

# Strong health systems save lives: Improving pneumonia case management at all levels

- Pneumonia — a preventable, treatable and curable disease — remains the leading infectious cause of death among children under five.
- A holistic approach is needed to strengthen pneumonia case management at every level of the health system.
- A coordinated global effort to tackle pneumonia must be underpinned by rigorous implementation research that answers pressing questions about prevention, diagnosis and treatment.

## Background

Pneumonia is an acute respiratory infection that limits oxygen intake and makes breathing painful. While incidence decreased by 30 percent between 2000 and 2015,<sup>[1]</sup> pneumonia is still the biggest infectious killer in children under five globally, accounting for an estimated 900,000 deaths in 2015.<sup>[2]</sup> This equates to almost two fatalities every minute — more than diarrhoea, malaria and measles combined. Over 75 percent of the fatalities are clustered in south Asia and sub-Saharan Africa.<sup>[2]</sup>

Over the past 20 years, the large-scale introduction of vaccines improved prevention of the disease. However, pneumonia case management lags behind. Early diagnosis and treatment at all levels of the health system could prevent more than two-thirds of pneumonia deaths,<sup>[3]</sup> but at least 40 percent of under-fives with pneumonia

are currently incorrectly diagnosed<sup>[4]</sup> and only 34 percent receive correct treatment.<sup>[5]</sup>

Incorrect diagnosis can lead to over-prescription of antibiotics for children with non-severe respiratory infections and under-treatment of those with pneumonia.<sup>[1]</sup> This is concerning, given the growing threat of antimicrobial resistance (AMR), which contributes to at least 700,000 deaths every year.<sup>[6]</sup> Building capacity to correctly diagnose and treat the disease at all health system levels therefore presents a huge opportunity to reduce childhood mortality.

# A holistic approach

## Our view

Malaria Consortium believes that effectively combating pneumonia requires a health systems strengthening approach, modelled on the World Health Organization’s Health Systems Framework (Figure 1).<sup>[7]</sup> Such an approach entails improving prevention, diagnostic aids and health worker training, and guaranteeing access to treatment at the community, health facility and hospital levels. Referral of children diagnosed with pneumonia also needs to be improved with support for patient transport and sharing of health records between different levels of the health system.

These interventions should be integrated with horizontal child health programmes, including integrated community case management (iCCM) at the community level and integrated management of childhood illnesses (IMCI) at the health facility level. It is also important to ensure that both private and public healthcare providers are targeted.

Pneumonia interventions need to be introduced at all levels of the health system to maximise impact; if hospitals cannot manage referred cases properly, the benefits of improved community-level diagnosis will not be felt. Unfortunately, hospitals in low-resource settings are often under-resourced and over-crowded. As a result, many acutely unwell children and newborns lack access to oxygen supplementation — an essential medical treatment, as low blood oxygen saturation increases the

under-five mortality rate six-fold.<sup>[8]</sup> Inadequate equipment, weak maintenance, high oxygen costs and poor clinical practices also need to be addressed.<sup>[9]</sup>

