Das J, Holla A, Das V, Mohanan M, Takak D, Chan B. In urban and rural India, a standardized patient study showed low levels of provider training and huge quality gaps. Health Aff (Millwood). 2012;31(12).

Appendix

In this technical appendix we describe the medical cases portrayed by the standardized patients in the study, our sampling protocol, and response rates. Further details, including the instrument used to debrief the standardized patients following their interactions with providers and the accompanying manual are available after a brief registration process through the website, www.healthandeducationinindia.org.

Cases

Standardized patients presented one of three cases: unstable angina, asthma, and dysentery of an absent child. For unstable angina, a 45-year-old male complains of chest pain the previous night. Appropriate history taking would reveal classic signs (radiating, crushing pain) and risk factors (smoking, untreated diabetes, and family history of cardiac illness) of unstable angina or an imminent myocardial infarction. The asthma case features a 25-year-old male or female standardized patient presenting with difficulty breathing the night before the visit. When questioned appropriately, the standardized patient reveals that the episode lasted for 10 to 15 minutes and involved a

“whistling” sound (wheezing) and that he or she has had similar episodes before, often triggered by house cleaning and cooking smoke. The standardized patient also reports a family history of similar symptoms. For the dysentery case, a 26-year-old father or mother of a 2-year-old child complains that his or her child has diarrhea and requests medicines. When probed, the standardized reveals details of their water source and sanitation habits, in addition to the presence of fever and the frequency and quality of the child’s stools.

Sampling of providers and standardized patient assignment

In 2009, the study was piloted in urban Delhi among 41 private providers and 23 public clinics offering primary care in 6 neighborhoods of the city. This convenience sample of providers was based on previous research in the neighborhoods.

In 2010, rural providers in Madhya Pradesh were sampled from a census of all medical care providers catering to 60 villages randomly sampled in 3 districts in Madhya Pradesh, conducted as part of a larger study of 100 rural health care markets. To decrease standardized patient detection rates, the sampling strategy first excluded extremely remote villages, limited the maximum number of sampled providers per clinic to two for public and to one for private clinics, and eliminated community health workers, midwives, and providers who only make home visits. This

eliminated 250 of a total 752 health care providers; the remaining eligible providers accounted for over 80 percent of all visits from households in the sample villages according to a census of households that elicited information about health care decisions. Among eligible providers, every public provider and every private provider with an MBBS degree was automatically sampled, along with the private practices of public providers. For each eligible public provider, the closest private provider was also sampled. The remaining providers were randomly selected until the number of private providers sampled per village reached a total of 6. The final rural sample consisted of 241 providers.

Providers did not know the identity of the standardized patients, and they thus would have appeared as new patients. In Delhi, each provider received 4 standardized patients: unstable angina, male asthma, female asthma, and the mother of a child with dysentery. In Madhya Pradesh, each sampled provider was typically assigned 3 standardized patients: unstable angina, the father of a child with dysentery, and either male or female asthma.

To ensure that there was no correlation between standardized patient characteristics and provider/clinic characteristics, standardized patients were randomly assigned to providers. This

also ensures that inter-rater differences did not bias the results. In all regressions, we control for a full set of standardized patient fixed-effects and in all specifications, we cannot reject the null hypothesis that the identity of the standardized patient was uncorrelated to the clinical encounter - that is, an F-test for the joint significance of the standardized-patient fixed-effects cannot reject the null that they are jointly zero.

Response rates

In Delhi, all 64 sampled providers received at least one standardized patient, and 248 out of a total possible 256 patient-provider interactions were completed. Interactions were not completed when a provider repeatedly could not be found in his/her clinic.

In Madhya Pradesh, of the 246 initially sampled providers, standardized patients were able to visit 216 at least once. Because standardized patients sought care from whoever was operating the clinic at the time of the visit, there were 241 providers in the final sample, and out of 738 possible interactions, 678 were recorded.

