



UNIVERSITY OF LEEDS

This is a repository copy of *Improving the quality of care of children in community clinics: an intervention and evaluation in Bangladesh.*

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/103130/>

Version: Accepted Version

Article:

Huque, R, Ahmed, F, King, R et al. (6 more authors) (2016) Improving the quality of care of children in community clinics: an intervention and evaluation in Bangladesh. *Public Health Action*, 6 (2). pp. 77-82.

<https://doi.org/10.5588/pha.16.0004>

© 2016, The Union. This is an author produced version of a paper published in *Public Health Action*. Uploaded in accordance with the publisher's self-archiving policy.

Reuse

Unless indicated otherwise, fulltext items are protected by copyright with all rights reserved. The copyright exception in section 29 of the Copyright, Designs and Patents Act 1988 allows the making of a single copy solely for the purpose of non-commercial research or private study within the limits of fair dealing. The publisher or other rights-holder may allow further reproduction and re-use of this version - refer to the White Rose Research Online record for this item. Where records identify the publisher as the copyright holder, users can verify any specific terms of use on the publisher's website.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

1 **Improving quality of care of children in community clinics: an intervention and**
2 **evaluation in Bangladesh**

3 **Authors and affiliations:**

4 Rumana Huque,^{1 2} Farid Ahmed,¹ Rebecca King,³ John Walley,³ Joseph P Hicks,³
5 Helen Elsey,³ Shammi Nasreen,¹ Ajay Kumar,⁴ James N Newell³

6 ¹ARK Foundation, Dhaka, Bangladesh

7 ²Department of Economics, University of Dhaka, Dhaka, Bangladesh

8 ³Nuffield Centre for International Health and Development, University of Leeds, UK

9 ⁴The Union, South-East Asia office, New Delhi, India

10

11 **Corresponding author:**

12 Rumana Huque PhD, rumanah14@yahoo.com

13

14 **Manuscript content:**

15 Abstract word count: 195 (max 200)

16 Manuscript word count: 2,504 (max 2500)

17 No of Tables: 5

18 No of figures: 0

19 No of references: 14

20 **Short running title:**

21 Improving quality of care at community clinics in Bangladesh

22 **Key words:**

23 Primary care, childhood pneumonia, antibiotic reduction

24

25 **ABSTRACT**

26 **Setting:** Community health-care providers (CHCPs) in 40 rural community clinics of
27 Comilla district, Bangladesh, were trained using a newly-developed case-management
28 job aid based on ‘integrated management of childhood illness’ and a communication
29 guide.

30

31 **Objectives:** To assess change in knowledge of CHCPs after training; **absolute** quality
32 of care provided by CHCPs (determined as proportion of under-five children correctly
33 diagnosed, treated and referred); and CHCPs’ consultation behaviour.

34

35 **Design:** Change in knowledge was assessed by pre- and post-tests. Quality of care
36 was determined by reassessments at clinic exit by a medical officer, **without baseline**
37 **comparison**. Consultation behaviour was assessed through direct observation. The
38 study was performed during 2014-15.

39

40 **Results:** CHCPs’ mean standard knowledge score increased from 19 to 25 ($P < 0.001$).
41 Of 1490 under-five children examined, 91% were correctly diagnosed, 86% correctly
42 treated and 99.5% received a correct referral decision. CHCPs performed well on most
43 measures of good communication - though one-third did not explain diagnosis and
44 treatment to patients.

45

46 **Conclusion:** The training was effective in changing knowledge. CHCPs applied the
47 knowledge gained and provided good quality care. Following these results, the
48 Bangladesh Ministry of Health and Family Welfare has scaled up the training
49 nationwide. The lessons learnt should be useful for other countries.

