

PACK Child: the development of a practical guide to extend the scope of integrated primary care for children and young adolescents

Sandy Picken,¹ Juliet Hannington,¹ Lara Fairall,^{1,2} Tanya Doherty,^{1,3} Eric Bateman,¹ Mark Richards,⁴ Camilla Wattrus,¹ Ruth Cornick^{1,2}

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¹Knowledge Translation Unit, University of Cape Town Lung Institute, Cape Town, South Africa

²Department of Medicine, University of Cape Town, Mowbray, South Africa

³South African Medical Research Council, Cape Town, South Africa

⁴Department of Paediatrics and Child Health, Somerset Hospital, University of Cape Town, Green Point, South Africa

Correspondence to

Dr Sandy Picken;
sandy.picken@uct.ac.za

ABSTRACT

Pioneering strategies like WHO's Integrated Management of Childhood Illness (IMCI) have resulted in substantial progress in addressing infant and child mortality. However, large inequalities exist in access to and the quality of care provided in different regions of the world. In many low-income and middle-income countries, childhood mortality remains a major concern, and the needs of children present a large burden upon primary care services. The capacity of services and quality of care offered require greater support to address these needs and extend integrated curative and preventive care, specifically, for the well child, the child with a long-term health need and the child older than 5 years, not currently included in IMCI. In response to these needs, we have developed an innovative method, based on experience with a similar approach in adults, that expands the scope and reach of integrated management and training programmes for paediatric primary care. This paper describes the development and key features of the PACK Child clinical decision support tool for the care of children up to 13 years, and lessons learnt during its development.

CURRENT LANDSCAPE OF PRIMARY CARE FOR CHILDREN

The three overarching objectives of the *2016–2030 Global Strategy for Women's, Children's and Adolescents' Health* are Survive, Thrive and Transform.¹ These align with the United Nation's Sustainable Development Goals,² which envisage the highest standards of physical and mental well-being for these vulnerable groups. Healthcare, and specifically universal access to care, is intrinsic to achieving these goals. However, large inequalities exist in access to and the quality of care provided in different regions of the world.³ In many low-income and middle-income countries (LMICs), childhood mortality remains a major concern, and the needs of children present a large burden on primary care services. Innovative approaches are required

Summary box

- ▶ Child mortality has significantly improved, yet in 2015, 5.9 million children under 5 years died, mostly from preventable conditions.
- ▶ WHO's Integrated Management of Childhood Illness (IMCI) strategy, scaled up across low-income and middle-income countries has undoubtedly contributed to significant reductions in under-five mortality and morbidity, but gaps remain: the child over 5, long-term health conditions and well-child care.
- ▶ The Practical Approach to Care Kit (PACK) Child guide has the potential to expand on the gains of IMCI by blending preventive and curative care and providing algorithmic approaches to symptoms and long-term health conditions for the child from birth up to 13 years.
- ▶ PACK Child has the capacity to clarify clinician scope of practice and referral prompts to facilitate task sharing and expansion of the team of primary care clinicians delivering child care.

to improve the capacity of services and quality of care offered.⁴

For the last 20 years, primary healthcare for children under 5 years in LMICs has been shaped by the Integrated Management of Childhood Illness (IMCI) strategy, developed by WHO in collaboration with Unicef.^{5 6} The strategy pioneered a syndromic approach to the sick child and uses an integrated case management approach to promote timely administration of life-saving empirical treatments based on a classification system rather than diagnoses. The generic IMCI guideline requires adaptation for in-country needs, often with external technical assistance, and training involves an intensive, 11-day, skills-based course. Implemented in over 100 LMICs,⁷ a foremost consideration in its development was the need to address the skills gap among frontline health workers

in managing common childhood illnesses by providing a practical, easy-to-follow algorithmic approach to case management.⁸⁻¹¹

The results achieved with IMCI and lessons learnt are reported in several reviews, surveys and multi-country evaluations.^{10 12-17} Implementation challenges include inadequate local adaptation and infrequent revision of the guideline, insufficient staff training and supervision, patchy uptake and inconsistent use of the guideline in primary care facilities. In response, the programme incorporated a section on neonates, occasional updating, greater use of the syndromic approach, a focus on antibiotic stewardship, revised training and supervision methods, community health worker involvement and health system coordination.¹² There remain aspects that are not addressed: guidance for children 5 years and older, management of chronic diseases, and more complete integration of curative and preventive measures, including care of the well child. Furthermore, there is a need for mentoring of clinicians in LMICs to adapt and regularly update the guideline to ensure it remains relevant, and for a training programme that ensures continuous learning, in response to the frequent changes in content in such 'living' documents.

Over the past 18 years, the Knowledge Translation Unit (KTU) of the University Cape Town Lung Institute (South Africa), a health systems intervention unit, has investigated and developed evidence-informed methods to strengthen primary care service delivery in underserved communities. The Practical Approach to Care Kit (PACK) Adult programme was designed to support health workers to deliver policy-aligned, comprehensive and integrated primary care for adult patients.^{18 19} The programme comprises four pillars: (1) a clinical decision support tool (the PACK guide),²⁰ (2) a training strategy,²¹ (3) a primary care health system strengthening component and (4) monitoring and evaluation.

PACK and its predecessors have been implemented, scaled up and sustained across South Africa, with over 30 000 health workers trained since 2007. Four pragmatic randomised controlled trials evaluating these interventions showed modest but consistent improvements in quality of care, health outcomes and healthcare use,²²⁻²⁵ with parallel qualitative evaluations reporting improved job satisfaction, work morale and a sense of empowerment.^{26 27}

The PACK training strategy, described in detail in another paper in this Collection, employs three key elements that allow for sustainable scale-up²¹: an educational outreach training,²⁸ a cascade model of implementation and support delivered by government-employed trainers, and a training methodology underpinned by adult education principles.

