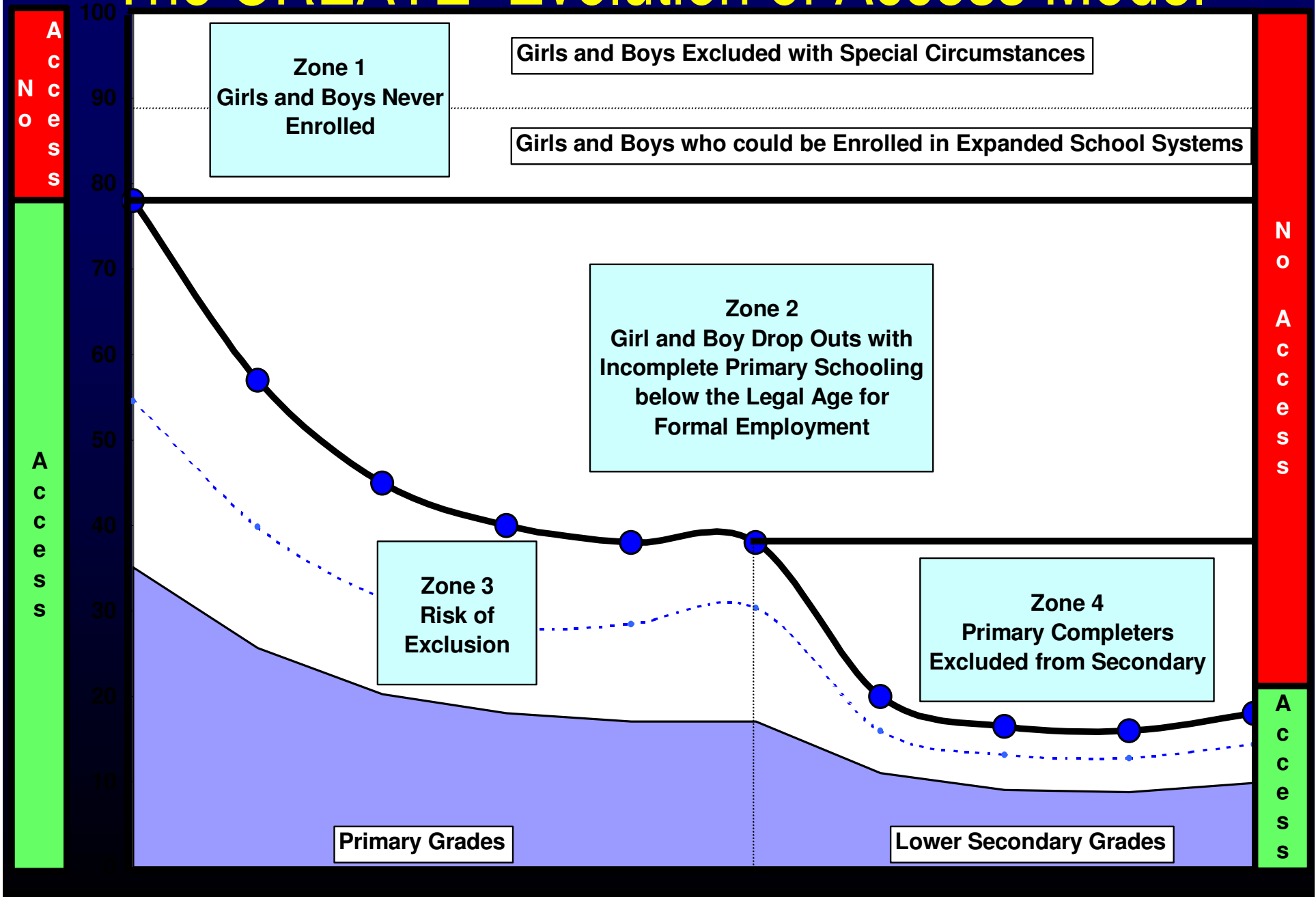


The impact of health on education access  
and achievement: a cross national review  
of the research evidence

[www.create-rpc.org](http://www.create-rpc.org)

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# The CREATE Evolution of Access Model



Within the CREATE programme of work the health strand will seek to address the following questions:

- What are the health factors that shape education access and retention?
- What are their consequences?
- How can education policy and practice be transformed to enhance access and retention?

