Medical practice in rural Tanzania: Lack of opportunity or lack of motivation?

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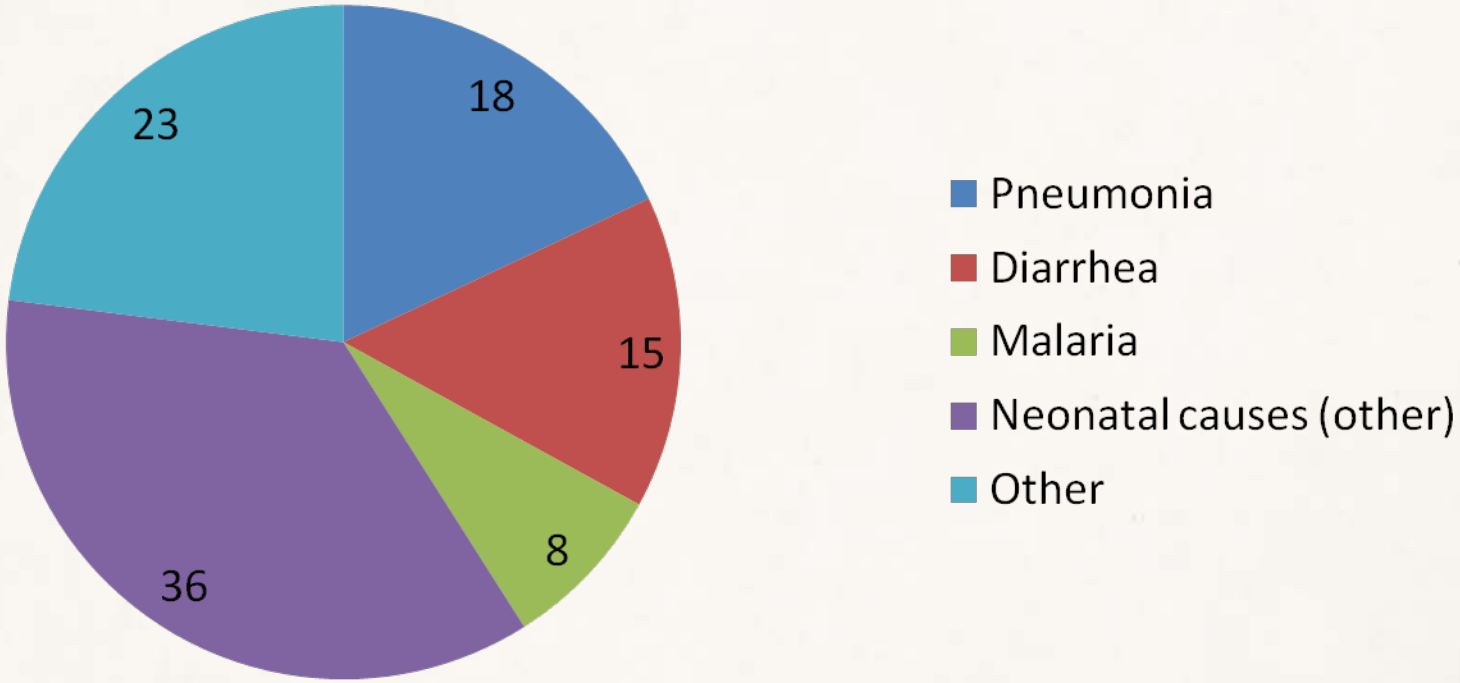
Why do 8 mill children die every year?



Source: Black et al. (2010), *The Lancet*

A key role for health workers, but…

1) Health workers are few

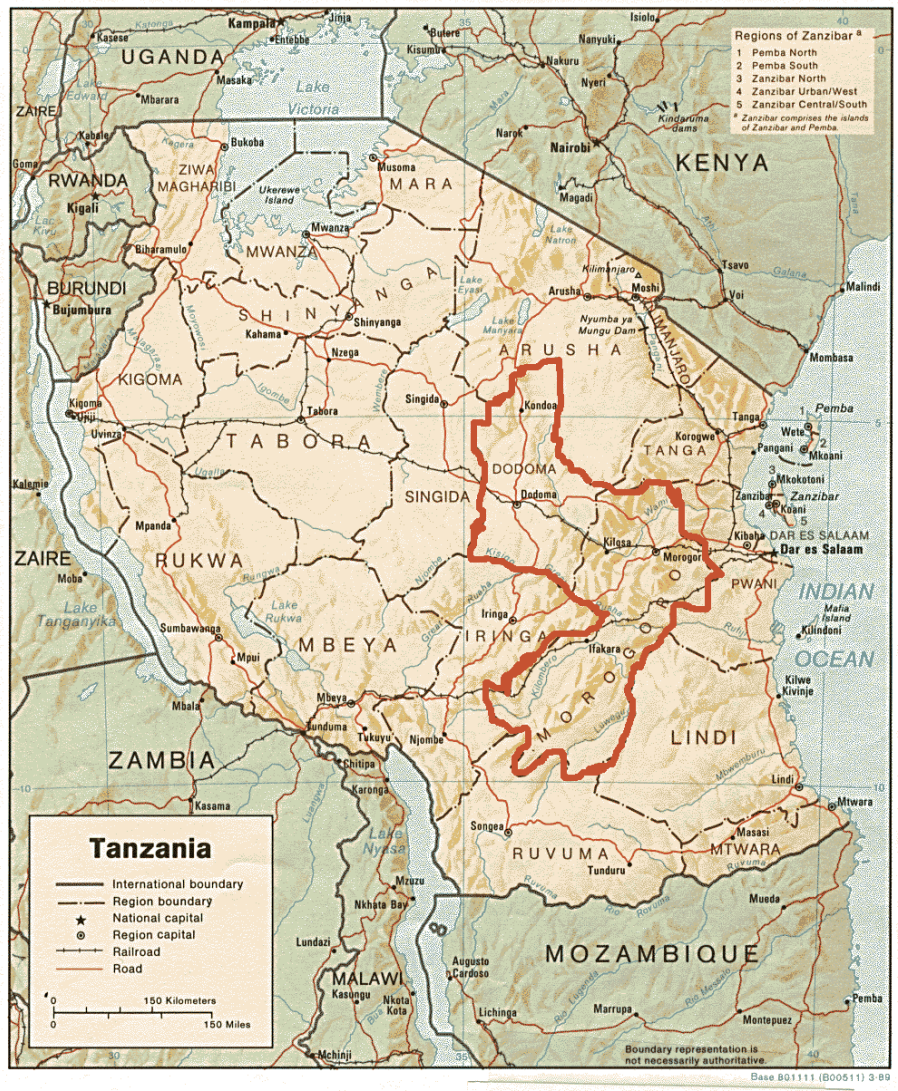
2) Performance is often inadequate

Objective

Describe and explain health worker performance

MAP project, Tanzania (2006-10):

Health worker Motivation, Availability and Performance

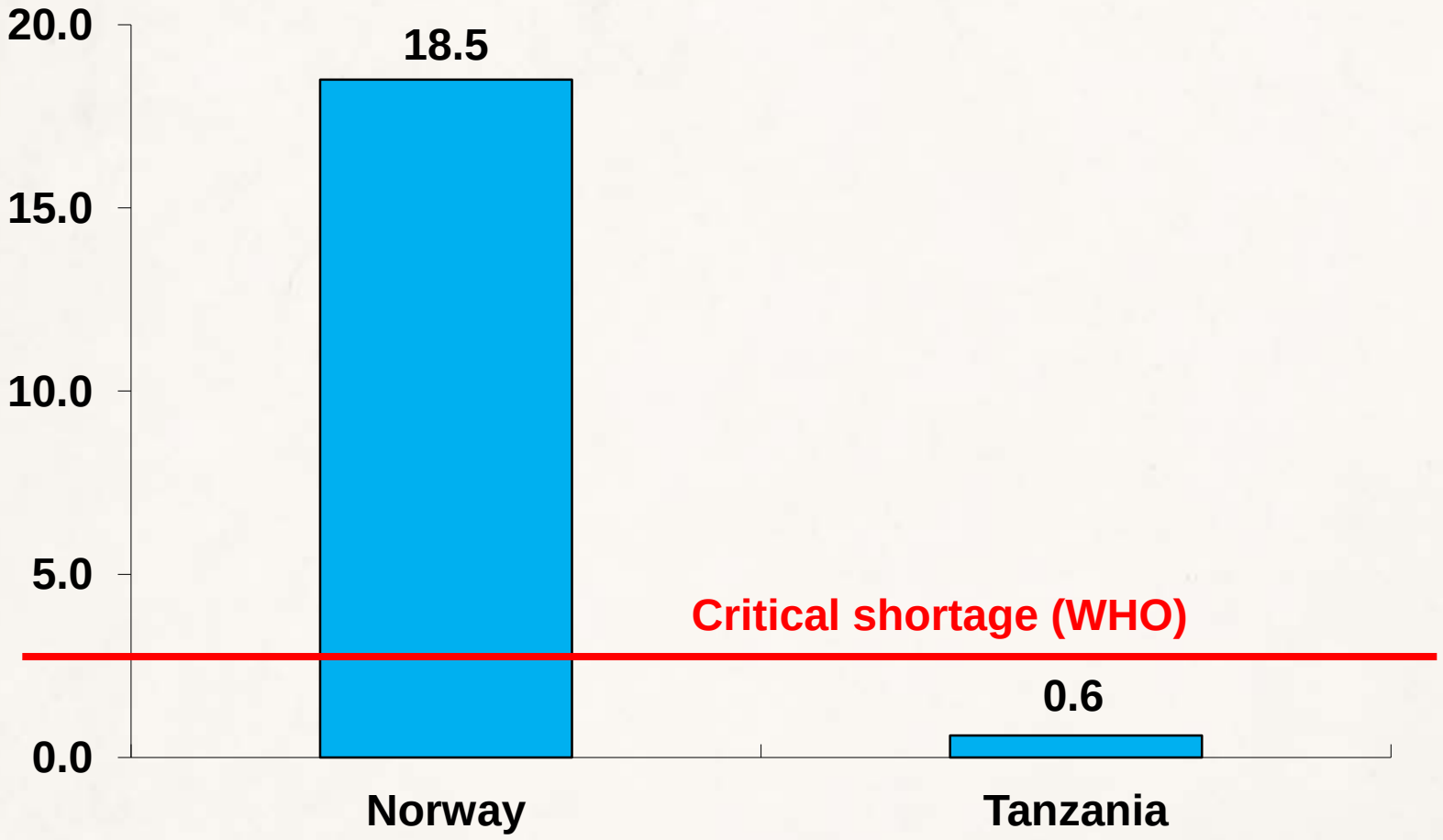


- 9 rural districts
- 126 health facilities (up to first referral level)
- 156 prescribers
- 3500 outpatient consultations

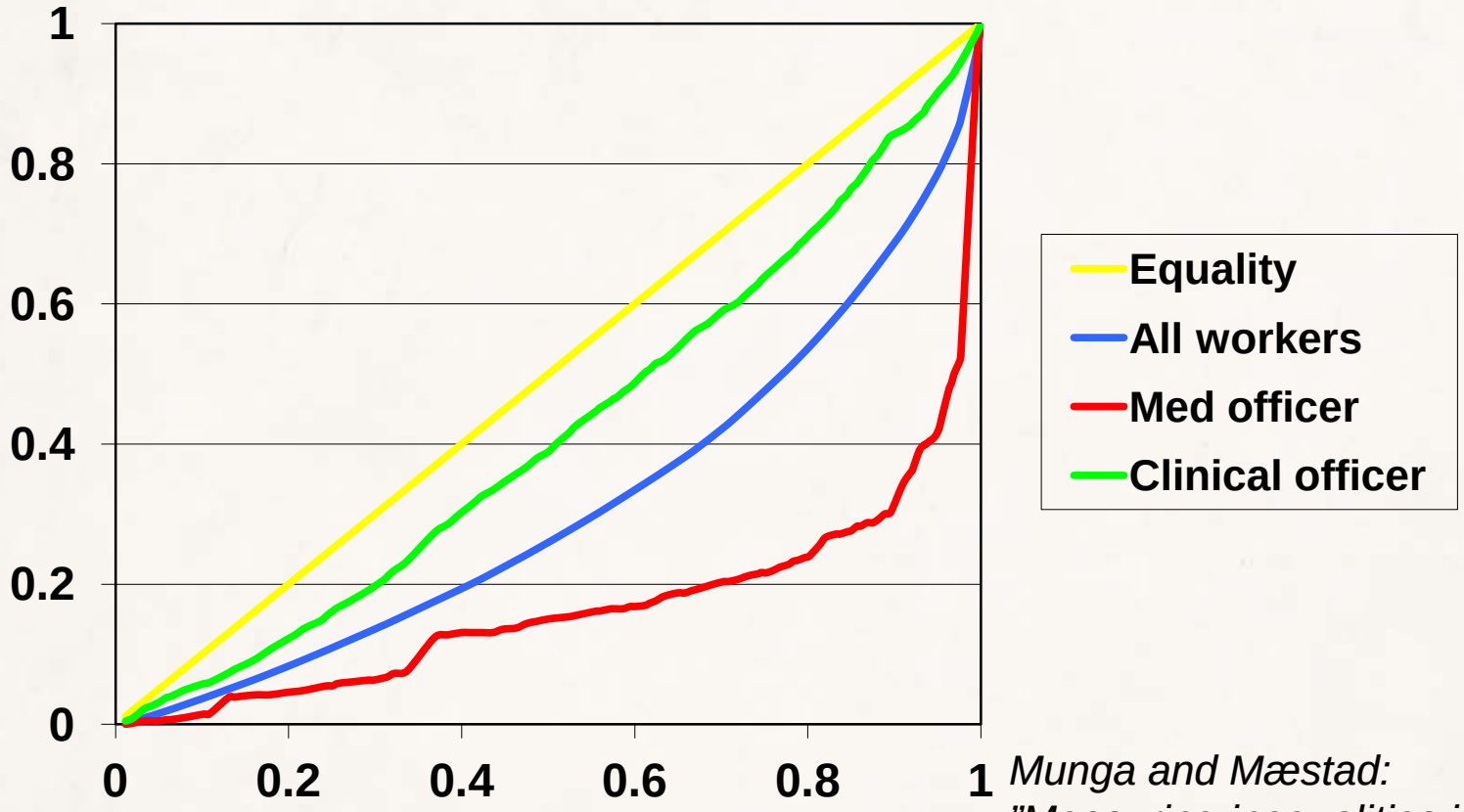
Tanzanian health system

- Extensive network of health facilities (6000+)
  - Hospitals, health centres and dispensaries
- Both public and private supply
- Professional cadres:
  - International cadres:
    - Medical officer (physician), Nurse, Midwife
  - Local cadres:
    - Clinical Officer, Assistant Medical Officer, Medical Attendant

Clinicians, nurses, midwives per 1,000



Unequal distribution of health workers



Munga and Mæstad: "Measuring inequalities in the distribution of health workers", Human Resources for Health, 2009.

