

Supplementary Online Content

Siddharthan T, Pollard SL, Quaderi SA, et al; GECostudy Investigators. Discriminative Accuracy of Chronic Obstructive Pulmonary Disease Screening Instruments in 3 Low- and Middle-Income Country Settings. *JAMA*. doi:10.1001/jama.2021.23065

eFigure 1. STARD Flow Diagram, Overall and for Nepal, Peru, and Uganda

eTables 1-12

eFigure 2. Performance of the 3 COPD Screening Tools at the 3 sites, Weighted to the Population Data

eTables 13-25

This supplementary material has been provided by the authors to give readers additional information about their work.

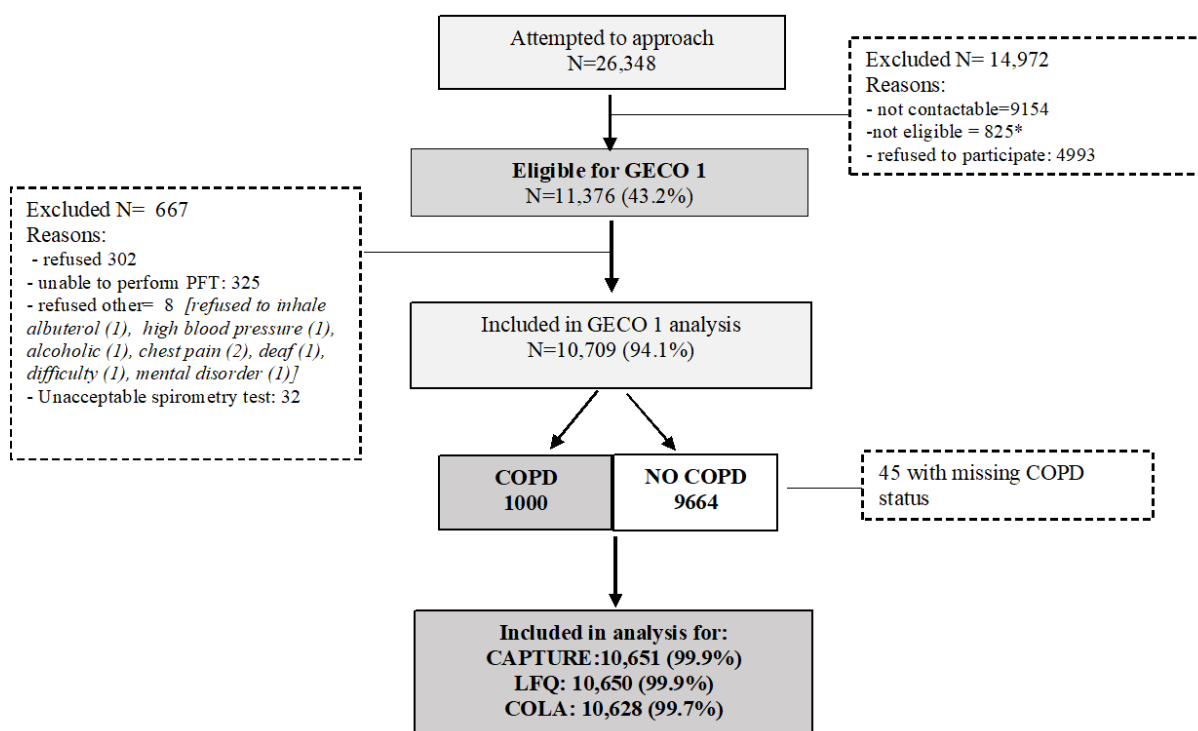
SUPPLEMENTAL TABLES AND FIGURES FOR PRIMARY ANALYSIS

Note: Reference numbers in this section refer to the primary reference list.

I. Standards for the Reporting of Diagnostic accuracy studies (STARD) flow diagrams

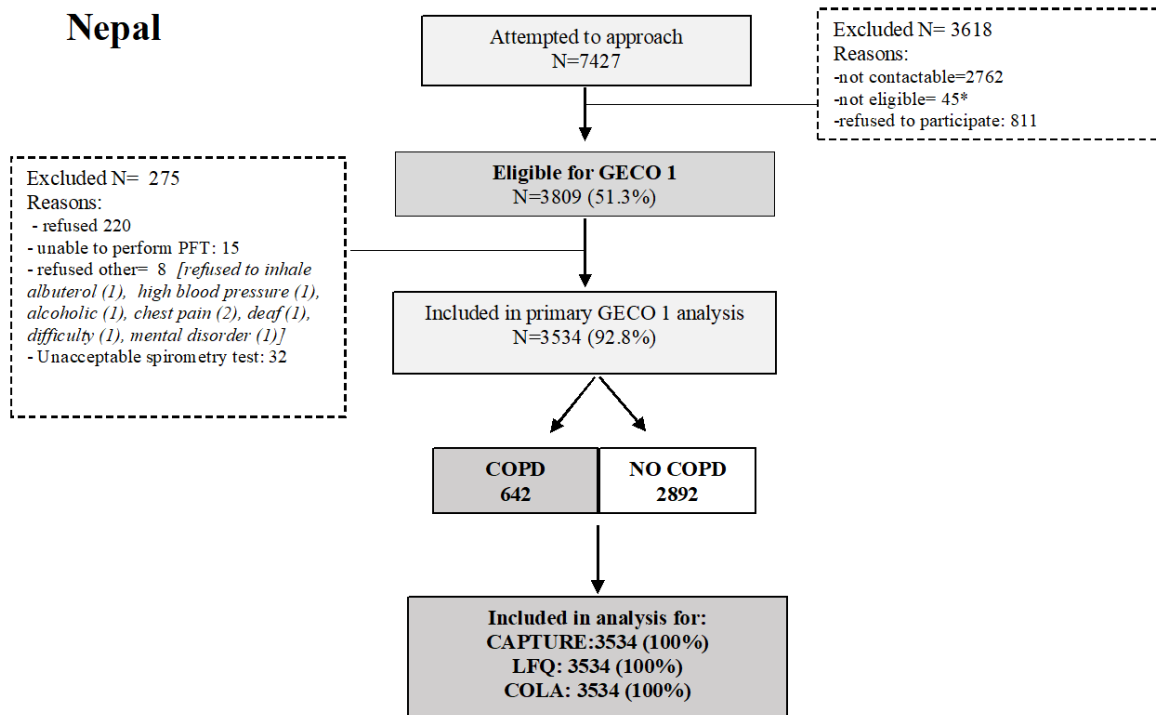
Below, we present STARD flow diagrams, overall (eFigure 1a) and for each site (eFigures 1b-d). Each of these figures has additional details on reasons for exclusion.

FIGURE S1a: STARD Flow Diagram, overall.



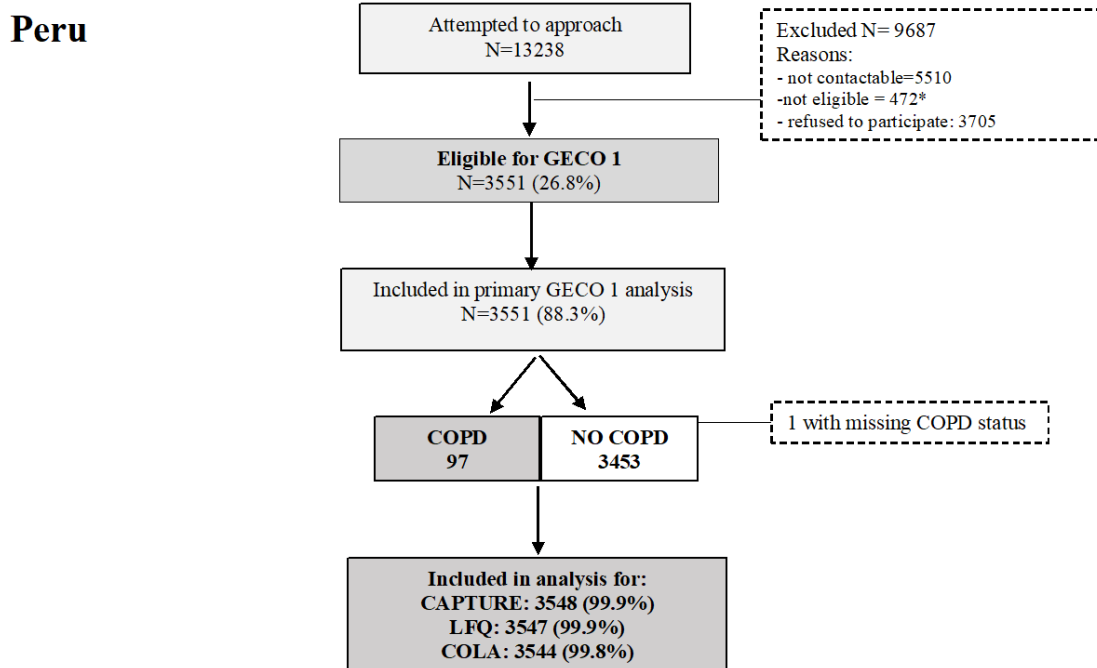
* REASONS: Outside of age range = 70; Age missing: 114; Pregnant = 9; Active tuberculosis = 13; Taking medications for tuberculosis = 9; Surgery in past 3 months = 73; Heart attack in past 3 months = 22; Not capable of performing spirometry = 141; Not capable of understanding procedures = 36, Could not get informed consent = 50; died=1; Paralysis =4, Seizure disorder = 2; Other reasons = 281