50

51 INTRODUCTION

52

53 Globally, the under-five mortality rate has halved since 1990.¹ South Asia has achieved
54 an equivalent reduction, but under-five mortality remains unacceptably high at 52.5
55 deaths/1000 live births. Sick children's first point of contact with health services is
56 usually primary care. However, in low-income countries, primary care quality is often
57 poor. Additional supply-side factors causing poor outcomes include lack of information
58 on sources of care, distance of health facilities from home, high access costs and staff
59 discrimination; demand-side factors causing low utilisation by the poor include beliefs
60 that care is of poor quality, cultural and social belief systems, and lack of awareness of
61 the value of services.^{2 3}

62 In Bangladesh, the under-five mortality rate remains high, at 46 per 1000,^{4 5} half of
63 which are due to acute respiratory infections, serious infection and diarrhoea. Effective
64 case management through trained healthcare providers could prevent many of these
65 deaths.⁶ To improve access to care, utilisation and equity, the Ministry of Health and
66 Family Welfare (MOHFW) has initiated the Revitalization of Community Health Care
67 Initiatives in Bangladesh (RCHCIB) project, which aims to provide community clinics
68 (CCs) – with catchments of approximately 6,000 people – in rural areas, to deliver an
69 essential service package for women, children and the poor. So far, about 13,309 CCs
70 have been built.

71 CCs are staffed by Community Health Care Providers (CHCPs). CHCPs are meant to
72 provide health education, health promotion and treatment of minor ailments, and identify
73 and refer severe cases to hospitals. CHCPs are given monthly supportive supervision
74 by the Sub-Assistant Community Medical Officer (SACMO) of the upazilla (subdistrict)
75 in which the CC lies. SACMOs are trained medical professionals – **the level above**
76 **CHCPs, using similar clinical skills (i.e. not doctors)** – who provide healthcare services
77 at Upazilla Health Complexes (UHCs) (the first level of health facility staffed by **doctors**).

78 In response to concerns of the **Project Director of the RCHCIB project and the Line**
79 **Director of the Essential Service Delivery Programme** about poor quality of care, a

80 programme review was conducted. This indicated that although CHCPs received twelve
81 weeks training – six weeks in class acquiring mainly theoretical knowledge followed by
82 six weeks observing doctors practice – they lacked practical consultation and
83 communication skills. Based on the assessment of patient records by a medical doctor,
84 a rapid pre-intervention study at 5 CCs, selected using convenience criteria, confirmed
85 the Project Director’s concerns by demonstrating that only 29% of children received
86 proper diagnosis and care (Table 1). We also estimated that 90% of children who did
87 not need antibiotics received them. To address these issues, we developed a diagnostic
88 and case management job aid adapted from existing Integrated Management of
89 Childhood Illness (IMCI) guidelines¹⁰ and communication guidelines (pre-tested in
90 Kaliganj – a non-study upazila – and revised accordingly), and trained all (standard)
91 CHCPs in the study sites. It was anticipated that this would result in higher-quality care,
92 contribute to improved utilisation of community clinics and ultimately help reduce under-
93 five mortality.

94
95 The timeframe for this ‘embedded’ research was extremely tight, with a short deadline
96 to develop and pilot the intervention before the Ministry of Health undertook nationwide
97 training. This political reality gave us little opportunity to perform a major assessment of
98 quality of care prior to intervention implementation. Furthermore, prior quality of care
99 was sufficiently poor that we considered it preferable to assess absolute quality of care
100 to allow programme managers to judge whether this level of quality was adequate,
101 rather than measure improvement in care (since we could have found statistically
102 significant improvements even though care quality was still inadequate). Specific
103 objectives were to determine CHCPs’ knowledge and consultation behaviour after
104 training; and to determine the proportion of under-five patients seen by CHCPs who
105 received the correct diagnosis, correct treatment (including rational use of antibiotics)
106 and appropriate referral when necessary.

107
108

109 **METHODS**

110

111 **Study design**

112 The study used a cross-sectional approach to assess quality of care, and pre-post
113 testing to assess change in CHCPs' knowledge. The study population comprised all
114 under-five children who attended the selected CCs, and the CHCPs who cared for
115 them, from August 2014 to February 2015.

