

Global use of the WHO Pocket Book of Hospital Care for Children

Michelle Y. Li¹, Julian Kelly¹, Rami Subhi¹, Wilson Were², Trevor Duke¹

¹Centre for International Child Health, University of Melbourne, Royal Children's Hospital, Parkville, Victoria, Australia, and ²Department of Child & Adolescent Health & Development, World Health Organization, Geneva, Switzerland

Background: Studies in the last decade have identified major deficiencies in the care of seriously ill children in hospitals in developing countries. Effective implementation of clinical guidelines is an important strategy for improving quality of care. In 2005 the World Health Organization produced the *Pocket Book of Hospital Care for Children — Guidelines for Management of Common Childhood Illnesses in Rural and District Hospitals with Limited Resources*.

Objective: To determine the worldwide distribution, uptake and use of the *WHO Pocket Book of Hospital Care for Children*.

Methods: A systematic online and postal survey was conducted to assess coverage and uptake of the Pocket Book in low- and middle-income countries (LMICs). More than 1000 key stakeholders with varied roles and responsibilities for child health in 194 countries were invited to participate. Indicators used to measure implementation of the guidelines included local adaptation, use as standard treatment and incorporation into undergraduate and postgraduate training.

Results: Information was gathered from 354 respondents representing 134 countries; these included 98 LMICs and 50 countries with under-5 childhood mortality rates >40 deaths/1000 live births. Sixty-four LMICs (44% of 145 LMICs worldwide) including 42 high-mortality countries (66% of 64 high-mortality countries worldwide) reported at least partial implementation of the Pocket Book. However, uptake remains fragmented within countries.

Conclusion: More than half of all LMICs with high rates of child mortality have reported use and substantial implementation activities, a considerable achievement given minimal resources available for implementation. Improving the accessibility of the Pocket Book and its implementation tools to health workers, and developing a strategic approach to implementation in each country could improve quality of hospital care for children and support efforts towards achieving the Millennium Development Goal 4 targets.

Keywords: Children, Hospitals, Practice guidelines, Implementation, Training, WHO

Introduction

Up to one in five children presenting to primary health facilities require referral to hospital; these are the sickest children at highest risk of death and complications.^{1,2}

Rural, district or small provincial hospitals at the first-referral level play an essential role in preventing child morbidity and mortality. It has been estimated that well-run district hospitals may prevent up to 44% of child deaths that would otherwise occur in the absence of any hospital.^{3,4} Yet, in developing countries, these hospitals are generally understaffed, under-resourced and have little or no ongoing

staff education; sick children are usually cared for by general nurses and non-specialist doctors not specifically trained in the care of seriously ill children.^{4,5} Evidence in the last decade suggests much scope for improvement in the care of children in these settings, highlighting deficiencies in assessment, treatment, monitoring and follow-up of children with common illnesses.^{6–10}

It has proved possible to improve quality of care in these settings by making better use of existing resources, without requiring new and expensive equipment and drugs, if staff are trained in evidence-based practice using basic and essential resources.⁵ Studies in Tanzania, Bangladesh, Papua New Guinea and South Africa have shown that clinical guidelines, when implemented well, can reduce child mortality in

Correspondence to: T Duke, Centre for International Child Health, University of Melbourne, MCRI, Royal Children's Hospital, Parkville, Victoria Australia. Email: trevor.duke@rch.org.au

primary health facilities and hospitals.^{11–15} The World Health Organization (WHO) publishes clinical and public health guidelines. However, guidelines may be under-utilised owing to inadequate implementation, and rarely is there a systematic assessment of implementation.^{16–19}

In 2005 the *Pocket Book of Hospital Care for Children — Guidelines for the Management of Common Illnesses with Limited Resources* (the Pocket Book) was published by WHO to provide doctors, senior nurses and other senior health workers at the first-referral level (district, rural hospitals or equivalent) in developing countries with up-to-date, evidence-based guidelines on the management of common childhood conditions.²⁰ The Pocket Book covers assessment, treatment and management of the major causes of child mortality worldwide, including pneumonia, diarrhoea, measles, malaria, malnutrition and neonatal conditions. Its pocket-size enables health workers to refer to it at points of care. The guidelines are generic, require the availability of minimal diagnostic resources and essential medicines, and can be adapted to country-specific needs.

