Integrated Community Case Management: Next Steps in Addressing the Implementation Research Agenda

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Integrated community case management (iCCM) of malaria, pneumonia, and diarrhea has been increasingly adopted as a strategy to improve the access of children to treatment of these diseases in underserved areas. iCCM offers a way forward both from the perspective of the sick child and from the perspective of rational drug use, by providing diagnostics-guided, evidence-based treatment of the sick child. Attesting to the importance of this approach, a United Nations Children's Fund/World Health Organization (UNICEF/WHO) joint statement justifying the need for iCCM and making recommendations on its implementation was released this year and republished in this special supplement.¹ However, there are many facets to this approach that need to be optimized for iCCM to have the greatest impact on morbidity and mortality of children less than five years of age. Well-designed implementation research and rigorous monitoring and evaluation of programs have been and will continue to be important sources of evidence for improvement of iCCM policies and program implementation.

A first global operations research agenda was developed at a WHO–Tropical Disease Research/UNICEF Joint Meeting for Community Case Management of Fever in June 2006,² and a CCM Operations Research Group (ccm.org) was created. The group further refined the agenda at a UNICEF meeting in New York in October 2008 and at a Program for Global Pediatric Research workshop on CCM for pneumonia in Vancouver in May 2010.³ Many of the studies reported in this supplement were designed to fill in the research knowledge gaps identified by CCM.ORG and are ready to be shared with the wider CCM community. However, there remain many gaps in our understanding of the optimal approaches to the implementation, scale-up, and sustainability of iCCM programs, and new questions have arisen.

For example, there remain many questions on the effect of iCCM on community health workers, including their capacity to absorb increasing amounts and complexity of disease management tasks, their role in surveillance and reporting of routine disease burden from the community level, optimal approaches for supervision, and the best strategies for remuneration (Table 1).⁴ There is also a need for more data on the impact of iCCM on child health outcomes, both reduction of morbidity and mortality, and the cost-effectiveness of this strategy. Similarly, how can adequate coverage be achieved and how can the private sector be effectively engaged in the

delivery of iCCM, and conversely can iCCM bring order to and improve the quality of care in unregulated health markets?⁵ Another pressing question is how the diagnosis of respiratory infections requiring antibiotic treatment can be improved. Although we need to better understand how iCCM modifies the use of antimicrobial agents in the community and the related therapeutic outcomes, we also need to monitor for adverse effects of the interventions and to assess the impact on antimicrobial resistance.

As many programs have implemented the use of rapid antigen-based diagnostic tests (RDTs) for malaria, there is a need to assess adherence of community-based health workers to the results given the problematic experiences with health workers at the primary health center level where treatment of malaria is often provided for febrile children and adults with RDT-negative test results.^{6,7} What is the potential contribution of providing enhanced diagnostic and treatment approaches (especially for presumed pneumonia) through iCCM on adherence to RDT test results, rational use of drugs, and quality of care in public as well as private sectors, e.g. the Affordable Medicine Facility-malaria?⁸

As iCCM expands, there will be a role to test different algorithms in various ecological and system contexts (Table 1).⁹ As the safety of treatment of severe disease with simple approaches is demonstrated, there is a need to understand how to scale these up while ensuring quality of care and outcomes. A key challenge will be to understand factors that influence adherence to therapy for malaria, pneumonia, or diarrhea. In addition, because infants in the first two months of life are especially vulnerable, regimens for community-based treatment or the utility of pre-referral therapy for serious infections need to be optimized. Part of the challenge there will be to ensure that mothers and other care providers are able to effectively recognize signs of illness, quickly seek appropriate care, and promptly accept recommended treatment and/or referral.

This special supplement of the American Journal of Tropical Medicine and Hygiene contains a number of excellent studies that fill in some of the gaps in the applied health research agenda for iCCM. The list provided in Table 1 includes a number of topics that were previously identified by CCM.ORG for which adequate evidence does not yet exist, and a number of new questions that have arisen during recent years as iCCM programs have expanded in many countries.