116

117 To assess the change in knowledge following training, CHCPs were pre- and post-
118 tested (**immediately before and after training**) using 12 multiple choice questions
119 (MCQs) and 3 case studies addressing the process and content of service delivery.
120 **MCQs and case studies were pre-tested for clarity and relevance in Kaliganj with 23**
121 **CHCPs, and revised accordingly.** To assess the CHCPs' diagnosis, treatment and
122 referral post-intervention, at each selected CC, every under-five child examined for six
123 consecutive days was re-assessed at exit by a SACMO **situated in a separated room**
124 **within the CC.** SACMOs were **not previously known to the CHCPs, but CHCPs were**
125 **aware they would be assessed.** To assess the CHCPs' communication with the
126 patient/carer, on the final day of assessment a social researcher observed consultations
127 and completed a checklist.

128

129 **Setting**

130 The study was carried out in two sub-districts of Comilla, a peri-urban district about 100
131 kilometres from Dhaka with a population of 3.74 million.⁷ Comilla has 16 upazillas, from
132 which we selected two – Daudkandi and Chandina – purposively to avoid overlap with
133 other RCHCIB NGO partner projects, and to approximate the national average patient
134 load of 45 patients per day per CC. Daudkandi and Chandina have respectively 23 and
135 27 functioning CCs serving approximately 16,000 and 15,000 under-five children
136 yearly.^{8 9} CCs were situated from 7 to 25 kilometres from their UHC. Of the 50 CCs, 40
137 (20 from each upazilla) were **non-randomly** selected to ensure a range of geographical
138 locations, distances from their UHC, knowledge levels (assessed using pre- and post-
139 test exams), and equal numbers of male and female CHCPs. Study CCs were not

140 atypical of CCs nationally, being a mix of rural CCs, peri-urban CCs and very remote
141 CCs (up to 25 km from their UHC). Study CCs may not be representative of some CCs
142 in the hill areas of Chittagong and remote coastal areas, which are difficult to access
143 and possess unique features.

144

145 **Intervention and training**

146 All study CHCPs underwent six days of refresher training during April-June 2014,
147 facilitated by the RCHCIB project and a member of our study team. Eight of the 37
148 sessions during this training covered IMCI¹⁰ guidelines. The intervention and training
149 package included five new components: (1) a job aid¹¹ to facilitate the effective
150 management of six common illnesses, based on IMCI, including guidance on
151 appropriate use of antibiotics; (2) training on ‘how to diagnose and treat’; (3) training on
152 how to communicate with the child and caregiver; (4) IMCI user guidelines describing
153 how to use the IMCI job aid; and (5) training modules including case studies and role-
154 play exercises. The package was developed shortly prior to the training in January-
155 March 2014 by a national technical working group committee comprised of national and
156 international experts in relevant health disciplines, social science and public health.
157 Following the training the CHCPs were expected to keep the job aid and guide on their
158 desks for ready reference during consultations. A simple referral mechanism was
159 included in the IMCI job aid to strengthen referral of complicated cases.

160

161 **Data collection procedures**

162 One fieldworker was appointed in each upazilla to communicate with CCs and manage
163 data collection. Fieldworkers received training on data collection tools and procedures.
164 Two SACMOs, one from each UHC, were selected to assess CHCPs’ skills with
165 permission from upazilla authorities. The SACMOs spent six consecutive working days
166 at each CC assessing all the CHCP’s consultations with under-five children. Each child
167 was then re-assessed by the SACMO blind to the CHCP’s consultation. At the end of
168 each day the SACMO matched his own register to the CHCP’s register and, using a
169 pre-developed reporting form, recorded all consistencies and inconsistencies. On the
170 sixth day, a researcher observed the CHCP’s consultations to assess the CHCP’s

171 communication skills and completed a pre-developed consultation observation checklist.
172 At the end of the sixth day the SACMO gave feedback to the CHCP on each
173 consultation. All data were collected using pre-tested structured tools.

174

175 **Data entry and analysis**

176 All data from SACMO reporting forms were checked, and analysed using SPSS (version
177 23). Performance of CHCPs was assessed using outcomes measuring the proportion of
178 under-five children:

179 1) who received the correct diagnosis

180 2) who received the correct treatment

181 3) who received appropriate referral services, when necessary

182 4) for whom antibiotics were used rationally (antibiotics given when recommended in the
183 job aid and not given when not recommended).

