

1 **Addressing the quality of paediatric primary care: Health**
2 **worker and caregiver perspectives from a process evaluation**
3 **of PACK Child, a health systems intervention in South Africa**

4 Robyn Curran, Jamie Murdoch, Max Bachmann, Eric Bateman, Ruth Cornick, Sandra
5 Picken, Makhosazana Lungile Simelane, Lara Fairall

6

7 University of Cape Town Lung Institute, Knowledge Translation Unit, University of
8 Cape Town, South Africa, Mowbray 7700

9 Robyn Curran

10 Process Evaluation Researcher

11

12 School of Health Sciences, University of East Anglia, Norwich, UK, NR4 7TJ

13 Jamie Murdoch

14 Senior Research Fellow in Process Evaluation

15

16 Norwich Medical School, University of East Anglia, Norwich, UK, NR4 7TJ

17 Max Bachmann

18 Professor of Health Services Research

19

20 University of Cape Town Lung Institute, Knowledge Translation Unit, University of
21 Cape Town, South Africa, Mowbray 7700

22 Eric Bateman

23 Emeritus Professor

24

25 University of Cape Town Lung Institute, Knowledge Translation Unit, University of

26 Cape Town, South Africa, Mowbray 7700

27 Ruth Cornick

28 Senior Lecturer, Department of Medicine, University of Cape Town

29 Content Team Lead, Knowledge Translation Unit

30

31 University of Cape Town Lung Institute, Knowledge Translation Unit, University of

32 Cape Town, South Africa, Mowbray 7700

33 Sandy Picken

34 Senior Content Developer

35

36 University of Cape Town Lung Institute, Knowledge Translation Unit, University of

37 Cape Town, South Africa, Mowbray 7700

38 Makhosazana Lungile Simelane

39 Trainer and Implementation Facilitator

40

41 University of Cape Town Lung Institute, Knowledge Translation Unit, University of

42 Cape Town, South Africa, Mowbray 7700

43 Lara Fairall

44 Head of Knowledge Translation Unit

45 Professor, Department of Medicine, University of Cape Town

46 Professor of Global Healthcare Delivery

47 King's Global Health Institute, King's College London, SE1 9NH

48

49 Correspondence to:

50 Dr Robyn Curran

51 Knowledge Translation Unit

52 University of Cape Town Lung Institute

53 George Street

54 Observatory

55 7824

56 Cape Town

57 South Africa

58 Tel: 0027 214063674

59

60 robyn.curran@uct.ac.za

61

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63

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72 **ABSTRACT**

73 **Background:** The WHO's Integrated Management of Childhood Illness (IMCI) has
74 resulted in progress in addressing infant and child mortality. However, unmet needs
75 of children continue to present a burden upon primary healthcare services. The
76 capacity of services and quality of care offered require greater support to address
77 these needs by extending and integrating curative and preventive care for the child
78 with a long-term health condition and the child older than 5, not prioritised in IMCI.
79 In response to these needs, the PACK Child intervention was developed and piloted in
80 October 2017- February 2019 in the Western Cape Province of South Africa. We
81 report health worker and caregiver perspectives of the existing paediatric primary
82 care context as well as the extent to which PACK Child functions to address perceived
83 problems within the current local healthcare system.

84 **Methods:** This process evaluation involved 52 individual interviews with caregivers,
85 10 focus group discussions with health workers, 3 individual interviews with trainers,
86 and 31 training observations. Interviews and focus groups explored participants'
87 experiences of paediatric primary care, perspectives of the PACK Child intervention,
88 and tensions with implementation in each context. Inductive thematic analysis was
89 used to analyse verbatim interview and discussion transcripts.

90 **Results:** Perspectives of caregivers and health workers suggest an institutionalised
91 focus of paediatric primary care to treating children's symptoms as acute episodic
92 conditions. Health workers' reports imply that this focus is perpetuated by
93 interactions between contextual features such as, IMCI policy, documentation-driven
94 consultations, overcrowded clinics and verticalised care. Whilst these contextual
95 conditions constrained health workers' ability to translate skills developed within

96 PACK Child training into practice, the intervention initiated expanded care of children
97 0-13 years and those with long-term health conditions, enhanced professional
98 competence, improved teamwork and referrals, streamlined triaging, and facilitated
99 probing for psychosocial risk.

100 **Conclusion**

101 PACK Child appears to be catalysing paediatric primary care to address the broader
102 needs of children, including long-term health conditions and the identification of
103 psychosocial problems. However, to maximise this requires primary care to re-
104 orientate from risk minimisation on the day of attendance towards a view of the child
105 beyond the day of presentation at clinics.

106 **Keywords**

107 paediatric primary care, PACK, process evaluation, IMCI, health systems
108 strengthening, educational outreach

109

110 **BACKGROUND**

111 South Africa has not met the child mortality target for the Millennium Development
112 Goals, in spite of having invested substantially in programmes and policies to achieve
113 these targets [1]. In 2016, the child mortality and infant mortality rates were 42 and
114 35 per 1000, and their decline has slowed, making the target goals of <25 and <12 per
115 1000 live births, respectively, by 2030, a distant reality [2]. The World Health
116 Organisation's (WHO) Integrated Management of Childhood Illness (IMCI) strategy has
117 played a crucial role in shaping primary healthcare for children under five in low and
118 middle income countries (LMICs) for the past twenty years and has contributed to the

119 decline in child mortality. Although it has seen many successes [3-7], implementation
120 has been limited by inadequate local adaptation and infrequent revision of content,
121 insufficient health worker training and supervision, and variable uptake in care [7]. In
122 addition, IMCI focuses on priority life-limiting conditions like diarrhoea, pneumonia,
123 HIV and TB, but does not address other common and increasingly pressing problems
124 like asthma, allergies, epilepsy and mental illness. Lacking too is guidance for children
125 over 5 years and management of long-term health conditions.

