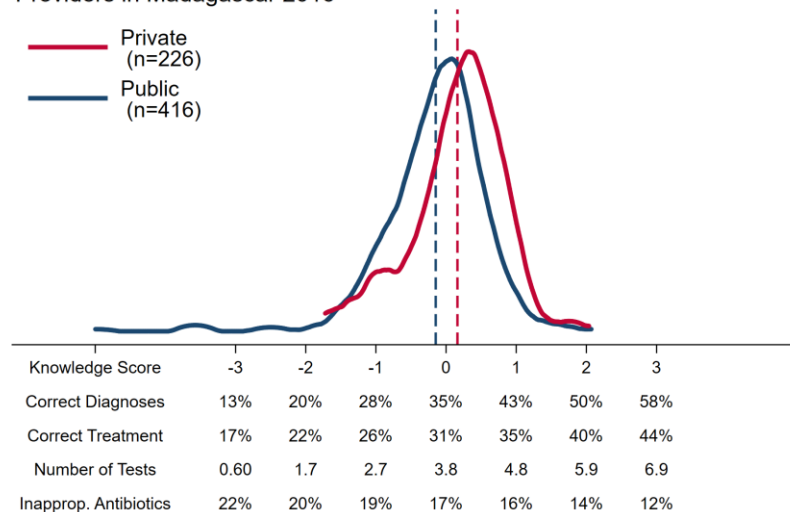
## Public vs. Private Providers

In this figure, one can see how the distribution in provider knowledge for providers who work in private facilities compare to those who work in public facilities.

Providers in Madagascar 2016



Providers in Madagascar 2016





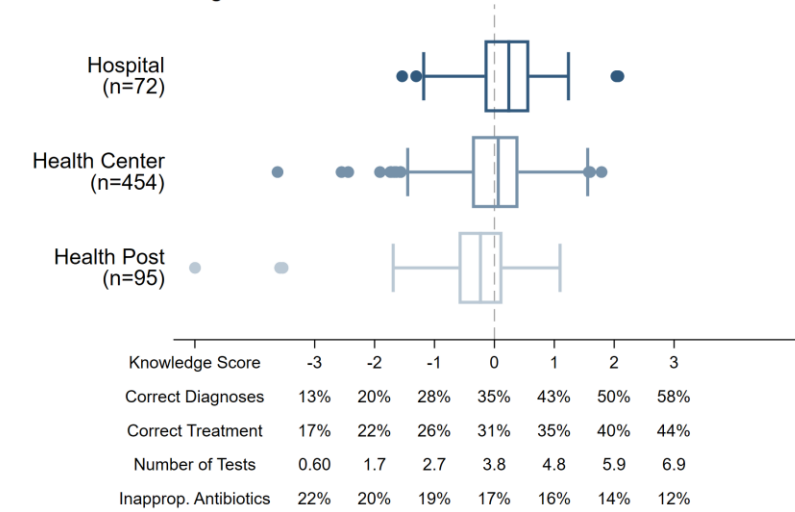
# Demographic Variation

## Comparing Providers at Different Facility Types

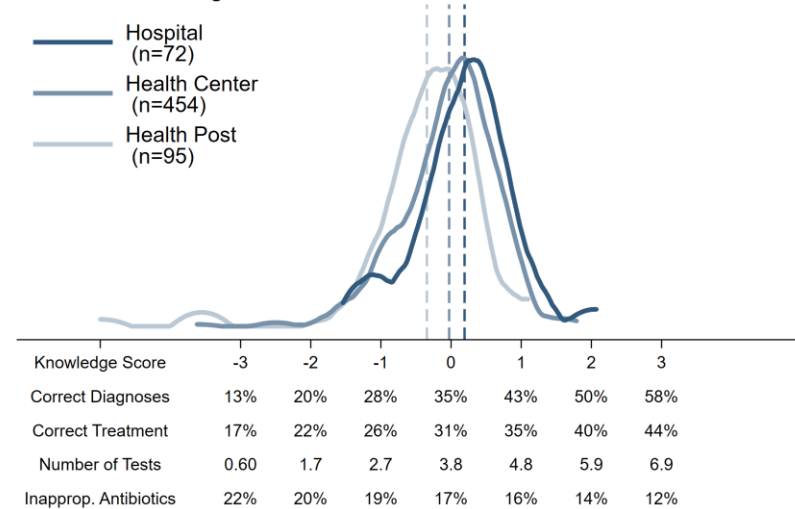
The distributions of knowledge for providers working in different tiers of the health care system are shown here.

