

Getting Better:

What education systems in less developed countries can learn from evidence-based medicine

Summary report

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**This document is a summary (the first few sections)
of a longer report, which is available in full at
www.giving-evidence.com/education**

‘I beseech you, in the bowels of Christ, think it possible that you may be mistaken.’

- *Oliver Cromwell to the synod of the Church of Scotland, 1650*

‘There still seems to be considerable misunderstanding amongst the general public [...] about the relative value of opinion, observation and experiment in testing hypotheses.’

- *Archie Cochrane, the ‘father of evidence-based medicine’*¹

‘Remarkably little is known about the impact of education policies on student outcomes in developing countries’

- *Conclusion of a study of 20 years of education studies*²

About Giving Evidence

Giving Evidence is a consultancy and campaign, promoting charitable *giving* based on sound *evidence*. Our interest in medicine arises because it is more organised around evidence than virtually any other discipline.

Through consultancy, Giving Evidence helps donors and charities to understand their impact and to increase it. Through campaigning and thought-leadership, we show what evidence is available, what is needed, what charities and funders should gather, and what isn’t worth gathering.

Giving Evidence was founded by **Caroline Fiennes**, a former award-winning charity CEO, and author of *It Ain’t What You Give*. Caroline speaks and writes extensively about these issues, e.g., at the Skoll World Forum, the US Center for Effective Philanthropy, in the Stanford Social Innovation Review, Freakonomics, and the Daily Mail. She is on boards of The Cochrane Collaboration, Charity Navigator (the world’s largest charity ratings agency) and the US-based Center for Global Development.

Since graduating with a degree in Politics and Philosophy, **Liora Wulf** has worked in the private and charitable sectors to improve project design, clarify thinking around outcomes and impact and secure funding in excess of £1 million for a range of large and small non-profit organisations.

We are grateful to the funders who enabled this work.

1 Introduction

‘It’s chilling that when we think we are doing good, we may actually be doing harm.’

– Ben Goldacre, epidemiologist and campaigner for the good use of evidence in health

This Getting Better project aims to help improve education in less economically developed countries (LEDCs). It grew from the observations that medicine has made marked performance improvements in many areas in recent decades, and that it has a strong culture of producing evidence, critiquing it and basing decisions on it.[†] This evidence-based practice contrasts starkly with the norm in education in LEDCs, where attainment standards are generally flat or sometimes declining.

The purpose of producing evidence is to influence behaviour – of practitioners, policy-makers, communities and others. So this is at root a behaviour change exercise. Richard Thaler of the University of Chicago, ‘father of behavioural economics’ and co-author of “Nudge: Improving Decisions about Health, Wealth and Happiness” cites two ‘mantras’ essential for evidence-based policy and practice:

- ‘You can’t make evidence-based policy decisions without evidence.
- If you want to encourage some activity, make it easy’.

The activity we want to encourage is finding and heeding evidence about education in LEDCs.

With that in mind, this project explores both health and education, looking at how and what evidence is produced (is it possible for decisions to be evidence-based?), and how it is shared and used (is it easy for anybody to find, understand and use?)

Others share our interest in increasing the use of evidence in education. For example, the UK’s Department for Education and Skills commissioned a report in 2013 from Dr Ben Goldacre, author and Wellcome Research Fellow in Epidemiology, entitled ‘Building Evidence into Education’ The World Bank, the UK Department for International Development (DFID) and US Agency for International Development (USAID), have created an initiative named Building Evidence on Education to advance more rigorous research on international education.³

The need for change is clear from, for example, the estimation that only half of Africa’s school-aged children will attend school and learn basic skills.⁴ Or the fact that, in India, educational attainment has been falling despite rising spending⁵: at least 250 million primary school-aged children there cannot read, write or count well, even those who have spent four years in school.⁶

Project aims

There are enough similarities in the delivery mechanisms for health and education for the parallel to be relevant. We are therefore seeking to understand what education in LEDCs can learn about evidence from evidence-based medicine (EBM). To be clear, the aim is to *learn* from EBM, not necessarily to *emulate* it, since clearly education and medicine differ in many respects.