Until now, there has been no assessment of implementation of the guidelines. This study aimed to determine the extent of distribution, uptake and use of the Pocket Book around the world.

Methods

A survey was conducted, involving key stakeholders in child health in almost every country in the world. These included the most senior people responsible for child health within national ministries of health, heads of national paediatric and nursing associations, and child health officers in WHO and UNICEF national offices. The survey consisted of 25 questions on national and local implementation activities, use of the Pocket Book at a clinical level, and questions to identify the professional role and background of the respondents.

Estimation of the extent of implementation was based on three key strategies proposed in 2008 by the Paediatric Hospital Improvement Group, which comprised 60 medical, nursing and health management staff from 22 countries.²¹ These criteria were: (i) local adaptation of guidelines, which may include translation into a local language, (ii) use of guidelines as standard clinical guidelines for hospital care of children, and (iii) incorporation of guidelines into training for clinicians (doctors, nurses and other health-care providers) at undergraduate, postgraduate and in-service levels.²¹ These strategies are supported by evidence of the importance of local content appropriateness, local ownership and official

endorsement of guidelines, and the value of interactive workshops and incorporation of guidelines into pre-service training.^{18,22–25}

The questionnaire was sent by email, or by post where email was not available, to 1106 contacts in 194 countries (Textbox 1).

Textbox 1 Contacts invited to participate in the survey

- All 202 national ministries of health worldwide (addresses obtained from WHO headquarters)
- All 130 heads of national paediatric societies worldwide (emails and postal addresses obtained from the International Pediatric Association: <http://www.ipa-world.org/>)
- All 135 national nursing associations worldwide (email and postal addresses obtained from the International Council of Nurses <http://www.icn.ch/about-icn/members/>)
- All 153 WHO country offices worldwide (email addresses obtained from WHO headquarters in Geneva)
- All 170 UNICEF country offices (email and postal addresses obtained from <http://www.unicef.org/infobycountry/>)
- 247 recipients of Pocket Books distributed by WHO (email addresses and mailing list obtained from WHO Library, Geneva)
- 69 recipients of Pocket Books distributed by the Centre for International Child Health, University of Melbourne (CICH) (email addresses and mailing list held in CICH)

The survey was published online on 8 October 2010 using SurveyMonkeyTM and links to the survey were sent by email to 988 respondents. Contacts were notified of the upcoming survey 5 days before they were given access to it, and subsequent follow-up of non-respondents was conducted three times via email. These strategies have been shown to increase response rates.^{26–30} A hard-copy version of the survey, including an international reply-paid envelope, was posted to 287 contacts whose email addresses we did not have, and to those whose email addresses malfunctioned.^{26,31} The survey was completed on 8 April 2011.

Data analysis

Data were entered in Microsoft Excel 2000, and analysed using EpiInfoTM Version 3.5.3. Tableau Public[®] 6.0 was used for graphing. Results were shown shaded on a world map using the website http://edit.freemap.jp/en/trial_version/edit/world (accessed April 2011).

Responses were grouped and analysed by country. We classified extent of implementation of the Pocket Book in each country according to criteria described in Textbox 2.

Textbox 2 Criteria used to classify level of implementation in countries

Implementation well under way

Criteria

Countries which fulfilled all of the following criteria:

- At least one in two respondents indicated they were familiar with the Pocket Book (PB)*
- Local adaptation/translation had occurred OR all respondents agree that PB used as standard treatment
- PB had been incorporated into pre-service education/in-service training/workshops

Implementation partially under way

Criteria

- One or more respondents indicated they were familiar with the PB

And at least one of the following (as indicated by one or more respondents)

- Local adaptation/translation had occurred
- PB used as standard treatment
- PB had been incorporated into pre-service education/in-service training/workshops
- PB used to guide clinical practice at a respondent's institution
- PB used by some hospitals in the country

No evidence of implementation

One or more respondents had heard of the PB but there was no evidence of use (i.e. did not fulfil any of the above criteria for 'implementation partially under way').