Providers employed in hospitals tend to have a higher median knowledge score, while those in health posts have a lower median knowledge score. Providers in health posts are mainly nurses while those in hospitals span different professions.

Providers in Madagascar 2016



Providers in Madagascar 2016



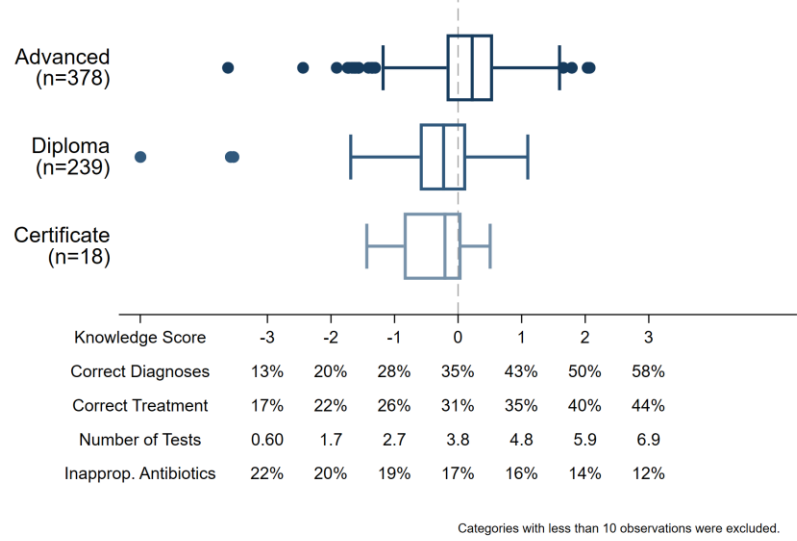
# Demographic Variation

## Comparing Providers of Varying Levels of Medical Education

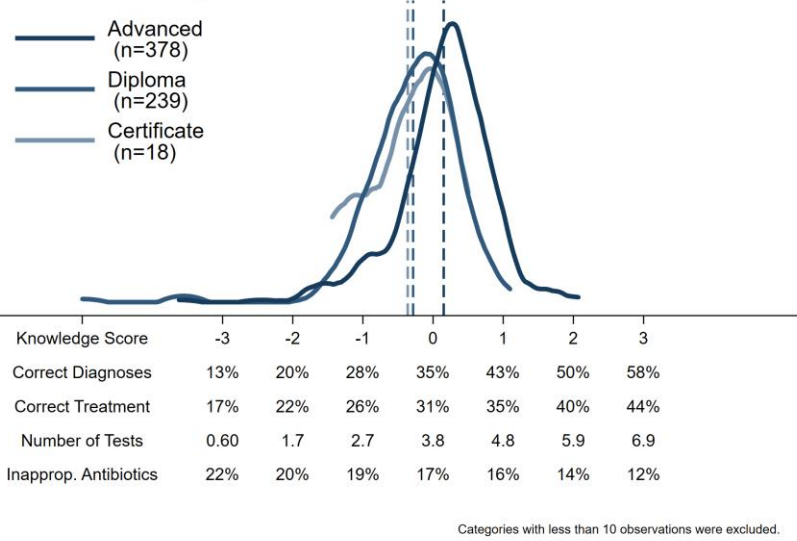
In the figures, the distributions of provider knowledge based on different levels of medical education are shown.

Providers with advanced degrees have the highest median knowledge while those with no medical education, if surveyed, have the least medical knowledge. However, there is a wide distribution in knowledge in every category of medical education.

