

Annex 26A. Methodology and Results of Systematic Search, Cost-Effectiveness Analysis

Supplemental material for: Horton, S., E. de la Cruz Toledo, J. Mahon, J. Santelli, and J. Waldfogel. "Identifying an Essential Package for Adolescent Health: Economic Analysis." In *Disease Control Priorities* (third edition), Volume 8, *Child and Adolescent Health and Development*, edited by D.A.P Bundy, N. de Silva, S. Horton, D.T. Jamison, and G.C Patton. Washington DC: World Bank.

Acknowledgement

Thanks to Vittoria Lutje for running the initial search for abstracts for the search involving low- and middle-income countries and to Ramesh Lamsal for the search involving high-income countries.

Methodology

The economic analysis was based on systematic literature searches undertaken for the project. The search terms are given in Tables 26A.1 (search for low and middle income countries) and 26A.2 (separate search also including high income countries).

One search was conducted in PubMed, EMBASE and Cochrane library in January 2015 and included journal articles published in English between January 1st, 2000 and January 22nd, 2015. The focus was restricted to low- and middle-income countries.

All titles and abstracts of the publications returned from the search for low income countries were screened and duplicates were removed. Full texts were obtained only for studies conducted in low- and middle-income countries and contained estimates of cost-effectiveness of child and adolescent development. Only studies with primary data on unit cost or cost modelled with data from a credible or known source such as WHO-CHOICE (World Health Organization's "Choosing Interventions which are Cost-Effective") or DHS (Demographic and Health Surveys) were included. Studies conducted from the perspective of the health system, hospital, program, or from economic or societal perspective, if the health system costs were delineated, were also included. Studies with no detailed description of the interventions, time and location of data collected and data analysis were excluded. Cost-effectiveness information was extracted from the selected articles and summarized in the volume. Articles did not meet the inclusion criteria were discarded. All articles chosen for extraction were read by two readers and any discrepancies in cost-effectiveness data extracted were resolved by discussion.

All cost-effectiveness data were standardized to US dollars of 2012 as follows. First, costs were converted back into the currency of the original study country using exchange rates from the World Development Indicators (World Bank, 2013). Using the consumer price index from the same source, the prices were updated to the year 2012. The costs and cost-effectiveness results were then converted back to US dollars using the 2012 market exchange rate.

Figure 26A.1 provides a flowchart summarizing the results from the search for low and middle income countries. Chapter 26 utilizes only the results applicable to selected topics discussed in the chapter on adolescence (which included two studies on education regarding sexual health and one study on nutrition promotion in schools). The other four studies identified came from expert searches.

The other search was conducted in PubMed on June 2014 and was limited to journal articles published in English language from January 1st, 2000 to June 26th, 2014: from this search, the systematic reviews for high income countries were obtained, and also the one study on smoking in low and middle income countries.

Table 26A.1. Search Terms used for Systematic Search for *Child and Adolescent Health and Development* for Low- and Middle-Income Countries

Category of terms	Terms
Age-group terms	[child* OR adolescen* OR teen* OR teenage* OR "school-age" OR pubescen* OR prepubescen* OR puberty OR youth* OR minor* OR "school based" OR "school-based" OR school OR preschool OR "pre-school" OR childcare OR "child care" OR "young people"]
AND	
Conditions:	
a. Nutrition in 5-19 year olds	[iron OR "body mass index" OR BMI OR "noncommunicable disease OR risk" OR "NCD risk" OR toxins OR weight OR obesity OR nutrients OR "growth promotion" OR "mam" OR "cmam" OR "moderate acute malnutrition" OR Anemia OR Wasting OR Stunting OR Supplement OR Vitamin* OR "food security" OR Micronutrient* OR Hunger OR Folate OR "dietary diversity" OR "junk food" OR breakfast OR
b. General child and adolescent development	health OR development OR nutrition OR feeding OR food OR growth OR illness OR chronic OR cognitive OR vaccine* OR immunization OR malaria OR oral OR disability OR prevention OR vision OR blindness OR hearing OR deaf* OR intervention OR campaign OR acute OR behavior OR relation* OR function* OR activity OR attendance OR "drop out" OR "sexual health" OR Reproduc* OR Substance* OR Tobacco OR Injury OR Achievement OR Learning OR "raven's test" OR "digit span test" OR "test scores" OR Attentiveness OR Retention OR Enrolment OR Ppvt OR memory OR
c. Deworming and dynamics of infectious disease	deworming OR "de-worming" OR helminthes OR schistosomiasis OR parasit* OR hookworm* OR ascaris OR whipworm OR trichuriasis OR intestinal OR nematode OR