184

185 The study was powered to estimate 95% confidence interval widths of at most $\pm 10\%$ for
186 the outcomes for each type of disease, which implied identifying at least 120 cases of
187 severe pneumonia.

188

189 A knowledge score was calculated based on responses in pre- and post-training tests,
190 and mean change in scores was assessed using a paired t-test. Simple frequencies and
191 proportions, and their 95% confidence intervals (calculated using the Clopper-Pearson
192 exact method¹²), were used to describe the consultation performance and behaviour of
193 CHCPs and make inferences about the effectiveness of the training.

194

195 **Ethics**

196 Ethics approval was obtained from the Bangladesh Medical Research Council (BMRC)
197 and the University of Leeds, UK. Written informed consent was obtained from all
198 respondents and CHCPs before interview.

199

200

201 **RESULTS**

202 Overall, 1501 under-five children attended the 40 CCs during the study. Eleven children
203 had missing data; analysis is therefore restricted to 1490 (99%) children. Half (51%) of
204 all children were females, and the median age was 2 (interquartile range 1-3) years.

205 The most common presentations were 'No pneumonia (cough or cold)' (67% of
206 patients), fever and diarrhoea (Table 2). A total of 17 (1%) children had severe disease
207 requiring referral to a UHC.

208

209 **Quality of care**

210 Overall, 91% (95% CI 89-92%) of children were correctly diagnosed, 86% (95% CI 84-
211 87%) were correctly treated and almost all received a correct referral decision by the
212 CHCP (99.5%: 95% CI 99-99.8%) (Table 3). Only one child who required referral was
213 missed by the CHCP (Table 3). Excluding severe pneumonia, for which there were only
214 two cases (and therefore accurate inference is not possible), correct diagnosis was
215 lowest for pneumonia (68%: 95% CI 53-80%), with much higher levels of correct
216 diagnosis for all other diseases (Table 4).

217

218 **Rational use of antibiotics**

219 Overall, 89% (95% CI 87-91%) of consultations resulted in the correct use of antibiotics,
220 comprising 89% (95% CI 81-93%) of consultations requiring an antibiotic that correctly
221 resulted in their use, and 89% (95% CI 87-91%) of consultations not requiring an
222 antibiotic that correctly did not result in their use (Table 3). The correct use of antibiotics
223 was lowest for children presenting with 'No Pneumonia (cold or cough)' (86%: 95% CI
224 83-88%) and pneumonia (88%: 95% CI 76-95%), with high levels of correct antibiotic
225 use for all other diseases (Table 4).

226

227 **Change in knowledge of CHCPs**

228 The mean knowledge score (maximum 30) before the training was 19 (SD 16-22) which
229 increased to 25 (SD 23-27) after the training ($p < 0.001$).

230

231 **Consultation behaviour of CHCPs**

232 CHCPs performed well on most measures of good communication. However, about half
233 interrupted the child's parent or carer while they were talking, around one-third did not
234 explain the diagnosis and treatment, and slightly less than one-third failed to provide
235 preventive messages to the patients (Table 5).

236

237

238 **DISCUSSION**

239 We found that following the training, CHCPs were able to correctly diagnose, treat and
240 refer 86% of under-five children cared for. The pre/post training evaluation showed a
241 highly significant and clinically meaningful increase in knowledge based on the content
242 of the job aid. These findings indicate that CHCPs' knowledge gained in training was
243 applied in clinical practice, and justify the decision of the MOHFW to roll out the
244 refresher training countrywide.

245
246 There remained some over-prescribing of antibiotics (about 11% of children were
247 prescribed antibiotics when they should not have been), but this was less than half the
248 rate found in the pre-intervention study – this is important given global concerns about
249 antibiotic resistance. There were still some errors in diagnosis (9%) and treatment
250 (14%), especially among children with respiratory symptoms (9% and 14% respectively)
251 – these need to be addressed during supportive supervisory visits and on-the-job
252 training. The programme managers have begun to fill remaining gaps identified in
253 CHCP performance through electronic distance learning modules. The MoHFW has
254 introduced distance learning, as arranging classroom-based training for the 14,000
255 CHCPs is very expensive and time consuming. In the next health sector programme,
256 there are plans to arrange 6 days refresher training for all CHCPs in 2017.