[†] We use ‘health’, ‘healthcare’ and ‘medicine’ interchangeably, and use them to refer to healthcare in more economically developed countries (MEDCs), unless stated otherwise. By ‘education’, we mean school education in LEDCs, unless stated otherwise.

This project aims to identify institutions, skills, resources, relationships, culture and funding systems which would bolster the use of evidence in education. It is designed to identify ways to change the behaviour of actors in education – practitioners, policy-makers, funders and others – to ensure that practice is based on good evidence. Crucially, the project is a behaviour change exercise itself, also aiming to mobilise relevant organisations to make these improvements.

‘Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients.’⁷

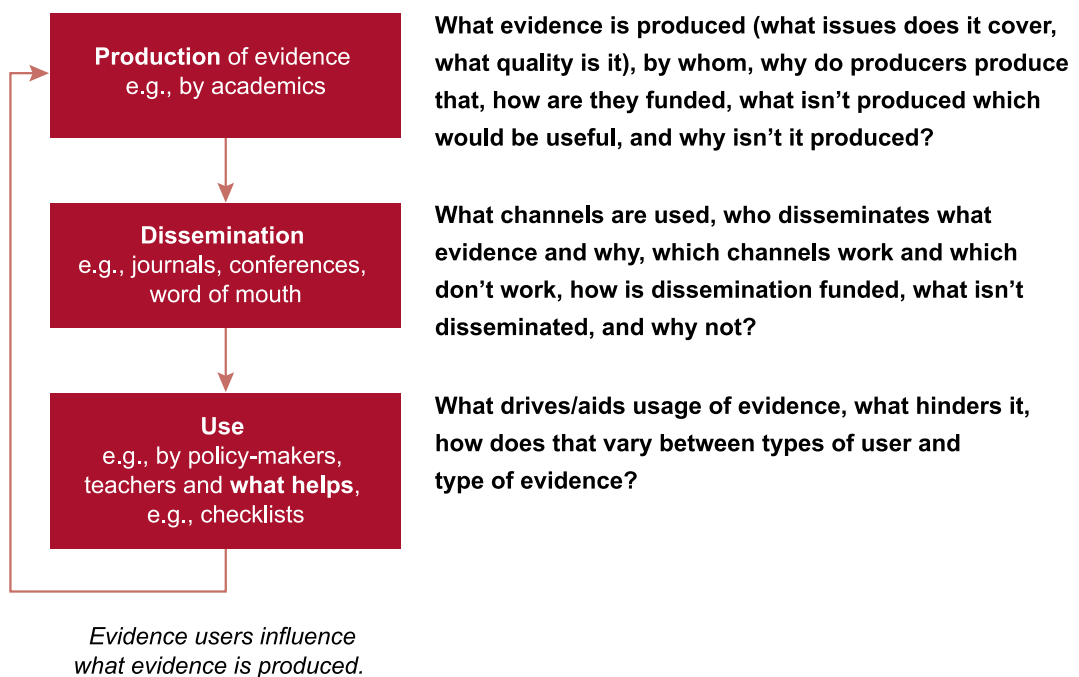
Evidence systems

By ‘evidence system’ we mean what evidence is **produced** (and how, by whom, why, and how it’s funded), how it is **disseminated** and stored, and how it is **used**.⁸

The project also looks at the respective goals of health and education, which inform (or should inform) what evidence is produced, disseminated and used.

To allay one fear expressed about the project, we will not simply advocate for randomised control trials (RCTs) in education. In our structure, RCTs are one method for producing evidence – there are many other methods and plenty of other issues in dissemination and use.

Figure 1: Model of an evidence system⁹



1.1 The project plan: work so far and proposed next steps

Stage 1: Research

This report is the first output from the Getting Better project. Following discussions with senior people in education and medicine and a review of the literature, we have outlined the evidence systems in health and education. (We do not claim that this research is comprehensive. It was done on a relatively small budget and we spoke to people we could reach relatively easily.)