FIGURE S1b: STARD Flow Diagram, Nepal



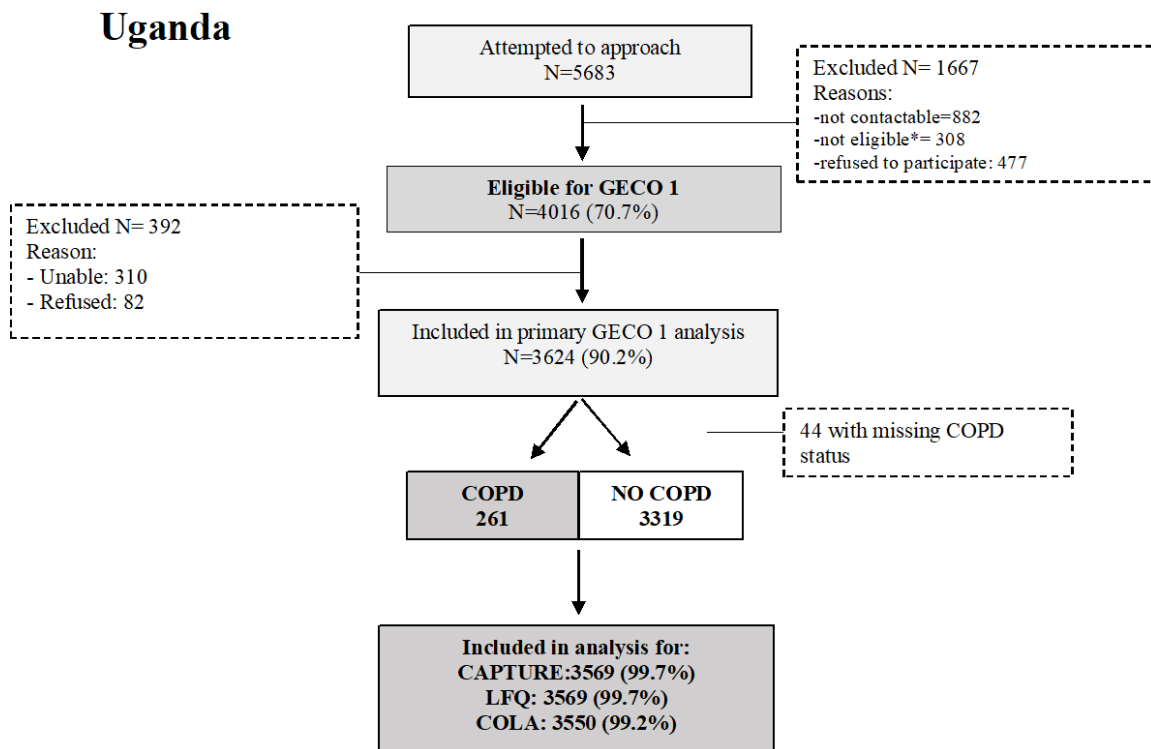
* REASONS: not able to do spirometry=5 , under 40 years = 28, over 95 years= 1, Paralysis =4, Seizure disorder = 2, Surgery = 1, TB=4

FIGURE S1c: STARD Flow Diagram, Peru



* REASONS: Outside of age range = 6; Pregnant = 5; Active tuberculosis = 3; Taking medications for tuberculosis = 7; Surgery in past 3 months = 44; Heart attack in past 3 months = 12; Not capable of performing spirometry = 101; Not capable of understanding procedures = 36, Not capable of providing informed consent = 41; Other reasons = 217

FIGURE S1d: STARD Flow Diagram, Uganda



*REASONS: Missing age: 114, Below 40Y: 31, Above 95Y: 4, Could not get informed consent: 9, Pregnant: 4, Had active TB: 6, On TB drug: 2, Had surgery: 28, Had MI: 10, Could not do spirometry: 35, Not eligible: 64, died: 1

Supplemental Tables of Descriptive Analysis:

eTable 1. COPD Prevalence, Self-reported COPD Diagnosis, and COPD GOLD Classification by Site

Variable	Level	Nepal	Peru	Uganda	Missing %	Missing N
n		3534	3551	3624		
COPD prevalence	No	2892 (81.83)	3453 (97.27)	3319 (92.71)	0.4	45
	Yes	642 (18.17)	97 (2.73)	261 (7.29)		
Severity - GOLD (1-4)	1	453 (70.6)	23 (23.7)	30 (11.5)	0.0	0
	2	175 (27.3)	62 (63.9)	140 (53.2)		
	3	2 (0.3)	0 (0.0)	14 (5.3)		
	4	12 (1.87)	12 (12.37)	76 (29.23)		
Severity - GOLD (A-D)	A	249 (38.8)	47 (48.5)	121 (46.4)	0.1	1
	B	324 (50.5)	36 (37.1)	91 (34.9)		
	C	56 (8.7)	12 (12.4)	34 (13.0)		
	D	10 (1.6)	2 (2.1)	13 (5.0)		

Supplemental Tables and Figures for Diagnostic Accuracy Analysis

A. Comparison of AUCs with continuous predictors (LFQ, CAPTURE, CAPTURE WITHOUT PEF, COLA)

Unweighted AUCs

eTable 2. Area Under the Curve (AUC) for Continuous Predictors (LFQ, CAPTURE, CAPTURE WITHOUT PEF, COLA)

	Uganda			Nepal			Peru		
	AUC	95% CI		AUC	95% CI		AUC	95% CI	
LFQ	0.760	0.726	0.793	0.789	0.770	0.808	0.720	0.668	0.771
CAPTURE W/O PEF	0.691	0.656	0.726	0.625	0.602	0.648	0.696	0.641	0.752
CAPTURE	0.735	0.703	0.767	0.758	0.737	0.780	0.784	0.731	0.836
COLA	0.756	0.724	0.788	0.792	0.773	0.811	0.773	0.727	0.820

Weighted AUCs

eTable 3. Results for Weighted AUCs (and Their 95% CIs) Based on Census Information (Age Group and Sex)

	Uganda			Nepal			Peru		
	AUC	95% CI		AUC	95% CI		AUC	95% CI	
LFQ	0.753	0.719	0.791	0.790	0.771	0.810	0.717	0.677	0.774
CAPTURE W/O PEF	0.689	0.652	0.724	0.627	0.606	0.653	0.696	0.650	0.760
CAPTURE	0.730	0.698	0.764	0.754	0.731	0.775	0.780	0.728	0.835
COLA	0.752	0.716	0.783	0.791	0.770	0.809	0.771	0.724	0.818

B. 2x2 tables for diagnostic accuracy estimates for binary predictors (CAPTURE, LFQ, COLA)

In this section, sensitivity, specificity, PPV, NPV, accuracy and diagnostic Odds Ratio (all with 95% confidence intervals) have been calculated for CAPTURE, LFQ, and COLA.

CAPTURE

We obtained a binary indicator for High/low risk of COPD combining CAPTURE and PEF as follows:

- CAPTURE score <2 is considered low risk;
- CAPTURE score =2/3/4 with PEF \geq 250Lmin⁻¹ for Females or PEF \geq 350min⁻¹ for Males will be considered low risk;
- CAPTURE score =2/3/4 with PEF<250Lmin⁻¹ for Females or PEF<350min⁻¹ for Males is considered high risk;
- CAPTURE score \geq 5 is considered high risk.

eTable 4. The 2x2 Contingency Tables of COPD Diagnosis and High/Low Risk Given by CAPTURE

	Uganda		Nepal		Peru	
	COPD+	COPD-	COPD+	COPD-	COPD+	COPD-
High	136	692	413	734	51	380
Low	125	2616	229	2158	46	3071

LFQ (Cutpoint = 18)

If the LFQ score is 18 or less, the patient is at risk for COPD.

eTable 5. The 2x2 Contingency Tables of COPD Diagnosis and High/Low Risk Given by a Cutoff of 18 for LFQ

	Uganda		Nepal		Peru	
	COPD+	COPD-	COPD+	COPD-	COPD+	COPD-
High	149	592	385	508	63	1011
Low	112	2716	257	2384	34	2439

COLA (Cutpoint = 4)

If the COLA score is 4 or more, the patient is at high risk for COPD.

eTable 6. The 2x2 Contingency Tables of COPD diagnosis and High/Low risk Given by a Cutoff of 4 for COLA.

	Uganda		Nepal		Peru	
	COPD+	COPD-	COPD+	COPD-	COPD+	COPD-
1	169	846	252	181	35	276
0	91	2444	390	2711	62	3171

C. Diagnostic performance of screening tools

Characteristics of False Positives vs. True Negatives for CAPTURE

eTable 7a. Characteristics of False Positives vs. True Negatives for CAPTURE in Uganda

Variable	level	Overall	False Positives	True Negatives	p	Missing %	Missing N
n		3319	692	2616			
Age		55.69 (11.98)	59.81 (13.06)	54.58 (11.42)	<0.001	0.0	0
Sex	Male	1620 (48.81)	340 (49.13)	1275 (48.74)	0.887	0.0	0
	Female	1699 (51.19)	352 (50.87)	1341 (51.26)			
Ever smoked	No	2817 (84.93)	560 (80.92)	2249 (86.04)	0.001	0.1	2
	Yes	500 (15.07)	132 (19.08)	365 (13.96)			
Current smoker	No	3024 (91.17)	614 (88.73)	2401 (91.85)	0.012	0.1	2
	Yes	293 (8.83)	78 (11.27)	213 (8.15)			
Ever used biomass	Yes	3319 (100.00)	692 (100.00)	2616 (100.00)	NA	0.0	0
Currently uses biomass	No	580 (17.56)	121 (17.56)	458 (17.60)	1.000	0.5	16

Variable	level	Overall	False Positives	True Negatives	p	Missing %	Missing N
	Yes	2723 (82.44)	568 (82.44)	2145 (82.40)			
Asthma Diagnosis	No	3304 (99.58)	687 (99.28)	2606 (99.66)	0.301	0.0	1
	Yes	14 (0.42)	5 (0.72)	9 (0.34)			
Tuberculosis history	No	3291 (99.19)	686 (99.13)	2594 (99.20)	1.000	0.0	1
	Yes	27 (0.81)	6 (0.87)	21 (0.80)			
Chronic bronchitis diagnosis	No	3314 (99.88)	690 (99.71)	2613 (99.92)	0.415	0.0	1
	Yes	4 (0.12)	2 (0.29)	2 (0.08)			
Emphysema diagnosis	No	3318 (100.00)	692 (100.00)	2615 (100.00)	NA	0.0	1
Lung cancer diagnosis	No	3318 (100.00)	692 (100.00)	2615 (100.00)	NA	0.0	1

eTable 7b. False Positives vs. True Negatives for CAPTURE in Nepal

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		2892	734	2158			
Age		54.62 (11.21)	59.41 (11.84)	52.99 (10.50)	<0.001	0.0	0
Sex	Male	1372 (47.44)	314 (42.78)	1058 (49.03)	0.004	0.0	0
	Female	1520 (52.56)	420 (57.22)	1100 (50.97)			
Ever smoked	No	2099 (72.58)	516 (70.30)	1583 (73.35)	0.120	0.0	0
	Yes	793 (27.42)	218 (29.70)	575 (26.65)			
Current smoker	No	2386 (82.50)	595 (81.06)	1791 (82.99)	0.257	0.0	0
	Yes	506 (17.50)	139 (18.94)	367 (17.01)			
Ever used biomass	No	2 (0.07)	0 (0.00)	2 (0.09)	0.990	0.0	0
	Yes	2890 (99.93)	734 (100.00)	2156 (99.91)			
Currently uses biomass	No	2752 (95.16)	695 (94.69)	2057 (95.32)	0.555	0.0	0
	Yes	140 (4.84)	39 (5.31)	101 (4.68)			