257
258 An important innovation in this study is the adaptation of the IMCI job aid and training to
259 the Bangladesh context, in line with updated World Health Organization guidance, and
260 the country cultural and epidemiological context. For example the job aid includes an
261 expanded fever section which recognises that most of Bangladesh is malaria-free, but
262 that in the districts bordering Myanmar where there is malaria, a rapid malaria-
263 diagnostic test is necessary. The resulting six page job aid is easy to use, and easily
264 replicable and scalable¹¹. The intervention contributed to a change in national policy and
265 practice: about 14,000 CHCPs nationwide were given the job aid and trained.

266
267 A study from Ethiopia¹³ which used a similar training methodology and evaluation found
268 that health extension workers, following training, provided correct case management in

269 two-thirds of the under-five children, and only one-third of children with severe illness
270 were correctly managed and referred. The performance of CHCPs in our study has
271 been substantially better, but the reasons for this difference are unclear.

272
273 This is the first study of CHCPs performance in Bangladesh. There were several
274 strengths in the intervention and its evaluation. The study had a large sample size. The
275 intervention was designed and developed to be replicable, scalable and sustainable
276 within routine service. There are clear criteria for classifying severe illness that needs
277 urgent treatment and referral. The CHCPs identified all the children needing referral,
278 although there were far fewer requiring referral than expected: this may be because the
279 parents go directly to the UHC when their child looks very ill.

280
281 There were some weaknesses. First, there was no systematic baseline assessment in
282 the study sites, due to the quick programme decision to scale up CHCP trainings
283 nationwide based on the pilot results. However, it was widely acknowledged that
284 baseline quality of care was suboptimal and it was deemed inappropriate to divert
285 scarce resources for baseline assessment. Second, the study was done only in 2 sub-
286 districts, and may not be representative of the country. **Third, the relatively short time**
287 **interval between training and knowledge assessment measured short-term recall, and**
288 **may not represent long-term learning – but the longer period between training and**
289 **SACMO reassessment suggests knowledge was retained. Fourth, the CHCP was**
290 aware that a SACMO was reassessing the children and a researcher was observing the
291 consultation behaviour. The observed quality of care may in part be due to the
292 Hawthorne effect,¹⁴ where increased attention during assessment in itself increases
293 performance. Thus, the performance observed in the study may not necessarily be
294 reflective of that expected in routine practice. **Fifth, the re-assessment was conducted**
295 **by two SACMOs – using a panel of clinicians would have increased the rigour of re-**
296 **assessment.**

297
298 In conclusion, we believe this study provides evidence to demonstrate that there are
299 likely to be substantial benefits if countries develop tailored materials and training

300 packages for lower-level health workers. These should be based on current WHO IMCI
301 guidance.¹⁰

302

303 **ACKNOWLEDGMENTS**

304 We would like to thank the patients attending the study CCs, and the CHCPs and
305 SACMO involved. We would also like to thank Dr Makhduma Nargis, Additional
306 Secretary, Bangladesh Ministry of Health and Family Welfare and the Project Director of
307 the CC project for permission to carry out the study.

308 This paper was produced as a result of a paper writing workshop facilitated by faculty
309 from i) Centre for Operational Research, International Union Against Tuberculosis and
310 Lung Disease, Paris, France; ii) The Union, South-East Asia Regional Office, New
311 Delhi, India; and iii) the Operational Research Unit, Médecins Sans Frontières,
312 Luxembourg. We would also like to thank Dr Nilam Ashra-McGrath for helping to
313 facilitate the workshop and for editorial support.

314

315 **FUNDING STATEMENT**

316 This study was funded by COMDIS-HSD, a research consortium funded by UK aid from
317 the UK government: however, the views expressed do not necessarily reflect the UK
318 government's official policies.