No awareness of the Pocket Book

No respondents had heard of the PB.

*Countries with only one respondent needed to demonstrate further evidence of use to qualify as 'implementation well under way', e.g. PB used clinically at respondent's institution. Three countries were able to fulfil these criteria despite having only one respondent.

Results were further analysed according to country income and child mortality rates. Countries were grouped by income-level using the World Bank classification.³² Gross national income (GNI) per capita (current US\$) was obtained from the World Bank (2009/2008 levels) and UN databases (2008/2005 levels).^{33,34} Under-5 childhood mortality rates were based on estimates by the UN Inter-Agency Group for Child Mortality Estimation from 2009.³⁵

The total numbers of Pocket Books ordered through the WHO Bookshop in Geneva, from January 2006 to July 2010 (data obtained directly from the shop) were tallied by country and presented alongside results of the survey (Table 1, Supplementary Material, <http://dx.doi.org/10.1179/2046905512Y.0000000017.S1>).

Ethics statement

The study was approved by the Royal Children's Hospital (Melbourne, Australia) Human Research Ethics Committee (HREC No: 30117 A).

Results

There were 354 responses from 134 countries (country response rate 69%): 327 responses were from the online survey (response rate 33%), 22 from the postal survey (response rate 8%) and five by email correspondence (in response to either web or postal survey). Forty-nine per cent of respondents were female, 40% male, 11% unspecified; 55% of respondents were aged between 31 and 50. Respondents identified their main employment role as paediatrician (30%), WHO officer (21%), doctor (9%), nurse (9%), ministry of health officer (6%), head of nursing association (6%), UNICEF officer (4%), head of paediatric association (3%), other health care worker (2%), or none of the above (9%). Most respondents worked at a public tertiary-level hospital, WHO office, ministry of health or a university/academic institution. Thirty respondents (8%) worked at a district or rural hospital.

Respondents from 26 countries indicated evidence that implementation of the Pocket Book was well under way, 50 countries had evidence of partial implementation, 30 countries indicated awareness of the Pocket Book but no evidence of national implementation, and respondents from 28 countries had no awareness of the Pocket Book (Table 1 Supplementary Material, <http://dx.doi.org/10.1179/2046905512Y.0000000017.S1>).

Among 98 LMICs, implementation of the Pocket Book was well under way in 25 (25%) countries and there was partial implementation in 39 (40%). Eighteen LMICs had no evidence of implementation, and another 16 had no awareness of the Pocket Book (Figure 1). Regions with evidence of active implementation of the Pocket Book were Asia and Eastern Europe, with some evidence of use in Africa and the Pacific. Few data were available for much of Central and South America, the Middle East and parts of Africa.

The Pocket Book, which was initially published in English and French, has been translated into 15 other languages: Albanian, Armenian, Bahasa Indonesian, Chinese, Dari (Afghanistan), Khmer, Laotian, Mongolian, Portuguese, Russian, Spanish, Turkish, Turkmen, Uzbek and Vietnamese. It is available in the official language of 64 countries (55 LMICs). Some respondents were not aware that it was available in their language: 70% of respondents from Latin American countries were unaware of the Spanish translation.

The Pocket Book guidelines have been adapted for local use in 30 countries (28 LMICs) (Table 2 Supplementary Material, <http://dx.doi.org/10.1179/2046905512Y.0000000017.S1>).

