**Supplementary table 1.** Research questions on adolescent HIV testing, treatment and service delivery ranked in order of Research Priority Scores (RPS)

| Rank | Research questions | Research domain | Answerability score | Impact score | Implementation score | Equity score | Research priority score\* | Average expert agreement\*\* |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| HIV TESTING |
| 1 | What are acceptable and effective strategies or interventions to improve access and uptake of HIV testing services by adolescents?*Consider different strategies for sub groups such as young/older adolescents, urban/rural, adolescent girls and boys. Intervention or strategies may include, but are not limited to, stigma reduction, demand creation activities, comprehensive sexuality education and mHealth etc.* | Development | 91 | 92 | 87 | 92 | **90,6** | 81 |
| 2 | What individual, programmatic and structural factors enable or hinder newly diagnosed adolescents to link to HIV treatment and care?*Consider different sub groups such as young/older adolescents, key populations, gender and sex etc.* | Delivery | 88 | 88 | 86 | 87 | **87,5** | 75 |
| 3 | What strategies or interventions ensure timely linkage between HIV diagnosis and HIV treatment and care services for adolescents living with HIV?*Consider different strategies for sub groups such as young/older adolescents, key populations, urban/rural, adolescent girls and boys etc. Interventions or strategies may include, but are not limited to, peer interventions, loss to follow up tracing, community based and mHealth etc.* | Delivery | 89 | 86 | 85 | 88 | **87,1** | 77 |
| 4 | For adolescents from key populations, what are safe, acceptable and effective strategies or interventions to improve access and uptake of HIV testing services?*Consider different strategies for adolescents from different key population groups. Intervention or strategies may include, but are not limited to, stigma reduction, demand creation activities, outreach, and mHealth etc.* | Development | 88 | 89 | 80 | 88 | **86,8** | 73 |
| 5 | What are the individual, programmatic and structural factors that enable or hinder access and uptake of HIV testing services by adolescents?Consider different sub groups such as young/older adolescents, key populations, gender and sex etc. | Descriptive | 86 | 86 | 83 | 85 | **85,0** | 70 |
| 6 | What consent policies and practices facilitate the access and uptake of HIV testing services among adolescents?*These may include, but are not limited to, lowering the age of consent, use of best interest principles and policies, parent support interventions and protocols for providers etc.* | Descriptive | 85 | 85 | 78 | 83 | **83,3** | 68 |
| 7 | What strategies or interventions are effective for identifying adolescents at high risk of HIV for high yield testing, especially in low HIV prevalence settings?*Interventions or strategies may include, but are not limited to, screening tools, index parent, partner testing and new innovations etc.* | Development | 84 | 84 | 80 | 80 | **82,4** | 65 |
| 8 | Is self-testing a safe, acceptable and feasible HIV testing approach for adolescents? | Descriptive | 79 | 82 | 72 | 75 | **77,9** | 60 |
| 9 | Is self-testing effective in increasing the uptake of HIV testing and improving linkage to care among adolescents? | Delivery | 78 | 80 | 70 | 75 | **76,3** | 57 |
| 10 | What is the acceptability, feasibility, sustainability and cost effectiveness of implementing school-based testing for adolescents? | Development | 81 | 79 | 70 | 72 | **76,3** | 62 |
| 11 | What are the rates, predictors and correlates for HIV infection among adolescents? | Descriptive | 79 | 71 | 74 | 75 | **74,1** | 58 |
| 12 | What community based approaches are effective at identifying undiagnosed HIV positive adolescents? | Delivery | 55 | 54 | 47 | 49 | **51,8** | 74 |
| HIV TREATMENT |
| 1 | What are effective strategies or interventions to improve adherence among adolescents on ART?*These may include, but is not limited to, mHealth, mental health interventions, treatment strategies, peer interventions and financial and social incentives etc.* | Development | 93 | 91 | 83 | 88 | **89,3** | 78 |