Providers in Madagascar 2016



Providers in Madagascar 2016



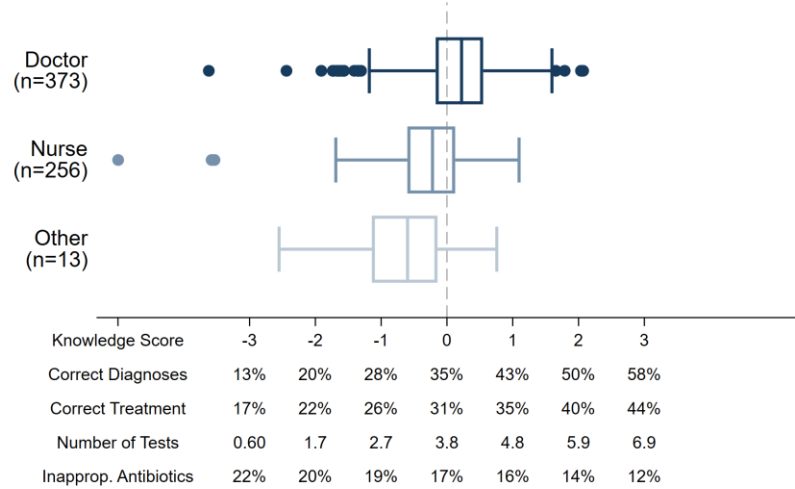
# Demographic Variation

## Comparing Providers of Different Professions

These figures allow one to compare the overall distribution in provider knowledge across different professional cadres.

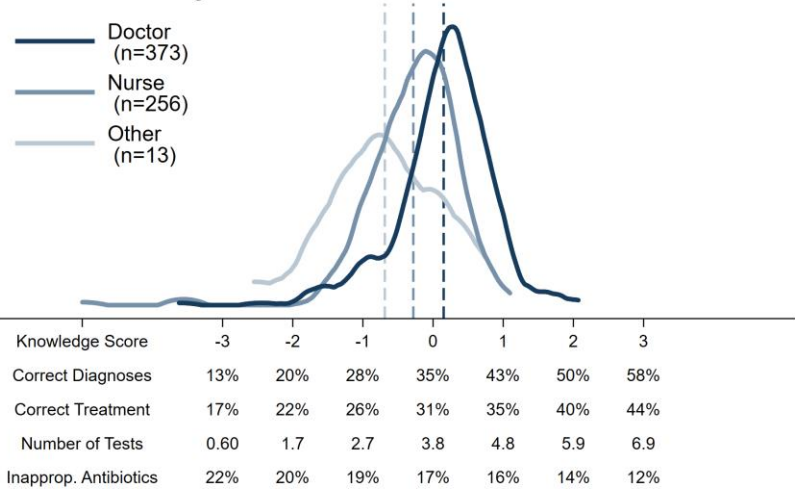
Typically, doctors are the most knowledgeable and the “other” category, which captures nursing assistants and various other auxiliary health care workers, are the least knowledgeable.

Providers in Madagascar 2016



Categories with less than 10 observations were excluded.

Providers in Madagascar 2016



Categories with less than 10 observations were excluded.

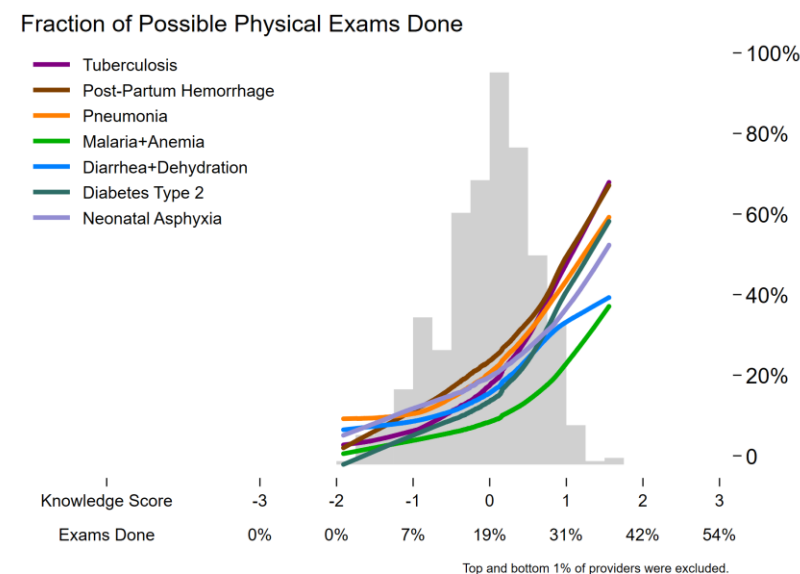
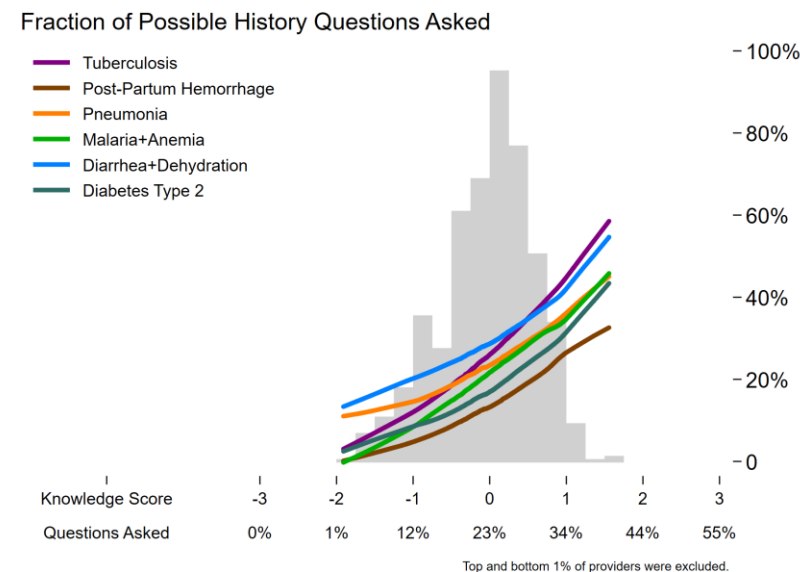
# Appendix - Knowledge Score vs. Vignette-Specific Behavior

