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ESTIMATING THE COSTS AND BENEFITS OF EDUCATION FROM A HEALTH PERSPECTIVE

**Background paper for the Oslo Summit
on Education for Development**

Executive Summary

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Estimating the costs and benefits of education from a health perspective

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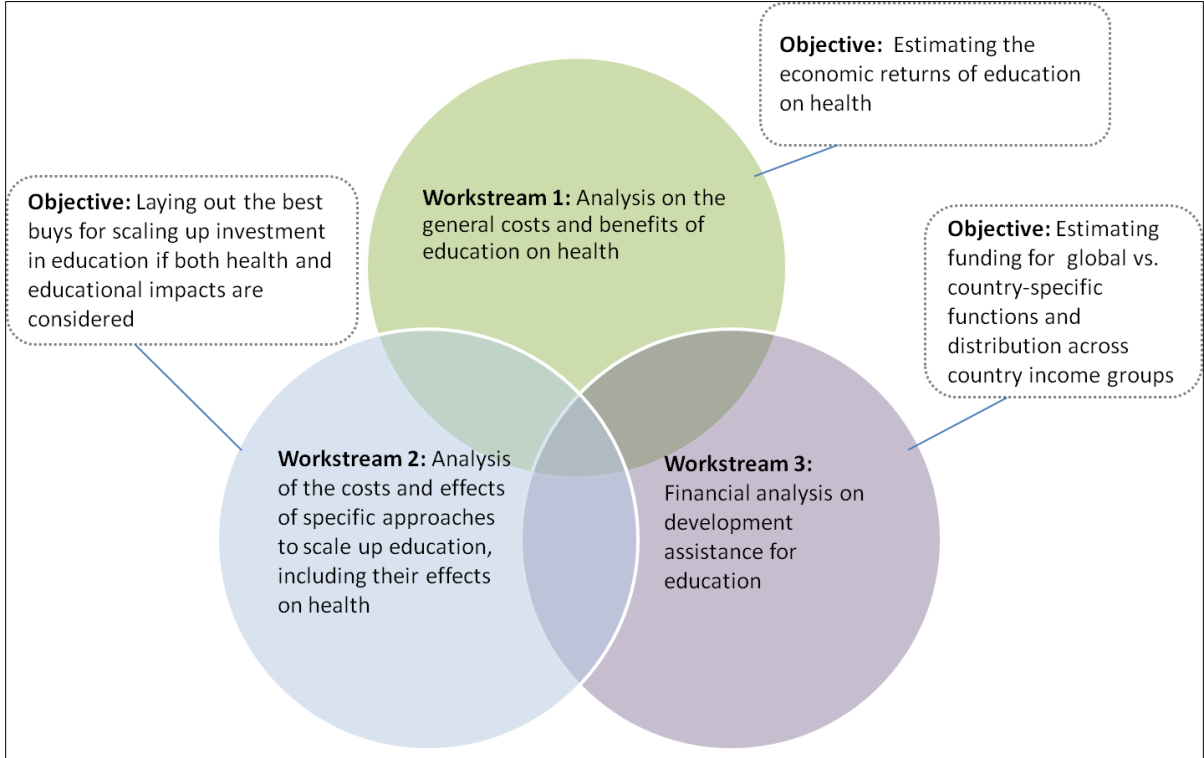
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Summary of key results and recommendations

In preparation for the Oslo Summit on Education for Development in July 2015, the Norwegian Agency for Development Cooperation (NORAD) recently commissioned SEEK Development to conduct an evaluation of the costs and benefits of education from a health perspective.¹ Such a study is very relevant in light of ongoing discussions around the Sustainable Development Goals and post-2015 development agenda, which emphasize the need for a stronger focus on the broader determinants of health. The study is organized around three interconnected workstreams.

Figure 1: Three interrelated workstreams



Workstream 1: Estimating the general costs and benefits of education on health

Workstream 1 estimated the general costs and benefits of general education on health. This analysis is based on a review of the existing literature and modeling on the costs and impacts of education investments to extend the literature. Using the approach of the *Lancet Commission on Investing in Health* (CIH) – the full-income approach – we also valued the gains of education in monetary terms.² The existing literature focuses on the effects of education on child mortality and our review and analysis necessarily does likewise. Our results should be interpreted as providing a lower bound of the overall impact of education.

¹ <http://www.osloeducationsummit.no/>

² Jamison, DT et al. (2013). Global health 2035: A world converging within a generation. *The Lancet*: 382: 1898-955.