| 2 | What is the safety, efficacy and acceptability of novel drug delivery systems to improve treatment outcomes for adolescents?*These include but, are not limited to, long-acting or extended release delivery systems for example a single dose regimen (injection) or continuous dosing regimen (implant, transdermal patch, optimization of oral formulations etc.).* | Discovery | 91 | 92 | 80 | 84 | **88,0** | 75 |
| 3 | What are the individual, programmatic and structural factors that enable or hinder adherence among adolescents taking ART? | Development | 89 | 89 | 84 | 86 | **87,2** | 76 |
| 4 | What simplified screening tools can be developed and validated to assess the risk of non adherence and treatment failure among adolescents on ART? | Development | 87 | 86 | 81 | 81 | **84,1** | 69 |
| 5 | How to optimise the prevention and/or clinical management of co-infections, particularly tuberculosis, for adolescents living with HIV to improve clinical outcomes? | Development | 83 | 84 | 82 | 86 | **83,5** | 70 |
| 6 | What are the optimal 1st, 2nd, and 3rd regimens and formulations to maximise adherence and treatment outcomes for adolescents living with HIV? | Discovery | 84 | 83 | 82 | 84 | **83,4** | 72 |
| 7 | What is the impact of HIV infection and/or ART exposure on long term outcomes among adolescents living with HIV?*These include, but are not limited to, prevelance and outcomes of non-communicable disease (cardiovascular, respiratory, metabolic), developmental outcomes (physical-, neuro-, psycho- and sexual development), disease progression and mortality, and quality of life, psychosocial and educational outcomes etc.* | Descriptive | 92 | 85 | 75 | 78 | **83,3** | 70 |
| 8 | What are the risk factors for non-communicable diseases among adolescents living with HIV and the optimal simplified screening tools to identify them? | Descriptive | 90 | 84 | 77 | 76 | **82,3** | 69 |
| 9 | What are the rates and correlates of virological suppression and treatment failure among adolescents on ART? | Development | 86 | 83 | 78 | 79 | **81,9** | 66 |
| 10 | What is the optimal frequency of viral load monitoring to prevent and identify virological failure among adolescents on ART? | Development | 89 | 80 | 76 | 75 | **80,0** | 66 |
| 11 | What simplified screening tool can be developed and validated to assess neurocognitive development and mental health disorders among adolescents living with HIV? | Discovery | 86 | 78 | 74 | 78 | **79,4** | 63 |
| 12 | What are the patterns and correlates of HIV drug resistance among adolescents living with HIV? | Descriptive | 85 | 80 | 73 | 77 | **79,2** | 63 |
| 13 | What is the prevalence of opportunistic and coinfections amongst adolescents living with HIV, especially tuberculosis and hepatitis? | Descriptive | 86 | 75 | 70 | 74 | **76,3** | 58 |
| 14 | What is the prevalence of ARV related side effects among adolescents on ART?*These may include, but are not limited to, renal, physical changes - skin lipoatrophy, lipo-hypertrophy, dyslipidaemia etc.* | Development | 86 | 74 | 68 | 70 | **74,7** | 55 |
| 15 | What are the best immunisation strategies for adolescents living with HIV?*These may include, but are not limited to, revaccination, novel vaccinations and standard vaccination procedures etc.* | Discovery | 79 | 69 | 68 | 67 | **70,6** | 51 |
| 16 | What are the levels of adherence by age and population (such as route of infection, high-risk group) amongst adolescents on ART? | Delivery | 78 | 69 | 70 | 67 | **70,5** | 50 |
| 17 | How does the age at ART initiation impact clinical and programme outcomes for those infected during adolescence? | Descriptive | 78 | 70 | 62 | 65 | **69,0** | 51 |
| HIV SERVICE DELIVERY |
| 1 | What are effective interventions to improve retention in care among adolescents living with HIV?*Consider sub groups such as younger adolescents, key populations, and gender. Interventions may include, but are not limited to, outreach, community or school based, adolescent friendly health services, peer interventions, mHealth, tracking loss to follow up, financial and social incentives, and those addressing structural barriers etc.* | Development | 95 | 92 | 91 | 90 | **92,4** | 85 |