The KTU has mentored the in-country localisation²⁹ of PACK Adult and its precursors in Botswana,³⁰ Malawi,³¹ Brazil,³² Nigeria³³ and Ethiopia.³⁴

Strong motivation for developing a version of PACK for children came from doctors and nurses who use PACK

Adult daily in public sector primary care, and from paediatricians who recognised the need to improve primary care services both to ensure greater access to quality primary care for children and encourage more appropriate referral patterns to higher levels. Both pointed to the need for an expanded scope of practice including children up to the age of 13 years. This paper describes the development of the first pillar, the PACK Child guide, its key features and lessons learnt during its development.

Importantly, the PACK guide is not a text book but rather a clinical decision support tool designed for point-of-care use during clinical encounters. Although broadly falling under the umbrella term of clinical practice guidelines, the term 'guide' is preferred to distinguish it from 'guidelines' developed with standard evidence-based methodologies.²⁰ The terms 'clinician' and 'user' of the PACK guide describe a healthcare professional who manages patients in a primary care setting. This may include several cadres of staff; doctors, nurses and, in some settings, physician assistants and community-extension health workers. 'Local' and 'localisation' refer to the context or region for which the guide was developed, in this instance, for the primary care clinics of Western Cape Province, South Africa.

OBJECTIVES IN DEVELOPING PACK CHILD GUIDE

We aimed to provide a guide with the following features: modelled on experience gained in the development of PACK Adult; suitable for use during primary care clinician consultations with children from birth up to 13 years; comprehensive in its coverage of reasons for attendance; fully integrated to enable cross-referencing for comorbidities; evidence-based, up to date, and in both book and electronic form.

DEVELOPMENT PROCESS

The steps in the development of PACK Child were similar to those used for PACK Adult and drew on relevant elements from international norms and standards for trustworthy guideline development.^{20 35 36} The decision to develop the PACK Child guide in one province was based on experience in developing the PACK Adult guide; that close and sustained engagement with expert contributors and clinicians in one region provides a workshop for developing algorithms and checklists, capturing the phronesis that underpins the delivery of clinical care. This experience captured in the first version of PACK Child will be carried over into more generic versions of the guide.²⁰

Development began January 2015 and the first version was completed in December 2017. Steps in development are presented in figure 1 and included the following:

High-level approval, funding and formation of a Guideline Development Advisory Group

The first step was to obtain high-level policy-maker endorsement and support for the project from the

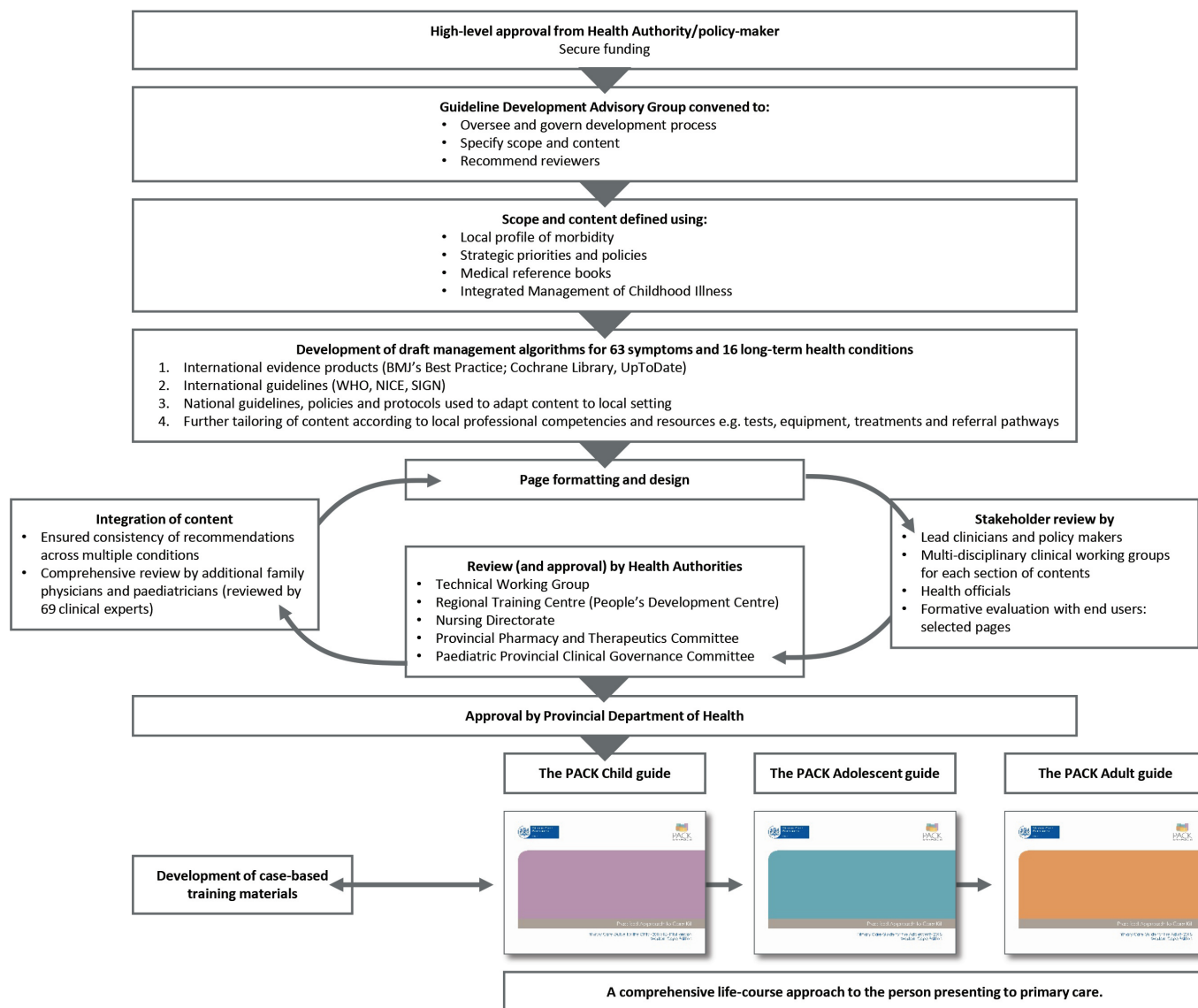


Figure 1 Steps in the development of the PACK Child clinical decision support tool. NICE, National Institute for Health and Care Excellence; PACK, Practical Approach to Care Kit; SIGN, Scottish Intercollegiate Guidelines Network.