126

127 In the Western Cape province of South Africa almost every public sector primary care
128 facility employs IMCI-trained nurses, who attend to the majority of children's
129 healthcare care needs. During consultation with clinical, managerial and policy
130 stakeholders responsible for provincial paediatric health care, gaps in services for
131 managing children at primary care level were identified, including the need to
132 integrate routine care into the delivery of everyday care. This prompted the
133 development of an expanded programme to address a larger remit of paediatric
134 primary care. Led by the University of Cape Town's Knowledge Translation Unit (KTU),
135 the PACK Child intervention was developed, comprising a clinical decision support tool
136 (the PACK Child guide), a cascade training and implementation programme, and health
137 system strengthening components. This was based on the Practical Approach to Care
138 Kit (PACK) Adult programme that has supported the delivery of comprehensive,
139 integrated adult primary care in the province for the past 14 years [8, 9].

140

141 The PACK intervention aimed to get health workers to use the guide in their everyday
142 practice and includes the PACK Child guide (localized for use in the Western Cape),

143 health worker training and systems strengthening. The PACK Child guide collates and
144 simplifies current evidence and policy for use in every nurse or doctor primary care
145 contact with a child 0-13 years old [10]. Comprehensive in scope, it provides an
146 approach to 63 symptoms and the routine care of 16 long-term health conditions, as
147 well as a well child screen designed for every visit. The training programme is a
148 streamlined version of PACK Adult training adapted from educational outreach [11]
149 which entails nine onsite training sessions of 2 hours highlighting alignment with IMCI,
150 refresher training in growth monitoring, long-term health conditions, distribution of
151 roles among health workers who see children and integration with documentation
152 (e.g. Integrated Clinical Stationery, Road to Health Booklet- a caregiver held record of
153 immunisations and child growth). Role clarification and documentation form part of
154 the systems strengthening components, which also include a sensitisation session for
155 facilities receiving referrals and clarification and compliance with IMCI prescriber
156 levels.

157

158 Implementation of a health system strengthening intervention like PACK in a health
159 system is a complex activity, requiring an understanding of how it will interact with
160 the varying contexts of delivery. The Department of Health was especially concerned
161 that we address stakeholder concerns of PACK's integration with existing programmes
162 and policies, particularly IMCI. To explore these issues and address concerns, a
163 process evaluation was conducted alongside a pilot of PACK Child in ten primary
164 healthcare facilities in the Western Cape of South Africa to determine what
165 refinements are needed at intervention and health system levels to optimise its
166 implementation.

167

168 We have previously reported findings from observed consultations of how the
169 implementation of PACK Child interacted with the wider context of paediatric care
170 [12]. This paper complements those findings by reporting the perspectives of
171 caregivers of children attending the facilities, and of health workers responsible for
172 delivering the PACK Child intervention. These perspectives are lacking in literature on
173 paediatric health care provision in primary health care settings in South Africa [13, 14].

174

175 **METHODS**

176 **Research Setting**

177 The setting for this pilot and process evaluation was ten public- sector primary care
178 facilities serving impoverished urban and rural communities in the Western Cape,
179 South Africa. The Western Cape Health Department's People Development Centre,
180 which oversees training public sector healthcare workers in the Western Cape,
181 purposively selected facilities for the study. They sought to provide maximum
182 variation of primary care delivery, informed by whether clinics were Ideal Clinic sites,
183 (a national policy to improve integration and quality of primary healthcare) [15]; had
184 differing levels of PACK Adult training; and used recently developed checklist-
185 enhanced child health records (Integrated Clinical Stationery). All facilities provided
186 services both for the well child which includes growth monitoring and health
187 promotion, immunisation, and care of the sick child. Different nurses conducted
188 growth monitoring and health promotion (one enrolled nurse assistant (ENA)),
189 immunisations (one enrolled nurse (EN) or professional nurse (PN)), or managed sick
190 children (one or two IMCI trained PNs). One facility provided specialised clinics for

191 asthma and skin conditions, and the other nine facilities reported rarely treating
192 children with long-term health conditions.

193

194 The pilot was implemented in three phases (**Figure 1**); Phase 1 was in one facility with
195 training delivered by one KTU trainer (MS), Phase 2 in three facilities was implemented
196 by two KTU trainers and Phase 3 in six facilities, where six facility trainers were trained
197 to train staff within their facilities.

198

199 **Figure 1: PACK Child training, implementation cascade model**

200

201 **Design and participant recruitment**

202 The UK Medical Research Council guidance on process evaluation of complex
203 interventions was used to inform the design, conduct and reporting of the study [16]
204 as well as the Consolidated criteria for reporting qualitative research (COREQ) for the
205 reporting of findings in this article [17]. The study used a mixed method approach
206 including quantitative and qualitative data collection methods in all ten primary care
207 facilities. Quantitative data collection methods were training attendance logs and
208 health workers questionnaires. Qualitative data collection methods were
209 observations of training sessions, semi-structured interviews with caregivers,
210 individual or focus group discussions with health workers and managers, and
211 ethnographic observations of consultations and non-clinical areas.

212

213 In this paper we report findings from interviews with caregivers, focus group
214 discussions with health workers, observations of training sessions and interviews with

215 PACK Child trainers. To be eligible for inclusion, nurses and doctors needed to have
216 received PACK Child training and caregivers and children to be receiving paediatric
217 services at the selected facilities. Children needed to be aged 0-13 years to receive
218 paediatric services. Purposive sampling was planned in Phase One to select and recruit
219 a range of staff treating children, caregivers and their children. Sampling of children in
220 Phase One was intended to be informed by diversity of conditions, level of deprivation
221 and the age of the child. However, in practice, we recruited children presenting on
222 that day, with clinic nurses identifying and approaching eligible participants in clinic
223 waiting room areas. Findings from the analysis of Phase One qualitative observation
224 (challenging aspects of using the PACK Child guide) and interview data (children's
225 presenting conditions), were used to inform theoretical sampling [18] of health
226 workers, caregivers, children and timing of data collection in Phases Two and Three.