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
Asthma Diagnosis	No	2861 (98.93)	714 (97.28)	2147 (99.49)	<0.001	0.0	0
	Yes	31 (1.07)	20 (2.72)	11 (0.51)			
Tuberculosis history	No	2820 (97.51)	714 (97.28)	2106 (97.59)	0.737	0.0	0
	Yes	72 (2.49)	20 (2.72)	52 (2.41)			
Chronic bronchitis diagnosis	No	2890 (99.93)	734 (100.00)	2156 (99.91)	0.990	0.0	0
	Yes	2 (0.07)	0 (0.00)	2 (0.09)			
Emphysema diagnosis	No	2891 (99.97)	733 (99.86)	2158 (100.00)	0.572	0.0	0
	Yes	1 (0.03)	1 (0.14)	0 (0.00)			
Lung cancer diagnosis	No	2892 (100.00)	734 (100.00)	2158 (100.00)	NA	0.0	0

eTable 7c. False Positives vs. True Negatives for CAPTURE in Peru

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		3453	380	3071			
Age		56.53 (11.28)	63.97 (11.82)	55.62 (10.87)	<0.001	0.0	0
Sex	Male	1722 (49.87)	167 (43.95)	1553 (50.57)	0.017	0.0	0
	Female	1731 (50.13)	213 (56.05)	1518 (49.43)			
Ever smoked	No	1533 (44.40)	201 (52.89)	1330 (43.31)	<0.001	0.0	0
	Yes	1920 (55.60)	179 (47.11)	1741 (56.69)			
Current smoker	No	2914 (84.41)	351 (92.37)	2561 (83.42)	<0.001	0.0	1
	Yes	538 (15.59)	29 (7.63)	509 (16.58)			
Ever used biomass	Yes	3453 (100.00)	380 (100.00)	3071 (100.00)	NA	0.0	0
Currently uses biomass	No	3435 (99.54)	375 (98.94)	3058 (99.61)	0.163	0.1	2
	Yes	16 (0.46)	4 (1.06)	12 (0.39)			
Asthma Diagnosis	No	3231 (93.60)	321 (84.47)	2908 (94.72)	<0.001	0.0	1

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
	Yes	221 (6.40)	59 (15.53)	162 (5.28)			
Tuberculosis history	No	3204 (92.84)	342 (90.24)	2860 (93.16)	0.048	0.1	2
	Yes	247 (7.16)	37 (9.76)	210 (6.84)			
Chronic bronchitis diagnosis	No	3363 (97.45)	362 (95.26)	2999 (97.72)	0.007	0.1	2
	Yes	88 (2.55)	18 (4.74)	70 (2.28)			
Emphysema diagnosis	No	3450 (99.97)	379 (100.00)	3069 (99.97)	1.000	0.1	2
	Yes	1 (0.03)	0 (0.00)	1 (0.03)			
Lung cancer diagnosis	No	3452 (100.00)	380 (100.00)	3070 (100.00)	NA	0.0	1

Characteristics of False Negatives vs. True Positives for CAPTURE

eTable 8a. False Negatives vs. True Positives for CAPTURE in Uganda

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		261	125	136			
Age		61.08 (12.98)	57.86 (12.07)	64.04 (13.13)	<0.001	0.0	0
Sex	Male	137 (52.49)	58 (46.40)	79 (58.09)	0.078	0.0	0
	Female	124 (47.51)	67 (53.60)	57 (41.91)			
Ever Smoked	No	167 (64.23)	83 (66.94)	84 (61.76)	0.460	0.4	1
	Yes	93 (35.77)	41 (33.06)	52 (38.24)			
Current smoker	No	198 (76.15)	99 (79.84)	99 (72.79)	0.236	0.4	1
	Yes	62 (23.85)	25 (20.16)	37 (27.21)			
Ever used biomass	Yes	261 (100.00)	125 (100.00)	136 (100.00)	NA	0.0	0
Currently uses biomass	No	52 (19.92)	24 (19.20)	28 (20.59)	0.900	0.0	0
	Yes	209 (80.08)	101 (80.80)	108 (79.41)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
Severity – GOLD (1-4)	1	77 (29.50)	44 (35.20)	33 (24.26)	0.020	0.0	0
	2	149 (57.09)	72 (57.60)	77 (56.62)			
	3	29 (11.11)	8 (6.40)	21 (15.44)			
	4	6 (2.30)	1 (0.80)	5 (3.68)			
GOLD 1,2 vs. 3,4	1-2	226 (86.59)	116 (92.80)	110 (80.88)	0.008	0.0	0
	3-4	35 (13.41)	9 (7.20)	26 (19.12)			
Severity – GOLD (A-D)	A	30 (11.54)	24 (19.35)	6 (4.41)	<0.001	0.4	1
	B	140 (53.85)	71 (57.26)	69 (50.74)			
	C	14 (5.38)	10 (8.06)	4 (2.94)			
	D	76 (29.23)	19 (15.32)	57 (41.91)			
GOLD A vs. B,C,D	A	30 (11.54)	24 (19.35)	6 (4.41)	<0.001	0.4	1
	B-C-D	230 (88.46)	100 (80.65)	130 (95.59)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
Asthma diagnosis	No	247 (95.00)	122 (98.39)	125 (91.91)	0.035	0.4	1
	Yes	13 (5.00)	2 (1.61)	11 (8.09)			
Tuberculosis history	No	249 (95.77)	121 (97.58)	128 (94.12)	0.281	0.4	1
	Yes	11 (4.23)	3 (2.42)	8 (5.88)			
Chronic bronchitis diagnosis	No	258 (99.23)	123 (99.19)	135 (99.26)	1.000	0.4	1
	Yes	2 (0.77)	1 (0.81)	1 (0.74)			
Emphysema diagnosis	No	259 (99.62)	124 (100.00)	135 (99.26)	1.000	0.4	1
	Yes	1 (0.38)	0 (0.00)	1 (0.74)			
Lung cancer diagnosis	No	260 (100.00)	124 (100.00)	136 (100.00)	NA	0.4	1

eTable 8b. False Negatives vs. True Positives for CAPTURE in Nepal

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		642	229	413			
Age		63.31 (11.17)	60.17 (11.86)	65.04 (10.38)	<0.001	0.0	0
Sex	Male	393 (61.21)	150 (65.50)	243 (58.84)	0.115	0.0	0
	Female	249 (38.79)	79 (34.50)	170 (41.16)			
Ever smoked	No	287 (44.70)	92 (40.17)	195 (47.22)	0.102	0.0	0
	Yes	355 (55.30)	137 (59.83)	218 (52.78)			
Current smoker	No	421 (65.58)	132 (57.64)	289 (69.98)	0.002	0.0	0
	Yes	221 (34.42)	97 (42.36)	124 (30.02)			
Ever used biomass	Yes	642 (100.00)	229 (100.00)	413 (100.00)	NA	0.0	0
Currently uses biomass	No	595 (92.68)	219 (95.63)	376 (91.04)	0.048	0.0	0
	Yes	47 (7.32)	10 (4.37)	37 (8.96)			
Severity – GOLD (1-4)	1	218 (33.96)	120 (52.40)	98 (23.73)	<0.001	0.0	0

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	2	310 (48.29)	94 (41.05)	216 (52.30)			
	3	97 (15.11)	15 (6.55)	82 (19.85)			
	4	17 (2.65)	0 (0.00)	17 (4.12)			
GOLD 1,2 vs 3,4	1-2	528 (82.24)	214 (93.45)	314 (76.03)	<0.001	0.0	0
	3-4	114 (17.76)	15 (6.55)	99 (23.97)			
Severity – GOLD (A-D)	A	453 (70.56)	203 (88.65)	250 (60.53)	<0.001	0.0	0
	B	175 (27.26)	24 (10.48)	151 (36.56)			
	C	2 (0.31)	1 (0.44)	1 (0.24)			
	D	12 (1.87)	1 (0.44)	11 (2.66)			
GOLD A vs. B,C,D	A	453 (70.56)	203 (88.65)	250 (60.53)	<0.001	0.0	0
	B-C-D	189 (29.44)	26 (11.35)	163 (39.47)			
Asthma diagnosis	No	542 (84.42)	216 (94.32)	326 (78.93)	<0.001	0.0	0

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	Yes	100 (15.58)	13 (5.68)	87 (21.07)			
Tuberculosis history	No	601 (93.61)	216 (94.32)	385 (93.22)	0.705	0.0	0
	Yes	41 (6.39)	13 (5.68)	28 (6.78)			
Chronic bronchitis diagnosis	No	637 (99.22)	228 (99.56)	409 (99.03)	0.790	0.0	0
	Yes	5 (0.78)	1 (0.44)	4 (0.97)			
Emphysema diagnosis	No	641 (99.84)	229 (100.00)	412 (99.76)	1.000	0.0	0
	Yes	1 (0.16)	0 (0.00)	1 (0.24)			
Lung cancer diagnosis	No	642 (100.00)	229 (100.00)	413 (100.00)	NA	0.0	0

eTable 8c. False Negatives vs. True Positives for CAPTURE in Peru

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		97	46	51			
Age		60.26 (12.15)	58.46 (12.21)	61.88 (11.99)	0.167	0.0	0
Sex	Male	61 (62.89)	29 (63.04)	32 (62.75)	1.000	0.0	0
	Female	36 (37.11)	17 (36.96)	19 (37.25)			
Ever Smoked	No	42 (43.30)	15 (32.61)	27 (52.94)	0.070	0.0	0
	Yes	55 (56.70)	31 (67.39)	24 (47.06)			
Current smoker	No	76 (78.35)	31 (67.39)	45 (88.24)	0.025	0.0	0
	Yes	21 (21.65)	15 (32.61)	6 (11.76)			
Ever used biomass	Yes	97 (100.00)	46 (100.00)	51 (100.00)	NA	0.0	0
Currently uses biomass	No	97 (100.00)	46 (100.00)	51 (100.00)	NA	0.0	0
Severity – GOLD (1-4)	1	50 (51.55)	33 (71.74)	17 (33.33)	0.002	0.0	0
	2	33 (34.02)	10 (21.74)	23 (45.10)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	3	12 (12.37)	3 (6.52)	9 (17.65)			
	4	2 (2.06)	0 (0.00)	2 (3.92)			
GOLD 1,2 vs. 3,4	1-2	83 (85.57)	43 (93.48)	40 (78.43)	0.069	0.0	0
	3-4	14 (14.43)	3 (6.52)	11 (21.57)			
Severity – GOLD (A-D)	A	23 (23.71)	16 (34.78)	7 (13.73)	0.044	0.0	0
	B	62 (63.92)	26 (56.52)	36 (70.59)			
	D	12 (12.37)	4 (8.70)	8 (15.69)			
GOLD A vs. B,C,D	A	23 (23.71)	16 (34.78)	7 (13.73)	0.029	0.0	0
	B-C-D	74 (76.29)	30 (65.22)	44 (86.27)			
Asthma diagnosis	No	63 (64.95)	35 (76.09)	28 (54.90)	0.049	0.0	0
	Yes	34 (35.05)	11 (23.91)	23 (45.10)			
Tuberculosis history	No	65 (67.01)	33 (71.74)	32 (62.75)	0.469	0.0	0