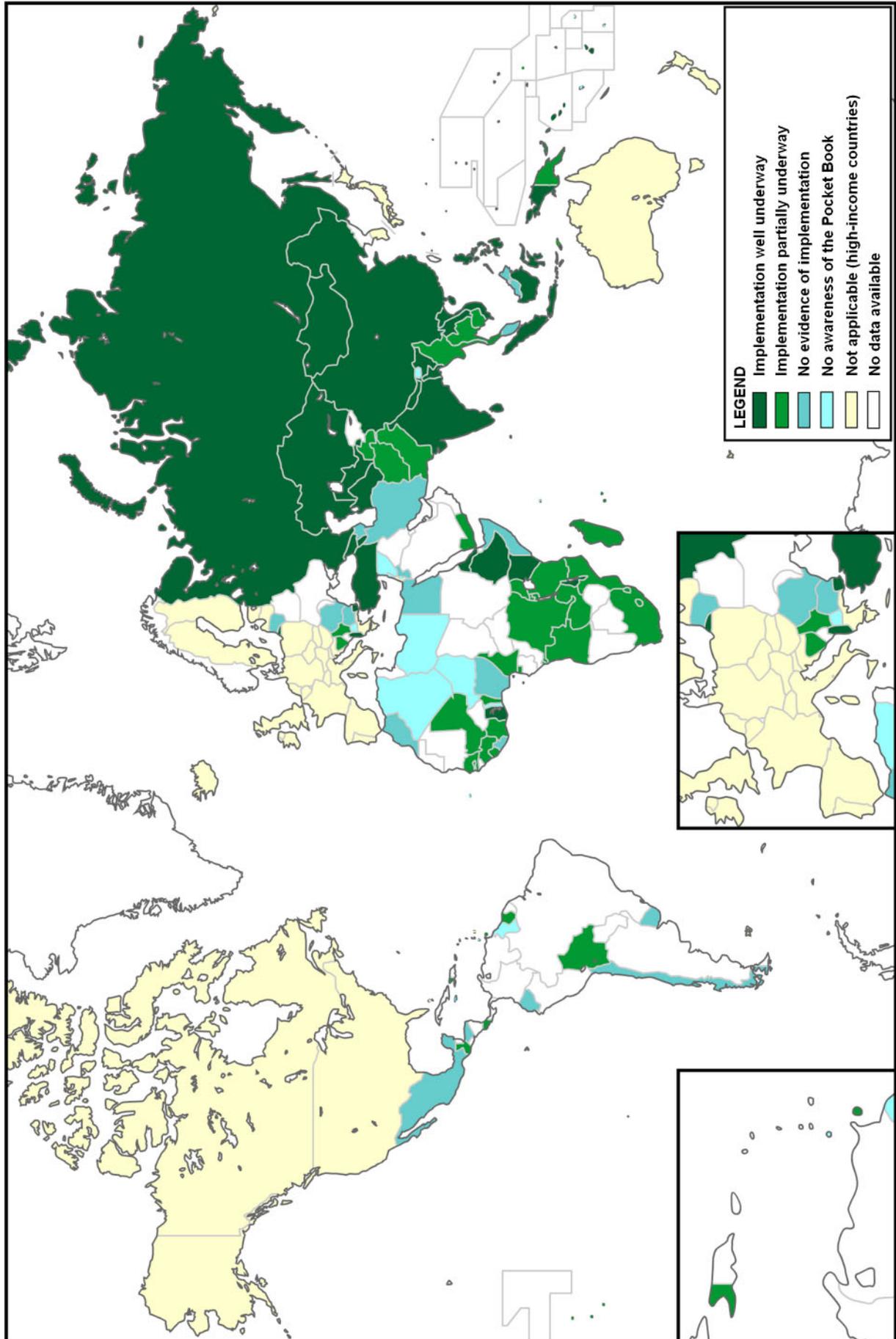


Figure 1 Awareness and implementation of the Pocket Book in low- and middle-income countries worldwide