227

228 **Data Collection**

229 To understand caregiver perspectives of paediatric primary care and their experience
230 of the PACK Child intervention, we conducted individual interviews with caregivers
231 and their children at the facilities, either in the waiting area or in a consulting room
232 where a room was available (**Additional file 1**). Where interviews were conducted in
233 waiting areas, the interviewer identified sections of the waiting area that were less
234 crowded and distant from other people. Caregivers were asked about their child's
235 health, their experience of paediatric primary care and changes in the care they
236 received since the intervention. Caregiver interviews were carried out by RC or JM
237 after their child's consultation in which PACK Child was used. RC is a clinician and has
238 experience working in primary care, as well as having extensive experience in

239 conducting qualitative interviews in public health with vulnerable people. JM is a social
240 scientist specialising in qualitative and mixed methods process evaluation. If the
241 caregiver preferred to communicate in a language other than English, spoken by RC
242 or JM, then a member of staff was asked to act as a translator. This only occurred on
243 two occasions and the translator was a member of staff (receptionist) who was not
244 involved in the clinical management of the patient, therefore an issue of bias was
245 unlikely.

246

247 To understand the perspectives of users of the PACK Child guide, focus group
248 discussions were conducted by RC with PACK Child-trained health workers at the
249 completion of training at each facility. These were audio recorded. Health workers
250 were asked about their perspectives of PACK Child training and implementation of the
251 intervention in routine paediatric primary care, and its effect on clinic workflow and
252 clinical competency (**Additional file 2**). All health workers' focus groups were
253 conducted in English. However, several health workers articulated their perspectives
254 in Afrikaans, which we translated into English during transcription.

255

256 To understand features of the delivery of the PACK Child intervention in the varying
257 contexts, a researcher (RC or JM) observed and took handwritten fieldnotes of all
258 training sessions in Phase One, in order to record how training was delivered, how
259 training was received, and points of difficulty within the training. To further investigate
260 the interaction between intervention implementation and existing practice, we
261 identified training sessions that evoked tensions between the PACK Child guidance
262 and usual practice or raised challenges in attempts to integrate PACK Child guide into

263 everyday routine care. Using these findings, we then selected other training sessions
264 for observation in Phase Two and Phase Three. We conducted three interviews with
265 trainers responsible for delivering the PACK Child training sessions, to elicit their
266 perspectives of how health workers received the training and to pick up on points of
267 difficulty identified in our earlier observations. These were important points of
268 contrast to health worker perspectives of training sessions, elicited during health
269 worker focus group discussions.

270

271 Data collection took place from October 2017 to February 2019. We conducted 52
272 caregiver interviews (Phase 1: 20; Phase 2: 12; Phase 3: 20), 10 health worker focus
273 groups (one per clinic), 31 training observations (Phase 1: 8, Phase 2: 13; Phase 3: 10),
274 and three trainer interviews. Interviews and focus groups had an average duration of
275 6 and 26 minutes respectively. The ten focus groups had an average of six participants,
276 were conducted in each of the facilities, and included doctors, Clinical Nurse
277 Practitioners (CNPs), Professional Nurses (PNs), Enrolled Nurses (ENs) and
278 pharmacists. All caregiver, health workers and trainer interviews were audio recorded
279 and transcribed or translated in English.

280

281 The caregivers who were interviewed in the facilities had brought their children for a
282 variety of problems including upper respiratory tract infections, skin problems,
283 asthma, and eczema, or for immunisations. Caregivers in Phase One were interviewed
284 throughout the nine-week period of the pilot. Analysis of these interviews revealed a
285 lack of caregiver awareness of the PACK Child intervention, so we decided to conduct
286 Phase Two and Three caregiver interviews towards the final session of the training

287 programme, to allow more time for caregivers and children to be exposed to the use
288 of the PACK Child guide in their clinic.

289

290 **Data Analysis**

291 Health worker focus group discussions, and caregiver and trainer interviews were
292 transcribed verbatim and thematically analysed inductively [19], to understand how
293 the PACK Child intervention was implemented from the perspectives of health
294 workers and caregivers, and the interaction between the context of paediatric primary
295 care and the intervention. We conducted open coding of the transcripts to reduce the
296 data into fragments, which we then reflected upon through memos to begin to
297 conceptualise properties and dimensions of categories and sub-categories which
298 might form themes. We then carried out axial coding, examining how open codes
299 related to each other in order to develop higher order categories. We also used a
300 constant comparative method to test out categories, including searching for
301 disconfirming cases [20]. Finally, we triangulated codes and categories with themes
302 and field notes from our observations of training sessions, including comparing
303 tensions and difficulties identified in observations with those reported by health
304 workers and caregivers. This enabled us to identify key perspectives on current
305 paediatric primary care and the extent to which PACK Child functions to address
306 perceived problems within the current healthcare system. One researcher (RC) coded
307 all of the interviews and focus group data in the first phase of the intervention, and a
308 second (JM) independently coded 10% of the data. There was sufficient agreement
309 between the coders with only minor disagreements in coding categories and choice of
310 coding . These were discussed, with coding and coding categories refined as a result.

311 Following completion of Phase 2 and 3, all coded data were reviewed by JM and RC to
312 check for coding consistency. Minor inconsistencies were identified, discussed and
313 recoded as appropriate.