jurisdiction for which it was intended, the Western Cape government. The Western Cape Department of Health appointed members to form a Guideline Development Advisory Group (GDAG). This group comprised local child health clinicians (primary care physicians, paediatricians, nurses) and policy-makers who oversaw and guided the 2-year development process, assisted in defining the scope and content of the guide, and facilitated collaboration with potential peer reviewers. A specialist in the National Department of Health Child and Youth Health Directorate attended the first GDAG meeting and followed the development process.

Funds for the project were obtained from The Children's Hospital Trust, an independent public benefit organisation that supports the delivery of healthcare for children, primarily through the Red Cross War Memorial Children's Hospital. In 2011, the Trust expanded its fundraising reach to other levels of health services. No

funding from commercial enterprises, including pharmaceutical companies, was accepted.

Ethics approval was not required for the development process, as it was not conducted as part of a research study.

Confirming the scope and content of PACK Child

When deciding on the scope of PACK Child, the GDAG considered the opinions, knowledge and experience of local clinicians, available child morbidity statistics in the Western Cape, as well as findings from a cross-sectional survey of reasons for paediatric primary care encounters across four provinces in South Africa, performed in 2010.³⁷ The scope of content of the South African Standard Treatment Guidelines was also considered.³⁸ Consensus decision-making led to PACK including approaches to 63 common symptoms and 16 priority long-term health conditions and that it should be directed

towards children from birth up to age 13 (table 1). This content set is largely generalisable to most primary care settings although additional or adapted content is likely to be needed to address local disease profiles when localising for other settings.

A desk review was conducted of current local and international guidelines and online resources for the care of children at primary healthcare level relevant to LMICs. No single resource was found to address the objectives described above or to be suitable for adaptation.

Development of draft management algorithms

Based on the findings of the desk review, selected resources were consulted to develop each management algorithm. These resources included current international clinical practice guidelines from WHO, the National Institute for Health and Care Excellence, Scottish Intercollegiate Guidelines Network, the American Academy of Pediatrics and evidence synthesis products—BMJ's Best Practice, UpToDate and Cochrane Library reviews. As most of the evidence-based clinical recommendations appearing in these resources were developed primarily for high-income country settings, each recommendation in PACK Child, though evidence-informed, had to pass the tests of availability of resources and feasibility within South Africa. Further tailoring ensured alignment to latest Western Cape health policies and protocols and harmonisation between pages to avoid conflicting advice. Given the extensive use of IMCI in South Africa,¹⁵ we ensured close alignment with IMCI content. Table 1 compares the content of PACK Child and the 2014 South African version of IMCI.³⁹

Page formatting and design

Draft pages of the PACK Child guide were prepared, employing the standard PACK book format, layout and colour-coding to improve recognition and ease of use.²⁰

Stakeholder review

Draft pages were subjected to stakeholder review by specialist clinicians, allied health professionals, doctors and nurses working in primary care and school health services, patient advocates and policy-makers during clinical working group sessions, and through individual peer review. Separate clinical working groups considered 10 topics: the well-child assessment, nutrition, respiratory, neurodevelopment, mental health, musculoskeletal conditions, parenting, tuberculosis, HIV and palliative care. In addition, a group of eight primary care social workers reviewed criteria for referral to social services. Consultation with health officials developing clinic stationery for child care ensured alignment of the guide with proposed patient flow processes.

Two 'super-user' groups of IMCI-trained nurses trialled two sections of the guide during primary care consultations with children over a 2-week period. Focus groups were held at the end of this period to obtain feedback. A

key consideration was whether clinical decision nodes in the algorithms were clear and easy to use. The response was positive and reassuring, prompting only minor adjustments and clarifications. This feedback informed the use of specific terminology, for example, 'brassy cough', used to describe a croupy cough, was changed to 'barking cough'. An example of strongly positive feedback concerned the clarity of recommendations for prescribing an antibiotic.

Once complete, the full guide was sent for review to 69 clinical experts from various disciplines. They were requested to review particular sections within their field of expertise, with special attention to how this was embedded within the whole guide. Following Shekelle *et al's* model, an open and systematic process was adopted for receiving and reviewing comments in the form of a database.⁴⁰ In total, 410 comments were received. None suggested removal of content but rather, refinements. The iterative correspondence with reviewers led to finalisation of the guide within 3 months. This transparent methodology may have provided reassurance to key stakeholders and facilitated their endorsement of the guide.

Approval by health authorities

The final step involved obtaining comments and approval from local health authorities, governance structures and committees. In the Western Cape, approval had to be obtained from a Technical Working Group, which included operational, monitoring and evaluation expertise, the Regional Training Centre for nurses and the Nursing directorate. Furthermore, a comprehensive medicine list was prepared for the Provincial Pharmaceutical and Therapeutics Committee, whose authorisation was required for the use and confirmation of dose, duration and alignment with the South African Essential Medicines List.³⁸ The latter informed decisions on which cadre of clinic staff was authorised to prescribe each medication.