Key findings

Increases in female schooling are associated with substantial reductions in under-five mortality

1. The results of our meta-analysis show that a one-year increment in female education is associated with a 6.5–9.9% reduction in mortality in children younger than 5 years in low- and middle-income countries.

2. Even if we use a conservative estimate on the effect of education on child mortality (a 6.5% reduction), 39.6% of the child mortality decline in low- and middle income countries from 1990–2000, and 17.5% of the child mortality decline from 2000–2011, can be attributed to increases in female schooling. In the second period, factors other than increases in female schooling have played a greater role in the decline of under-five mortality. Declines in child mortality between 2000 and 2010 were led by reductions in measles, pneumonia, and diarrhea, while tetanus, malaria, and HIV also fell substantially. These declines point to the impact of major financing channels, which emerged at the turn of the century that have raised and invested large amounts for key child health interventions, such as vaccination, malaria and HIV-related interventions. They also draw attention to the important effects of multi-sectoral interventions, such as improvements in water and sanitation, for health.³

The returns on investing in female schooling are enormous from a health perspective

3. There is an enormous payoff in investing in education if investments are assessed from a health perspective. Even without considering changes in GDP growth because of increases in female education over the last decade, reductions in under-five mortality attributable to increases in female education account for 7.3% and 1.3% of full income growth in low- and middle-income countries as measured in their national income accounts between 1990-2000 and 2000-2011, respectively.⁴

4. The value of the under-five mortality effect of education can also be expressed as a cost-benefit ratio: Every dollar invested in female schooling in low- and middle-income countries would return \$5 in terms of the value of under-5 mortality reduction alone. This calculation includes social benefits, which we define as the rate of return of one additional year of schooling on wages. It also takes into account the direct costs of schooling (e.g. salaries and infrastructure) and opportunity costs to children and their families of one additional year spent in school rather than working (i.e. lost wages from not working).

This economic return can be benchmarked with Global Health 2035 (GH2035), which showed that through an enhanced investment scenario to scale up current and new health tools, a “grand convergence” in global health – that is, a reduction in infectious, reproductive, maternal, newborn, and child deaths to universally low levels – would be possible by 2035. Achieving a grand convergence would require scaling-up the most cost-effective health interventions, such as family planning, childhood vaccinations, and management of childhood diarrhea and pneumonia. CIH modeling finds an extremely impressive economic return on this investment – a cost-benefit ratio of

³ Liu, L et al. (2012). Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *The Lancet*: 379. 2151-2161.

⁴ Nonetheless the term ‘full income’ change is being used to denote measures that include change in GDP plus the value of change in mortality.

9 in LICs and 20 in LMICs. The \$5 return that we estimate accrues to each one dollar invested in female education is highly attractive by the GH2035 yardstick. Although investments in education are not undertaken specifically to improve health, they produce substantial health returns even if the impact only on U5M is considered.

Workstream 2: The Microeconomic Perspective

Workstream 2 built on the first workstream by identifying what are the best buys for scaling up investment in the formal education system if both health and educational impacts are taken into account. It also takes a particular interest in reducing gender gaps in education.

Key findings

1. Even with the relatively high primary school enrollment rates that have been achieved in low-income countries, selected interventions that help to complete the goal of universal primary enrollment are still cost-effective. Prime is building schools and classrooms in isolated areas, which not only improves enrollment and survival, but also learning. Getting schools closer to communities is also critical to reducing gender gaps in education, and broader inequalities linked to isolation. Given the rate of population growth in sub-Saharan Africa, new schools would have to be built and new teachers hired at a rapid rate even to maintain current net enrollment rates.

2. Improving the quality of education (learning) and getting children, particularly girls, into secondary education are also important. Getting girls into secondary education not only increases their learning, but also improves their earning potential and health (their own and the health of any subsequent children). It also is associated with delayed marriage and lower fertility rates. Lower-secondary schools are also the time when health interventions that focus on sexual and reproductive health and the prevention of sexually transmitted diseases (including HIV) are effective in reducing risk-taking, reinforcing the positive effects on girls' lives.

3. Cost-effective interventions that reduce gender gaps in education and improve the health of girls are building classrooms in isolated areas, hiring female teachers (in some settings), some types of conditional cash transfers targeted at the times girls typically drop out, participation in school boards by female members of the community, and school feeding. Treating worms and iron supplementation have at times, though not always, also had positive impact on enrolment, attendance and the health of girls.

4. Early childhood development (ECD) is critical, having a large impact on cognitive function and learning capacity throughout life, as well as on subsequent earnings. Forms of ECD that are parent-centered can be undertaken in the community or home at relatively low cost with high returns, particularly for disadvantaged children. Child-centered ECD can be done in preschools or in homes. Costs vary so the challenge is to find affordable, sustainable ways of scaling up these activities to take advantage of the very high potential returns.