314

315 This analysis enabled us to obtain a broad picture of the context of paediatric primary
316 care according to the perspectives of health workers providing the care and the
317 caregivers and children receiving it. It also highlighted how receipt of the PACK Child
318 intervention interacted with these perspectives, enabling us to make specific
319 recommendations for optimising implementation of the intervention more widely.

320

321 **RESULTS**

322 Our findings are separated into two broad categories. First, we report four themes
323 from our analysis which provide insight into the paediatric primary care context prior
324 to PACK Child implementation. These findings expand on our previous findings from
325 consultation observations [12], that identified an institutionalised orientation to treat
326 children's symptoms as acute conditions, rather than as potential markers of
327 underlying long-term health conditions. They provide insight into the wider context
328 into which implementation of the PACK Child intervention was introduced. These four
329 themes include: (i) organisational barriers, (ii) IMCI policy, (iii) verticalised care and (iv)
330 symptoms of long-term problems viewed as acute conditions. Secondly, we present
331 three themes from our analysis of the extent to which PACK Child addressed the
332 perceived problems within the current paediatric primary care system. These are
333 problems with: (i) expansion of paediatric primary care, (ii) teamwork and referrals
334 and (iii) eliciting and responding to psychosocial problems. **Figure 2** provides a visual

335 representation of themes and sub-themes. The figure is not intended to represent the
336 interaction between different contextual features and the PACK Child intervention,
337 but to show contextual features that contributed to the institutionalised orientation
338 to treat children' symptoms as acute, episodic conditions, and how the introduction
339 of PACK Child initiated a shift towards a different model of child care. To capture some
340 of this complexity within the text here, we present the themes and sub-themes as part
341 of a narrative rather than reporting each theme sequentially.

342

343 **Figure 2: Themes and sub-themes**

344

345 **Perceptions of paediatric primary care**

346 Caregivers frequently shared experiences of care which indicated how health workers
347 were oriented to treating children's symptoms as acute episodic conditions. Despite
348 having attended the facility repeatedly with the same problem, some caregivers
349 reported that health workers rarely asked about the child's previous history to help
350 establish a diagnosis. Where caregivers did report a diagnosis of a long-term health
351 condition, they provided accounts of an absence of ongoing management and routine
352 follow up.

353 "The third son of mine, they say he got eczema, sometimes his skin would be
354 so bad, and he would use all those creams. They would give you when his skin
355 is got so bad, I would go to the clinic and they would give you the aqueous
356 cream. Then they will say the skin is fine now. But when the child goes off
357 medicine and it is finished, then I will stop going. Along the line the same thing
358 will come back again. So, I was thinking maybe they are supposed to be giving

359 me the same aqueous cream all the time, because you know he has eczema
360 you know he should be coming for the same medication every time.”(Caregiver
361 50, Interview, Phase 1)

362

363 This finding from the perspective of caregivers was set against that of health workers
364 who in many facilities reported that they rarely had children attending with long-term
365 health conditions, and these children were attending larger clinics known in Cape
366 Town as ‘day hospitals’.

367 “I haven't seen a child with long-term health conditions. I think most of them
368 go to day hospital.” (Nurse, Focus Group 2, Phase 2)

369

370 A consequence of this orientation to acute, episodic care is that it limits the ability of
371 health workers to address other problems that may have an important bearing on the
372 child’s health more generally, as described by one caregiver with a child with
373 behavioural problems.

374 “Earlier this year [Child’s name] schooling hasn't been going very well, we have
375 tried to help him at home but it’s not easy as he struggles to concentrate and
376 I thought maybe he has ADHD so I came to the clinic to ask for advice but
377 nobody could really help me or give me proper information. They gave me this
378 number and that number and this form and that form so that wasn't really
379 proper information about how to have my child tested for ADHD, because if he
380 does have it, I would like to do something about it before he gets older. But
381 then I struggled up and down for a few months here and then I decided I am

382 just going to leave it and I put more effort into helping him at
383 home.”(Caregiver, Interview, Phase 3)

384

385 A recurrent sub-theme, often set alongside descriptions of health workers focusing on
386 their child’s long-term health condition symptoms as acute problems, was the notion
387 that caregivers felt marginalised as a resource and active agent in their child’s care,
388 repeatedly describing how they were ignored, their view dismissed, or felt blamed for
389 their child’s health problems.

390 “You know this nurse, sometimes they are very rude because they ask me
391 “Why is your child like this, why is your child underweight” and it's not my fault
392 and my child was sick and I was not giving him food. I was only breastfeeding.
393 They always judge my child, why is your child like this, why is your child like
394 this, why you don't feed your child. But they said to me I must not give the
395 child water; I must not give the child food. You see. But they are rude
396 sometimes, sometimes they are shouting you. If you don't have problem, you
397 see. We come here to clinic because we want the help because the child is
398 sick.” (Caregiver, Interview, Phase 1)

399

400 This sense of being ignored or blamed left caregivers feeling confused about their
401 child’s condition and how to manage it. Yet, caregivers had a clear view of what they
402 wanted to discuss:

403 “... listen to a parent who come, as to what's been going on over the past
404 couple of days, and why am I actually here, because I think that would be a
405 good starting point, to say, ‘ok now do your routine check-up’. I find that to be

406 a little bit of an issue sometimes, because I've been waiting for an hour.”

407 (Caregiver, Interview, Phase 3)

408

409 In contrast to health workers, caregivers often conceptualised quality of care in terms

410 of their level of participation in the consultation, indicating a need for caregivers’

411 voices to be heard and for their knowledge of their child to be a crucial part of

412 determining the best care for their child that goes beyond dealing with the acute

413 presentation on the day.

