

Appendix E. Top 10 research questions according to their total Research Priority Score, by research type								
Research type	Health area	Clarity score	Answerability score	Impact score	Implementation score	Equity score	Total score (Research Priority Score)	Average Expert Agreement
Descriptive epidemiology								
1	Considering comprehensive theoretical models and variables from different levels/systems/contextes (e.g., Socio-ecological Model), which variables predict, at an individual or population level, the different patterns of physical activity in adolescents living in low- and middle-income countries?	Physical activity	91	100	100	100	100	98
2	What are treatment adherence rates, and what are the risk factors for non-adherence or default, among adolescents on long-term treatment for TB?	Communicable diseases	100	94	97	94	97	93
3	What is the incidence and burden of TB among younger (10-14y) and older (15-19y) adolescents in the world, by sex particularly among adolescents with HIV, and what proportion of the adolescents have drug resistant TB?	Communicable diseases	91	100	91	85	91	87
4	What are the true rates (based on empirical data not models) of mortality and DALYs lost from diarrhoeal disease and from lower respiratory tract infections in adolescents (10-14y and 15-19y) by sex, SES, rural/urban, by HIC/UMIC/LMIC/LIC, and by world region?	Communicable diseases	91	94	90	88	94	85
5	What are the causes of anaemia among adolescent girls and how does this vary by region?	Nutrition	98	85	93	92	93	87
6	What are the rates of development of anti-tuberculosis drug resistance in adolescents?	Communicable diseases	82	100	91	91	81	82
7	What are the global and regional levels and trends in physical activity (by type and degree) among adolescents over time and also by age, both at a population level (eg. repeated cross-sectional studies) and in the same individuals over time (ie. longitudinal studies) in LMICs?	Physical activity	91	91	95	73	95	85
8	What are the risk factors contributing to adolescents' substance use in the different world regions?	Substance use	73	86	91	86	91	78
9	What are the knowledge, attitudes and beliefs about the benefits of physical activity among adolescents in low- and middle-income countries?	Physical activity	91	91	82	91	95	84
10	What are the relationships between early pregnancy and stunting, anaemia, and NCD risk (overweight, diabetes, hypertension)?	Nutrition	89	97	87	89	79	84
	Descriptive epidemiology (mean)		90	94	92	89	92	86
Intervention: Discovery								
1	What is the best (feasibility, cost, acceptability, effectiveness, sustainability) design of a school-based intervention that aims to engage and gain the support of students, parents and teachers for young people to take the recommended 60 minutes of physical activity daily, and to ensure that there are at least two physical education (PE) classes within schools per week, with at least 50% of the time for PE classes spent in moderate-to-vigorous intensity physical activity)?	Physical activity	70	100	100	100	100	94
2	What prevention and treatment services related to substance use are acceptable to adolescents?	Substance use	95	95	100	100	95	95
3	Can a low cost rapid antigen test for diagnosis of streptococcal pharyngitis (which can lead to rheumatic heart disease) be developed that is suitable for use in low resource settings?	NCD management	95	95	86	86	77	84
4	Is the use of electronic substitutes for nicotine delivery by adolescents a gateway or replacement mechanism for smoking?	Substance use	91	86	91	91	73	80
5	What is the best design of an intervention with the central theme "Healthy Students Study Better" that aims to link the central concerns of parents and teachers for healthy lifestyles, including physical activity, to a better capacity for students to learn?	Physical activity	75	90	90	75	85	72
6	What are the most effective strategies for evaluating community-based interventions for reducing the burden of substance use among adolescents?	Substance use	91	86	86	86	82	82
7	Which theoretical and evidence-based framework should guide decision-making on the most effective strategies and the most relevant types/domains of physical activity to reduce physical inactivity among adolescents living in low- and middle-income countries?	Physical activity	95	90	90	85	72	75
8	What are the effectiveness and cost-effectiveness of an innovative intervention to reduce sedentary behaviour and promote leisure time physical activity that draws on a culturally relevant model?	Physical activity	80	80	85	85	85	68
9	When controlled for other socioeconomic factors, is TB disease during adolescence associated with lower earning potential, and/or higher prevalence or severity of depression, and/or higher prevalence of substance use?	Communicable diseases	85	91	81	72	84	70
10	What is the relationship between cognitive development and physical activity/exercise in children and adolescents?	Physical activity	100	90	85	85	65	80
	Intervention: Discovery (mean)		88	90	89	87	82	80
Intervention: Development / Testing								
1	What would be the most cost-effective, affordable and feasible package of interventions for promotion of mental health and prevention of mental health disorders among adolescents?	Mental health	92	95	100	92	86	88
2	What are the effects of daily physical education and recreation on total physical activity levels, physical fitness, cognitive development, and school performance among children and adolescents?	Physical activity	90	95	95	90	90	86