Sample of health facilities:

14 random facilities in each district

	Population *Total*	Sample		
		Total	Government	Church
Hospitals	*12*	**11**	6	5
Health centres	*35*	**25**	24	1
Dispensaries	*393*	**90**	56	34
Total	***440***	**126**	**86**	**40**

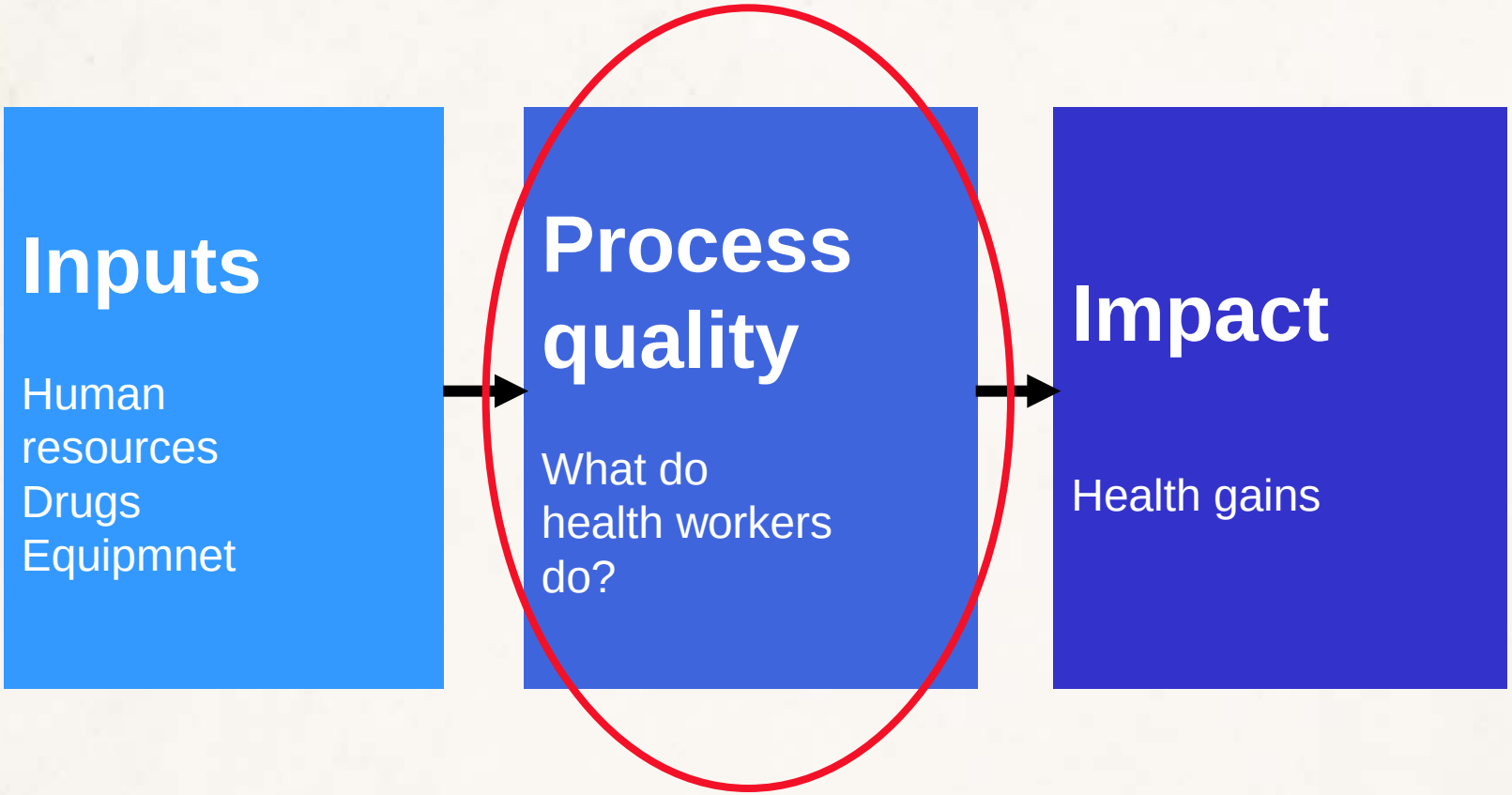
Sample of observed clinicians / prescribers

	Number of health workers	*Share (%)*
Medical officer	1	*0.6*
AMO	3	*1.9*
CO	96	*61.5*
Nurse	26	*16.7*
Other	30	*19.2*
Total	**156**	***100.0***

Sample of observed consultations

	Sample		
	Total	Fever/cough/ diarrhea	Other symptoms
Age <5	**1 751**	1 387	364
Age >5	**1 770**	729	1 041
Total	**3 521**	**2116**	**1405**

Measuring quality of health services



Quality of diagnostic process

- **Step 1: Selection of focus symptoms**
  - Fever, cough and diarrhea.

- **Step 2: Identify a quality standard**
  - Clinical officer curriculum (adapted from Leonard, 2007)
  - IMCI guidelines

Checklists used for direct observation in OPD

COUGH: HISTORY TAKING	ASKED?
All patients:	
Duration of cough	√
Sputum production or dry cough	
Blood in sputum	
Chest pain	
Difficulty in breathing	√
Fever	
Age < 5:	
Ability to drink / breastfeed	
Convulsion	
Ear problems	
Vomiting / diarrhea	√
Vaccination history	

COUGH: EXAMINATIONS	DONE?
All patients:	
Count respiratory rate	
Observe for lower chest wall indrawing	
Examine throat	
Auscultate the chest	√
Take temperature	
Age < 5:	
Check for lethargy	
Check for visible severe wasting	
Look for palmar pallor	
Look for oedema both feet	
Check weight (against growth chart)	√

Findings

Number of relevant diagnostic items per patient:

4.2 tasks

(2.9 questions, 1.3 examinations)

Time use per patient:

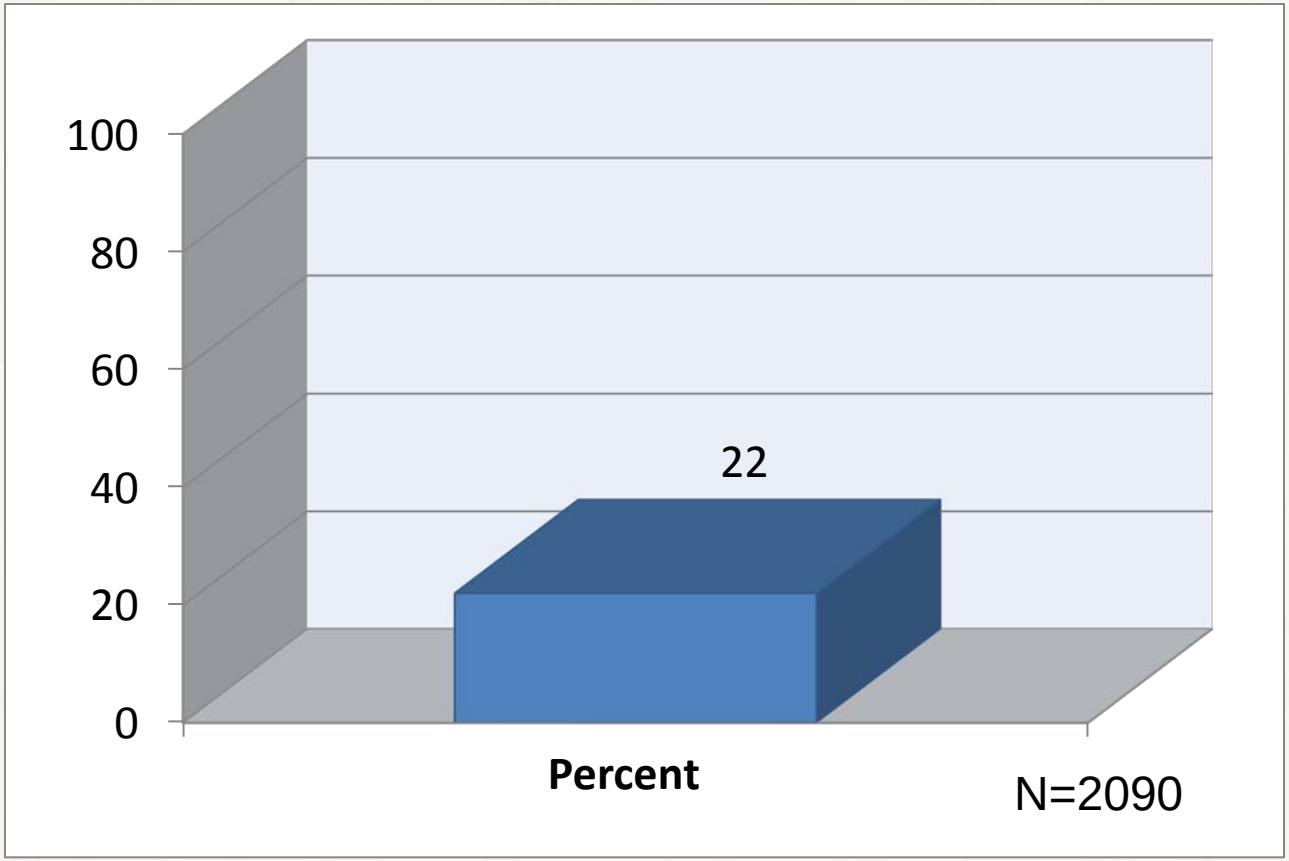
5.7 minutes

A raw performance score

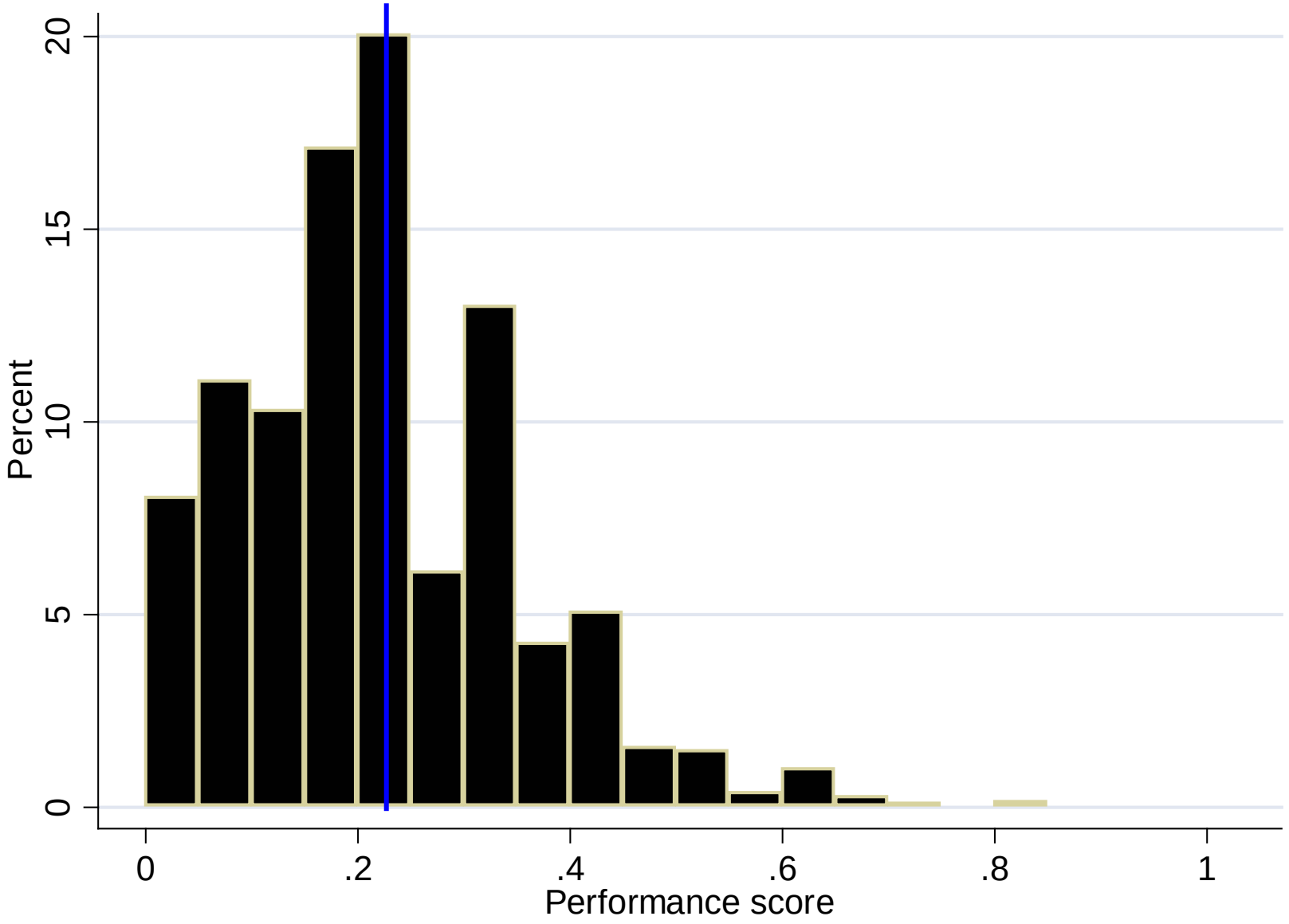
$$\textit{Performance} = \frac{\textit{Number of relevant items performed}}{\textit{Total number of relevant items}}$$

Performance score

(all patients with fever, cough diarrhea)