Based on this research, we are recommending various activities that would improve educational outcomes for students by improving the evidence system in education in LEDCs. These are listed in summary in Chapter 2.

We also identified other areas which might yield insights or ideas for improving the evidence system in education in LEDCs, such as how the evidence system in nursing works, since nurses are often more similar to teachers than are, say, surgeons. We would happily investigate these areas, and they are listed in the full report (at www.giving-evidence.com/education).

Stage 2: Planning for action

Giving Evidence is starting to consult on the activities listed in Chapter 2 with various funders, policy-makers, analysts and practitioners in education. With them, we are prioritising the recommendations, identifying possible partners for them, and planning for action on them. Others are already working on some of the areas and we will not replicate their work but hope that our findings are useful to them.

We welcome your feedback on these recommendations, your ideas on whether and how to take them forward, and invite you to get in touch if you are interested in being involved.

Stage 3: Mobilisation

Once we have identified relevant partners and actors for the recommendations, we will begin work in those areas.

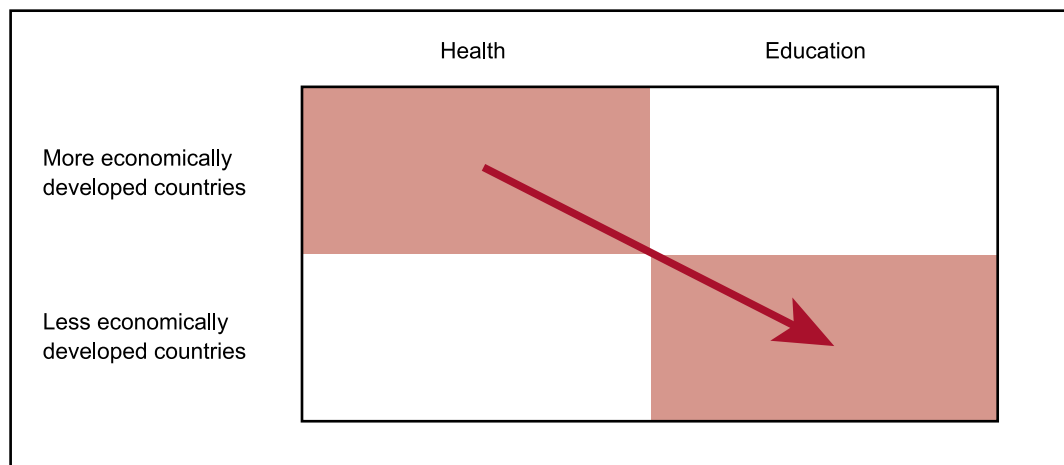
We invite your feedback on this document and the recommendations in it. Please direct comments to: Caroline Fiennes, Director, Giving Evidence caroline.fiennes@giving-evidence.com

1.2 Project scope

We have focused largely on government-funded health and education systems. We have not looked much at private healthcare systems (e.g., in the US) since the economics, incentives and resulting behaviours are so dissimilar to those in public education in LEDCs. Nor have we researched pharmaceutical companies or senior specialists in hospitals, as these differ too much from education systems in LEDCs.

In seeking to learn from the best practice in medicine, we take lessons primarily from more economically developed countries (MEDCs). Clearly this means that most of the lessons must be translated twice – between sectors, and between types of countries.

Figure 2: Applying lessons



We are aware that the research does not adequately cover education specialists and qualitative research. This is partly because, to date, we reached out to more quantitative than qualitative researchers. But it's also partly because few of the qualitative researchers and education specialists we contacted acknowledged our request or agreed to talk with us.

We're also aware of the limitation that the research so far does not distinguish between conflict, post-conflict and non-conflict countries.

2 Emerging recommendations

Our investigations suggest that work on the following areas could improve the evidence system in education and hence educational outcomes for students. Hence we recommend investigating and working in the following areas. (The recommendations are ordered according to how they arise in the document, not the priority we would attach to them. In terms of sequencing implementation, the recommendations marked with an asterisk should perhaps be tackled before those without). Giving Evidence is working on some, and invite you to get in touch if you are interested in being involved.