414

415 However, health workers reported numerous organisational barriers that limited their

416 focus to acute symptoms, including having little time for routine care, limited health

417 worker resources, limited experience in treating children, overcrowded clinics with

418 long waiting times, requirements to prioritise critical questions about the presenting

419 symptom as well as needing to conduct standard weight checks for calculating

420 medication dosages.

421 “Sometimes it takes too long, because I work alone in the room, and I have

422 about 30 patients, sometimes more the 30 that I see in a day, then it takes a

423 while.” (Nurse, Focus group 10, Phase 3)

424

425 Further, health workers even questioned whether it was appropriate to offer more

426 comprehensive care in this setting.

427 “When someone has been sitting here all day and the kid is screaming and they

428 are sick, the mother is not psychologically in a space. I mean you can do a few,

429 like look at the weight and do things that are red flags, that are critical, but you

430 know the mother is not in a space, if she is sitting all day with a sick kid, to do
431 a full comprehensive visit either.” (Doctor, Focus Group 8, Phase 3)

432

433 These problems were compounded by two broader contextual characteristics which
434 shape how facilities deploy their health workers to care for children. First, verticalised
435 care was the predominant pathway for children at all facilities with a limited number
436 of nurses seeing children and each nurse was delegated to specific tasks.

437 “They have two dedicated nurses in child prep [triaging and weighing of
438 children]. We've got someone dedicated for expanded immunization and
439 PMTCT [prevention of mother to child transmission of HIV]. Then Mr
440 ((name)) and Sr ((name)) render the child health.” (Manager, Interview, Phase
441 2)

442

443 Second was the role played by IMCI policy, which nurses felt played a fundamental
444 role in structuring their consultations, underpinned by IMCI checklist documentation.
445 The extent of this was illustrated by several nurses who reported that elements of the
446 IMCI checklist were ingrained in their memory, including checking for danger signs,
447 and ruling out cough, diarrhoea or ear pain.

448 “The IMCI, you know it by heart. You know it asks danger signs, it asks you
449 cough, diarrhoea, ear.” (Nurse, Focus Group 2, Phase 2)

450

451 This method of consulting appeared to set fixed boundaries around the consultation,
452 displaying a habituated practice that limits the possibility of including anything other

453 than a discussion of acute symptoms, growth and feeding which the IMCI sequence
454 follows.

455 “Because for the growth, you will only check when you are down here. Then
456 you check what was my child’s weight. After you start with your symptoms...”

457 (Nurse, Focus Group 1, Phase 1)

458

459 The use of standardised prompting limited the potential for caregivers to interject in
460 the usual checklist process. This reflected our observations of consultations which
461 displayed a predominance of questions designed to efficiently progress through a
462 series of IMCI questions with limited caregiver involvement [12].

463

464 Taken together, the institutionalised focus of paediatric primary care to treat
465 children’s long- term health condition symptoms as acute could be seen to be
466 perpetuated by an interaction between IMCI policy, documentation-driven
467 consultations with limited caregiver involvement and tracking of medical history,
468 limited long-term health condition expertise and belief that children with long-term
469 health conditions did not attend facilities, and a high demand for care with limited
470 health workers resources. It was this organisational and social context into which the
471 PACK Child intervention was introduced.

472

473 **The introduction of PACK Child into paediatric primary care in the Western Cape**

474 ***Expansion of paediatric primary care***

475 Despite reporting a number of organisational barriers which limited their focus to
476 acute symptoms, health workers within all pilot facilities viewed the PACK Child’s

477 training programme and guidance for conditions like HIV, tuberculosis, eczema and
478 asthma as enabling their management and diagnosis of long-term health conditions.

479 “For example, I can say PACK guideline is very helpful, because I'm going to
480 mention like skin symptoms. I used to see a child with a rash, but I couldn't
481 differentiate what is it really, but when I go to the PACK Child, I know I can
482 name it. It has got its specific diagnosis. I know what it is. But when I look at
483 the PACK Child and I look at the child, then I see exactly what is in the PACK
484 Child, and also what kind of treatment. It's very helpful.” (Clinical Nurse
485 Practitioner, Focus Group 7, Phase 3)

486

487 This enablement of health workers practice was often linked to a sense of improved
488 professional competence in being able to more effectively meet children's needs, in
489 this case in their ability to support children aged over five years.

490

491 “So, with PACK Child it's much better, you feel more secure that now you can
492 treat the child until 12/13 years old.” (Clinical Nurse Practitioner, Focus Group
493 4, Phase 2)

494

495 A key component of the PACK Child intervention that health workers viewed as critical
496 in supporting them to make a shift from acute symptom management to a view of the
497 child's treatment over time were the guide's algorithms for guiding diagnosis,
498 treatment and referral (**See Additional file 3 for an example of the algorithms from**
499 **PACK Child**). These views resonated with our observations of the PACK Child training
500 sessions, where, through the medium of case scenarios, PACK Child trainers

501 'scaffolded' the skills of health workers by beginning with simple cases and then
502 increasing the complexity in steps as they developed their competence in using the
503 guide[21].

504

505 However, health workers expressed concerns about translating the skills developed
506 within training sessions into their practice setting [12]. As the following extract from
507 observational fieldnotes indicates, this difficulty led to a doctor reporting that she was
508 hesitant about supporting nurses to prescribe inhaled asthma medication.

509 "In the asthma case presented in the session, the child presented with a
510 recurrent wheeze for five days. The child was given a trial of an inhaler, but
511 the clinicians omitted checking the bronchodilator response before
512 prescribing. The doctor in the training felt that nurses would be prone to abuse
513 inhalers if they were not assessing how previous episodes were managed and
514 the correct diagnostic process followed including checking bronchodilator
515 response." (Field notes, observation of training session 7: Long-Term Health
516 Conditions, Phase 3)

517

518 Here we see an interaction between the change that PACK Child is attempting to effect
519 through guidance and training on how to treat long-term conditions, a primary care
520 practice not habituated to check and track children's medical history, an
521 institutionalised focus to treat symptoms of long-term problems as acute conditions,
522 and doctor's perception that nurses would be 'prone to abuse' prescribing inhalers.