Defining quality and associations with quality

Exhibits A1 and A2 list all the items that have been classified as essential and recommended for the dysentery and asthma cases, as well as the frequency with which each one was completed in the rural sample (See Exhibit 3 in the main text for the corresponding chart for the unstable angina case). Exhibit A3 lists the definitions of *correct*, *partially correct*, and *wrong treatment/diagnosis* used to classify any diagnoses/treatment provided by sampled providers and also categorizes treatments as *correct* or *incorrect/unnecessary*. Exhibit A4 presents the marginal effects of provider and clinical characteristic on the quality of care as measured by adherence to checklist, likelihood of correct diagnosis and likelihood of correct treatment. These coefficients are graphed in Exhibit 5 in the main text.

Software

Stata 11.2 software was used to compute unadjusted means and standard-errors of outcome variables and to calculate regression adjusted means and robust standard errors.

Human subjects review:

Institutional review boards at Harvard University and Innovations for Poverty Action and the Central and State governments in India granted clearance for the study. For the

Delhi pilot, consenting providers were informed they would receive a standardized patient in the following 6 months. No standardized patients were harmed or exposed to risk in this stage. To minimize detection in rural Madhya Pradesh, where providers are more likely to recognize their entire patient population, the study proceeded as an audit, and providers were not aware that they were being visited by standardized patients. Clearance was granted for this deception design because the risks to providers and their patients were minimal, whereas accurate measures of provider practice were nonexistent. The expected length of clinical interactions, patient loads, and levels of provider anxiety induced by the cases were thought to be small, and standardized patients had to pay providers whatever they charged.

Technical Appendix Exhibit List

TECHNICAL APPENDIX EXHIBIT 1 (figure)

Caption: Adherence to recommended checklist of questions and examinations: Dysentery

Source: Data collected by authors

Notes: Average values and 95% confidence intervals reported. History refers to questions asked during the standardized patient-based interaction, while exams refer to exams performed. All items listed are recommended. All essential items are marked with an “E” and are also considered recommended.

TECHNICAL APPENDIX EXHIBIT 2 (figure)

Caption: Adherence to recommended checklist of questions and examinations: Asthma

Source: Data collected by authors

Notes: Average values and 95% confidence intervals reported. History refers to questions asked during the standardized patient-based interaction, while exams refer to exams performed. A temperature attempt refers to checking temperature either by touch or with a thermometer. All items listed are recommended. All essential items are marked with an “E” and are also considered recommended.

TECHNICAL APPENDIX EXHIBIT 3 (table)

Caption: Diagnosis and treatment categories, by case

Source: Data collected by authors

Notes: This table lists for each case the definitions used for correct, partially correct, and incorrect diagnoses and for correct and unnecessary/harmful treatments.

TECHNICAL APPENDIX EXHIBIT 4 (table)

Caption: Marginal effects of provider and clinic characteristics: Urban Delhi

Source: Data collected by authors

Notes: *** p<0.01, ** p<0.05, * p<0.1. The table reports regression coefficients with standard errors in parentheses below. Each column refers to a different regression, and column titles refer to each regression's dependent variable. Row variables appear as independent variables in every regression. Column 1 was estimated using ordinary least squares regression. The remaining columns that measure relative risks were estimated using a Poisson regression with robust standard errors. All observations are standardized patient based interactions. All regressions also include fixed effects for each standardized patient.