Final approval of the PACK Child guide was obtained from the Paediatric Provincial Clinical Governance Committee and the Head of the Western Cape provincial Department of Health.

FEATURES OF PACK CHILD

The PACK Child guide is a comprehensive, integrated resource that uses familiar design features from PACK Adult,²⁰ such as easy-to-read algorithms and standardised approaches to routine care, to provide a 'one-stop' source of guidance for primary care of the child and young adolescent.

Figure 2 showcases examples of the various formats of PACK Child pages: symptom-based approach (figure 2A), standardised approach to routine care (figure 2B) and step-by-step illustrated guidance (figure 2C).

Prompts for recognising children requiring urgent or elective referral are designed to encourage efficient use of

Table 1 Comparison of the content of PACK Child and 2014 South African version of IMCI,³⁹ arranged according to page sections in PACK Child

PACK Child	Covered in IMCI	PACK Child	Covered in IMCI
Symptom pages		Routine care pages	
Assess and manage child's fluid needs	Yes	Help baby breathe at birth	Yes
Manage glucose	Yes	Assess and interpret growth	Yes
Fever	Yes	First assessment of the newborn	Limited
Pallor or anaemia	Yes	Baby <2 months old: routine care	Limited
Wheeze	Yes	Child ≥2 months old: routine care	Limited
Diarrhoea	Yes	Screen the child in the prep room	No
Seizures/fits	Limited*	Routine visit (schedule)	No
Eye/vision symptoms	Limited	Long-term health condition pages	
Ear symptom/difficulty hearing	Limited	Breast feeding	Yes
Mouth and throat symptoms	Limited	Formula feeding	Yes
Cough and/or breathing problems	Limited	Eating	Yes
Jaundice	Limited	Poor growth in the child <2 months old	Yes
Skin symptoms	Limited	The underweight child	Yes
Painful skin	Limited	Not growing well/growth faltering	Yes
Generalised itchy rash	Limited	Acute malnutrition	Yes
Localised itchy rash/itch with no rash	Limited	The child with a close TB contact	Yes
Generalised red rash	Limited	Check for TB	Yes
Lumps and bumps on skin	Limited	TB: routine care	Yes
Crusts, flaky skin and ulcers	Limited	TB medication	Yes
The emergency child	No	HIV: diagnosis	Yes
Cardiopulmonary resuscitation	No	HIV: routine care	Yes
Choking	No	Monitor the child with HIV	Yes
Decreased level of consciousness	No	Start ART	Yes
The injured child	No	Medication dosing chart	Yes
Fracture/s	No	Prevention of mother-to-child transmission of HIV	Yes
Bites and stings	No	Eczema	Limited
Burns	No	Chronic malnutrition	No
The blue child	No	Overweight	No
Poisoning	No	The child with a drug-resistant TB contact	No
The inconsolable crying/irritable child	No	Post-exposure prophylaxis	No
Headache	No	The child with allergy	No
The tired or lethargic child	No	Asthma	No
Lumps/swellings in neck, axilla or groin	No	Epilepsy	No
Nose symptoms	No	Bronchiectasis	No
Face symptoms	No	Known heart problem	No
Gum/teeth symptoms	No	Chronic arthritis	No
Recurrent respiratory symptoms	No	Cerebral palsy	No
Abdominal symptoms	No	Down syndrome	No
Vomiting/refluxing	No	Life-limiting illness: routine palliative care	No
Constipation	No	Charts	
Anal symptoms/worms	No	Weight-for-age chart: girls	Yes
Genital symptoms	No	Weight-for-age chart: boys	Yes
Urinary symptoms	No	Height-for-age chart: girls	Yes
Back pain	No	Height-for-age chart: boys	Yes

Continued

Table 1 Continued

PACK Child	Covered in IMCI	PACK Child	Covered in IMCI
Arm or hand symptoms	No	Weight-for-height charts: girls and boys	No
Leg symptoms/limp/walking problems	No	BMI chart: girls	No
Foot symptoms	No	BMI chart: boys	No
Joint symptoms	No	Weight-for-age chart: cerebral palsy (GMFCS IV)	No
Altered skin colour	No	Weight-for-age chart: cerebral palsy (GMFCS V)	No
Nappy rash	No	Useful tools for clinicians	
Hair and scalp symptoms	No	Protect yourself from occupational infection	No
Nail symptoms	No	Protect yourself from occupational stress	No
Suspected child abuse/neglect	No	Communicate effectively	No
The stressed, miserable or angry child	No	Prescribe rationally	No
Behaviour problems	No	Medication dosing tables	No
Communication problem	No	Helpline numbers	No
Not moving or sitting properly	No	Quick reference chart	No
School problems/bullying	No		
Sleep problems	No		
Parenting difficulty	No		

ART, antiretroviral therapy; BMI, Body Mass Index; IMCI, Integrated Management of Childhood Illness; PACK, Practical Approach to Care Kit; TB, tuberculosis; GMFCS, Gross Motor Function Classification System.

*Limited—these topics are covered to a limited extent in the 2014 South African version of IMCI.

services, and timeous access to higher levels of care. Indications, pathways and timeframes are clearly specified.

Medications are colour-coded according to prescriber, which may differ by indication. For example, prednisone appears in three different colours in the guide; a single dose may be prescribed by an IMCI-trained nurse for urgent treatment of croup-related stridor, a nurse practitioner or doctor may prescribe a 5-day course for an asthma exacerbation and only a doctor may prescribe prednisone for a child with Bell's palsy.

It is hoped that PACK Child will improve the delivery of primary care for children by:

1. Providing an extended scope of content (table 1) including the needs of children over 5 years old.
2. Actively guiding the clinician to integrate curative and preventive care at every visit.
3. Offering an approach for the well-child visit.
4. Allowing for the management of multiple presenting symptoms.
5. Providing an approach for routine care of long-term health conditions.
6. Facilitating task sharing by clarifying roles and responsibilities, referral criteria and prescribing levels.