2.1 Goals of education

1. *Improve clarity about the goals of education beyond literacy and numeracy. This will require hearing and considering the differing perspectives of stakeholders such as governments, employers, communities etc.
2. *Fund longer studies which track the effect of interventions right through to their intended effects (e.g., lifetime earnings). A possible alternative/adjunct is to explore using proximate outcomes in education research to reduce the need for lengthy studies.

2.2 Production of evidence

3. Fund work to assess (and thence improve) the quality of education research by non-academics. (This will require making the research more accessible and clearer about research methods used: see recommendations below.)
4. *Increase funding for producing better and more comprehensive baseline data in education in LEDCs. Many countries do not even know how many out-of-school children they have.
5. *Improve the ease of finding, assessing and using research by non-governmental organisations (NGOs) and other non-academics (including monitoring and evaluation). As a first step, create a repository for education research by NGOs, practitioners and any other entity, with requirements for clear description of the intervention used, the research method used, how it was used (e.g., how the sample was chosen), and the results. Funders could require entities they fund which conduct any monitoring and evaluation or other research to post it to the repository.
6. Improve the quality of research by NGOs and other non-academics. Recommendation 5 is necessary for this, but it will also require training those research-producers, training funders, and increasing partnership between them and professional researchers.
7. Develop a mechanism in education similar to the James Lind Alliance to ensure that the issues on which researchers work are those which practitioners, policy-makers, communities and other stakeholders would prioritise.
8. *Funders could encourage and facilitate more interaction between the two 'tribes' of researchers – educationalists and development economists. It seems likely that they could achieve more (and/or avoid redundant research) by collaborating better.
9. *Increase funding for researching the effectiveness of interventions, since so little currently exists.

2.3 Dissemination of evidence

10. Create better 'push' channels for disseminating education research to its intended users, such as journals, conferences.
11. *Increase the incentives on researchers (both academics and practitioners, e.g., NGOs) to share their findings with policy-makers and the field. Funders could make this a condition of funding.
12. *Make education research easier for users to 'pull' (find). This relates to recommendation 5, of publishing it in a findable place, and with standard searchable sections (as medical journal articles have standardised abstracts).

2.4 Use of evidence

13. Involve users in prioritising research topics, to ensure that research is relevant. This would secure buy-in from practitioners, making it more likely that they use the research, and reduce wastage.
14. *Produce guidance and training for education funders about the various types of evidence and their differing strengths and weaknesses.
15. Investigate mechanisms to make it easier for practitioners to consume, understand and use research. These might include 'practice guidelines' (analogous to doctors' clinical practice guidelines). They might also include checklists. Though terribly simple, checklists seem to be highly effective: in one study looking at the use of soap in Karachi, using a checklist halved cases of diarrhoea, a huge effect from a seemingly trivial intervention.¹⁰
16. Explore delineating binary 'conditions' in education (e.g., either a child needs remedial maths tuition or they don't) to help teachers make decisions (analogous to how doctors are aided in diagnosing conditions by binary delineation: either you have diabetes or you don't).

3 Summary findings from stage one

In summary, we found that education has a very limited evidence-base and little culture of producing, critiquing or using research. Research in education is normally quite separate from practice, whereas in medicine it often happens in the same buildings and involves the same people. Remarkably, even foundations which fund lots of education delivery and research, and some large delivery agencies, told us that they don't use research produced by others¹¹.