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	Yes	32 (32.99)	13 (28.26)	19 (37.25)			
Chronic bronchitis diagnosis	No	82 (84.54)	43 (93.48)	39 (76.47)	0.042	0.0	0
	Yes	15 (15.46)	3 (6.52)	12 (23.53)			
Emphysema diagnosis	No	96 (98.97)	45 (97.83)	51 (100.00)	0.959	0.0	0
	Yes	1 (1.03)	1 (2.17)	0 (0.00)			
Lung cancer diagnosis	No	97 (100.00)	46 (100.00)	51 (100.00)	NA	0.0	0

Characteristics of False Positives vs. True Negatives for LFQ (Cutpoint = 18)

eTable 9a. False Positives vs. True Negatives for LFQ in Uganda

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		3319	592	2716			
Age		55.69 (11.98)	65.99 (12.06)	53.43 (10.71)	<0.001	0.0	0
Sex	Male	1620 (48.81)	311 (52.53)	1304 (48.01)	0.051	0.0	0
	Female	1699 (51.19)	281 (47.47)	1412 (51.99)			
Ever Smoked	No	2817 (84.93)	335 (56.59)	2474 (91.16)	<0.001	0.1	2
	Yes	500 (15.07)	257 (43.41)	240 (8.84)			
Current smoker	No	3024 (91.17)	426 (71.96)	2589 (95.39)	<0.001	0.1	2
	Yes	293 (8.83)	166 (28.04)	125 (4.61)			
Ever used biomass	Yes	3319 (100.00)	592 (100.00)	2716 (100.00)	NA	0.0	0
Currently uses biomass	No	580 (17.56)	120 (20.41)	459 (16.97)	0.055	0.5	16
	Yes	2723 (82.44)	468 (79.59)	2245 (83.03)			

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
Asthma diagnosis	No	3304 (99.58)	587 (99.16)	2706 (99.67)	0.164	0.0	1
	Yes	14 (0.42)	5 (0.84)	9 (0.33)			
Tuberculosis diagnosis	No	3291 (99.19)	582 (98.31)	2698 (99.37)	0.019	0.0	1
	Yes	27 (0.81)	10 (1.69)	17 (0.63)			
Chronic bronchitis diagnosis	No	3314 (99.88)	588 (99.32)	2715 (100.00)	<0.001	0.0	1
	Yes	4 (0.12)	4 (0.68)	0 (0.00)			
Emphysema diagnosis	No	3318 (100.00)	592 (100.00)	2715 (100.00)	NA	0.0	1
Lung cancer diagnosis	No	3318 (100.00)	592 (100.00)	2715 (100.00)	NA	0.0	1

eTable 9b. False Positives vs. True Negatives for LFQ in Nepal

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		2892	508	2384			
Age		54.62 (11.21)	64.26 (10.16)	52.57 (10.31)	<0.001	0.0	0
Sex	Male	1372 (47.44)	344 (67.72)	1028 (43.12)	<0.001	0.0	0
	Female	1520 (52.56)	164 (32.28)	1356 (56.88)			
Ever Smoked	No	2099 (72.58)	134 (26.38)	1965 (82.42)	<0.001	0.0	0
	Yes	793 (27.42)	374 (73.62)	419 (17.58)			
Current smoker	No	2386 (82.50)	261 (51.38)	2125 (89.14)	<0.001	0.0	0
	Yes	506 (17.50)	247 (48.62)	259 (10.86)			
Ever used biomass	No	2 (0.07)	0 (0.00)	2 (0.08)	1.000	0.0	0
	Yes	2890 (99.93)	508 (100.00)	2382 (99.92)			
Currently uses biomass	No	2752 (95.16)	464 (91.34)	2288 (95.97)	<0.001	0.0	0
	Yes	140 (4.84)	44 (8.66)	96 (4.03)			
Asthma diagnosis	No	2861 (98.93)	485 (95.47)	2376 (99.66)	<0.001	0.0	0
	Yes	31 (1.07)	23 (4.53)	8 (0.34)			
Tuberculosis history	No	2820 (97.51)	488 (96.06)	2332 (97.82)	0.032	0.0	0
	Yes	72 (2.49)	20 (3.94)	52 (2.18)			
Chronic bronchitis diagnosis	No	2890 (99.93)	506 (99.61)	2384 (100.00)	0.033	0.0	0
	Yes	2 (0.07)	2 (0.39)	0 (0.00)			
Emphysema diagnosis	No	2891 (99.97)	508 (100.00)	2383 (99.96)	1.000	0.0	0
	Yes	1 (0.03)	0 (0.00)	1 (0.04)			
Lung cancer diagnosis	No	2892 (100.00)	508 (100.00)	2384 (100.00)	NA	0.0	0

eTable 9c. False Positives vs. True Negatives for LFQ in Peru

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		3453	1011	2439			
Age		56.53 (11.28)	62.53 (10.99)	54.04 (10.43)	<0.001	0.0	0
Sex	Male	1722 (49.87)	614 (60.73)	1106 (45.35)	<0.001	0.0	0
	Female	1731 (50.13)	397 (39.27)	1333 (54.65)			
Ever Smoked	No	1533 (44.40)	239 (23.64)	1293 (53.01)	<0.001	0.0	0
	Yes	1920 (55.60)	772 (76.36)	1146 (46.99)			
Current smoker	No	2914 (84.41)	747 (73.89)	2165 (88.80)	<0.001	0.0	1
	Yes	538 (15.59)	264 (26.11)	273 (11.20)			
Ever used biomass	Yes	3453 (100.00)	1011 (100.00)	2439 (100.00)	NA	0.0	0
Currently uses biomass	No	3435 (99.54)	1005 (99.50)	2427 (99.55)	1.000	0.1	2
	Yes	16 (0.46)	5 (0.50)	11 (0.45)			
Asthma diagnosis	No	3231 (93.60)	904 (89.42)	2324 (95.32)	<0.001	0.0	1

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
	Yes	221 (6.40)	107 (10.58)	114 (4.68)			
Tuberculosis history	No	3204 (92.84)	928 (91.88)	2273 (93.23)	0.184	0.1	2
	Yes	247 (7.16)	82 (8.12)	165 (6.77)			
Chronic bronchitis diagnosis	No	3363 (97.45)	973 (96.24)	2387 (97.95)	0.006	0.1	2
	Yes	88 (2.55)	38 (3.76)	50 (2.05)			
Emphysema diagnosis	No	3450 (99.97)	1009 (100.00)	2438 (99.96)	1.000	0.1	2
	Yes	1 (0.03)	0 (0.00)	1 (0.04)			
Lung cancer diagnosis	No	3452 (100.00)	1011 (100.00)	2438 (100.00)	NA	0.0	1

Characteristics of False Negatives vs. True Positives for LFQ (Cutpoint = 18)

eTable 10a. False Negatives vs. True Positives for LFQ in Uganda

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		261	112	149			
Age		61.08 (12.98)	54.85 (11.60)	65.77 (11.99)	<0.001	0.0	0
Sex	Male	137 (52.49)	47 (41.96)	90 (60.40)	0.005	0.0	0
	Female	124 (47.51)	65 (58.04)	59 (39.60)			
Ever Smoked	No	167 (64.23)	94 (84.68)	73 (48.99)	<0.001	0.4	1
	Yes	93 (35.77)	17 (15.32)	76 (51.01)			
Current smoker	No	198 (76.15)	103 (92.79)	95 (63.76)	<0.001	0.4	1
	Yes	62 (23.85)	8 (7.21)	54 (36.24)			
Ever used biomass	Yes	261 (100.00)	112 (100.00)	149 (100.00)	NA	0.0	0
Currently uses biomass	No	52 (19.92)	22 (19.64)	30 (20.13)	1.000	0.0	0
	Yes	209 (80.08)	90 (80.36)	119 (79.87)			
Severity - GOLD (1-4)	1	77 (29.50)	39 (34.82)	38 (25.50)	0.027	0.0	0
	2	149 (57.09)	65 (58.04)	84 (56.38)			
	3	29 (11.11)	8 (7.14)	21 (14.09)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	4	6 (2.30)	0 (0.00)	6 (4.03)			
GOLD 1,2 vs. 3,4	1-2	226 (86.59)	104 (92.86)	122 (81.88)	0.017	0.0	0
	3-4	35 (13.41)	8 (7.14)	27 (18.12)			
Severity - GOLD (A-D)	A	30 (11.54)	23 (20.72)	7 (4.70)	<0.001	0.4	1
	B	140 (53.85)	58 (52.25)	82 (55.03)			
	C	14 (5.38)	9 (8.11)	5 (3.36)			
	D	76 (29.23)	21 (18.92)	55 (36.91)			
GOLD A vs. B,C,D	A	30 (11.54)	23 (20.72)	7 (4.70)	<0.001	0.4	1
	B-C-D	230 (88.46)	88 (79.28)	142 (95.30)			
Asthma diagnosis	No	247 (95.00)	109 (98.20)	138 (92.62)	0.079	0.4	1
	Yes	13 (5.00)	2 (1.80)	11 (7.38)			
Tuberculosis history	No	249 (95.77)	106 (95.50)	143 (95.97)	1.000	0.4	1
	Yes	11 (4.23)	5 (4.50)	6 (4.03)			
Chronic bronchitis diagnosis	No	258 (99.23)	110 (99.10)	148 (99.33)	1.000	0.4	1
	Yes	2 (0.77)	1 (0.90)	1 (0.67)			
Emphysema diagnosis	No	259 (99.62)	111 (100.00)	148 (99.33)	1.000	0.4	1