Exhibit A1

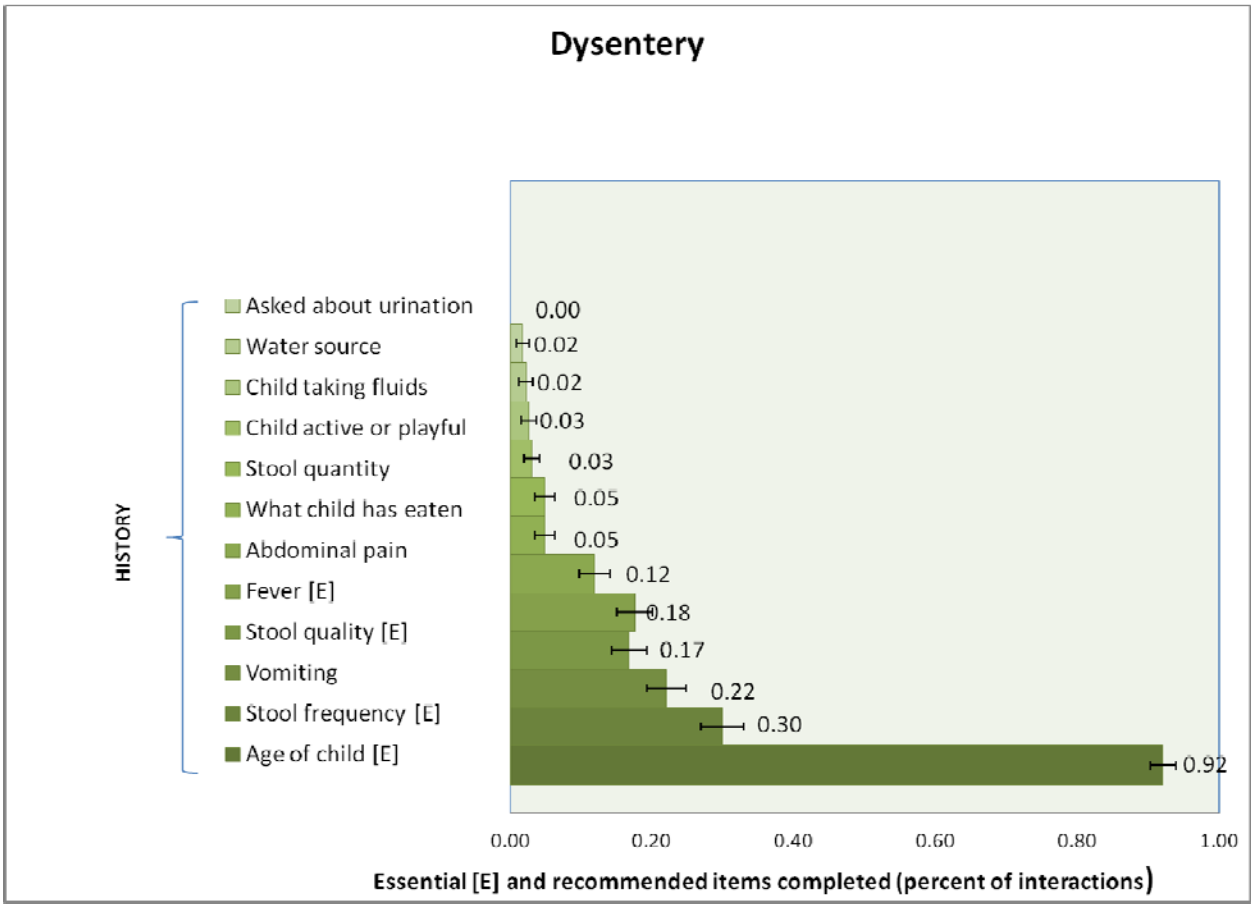
Dysentery
HISTORY
Asked about urination
Water source
Child taking fluids
Child active or playful
Stool quantity
What child has eaten
Abdominal pain
Fever [E]
Stool quality [E]
Vomiting
Stool frequency [E]
Age of child [E]
0.00
0.02
0.02
0.03
0.03
0.05
0.05
0.12
0.18
0.17
0.22
0.30
0.92
0.00
0.20
0.40
0.60
0.80
1.00
Essential [E] and recommended items completed (percent of interactions)