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| d. Malaria in school-age children | [("school-based" OR "school-age") AND (Malaria OR "intermittent preventive treatment" OR IPT OR "rapid diagnostic test" OR RDT OR "bed net*" OR Insecticide OR ITN)] OR |
| e. Early child delivery platforms and policies | "early childhood development" OR "early childhood education" OR education OR |
| f. Financing | "cash transfer*" OR Voucher* OR Grant* OR "conditional cash transfer" OR CCT OR Allowance OR stipend OR |
| g. Oral health | "Dental decay" OR "Tooth decay" OR caries OR "dental caries" OR "dental trauma" OR "dental infection" OR odontogenic OR pulp OR "oral pain" OR "dental pain" OR filling OR "dental filling" OR "tooth filling" OR "dental restoration" OR "Atraumatic restorative treatment" OR "early childhood caries" OR "oral health promotion" OR "dental health education"] |

AND

Geographic terms	["developing countries" OR "developing country" OR "low and middle income countries" OR LMIC OR "south america" OR "latin America" OR Afghanistan OR Albania OR Algeria OR Angola OR Argentina OR Armenia OR Armenian OR Azerbaijan OR Bangladesh OR Benin OR Belize OR Bhutan OR Bolivia OR Botswana OR Brazil OR "Burkina Faso" OR "Burkina Fasso" OR Burundi OR Urundi OR Cambodia OR "Khmer Republic" OR Kampuchea OR Cameroon OR Camerouns OR Cameron OR Camerons OR "Cape Verde" OR "Central African Republic" OR Chad OR China OR Colombia OR Comoros OR "Comoro Islands" OR Comores OR Mayotte OR Congo OR Zaire OR "Costa Rica" OR "Cote d'Ivoire" OR "Ivory Coast" OR Djibouti OR "French Somaliland" OR Dominica OR "Dominican Republic" OR "East Timor" OR "East Timur" OR "Timor Leste" OR Ecuador OR Egypt OR "United Arab Republic" OR "El Salvador" OR Eritrea OR Ethiopia OR Fiji OR Gabon OR "Gabonese Republic" OR Gambia OR Gaza OR Georgia OR Ghana OR Grenada OR Guatemala OR Guinea OR Guiana OR Guyana OR Haiti OR Honduras OR India OR Maldives OR Indonesia OR Kenya OR Kiribati OR "Lao PDR" OR Laos OR Lesotho OR Basutoland OR Liberia OR Libya OR Madagascar OR "Malagasy Republic" OR Sabah OR Sarawak OR Malawi OR Nyasaland OR Mali OR "Marshall Islands" OR Mauritania OR Mauritius OR "Agalega Islands" OR Mexico OR Micronesia OR Moldova OR Moldovia OR Moldovian OR Mongolia OR Montenegro OR Morocco OR Ifni OR Mozambique OR Myanmar OR Myanma OR Burma OR Namibia OR Nepal OR "Netherlands Antilles" OR Nicaragua OR Niger OR Nigeria OR Muscat OR Pakistan OR Palau OR Palestine OR Panama OR Paraguay OR Peru OR Philippines OR Philipines OR Phillipines OR Phillippines OR Rwanda OR Ruanda OR Nevis OR "Saint Lucia" OR "St Lucia" OR "Saint Vincent" OR "St Vincent" OR Grenadines OR Samoa OR "Samoan Islands" OR "Navigator Island" OR "Navigator Islands" OR "Sao Tome" OR Senegal OR Serbia OR Montenegro OR Seychelles OR "Sierra Leone" OR "Sri Lanka" OR Ceylon OR "Solomon Islands" OR Somalia OR Sudan OR Suriname OR Surinam OR Swaziland OR Tajikistan OR Tadzhiistan OR Tadjikistan OR Tadzhiik OR
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Tanzania OR Thailand OR Togo OR "Togolese Republic" OR Tonga OR Tunisia OR Turkey OR Turkmenistan OR Turkmen OR Uganda OR Ukraine OR Vanuatu OR "New Hebrides" OR Venezuela OR Vietnam OR "Viet Nam" OR Zambia OR Zimbabwe OR "Africa, Northern" OR "Northern Africa" OR "North Africa" OR "Africa South of the Sahara" OR "sub-Saharan Africa" OR "subsaharan Africa" OR "Africa, Central" OR "central Africa" OR "Africa, Eastern" OR "Eastern Africa" OR "east Africa" OR "Africa, Southern" OR "southern Africa" OR "Africa, Western" OR "western Africa" OR "west africa" OR "Caribbean Region" OR Caribbean OR "Central America" OR "Panama Canal Zone" OR "French Guiana" OR Borneo OR "Mekong Valley" OR "mekong delta" "Republic of Congo" OR "Congo-Brazzaville" OR "Democratic Republic of the Congo" OR DRC OR "Congo-Kishasha" OR "South Sudan" OR "South Africa" OR "Guinea-Bissau"]