| 2 | Among adolescents living with HIV, what are effective strategies or interventions to improve sexual and reproductive health (SRH) outcomes?*These may include, but are not limited to, intervention to reduce SRH risk taking behaviours; increase use and uptake of SRH information and services; and rate of sexually transmitted infections etc.* | Delivery | 88 | 89 | 85 | 88 | **87,8** | 76 |
| 3 | What strategies or interventions are effective in supporting pregnant adolescents living with HIV to improve the health outcomes of the mother-baby pair? | Development | 91 | 88 | 84 | 86 | **87,5** | 78 |
| 4 | What peer interventions or models are effective in improving health outcomes for adolescents along the HIV cascade?*These may include, but are not limited to, peer navigators, peer networks, peer support groups or clubs, peer outreach workers, peers providers, camps and mHealth etc* | Development | 89 | 88 | 87 | 86 | **87,5** | 76 |
| 5 | What are effective psychosocial support strategies or interventions for adolescents living with HIV to improve health, wellbeing and programmatic outcomes?*Consider sub groups such as key populations, pregnant adolescents, and different delivery settings etc. Interventions may include, but are not limited to, peer interventions, support groups, counselling, and mHealth etc.* | Development | 90 | 88 | 84 | 84 | **86,9** | 73 |
| 6 | What are effective, acceptable, feasible and cost-effective models for perinatally HIV infected adolescents as they transition from paediatric to adult ART services?*These may include, but are not limited to, transitional clinics, joint paediatric/adult care before transition, peer interventions, and mHealth etc.* | Development | 90 | 87 | 86 | 83 | **86,7** | 75 |
| 7 | What differentiated service delivery models are appropriate and effective in improving health and programmatic outcomes for adolescents living with HIV?*Consider different sub populations groups such as younger adolescents, pregnant adolescents, and adolescent from key populations etc.* | Delivery | 87 | 89 | 85 | 84 | **86,7** | 73 |
| 8 | What are the individual, programmatic and structural factors that enable or hinder adolescents living with HIV to be retained in services? | Delivery | 90 | 83 | 84 | 86 | **85,5** | 72 |
| 9 | What are effective prevention, promotion and treatment strategies or interventions to improve mental health outcomes among adolescents living with HIV? | Development | 91 | 86 | 79 | 82 | **85,0** | 70 |
| 10 | What service delivery models are effective in improving the health and programmatic outcomes of adolescents along the HIV cascade?*Consider sub groups such as key population. Interventions may include, but are not limited to, adolescent clinics, decentralised primary health clinics, mobile and community based services etc* | Development | 88 | 85 | 82 | 82 | **84,4** | 70 |
| 11 | What are the sexual and reproductive health needs, characteristics and their associated outcomes of adolescents living with HIV?*Consider current sexual activity, age of sexual debut, fertility desires, partner numbers and status and risk taking behaviours etc* | Descriptive | 90 | 84 | 80 | 83 | **84,4** | 72 |
| 12 | How can effective adolescent friendly health services be best implemented in decentralised health care settings for adolescents living with HIV, taking into consideration cost effectiveness, feasibility, and sustainability? | Development | 85 | 86 | 81 | 83 | **84,3** | 69 |
| 13 | How can effective peer interventions for adolescents living with HIV be implemented at scale, taking into consideration cost effectiveness, feasibility, sustainability, and acceptability? | Development | 85 | 85 | 80 | 82 | **83,3** | 68 |
| 14 | What are effective strategies or interventions to reduce stigma and discrimination, including self-stigma, experienced by adolescents living with HIV?*Consider interventions in different settings such as community, home, health facilities, and education system etc.* | Delivery | 87 | 82 | 80 | 80 | **82,5** | 67 |
| 15 | How can effective retention strategies or interventions be implemented in different settings at scale, taking into consideration cost effectiveness, feasibility and sustainability? | Delivery | 85 | 81 | 80 | 80 | **81,4** | 64 |