5. Good buys in education that have a longer-term impact on health involve the introduction of more participatory pedagogical methods, provision of some types of teaching materials, and community participation in school boards. Reducing costs through elimination of school fees or school uniforms can also contribute.

6. Health interventions delivered through schools can be particularly good buys because they can improve health immediately, then improve educational outcomes, subsequent earnings, and second-generation health through reductions in infant mortality. The complication is that the interventions that have been evaluated sometimes have an impact and sometimes do not, reflecting the heterogeneity across the communities where they have been implemented and the way they have been designed. A meta-analysis of the effects of deworming, micronutrient supplementation and malaria treatment shows significant effects on enrolment, completion and test scores, which makes them very good buys because of their low costs, although understanding why they have had an impact only in some communities and not others is critical. School feeding also increases enrolment, attendance and school survival, although the cost is higher than deworming and lower-cost, more sustainable options need to be developed and supported. Given the increase in non-communicable diseases (NCDs) in low- and middle-income countries, new prevention interventions targeting obesity and mental health have been developed for delivery through schools in those settings. The results are promising.

7. Sexual and reproductive health interventions and preventive programs focusing on HIV delivered through schools have an impact on knowledge and on risky behaviors in adolescent girls even if the impact on HIV infections is not yet evident. They are relatively low cost. When added to the information from other studies that girls in school at the time of puberty delay marriage and the age of giving birth for the first time, this reinforces the earlier conclusion that it is critical to try to ensure that girls make the transition from primary to secondary school. On the other hand, interventions designed to reduce violence against women delivered through schools have had an impact on knowledge and on the willingness of girls to report violence, but have not yet been shown to reduce levels of violence.

Workstream 3: Assessing development assistance for education

Education experts have emphasized the need for more investments in global functions.⁵ As there have been no studies that have tracked donor funding for education according to the functions that it supports, this study developed a way of classifying donor assistance for education (DAE) according to its functions, and analyzed how much investments are targeted to these global functions. Global functions are characterized by their ability to address transnational issues, and were divided into three functions: i) providing global public goods (e.g. knowledge generation & sharing); (ii) fostering leadership and stewardship (e.g. convening for negotiation and consensus building on strategy and policy in education), and (iii) managing cross-border externalities (e.g. managing the reversal of migration flows). There is one country-specific function, which was defined as technical and financial support for countries, without any transnational benefits.

In addition, this study analyzed whether the country-specific donor aid is targeted specifically for vulnerable groups, especially girls, displaced people, and those who are affected by violent conflict. The assessment focused on eight large providers of DAE (Germany, France, the UK, IDA, the US, the EU institutions, Japan, and Norway), which accounted for 73% of total disbursements to education in 2013. Furthermore, this study also conducts an assessment of overall education funding

⁵ Nicholas Burnett 2011: How to develop the UNESCO the world needs. Journal of International Cooperation in Education; Birger Fredriksen 2011: Scope for Efficiency Gains through more Strategic Use of Education Aid. R4D.

trends, and tracked how much donor funding is targeted to the different country income groups and levels of education.

The results provide a “baseline” of the support for global versus country-specific functions that could help inform discussions on the optimal distribution of donor funding for education. Furthermore, an improved understanding of the extent to which donors focus their country-specific aid on vulnerable subpopulations also has the potential to guide aid investments. Our assessment of the allocation to country income groups will also be useful in the context of the ongoing debate about the role and purpose of donor aid for countries that experience economic growth and graduate from low- to middle-income status.

Key findings

1. Only a fraction of DAE is spent on global functions. On average, the eight assessed donors spend only 3% on global functions (range: 2-7%). If we establish a global estimate by extrapolating from our results for our eight assessed donors, the total amount of DAE for global functions provided in 2013 was US\$242 million.