Similarities and differences of PACK and IMCI

Table 2 uses clinical scenarios to practically demonstrate how the PACK features intend to reinforce the approach of IMCI and build on its limitations.

LESSONS LEARNT DURING THE DEVELOPMENT OF PACK CHILD

The concept of developing a PACK Child guide concerned some stakeholders, particularly around its impact on the

use of IMCI, which is firmly embedded in clinics in the Western Cape. However, these concerns abated as development progressed and it became evident that, rather than undermine IMCI, PACK Child built on the foundations of integrated care laid by IMCI.

The clinical working groups noted system issues relating to IMCI implementation: in many Western Cape facilities, one IMCI-trained nurse was responsible for managing almost all children attending that facility. This sometimes limited the capacity of the clinic to offer care, further exacerbated by the uneven distribution of staff and curative and preventive care services across the region. This in turn was reported to influence referral patterns to doctors and hospitals. The hope was expressed that by training all categories of clinician in the care of children together, capacity might be increased and referral patterns improved. This inclusive approach to training ensures team members in the same clinic are aware of the others' roles and responsibilities and may help facilitate task sharing between nurses and doctors. The inclusive PACK training may also ensure a pharmacist is kept up to date with approved treatments and doses and corresponding prescriber authorisation.

The active involvement in the development of PACK Child of primary care doctors and nurses who often see around 60 children per day in stressful conditions served to sharpen recommendations on the basis of feasibility, in many instances tempering the advice and opinions of specialists. This highlighted the practical challenge of successfully integrating preventive services into curative consultations and resulted in further refinement of the routine care pages and influenced the structure of the PACK Child training curriculum.

A

Red box to recognise the child needing urgent attention

Nose symptoms

One symptom per page

Give urgent attention to the child with nose symptoms and any of:

- Newborn unable to breathe through nose
- Unable to feed because of blocked nose
- Head trauma with watery discharge from nose

Refer urgently.

Approach to the child with nose symptoms not needing urgent attention

Blocked/running nose or persistent sneezing
Ask about duration and associated symptoms:

See throat or fever + If age > 6/5?	Headache worse on bending forward, pain over cheeks	Recurrent sneezing or itchy blocked nose rubbing nose most days for > 4 weeks	Only one nostril affected	Persistent sneezing and poor sleep	Bleeding nose
Any of temperature > 38°C, chills, flu-like symptoms					
Common cold likely		Sinusitis likely	Allergic rhinitis likely	Foreign body likely	Obstructive sleep apnoea likely
<ul style="list-style-type: none"> • Advise on cough/fever hygiene. • If pain or fever causing discomfort, give paracetamol (15mg/kg up to 1g) 4 hourly as needed up to 5 days (2-15/2/7). • Advise that antibiotics are not necessary. • Advise to return if: <ul style="list-style-type: none"> - Initially better but fever returns and obstructive cough > 5/5. - Ear pain > 4/4. - Flu over cheeks, sinusitis likely - If on ART, advise yearly influenza vaccination. 	<ul style="list-style-type: none"> • Give paracetamol (15mg/kg 4 hourly as needed for up to 5 days (2-13/3/7)). • Give sodium chloride 0.9% drops into nostrils as needed. • If no better, give oral amoxicillin 0.5/5/5, 2 drops in each nostril 4 hourly for up to 5 days. • If symptoms > 10 days give amoxicillin/clavulanic acid 12.5/6.25mg/kg once daily. • If > 1 month, test for HIV > 10/5. • Refer to specialist if: <ul style="list-style-type: none"> - > 4 episodes per year - Floor response to antibiotics - Swelling around sinuses/eye or tooth infection 	<ul style="list-style-type: none"> • Give histamine-2 nasal spray once daily in each nostril. • If < 6 years old, give 50µg. • If > 6 years old, give 100µg. • Review > 1 month. • > 1 month, give corticosteroid once daily until fully controlled (up to 2 weeks). • 12.5 mg/kg. • Give routine care to child with allergy > 1/1. 	<ul style="list-style-type: none"> • Examine nostrils and ears using good light and nasal speculum. • Wipe child in front if need to restrain. • Gently remove object with crocodile forceps. • If unable, block clear nostril and ask child to blow nose through. • Refer to specialist if object not visible, refer. 	<ul style="list-style-type: none"> • Refer if enlarged tonsils/episodes of no breathing for 10 seconds/choke/gasp/white sleeping. 	<ul style="list-style-type: none"> • Check for foreign body • Advise family to do: <ul style="list-style-type: none"> - Months together for 5-10 minutes with child sitting and leaning forward - If still bleeding, insert binomial iodoforn gauze soaked in 3% hydrogen peroxide - If bleeding stops, advise to return next day to remove BPP gauze - If still bleeding or unable to stop above procedures, refer urgently - If recurrent bleeds: <ul style="list-style-type: none"> - Advise to avoid picking nose. - Rubbing nose, consider allergic rhinitis. - If no better, refer.

© 2016 British Allergy Society of anaesthetics, urticaria or angioedema, give antihistamine 15mg/kg up to 50mg once daily for 3 days (total < 210mg).

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B

The child with allergy

Allergy likely if recurrent sneezing and runny/itchy/blocked nose, itchy/watery/red eyes, or itchy eczema rash.