Exhibit A2

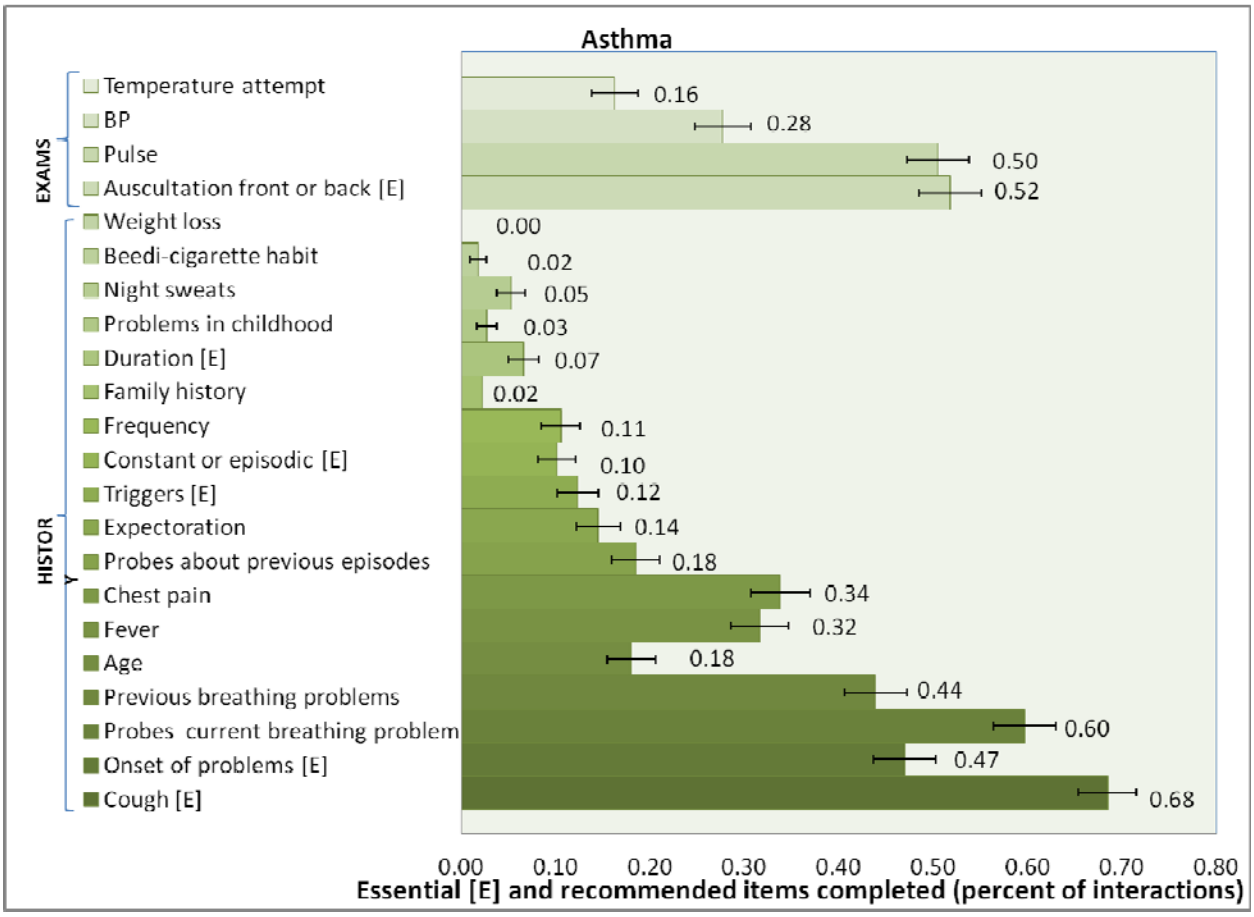
Asthma
EXAMS
HISTORY
Temperature attempt
BP
Pulse
Auscultation front or back [E]
Weight loss
Beedi-cigarette habit
Night sweats
Problems in childhood
Duration [E]
Family history
Frequency
Constant or episodic [E]
Triggers [E]
Expectoration
Probes about previous episodes
Chest pain
Fever
Age
Previous breathing problems
Probes current breathing problem
Onset of problems [E]
Cough [E]
0.16
0.28
0.50
0.52
0.00
0.02
0.05
0.03
0.07
0.02
0.11
0.10
0.12
0.14
0.18
0.34
0.32
0.18
0.44
0.60
0.47
0.68
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80
Essential [E] and recommended items completed (percent of interactions)