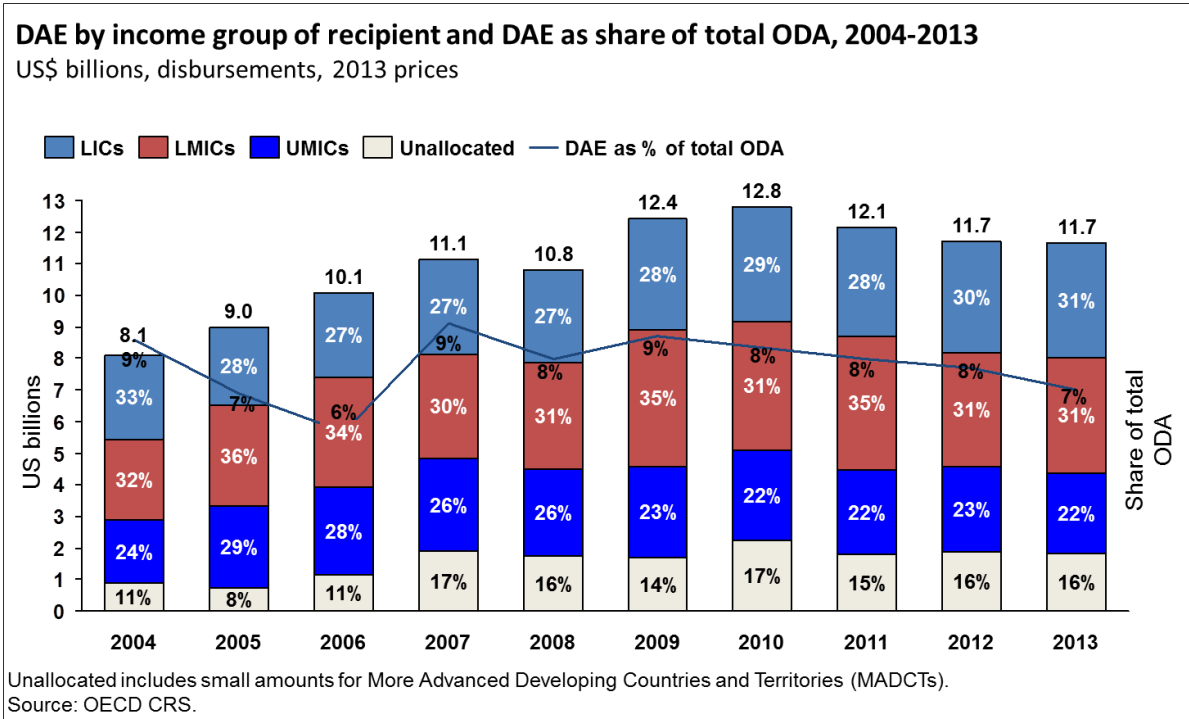
2. Across the three global functions, financing in 2013 was heavily concentrated on global public goods. On average almost two-thirds (64%, or US\$113 million) of the funding for global functions from the eight donors went towards the creation of global public goods. Eighteen percent (US\$33 million) went to leadership and stewardship, and 17% to the management of cross-border externalities (US\$33 million).

3. Our analysis suggests that country-specific support should increasingly target vulnerable or marginalized populations, including the out of school, girls, displaced children, and those living in conflict zones. More funding is also needed that specifically targets girls to more rapidly reduce gender equities in education.

4. Between 2010 and 2012, DAE declined by 9%, and DAE as a share of total ODA declined steadily since 2009, to 7% in 2013 (in constant dollar terms). Less than a third of DAE was disbursed to LICs in 2013, with 53% of DAE disbursed to MICs, including 22% for UMICs.⁶

⁶ The remaining 16% is “unallocated”, which refers to funding that is not provided to a specific country.

Figure 2: DAE in absolute figures and as a share of total ODA and by country income group



Policy and research recommendations

Our research leads us seven recommendations:

1. Reflect the substantial returns of education in investment decisions

Our analysis shows that the existing estimates on the rate of return to education are, although high, systematic and quantitatively important underestimates. This finding results from our systematic inclusion of the dollar value of education’s favorable effect of education. Investment priority for the sector is therefore correspondingly higher than the current policy literature suggests.

2. Continue to search for universal primary education

As LICs move closer to universal primary enrolment and the unit costs of reaching the remaining children rise, there will be a tendency in countries to focus on reducing dropouts, increasing educational quality and survival, and expanding secondary education. While these steps are critical, it is important to continue push to reach the remaining out-of-school children at primary level. The analysis of Workstream 2 showed that despite higher costs this is still cost-effective, with large potential increases in overall years of schooling. Getting new classrooms into isolated areas has also been shown to be a particularly useful way to increase the participation and duration of schooling for girls and reduce inequalities linked to gender and isolation. Special efforts will need to be taken to address the problems encountered by the 30-50% of out-of-school children that are living in conflict zones or refugee camps.

3. Develop and implement affordable yet effective strategies for early childhood development (ECD)

The brain develops very rapidly in the years before children get to primary school, and the absence of stimulation and learning can prevent children reaching their full capacities in cognitive development, learning, and subsequent earning. Parent-based and child-based forms of ECD have shown important impacts on cognitive development while multi-sectoral approaches involving health and education, and sometimes income support, have an even bigger impact. Because of the lifetime impact, it is important to find ways of expanding ECD, particularly to disadvantaged children who benefit most.