# The purpose of the review

- Synthesise what is already known about the link between health and educational access and achievement.
- Identify knowledge gaps that could be filled by new empirical research.
- Discuss the advantages and disadvantages of a range of research designs and methods employed in these studies.
- Discuss the conceptual and theoretical models of health and education that lie behind the studies.
- Draw implications from the literature review for
  - (i) the further conceptual development of the Zones of Access model
  - (ii) the design of future empirical studies.

## Method: Searching the literature

- Literatures on (i) childhood obesity and (ii) disability were excluded.
- Step 1 – ERIC data base searched using string of keywords in stages: (health or nutrition or wellbeing or malnutrition or malnourish) and (developing countries or Africa) and (gender or women or woman or female or females) and (access and (education or schools or school or schooling or educational or learning or preschools or pre-school or primary school or secondary school)

## Step 2

- Searches were conducted of the separate databases PubMed, Popline and the Social Sciences Citations Index (SSCI) using the same string of keywords.

## Step 3

- Searches were conducted on the web pages of key international development agencies – UNICEF, UNESCO, UNAIDS, WHO, World Bank.

- Step 4
- Personal communication was initiated with Prof. Sally Grantham, Dr. Matthew Jukes, Prof. Michael Kelly, Prof. Roy Carr-Hill and Prof. Don Bundy who research and write extensively in this field of study. Databases were exchanged with Prof. Grantham-McGregor and articles not yet published (but 'in press' or 'submitted') were made available by Dr. Jukes.
- Step 5
- Key references cited in the literature were followed up.

## Step 6

The following criteria were used for selecting key references to be entered into the Endnote bibliography:

- Published in English.
- Recent summaries and meta-analyses.
- The best designed studies from all countries.
- Well designed individual studies from DFID priority countries, including the four Consortium partner countries, Ghana, South Africa, Bangladesh and India with a particular emphasis on issues of gender, poverty, social exclusion and innovative practices.
- The most recent statistical data and consensual views from the international development agencies.

## Step 7

- The selected references were carefully scrutinized to identify categories and themes in the literature which then formed the organizational framework for the review.



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## Ch 2 Issues of theory and research design

- A simple analytical framework (Glewwe 2005)
  - production function relationship
  - conditional demand relationship
  - reduced form relationship
- What can and cannot be estimated from cross-sectional data, longitudinal data and RCTs
- Underlying definitions and values
- Models of health and of education

# Ch 3 The pre-school years

Delayed enrolment and exclusion in zone 1



Cumulative effects lead to stunting, reduced cognition



Under-nutrition

Micro-nutrient deficiency

Malaria

Diarrhoea

Worms

Timing and severity of threats

In utero, breastfeeding

Interventions  
Stimulation

Supplementary feeding and micronutrients

# Evidence

- There is reasonably good evidence from meta-analyses that early childhood malnutrition, moderate and severe stunting and underweight are associated with poor cognitive development, behaviour and academic attainment in later childhood. (Jukes 2005, Grantham-McGregor 2005)
- Recent analyses have estimate that 200 million children under 5 years of age in developing countries are failing to reach their full developmental potential. (Grantham-McGregor 2007)
- Study in Ghana found delayed enrolment was associated with stunting but not with family income, borrowing constraints or rationing of school places. (Glewwe and Jacoby 1995)

- Study in rural schools in Ghana, Indonesia, Kenya, Malawi, Mali, Mozambique, Tanzania and Vietnam found children who enrolled late were more likely to be anaemic.(Hall et al.2001)
- Study in Peru followed up cohort from birth to 2 years and found at 9 yrs.children with severe stunting in second year of life had IQ 10 point lower and those with more than one episode of diarrhoea a year had 4.1 points lower.(Berkman et al/ 2002)