| 16 | How can effective psychosocial support strategies or interventions be implemented at scale, taking into consideration cost effectiveness, feasibility and sustainability? | Development | 83 | 82 | 80 | 80 | **81,4** | 65 |
| 17 | What strategies or interventions are appropriate and effective in supporting self-efficacy and resilience among adolescents living with HIV? | Delivery | 82 | 82 | 77 | 78 | **80,1** | 59 |
| 18 | What are the outcomes and characteristics of perinatally HIV infected adolescents transitioning from paediatric to adult ART services? | Descriptive | 86 | 80 | 78 | 76 | **80,0** | 67 |
| 19 | What are the rates, predictors and correlates of loss-to-follow-up among adolescents living with HIV? | Descriptive | 83 | 80 | 76 | 79 | **79,8** | 64 |
| 20 | What are effective strategies or interventions to support the development of relationships and communication skills, for parents and caregivers, to improve health and programmatic outcomes for adolescents living with HIV? | Delivery | 87 | 77 | 79 | 76 | **79,4** | 62 |
| 21 | Among adolescents living with HIV, what are the literacy, knowledge, and understanding levels regarding HIV, ART, and sexual and reproductive health, and how can they be improved? | Descriptive | 84 | 78 | 78 | 79 | **79,3** | 64 |
| 22 | What school based strategies or interventions are effective, appropriate and feasible to support the health and educational outcomes of adolescents living with HIV? | Delivery | 80 | 80 | 77 | 76 | **78,8** | 63 |
| 23 | What are the rates, correlates and impact of mental health disorders among adolescents living with HIV?*Consider sub groups such as young/older adolescents, sex and gender identity, key populations, and mode of infection.* | Descriptive | 83 | 81 | 70 | 75 | **78,1** | 59 |
| 24 | What is the level of stigma and discrimination experienced by adolescents living with HIV in different settings and its impact on health and wellbeing, educational and programmatic outcomes? | Descriptive | 83 | 78 | 74 | 77 | **78,0** | 61 |
| 25 | What strategies or interventions can be implemented to support late disclosure to adolescents living with HIV?*Consider interventions for adolescents, parents and caregivers and/or health providers etc* | Development | 78 | 78 | 74 | 75 | **76,6** | 58 |
| 26 | What individual, programmatic, societal and structural factors enable or hinder the improvement of self-efficacy and resilience among adolescents living with HIV? | Descriptive | 82 | 76 | 73 | 76 | **76,6** | 57 |
| 27 | What models of health provider capacity building are effective, feasible and sustainable in improving health and programmatic outcomes for adolescents living with HIV?*Models may include, but are not limited to, routine supervision, mentoring, audits with feedback and continuous quality improvementetc* | Development | 80 | 75 | 75 | 73 | **75,6** | 56 |
| 28 | What strategies or interventions are effective in supporting adolescents to disclose to others?*Consider family, sexual partners, friends, teachers and work colleagues.* | Discovery  | 80 | 76 | 73 | 71 | **75,0** | 55 |
| 29 | Among adolescents living with HIV, what are rates and influencing factors of disclosure/nondisclosure to others?*Consider family, sexual partners, friends, teachers and work colleagues.* | Development | 80 | 76 | 71 | 71 | **74,7** | 55 |
| 30 | What are the pregnancy rates of adolescents living with HIV and what are the characteristics and outcomes of pregnant adolescents living with HIV? | Descriptive | 82 | 73 | 69 | 73 | **73,8** | 56 |
| 31 | What is the impact of different types of violence on the health outcomes of adolescents living with HIV? | Descriptive | 76 | 72 | 69 | 71 | **72,1** | 50 |
| 32 | What are rates, influencing factors and outcomes of late disclosure among adolescents living HIV? | Descriptive | 75 | 71 | 70 | 70 | **71,4** | 50 |

\*Research Priority Score (RPS) is the mean score given across criteria (answerability, impact, implementation and equity) and scorers for each research question, weighted according to published guidelines from CHNRI stakeholders and adjusted to a 100-point scale.

\*\*Average Expert Agreement (AEA) is the average proportion of scorers that agreed on responses for each of the four criteria of answerability, impact, implementation and equity.