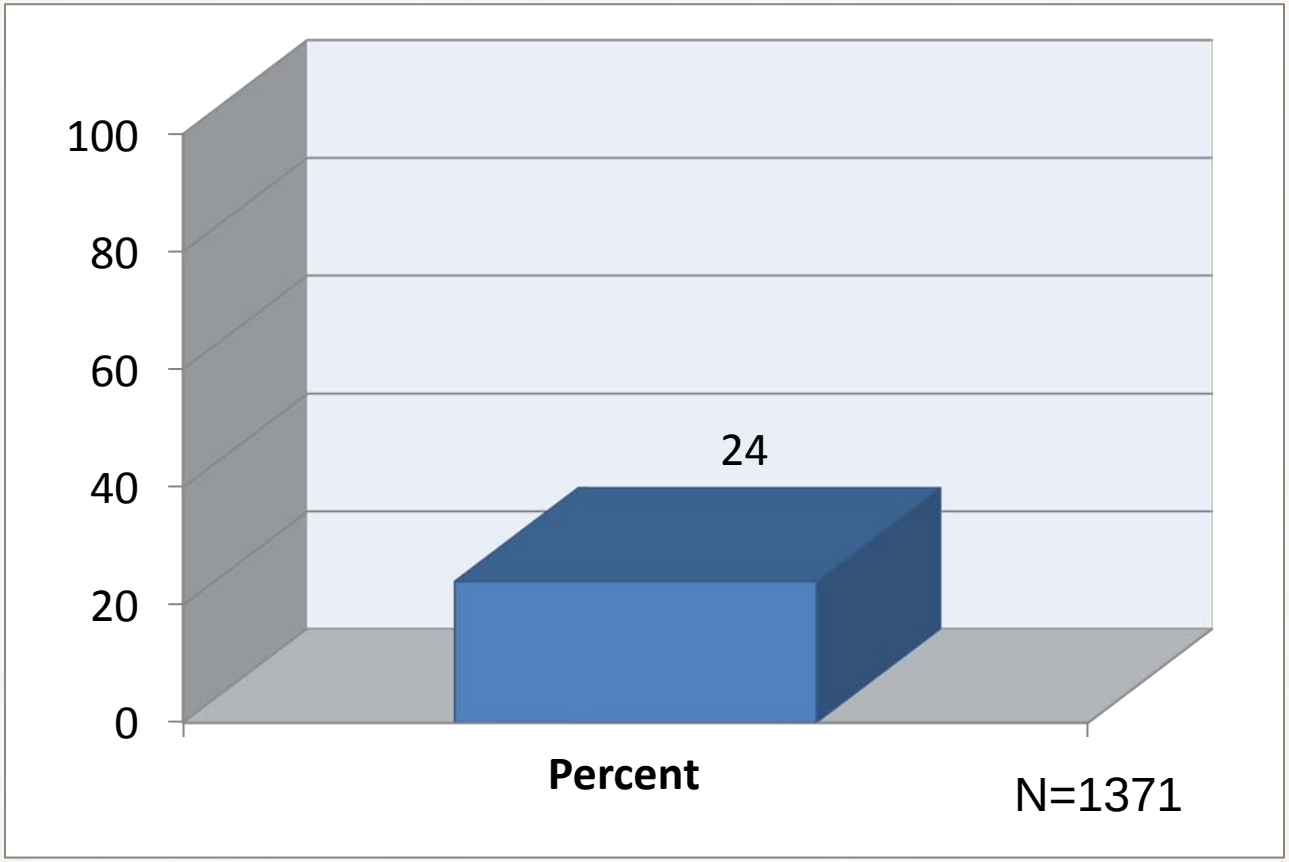


Performance score

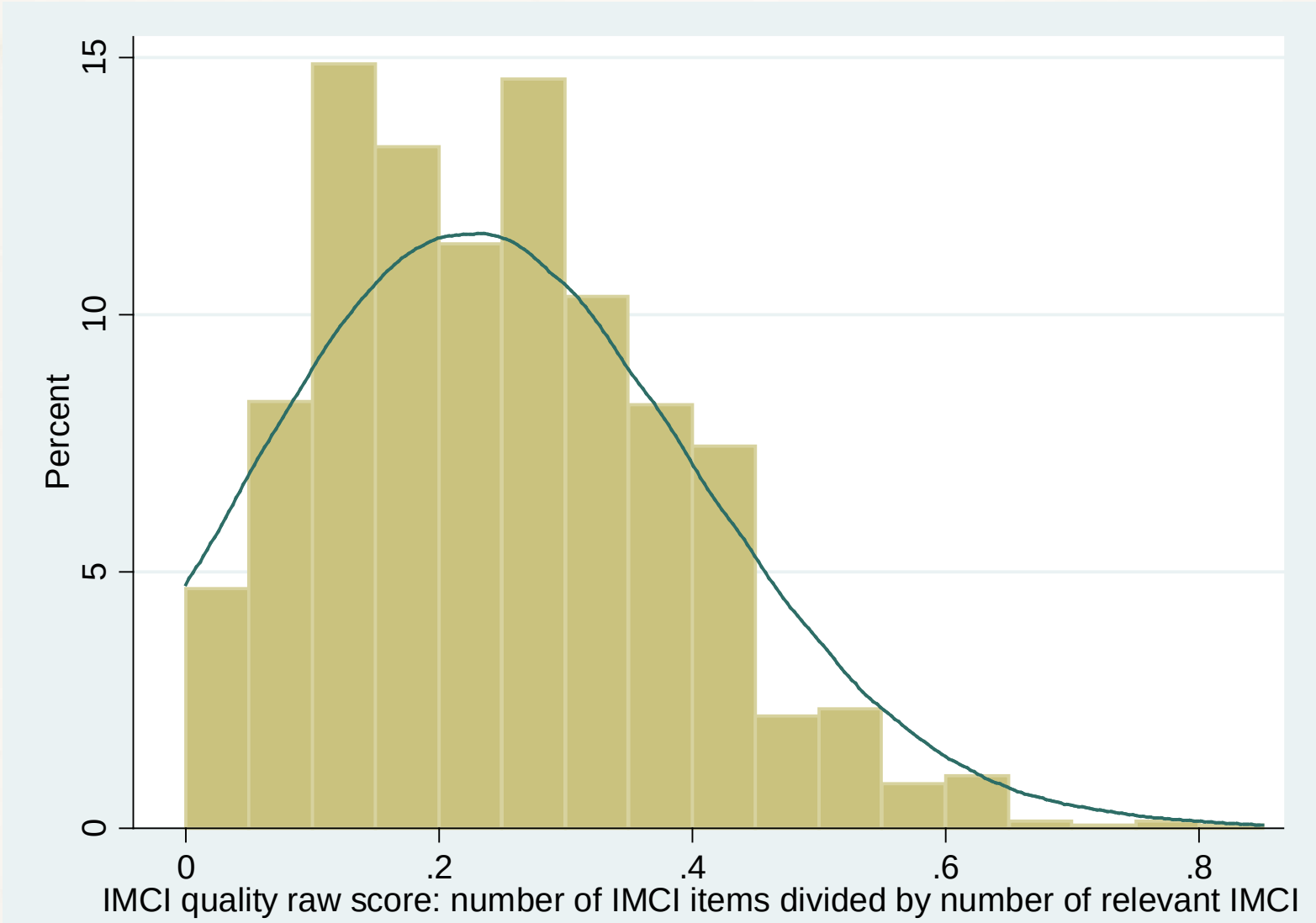


Adherence to IMCI guidelines

(Integreated Management of Childhood Illnesses)



IMCI performance score



Assessment tasks IMCI	Percent of children age < 5 checked
Fever	53
Diarrhea	46
Vomiting	45
Weight checked against growth chart	39
Take temperature	36
Cough	35
Ability to drink or breastfeed	29
Palmar pallor	25
Convulsion	16
Vaccination history	14
Difficulty in breathing	12
Ear problems	7
Visible severe wasting	3
Oedema both feet	2

Patients with fever (% of patients investigated)

FEVER: HISTORY TAKING	>5	<5
All patients:		
Duration of fever	85	84
Wether temperature has been taken	8	7
Pattern(periodicity) of fever	29	14
Presence of chills ,sweats	5	1
Presence of cough,sore throat, pain during swallowing	21	41
Presence of diarhoea and vomiting	40	53
Presence of convulsions	5	20
Presence of running nose	4	7
Age < 5:		
Ability to drink / breastfeed		30
Difficluty in breathing		7
Presence of ear problems		8
Vaccination history		15

FEVER: EXAMINATIONS	>5	<5
All patients:		
Take temp with a thermometer	23	45
Check neck stffness	2	2
Look for palmor pallor	18	28
Check ear/throat	1	4
Palpate for spleen	2	3
Age < 5:		
Check for lethargy or unconsciousness		3
Check for visible wasting		4
Look for oedema both feet		2
Check weight (against growth chart)		40

Patients with cough (% of patients investigated)

COUGH: HISTORY TAKING	>5	<5
All patients:		
Duration of cough	77	79
Sputum production or dry cough	30	6
Blood in sputum	10	0
Chest pain	23	3
Difficulty in breathing	11	18
Fever	37	52
Age < 5:		
Ability to drink / breastfeed		25
Convulsion		11
Ear problems		8
Vomiting / diarrhea		34
Vaccination history		17

COUGH: EXAMINATIONS	>5	<5
All patients:		
Count respiratory rate	4	14
Observe for lower chest wall indrawing	NA	18
Examine throat	4	3
Auscultate the chest	24	18
Take temperature	8	13
Age < 5:		
Check for lethargy		2
Check for visible severe wasting		1
Look for palmar pallor		11
Look for oedema both feet		1
Check weight (against growth chart)		26

Patients with diarrhea? (% of patients investigated)

DIARRHEA: HISTORY TAKING	>5	<5
All patients:		
Duration of diarrhoea	72	77
Frequency of stools	50	54
Consistencey of stools	19	25
Presence of blood, and or mucus in stools	32	36
Presence of vomiting	22	29
Presence of fever	38	50
Age < 5:		
Ability to drink / breastfeed		30
Convulsion		8
Ear problems		3
Cough or difficluty in breathing		15
Vaccination history		15

DIARRHEA EXAMINATIONS	>5	<5
All patients:		
Assess general health status	1	12
Examine for sunken eyes	5	22
Pinch abdominal skin to asses dehydration	2	25
Take temperature	9	22
Age < 5:		
Offer the child a drink or observe breastfeeding		5
Check for visible severe wasting		1
Look for palmar pallor		16
Look for oedema both feet		1
Check weight (against growth chart)		37

Why low performance?

Lack of opportunity

Knowlegde
Time
(Equipment)

Lack of motivation

…the workload becomes so big and as result the doctors decide to rush in order to catch up with the big number of patients waiting

Doctor, urban

I think what hinders our performance is the issue of education. Education especially for us the nurse assistants.

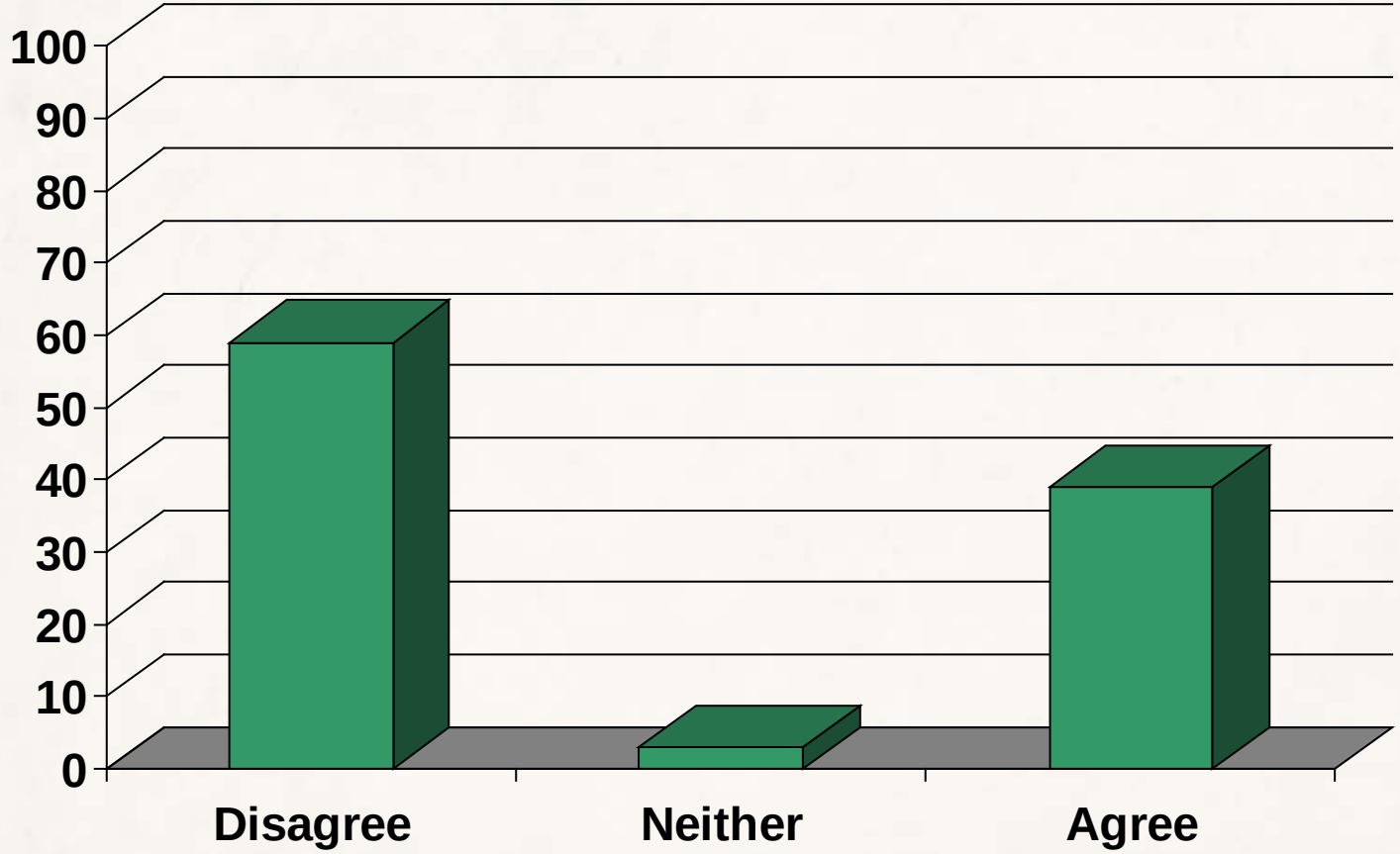
Medical assistant, rural

Honestly speaking, … the nursing discipline does no longer exist. What was long held to be the call … does no longer exist because there's no longer love to the patients

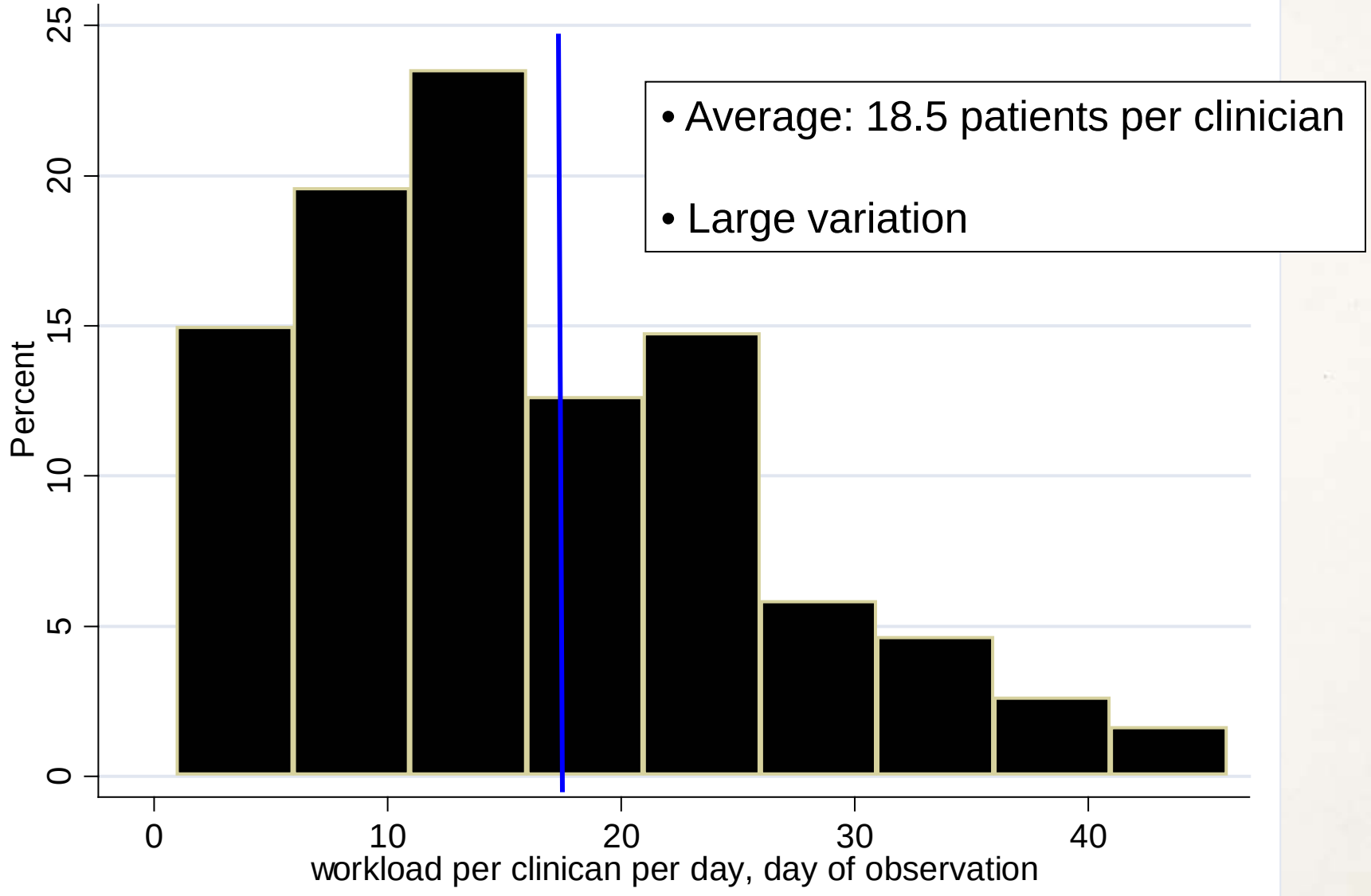
Medical assistant, urban

WORKLOAD

”Clinicians at this facility have to rush in the OPD due to high number of patients”