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	Yes	1 (0.38)	0 (0.00)	1 (0.67)			
Lung cancer diagnosis	No	260 (100.00)	111 (100.00)	149 (100.00)	NA	0.4	1

eTable 10b. False Negatives vs. True Positives for LFQ in Nepal

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		642	257	385			
Age		63.31 (11.17)	57.06 (10.89)	67.48 (9.25)	<0.001	0.0	0
Sex	Male	393 (61.21)	120 (46.69)	273 (70.91)	<0.001	0.0	0
	Female	249 (38.79)	137 (53.31)	112 (29.09)			
Ever Smoked	No	287 (44.70)	177 (68.87)	110 (28.57)	<0.001	0.0	0
	Yes	355 (55.30)	80 (31.13)	275 (71.43)			
Current smoker	No	421 (65.58)	208 (80.93)	213 (55.32)	<0.001	0.0	0
	Yes	221 (34.42)	49 (19.07)	172 (44.68)			
Ever used biomass	Yes	642 (100.00)	257 (100.00)	385 (100.00)	NA	0.0	0
Currently uses biomass	No	595 (92.68)	246 (95.72)	349 (90.65)	0.024	0.0	0
	Yes	47 (7.32)	11 (4.28)	36 (9.35)			
Severity - GOLD (1-4)	1	218 (33.96)	121 (47.08)	97 (25.19)	<0.001	0.0	0
	2	310 (48.29)	112 (43.58)	198 (51.43)			
	3	97 (15.11)	24 (9.34)	73 (18.96)			
	4	17 (2.65)	0 (0.00)	17 (4.42)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
GOLD 1,2 vs 3,4	1-2	528 (82.24)	233 (90.66)	295 (76.62)	<0.001	00	0
	3-4	114 (17.76)	24 (9.34)	90 (23.38)			
Severity - GOLD (A-D)	A	453 (70.56)	220 (85.60)	233 (60.52)	<0.001	0.0	0
	B	175 (27.26)	36 (14.01)	139 (36.10)			
	C	2 (0.31)	0 (0.00)	2 (0.52)			
	D	12 (1.87)	1 (0.39)	11 (2.86)			
GOLD A VS. B,C,D	A	453 (70.56)	220 (85.60)	233 (60.52)	<0.001	0/	0
	B-C-D	189 (29.44)	37 (14.40)	152 (39.48)			
Asthma diagnosis	No	542 (84.42)	238 (92.61)	304 (78.96)	<0.001	0.0	0
	Yes	100 (15.58)	19 (7.39)	81 (21.04)			
Tuberculosis history	No	601 (93.61)	243 (94.55)	358 (92.99)	0.529	0.0	0
	Yes	41 (6.39)	14 (5.45)	27 (7.01)			
Chronic bronchitis diagnosis	No	637 (99.22)	254 (98.83)	383 (99.48)	0.648	0.0	0
	Yes	5 (0.78)	3 (1.17)	2 (0.52)			
Emphysema diagnosis	No	641 (99.84)	257 (100.00)	384 (99.74)	1.000	0.0	0
	Yes	1 (0.16)	0 (0.00)	1 (0.26)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
Lung cancer diagnosis	No	642 (100.00)	257 (100.00)	385 (100.00)	NA	0.0	0

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		97	34	63			
Age		60.26 (12.15)	53.62 (10.02)	63.84 (11.75)	<0.001	0.0	0
Sex	Male	61 (62.89)	16 (47.06)	45 (71.43)	0.032	0.0	0
	Female	36 (37.11)	18 (52.94)	18 (28.57)			
Ever Smoked	No	42 (43.30)	21 (61.76)	21 (33.33)	0.013	0.0	0
	Yes	55 (56.70)	13 (38.24)	42 (66.67)			
Current smoker	No	76 (78.35)	31 (91.18)	45 (71.43)	0.046	0.0	0
	Yes	21 (21.65)	3 (8.82)	18 (28.57)			
Ever used biomass	Yes	97 (100.00)	34 (100.00)	63 (100.00)	NA	0.0	0
Currently uses biomass	No	97 (100.00)	34 (100.00)	63 (100.00)	NA	0.0	0
Severity - GOLD (1-4)	1	50 (51.55)	21 (61.76)	29 (46.03)	0.115	0.0	0
	2	33 (34.02)	12 (35.29)	21 (33.33)			
	3	12 (12.37)	1 (2.94)	11 (17.46)			
	4	2 (2.06)	0 (0.00)	2 (3.17)			
GOLD 1,2 vs. 3,4	1-2	83 (85.57)	33 (97.06)	50 (79.37)	0.039	0.0	

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	3-4	14 (14.43)	1 (2.94)	13 (20.63)			
Severity - GOLD (A-D)	A	23 (23.71)	18 (52.94)	5 (7.94)	<0.001	0.0	0
	B	62 (63.92)	13 (38.24)	49 (77.78)			
	D	12 (12.37)	3 (8.82)	9 (14.29)			
GOLD A vs. B,C,D	A	23 (23.71)	18 (52.94)	5 (7.94)	<0.001	0	0
	B-C-D	74 (76.29)	16 (47.06)	58 (92.06)			
Asthma diagnosis	No	63 (64.95)	24 (70.59)	39 (61.90)	0.527	0.0	0
	Yes	34 (35.05)	10 (29.41)	24 (38.10)			
Tuberculosis history	No	65 (67.01)	23 (67.65)	42 (66.67)	1.000	0.0	0
	Yes	32 (32.99)	11 (32.35)	21 (33.33)			
Chronic bronchitis diagnosis	No	82 (84.54)	32 (94.12)	50 (79.37)	0.105	0.0	0
	Yes	15 (15.46)	2 (5.88)	13 (20.63)			
Emphysema diagnosis	No	96 (98.97)	34 (100.00)	62 (98.41)	1.000	0.0	0
	Yes	1 (1.03)	0 (0.00)	1 (1.59)			
Lung cancer diagnosis	No	97 (100.00)	34 (100.00)	63 (100.00)	NA	0.0	0

Characteristics of False Positives vs. True Negatives for COLA (Cutpoint = 4)

eTable 11a. False Positives vs. True Negatives for COLA in Uganda

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		3319	846	2444			
Age		55.69 (11.98)	65.76 (10.36)	52.18 (10.42)	<0.001	0.0	0
Sex	Male	1620 (48.81)	255 (30.14)	1351 (55.28)	<0.001	0.0	0
	Female	1699 (51.19)	591 (69.86)	1093 (44.72)			
Ever Smoked	No	2817 (84.93)	637 (75.30)	2159 (88.34)	<0.001	0.1	2
	Yes	500 (15.07)	209 (24.70)	285 (11.66)			
Current smoker	No	3024 (91.17)	689 (81.44)	2312 (94.60)	<0.001	0.1	2
	Yes	293 (8.83)	157 (18.56)	132 (5.40)			
Ever used biomass	Yes	3319 (100.00)	846 (100.00)	2444 (100.00)	NA	0.0	0
Currently uses biomass	No	580 (17.56)	30 (3.55)	549 (22.46)	<0.001	0.5	16
	Yes	2723 (82.44)	816 (96.45)	1895 (77.54)			
Asthma diagnosis	No	3304 (99.58)	841 (99.41)	2436 (99.67)	0.462	0.0	1
	Yes	14 (0.42)	5 (0.59)	8 (0.33)			
Tuberculosis history	No	3291 (99.19)	839 (99.17)	2425 (99.22)	1.000	0.0	1

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
	Yes	27 (0.81)	7 (0.83)	19 (0.78)			
Chronic bronchitis diagnosis	No	3314 (99.88)	843 (99.65)	2443 (99.96)	0.092	0.0	1
	Yes	4 (0.12)	3 (0.35)	1 (0.04)			
Emphysema diagnosis	No	3318 (100.00)	846 (100.00)	2444 (100.00)	NA	0.0	1
Lung cancer diagnosis	No	3318 (100.00)	846 (100.00)	2444 (100.00)	NA	0.0	1

eTable 11b. False Positives vs. True Negatives for COLA in Nepal

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		2892	181	2711			
Age		54.62 (11.21)	67.02 (8.28)	53.79 (10.88)	<0.001	0.0	0
Sex	Male	1372 (47.44)	65 (35.91)	1307 (48.21)	0.002	0.0	0
	Female	1520 (52.56)	116 (64.09)	1404 (51.79)			
Ever Smoked	No	2099 (72.58)	85 (46.96)	2014 (74.29)	<0.001	0.0	0
	Yes	793 (27.42)	96 (53.04)	697 (25.71)			
Current smoker	No	2386 (82.50)	95 (52.49)	2291 (84.51)	<0.001	0.0	0
	Yes	506 (17.50)	86 (47.51)	420 (15.49)			
Ever used biomass	No	2 (0.07)	0 (0.00)	2 (0.07)	1.000	0.0	0
	Yes	2890 (99.93)	181 (100.00)	2709 (99.93)			
Currently uses biomass	No	2752 (95.16)	136 (75.14)	2616 (96.50)	<0.001	0.0	0
	Yes	140 (4.84)	45 (24.86)	95 (3.50)			
Asthma diagnosis	No	2861 (98.93)	166 (91.71)	2695 (99.41)	<0.001	0.0	0
	Yes	31 (1.07)	15 (8.29)	16 (0.59)			
Tuberculosis history	No	2820 (97.51)	176 (97.24)	2644 (97.53)	1.000	0.0	0

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
	Yes	72 (2.49)	5 (2.76)	67 (2.47)			
Chronic bronchitis diagnosis	No	2890 (99.93)	180 (99.45)	2710 (99.96)	0.274	0.0	0
	Yes	2 (0.07)	1 (0.55)	1 (0.04)			
Emphysema diagnosis	No	2891 (99.97)	181 (100.00)	2710 (99.96)	1.000	0.0	0
	Yes	1 (0.03)	0 (0.00)	1 (0.04)			
Lung cancer diagnosis	No	2892 (100.00)	181 (100.00)	2711 (100.00)	NA	0.0	0

eTable 11c. False Positives vs. True Negatives for COLA in Peru

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
n		3453	276	3171			
Age		56.53 (11.28)	65.02 (9.54)	55.79 (11.12)	<0.001	0.0	0
Sex	Male	1722 (49.87)	84 (30.43)	1635 (51.56)	<0.001	0.0	0
	Female	1731 (50.13)	192 (69.57)	1536 (48.44)			
Ever Smoked	No	1533 (44.40)	136 (49.28)	1393 (43.93)	0.099	0.0	0
	Yes	1920 (55.60)	140 (50.72)	1778 (56.07)			
Current smoker	No	2914 (84.41)	211 (76.45)	2698 (85.08)	<0.001	0.0	1
	Yes	538 (15.59)	65 (23.55)	473 (14.92)			
Ever used biomass	Yes	3453 (100.00)	276 (100.00)	3171 (100.00)	NA	0.0	0
Currently uses biomass	No	3435 (99.54)	267 (96.74)	3164 (99.78)	<0.001	0.1	2
	Yes	16 (0.46)	9 (3.26)	7 (0.22)			
Asthma diagnosis	No	3231 (93.60)	225 (81.52)	3001 (94.67)	<0.001	0.0	1
	Yes	221 (6.40)	51 (18.48)	169 (5.33)			
Tuberculosis history	No	3204 (92.84)	252 (91.64)	2946 (92.93)	0.498	0.1	2
	Yes	247 (7.16)	23 (8.36)	224 (7.07)			