SDI – Madagascar

# Diagnostic Knowledge Assessment

## Vignette-Specific History Taking and Physical Examination Behavior

Here, one can see whether and how the history taking and physical examination behaviors vary over the knowledge distribution, allowing one to compare the behavior of the most and least knowledgeable provider for specific vignettes.



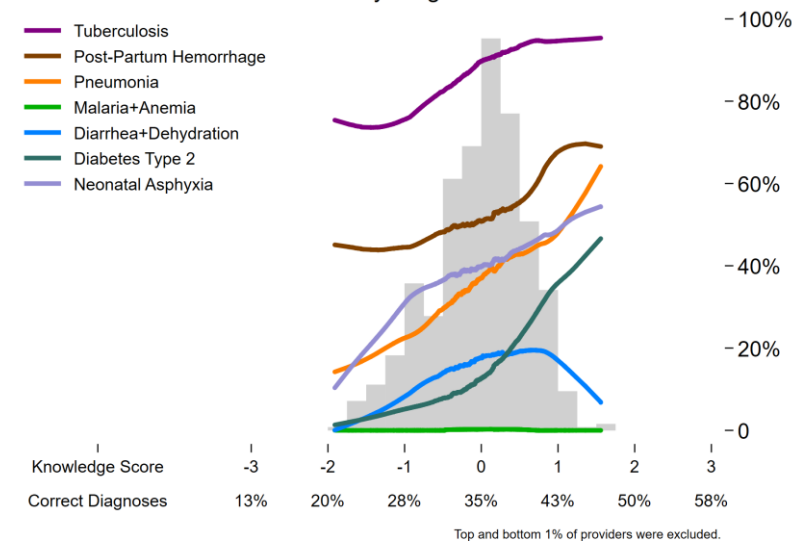
# Diagnostic – Treatment Linkages

## Vignette-Specific Treatment Indicators, By Knowledge Score

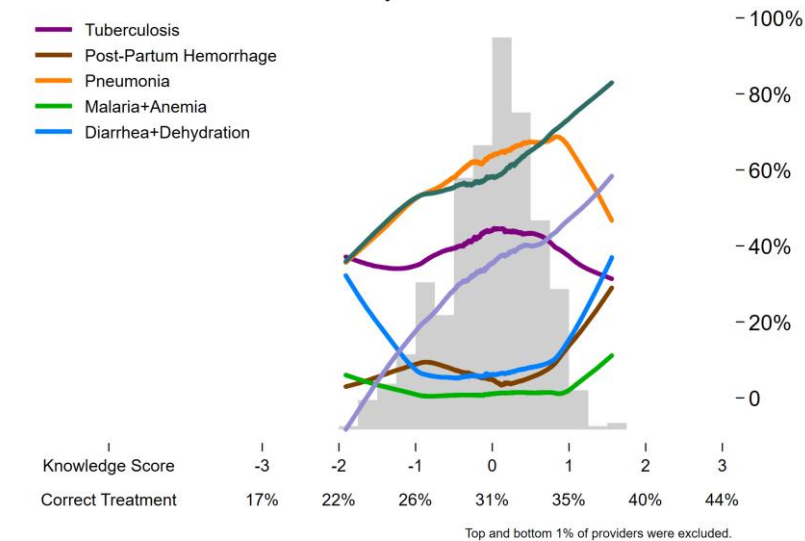
In these figures, one can look at the degree to which correct diagnosis and treatment for the different vignettes vary across the spectrum of provider knowledge.