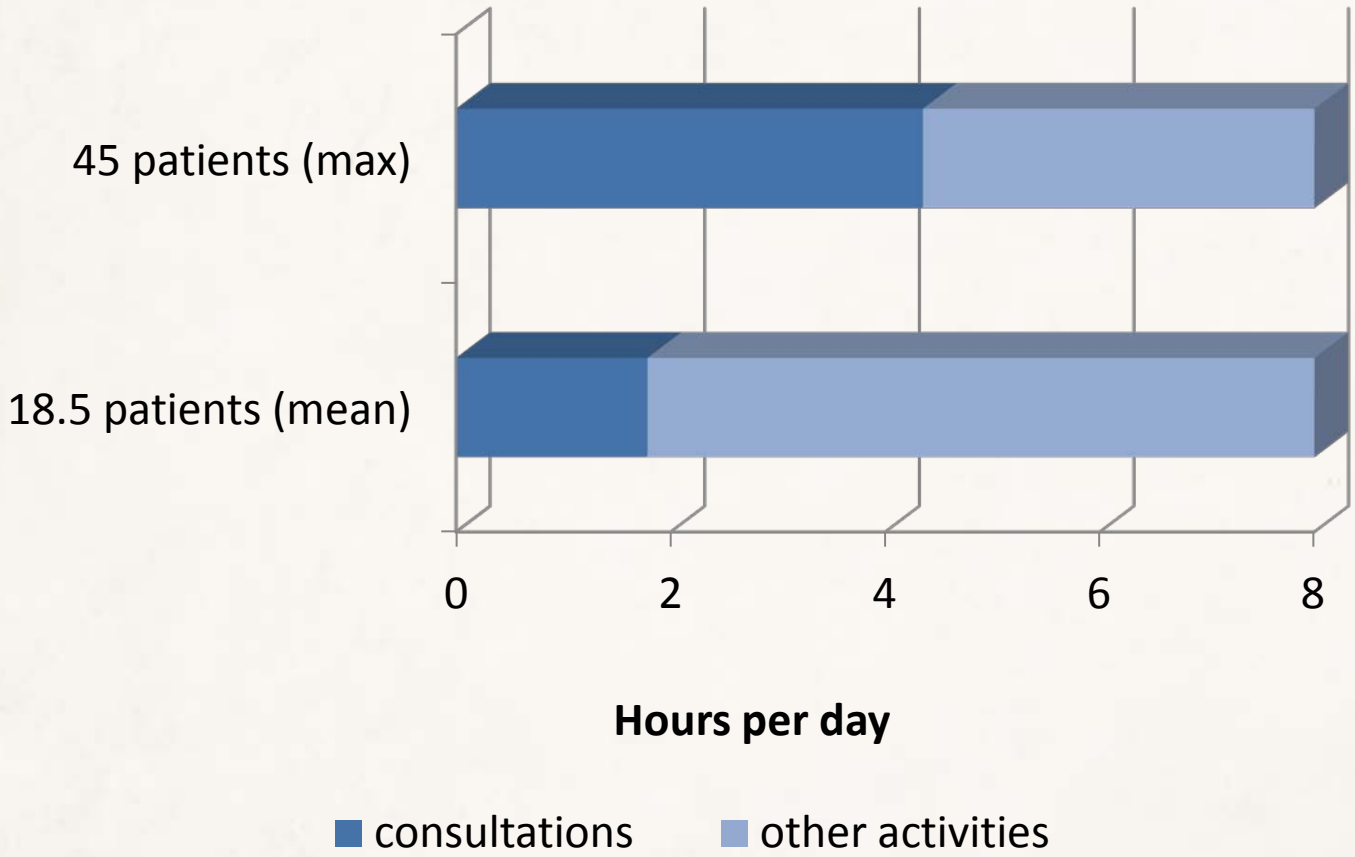


Workload

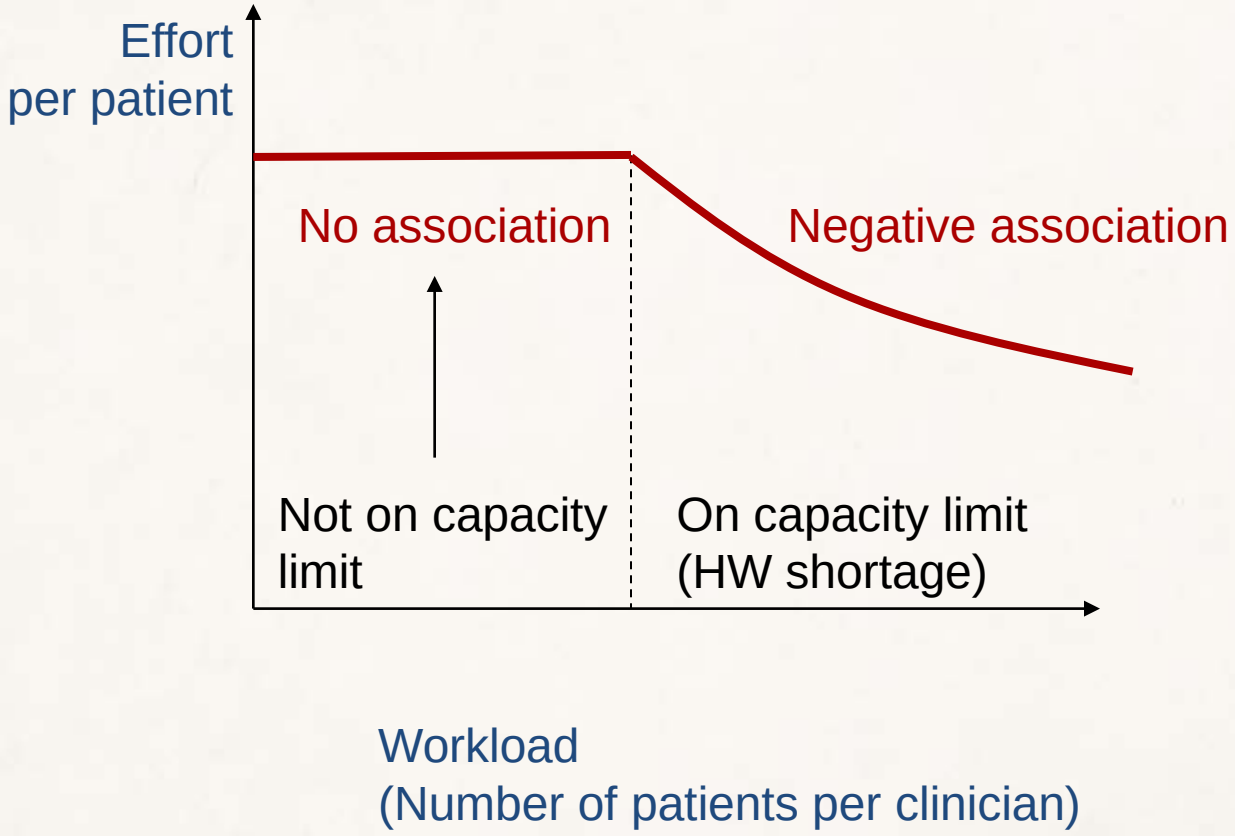

• Average: 18.5 patients per clinician
• Large variation
Percent
0
5
10
15
20
25
0
10
20
30
40
workload per clinican per day, day of observation

High workload?

5.7 minutes per patient



Test:
How much does workload reduce effort per patient?

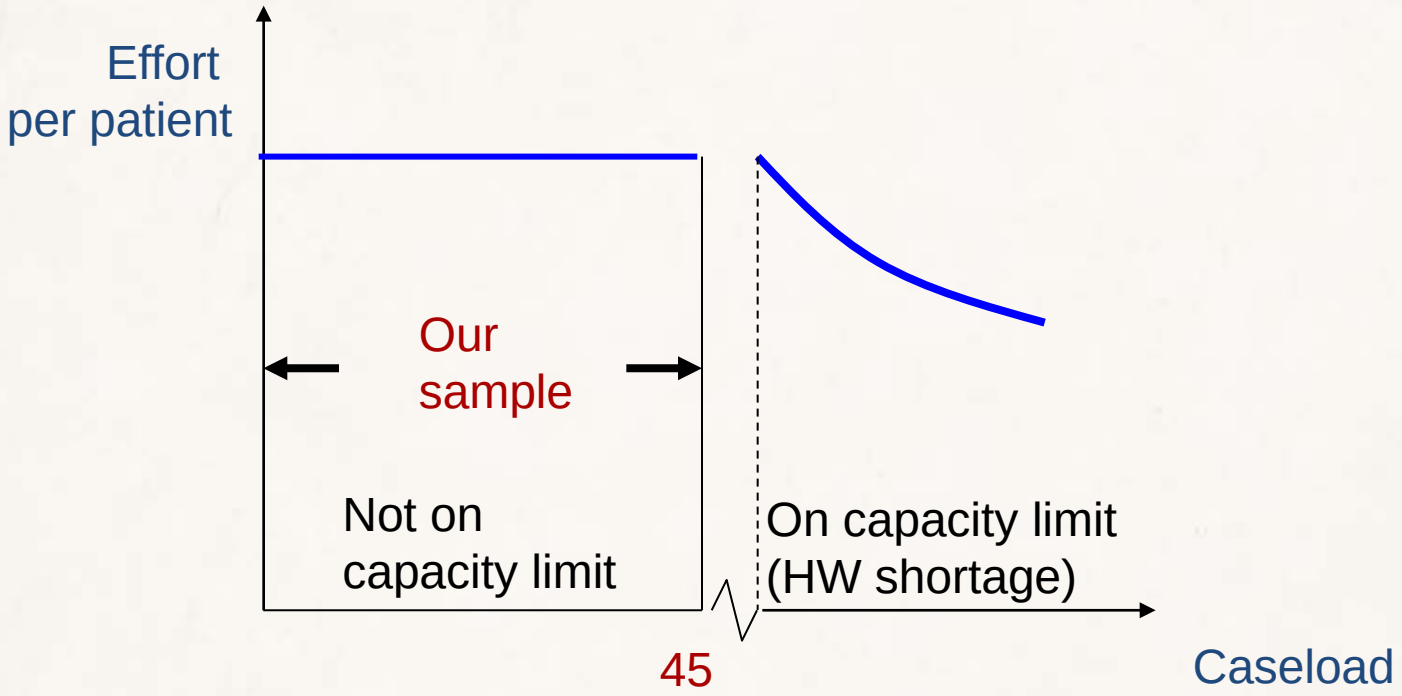


Econometric specification

$$e_{ijh} = \alpha_1 + \beta_1 w_j + \delta_1 (w_j - \hat{w}) d_j + z\gamma + \varepsilon_{ijh}$$

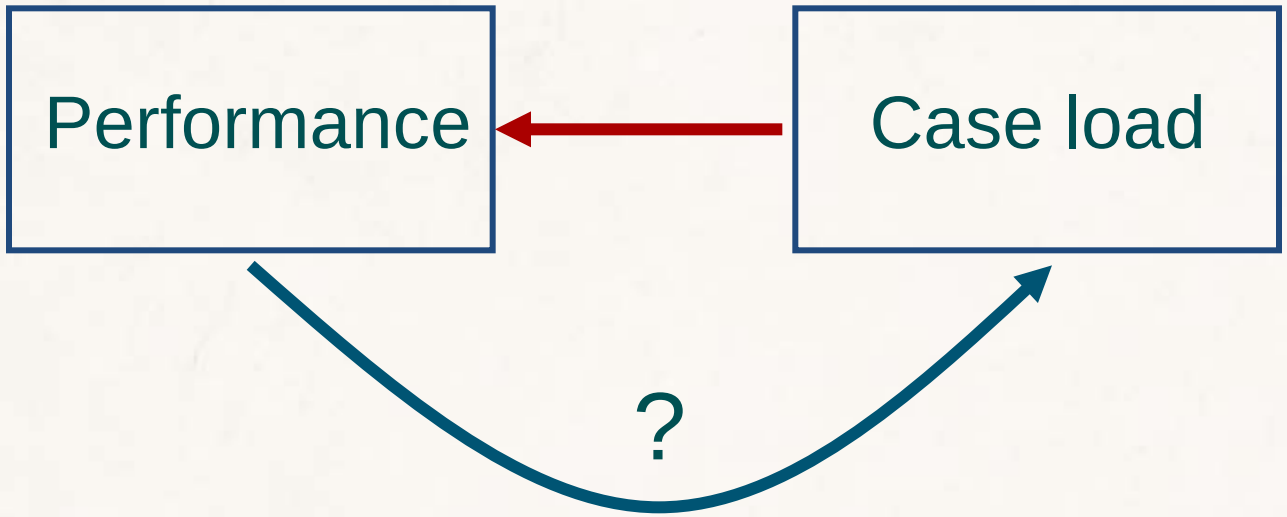
e = number of relevant questions and examinations
w = caseload

Result:
Case load does not explain low performance



Mæstad *et al.* (2010)
Journal of Health Economics

Reverse causality?