Variable	level	Overall	False Positive	True Negative	p	Missing %	Missing N
Chronic bronchitis diagnosis	No	3363 (97.45)	260 (94.20)	3098 (97.76)	0.001	0.1	2
	Yes	88 (2.55)	16 (5.80)	71 (2.24)			
Emphysema diagnosis	No	3450 (99.97)	276 (100.00)	3168 (99.97)	1.000	0.1	2
	Yes	1 (0.03)	0 (0.00)	1 (0.03)			
Lung cancer diagnosis	No	3452 (100.00)	276 (100.00)	3170 (100.00)	NA	0.0	1

Characteristics of False Negatives vs. True Positives for COLA (Cutpoint = 4)

eTable 12a. False Negatives vs. True Positives for COLA in Uganda

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		261	91	169			
Age		61.08 (12.98)	52.48 (10.41)	65.84 (11.72)	<0.001	0.0	0
Sex	Male	137 (52.49)	52 (57.14)	84 (49.70)	0.310	0.0	0
	Female	124 (47.51)	39 (42.86)	85 (50.30)			
Ever Smoked	No	167 (64.23)	69 (75.82)	98 (57.99)	0.006	0.4	1
	Yes	93 (35.77)	22 (24.18)	71 (42.01)			
Current smoker	No	198 (76.15)	80 (87.91)	118 (69.82)	0.002	0.4	1
	Yes	62 (23.85)	11 (12.09)	51 (30.18)			
Ever used biomass	Yes	261 (100.00)	91 (100.00)	169 (100.00)	NA	0.0	0
Currently uses biomass	No	52 (19.92)	31 (34.07)	20 (11.83)	<0.001	0.0	0
	Yes	209 (80.08)	60 (65.93)	149 (88.17)			
Severity - GOLD (1-4)	1	77 (29.50)	30 (32.97)	46 (27.22)	0.121	0.0	0
	2	149 (57.09)	55 (60.44)	94 (55.62)			
	3	29 (11.11)	5 (5.49)	24 (14.20)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	4	6 (2.30)	1 (1.10)	5 (2.96)			
GOLD 1,2 vs. 3,4	1-2	226 (86.59)	85 (93.41)	140 (82.84)	0.028	0.0	0
	3-4	35 (13.41)	6 (6.59)	29 (17.16)			
Severity - GOLD (A-D)	A	30 (11.54)	22 (24.18)	8 (4.73)	<0.001	0.4	1
	B	140 (53.85)	42 (46.15)	98 (57.99)			
	C	14 (5.38)	8 (8.79)	6 (3.55)			
	D	76 (29.23)	19 (20.88)	57 (33.73)			
Gold A,B,C vs. D	A	30 (11.54)	22 (24.18)	8 (4.73)	<0.001	0.4	1
	B-C-D	230 (88.46)	69 (75.82)	161 (95.27)			
Asthma diagnosis	No	247 (95.00)	90 (98.90)	157 (92.90)	0.069	0.4	1
	Yes	13 (5.00)	1 (1.10)	12 (7.10)			
Tuberculosis history	No	249 (95.77)	89 (97.80)	160 (94.67)	0.383	0.4	1
	Yes	11 (4.23)	2 (2.20)	9 (5.33)			
Chronic bronchitis diagnosis	No	258 (99.23)	91 (100.00)	167 (98.82)	0.766	0.4	1
	Yes	2 (0.77)	0 (0.00)	2 (1.18)			
Emphysema diagnosis	No	259 (99.62)	91 (100.00)	168 (99.41)	1.000	0.4	1

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	Yes	1 (0.38)	0 (0.00)	1 (0.59)			
Lung cancer diagnosis	No	260 (100.00)	91 (100.00)	169 (100.00)	NA	0.4	1

eTable 12b. False Negatives vs. True Positives for COLA in Nepal

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		642	390	252			
Age		63.31 (11.17)	59.92 (11.24)	68.55 (8.78)	<0.001	0.0	0
Sex	Male	393 (61.21)	239 (61.28)	154 (61.11)	1.000	0.0	0
	Female	249 (38.79)	151 (38.72)	98 (38.89)			
Ever Smoked	No	287 (44.70)	197 (50.51)	90 (35.71)	<0.001	0.0	0
	Yes	355 (55.30)	193 (49.49)	162 (64.29)			
Current smoker	No	421 (65.58)	285 (73.08)	136 (53.97)	<0.001	0.0	0
	Yes	221 (34.42)	105 (26.92)	116 (46.03)			
Ever used biomass	Yes	642 (100.00)	390 (100.00)	252 (100.00)	NA	0.0	0
Currently uses biomass	No	595 (92.68)	380 (97.44)	215 (85.32)	<0.001	0.0	0
	Yes	47 (7.32)	10 (2.56)	37 (14.68)			
Severity - GOLD (1-4)	1	218 (33.96)	176 (45.13)	42 (16.67)	<0.001	0.0	0
	2	310 (48.29)	175 (44.87)	135 (53.57)			
	3	97 (15.11)	32 (8.21)	65 (25.79)			
	4	17 (2.65)	7 (1.79)	10 (3.97)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
GOLD 1,2 vs. 3,4	1-2	528 (82.24)	351 (90.00)	177 (70.24)	<0.001	0.0	0
	3-4	114 (17.76)	39 (10.00)	75 (29.76)			
Severity - GOLD (A-D)	A	453 (70.56)	325 (83.33)	128 (50.79)	<0.001	0.0	0
	B	175 (27.26)	62 (15.90)	113 (44.84)			
	C	2 (0.31)	1 (0.26)	1 (0.40)			
	D	12 (1.87)	2 (0.51)	10 (3.97)			
Gold A,B,C vs. D	A	453 (70.56)	325 (83.33)	128 (50.79)	<0.001	0.0	0
	B-C-D	189 (29.44)	65 (16.67)	124 (49.21)			
Asthma diagnosis	No	542 (84.42)	359 (92.05)	183 (72.62)	<0.001	0.0	0
	Yes	100 (15.58)	31 (7.95)	69 (27.38)			
Tuberculosis history	No	601 (93.61)	368 (94.36)	233 (92.46)	0.426	0.0	0
	Yes	41 (6.39)	22 (5.64)	19 (7.54)			
Chronic bronchitis diagnosis	No	637 (99.22)	387 (99.23)	250 (99.21)	1.000	0.0	0
	Yes	5 (0.78)	3 (0.77)	2 (0.79)			
Emphysema diagnosis	No	641 (99.84)	389 (99.74)	252 (100.00)	1.000	0.0	0
	Yes	1 (0.16)	1 (0.26)	0 (0.00)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
Lung cancer diagnosis	No	642 (100.00)	390 (100.00)	252 (100.00)	NA	0.0	0

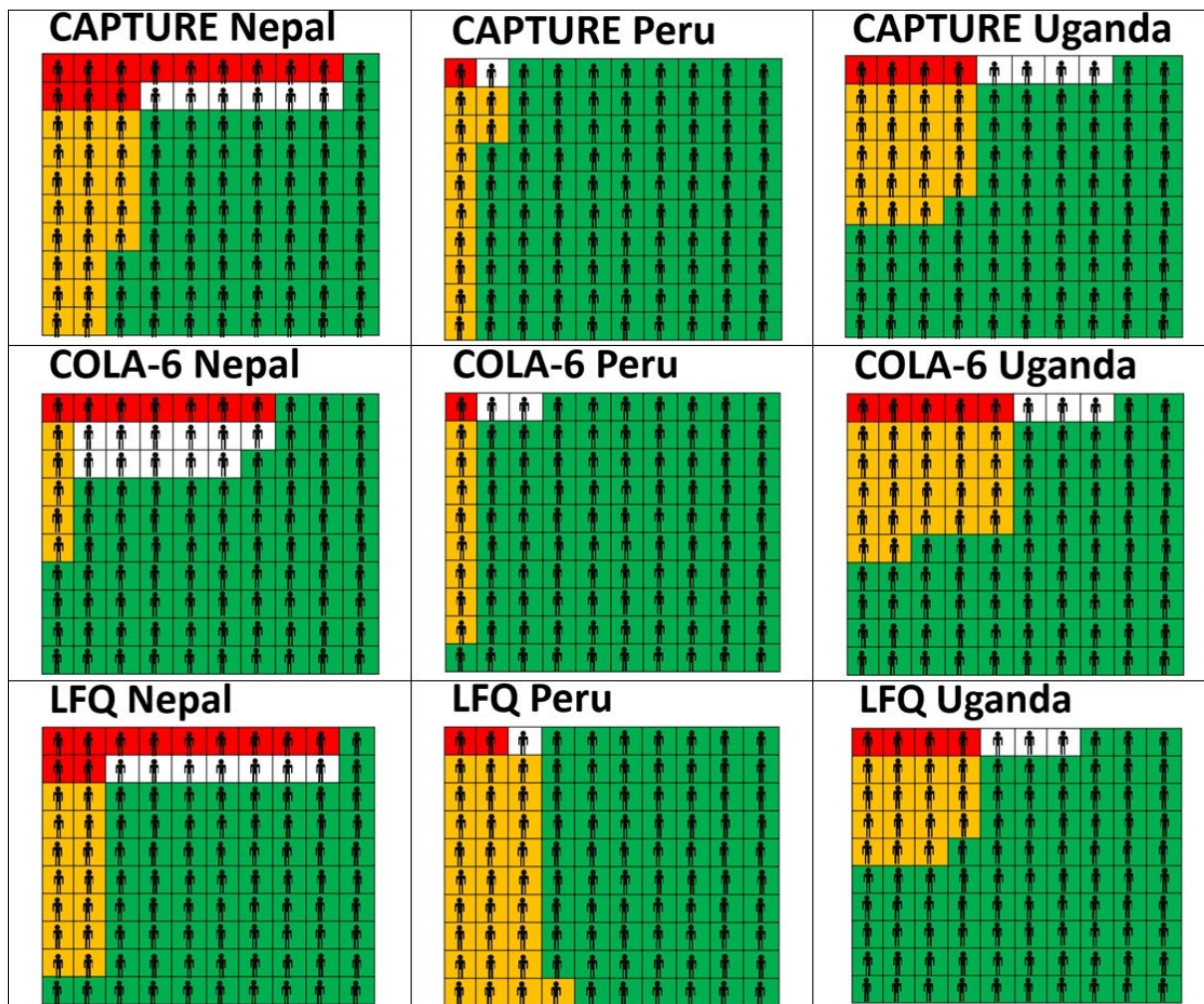
eTable 12c. False Negatives vs. True Positives for COLA in Peru