- Developmental benefits more likely to be sustained if supplementary feeding begins in late pregnancy and is continued until 24 months.
- Breastfeeding associated with sig. higher scores for cognitive development in later life cf formula feeding. (17 studies)
- Improved health and nutrition associated with subsequent chances of attending school, gender equity in education access and performance at school. (5 RCTs)

- RCT in Jamaica. Malnourished children aged 9-24 months given food supplementation or psychosocial stimulation, both or neither for 2 years. Long-term follow up

(i) at 5-6yrs perceptual motor skills of children showed significant benefit from stimulation, but nutrition supplementation only benefited those whose mothers had higher verbal IQ. (Grantham-McGregor et al. 1997)

(ii) at 11-12yrs early psychosocial stimulation had long term benefit but stunted children had significantly poorer performance on wide range of cognitive tests. (Chang et al 2002)

- RCT in India found deworming and iron supplementation of 1-4 year olds attending pre-school for 5 months increased weight significantly and decreased absenteeism by one fifth. (Bobonis et al. 2004)
- RCT in Indonesia showed that iron-deficient infants (12-18m old) given iron supplementation for 12 weeks showed very impressive gains in psychomotor and mental development. (Idjradinata and Pollitt 1994)



- Cerebral malaria causes 1million death each year mostly in under 5 year olds. Of those who survive 10% have neurological problems that prevent them from attending school.(WHO and UNICEF 2005)
- RCT in the Gambia showed under 5 year olds children protected from malaria had improved short and long term memory aged 17 yrs. (Jukes et al. in press)

# Ch 4 The Primary and Secondary School - Age Years

Reduced cognition and possible exclusion in zones 2 and 3

Cumulative threats

Under-nutrition

Micro-nutrient Deficiency:

Malaria

Diarrhoea

Worms

Interventions

Global School Health Programme/  
FRESH

School feeding Programmes:  
Meals and FFE

Micronutrient supplementation

Deworming

- Most of the best recent studies have found sizeable and statistically significant impacts of school health and nutrition on education outcomes (attendance, drop-out, achievement). Children who are stunted, anaemic, or iodine deficient have poorer school achievement. (Glewwe 2005)

## Iron deficiency

- Over 1 million children suffer from iron deficiency anaemia associated with weakness and poor cognition. (Jamieson et al. 1993)
- Study in Ghana, Indonesia, Kenya, Malawi, Mali, Mozambique, Tanzania and Vietnam found anaemia prevalence was more than 40% in 5 African countries for 7-11 year olds and in 4 of these countries also for 12-14 year olds. Prevalence high but less than 40 % in the 2 Asian countries. (Hall et al 2001)
- Impact of anaemia through physical and cognitive channels estimated to be 4% of GDP and though to be central to understanding intergenerational transmission of poverty. (Hutchinson et al. 2004)

## Vitamin A deficiency

- Vit A deficiency impairs the immune system and increases risk of ARI and diarrhoea. Severe deficiency causes blindness.
- The few studies done in low-income countries suggest that Vit. A deficiency is a serious public health problem in school-age children. A study in Mexico found that almost half the school children surveyed were vit. A deficient. (Drake et al. 2000)
- Interventions include fortifying school meals with Vit A and efforts to promote increased consumption of green, yellow and red fruits and vegetables and red palm oil.