Table 1: Outline of the evidence systems in health and education

Evidence system stage	Health	Education
Production	Large amount of evidence produced.	Very little evidence produced.
	Significant funding of research (far exceeding education).	Scant funding for research.
	Some intermingling of qualitative and quantitative research methods.	Two 'tribes' of researchers, researching causal and non-causal parts of education. Neither tribe is particularly close to practitioners or policy-makers.
	Demand from practitioners for evidence is high.	Little demand from teachers, policy-makers and other practitioners.
	Intermingling of practice, teaching and research.	Little intermingling of practice, teaching and research.
Dissemination	Many dissemination channels reach practitioners and policy makers. Notable channels are medical journals, conferences, training, drug sales reps although there are a number of biases that exist in dissemination mechanisms.	Few (if any) dissemination channels reach practitioners or policy-makers. Journals are not aimed at practitioners, but at other researchers.
	The research that is published is generally quite well indexed and findable.	Published information is dispersed, not standardised or well indexed and so is hard to locate.
Use	Guidelines and checklists help practitioners to overcome cognitive and other barriers to use of evidence.	Few (if any) guidelines or translation of evidence, so research is hard to interpret or use for practitioners.

Thus it is currently probably impossible to run an evidence-based education system in an LEDC. This is partly because of history, and partly culture and funding. Some of the factors are probably amenable to change, and so, on the positive side, it seems that much could be improved relatively swiftly.

3.1 Goals: there are few agreed goals in education

In health, goals are reducing incidence, mortality and symptoms of disease. These goals are generally agreed, and lend themselves to measurement, such as whether the incidence of flu has changed.

By contrast, goals in education are contested, beyond basic literacy and numeracy. People variously argue that the goals for education are high-school graduation rates, college graduation rates, lifetime earnings, results in exams, vocational skills, knowledge for its own sake, and so on. Different goals would lead to quite different education systems. Clearly, researchers can't identify interventions that achieve education's goals without clarity on what those goals are.

Education's focus on inputs

Education policy tends to revolve around inputs, such as access, enrolment, attendance, and availability of teachers, rather than outcomes such as learning or employment. For instance, whereas the Millennium Development Goals (MDGs) relating to health focus on outcomes (better maternal health, reducing incidence of HIV/AIDS), the education MDG concerns an input – school attendance (specifically, “Ensure that children everywhere will be able to complete a full course of primary schooling”¹²), irrespective of what, if anything, happens in school.

Table 2: Millennium Development Goals – inputs or outcomes?

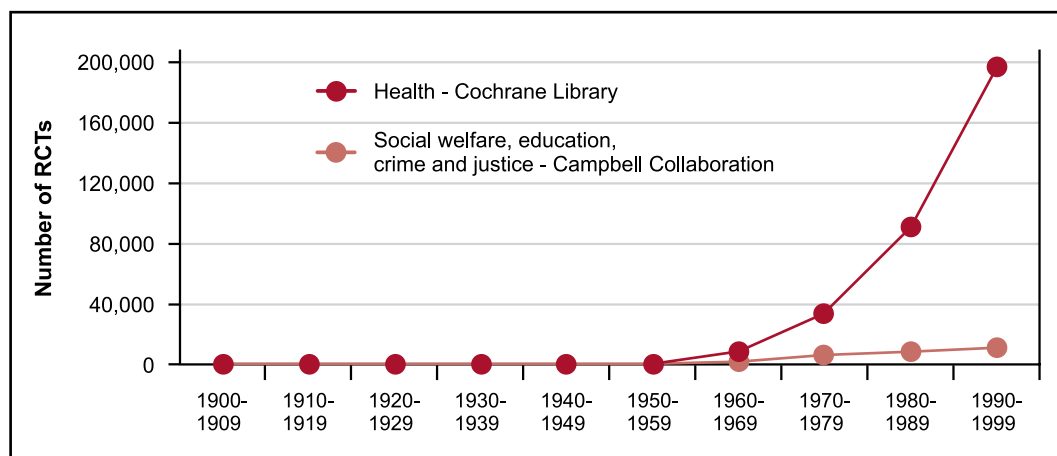
Health and education MDGs	Input?	Outcome?
Education		
Enrolment in primary education	✓	
Health		
Reduce child mortality		✓
Improve maternal health		✓
Combat HIV/AIDS, malaria and other diseases		✓

This focus on inputs would be fine if a clear link had been established between the input and desired goals of education, but this is not the case.