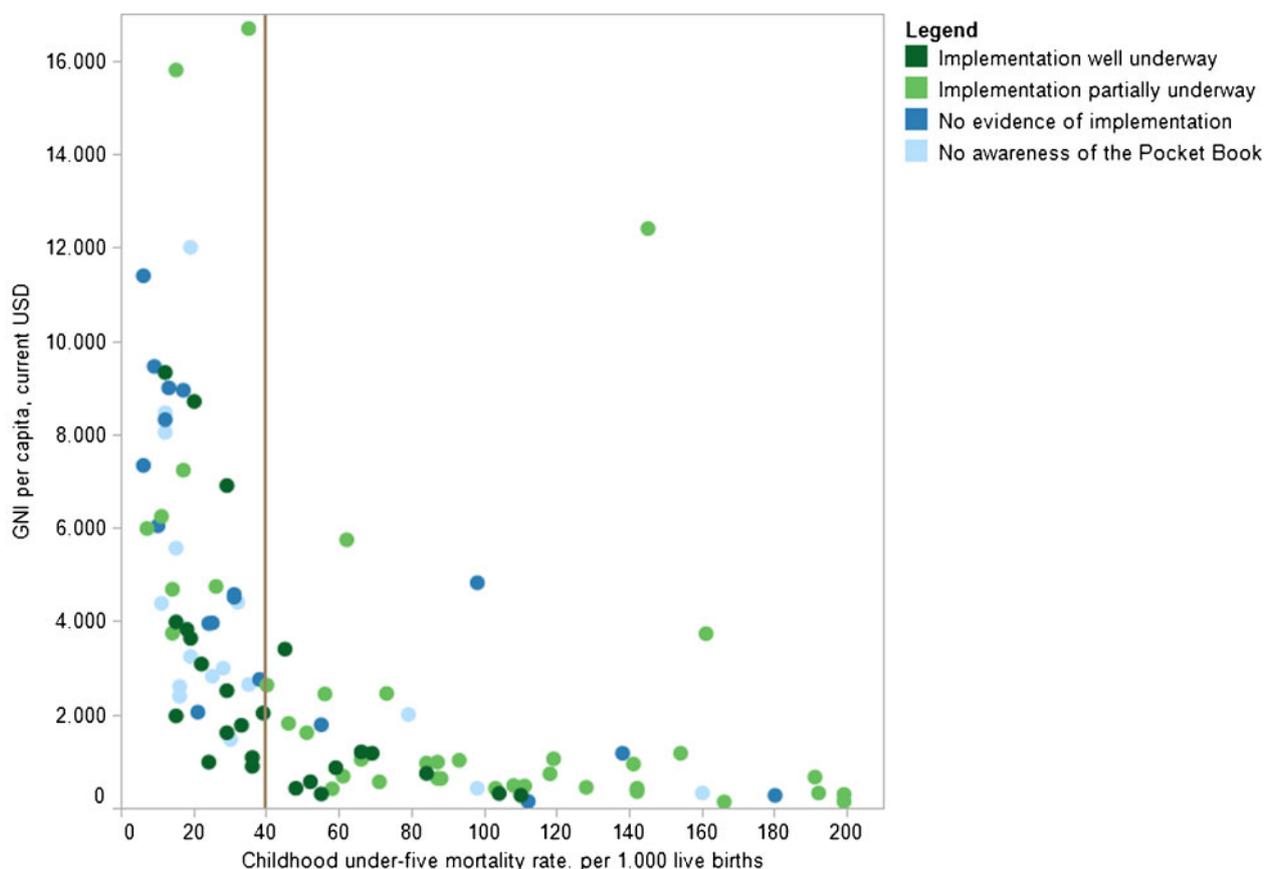


Figure 2 Awareness and implementation of the Pocket Book according to under-five childhood mortality rate and GNI per capita. The vertical line marks the under-5 mortality rate of 40 deaths per 1000 live births, separating 'high' mortality rates of ≥ 40 from 'mortality rates < 40

Adaptations included adding a condition to increase the relevance to national disease patterns, or changes to antibiotic prescribing guidelines to reflect antimicrobial resistance. Most adaptations were done by working groups comprising representatives from ministries of health, national paediatric associations, academic institutions and other stakeholders; many of these processes were supported by WHO national offices.

There were 32 countries (30 LMICs) in which 50% or more respondents reported that the Pocket Book was being used as a standard reference in their country (i.e. guidelines being used daily in hospitals and health clinics). Workshops on how to use the Pocket Book have been conducted in 24 countries (21 LMICs). The Pocket Book was reported to have been incorporated into pre-service and/or in-service training in 36 countries (32 LMICs) (Table 3 Supplementary Material, <http://dx.doi.org/10.1179/2046905512Y.0000000017.S1>). Eighty-nine clinicians in 49 countries (39 LMICs) reported that clinical staff caring for children at their institution used the Pocket Book. Thirty-eight respondents from 24 countries (21 LMICs) reported that the Pocket Book had been used for in-service training of staff at their institution. The proportions of hospitals estimated by respondents to be using the

Pocket Book were often low, even in countries in which implementation was well under way (Table 1). 148/154 clinicians (96%) would recommend the Pocket Book to other health-care professionals.