319

320 **CONFLICTS OF INTEREST**

321 None declared

322

323 **REFERENCES**

324 ¹ Liu L, Johnson HL, Cousens S, et al. Global, regional, and national causes of child mortality:
 325 An updated systematic analysis for 2010 with time trends since 2000. *Lancet* 2012; 379:
 326 2151-2161. Available from: [http://dx.doi.org/10.1016/S0140-6736\(12\)60560-1](http://dx.doi.org/10.1016/S0140-6736(12)60560-1)
 327 ² Ahmed S, Khan MM. A maternal health voucher scheme: what have we learned from the
 328 demand-side financing scheme in Bangladesh? *Health Policy Plan* 2011; 26: 25-32.
 329 Available from: <http://heapol.oxfordjournals.org/content/26/1/25.abstract>
 330 ³ Ensor T. Overcoming barriers to health service access: influencing the demand side. *Health*
 331 *Policy Plan* 2004;19: 69-79. Available from:
 332 <http://www.heapol.oupjournals.org/cgi/doi/10.1093/heapol/czh009>
 333 ⁴ You D, Hug L, Ejdemyr S, et al. Global, regional, and national levels and trends in under-5
 334 mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic
 335 analysis by the UN Inter-agency Group for Child Mortality Estimation. *Lancet* 2015; 386:
 336 2275-2286. Available from: [http://dx.doi.org/10.1016/S0140-6736\(15\)00120-8](http://dx.doi.org/10.1016/S0140-6736(15)00120-8)
 337 ⁵ Bangladesh MOHFW. Bangladesh Demographic and Health Survey 2014: Key Indicators.
 338 Dhaka, Bangladesh: MOHFW 2015. Available from:
 339 https://www.k4health.org/sites/default/files/bdhs_2014.pdf (accessed 4/1/16).
 340 ⁶ Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS. How many child deaths can we
 341 prevent this year? *Lancet* 2003; 362: 65-71.
 342 ⁷ Bangladesh Bureau of Statistics. Population and Housing Census 2011. Government of
 343 Bangladesh 2011. Available from:
 344 http://203.112.218.66/WebTestApplication/userfiles/Image/BBS/Socio_Economic.pdf
 345 (accessed 4/1/16).
 346 ⁸ Bangladesh MOHFW Local Health Bulletin, Chandina Upazilla Health Complex, 2014.
 347 Available from:
 348 [http://app.dghs.gov.bd/localhealthbulletin2014/publish/publish.php?org=10000857&year=201](http://app.dghs.gov.bd/localhealthbulletin2014/publish/publish.php?org=10000857&year=2014)
 349 [4](http://app.dghs.gov.bd/localhealthbulletin2014/publish/publish.php?org=10000857&year=2014) (accessed 4/1/16).
 350 ⁹ Bangladesh MOHFW Local Health Bulletin, Daudkandi Upazilla Health Complex, 2014.
 351 Available from:
 352 [http://app.dghs.gov.bd/localhealthbulletin2014/publish/publish.php?org=10000875&year=201](http://app.dghs.gov.bd/localhealthbulletin2014/publish/publish.php?org=10000875&year=2014)
 353 [4](http://app.dghs.gov.bd/localhealthbulletin2014/publish/publish.php?org=10000875&year=2014) (accessed 4/1/16).
 354 ¹⁰ WHO. Integrated Management of Childhood Illness (IMCI). Available from:
 355 http://www.who.int/maternal_child_adolescent/topics/child/imci/en/ (accessed 4/1/16).
 356 ¹¹ Bangladesh MOHFW, ARK Foundation, 2015. Integrated management of childhood illness
 357 (IMCI): age 2 months up to 5 years. Available from:
 358 <http://comdis-hsd.leeds.ac.uk/wpcontent/uploads/2016/01/IMCI-English-version.pdf>
 359 (accessed 6/1/16).
 360 ¹² Clopper CJ, Pearson ES. The use of confidence or fiducial limits illustrated in the case of the
 361 binomial. *Biometrika* 1934; 26: 404.
 362 ¹³ Miller NP, Amouzou A, Tafesse M, Hazel E, Legesse H, Degefie T, Victora CG, Black RE,
 363 Bryce J. Integrated community case management of childhood illness in Ethiopia:
 364 implementation strength and quality of care. *Am J Trop Med Hyg* 2014; 91: 424-434. doi:
 365 10.4269/ajtmh.13-0751
 366 ¹⁴ Landsberger HA. Hawthorne Revisited. The New York State School of Industrial and Labor
 367 Relations, Ithaca, New York, 1958.
 368