3	What is the best way to help adolescents to adhere to TB medication when they are also taking ARVs?	Communicable diseases	88	88	94	94	90	84

4	Can overall duration of TB treatment and/ or frequency of TB medication dosing be reduced to facilitate adherence and improve rates of treatment completion among adolescents?	Communicable diseases	94	83	100	90	80	90	84
5	What are effective interventions to prevent and treat mental health problems of adolescents that can be delivered at primary care level in LMICs?	Mental health	100	97	89	87	82	89	88
6	What are the most cost-effective interventions to decrease multiple health-risk behaviours and conditions and promote healthy behaviours?	Policy, health and social systems	82	92	92	91	73	88	80
7	Is TB screening at school registration in adolescents cost-effective?	Communicable diseases	88	88	90	90	83	88	82
8	What works in co-producing (ie. working with young people to design) interventions to promote physical activity in young people from low and middle-income families?	Physical activity	80	85	90	90	85	88	84
9	What are effective interventions addressing self-harm/suicide in adolescent girls in LMICs?	Mental health	97	87	97	79	76	87	82
10	What is the efficacy and effectiveness of a screening instrument linked to a brief intervention for alcohol use among adolescents for use in primary care settings?	Substance use	77	91	86	91	82	87	78
	Intervention: Development/Testing (mean)		89	90	93	89	83	90	84
	Intervention: Implementation/Delivery								
1	How best can the capacity of the education sector be improved to deliver high quality physical education programs within schools?	Physical activity	89	100	100	94	94	98	93
2	How does one best implement a sustainable, structured physical activity program for adolescents in schools and out of schools in LMICs?	Physical activity	78	100	100	100	89	98	93
3	What are the key barriers faced by adolescents to access TB and TB/HIV diagnostic and treatment services in high and low income countries, and how can these be overcome?	Communicable diseases	100	97	100	90	97	97	95
4	How best can parents, teachers, and policymakers be engaged in creating physical activity-friendly school environments for children and adolescents?	Physical activity	100	89	100	89	94	94	91
5	What are scalable and sustainable approaches to improve physical activity in children and adolescents, particularly in low-to-middle income countries?	Physical activity	89	83	94	100	100	94	91
6	What is the potential contribution of peer-led interventions for improving retention in care among adolescents with TB and/or HIV?	Communicable diseases	97	94	97	91	90	94	87
7	How can effective local interventions for increasing physical activity in adolescents best be scaled up for national and cross-national implementation?	Physical activity	100	100	94	94	83	93	91
8	Which programmatic interventions developed to improve adolescent retention in care and treatment adherence for other communicable diseases (i.e. HIV) would be useful for application in TB programs?	Communicable diseases	88	93	93	90	93	93	84
9	What are adolescents' preferences for type of physical activities by community and the relationship of this to their cultural background?	Physical activity	89	94	94	89	89	92	84
10	How effective and cost-effective is the integration of HIV and TB surveillance to enhance early detection and case management in adolescents?	Communicable diseases	100	100	94	88	78	91	85
	Intervention: Implementation/Delivery (mean)		93	95	97	92	91	94	90
	Health policy, health and social systems								
1	What are the policy and/or environmental changes that influence physical activity among adolescents in low- and middle-income countries?	Physical activity	100	100	100	94	94	98	96
2	How best can physical exercise programs for children and adolescents be initiated in public health care systems?	Physical activity	89	94	89	89	89	90	82
3	How can the policies of various sectors align and interact to promote physical activity and health in adolescents living in low- and middle-income countries?	Physical activity	67	83	89	89	94	89	78
4	How can mental health and psychosocial support (including identification, support and basic management of relevant conditions) be integrated with adolescent friendly services, general health, reproductive health etc?	Mental health	91	91	94	79	71	86	74
5	What are the barriers to adolescents with severe mental disorders receiving diagnosis, treatment and care?	Mental health	97	91	82	76	88	84	78
6	What training, support and supervision will enable existing health workers to recognize, and provide basic treatment for common adolescent mental disorders?	Mental health	94	97	91	76	65	84	80
7	What is the role of social media/online advertising in adolescents' uptake of alcohol or tobacco?	Substance use	90	90	85	80	80	84	80
8	What is the extent of adolescents' access to and utilization of smoking cessation services in LMIC?	Substance use	70	90	85	80	80	84	72
9	To what extent do national health policies in LMICs address substance use by adolescents?	Substance use	60	85	85	80	80	83	62
10	What impact will the incorporation of mental health services into juvenile justice and child social-welfare systems have on outcomes for children in LMICs?	Mental health	85	88	82	71	85	82	72
	Health policy, health and social systems (mean)		84	91	88	82	83	86	77
	Overall (mean)		89	92	92	88	86	90	83