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
n		97	62	35			
Age		60.26 (12.15)	56.92 (12.10)	66.17 (9.91)	<0.001	0.0	0
Sex	Male	61 (62.89)	39 (62.90)	22 (62.86)	1.000	0.0	0
	Female	36 (37.11)	23 (37.10)	13 (37.14)			
Ever Smoked	No	42 (43.30)	26 (41.94)	16 (45.71)	0.883	0.0	0
	Yes	55 (56.70)	36 (58.06)	19 (54.29)			
Current smoker	No	76 (78.35)	46 (74.19)	30 (85.71)	0.286	0.0	0
	Yes	21 (21.65)	16 (25.81)	5 (14.29)			
Ever used biomass	Yes	97 (100.00)	62 (100.00)	35 (100.00)	NA	0.0	0
Currently uses biomass	No	97 (100.00)	62 (100.00)	35 (100.00)	NA	0.0	0
Severity - GOLD (1-4)	1	50 (51.55)	41 (66.13)	9 (25.71)	0.001	0.0	0
	2	33 (34.02)	17 (27.42)	16 (45.71)			

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	3	12 (12.37)	4 (6.45)	8 (22.86)			
	4	2 (2.06)	0 (0.00)	2 (5.71)			
GOLD 1,2 vs. 3,4	1-2	83 (85.57)	58 (93.55)	25 (71.43)	0.007	0.0	0
	3-4	14 (14.43)	4 (6.45)	10 (28.57)			
Severity - GOLD (A-D)	A	23 (23.71)	22 (35.48)	1 (2.86)	<0.001	0.0	0
	B	62 (63.92)	36 (58.06)	26 (74.29)			
	D	12 (12.37)	4 (6.45)	8 (22.86)			
Gold A,B,C vs. D	A	23 (23.71)	22 (35.48)	1 (2.86)	0.001	0.0	0
	B-C-D	74 (76.29)	40 (64.52)	34 (97.14)			
Asthma diagnosis	No	63 (64.95)	48 (77.42)	15 (42.86)	0.001	0.0	0
	Yes	34 (35.05)	14 (22.58)	20 (57.14)			
Tuberculosis history	No	65 (67.01)	40 (64.52)	25 (71.43)	0.638	0.0	0

Variable	level	Overall	False Negative	True Positive	p	Missing %	Missing N
	Yes	32 (32.99)	22 (35.48)	10 (28.57)			
Chronic bronchitis diagnosis	No	82 (84.54)	57 (91.94)	25 (71.43)	0.017	0.0	0
	Yes	15 (15.46)	5 (8.06)	10 (28.57)			
Emphysema diagnosis	No	96 (98.97)	61 (98.39)	35 (100.00)	1.000	0.0	0
	Yes	1 (1.03)	1 (1.61)	0 (0.00)			
Lung cancer diagnosis	No	97 (100.00)	62 (100.00)	35 (100.00)	NA	0.0	0

eFigure 2. Performance of the 3 COPD Screening Tools at the 3 sites, Weighted to the Population Data. Green = true negative, red = true positive, white= false negative, yellow= false positive.



D. Sensitivity analyses using alternative definitions of COPD

We assessed the sensitivity of the results to different definitions of a positive COPD case. There are three alternative definitions that have been considered, listed below:

- **SA1:** A positive case is anyone with a post-bronchodilator FEV1/FVC ratio that is below 0.7;
- **SA2:** A positive case is anyone with a Post-bronchodilator FEV1/FVC ratio that is below the LLN (as per the primary analysis) *AND* 2017 GOLD classification B, C or D;
- **SA3:** A positive case is anyone with a Post-bronchodilator FEV1/FVC ratio that is below the LLN (as per the primary analysis) *AND* FEV1<60% predicted (Martinez et al 2017);

eTable 13. COPD Prevalence Given Alternative Definitions of COPD

Variable	Level	Nepal	Peru	Uganda	Missing %	Missing N
n		3534	3551	3624		
COPD Prevalence	No	2892 (81.83)	3453 (97.27)	3319 (92.71)	0.4	45
	Yes	642 (18.17)	97 (2.73)	261 (7.29)		
COPD Prevalence SA1	No	2776 (78.55)	3406 (95.94)	3231 (90.25)	0.4	45
	Yes	758 (21.45)	144 (4.06)	349 (9.75)		
COPD Prevalence SA2	No	3345 (94.65)	3476 (97.92)	3349 (93.55)	0.4	45
	Yes	189 (5.35)	74 (2.08)	231 (6.45)		
COPD Prevalence SA3	No	3328 (94.17)	3526 (99.32)	3512 (98.10)	0.4	45
	Yes	206 (5.83)	24 (0.68)	68 (1.90)		

Alternative Definition SA1: Fixed FEV₁/FVC ratio (<0.7)

AUCs for continuous predictors

eTable 14. Unweighted and Weighted AUCs (and Their 95% CIs) for Continuous Predictors Given a Definition of COPD as FEV₁/FVC ratio <0.7.

	Uganda			Nepal			Peru		
	AUC	95% CI		AUC	95% CI		AUC	95% CI	
Unweighted AUCs									
LFQ	0.808	0.784	0.833	0.824	0.808	0.840	0.752	0.712	0.791
CAPTURE W/O PEF	0.663	0.631	0.695	0.601	0.579	0.624	0.670	0.622	0.718
COLA	0.774	0.748	0.801	0.813	0.796	0.829	0.787	0.752	0.823
Weighted AUCs									
LFQ	0.806	0.779	0.833	0.826	0.807	0.840	0.754	0.714	0.792
CAPTURE W/O PEF	0.667	0.633	0.698	0.603	0.581	0.627	0.671	0.625	0.721
COLA	0.780	0.748	0.803	0.812	0.790	0.825	0.790	0.756	0.826

Diagnostic accuracy for binary predictors

CAPTURE

eTable 15. Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for CAPTURE, for COPD Definition SA1.

	Uganda			Nepal			Peru		
	est	95% CI		est	95% CI		est	95% CI	
Unweighted									
Sensitivity (%)	49.57	44.20	54.94	62.01	58.44	65.47	50.00	41.56	58.44
Specificity (%)	79.66	78.23	81.04	75.61	73.97	77.20	89.45	88.37	90.47
PPV (%)	20.89	18.17	23.82	40.98	38.11	43.89	16.71	13.31	20.57
NPV (%)	93.58	92.60	94.47	87.93	86.56	89.22	97.69	97.10	98.19
Accuracy (%)	76.72	75.29	78.09	72.69	71.19	74.16	87.85	86.73	88.91
Weighted									
Sensitivity (%)	48.64	43.18	54.12	61.91	58.33	65.40	50.73	42.17	59.26
Specificity (%)	80.33	78.91	81.69	75.81	74.19	77.37	89.49	88.42	90.50
PPV (%)	18.98	16.43	21.73	40.01	37.26	42.81	15.76	12.50	19.47
NPV (%)	94.29	93.41	95.08	88.42	87.16	89.61	97.91	97.38	98.36
Accuracy (%)	77.59	76.19	78.93	72.94	71.46	74.38	88.05	86.95	89.08

LFQ (Cutpoint = 18)**eTable 16.** Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for LFQ Considering a Cutpoint of 18, for COPD definition SA1

	Uganda			Nepal			Peru		
	est	95% CI		est	95% CI		est	95% CI	
Unweighted									
Sensitivity (%)	61.60	56.28	66.73	61.35	57.77	64.83	68.53	60.24	76.03
Specificity (%)	83.66	82.34	84.93	84.58	83.18	85.91	71.33	69.78	72.84
PPV (%)	29.01	25.77	32.43	52.07	48.74	55.39	9.12	7.47	11.01
NPV (%)	95.26	94.41	96.02	88.91	87.65	90.08	98.18	97.57	98.67
Accuracy (%)	81.51	80.19	82.77	79.60	78.23	80.92	71.22	69.69	72.70
Weighted									
Sensitivity (%)	59.46	53.97	64.78	60.77	57.22	64.23	67.53	59.03	75.27
Specificity (%)	85.11	83.93	86.23	85.19	83.91	86.41	72.36	70.90	73.78
PPV (%)	27.44	24.28	30.78	51.68	48.39	54.95	8.58	7.02	10.36
NPV (%)	95.68	94.90	96.38	89.28	88.09	90.40	98.31	97.74	98.76
Accuracy (%)	82.89	81.69	84.03	80.14	78.86	81.38	72.18	70.74	73.58

COLA (Cutpoint = 4)

eTable 17. Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for COLA Considering a Cutpoint of 4, for COPD Definition SA1

	Uganda			Nepal			Peru			
	est	95% CI		est	95% CI		est	95% CI		
Unweighted										
Sensitivity (%)	48.89	67.53	62.33	72.42	37.73	34.27	41.29	38.19	30.23	46.65
Specificity (%)	88.05	75.64	74.11	77.12	94.70	93.81	95.51	92.47	91.53	93.34
PPV (%)	34.99	23.15	20.59	25.87	66.05	61.38	70.50	17.68	13.61	22.39
NPV (%)	92.94	95.54	94.67	96.31	84.78	83.47	86.03	97.25	96.62	97.78
Accuracy (%)	83.24	74.85	73.38	76.27	82.48	81.19	83.72	90.27	89.24	91.22
Weighted										
Sensitivity (%)	47.58	65.90	60.49	71.02	37.28	33.85	40.80	38.32	30.24	46.90
Specificity (%)	88.92	78.10	76.94	79.23	94.91	94.07	95.66	92.54	91.64	93.38
PPV (%)	34.52	22.24	19.75	24.88	65.60	60.97	70.03	16.62	12.73	21.13
NPV (%)	93.29	96.02	95.21	96.72	85.31	84.10	86.45	97.48	96.91	97.97
Accuracy (%)	84.18	77.04	75.86	78.20	82.99	81.79	84.14	90.52	89.55	91.43