So, what are the next steps? We recommend that the operational and applied health research priorities for iCCM be systematically reviewed and updated using the methods developed by the Child Health and Nutrition Research Initiative.¹⁰ This approach to research priority setting requires a well-defined context, transparent evaluation criteria, and independent input

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TABLE 1
Global iCCM implementation research agenda*

Front-line health workers

1. What is the effect on the performance of CHWs when management of one or more disease is added to their existing responsibilities?
- 2. Which is the effect of iCCM in improving adherence to RDT test results and rational use of drugs?**
- 3. What are all of the roles that community-based health workers currently play apart from managing the 3 top killers, such as community-based surveillance, immunization, management of cholera, and preparing families for emergencies/outbreaks?**
4. Are CHWs able to assess, classify, and treat various illnesses under integrated CCM?
5. What are the best ways to improve and sustain performance of CHWs?
6. What are the costs and performance of different training methods for (illiterate/literate) CHWs?
7. What are the best methods for evaluating the quality of services provided by CHWs?
8. What is the optimal number of CHWs to give near universal coverage to a given geographic area?
- 9. What are the roles of community-based volunteers (Red Cross, etc.) and how do they link to CHWs and formal health systems?**
- 10. How do community-based volunteers fill gaps and can they take off some of the burden from CHWs?**
11. What are the best ways of supervising CHWs?
12. Which factors increase recruitment and reduce attrition?
13. Which methods of remuneration/incentivization are effective and sustainable?
- 14. How can mobile telecommunication technology (mHealth) improve the quality of care and supervision of CHWs?**

Implementation

15. What is the cost and cost-effectiveness of iCCM?
16. What are appropriate methods for cost recovery and financing?
17. How can effective coverage be achieved by CCM (equity, community effectiveness, etc.)?
- 18. Which is the role of community monitoring and local accountability in iCCM implementation?**
19. How can the private sector become involved in delivering iCCM and what role can iCCM play in improving the quality of care in the private and informal sectors?
20. How acceptable are CHWs to the health system, and how can CCM requirements for drugs, supplies, supervision, etc. be met? **Which are the minimum and optimal health systems support for iCCM to be effective?**
21. What are health system effects of CCM on referral patterns to and caseload and case mix at first level health facilities?
22. What is the effect of iCCM on antibiotic resistance?
23. What is the impact of iCCM on drug use and therapeutic outcomes in the community?
- 24. How best can CCM be implemented in fragile or emergency settings? How it can be streamlined, accelerated, targeted, and monitored to reach emergency affected communities or improve resilience? How quickly can CHWs be trained and mobilized in an emergency?**

Management of illness

25. How can available tools (RDTs, clinical signs, timers, drugs, pulse oximeters, etc.) be combined into clinical algorithms?
26. What is the algorithm performance in different epidemiologic and health system contexts?
- 27. Can mHealth applications play a role in improving the adherence of CHWs to clinical diagnostic and treatment algorithms?**
28. What is the appropriate duration of antibiotic treatment of WHO-defined non-severe pneumonia in African settings?
29. Can CHWs treat WHO-defined severe pneumonia in the community?
30. How can age-dose regimens for different drugs be harmonized, and what are the effects on treatment of different packaging techniques?
31. What is the impact of pre-referral drugs on clinical outcomes of children with severe disease?
- 32. What treatment options are effective and safe in settings where referral is not possible?**
33. What is the most appropriate antibiotic for treatment of pneumonia?
34. What is the most appropriate formulation of antibiotics?

Families and caregivers

35. Do family members recognize the disease and promptly seek care?
36. What are the elements that facilitate family members to use CCM services?
37. Do family members follow treatment recommendations properly?
- 38. How can timely referral completion be facilitated for severely ill children?**
- 39. Can mHealth applications be used to help family members recognize disease, seek care, and adhere to treatment recommendations?**
40. How does prescription of multiple medicines for multiple diseases (e.g., malaria and pneumonia) impact on adherence?
- 41. What key knowledge and tools can be provided by CHWs to families so they can care for themselves at home in the event of an emergency (home care) in the event that services are not accessible? How can families be best prepared for emergencies and outbreaks?**

Impact

42. What is the impact of iCCM on health and survival of children?
43. Does iCCM lead to increased penetration in terms of reaching the poor? (effective coverage)
- 44. What is the impact of iCCM on building community and health system resilience (e.g., coping with an emergency)?**

*New additions to the list of research priorities are indicated in **bold**. iCCM = integrated community case management; CHW = community health worker; RDT = rapid diagnostic test; WHO = World Health Organization.

from investors, technical experts, and other stakeholders.^{11–13} Some elegant examples of the outcome of this approach have been recently published.^{14,15} After a re-evaluation of research priorities for iCCM using the Child Health and Nutrition Research Initiative approach, there will be a need for donors, including international development agencies and foundations to provide funding to help address these gaps. Funding for implementation research on iCCM has been inconsistent and at times disappointing. Although it is encouraging that the interest for large-scale iCCM interventions is increasing, the iCCM community should realize there cannot be successful wide-scale iCCM implementation if it is not accompanied and

supported by sound and rigorous research because many critical questions remain to be answered. Such research can and should be built into iCCM implementation. The medium- and long-term results of additional delivery science experiments will help inform program, policies, and ultimately improve the health of children living in challenging, resource-poor environments.

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