Addressed by : Instrumental variable approach (IV)
Instrument variable: Catchment population per clinician

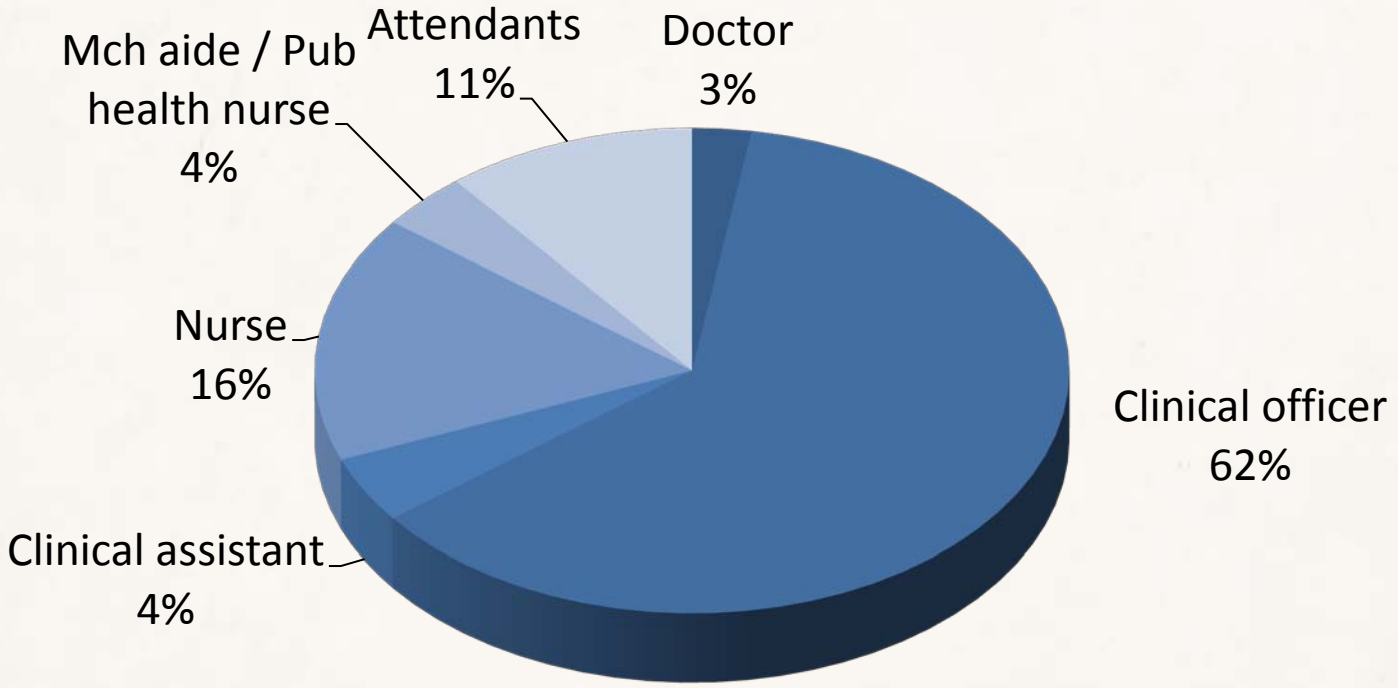
No impact on results!

	(1) OLS I	(2) OLS II	(3) IV
Caseload	0.010 (0.028)	0.018 (0.022)	0.010 (0.028)
Clinical officer		1.29*	1.29*
Male		0.13	0.15
Age		-0.04	-0.04
Imci_child		1.03*	1.05*
Government		-0.02	-0.01
Drugs		0.08	0.08
Laboratory		0.66	0.62
Child		1.25**	1.25**
Patient weakness		0.83**	0.82**
Patient number		-0.05**	-0.05**
Constant		1.67	1.79
Facility type fixed effect	No	Yes	Yes
Symptom fixed effect	No	Yes	Yes
N	*2,095*	*1,806*	*1,806*
R^2	*0.001*	*0.310*	*0.309*

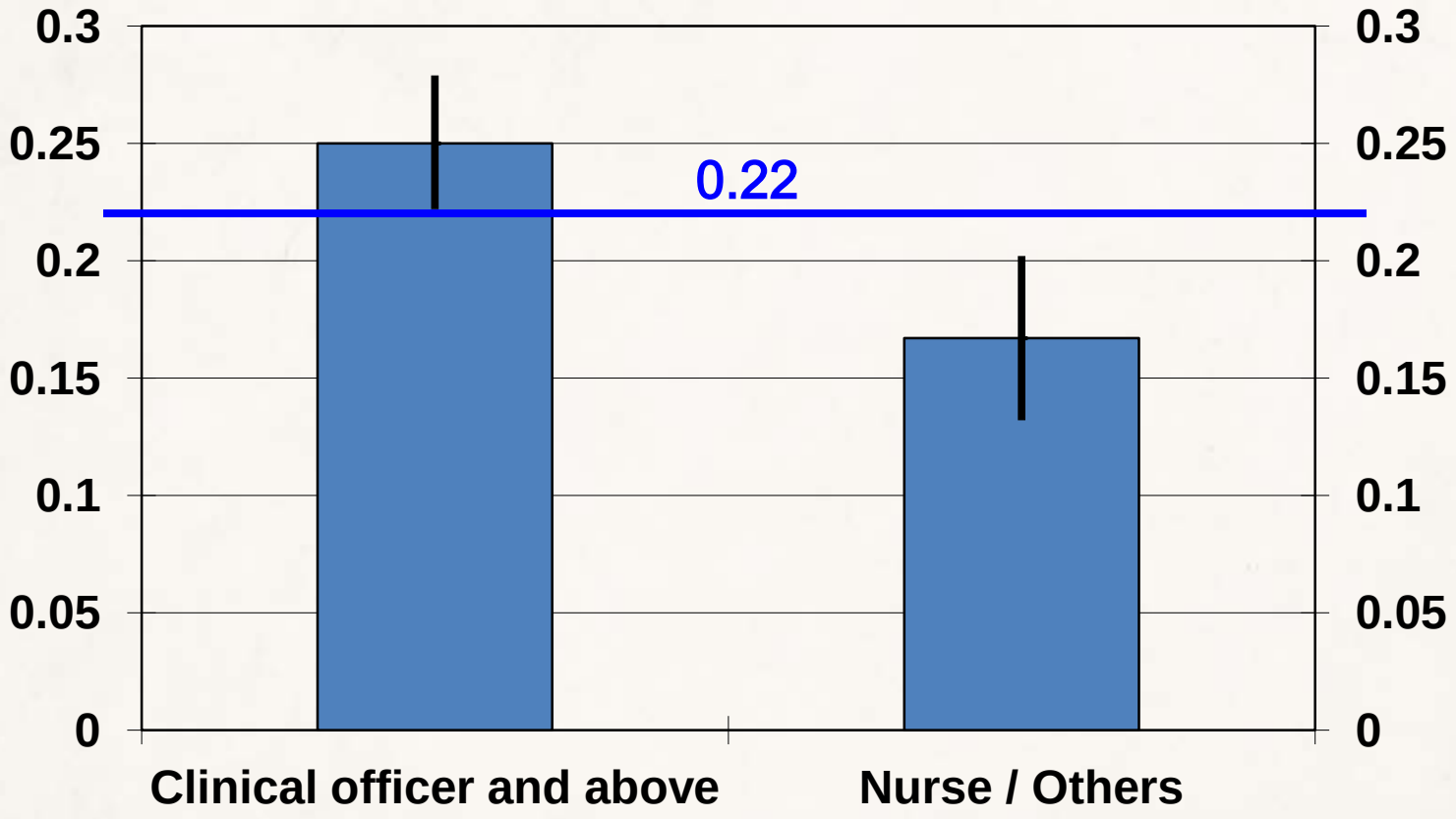
* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$

LACK OF KNOWLEDGE

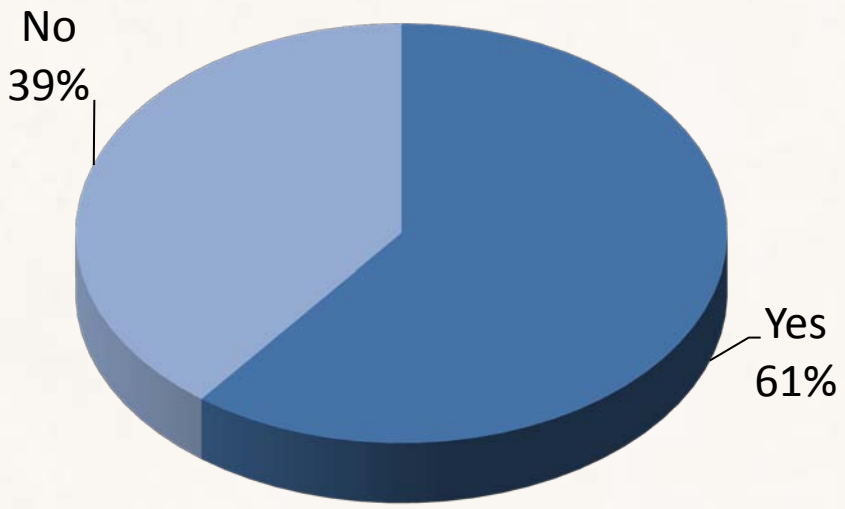
Pre-service training
(among prescribers in the OPD)



Performance score by level of training

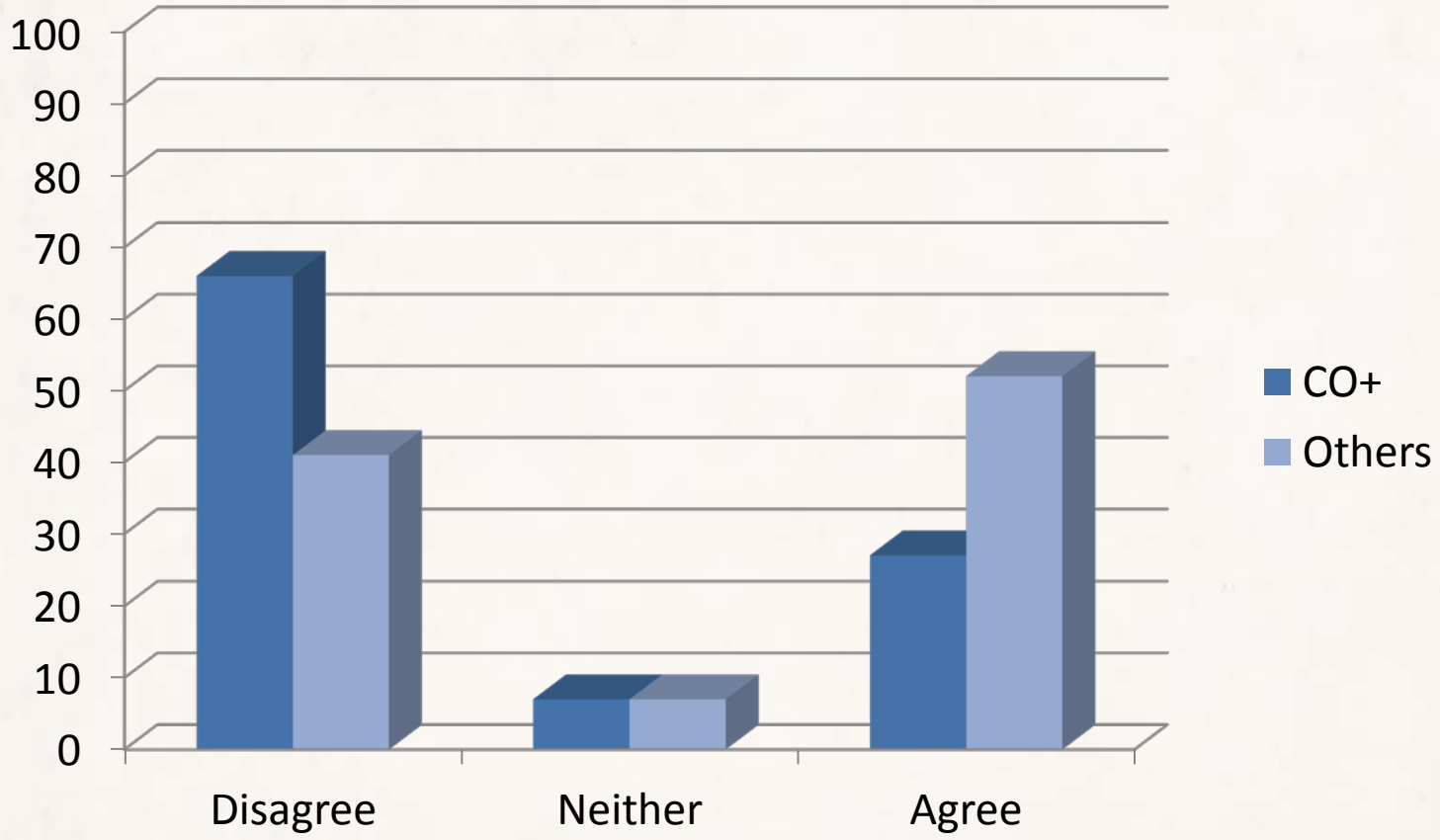


IMCI training



Average time since training: **4 years**

”I often feel I lack the knowledge to form a correct diagnosis and treatment”