Progress in the Poorest Countries

Implementation of the Pocket Book in the LMICs surveyed was analysed according to under-5 mortality rates and GNI per capita (Figure 2).

Fifty respondent countries had high rates of under-5 mortality (≥ 40 deaths/1000 live births); most of these had relatively low GNI per capita.³⁵ Forty-two high-mortality countries (66% of all 64 high-mortality countries worldwide) have at least partially implemented the Pocket Book, whilst eight countries have no evidence of implementation or no awareness of the Pocket Book.

Textbox 3 describes the strategies chosen by respondents to improve implementation of the Pocket Book in their country.

Discussion

This study mapped the use of clinical guidelines for paediatric care (the WHO Pocket Book of Hospital Care for Children) in 134 countries including 98 LMICs. We found encouraging evidence of uptake and use of the Pocket Book in LMICs. Sixty-four

Textbox 3 Strategies proposed to improve in-country implementation of the Pocket Book

Strategies to improve in-country implementation of the Pocket Book, in order of popularity as selected by respondents were:

1. Free copies supplied to hospitals (117/196 respondents, 60%)
2. Adopted by Ministry of Health as national standard for paediatric care (98/196, 50%)
3. Incorporation into undergraduate education (97/196, 49%)
4. Free copies supplied to individual clinicians (91/196, 46%)
5. Merged with current standard treatment guidelines (76/196, 39%)
6. Incorporation into postgraduate education (75/196, 38%)
7. Recommended by professional organisations (71/196, 36%)
8. More in-service training in using the Pocket Book (70/196, 36%)
9. Adaptation to suit local needs (66/196, 34%)
10. Copies available locally for purchase (65/196, 33%)
11. Translation into my country's language(s) (61/196, 31%)
12. More basic resources available in hospitals (18/196, 18%)
13. More self-directed learning resources (8/196, 9%)

LMICs (65% of respondent LMICs, 44% of LMICs worldwide) reported at least partial implementation or use, and in 25 of them (25% of respondent LMICs, 17% of LMICs worldwide) implementation was well under way. Among the 64 countries worldwide with high rates of childhood mortality, two-thirds (42 countries) were reportedly using the Pocket Book. This is a considerable achievement, despite minimal resources for promotion or implementation since the Pocket Book was published in 2005. It suggests that the book has filled an important gap.

In several countries (Afghanistan being a notable example), implementation of the Pocket Book has been led by local champions, without, until now, the international community being aware of the fact. We found that the Pocket Book has been translated into 15 languages besides the original English and French versions, many of these 15 were previously undocumented or unknown to the wider international community.

It was promising to find a number of LMICs actively promoting use of the Pocket Book. Thirty countries (30% of those surveyed, 21% of LMICs worldwide) have locally adapted the Pocket Book to make it relevant to national disease patterns, antimicrobial resistance, prescribing guidelines, etc., thus making the guidelines more acceptable to clinicians whilst giving the country a sense of local ownership, increasing the likelihood of uptake.^{18,21,36} Producing locally adapted versions of the Pocket

Book in LMICs has relied on strong local leadership and partnerships between local government, universities, professional associations (particularly paediatric associations), research institutions and WHO national offices.

Thirty-two LMICs (31% of those surveyed, 22% of LMICs worldwide) reported incorporating the Pocket Book into pre-service and/or in-service training, shaping the practice of future clinicians and helping to change older clinicians' attitudes and outdated practices.^{18,22,24}

However, respondents from some high-mortality countries (eight countries surveyed, 13% of high-mortality countries worldwide) did not report any use of the Pocket Book or were unaware of its existence. This situation needs to be addressed in order to improve quality of care in countries most in need. Furthermore, owing to the limited resources available for implementation, the process is fragmented in many if not most countries. The classification that implementation is 'well under way' does not mean that there is national coverage; even in countries using several implementation strategies, the proportion of hospitals estimated to be using the Pocket Book remained low.