Similarly, one can look at how the number of tests ordered for each vignette and whether inappropriate antibiotics were prescribed varies over the provider knowledge distribution.

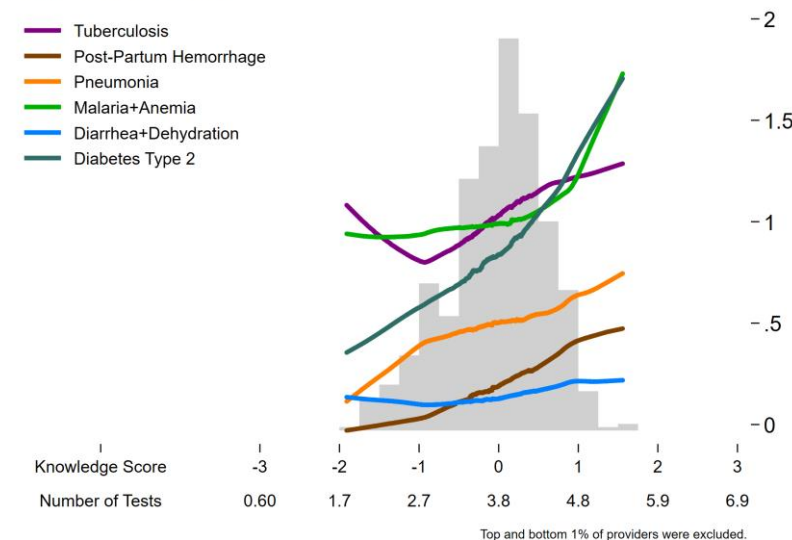
Fraction of Providers Who Correctly Diagnosed Condition



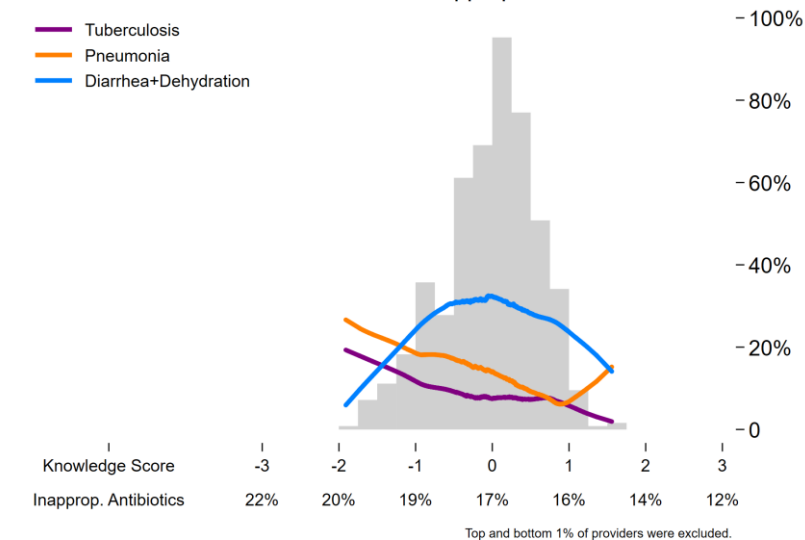
Fraction of Providers Who Correctly Treated Condition



Number of Tests Done



Fraction of Providers Who Prescribed Inappropriate Antibiotics



# Acknowledgements

Prepared by:

- Anna Konstantinova
- Benjamin Daniels
- Jishnu Das

Thanks to:

- SDI Team

For any questions, please contact: Jishnu Das, [jdas1@worldbank.org](mailto:jdas1@worldbank.org)

The data used for this analysis can be found <https://github.com/worldbank/SDI-Health>. Additional documentation on the Service Delivery Indicators can be found <https://www.sdindicators.org/>.