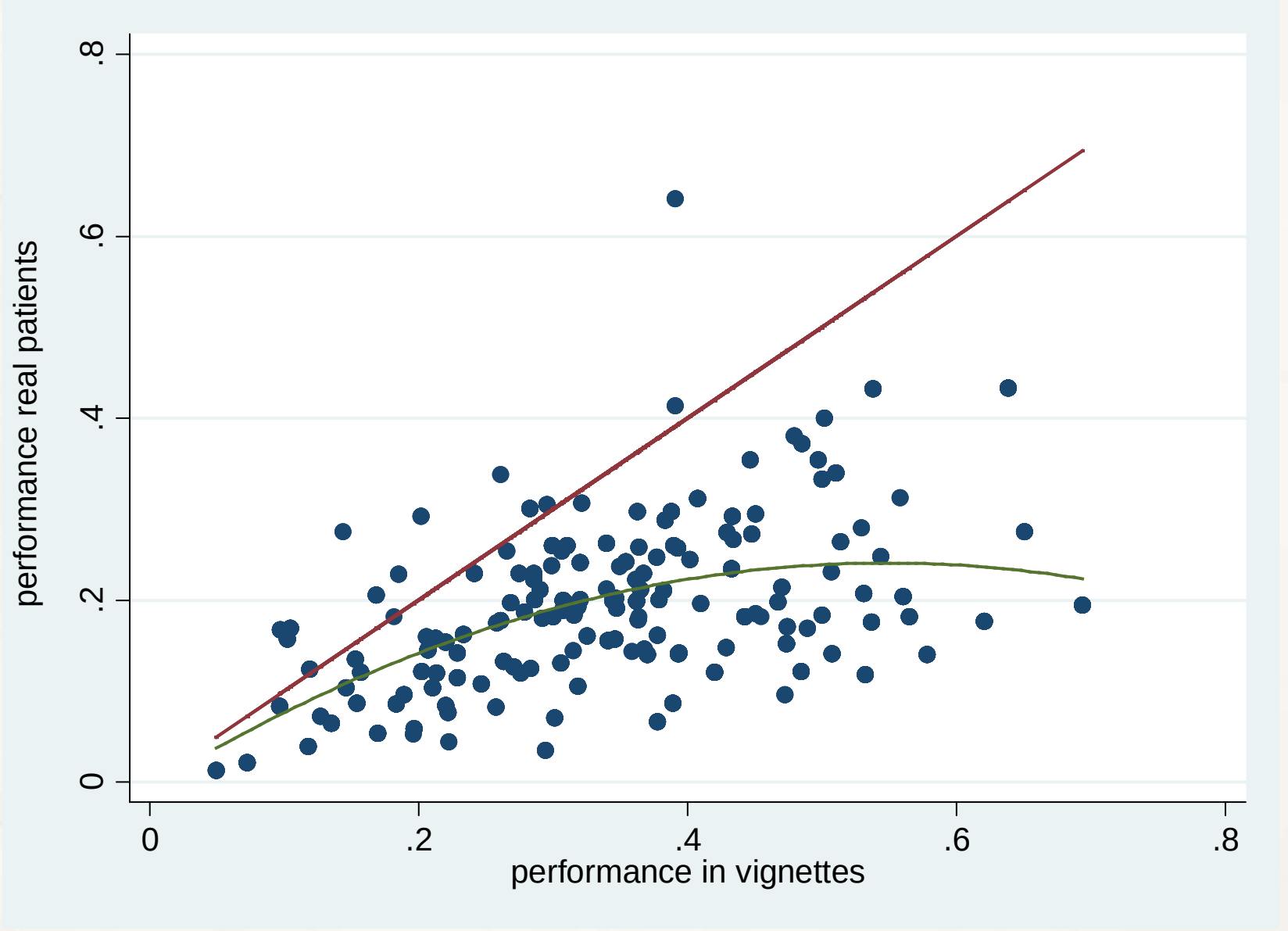


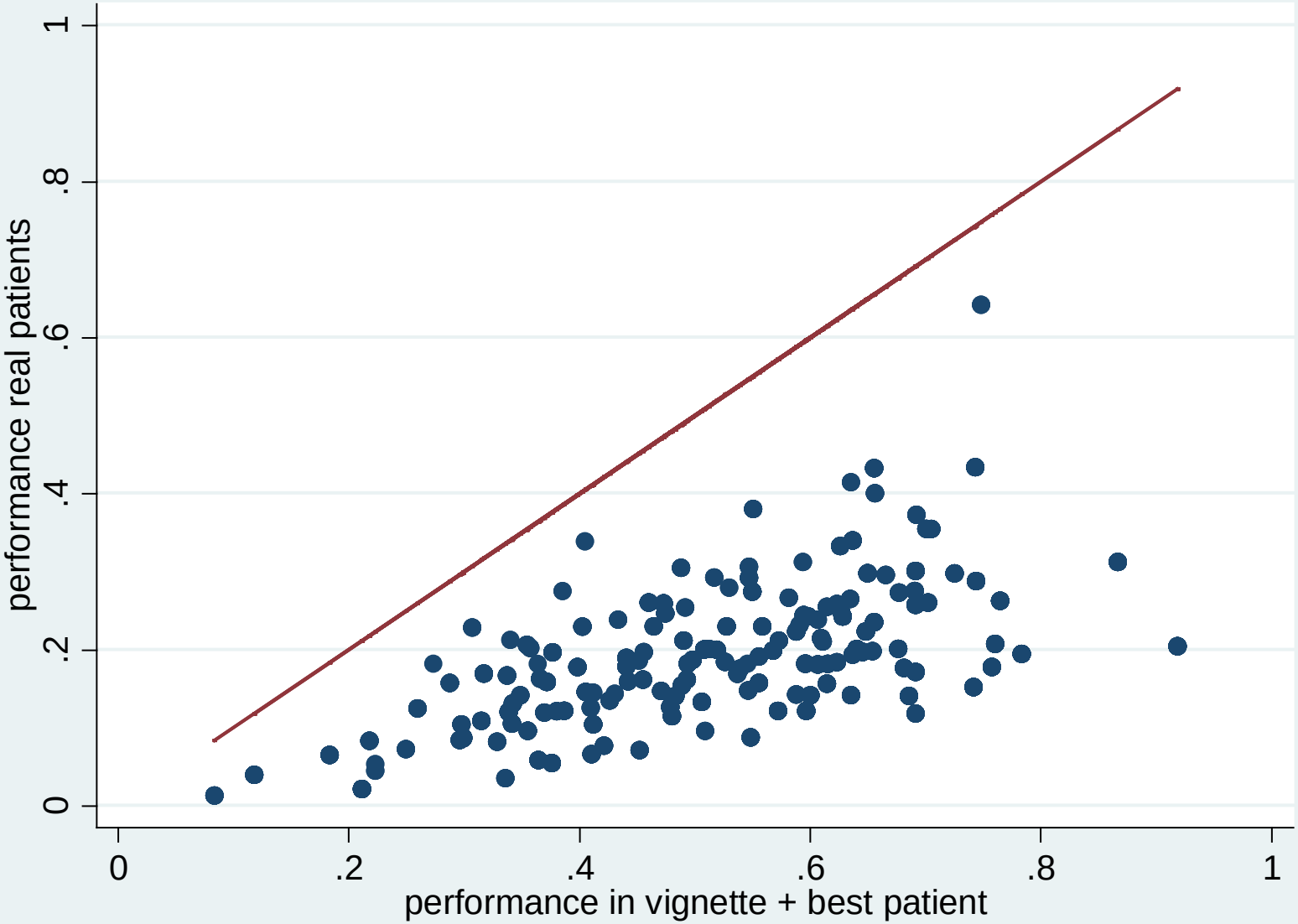
Measuring knowledge through vignettes(?)

Vignettes: Hypothetical patients.

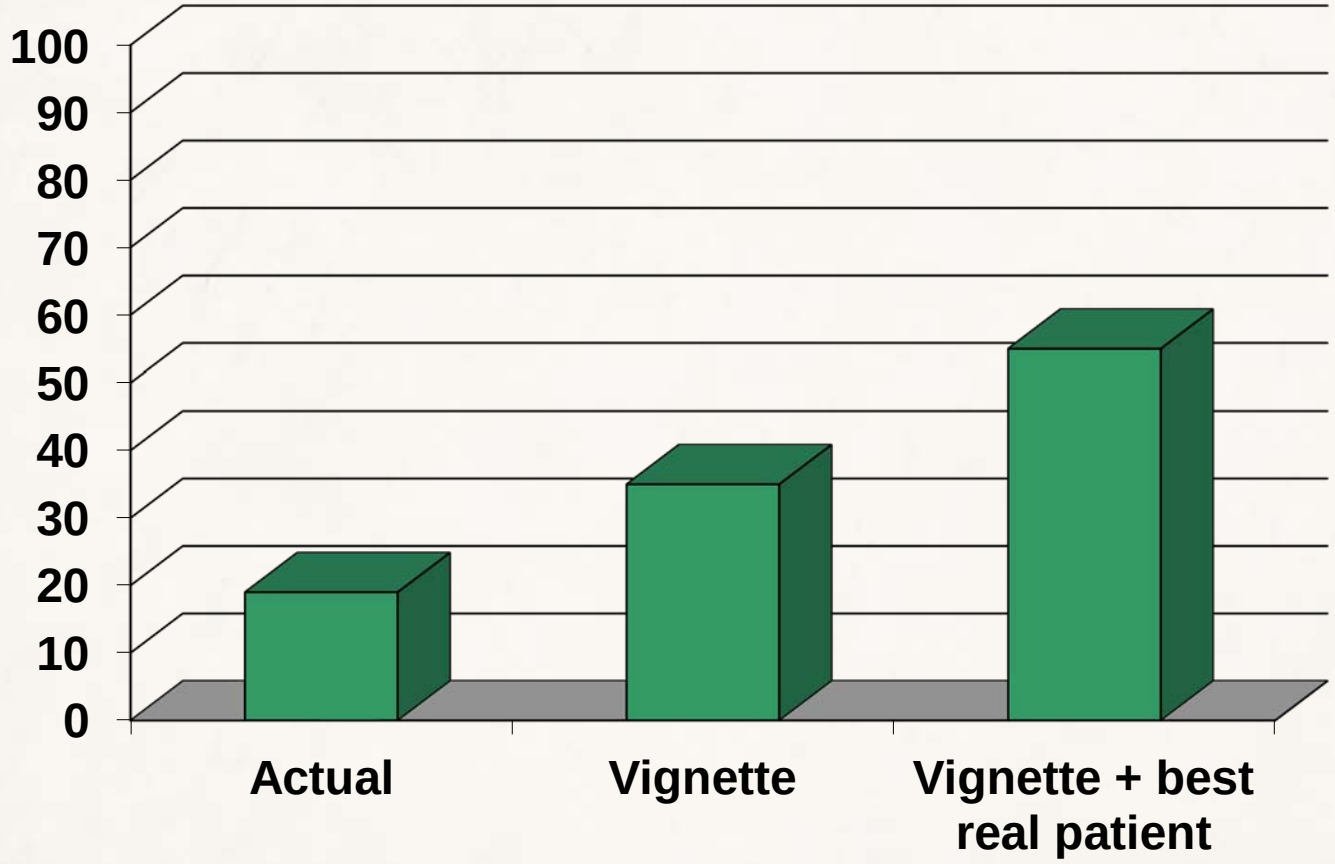
- Fever
- Cough
- Diarrhea

Question: How does performance in vignettes compare with performance with real patients?


performance real patients
0
.2
.4
.6
.8
0
.2
.4
.6
.8
performance in vignettes

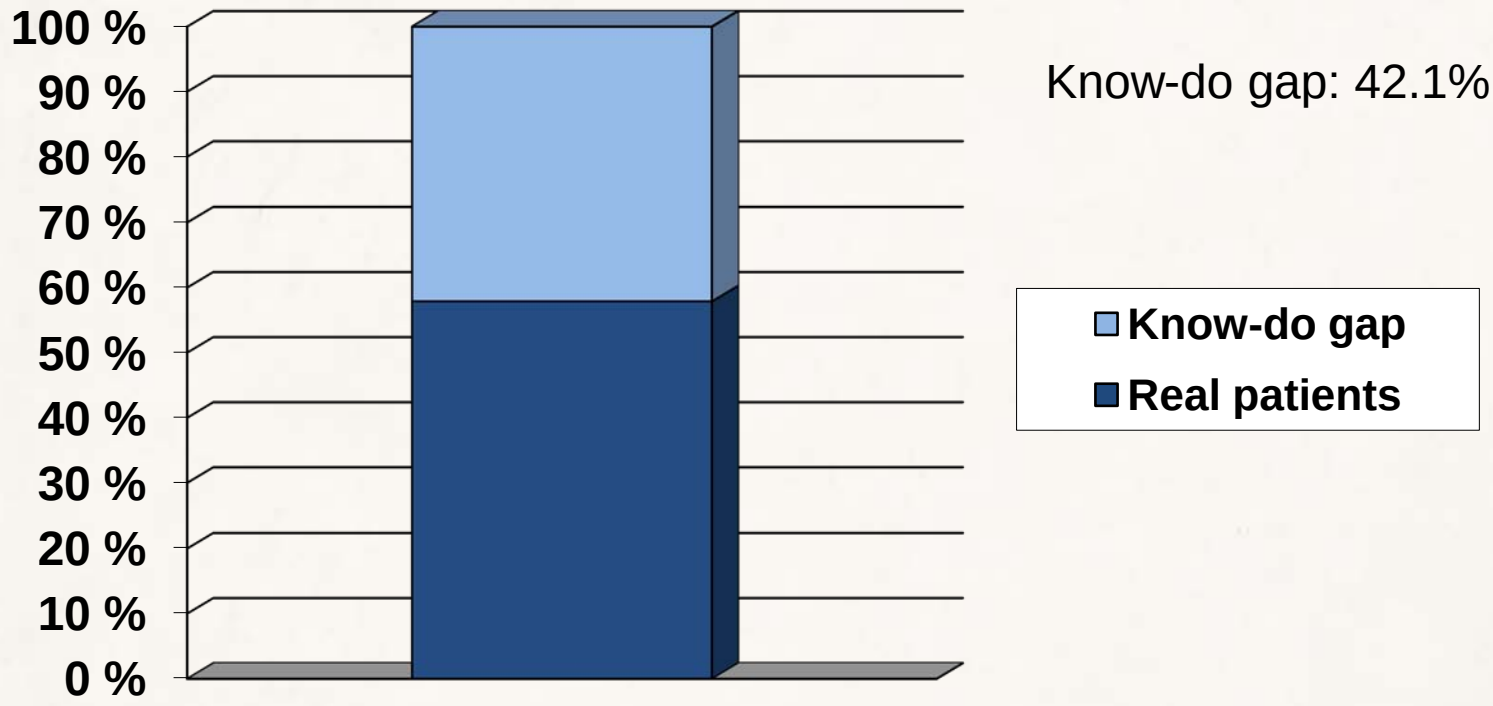

performance real patients
0
.2
.4
.6
.8
1
0
.2
.4
.6
.8
1
performance in vignette + best patient

Real patients vs vignettes



Know-do gap – as defined by plain vignette

(conservative measure)



Know-do gap: 42.1%

Examples of large know-do gap IMCI (*COs*)

Symptom	IMCI investigation	Score		Difference (a)-(b)
		Knowledge test (a)	Real children (b)	
Cough	Auscultate the chest	0.747	0.214	**0.533**
Diarrhea	Pinch abdominal skin (check dehydration)	0.758	0.311	**0.447**
Diarrhea	Ask about vomiting	0.724	0.299	**0.425**
Diarrhea	Examine for sunken eyes	0.708	0.292	**0.416**
Diarrhea	Inability to drink or breastfeed	0.714	0.332	**0.382**
Cough	Count respiratory rate	0.562	0.195	**0.367**
Fever	Take temperature	0.807	0.480	**0.327**
Fever	Ask about pattern of fever	0.455	0.140	**0.315**
Fever	Ask about cough	0.698	0.383	**0.315**

Why low performance?