Barriers to Implementation

Several barriers to achieving greater use of the Pocket Book were identified within countries and worldwide. Perhaps the greatest was poor availability, with many respondents calling for the book to be supplied free of charge to hospitals and individual health workers (these strategies were the first and fourth most frequently cited strategies to improve implementation). Currently in most countries that have not printed their own copies, the Pocket Book must be ordered online through WHO for US\$20 (<http://apps.who.int/bookorders/>; accessed July 2011), a process that is not easily accessible and a price that is not affordable to many clinicians in resource-poor settings. So far, over 45,000 copies of the Pocket Book in English and French have been ordered from the WHO Bookshop or sent to countries free of charge by WHO.³⁷ Another source of the Pocket Book is Teaching Aids at Low Cost, purchase price £5.65 (<http://www.talcuk.org/books/hospital-care-for-children-guidelines-for-the-management-of-common-illnesses-with-limited-resources.htm>; accessed January 2012). The availability through these sources may not be very well known. Many countries have printed their own versions, so the total number of all language versions in circulation is unknown.

Respondents identify lack of essential drugs, medical equipment and supplies as another important barrier to greater use, despite the Pocket Book being written for resource-poor settings, using only basic drugs and equipment. Of the 25 LMICs in which implementation was well under way, only ten were high-mortality countries with relatively lower incomes.

Absence of a strong culture of evidence-based practice and guideline adherence amongst clinicians prevents further use of the Pocket Book in some resource-poor settings. Several strategies could address this issue, including quality improvement processes such as routine audit with feedback to ensure clinicians are aware of their standards of care and any room for improvement, education to alter attitudes by presenting evidence behind guidelines, and culture-shifting through local opinion leaders.^{18,22,25,38} Many respondents identified common barriers to change; however, countries need to consider their unique context and address the barriers to implementation accordingly.

It was notable that there was little reported use of the Pocket Book in the Middle East and South America. Currently there is no Arabic translation of the Pocket Book and the Spanish translation was done by a private publishing organisation aligned to the Pan American Office of WHO. Unlike other language translations, which are freely available on the Internet (www.ichrc.org; accessed July 2011), the Spanish translation is only available as a hard copy through the private publishing company, with no other distribution strategy.

Study Limitations

Given limited funding, an internet-based and mail-out survey of key stakeholders was the only feasible method in a study aiming for global coverage. However, any study relying on survey responses has limitations. It can be difficult to be certain that responses were truly representative of the country situation, even though we targeted professional groups and individuals on the basis of their likely understanding of the health system and child health situation in their country. We were conservative in our approach to interpreting answers to the questionnaires, being sceptical of responses that were lacking in detail or those that conflicted within a country. Ultimately we received informative data on 98/145 (68%) LMICs worldwide; thus, conservative results (% of LMICs worldwide) are presented. There is clearly difficulty in obtaining definitive results from the small number of responses from large countries such as China (six respondents) and India (three), and in high-population countries such as Indonesia (four) and Nigeria (two). Compared with medical practitioners who made up the majority of respondents, nurses, including heads of nursing associations (15% of respondents) and other health care workers (2%), were relatively under-represented in this survey. We accept that the results are the opinions of respondents and reflect reported use of the Pocket Book and the steps that countries have taken towards implementation. This is the first study we are aware of that has attempted to systematically map the distribution, uptake and use

of a clinical guideline around the world. More evidence of implementation and use in each country could yield valuable additional information — such studies have been conducted in Indonesia and Kenya.^{24,25}

Conclusion

This global survey validates the widespread use of the WHO Pocket Book of Hospital Care for Children and its potential to improve quality of hospital care for children in developing countries. Respondents confirmed that the book fills an important gap. In order to fully realise its potential to reduce rates of global childhood morbidity and mortality, WHO and key stakeholders in developing countries should address the current barriers to implementation, and utilise multifaceted implementation strategies appropriate to their local context. Such approaches require a unified commitment to work towards a common goal by national ministries of health, local professional leaders, academic institutions and donor agencies. Evidence from this survey suggests that this is indeed achievable.

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