## Iodine and Iron deficiency

- Iodine deficiency in pregnancy causes poor cognitive function in the offspring.
- Quasi experimental study in Bangladesh found iodine-deficient children performed worse on reading and spelling tests and on the general cognitive factor cf controls. (Huda et al. 1999)
- 1.6 million children die from diarrhoeal diseases each year. It is the principal cause of school absenteeism. Vit. A is protective.
- Study in Bangladesh found that stunting was associated with lower cognitive scores but not diarrhoea in 6-9 year olds. (Tarleton 2006)

## Worm infestation

- Worms are the most common infection in 5-14 year olds killing 150,000 children each year.(UNICEF 1998) 44% of school-aged children are infected and 88 million under 15 year olds have Schistosomiasis.
- Worm infections reduce growth, nutritional status, physical activity, cognition, concentration and school performance. (UNICEF/IRC 2005)
- There is reliable evidence that school-based health and nutrition programmes which include deworming can provide a low cost solution. (Bundy and de Silva 1998)

- RCT in Kenya involving school-based mass treatment of children found that low-cost deworming medicine improved child health and reduced school absenteeism by at least one-quarter in the first 2 yrs of the project and schooling increased by 0.14 years per pupil treated. Attendance rates also increased amongst children in treatment schools who were not treated and in untreated children in neighbouring schools as a result of reduced disease transmission. Surprisingly deworming did not improve academic test scores. Investigators calculated a cost benefit ratio of more than 10 if the rate of return to an additional year of schooling is as low as 1.5%. (Miguel and Kremer 2004)



- A framework to 'Focus Resources on Effective School Health' (FRESH) was launched at World Ed Forum in Dakar (2000) by UNESCO, UNICEF, WHO, Education International and World Bank to enhance the quality and quantity of school based health promotion.

- School feeding programmes

RCT in Jamaica - breakfast given every day for 1 school year to mildly malnourished primary school children. Height, weight and attendance improved significantly and younger children improved in arithmetic compared to controls. (Powell et al. 1998)

# The new Food for Education (FFE) Programmes

- Includes broader range of interventions than school meal programmes. WFP provided FFE to 15 million children in 70 countries in 2003. (World Food Programme 2003)
- FFE involves giving food to 'at risk children' (usually girls, orphans or other vulnerable children) who attend school regularly to increase participation and offset opportunity and cash costs of educating the child.
- FFE includes Food for Work (FFW) targeted to teachers or parents involved in activities to improve demand (enrolment and attendance) and supply (quality).

FFE must reflect local supply and demand realities  
(Levinger 2005, p.S176)