AND

Economic terms	costs OR "cost analysis" OR economics OR "cost savings" OR "cost of illness" OR "health care costs" OR "direct service costs" OR "drug costs" OR "hospital costs" OR "health expenditures" OR "household expenditures" OR "cost effectiveness" OR "cost-effectiveness" OR "cost of treatment" OR "cost of disease" OR "cost of care" OR "health care cost" OR "economic evaluation" OR "cost analysis" OR "economic analysis" OR "cost benefit analysis" OR "cost allocation" OR "cost of services" OR "medicine costs" OR "hospital cost" OR "health expenditure" OR "out-of-pocket" OR expenses OR expenditure OR "household expense*" OR "household expenditure*" OR QALY OR DALY OR "life years saved" OR "life-years saved" OR "deaths averted" OR "benefit-cost" OR "cost-benefit" OR "BCR" OR "benefit cost ratio" OR "cost benefit ratio" OR CBA OR CBR
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Source: Authors

Note:

- BCR= Benefit-cost ratio
- BMI= Body mass index
- CBA= Cost-benefit analysis
- CBR= Cost benefit ratio
- CCT= Conditional cash transfer
- cmam= Community-based management of acute malnutrition
- DALY= Disability-adjusted life-year
- IPT= Intermittent preventive therapy
- ITN= Insecticide-treated net
- mam= Moderate acute malnutrition
- NCD= Non-communicable disease
- ppvt= Peabody Picture Vocabulary Test
- QALY= Quality-adjusted life-year
- RDT= Rapid Diagnostic Test

Table 26A.2. Search also including articles for high-income countries, from which systematic reviews (only) were retrieved.

Category of Terms	Terms
Age-group terms	adolescent[MeSH Terms]) OR young adult[MeSH Terms]) OR minors[MeSH Terms]) OR adolescen*[Title/Abstract]) OR teenage*[Title/Abstract]) OR "young adult"[Title/Abstract]) OR teen*[Title/Abstract]) OR youth[Title/Abstract]) OR youths[Title/Abstract]) OR "young people"[Title/Abstract]) OR "young persons"[Title/Abstract]) OR "young adulthood"[Title/Abstract]))
AND	
Economic terms	(analysis, cost benefit[MeSH Terms]) OR allocation, cost[MeSH Terms]) OR health care cost[MeSH Terms]) OR hospital cost[MeSH Terms]) OR cost, direct service[MeSH Terms]) OR cost of illness[MeSH Terms]) OR health expenditure[MeSH Terms]) OR economics[MeSH Terms]) OR cost saving[MeSH Terms]) OR finances[MeSH Terms])) OR (costs[Title/Abstract]) OR "cost analysis"[Title/Abstract]) OR economics[Title/Abstract]) OR "cost saving"[Title/Abstract]) OR "cost of illness"[Title/Abstract]) OR "health care costs"[Title/Abstract]) OR "direct service costs"[Title/Abstract]) OR "drug costs"[Title/Abstract]) OR "hospital costs"[Title/Abstract]) OR "health expenditures"[Title/Abstract]) OR "cost effectiveness"[Title/Abstract]) OR "cost of treatment"[Title/Abstract]) OR "cost of disease"[Title/Abstract]) OR "cost of care"[Title/Abstract]) OR "cost analysis"[Title/Abstract]) OR "health care cost"[Title/Abstract]) OR "economic evaluation"[Title/Abstract]) OR "cost analysis"[Title/Abstract]) OR "economic analysis"[Title/Abstract]) OR "cost benefit analysis"[Title/Abstract]) OR "cost allocation"[Title/Abstract]) OR "cost of services"[Title/Abstract]) OR "medicine costs"[Title/Abstract]) OR "hospital costs"[Title/Abstract]) OR "health expenditure"[Title/Abstract]) OR "out-of-pocket cost"[Title/Abstract]) OR expenses[Title/Abstract]) OR expenditure[Title/Abstract]) OR "household expense"[Title/Abstract]) OR "household expenditure"[Title/Abstract]))))
AND	
Adolescent-relevant health terms	(health[MeSH Terms]) OR violence[Title/Abstract]) OR suicide*[Title/Abstract]) OR "mental health"[Title/Abstract]) OR overweight[Title/Abstract]) OR underweight[Title/Abstract]) OR smoking[Title/Abstract]) OR "traffic injury"[Title/Abstract]) OR "mental disorders"[Title/Abstract]) OR "psychiatric disorders"[Title/Abstract]) OR "tobacco use"[Title/Abstract]) OR obesity[Title/Abstract]) OR "physical activity"[Title/Abstract]) OR "sexual activity"[Title/Abstract]) OR "alcohol use"[Title/Abstract]) OR "disability"[Title/Abstract]) OR "substance use"[Title/Abstract])

Notes: Search in English only; prioritized literature for low and middle income countries if available, otherwise included high income countries

7394 abstracts found (all countries, since 2000): 150 on low- and middle-income countries from 2000 onwards; search undertaken April 2015.

Figure 26A.1. Flowchart of Search Strategy, Low- and Middle-Income Countries