Alternative Definition SA2: LLN and GOLD B/C/D

AUCs for continuous predictors

eTable 18. Unweighted and Weighted AUCs (and Their 95% CIs) for Continuous Predictors for COPD Definition SA2

	Uganda			Nepal			Peru		
	AUC	95% CI		AUC	95% CI		AUC	95% CI	
Unweighted AUCs									
LFQ	0.796	0.764	0.828	0.859	0.834	0.884	0.799	0.755	0.844
CAPTURE W/O PEF	0.711	0.674	0.748	0.729	0.695	0.764	0.766	0.711	0.821
CAPTURE	0.746	0.713	0.780	0.897	0.876	0.918	0.830	0.778	0.883
COLA	0.785	0.753	0.817	0.883	0.859	0.906	0.821	0.773	0.868
Weighted AUCs									
LFQ	0.791	0.759	0.828	0.860	0.833	0.884	0.796	0.748	0.841
CAPTURE W/O PEF	0.712	0.675	0.750	0.729	0.696	0.764	0.766	0.714	0.823
CAPTURE	0.742	0.707	0.777	0.895	0.871	0.915	0.825	0.771	0.880
COLA	0.781	0.742	0.811	0.882	0.856	0.906	0.817	0.770	0.866

Diagnostic accuracy estimates for binary predictors

CAPTURE

eTable 19. Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for CAPTURE, for COPD Definition SA2

	Uganda			Nepal			Peru			
	est	95% CI		est	95% CI		est	95% CI		
Unweighted										
Sensitivity (%)	56.28	49.62	62.77	86.24	80.50	90.81	59.46	47.41	70.73	
Specificity (%)	79.09	77.67	80.46	70.58	69.01	72.12	88.86	87.77	89.89	
PPV (%)	15.70	13.29	18.36	14.21	12.24	16.37	10.21	7.52	13.46	
NPV (%)	96.32	95.54	96.99	98.91	98.41	99.29	99.04	98.63	99.35	
Accuracy (%)	77.61	76.21	78.97	71.42	69.90	72.91	88.25	87.14	89.29	
Weighted										
Sensitivity (%)	54.64	47.80	61.36	85.93	80.02	90.63	60.00	47.69	71.44	
Specificity (%)	79.90	78.50	81.24	70.93	69.40	72.43	88.96	87.89	89.97	
PPV (%)	14.80	12.46	17.39	13.80	11.89	15.89	9.86	7.23	13.05	
NPV (%)	96.50	95.75	97.15	98.94	98.45	99.31	99.10	98.72	99.40	
Accuracy (%)	78.38	77.00	79.72	71.70	70.21	73.15	88.39	87.31	89.41	

LFQ (Cutpoint = 18)**eTable 20.** Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for LFQ Considering a Cutpoint of 18, for COPD Definition SA2

	Uganda			Nepal			Peru			
	est	95% CI		est	95% CI		est	95% CI		
Unweighted										
Sensitivity (%)	61.47	54.86	67.78	80.42	74.04	85.83	78.38	67.28	87.11	
Specificity (%)	82.06	80.71	83.34	77.85	76.40	79.24	70.75	69.20	72.26	
PPV (%)	19.16	16.39	22.19	17.02	14.61	19.65	5.40	4.13	6.93	
NPV (%)	96.85	96.14	97.47	98.60	98.07	99.01	99.35	98.95	99.63	
Accuracy (%)	80.72	79.39	82.01	77.99	76.58	79.34	70.90	69.38	72.40	
Weighted										
Sensitivity (%)	58.43	51.57	65.05	79.73	73.15	85.31	76.19	64.12	85.80	
Specificity (%)	83.79	82.61	84.91	78.69	77.44	79.90	71.83	70.39	73.24	
PPV (%)	18.72	15.95	21.74	16.84	14.46	19.45	5.16	3.94	6.63	
NPV (%)	96.93	96.22	97.54	98.62	98.11	99.03	99.34	98.92	99.62	
Accuracy (%)	82.26	81.06	83.42	78.74	77.50	79.95	71.92	70.48	73.32	

COLA (Cutpoint = 4)

eTable 21. Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for COLA Considering a Cutpoint of 4 for COPD Definition SA2

	Uganda			Nepal			Peru		
	est	95% CI		est	95% CI		est	95% CI	
Unweighted									
Sensitivity (%)	70.00	63.63	75.85	65.61	58.37	72.35	45.95	34.29	57.93
Specificity (%)	74.28	72.75	75.76	90.76	89.73	91.72	92.02	91.07	92.90
PPV (%)	15.86	13.67	18.26	28.64	24.42	33.15	10.93	7.69	14.94
NPV (%)	97.28	96.57	97.88	97.90	97.34	98.38	98.76	98.32	99.11
Accuracy (%)	74.00	72.52	75.44	89.42	88.36	90.41	91.06	90.07	91.97
Weighted									
Sensitivity (%)	66.37	59.55	72.73	65.06	57.71	71.91	44.33	32.57	56.56
Specificity (%)	76.88	75.74	78.00	91.14	90.20	92.02	92.11	91.20	92.96
PPV (%)	15.51	13.34	17.89	28.45	24.24	32.95	10.17	7.12	13.96
NPV (%)	97.28	96.55	97.89	97.97	97.41	98.43	98.80	98.36	99.14
Accuracy (%)	76.25	75.08	77.40	89.80	88.82	90.72	91.17	90.22	92.06

Alternative Definition SA3: LLN and FEV1<60%

AUCs for continuous predictors

eTable 22. Unweighted and Weighted AUCs (and their 95% CIs) for Continuous Predictors for COPD Definition SA3

	Overall			Uganda			Nepal			Peru		
	AUC	95% CI		AUC	95% CI		AUC	95% CI		AUC	95% CI	
Unweighted AUCs												
LFQ	0.829	0.806	0.852	0.806	0.750	0.861	0.852	0.827	0.877	0.814	0.726	0.903
CAPTURE	0.767	0.740	0.794	0.738	0.670	0.806	0.694	0.658	0.729	0.896	0.833	0.960
COLA	0.847	0.827	0.868	0.813	0.758	0.868	0.875	0.853	0.897	0.915	0.867	0.962
Weighted AUCs												
LFQ	0.830	0.804	0.853	0.802	0.737	0.863	0.853	0.825	0.878	0.804	0.707	0.895
CAPTURE	0.769	0.742	0.796	0.745	0.672	0.810	0.693	0.659	0.730	0.897	0.838	0.956
COLA	0.848	0.826	0.869	0.811	0.746	0.863	0.875	0.851	0.898	0.911	0.859	0.960

Diagnostic accuracy estimates for binary predictors

CAPTURE

eTable 23. Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for CAPTURE, for COPD Definition SA3

	Uganda			Nepal			Peru		
	est	95% CI		est	95% CI		est	95% CI	
Unweighted									
Sensitivity (%)	66.18	53.68	77.21	84.95	79.32	89.54	87.50	67.64	97.34
Specificity (%)	77.63	76.22	79.01	70.79	69.22	72.33	88.37	87.26	89.41
PPV (%)	5.43	3.99	7.20	15.26	13.22	17.47	4.87	3.04	7.35
NPV (%)	99.16	98.74	99.47	98.70	98.16	99.12	99.90	99.72	99.98
Accuracy (%)	77.42	76.01	78.78	71.62	70.10	73.10	88.36	87.26	89.40
Sensitivity (%)	65.84	52.76	77.36	84.75	79.01	89.43	87.55	66.20	97.69
Specificity (%)	78.60	77.22	79.94	71.14	69.61	72.64	88.49	87.40	89.51
PPV (%)	5.20	3.80	6.94	14.84	12.87	16.98	4.73	2.93	7.17
NPV (%)	99.23	98.84	99.52	98.74	98.22	99.14	99.91	99.73	99.98
Accuracy (%)	78.38	77.00	79.71	71.90	70.42	73.35	88.48	87.40	89.50

LFQ (Cutpoint = 18)

eTable 24. Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for LFQ Considering a Cutpoint of 18, for COPD Definition SA3

	Uganda			Nepal			Peru		
	est	95% CI		est	95% CI		est	95% CI	
Unweighted									
Sensitivity (%)	69.12	56.74	79.76	77.18	70.84	82.73	79.17	57.85	92.87
Specificity (%)	80.18	78.82	81.49	77.94	76.50	79.34	70.05	68.51	71.56
PPV (%)	6.34	4.70	8.35	17.81	15.35	20.48	1.77	1.07	2.75
NPV (%)	99.26	98.87	99.54	98.22	97.64	98.69	99.80	99.53	99.93
Accuracy (%)	79.97	78.61	81.27	77.90	76.50	79.26	70.12	68.58	71.62
Weighted									
Sensitivity (%)	66.91	53.68	78.44	76.64	70.17	82.31	76.05	51.51	92.20
Specificity (%)	82.11	80.93	83.24	78.80	77.53	80.02	71.19	69.75	72.60
PPV (%)	6.26	4.61	8.27	17.66	15.23	20.30	1.69	1.02	2.64
NPV (%)	99.29	98.90	99.56	98.27	97.70	98.73	99.78	99.49	99.93
Accuracy (%)	81.84	80.66	82.98	78.67	77.42	79.89	71.22	69.78	72.62

COLA (Cutpoint = 4)

eTable 25. Unweighted and Weighted Diagnostic Performance Estimators (All With 95% Confidence Intervals) for COLA Considering a Cutpoint of 4, for COPD Definition SA3

	Uganda			Nepal			Peru			
	est	95% CI		est	95% CI		est	95% CI		
Unweighted										
Sensitivity (%)	73.53	61.43	83.50	61.17	54.14	67.86	70.83	48.91	87.38	
Specificity (%)	72.29	70.77	73.77	90.78	89.74	91.74	91.65	90.68	92.54	
PPV (%)	4.93	3.68	6.44	29.10	24.86	33.63	5.47	3.22	8.61	
NPV (%)	99.29	98.88	99.58	97.42	96.80	97.95	99.78	99.55	99.91	
Accuracy (%)	72.31	70.81	73.78	89.05	87.97	90.06	91.51	90.54	92.40	
Weighted										
Sensitivity (%)	70.47	57.14	81.65	60.69	53.59	67.47	69.40	45.45	87.51	
Specificity (%)	75.09	73.96	76.19	91.16	90.21	92.04	91.79	90.87	92.64	
PPV (%)	4.83	3.59	6.34	28.94	24.73	33.44	5.23	3.06	8.28	
NPV (%)	99.30	98.88	99.59	97.50	96.90	98.02	99.78	99.55	99.91	
Accuracy (%)	75.01	73.86	76.12	89.45	88.46	90.38	91.64	90.72	92.50	