523

524 Despite this difficulty, the shift to enquiring about children’s medical history,
525 considering root causes of their child’s condition, and tracking the course of long-term
526 conditions, was appreciated by caregivers.

527 “What I say today is different because they never give us... you know when
528 you are sick, they have to find the root of that, sometimes to go through
529 what could be the cause of this, but they normally do a shortcut thing,
530 especially here at the clinic. They just do the shortcut. So sometimes I see it
531 keeps the baby, the baby keeps on suffering with the same thing because
532 they never found the root of that. That's what I normally observe for
533 myself.”(Caregiver, Interview, Phase 3)

534

535 This view of getting to the root cause was linked to extensive questioning that went
536 along with using the PACK Child guide.

537

538 “Because it’s the third time. Sometimes you go to the doctor then the doctor
539 says, just that one thing. Like this ((PACK Child guide)) was now nice.
540 Everything was asked, and they have the patience to explain everything. And
541 feel free to explain everything. Sometimes you go to the doctor you just cut
542 you off because they rush you to get to another patient. Then that happens
543 all the time.” (Caregiver, Interview, Phase 3)

544

545 Some caregivers described opportunities for them to explain their story and that
546 health workers explained what was happening, indicating that they felt central to the
547 decision-making process.

548 “Yeah, the way the doctor handled it. It was nice for me, because just for the
549 fact that I can talk a lot of things ask lot of things. He come for his nose, but I
550 could ask for this... she saw the marks of the eczema, almost like eczema.”

551 (Caregiver, Interview, Phase 3)

552

553 However, the capacity for health workers to routinely provide this level of questioning
554 was viewed as problematic by several health workers, despite caregivers noticing an
555 increase in the depth of questioning and more opportunities for them to express
556 themselves. Our observations of the PACK Child guide being used in consultations
557 were that the perspectives of caregivers were rarely elicited[12]. Health workers
558 explained that, because of the need to enquire more broadly in following PACK Child
559 algorithms, as well as those of IMCI if the child was under 5 years, some questions and
560 elements of algorithms were often bypassed. Instead health workers selected only
561 what they considered was most appropriate or necessary in each consultation.

562

563 “Especially in clinics where we are strapped for time or short staff. Like today
564 we have one sister doing all the sick children walking into the clinic. So, if she
565 has to go through each little step, which is better, but she won't be able to see
566 all the children. So, we tend to just skip to the problem, and ignore some of
567 the routine.” (Doctor, Focus Group 10, Phase 3)

568

569 A frequently reported challenge for health workers in completing routine and
570 symptom-based activities, as well as involving the caregiver and child in the

571 consultation process, were the demands of completing Integrated Clinical Stationery
572 alongside PACK Child.

573 “If you look at the paperwork, you write down on your IMCI form, you have to
574 write down on your clinical as well, you have to write your script. We supposed
575 to write in the child’s book ((Road to health book)), that we must be honest
576 that is not done. You see how many different documents we need to write
577 on. On top that, you starting to mix your medication, you are starting do all
578 this. If you look at it, you more busy writing. You more focusing on writing
579 instead of focusing on the child.” (Nurse, Focus Group 1, Phase 1)

580

581 ***Teamwork, patient flow and referrals***

582 PACK Child was reported to have an impact on how health workers worked together
583 and the referral of children. ENs, pharmacists, PNs and CNPs noted that the training
584 helped to delineate different roles and responsibilities so that tasks were shared and
585 enabled greater collaboration between health workers. This included a
586 reconfiguration of which problems different cadres of health workers needed to
587 manage, advise or oversee.

588 “What I have noticed is that she is always consulting, she is knowledgeable,
589 almost to her utmost best of what is in PACK. But I have not seen her coming
590 to me with a challenge she cannot go beyond. Even those kids that are referred
591 to the emergency section. Sometimes, she doesn’t even come to me. She picks
592 up the problem for the emergency and she send them without my
593 intervention.” (CNP, speaking about an EN, Focus Group 2, Phase 2)

594

595 The “health system strengthening session”, which primarily focused on the flow of
596 children through the clinic, facilitated changes in some facilities including one nurse
597 deciding to weigh all children in consultation rooms rather than as a separate activity
598 carried out by enrolled nurses. Some facilities reported that triaging of children was
599 streamlined, and nurses felt equipped to identify children needing referral within the
600 clinic.

601 “The other thing for triaging of the patients, the babies they really get
602 emergency care much quicker, also their routine screening is so much easier
603 with the length mat is there, everything is there. So, the staff have really
604 benefitted from the training.”(Manager, Interview, Phase 2)

605

606 One of the training sessions was dedicated to embedding correct monitoring and
607 interpreting growth in children. Nurses reported increased confidence in interpreting
608 growth charts and alongside PACK Child screening tools they reported that they
609 identified more children with problems that required referral. For this nurse, this was
610 specifically in relation to identifying overweight children.

611 “We picked up lots of obese babies, of which now we are referring to the
612 dietician and the dietician now has something to do. Before we were only
613 picking up children with malnutrition. We didn't consider the obese, now we
614 know when to refer, we know which weight is expected of each child, so we
615 know when to refer. So now really it is of help.” (Nurse, Focus Group 2, Phase
616 2)

617 ***Eliciting and responding to psychosocial problems***

618 According to health workers, use of PACK Child in consultations led to more
619 psychosocial risk issues being identified in consultations, sometimes resulting in
620 referral and resolution of these disclosures.