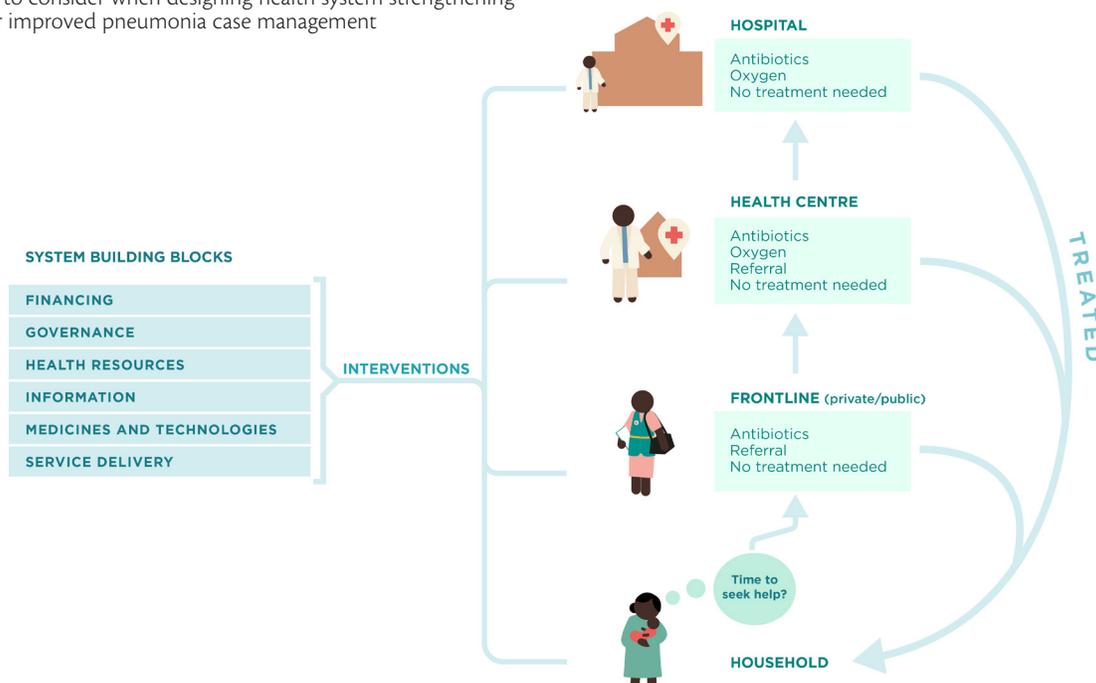
## High quality research

Malaria Consortium has been at the forefront of pneumonia case management implementation research over the past 10 years. A key element of this work was through the Acute Respiratory Infection Diagnostic Aid (ARIDA) project between 2016 and 2019. Through this project, we studied the usability and acceptability of two automated respiratory rate counting aids to help frontline health workers in Ethiopia and Nepal classify fast breathing.

In 2020, we plan to build on our previous work, as well as on our expertise in health systems strengthening, to conduct research in the three countries with the highest rates of pneumonia-related childhood deaths: Chad (23 percent), Nigeria (19 percent) and Ethiopia (17 percent).

Our research is part of the global effort to close current knowledge gaps relating to the prevention, diagnosis and treatment of pneumonia. We chair the research group of the Every Breath Counts coalition, which aims to end preventable child pneumonia deaths by 2030. In partnership with key international stakeholders, the coalition seeks to focus the pneumonia response on 10 countries that account for 60 percent of pneumonia deaths and agreed on global research priorities.

Figure 1: Factors to consider when designing health system strengthening interventions for improved pneumonia case management



## Recommendations

We recommend improving pneumonia case management through a health systems strengthening approach, taking into account the recommendations below.

1. **National governments, with support from technical partners and donors, should adopt comprehensive health systems strengthening approaches to improve pneumonia case management at all levels.** These need to be coupled with strong repair and replacement mechanisms for diagnostic devices, innovations to ensure an uninterrupted power supply to oxygen management systems, and strengthened supply chains for commodities. Integration with existing national and local frameworks, e.g. national oxygen roadmap, will also be key.
2. **Donors should fund implementation research in line with the priorities set by the Every Breath Counts coalition.** For example, evidence is needed on the usability of new automated respiratory rate counters at the community level and multimodal devices at the health facility and hospital levels. The results of such research should enable decision makers to improve health systems strengthening interventions for pneumonia at the most appropriate settings and levels.
3. **The global community should better support pneumonia case management at country level through providing improved guidelines.** The World Health Organization could provide further guidance on the inclusion of pulse oximetry into the iCCM/IMCI algorithm, for example. A technical consultation is needed to develop global and country-specific guidance for health workers on how to detect, classify and treat or refer children under five with hypoxemia.
4. **National governments should work with technical partners to strengthen the training and supervision of health workers to improve their ability to correctly diagnose, treat and refer children at each level of the health system.** Training should also help community health workers appropriately counsel caregivers on preventive behaviours — such as pneumococcal vaccines, exclusive breastfeeding for infants under six months to boost their immunity to infection, and the use of clean cooking fuels to reduce household air pollution — as well as advise on correct adherence to antibiotics and recommended follow-up visits.
5. **Programme implementers should actively engage communities in pneumonia prevention and control.** This will help ensure that interventions are locally accepted and meet communities' needs.
6. **Donors and the pharmaceutical industry must commit to research investments to prevent AMR.** The prevalence and severity of antibiotic resistant bacterial pneumonias needs to be assessed. This data should be fed into international AMR databases — including the Global Antimicrobial Resistance Surveillance System — to better inform clinical decisions, promote the rational use of amoxicillin dispersible tablets and improve international and national policies.

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