DEMAND LOW / QUALITY  
LOW

Use food as incentive to  
attract more students and  
improve teacher skills

DEMAND LOW / QUALITY  
HIGH

Use food to attract out-of-  
school children and retain  
those in school

DEMAND HIGH /  
QUALITY HIGH

Consider phasing out or  
scaling back feeding activity

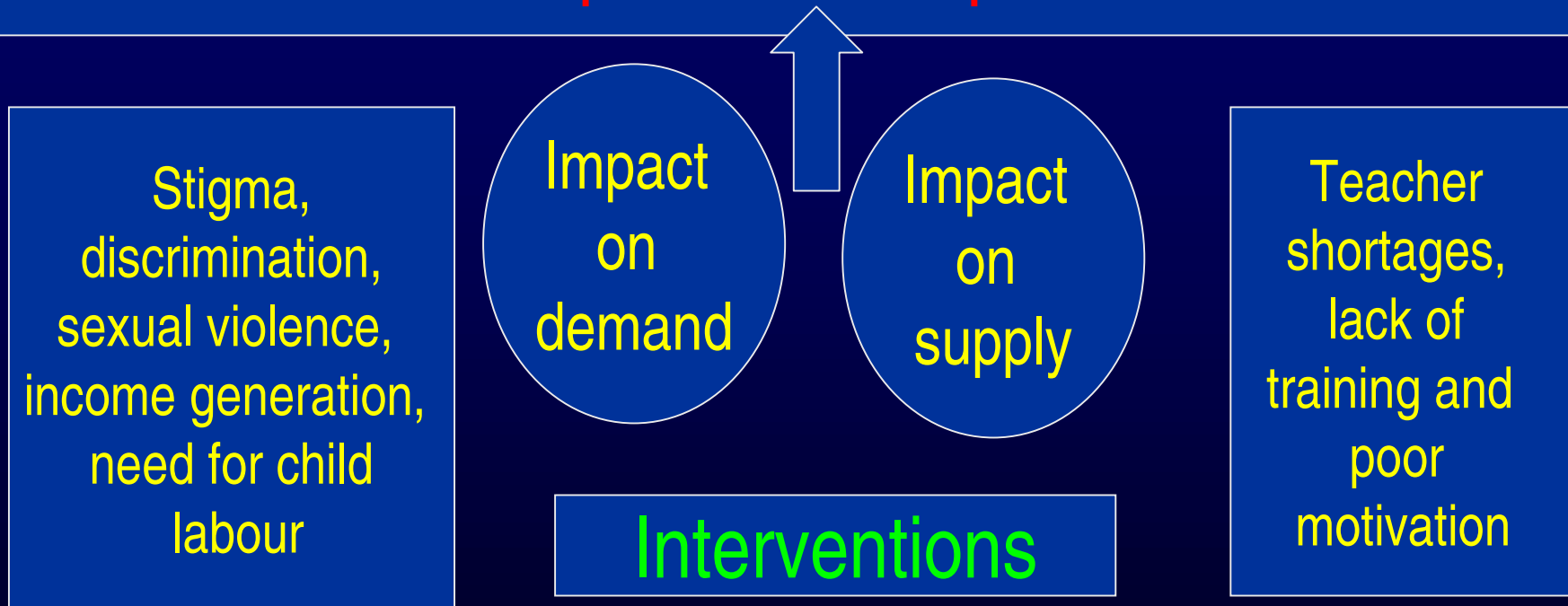
DEMAND HIGH / QUALITY  
LOW

Use food to improve active  
learning capacity, community  
involvement and teacher skills

- Study in Bangladesh found that a free monthly ration of grain given from 1993-2000 as part of a FFE programme had increased primary school enrolment and school attendance, and reduced drop out, especially for girls. (Ahmed and Ninno 2002)
- Study in India found that supplementing GOI lunch programme in Gujarat with vit. A, iodine and iron and giving deworming medicine for 3 years increased child weight by over 1kg., height by over 1cm. and blood iron levels, halved worm infection rates and significantly reduced prevalence of night blindness and vit. A deficiency. Programme now extended to 3 new states covering 30 million school children.(Gopaldas 2005)

# Ch 5 HIV and AIDS

Affected children pushed and pulled out of school



FFE, multipurpose education, health and social centres, mirco-circles of support, buddy systems, for homework, teachers trained to provide guidance and support, strengthening of child rights and child protection legislation, ODFL, extension of home-based care

## Some staggering figures

- Of the 38m people living with HIV, one quarter are 15-24 year olds. 5 m new infections in under 25 years olds in 2003 mostly amongst young women.
- By 2003 15 million children under 18 yrs had been orphaned. 12 million in SSA. In SA 30% of under 15 yr olds predicted to be orphaned by 2010 and epidemic shows little signs of slowing down in SSA.
- Most AIDS orphans outside SSA live in Asia where total number of orphans for all reasons exceeds 87million. No figures available for children orphaned by AIDS for individual countries but epidemic is gathering force.
- Information on children directly affected by HIV and AIDS is very limited.

# Ch 5 Impact of HIV and AIDS on demand

- Recent Demographic and Health Survey (DHS) data from 31 countries in SSA shows children 10-14 yrs who have lost both parents are less likely to be in school than their peers living with only one parent. (UNAIDS 2006)
- DHS data from Zimbabwe, Kenya, Tanzania, Ghana and Niger found that losing one or both parents was associated with diminished chances of being at the appropriate grade level for age. (Bicego et al. 2003)
- Another study draws on survey data from Uganda, Malawi and South Africa to challenge the DHS data. (Bennell 2005)
- A study in SA and Mozambique explored some of the qualitative factors that affect demand in children affected by HIV and AIDS. (Pridmore and Yates 2005)
- Studies have found that an unhealthy and unsafe school environment reduces demand. A study in SA found that sexual harassment of girls by both teachers and other students was common in many schools. (Afenyadu and Goparaju 2003; Leach 2004)