621 “It prompted you now with that section to ask for social problems. I also had
622 one child: she didn't have an ID. Mum didn't have an ID that's why she didn't
623 register the child, and she can't apply for a grant, and I helped her. So that
624 section is really good. It prompts you to ask those questions. In the past we
625 overlooked it.” (Nurse, Focus Group 4, Phase 2)

626

627 However, our observations of consultations revealed that routine psychosocial risk
628 questions, delivered in an embedded checklist approach to consultations were framed
629 in a way to rule out problems instead of encouraging disclosure [12]. Furthermore, in
630 some cases, where disclosures were made, the health worker could be seen to
631 minimise its importance or not address the problem reported by caregivers. For one
632 health worker the lack of expertise within facilities was a key reason why psychosocial
633 issues are not fully addressed.

634 “We have a problem with psychiatrist. If you get the problem of abuse, then
635 you must send the child to the hospital, because we don't have a person here
636 every day, that's also a problem. Sometimes when you book the people, for
637 that then the guy cancels his visit.” (Nurse, Focus Group 9, Phase 3)

638

639 **Discussion**

640 The PACK Child intervention was developed in part to expand the scope of practice
641 provided by IMCI, by including provision of paediatric primary care from under-fives
642 to children aged up to 13 years and those living with long-term health conditions[10].
643 However, this study illustrates the challenges of implementing PACK Child to change
644 an existing primary healthcare system that focuses on acute symptoms in a
645 verticalised pathway of care with severe time limitations. This challenge is
646 compounded by consultations that are often driven by complex and multiple demands
647 for documentation completion, reducing meaningful interaction with the caregiver
648 and child. These challenges need to be addressed in seeking to provide care for acute
649 and long-term health conditions of children that is comprehensive and person-centred
650 rather than nurse and documentation centric.

651

652 Caregivers in the study emphasised that the focus of paediatric primary care is on the
653 primary presenting symptom, with little reference to past medical history resulting in
654 repeated visits for the same presenting symptom. These perspectives were
655 corroborated with findings of observations of consultations in this study [12] and with
656 perspectives of health workers who reported an acute symptom focus of care and a
657 preference for following IMCI from memory or according to a checklist. These findings
658 also resonate with similar findings from a study of health care worker adherence to
659 IMCI in Tanzania where nurses delivered the IMCI protocol from memory [22] and a
660 study evaluating health care worker adherence to IMCI guidelines in South Africa,
661 which identified that less than 2% of health care workers referred to IMCI guidelines
662 during a paediatric visit [14].

663

664 Caregivers' perceptions of paediatric primary care as non-participatory and
665 positioning them as passive recipients of care was compatible with how health
666 workers viewed consultations as dominated by completing required documentation.
667 These findings are in keeping with a study in South Africa, which evaluated the change
668 in quality of care provided to sick children as a result of routine implementation of
669 IMCI which showed limited caregiver knowledge regarding medication or when to
670 return to the facility [13].

671

672 These insights inevitably reveal the current state of paediatric primary care in the
673 facilities included in this study, which could be generalisable to the broader continent
674 where IMCI is also institutionalised within primary healthcare facilities and frame the
675 way in which children are treated. This has unknowingly impacted on which questions
676 are prioritised in a consultation and evidence from this study shows that the demands
677 of completing the correct documentation drives this process rather than the caregiver
678 and the child.

679

680 Our findings indicate that PACK Child has improved clinical knowledge and practice in
681 the diagnosis and management of children, identification of long-term health
682 conditions, and management of children above five years of age where previously
683 guidance was limited. In some facilities it also catalysed more streamlined triaging and
684 appropriate referrals, indicating the potential of PACK Child for enhancing the ability
685 of clinicians to treat a wider range of conditions within facilities whilst also reducing
686 the burden on emergency care services. However, in order for PACK Child

687 implementation to be optimised within facilities, paediatric primary care needs
688 significant restructuring to support its implementation at scale. There is a need for
689 district and sub-district departments of health to prepare the health system through
690 managerial buy-in, to support a different view of caring for children over time,
691 changing prescribing regulations for professional nurses and to re-assess
692 documentation[12], patient flow and referral pathways. This could be supported by
693 refining the structure of the PACK Child guide to further improve use and facilitate a
694 smoother consultation flow, to increase the focus on ongoing care of the child and
695 identification of psychosocial issues. Rephrasing of parts of the PACK Child guide could
696 facilitate greater involvement of caregivers within consultations.

697

698 **Strength and Limitations**

699 This process evaluation has included the perspectives of caregivers as well as health
700 workers, which are rarely reported, providing critical insights on the current state of
701 paediatric primary care in low income settings of the Western Cape, South Africa.
702 However, partly as a consequence of the interview schedule, caregivers and health
703 workers tended to separate out their perspectives of the wider paediatric context
704 from their views of PACK Child which we then had to reintegrate through our analysis.
705 However, the breadth of data we obtained from observations of training sessions,
706 interviews and focus groups, which also follow on from our analysis of consultation
707 data[12], provided opportunities for triangulating and extending our interpretations
708 of the relationship between different contextual features and delivery of PACK Child.
709 The perspectives of caregivers and health workers therefore add an important
710 contribution for understanding the potential of PACK Child to fill important gaps in

711 service provision. Such understanding of the interaction between the wider primary
712 care context and implementation of PACK Child, generated from working inductively
713 with different data, resonates with broader theoretical models of behaviour, such as
714 Bronfenbrenner's socio-ecological model, as well as Implementation Science
715 frameworks (e.g. Consolidated Framework for Implementation Research)[23], thereby
716 providing a platform for future research to investigate how best to optimise and scale-
717 up implementation across a diversity of primary care settings.