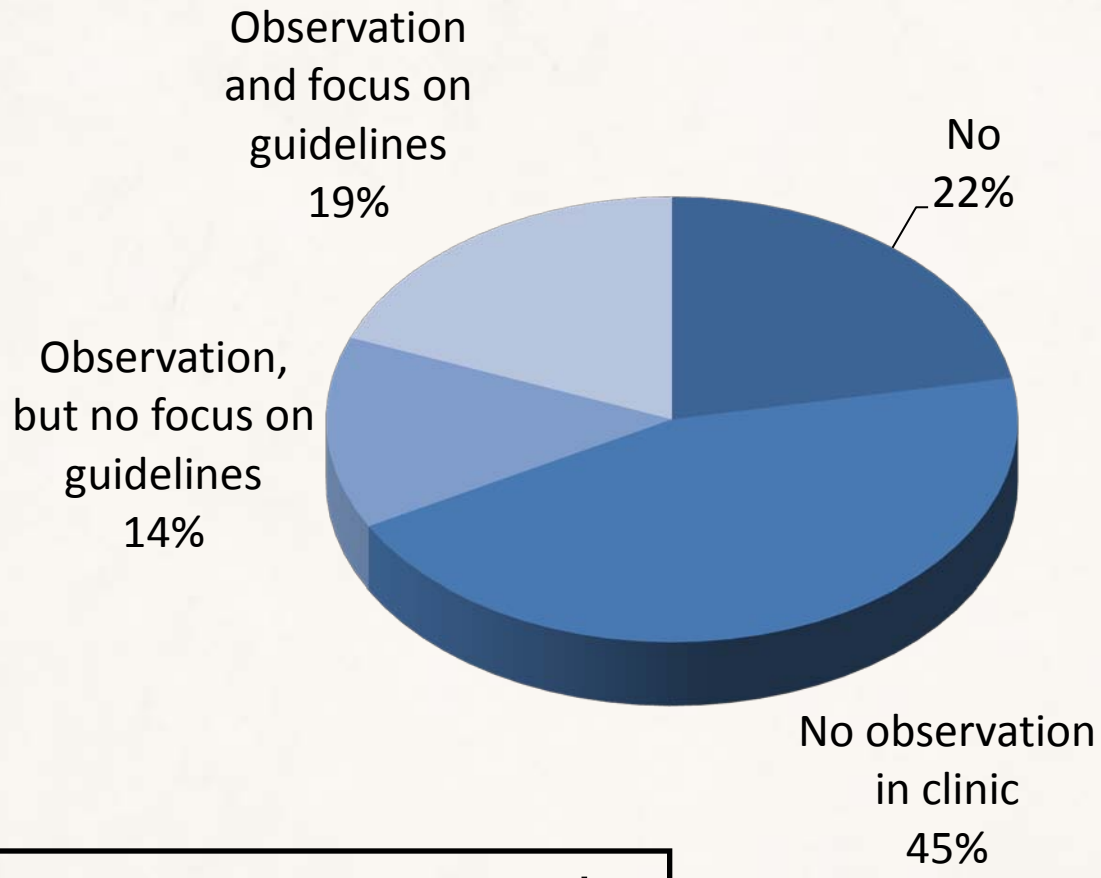
Lack of opportunity

Knowlegde
Time
(Equipment)

Lack of motivation

Preferences
Rewards / penalties
Supervision
Expectations

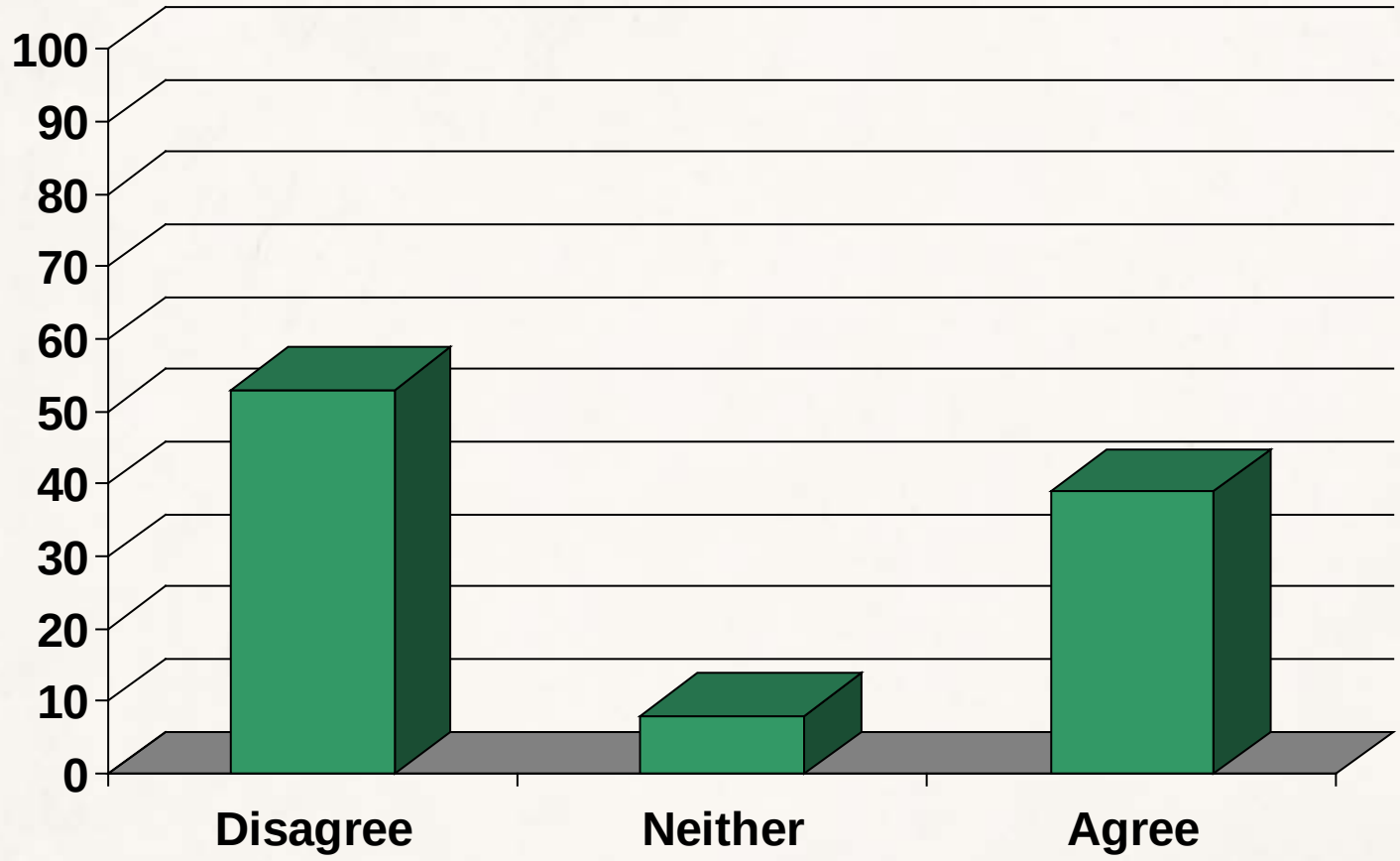
External supervision



Frequency: Every 3 months

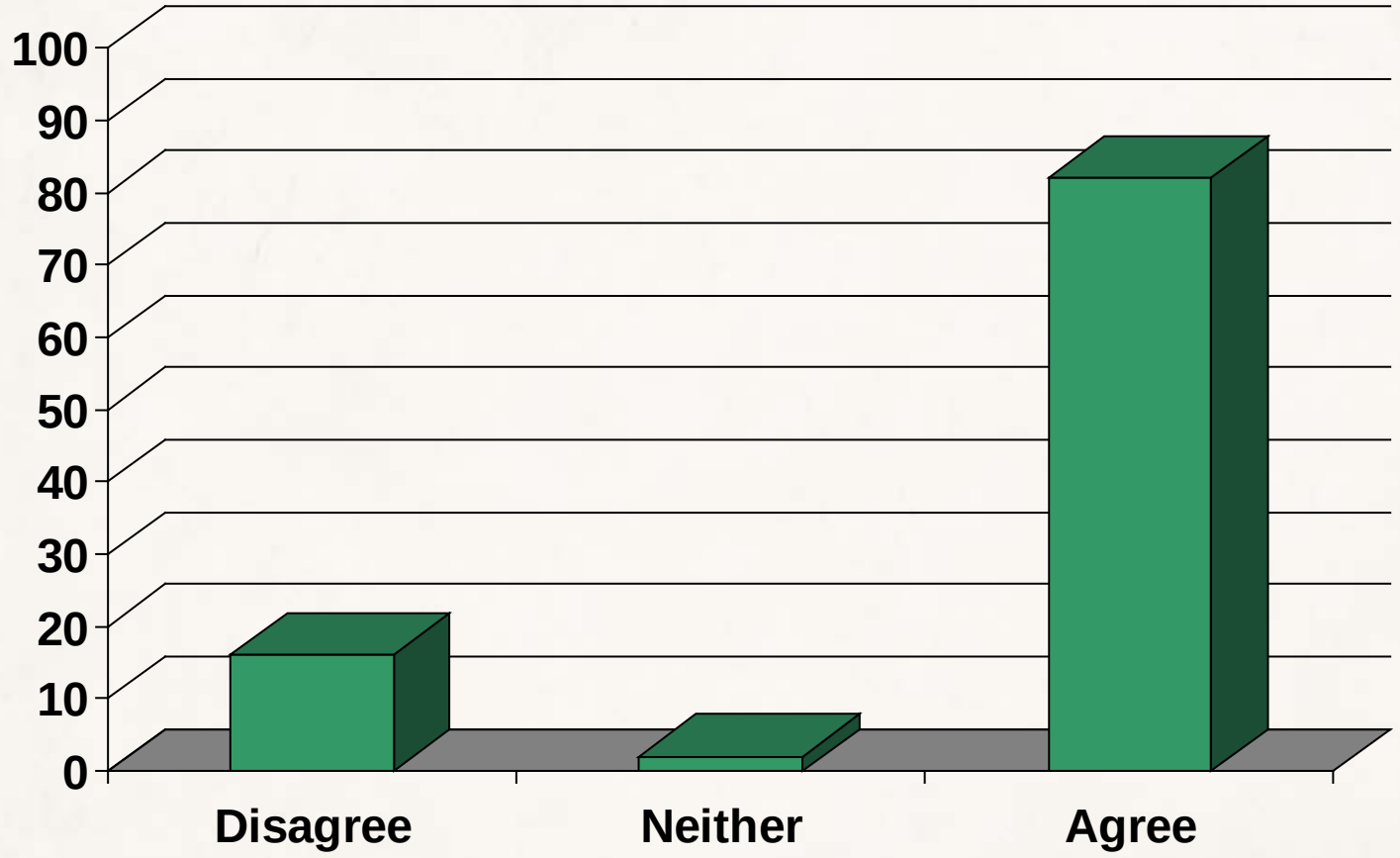
EXPECTATIONS FROM COLLEAGUES:

”Most health workers dislike a fellow who provide better services than they do”

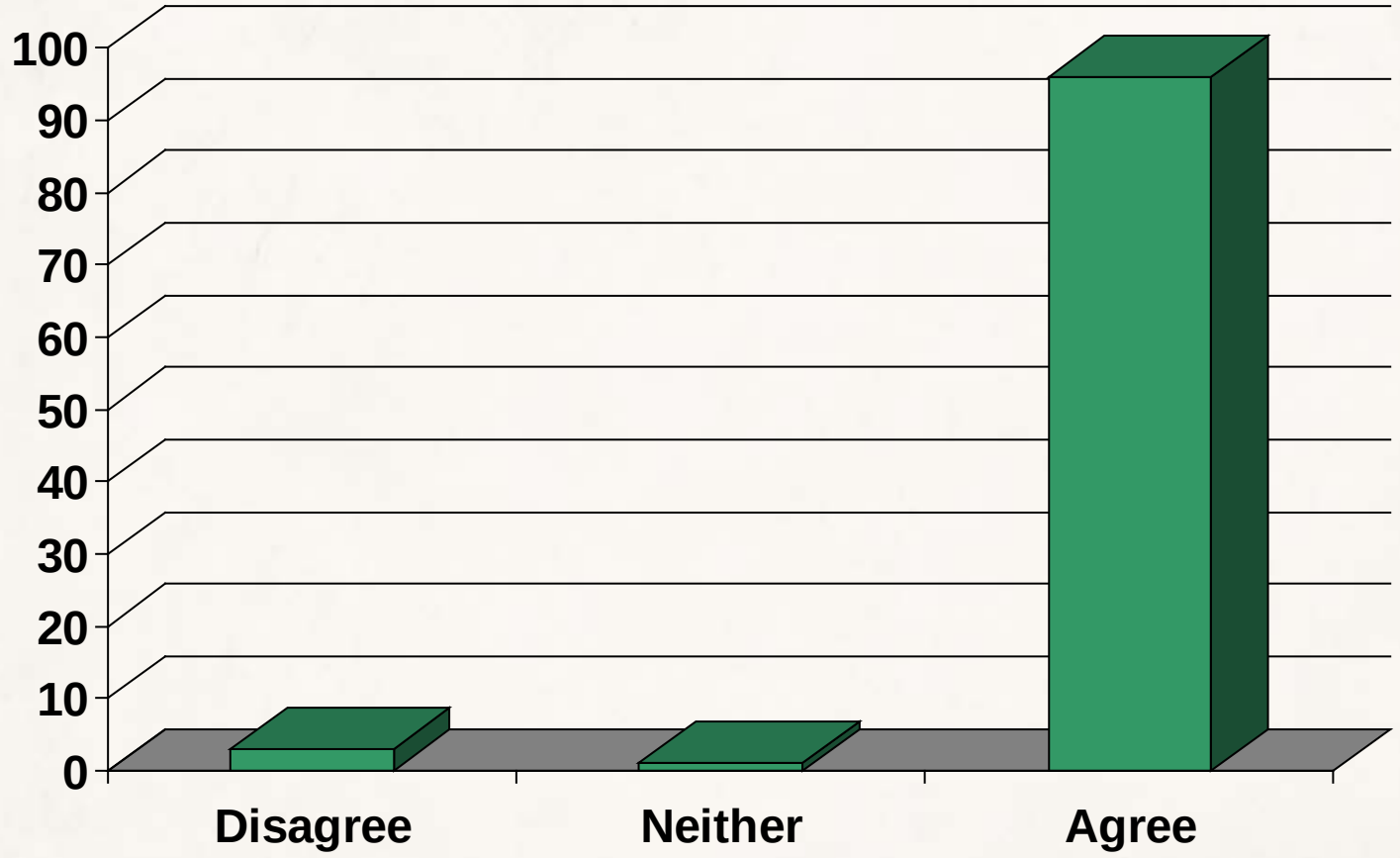


COMMUNITY EXPECTATIONS:

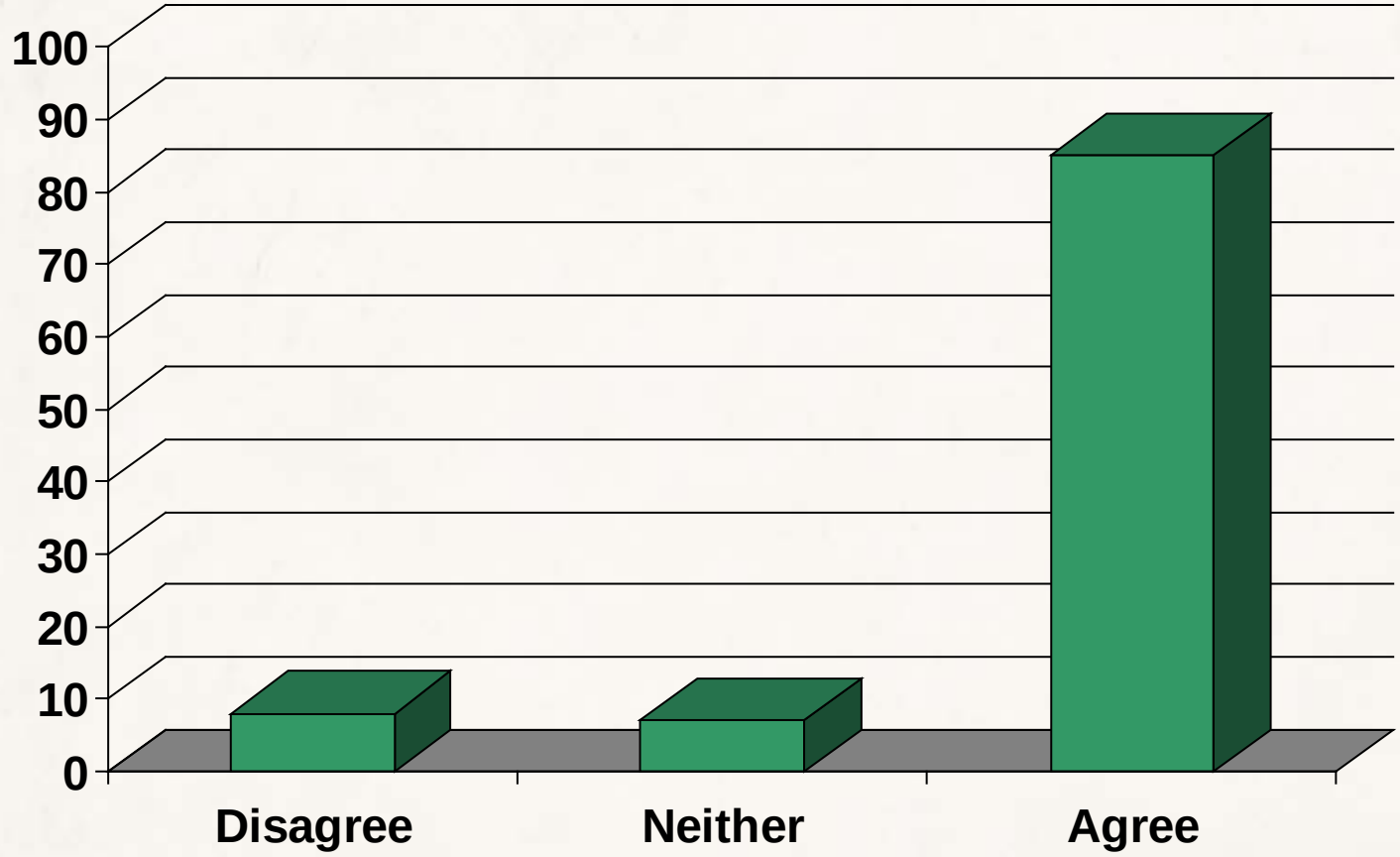
”Most patients are dissatisfied if you do not prescribe drugs”