Exhibit A3: Diagnosis and Treatment Categories by Case

		Asthma	Dysentery	Unstable Angina
Diagnosis	Correct	Asthma, asthma attack	Dysentery, bacteria	Heart attack, angina, myocardial infarction, attack
	Partially Correct	Allergies, breathing problem,	Loose motions, diarrhea	Heart problem, heart disease
	Incorrect (Diagnosis offered by providers)	Weather, blood pressure problem, gastrointestinal problem, heart problem, cough in chest, thyroid problem, weakness, lack of blood, infection in windpipe, pregnancy, piloxsophil,	Weather, heat in liver, acidity, digestive problem, cramps in stomach	Blood pressure problem, gastrointestinal problem, muscle problem, the weather, injury, nerve pull, lack of blood, swelling in chest, pain from drinking cold water, heavy work, bad blood, decaying lungs, chest congestion.
Treatment	Correct	Bronchodilators, theophylline, inhaled or oral corticosteroids, leukotriene inhibitors, cromones, inhaled anticholinergics	ORS, rehydration	Aspirin, clopidogrel/other anti-platelet agents, referral.
	Unnecessary or harmful (offered by providers)	Aspirin, clopidogrel, anti-platelet agents, blood thinners, betablockers, ACE inhibitors, vasodilators, other cardiac medication, morphine, other pain medication, oral rehydration salts, oral electrolyte solution, zinc, antibiotics, anti-ulcer medication, psychiatric medication	Aspirin, clopidogrel, anti-platelet agents, blood thinners, betablockers, ACE inhibitors, vasodilators, other cardiac medication, morphine, other pain medication, steroids, inhaler, bronchodilators, theophylline, inhaled corticosteroids, leukotriene inhibitors, cromones, inhaled anti-cholinergics, oral cortico-steroids, other anti-asthmatic medication, anti-allergy medication, psychiatric medication	Antibiotics, oral rehydration salts, oral electrolyte solution, zinc, steroids, inhaler, bronchodilators, theophylline, inhaled corticosteroids, leukotriene inhibitors, cromones, inhaled anti-cholinergics, oral cortico-steroids, other anti-asthmatic medication, anti-allergy medication, psychiatric medication.

Exhibit A4: Multiple and maximum likelihood regressions of quality of care on provider characteristics (regression coefficients and standard errors)

	(1)	(2)	(3)
DEPENDENT VARIABLES:	**% recommended questions and exams**	**Gave any diagnosis**	**Gave correct treatment**
MP Sample			
Private sector	6.81***	1.76***	1.05
	(1.73)	(0.36)	(0.20)
No qualification	-3.24**	1.11	0.87
	(1.41)	(0.14)	(0.11)
Facilities and equipment	1.01***	1.05	1.02
	(0.35)	(0.036)	(0.041)
Patient load	0.086	1.01	0.92**
	(0.37)	(0.021)	(0.037)
Provider gender	2.06	0.99	1.34
	(3.11)	(0.25)	(0.38)
Provider experience	-0.14**	0.99	0.99*
	(0.058)	(0.0054)	(0.0059)
Low income area	1.67	1.08	1.15
	(3.91)	(0.37)	(0.41)
Constant	24.1***	0.17***	0.60
	(3.98)	(0.069)	(0.20)
N	636	636	636
Delhi Sample			
Private sector	15.0***	3.00***	0.54***
	(1.72)	(1.01)	(0.078)
No qualification	-4.19*	1.08	0.92
	(2.13)	(0.25)	(0.20)
Patient load	0.023	1.00	0.99*
	(0.064)	(0.014)	(0.0067)
Low income area	-2.41	1.15	1.38**
	(1.63)	(0.23)	(0.18)
Constant	16.8***	0.15***	0.78
	(2.46)	(0.064)	(0.15)
N	234	234	234