Check for anaphylaxis in the child with allergy:

Anaphylaxis likely if:

- Sudden onset of generalised itchy rash or face/tongue swelling and 1 or more of: 1) difficulty breathing, 2) fainting/dizziness/collapse, 3) fainting/dizziness/collapse, 4) abdominal pain/vomiting
- Likely allergen exposure with any of: 1) generalised itchy rash or face/tongue swelling, 2) difficulty breathing, 3) fainting/dizziness/collapse, 4) abdominal pain/vomiting
- Known allergen exposure with fainting/dizziness/collapse or previous anaphylaxis and any of: 1) generalised itchy rash or face/tongue swelling, 2) difficulty breathing, 3) fainting/dizziness/collapse, 4) abdominal pain/vomiting

Manage and refer urgently:

- Give adrenaline 1mg/ml, 0.1mL/kg
- Give sodium chloride 0.9% 20mL

Assess

Assess the child with allergy not needing urgent attention: record child's condition and care plan in PRH.

Assess	When to assess	Assess
Routine care	Every visit	Integrate routine care into every visit > 1/2.
Symptoms	Every visit	<ul style="list-style-type: none"> • If patches of itchy, dry, scaly skin, eczema likely or if red raised wheals suddenly appear and reappear elsewhere, urticaria likely • Give 1st or 2nd line allergic conjunctivitis likely > 2/4. • Note if purple ring around eyes, runny/blocked nose, mouth breathing, line across nose from repeated rubbing, allergic rhinitis likely • Check if recurrent dry cough/wheezing/shortness of breath/asthma > 2/3.
Triggers	Every visit	<ul style="list-style-type: none"> • Ask if using new medication. If yes then stop use. If sudden rash/face swelling following medication, refer to specialist. • If sudden rash/face swelling following new food, refer to specialist. • Consider other triggers: insect bites, dog/cat dander, pollen, mould, cockroaches, peanuts, eggs, milk, fish. • Refer to specialist if unable to identify trigger.
Allergy control	Every visit	Allergy uncontrolled if symptoms interfere with daily life.
Adherence	Every visit	If using creams or ointments, check being applied correctly.

Advise

Advise the child/carer with allergy

Treat

Treat the child/carer with allergy

Referral prompts

Long term health conditions and co-morbidities

Colour coded medications

Epinephrine (adrenaline) dosing

Weight (kg)	Injection 1 mg/ml, (1:10 000)	Age if do not know weight
< 8kg	0.05mL	< 1 year
9-13kg	0.1mL	1-2 years
14-18kg	0.2mL	2-5 years
18-43kg	0.3mL	5-12 years

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C

Assess and interpret growth

Assess and interpret growth of child by following steps 1-5 when indicated. If < 5 years, start at step 3.

1) Measure

2) Plot

3) React

Different parameters to measure

Step 1: Weight-for-age

Measure weight-for-age at every visit:

Below -2 line	Between -2 line and +2 line	Above +2 line
Child is likely underweight > 9/5	Child is likely normal	Child is likely overweight > 9/5

Step 2: Length/height-for-age

Measure length/height-for-age every 6 months:

Below -2 line	Between -2 line and +2 line	On or above +2 line
Child likely malnourished > 9/5	Child likely normal	Child likely overweight > 9/5

Step 3: Weight-for-length/height

Plot weight-for-length/height according to age, every 6 months:

Below -2 line	Between -2 line and +2 line	Above +2 line
Child < 5 years old: Plot weight-for-length/height	Child < 5 years old: Calculate BMI and plot on BMI-for-age > 2/1	Child > 5 years old: Plot weight-for-length/height

Step 4: Mid-upper-arm circumference (MUAC)

Measure MUAC every 3 months, from 6 months old up to the age of 5 years:

MUAC < 12.5 cm	MUAC 12.5 cm
Acute malnutrition likely. Assess severity and manage > 9/5	No acute malnutrition > 9/5

Step 5: Head circumference

Measure head circumference at 14 weeks old and 12 months old:

14 weeks old	12 months old	14 weeks old	12 months old
Below -2 line > 4.5 cm	Below -2 line > 43.5 cm	Below -2 line > 43 cm	Below -2 line > 47.5 cm
Between -2 line and +2 line > 4.5 cm	Between -2 line and +2 line > 43.5 cm	Between -2 line and +2 line > 43 cm	Between -2 line and +2 line > 47.5 cm
Above +2 line > 4.5 cm	Above +2 line > 43.5 cm	Above +2 line > 43 cm	Above +2 line > 47.5 cm

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Figure 2 (A) Example of a symptom-based approach page. Each symptom is arranged on its own page with a 'red box' prefacing a simple algorithm. The 'red box' identifies and directs care for the child who needs urgent attention and referral to another level of care. For the child not requiring urgent attention, an algorithm directs the health worker to a likely diagnosis and provides primary care management as well as appropriate referral prompts where a condition is complex, there has been poor response to initial treatment or there is any doubt about a diagnosis. (B) Example of a standardised approach to routine care page. Structured approach to the routine care of a child with a long-term health condition: what to 'assess' and when, what to 'advise' the carer and child, and how to 'treat' the condition. The page also illustrates how PACK Child promotes the recognition of possible comorbid conditions. Three tones of grey in the 'assess' table delineate history, examination and investigations. (C) Routine care of the child is integrated into every visit. Growth is emphasised in the routine preventive care section with step-by-step, illustrated guidance on measuring, plotting, interpreting and reacting to growth parameters. ART, antiretroviral therapy.