718

719 Caregiver interviews were often conducted in facility waiting rooms either before or
720 following the child's consultation, which limited the ability to have extended private
721 discussions with caregivers. Although we took steps to ensure interviews with
722 caregivers were conducted in spaces where they couldn't be overheard, it is possible
723 that this affected what caregivers reported. Children were often present during the
724 interviews, nineteen were aged over 5 years and their presence may have influenced
725 what caregivers discussed during the interviews. Sampling of caregivers and children
726 was also limited by those who attended on the day, which may have restricted the
727 broader view of other caregivers with different problems who may have attended on
728 different days and attended the clinic regularly. Our findings are also limited by
729 needing to collect data both during and immediately following completion of the PACK
730 Child training programme, which allowed little time for the intervention to be
731 embedded into everyday practice. We tried to address this in Phase 2 and 3 by
732 conducting interviews at the end of the training programme. The generalisability of
733 this study was that it was conducted in the Western Cape Province of South Africa,
734 which is arguably better resourced than other provinces in the country. Despite this,

735 IMCI policy is pervasive across South Africa and other LMICs with policy targets to
736 reduce mortality in under 5s, underpinned by provincial documentation that attempts
737 to standardise care of these children. The identification of an institutionalised
738 orientation to view symptoms of long-term problems as acute conditions is likely
739 transferrable to other settings and maybe exacerbated where the tensions between
740 limited skilled resource and demand for care are more acute.

741

742 **Conclusion**

743 The Sustainable Development Goal aim to significantly reduce child and infant
744 mortality by 2030 using IMCI policy has shown some promise, however without
745 significant changes at a health systems level this target may be unachievable. PACK
746 Child offers support for this process by aiming to improve clinical skills for managing
747 the broader needs of children, including long-term health conditions, strengthening
748 teamwork and appropriate referral, and the identification of psychosocial problems.
749 However, maximising the potential of PACK Child requires paediatric primary care to
750 re-orientate from an acute episodic approach of the child, to the broader picture of
751 the child's health over time.

752 **List of Abbreviations**

753 Clinical Nurse Practitioner (CNP); Enrolled Nurse (EN); Enrolled Nursing Assistant
754 (ENA); Focus Group Discussion (FGD); Human Immuno-deficiency Virus (HIV);
755 Integrated Management of Childhood Illness (IMCI); Knowledge Translation Unit
756 (KTU); Lower -income country (LIC); Practical Approach to Care Kit (PACK);

757 Professional Nurse (PN); Road to Health Booklet (RtHB); Tuberculosis (TB); World
758 Health Organisation (WHO)

759 **Supplementary Information**

760 **Additional file 1(pdf):** Semi-structured Interview Guide with Caregivers-data
761 collection instrument for interviews with caregivers.

762 **Additional file 2(pdf):** Semi-Structured Focus Group Discussion Guide with Health
763 workers-data collection instrument for focus groups with health workers

764 **Additional file 3(pdf):** PACK Child Algorithm-example of PACK Child symptom page.

765

766 **DECLARATIONS**

767 **Ethical approval and consent to participate**

768 Ethics approval was obtained from University of Cape Town Human Research Ethics
769 Committee(568/2017), City of Cape Town Research Ethics Committee (7876) and the
770 Western Cape Provincial Health Research Committee (WC_201709_011). The key
771 ethical principles of voluntary and informed participation, confidentiality and safety
772 of participants were used in all researcher and participant interactions. Written
773 informed consent for interviews and observations was obtained from all health
774 workers, caregivers, children and trainers. Where participants were children (under
775 16 years old), written informed consent was obtained from caregivers (parents or
776 guardians). Children over seven years old were asked to give written assent to their
777 participation. Caregivers and children were asked to consent to interview on the day
778 they attended the clinic. All participants were provided with written information

779 about the research, informed that their participation was voluntary and that they
780 could withdraw from participation at any time.

781 **Consent for Publication**

782 Not applicable.

783 **Availability of data and materials**

784 This is a process evaluation mirroring the context of paediatric primary care in the
785 Western Cape, South Africa. Making the full data set publicly available could
786 potentially be a breach to the privacy that participants were promised upon request
787 of participation. In addition, our ethics approval from the Western Cape Department
788 of Health, the City of Cape Town and University of Cape Town's Human Research
789 Ethics Committee was granted based on the anonymity of the individual consenting
790 to participate. Due to these conditions, the authors are unable to make the full
791 transcripts available to a wider audience. Excerpts of specific segments of the text
792 will be reviewed for any potential identifying details and made available to
793 researchers or reviewers who complete a data sharing agreement and abide by strict
794 confidentiality protocols. Data requests may be sent to the corresponding author.

795 **Competing interests**

796 We have read and understood BMC Paediatrics policy on declaration of interests and
797 declare that Lara Fairall, Eric Bateman, Robyn Curran, Makhosazana Lungile Simelane,
798 and Sandra Picken are employees of the KTU. Professor Bateman reports personal
799 fees from Novartis, Menarini, ALK, Sanofi Regeneron, Boehringer Ingelheim and
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809 analysis, interpretation of data, writing of or final decision to publish the manuscript.

810

811 **Authors' Contributions**

812 All authors contributed to the conceptualisation of the research and contributed to
813 writing the manuscript. LF, EB, RVC, MB, JM and RC designed the process evaluation
814 protocol. MLS and SCP led the development of the PACK Child training intervention.
815 RVC led the development of the content of the PACK Child guide. JM and RC collected,
816 analysed and interpretation of all data. RC drafted the manuscript and all co-authors
817 edited and commented on revised drafts. All authors approved the final draft for
818 submission. All authors agree to be accountable for all aspects of the work in ensuring
819 that questions related to the accuracy or integrity of any part of the work are
820 appropriately investigated and resolved.

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