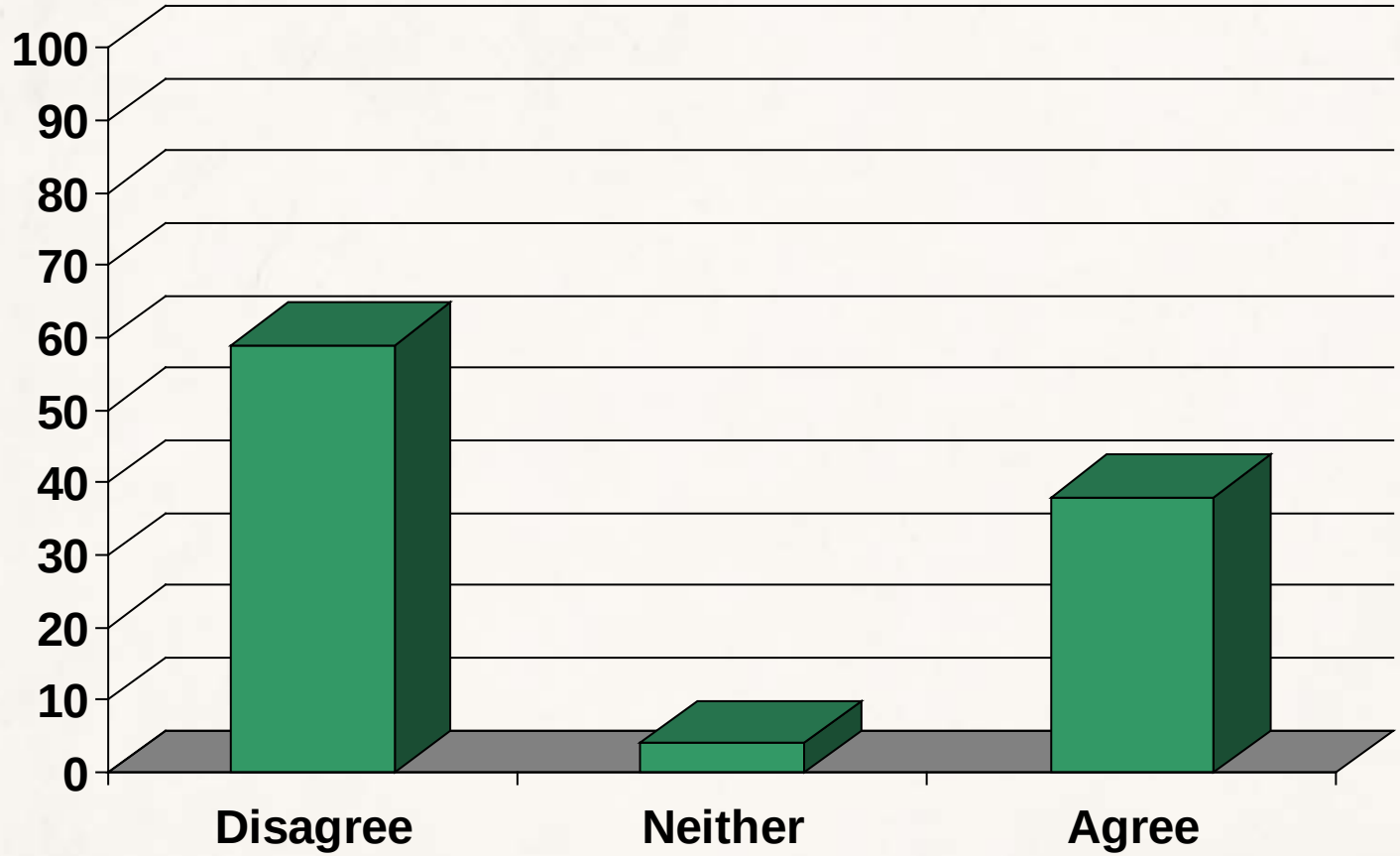
”Many patients want to get a confirmation of the diagnosis *they* think they suffer from”



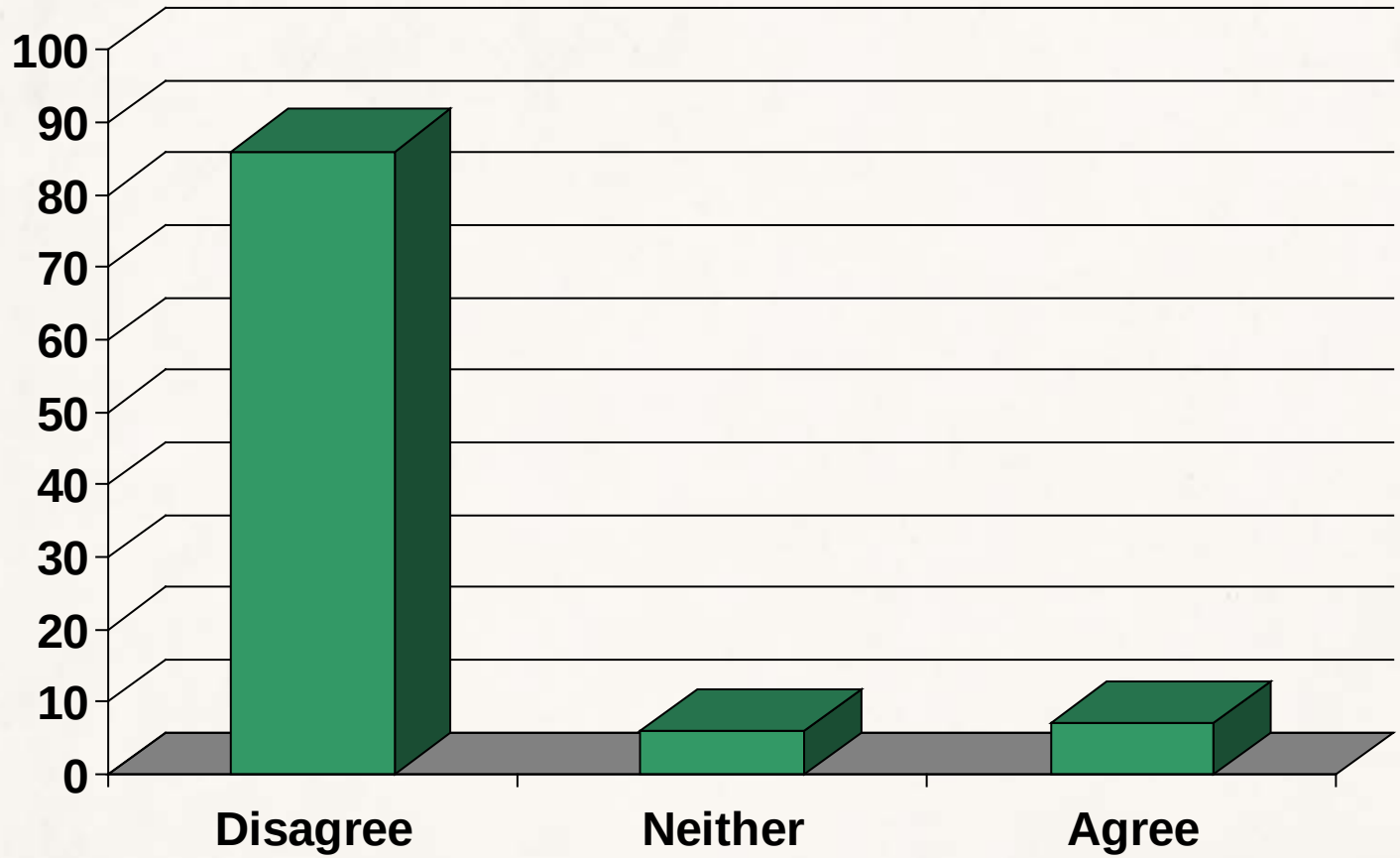
”If you spend much time with each patient, the patients waiting outside will complain”



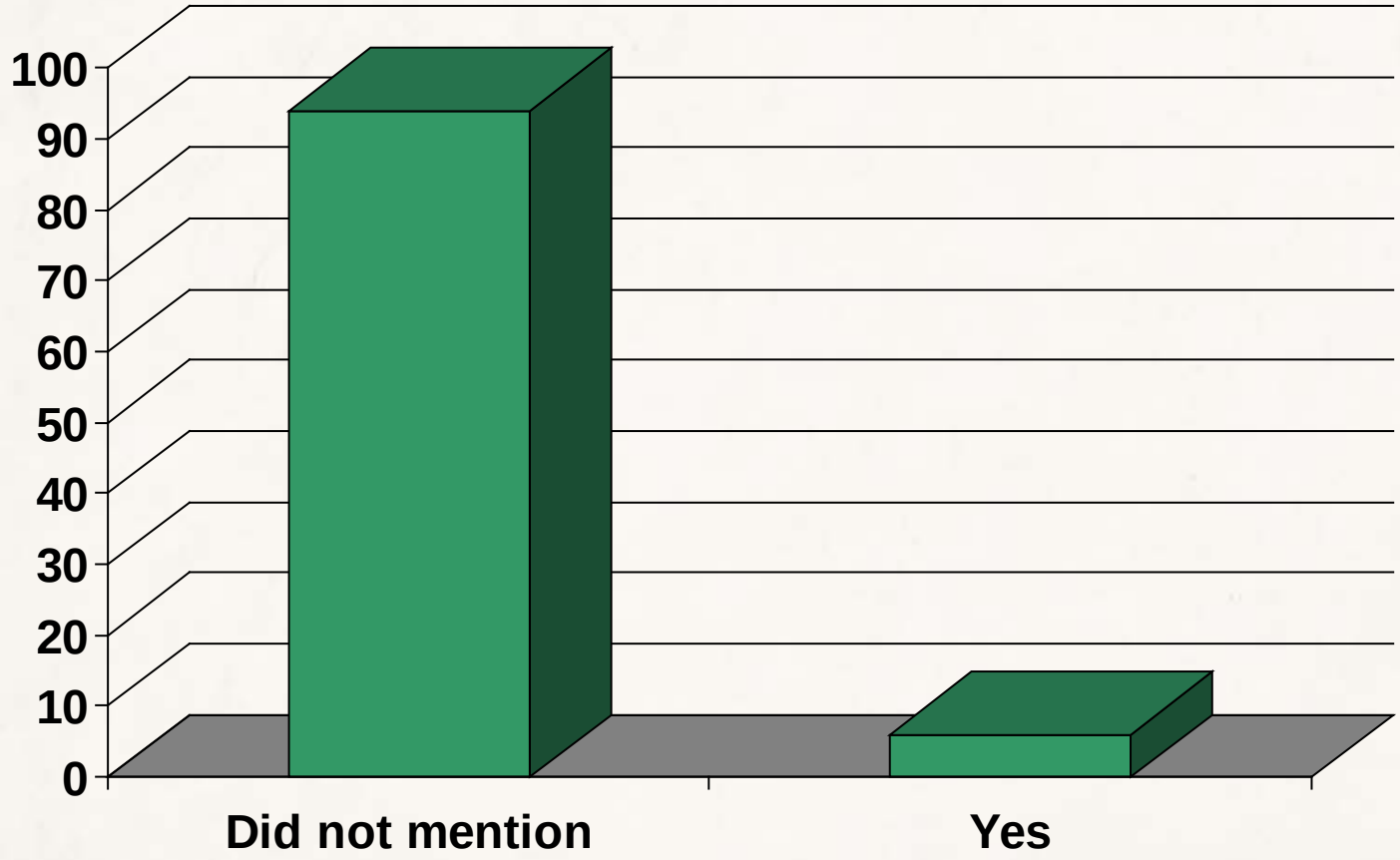
”When in the consultation room, patients will prefer the doctor to finish quickly”



”Fewer patients can delay or reduce my salary”



”The most important factor for getting promoted is to have friends in the local /central government”



Other-regarding preferences (altruism)

- I have donated blood
- I have helped carry a stranger's belongings
- I have let a neighbour whom I didn't know too well borrow an item of some value to me
- I have helped a classmate whom I did not know that well with a homework assignment when my knowledge was greater than his or hers
- I have before being asked, voluntarily looked after a neighbour's children without being paid for it

- Altruism index: Principal component analysis

Motivations and know-do gap

	Know-do gap (if agree or above mean)	Know-do gap (if not agree or below mean)	Difference in know-do gap
Altruism index	0.434 (.042)	0.408 (.039)	6.4%
Fewer patients can reduce or delay salary	0.360 (.033)	0.576 (.032)	-37.5%
Friends in gov't most important for promotions	0.515 (.032)	0.419 (.031)	22.9%
Patients want doctor to finish quickly	0.480 (.042)	0.384 (.037)	25.0%
Patients dissatisfied without drugs	0.433 (.031)	0.352 (.068)	23.0%
Patients want own diagnosis confirmed	0.558 (.041)	0.378 (.034)	47.6%
Supervision of process quality	0.388 (.051)	0.436 (.034)	-11.0%

KNOW-DO GAP	OLS (1)	OLS (2)
Altruism index	-0.023	-0.026
#Patients affect salary (1-5)	-0.096***	-0.100**
Promotion – through friends	0.131*	0.150*
Patients want to finish quickly	0.123*	0.094*
Patients want drugs	0.033	0.030
Patients want diagnosis confirmed	0.162**	0.190***
Supervision of diagnostic process	-0.127**	-0.127**
Case load		-0.001
Clinical officer		-0.059
IMCI trained + child		-0.082
Government		0.001
Drug index (0-7)		-0.016
Laboratory		-0.035
Child		0.005
Patient weakness		-0.016
Patient number		0.003
N	*1,995*	*1,915*
R^2	*0.198*	*0.291*

* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$

Conclusions

Large potential for improvement of diagnostic quality

- Weak adherence to guidelines (24% IMCI adherence)
- Case load is manageable (Less than 20 patients per day)
- Know-do gap is sizeable (at least 40-60%)

What can be done?

- Higher number of staff ineffective
- Training helps, but not much
- Improve motivation
  - Top-down vs. buttom-up
  - Preferences vs. incentives