Table 2 Clinical scenarios illustrating alignment and differences between IMCI²⁴ and PACK Child guides arranged according to six key features of child healthcare

IDENTIFICATION AND MANAGEMENT OF THE SICK CHILD			
1			
Example: 2-year-old child presents with signs and symptoms of severe pneumonia—worsening cough and difficulty breathing for 4 days. Now with lower chest indrawing.			
Management steps	IMCI	PACK Child	Comments
Check for danger signs	Yes	Yes	This clinical scenario aims to demonstrate that PACK Child management steps align well with IMCI management steps.
Assess cough	Yes	Yes	
Oxygen therapy	Yes	Yes	
Management of wheeze offered	Yes	Yes	
Management of stridor offered	Yes	Yes	
Pre-referral ceftriaxone	Yes	Yes	
Co-trimoxazole therapy	Yes	Yes	
Hypoglycaemia management	Yes	Yes	
Urgent referral	Yes	Yes	
INTEGRATION OF CURATIVE AND PREVENTIVE CARE			
2			
Example: 18-month-old child presents with 2-day history of diarrhoea. No danger signs. No blood or mucus. No dehydration. No feeding problem.			
Management steps	IMCI	PACK Child	Comments
Check for danger signs	Yes	Yes	This clinical scenario aims to demonstrate that PACK Child aims to streamline the use of the guide in response to presenting symptom: Number of pages consulted in IMCI guide to manage this case= 23 pages . Number of pages consulted in PACK Child to manage this case= 8 pages
Assess level of dehydration	Yes	Yes	
Give fluid according to level of dehydration	Yes	Yes	
Advise when to return immediately	Yes	Yes	
Zinc therapy	Yes	Yes	
Follow-up of diarrhoea	Yes	Yes	
Assess and interpret growth (then check all children for malnutrition)	Yes	Yes	
Assess feeding	Yes	Yes	
Developmental screen	Yes	Yes	
Basic examination	Yes	Yes	
Check HIV risk	Yes	Yes	
Check TB risk	Yes	Yes	
Check immunisation status	Yes	Yes	
Symptom screen	Yes	Yes	
Assess caregiver health	Yes	Yes	
Advice for caregiver at home	Yes	Yes	
Vitamin A and deworming, if needed	Yes	Yes	
Follow-up for routine child visit	Yes	Yes	
Psychosocial risk (like parenting, neglect/abuse and grants)	No	Yes	
Mental health (behaviour)	No	Yes	

Continued

Table 2 Continued

GUIDANCE FOR THE WELL-CHILD VISIT				
3	Example: 12-month-old well child is brought for immunisations.			
Management steps	IMCI	PACK Child	Comments	
Symptom screen		Yes		
Feeding screen		Yes		
Assess and interpret growth		Yes		
Developmental screen		Yes		
Assess HIV risk		Yes		
Assess TB risk		Yes		
Assess caregiver health	IMCI is designed for use during a sick-child consultation and, while it may integrate preventive care during a curative consultation, it has no formal entry point for the well child between the ages of 2 months and 5 years. IMCI does provide an entry point for the infant <2 months old for a well-baby visit; however, this is limited to a symptom screen, advice for home care and feeding counselling.	Yes		
Psychosocial risk		Yes		
Mental health (behaviour)		Yes		
Basic examination		Yes		
Health promotion messages		Yes		
Immunisation, if needed		Yes		
Vitamin A and deworming, if needed		Yes		
Follow-up for routine care		Yes		
STREAMLINED MANAGEMENT OF MULTIPLE PRESENTING SYMPTOMS				
4		Example: 3-year-old boy presents with 3-week history of loss of weight and a cough. No danger signs. No respiratory distress. No wheeze. Not growing well. HIV negative. TST positive.		
Management steps		IMCI	PACK Child	Comments
Check for danger signs		Yes	Yes	
Assess cough		Yes	Yes	
Assess for TB		Yes	Yes	
Identify TB contact	Yes	Yes		
TB investigations (tuberculin skin test, gastric washing, sputum test, chest X-ray, if available)	Yes	Yes		
Relieve cough (warm water/weak tea)	Yes	Not included		
Advise when to return immediately	Yes	Yes		
Ask about diarrhoea	Yes			
Ask about fever	Yes			
Ask about ear problem	Yes	Symptom screen included on routine care		
Ask about sore throat	Yes	care		
Assess and interpret growth (check for malnutrition)	Yes	Yes		
Feeding assessment and counselling	Yes	Not included, unless feeding problem	Regardless of multiple possible entry points, in this case, loss of weight, not growing well or cough, PACK guides the clinician to the same management steps.	
Assess HIV risk	Yes	Yes		
Deworming and vitamin A, if needed	Yes	Yes		
Arrange follow-up	Yes	Yes		
Notify and register in TB register	Yes	Yes		

Continued

Table 2 Continued

STREAMLINED MANAGEMENT OF MULTIPLE PRESENTING SYMPTOMS			
4	Example: 3-year-old boy presents with 3-week history of loss of weight and a cough. No danger signs. No respiratory distress. No wheeze. Not growing well. HIV negative. TST positive.		
Management steps	IMCI	PACK Child	Comments
Give TB treatment (dosing tables)	Yes	Yes	
Routine follow-up TB	Yes	Yes	
Check immunisation status	Yes	Yes	
Assess any other problems	Yes	Yes	
Check caregiver's health	Yes	Yes	
Step-by-step guidance on how to perform a tuberculin skin test (TST)	No	Yes	
Screen for other contacts	No	Yes	
Advise about importance of treatment adherence	No	Yes	
Advise about TB treatment side effects	No	Yes	
Guidance on TB and HIV co-infection (like ART dosage adjustments)	No	Yes	
5	LONG-TERM HEALTH CONDITIONS—IDENTIFICATION AND MANAGEMENT		
	Example: 4-year-old boy known with epilepsy has had 3 fits in the last month, lasting 5 minutes each. Not fitting now. No associated illness or fever reported.		
Management steps	IMCI	PACK Child	Comments
Prompted to integrate routine care into every visit	No	Routine care itemised in scenario 3	
Check adherence	No	Yes	
Check side effects	No	Yes	
Check other medication interactions	No	Yes	
Review fit diary: assess triggers	No	Yes	
Ask about mental health (behaviour)	No	Yes	
Ask about school problems	No	Yes	
Check development	No	Yes	
Advise the caregiver	No	Includes health education and support	
Doctor review of medication:			
Medication table provided	No	Yes	
When to refer to a specialist	No	Yes	
When to follow up routinely	No	Yes	
When to consider reducing treatment	No	Yes	