- **Impact of HIV and AIDS on supply:**
  - There is some consensus that HIV and AIDS reduces supply in high prevalence countries but this is a much contested issue. (Kelly 2000;; Carr-Hill et al. 2002; Bennell 2003) The situation is very context specific with fewer teachers being infected in countries with mature epidemics as a result of behaviour change (Jukes and Desai 2005) but increasing teacher demotivation (Bennell and Akyeampong 2006).
- **Interventions**

FFE, Schools as multi-purpose education, health and social centres, micro-circles of support, buddy systems for homework, teachers trained to provide guidance and support, strengthening of child rights and child protection legislation, ODFL/blended learning, extension of home-based care.



## Summary of main findings

- Most of the best recent studies have found sizeable and statistically significant impacts of school child health and nutrition on education outcomes. The evidence for a programmatic impact on education is good for achievement, reasonable for attendance and poor for enrolment..
- The evidence base is not yet complete to meet the stringent criteria of established knowledge.

## Some questions in need of answers

1. What are the likely biases in non-experimental designs?

Glewwe (2005) argues for more randomised evaluations, which compare their findings with standard cross-sectional or longitudinal estimates based on the control group data in order to create a record of the likely bias of non-experimental methods.

2. What are the independent cumulative effects of poverty, poor health and malnutrition on intellectual development and education through the generally recognized developmental periods, across a variety of eco-cultural settings.
3. To what extent does mild to moderate anaemia affect children's development and education access and outcomes?
4. How can health and nutrition programmes increase education access, through preventing disability or correcting eye vision problems?

## 5. How can nutrition interventions be better targeted toward school-age children

-What role can FFE play as an incentive for participation in education?

-What are the effects of age and nutrition status of the children, the quality of the school, and the timing of the meal on the outcomes from school meal programmes?

-What are the special needs of orphans and how can they be addressed through school feeding programmes?

-What are the long-term financial and social benefits of school feeding programmes?

6. Does malaria prevention improve school attendance?
7. What are the mechanisms through which worm infection leads to impaired learning?
8. What types of learning are most impaired by worm infections?
9. Is lassitude and low attention span associated with worm infections and poor cognition?
10. How is HIV and AIDS impacting on education access and achievement of boys and girls of different ages and how does the impact change over time after the loss of a parent.

# Ch 6 Implications for the design of future empirical educational studies

1. What are the health and nutrition barriers to accessing conventional schooling for primary and secondary school age children?

-What are the main causes of poor health in boys and in girls of school age?

-What, if any, health-related factors influence the decisions made by parents/guardians on when a boy or a girl is ready for school enrolment?

2. What, if any, school health and nutrition policies and programmes are already in place to support education access and attainment in school-age children?

-Are teachers aware of the impact that health and nutrition can have on school attendance and achievement?

-Are teachers given guidance on how to support children's psychosocial and physical health and nutrition needs?

-Are teachers sensitive to willing and able to support children's psychosocial and physical health and nutrition needs?

-for supporting needy children?

- Are teachers conducting a simple needs assessment of each vulnerable child on entry and then to keep accurate records to monitor his or her progress through the school, including dropout.
- Do teachers have access to a professional trained support and guidance teacher who can work closely with social workers and take overall responsibility with school managers

3. What more can schools do to help overcome these barriers?



## To summarise

Poor health and nutrition make a significant contribution to educational exclusion and are an important barrier to meeting the MDGs.

Millions of children in low income countries are missing out now on education because of health threats.

The response to the education system needs expanding, it lacks the necessary urgency, remains unfocused and is still limited in scope. There is an important role here for researchers to expand and contextualise the knowledge base and build cogent economic and political arguments that will influence policy and funding decisions.