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## Research Priorities for Eight Areas of Adolescent Health in Low- and Middle-Income Countries


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 A B S T R A C T

**Purpose:** To conduct an expert-led process for identifying research priorities for eight areas of adolescent health in low- and middle-income countries. Specific adolescent health areas included communicable diseases prevention and management, injuries and violence, mental health, non-communicable diseases management, nutrition, physical activity, substance use, and health policy.

**Methods:** We used a modified version of the Child Health and Nutrition Research Initiative methodology for reaching consensus on research priorities. In a three phase process, we (1) identified research and program experts with wide-ranging backgrounds and experiences from all geographic regions through systematic searches and key informants; (2) invited these experts to propose research questions related to descriptive epidemiology, interventions (discovery, development/testing, and delivery/implementation), and health policy/systems; and (3) asked the experts to prioritize the research questions based on five criteria: clarity, answerability, importance or impact, implementation, and equity.

**Results:** A total of 142 experts submitted 512 questions which were edited and reduced to 303 for scoring. Overall, the types of the top 10 research questions in each of the eight health areas included descriptive epidemiology (26%), interventions: discovery (11%), development/testing (25%), delivery (33%), and policy, health and social systems (5%). Across health areas, the top questions highlighted integration of health services, vulnerable populations, and different health platforms (such as primary care, schools, families/parents, and interactive media).

**Conclusions:** Priority questions have been identified for research in eight key areas of adolescent health in low- and middle-income countries. These expert-generated questions may be used by donors, program managers, and researchers to prioritize and stimulate research in adolescent health.

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**IMPLICATIONS AND CONTRIBUTION**

The Department of Maternal, Newborn, Child, and Adolescent Health of the World Health Organization (WHO) conducted an exercise to establish global research priorities for adolescent health in low- and middle-income countries through 2030, building on earlier work that proposed research priorities in adolescent sexual and reproductive health.

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**Disclaimer:** The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of WHO.

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In 2014, there were 1.2 billion adolescents aged 10–19 years old, comprising 16.4% of the world's population. Adolescent mortality was estimated at 1.3 million in 2012, with the leading global causes of death being road injury, human immunodeficiency virus (HIV), suicide, lower respiratory infections, and interpersonal violence [1]. The great majority of the world's

adolescents live in low- and middle-income countries (LMICs) [1], and 97% of deaths among young people occur in LMICs [2]. In the past 50 years, reductions in early child mortality have been greater than declines in adolescent mortality [3].

In terms of the global burden of diseases, the top three causes of disability-adjusted life years lost among adolescents are unipolar depressive disorders, road injury, and iron-deficiency anemia [1]. However, mortality and disability-adjusted life year data will underestimate the potential disease burden among adolescents because they do not reflect conditions and behaviors that can lead to future disability and mortality later in life, such as tobacco use and dependence or physical inactivity [4]. Health-related risk behaviors adopted or consolidated during adolescence may not always affect the adolescent's health during the second decade of life but will have a substantial effect later in life, and some will affect the health of future generations [4,5].

Improving the health of adolescents in LMICs will be essential for the world to achieve the United Nations Sustainable Development goals [6], and the specific targets and goals included in the United Nations Secretary General's Global Strategy for Women's, Children's and Adolescents' Health [7]. Although there has been an increased call for research on the health and wellbeing of adolescents and young people to guide these and other global and national initiatives, research from LMICs is still limited [1,8].

Here, we report the findings from an exercise to identify research priorities for eight areas of adolescent health in LMICs with the aim of stimulating research on the priority questions identified. The specific areas of adolescent health selected for inclusion were communicable diseases prevention and management (including diarrhea, parasites, hepatitis, malaria, meningitis, tuberculosis, influenza, pertussis, pneumonia, and others), injuries and violence, mental health, noncommunicable diseases management (including asthma, diabetes, cancer, hypertension, heart disease, and others), nutrition, physical activity, substance use, and adolescent health: policy, health and social systems. Of note, adolescent sexual and reproductive health and related topics were not included, as they had been the subject a recent similar research prioritization exercise [9].

## Methods

The Child Health and Nutrition Research Initiative (CHNRI) developed a method for ranking the relative importance of competing research options to help decision makers to effectively allocate limited resources to reduce morbidity and mortality [10]. The CHNRI approach has previously been applied to more than 50 health areas [11–15], including adolescent sexual and reproductive health [9].

We implemented a modified version of the CHNRI priority setting method in three phases. In Phase 1, we identified research and program experts through systematic searches of published and gray literature, members of journal editorial boards, and through interviews with key informants at WHO, and invited them to participate in the exercise. In Phase 2, we asked the experts who agreed to participate to propose research questions related to descriptive epidemiology, interventions, and health and social systems research. In Phase 3, we asked the same experts to prioritize the research questions generated in Phase 2 using a scoring scheme based on five criteria.

### Phase 1: Identification of Research and Program Experts

Experts were identified through journal publications, membership of journal editorial boards, from lists of participants at WHO meetings and consultations, and by nominations from relevant WHO departments. For journal publications, we identified experts in each health area through a systematic search of PubMed and Web of Science databases from 2005 to 2015. To be included on this preliminary list, authors had to have published at least two relevant articles within a specific health area that explicitly covered adolescents (ages 10–19 years) in LMICs during the 2005–2015 period. If more than 20 experts met these criteria, then the number was reduced to a maximum of 20, based on number of publications, relevance of the titles of the articles, and the position of authorship, with discrepancies resolved through discussion by D.R. and J.F. This resulted in 116 experts.

We searched for peer-reviewed journals related to adolescent health in all six official United Nations languages. Members of the editorial boards of the two peer-reviewed journals related to adolescent health with the highest impact factor (*Journal of Adolescent Health*—2.75 and *Journal of Research on Adolescence*—2.51) based on Web of Science Journal Citation Reports for 2013 [16] were included in the adolescent health: policy, health and social systems area. This identified an additional 69 experts.

Since the experts identified through the systematic PubMed and Web of Science search were likely to mainly be researchers, we also identified participants at WHO meetings and consultations held in 2010–2015 and that were relevant to the eight adolescent health areas through reports that were available on the WHO website and the WHO Index Medicus, a database focused on health literature produced by and within LMICs from all regions. Such meetings usually include program implementers and policymakers and researchers. The meetings included several that had participation by young persons themselves. We also invited representatives of the WHO departments relevant to each health area to review the lists and nominate any additional key experts in their respective fields. Overall, this resulted in 265 additional experts.

Combining the list of experts resulted in a total of 450 different individuals (Table 1). All these 450 experts were sent an invitation to participate in the research prioritization process, and 217 (48%) agreed to participate.

### Phase 2: Identification of Research Questions

The experts identified in Phase 1 were divided into groups based on their expertise in the eight adolescent health areas. Each expert was asked to propose research questions of the greatest priority for adolescent health within their health area related to descriptive epidemiology, interventions, and health and social systems research:

1. *Descriptive epidemiology* (1 question): descriptive studies, designed to measure burden of disease, explore risk, and protective factors.
2. *Intervention research*
  - A. *Discovery research* (1 question): designed to create new interventions.
  - B. *Development and testing research* (1 question): development, testing, and evaluation of interventions.

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