Continued

Table 2 Continued

				TASK SHIFTING
				Example: 3-year-old girl has a 3-day history of wheeze. This is the 4th presentation for wheeze in 3 months. No danger signs. No respiratory distress. Nocturnal cough. Not on asthma treatment. Growing well.
6	Management steps	IMCI	PACK Child	Comments
	Check for danger signs	Yes	Yes	This clinical scenario demonstrates how PACK Child might empower a nurse to perform additional tasks where she previously referred to a doctor. In this case, task-shifting may include instituting a trial of asthma treatment, screening for triggers and other allergy symptoms, providing advice and education, and demonstrating inhaler techniques.
	Assess cough	Yes	Yes	
	Salbutamol via spacer for 5 days	Yes	Yes	
	Refer non-urgently for assessment	Yes	Prompted later for confirmation of diagnosis	
	Ask about diarrhoea	Yes		
	Ask about fever	Yes	Symptom screen	
	Ask about ear problem	Yes	included in routine care	
	Assess and interpret growth (then check all children for malnutrition)	Yes	Yes	
	Check for anaemia	Yes	Yes	
	Assess HIV risk	Yes	Yes	
	Assess TB risk	Yes	Yes	
	Then check immunisation status	Yes	Yes	
	Assess any other problem	Yes	Yes	
	Check the caregiver's health	Yes	Yes	
	Vitamin A and deworming, if needed	Yes	Yes	
	Addresses smoking in house	No	Yes	
	Excludes TB	No	Yes	
	Assesses recurrent respiratory symptoms (asthma diagnosis algorithm)	No	Yes	
	Trial of treatment given:			
	Corticosteroid inhaler for 2 months	No	Yes	
	Step-by-step guidance on inhaler (with spacer) technique	No	Yes	
	Refer non-urgently for assessment if trial of treatment not effective	No	Yes	
	Prompts a likely asthma diagnosis if trial effective (non-urgent doctor confirmation within 1 month)	No	Yes	
	Asthma routine care started	No	Yes	
	Assesses symptom control	No	Yes	
	Allergy screen	No	Yes	
	Adherence screen (inhaler technique assessment)	No	Yes	
	Advice covers passive smoking, treatment education, recognition of acute exacerbations, trigger avoidance	No	Yes	

Continued

Table 2 Continued

		TASK SHIFTING	
		Example: 3-year-old girl has a 3-day history of wheeze. This is the 4th presentation for wheeze in 3 months. No danger signs. No respiratory distress. Nocturnal cough. Not on asthma treatment. Growing well.	
6			
Management steps	IMCI	PACK Child	Comments
Annual influenza vaccination	No	Yes	
Step-up and step-down corticosteroid inhalers according to symptom control	No	Yes	
Prednisone course for acute exacerbations	No	Yes	
When to return immediately	No	Yes	
When to follow up for routine asthma visit	No	Yes	

ART, antiretroviral therapy; IMCI, Integrated Management of Childhood Illness; PACK, Practical Approach to Care Kit; TB, tuberculosis.

The development process also highlighted the dearth of recommendations for the adolescent, especially for young girls seeking sexual and reproductive health services, which constitute many primary care attendances.³⁷ The consensus among reviewers, however, was that contraception or termination of pregnancy did not belong in a child guide and that there was a need for a PACK Adolescent guide.

NEXT STEPS FOR PACK CHILD

The next step for PACK Child is pilot testing in selected clinics in the Western Cape, accompanied by a process evaluation to record the experiences of clinicians who use the guide in routine daily practice, and of patients and caregivers. Major goals of this evaluation are to explore the articulation of PACK Child and IMCI in clinical practice, that is, to ensure that the outcomes expected of IMCI are achieved with PACK Child, and how the PACK training approach should be designed to help and encourage clinicians to integrate preventive and curative care in one consultation. The protocol for this study is described elsewhere and will inform changes to the guide and training programme.⁴¹ Thereafter, we plan to perform a large pragmatic randomised controlled trial in over 20 clinics to assess the effectiveness and impact of PACK Child implementation, one component of which will be a comparison of the performance of PACK and IMCI in intervention and control clinics, respectively. It is hoped that these evaluations will establish whether the PACK Child programme may be considered an alternative to IMCI in some health systems, offering comprehensive coverage for the needs of children attending clinics.

The PACK Child programme will be a valuable addition to the suite of PACK tools that may be used side by side in clinics in LMICs, articulating with PACK Adult, and, in advanced stages of development, PACK Adolescent, PACK Community (for community health workers) and PACK Information (for patients). This PACK suite of

tools aims to provide a continuum of care throughout the lifespan and support important concepts like the maternal-child dyad and the First 1000 days initiative.^{42 43}

CONCLUSION

Completion of the first version of the PACK Child guide promises to be a step towards better equipping clinicians in primary care to handle the pressing and varying needs of children aged 0 up to 13 years. It builds on experience of a similar approach for adult patients in which its comprehensive scope, thorough integration, symptom-based approach and easy-to-use algorithms providing step-by-step guidance for the clinicians, allows a broad range of health workers to access appropriate information to optimally manage their patient with task-sharing between doctors and nurses.^{20 26 27} As for all versions of PACK, regular revision provides a current curriculum for continuous learning. Whether PACK Child realises its potential of filling the care gaps in services for children and young adolescents and improves the quality and organisation of care needs to be thoroughly tested in pragmatic studies.

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