369 **Table 1: Rapid assessment of quality of care of under-five children who attended 5**
 370 **community clinics in Comilla district, Bangladesh, 2014-15**
 371

	Number seen per clinic per month	% who received proper diagnosis and care
Severely ill children		
Danger signs	3	50%
Pneumonia	9	20%
Diarrhoea	14	80%
Total severely ill children	26	56%
No treatment needed	37	10%
All children	63	29%

372
 373
 374

375 **Table 2: Distribution of diseases among under-five children who attended the community**
 376 **clinics in two upazillas of Comilla district, Bangladesh, 2014-15**
 377

Disease	Number	(%)
Total	1490	(100)
No pneumonia (cold or cough)	991	(67)
Pneumonia	50	(3)
Severe pneumonia	2	(<1)
Diarrhoea	107	(7)
Dysentery	27	(2)
Fever not malaria	117	(8)
Very severe disease	1	(<1)
Mild viral illness	26	(2)
Others*	169	(11)

*Others includes ear problems, cuts, burns, abdominal pain and skin problems

378
 379
 380

381 **Table 3: Proportion of under-five children who received a correct diagnosis, treatment**
 382 **and referral in two upazillas of Comilla district, Bangladesh, 2014-15 (n=1490)**
 383

Outcome measures	Number	%	(95% CI)
Correct diagnosis decision	1355	91	(89-92)
Correct treatment decision	1277	86	(84-87)
Correct use of antibiotic	1326	89	(87-91)
Among those who required antibiotic (n=106)	94	89	(81-93)
Among those who did not require antibiotic (n=1384)	1232	89	(87-91)
Correct referral decision	1483	99.5	(99.0-99.8)
Among those who required referral (n=17)	16	94	(73-99)
Among those who did not require referral (n=1473)	1467	99.6	(99.1-99.8)

384
 385
 386

387 **Table 4: Proportion of under-five children correctly diagnosed, treated (in relation to**
388 **antibiotic use) and referred, by presenting disease, in two upazillas of Comilla district,**
389 **Bangladesh, 2014-15**
390

Presenting disease	Total	Correct* Diagnosis			Correct* antibiotic use			Correct* Referral		
	n	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)
No Pneumonia (cold or cough)	991	919	93	(91-94)	849	86	(83-88)	990	99	(99-100)
Pneumonia	50	34	68	(53-80)	44	88	(76-95)	50	100	(93-100)
Severe Pneumonia	2	1	50	(1-99)	2	100	(16-100)	2	100	(16-100)
Diarrhoea	107	105	98	(93-100)	105	98	(93-100)	106	99	(95-100)
Dysentery	27	27	100	(87-100)	26	96	(81-100)	27	100	(87-100)
Fever	117	104	89	(82-94)	112	96	(90-99)	117	100	(97-100)

*Correct means the CHCP's diagnosis was in accordance with the SACMO's subsequent re-diagnosis

391
392
393

394 **Table 5: Assessment of consultation behaviours of community health care providers in**
 395 **two upazillas of Comilla district, Bangladesh, 2014-15 (n=37)**
 396

Consultation outcome measures	n	%	95% CI
Welcomed the patient	24	64	(47-80)
Encouraged patient to talk	37	100	(91-100)
Looked at the patient	37	100	(91-100)
Listened to the patient	37	100	(91-100)
Proper sitting arrangement during consultation	27	73	(56-86)
Look for danger signs of being severely ill	25	68	(50-82)
Asked about symptoms	37	100	(91-100)
Started questioning using open ended questions	37	100	(91-100)
Completed questioning using closed ended questions	35	95	(82-99)
Interrupted parent/carer while talking	18	49	(32-66)
Able to encourage parent/carer to describe the child's condition	37	100	(91-100)
Look, listen and feel for the relevant signs	36	97	(86-100)
Explain diagnosis and treatment to the patient	24	64	(47-80)
Give preventive messages related to this illness	26	70	(53-84)

397