4. Re-double efforts to reduce gender gaps and inequalities in education.

Gender gaps remain important in LICs and some MICs, in enrollment and school survival. Active steps need to be taken to remove these gaps, by financing the interventions that have been shown to reduce gender-gaps: building classrooms in isolated areas, hiring female teachers (in some settings), participation in school boards by female members of the community, school feeding programs, treating worms and iron supplementation where appropriate and some types of conditional cash transfers. Programs on sexual and reproductive health and HIV prevention are also important in improving knowledge and attitudes as well as on self-reported risky behaviors. Violence against women remains a major problem in the world and school-based interventions have been shown to modify attitudes and knowledge, and make girls more willing to report violence although the impact on the incidence of violence is yet to be determined. This is an area that requires additional research.

5. Pursue value for money strategies

While equity strategies are critical, it is also important to ensure that the available funds for education are used well. Good buys that improve the quality and duration of primary schooling include moving towards modern pedagogical methods, using simple teaching aids like flip charts and white boards, and community participation in school boards (in some settings). Some of the health interventions delivered through schools are particularly good value for money as described above. Given the rapid rise of non-communicable diseases in low- and middle-income settings, countries should consider the feasibility of school-based prevention programs such as those that have already been trialled with success on obesity and mental health.

6. Increase donor financing for global functions, vulnerable groups and the poorest countries

Many low- and middle-income countries are on course to experience impressive economic growth over the next twenty years and should therefore be increasingly able to self-finance education through domestic resources. A greater proportion of donor aid should thus flow towards the global functions. Funding for global functions should have a 'trickle-down' effect and benefit traditional recipient countries as well as donor countries and strengthen the impact of country-specific funding. In addition, as MICs are increasingly able to self-finance general education services domestically, donor funding should increasingly shift to low-income countries. Donor support should increasingly focus on the most vulnerable groups, such as girls and displaced and conflict-affected children.

7. Strengthen cross-sectoral collaboration between education and health

The highly positive cost-benefit ratio that takes into account the subsequent health impact of increases in education, and the evidence that health interventions delivered through schools can be highly cost-effective in increasing health and educational outcomes, provides a strong rationale for a much stronger *cross-sectoral collaboration* between the education and health sectors. The government of Norway has strengthened cross-sectoral linkages through its global health and education “Vision 2030 initiative”. Other bilateral donors should also rethink their strategies, which in many cases still reflect an overly siloed, insufficiently cross-sectoral approach to public health.

8. Research recommendations

Our study also points to a number of research gaps that should be addressed through future research efforts:

- Our meta-analysis does not assess the effect of a year of increase in mean years of schooling between different levels of female education (e.g. primary vs. secondary). Few methodologically strong studies stratify schooling by levels. In addition, this subset of studies provides a mixed message on the effect of level of education on child mortality. To assess the effect between levels, a cross-country study should be conducted based on the latest available cross-country data. An alternative, more labor intensive study, would use micro-data from DHS surveys.
- A follow-up study could expand our initial literature review on the relationship between education and fertility by generating pooled effect estimates and economic returns across key fertility variables (e.g. the impact that one year of education (female and/or male) has on total fertility rates, early pregnancy, and contraception use).
- The second workstream focused on interventions delivered through formal educational institutions. However, there are many interventions with educational aims – transmission of information, cognitive development – that are not delivered through formal educational institutions or that are done in schools but as a complement to broader community interventions. These include interventions to prevent violence against women, promote early childhood development in the community, prevent HIV/AIDS and other sexually transmitted infections, and reduce adolescent marriage and childbearing. A growing literature base covers these topics, through a large assessment we could better understand the costs and effects of the interventions and pose questions regarding their financial sustainability.
- Studies on the impact (and sometimes costs) of interventions often assume that they are done in isolation. However, this is rarely the case, e.g. CCTs might be done at the same time as interventions to improve teaching methods or school feeding. The impact of each will likely depend on what other interventions are being done at the same time. In health, cost-effective analyses have modelled interactions between various combinations of interventions, and this work would likely prove very valuable in education as well.
- CCTs and health interventions work sometimes and not others. Understanding why they work will require disaggregation of the data – obtaining it from the authors if possible,

understanding the characteristics of the people who obtained them, and understanding exactly how the interventions were administered. This is important for policymakers who often cannot simply introduce an intervention that has shown to work only sometimes, hoping that it will be applicable to their setting.

- A future study on donor financing for global versus country-specific should have a longer time frame—such as a time series since 2000.

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