3.2 Production of evidence: comparatively little is produced in education

The overwhelming finding is that **there is much less evidence about education than there is about health**. On most education topics there is no evidence at all. Taking just one type of evidence, RCTs, the 20 years between 1990 and 2010 saw only 13 RCTs on interventions in education in LEDCs, against tens of thousands in medicine.¹³ The graph below indicates the extent to which RCTs in health outnumber those in social fields.

Figure 3: The number of RCTs produced over time in health compared to the number of RCTs produced in social welfare, education, and crime and justice fields combined ¹⁴



3.2.1 Funding of health research vastly exceeds that of education

This is partly due to the pharmaceutical industry, though government and charitable funding for research is also greater in health. In the UK for example, government spending on health research (domestically) was nearly 60 times greater than that on education research in 2010 – 2011.¹⁵ In 2014, DFID spent £75 million on research into LEDCs, but less than £0.5 million on education research.¹⁶

This lack of funding obviously contributes to the lack of research in education. However we suspect that it is not the sole factor.

3.2.2 Education has patchy ‘baseline’ data

Baseline data provide a snapshot, showing how large a problem is and where it is. In health, they include data on incidence and mortality: e.g., how many people have flu and where are they? In education, baseline data might catalogue enrolment or reading levels in various locations. They are invaluable for prioritising problems though offer no guidance about improving performance.

Baseline data are surprisingly patchy in education: many countries do not have a clear picture of learning levels in various subjects. This obviously prevents policy-makers and practitioners knowing what to prioritise and seeing whether policies and processes are working.

3.2.3 There is a mismatch between the evaluation time-periods of interventions and outcomes

Most education research measures short-term outcomes such as test scores, despite the fact that the ostensible goals (e.g., labour market participation, political engagement) are much longer term. This would be acceptable if there were evidence to connect the short-term outcomes with longer-term goals, but currently there isn't.

A related issue is that policy-makers often need advice on decisions in quite different time-scales than researchers work to. For example, investigating the effect of a new two-year programme will (obviously) take at least two years, but a policy-maker or practitioner can't wait that long. They often need advice on the best material available, which creates tensions between them and researchers.

3.2.4 Research, practice and teaching are separate in education, whereas intermingled in medicine

Since Aristotle, medicine has intermingled teaching, research and practice: senior doctors often teach trainee doctors, do research and see patients. Most senior jobs (e.g., in Royal Colleges) require a strong research record. It supports evidence-based practice because evidence is generated by its users, who hence understand and can evaluate it.

This intermingling doesn't exist in education (nor indeed in most other disciplines). Consequently, education research can seem very distant and irrelevant to a teacher's work. We look briefly at policing, which also has no history of this intermingling but yet where evidence is increasingly important.

3.2.5 There is a much greater culture of research in health than in education

This intermingling means that doctors are taught to conduct research, to assess it and are exposed to it and involved in it throughout their careers. Hence it's natural for them to seek and use it. They're scientists by training and by nature: and science fundamentally involves acknowledging the limits of intuition and experience and looking for empirical findings. It's obvious that we can't understand the body intuitively and hence need experiments, the culture of which spills over to create experiments and empirical investigations in other areas of medicine, such as the best ways of teaching medicine or persuading patients to take more exercise.

Education (like policing) isn't like this: teachers aren't selected on their scientific ability, and the learning process isn't obviously unintuitive. It's more of a delivery culture, and hence demand for research is lower.

The causation isn't clear. Perhaps the lack of demand arises from scarce funding (nobody will seek research if there is none), or causes it (nobody's convinced funders to fund education research). Certainly demand may be limited by education research being (often rightly) perceived as context-specific: if the results of a trial in Kenya are not transferable to Uganda or Sri Lanka, it is unlikely that practitioners in those countries will bother to seek it out.

3.2.6 Education has two quite distinct groups of researchers

The interests of the first group, education specialists (educationalists), include pedagogy and context. The second group tends to comprise development economists, interested in the effectiveness of interventions. The latter therefore run studies that investigate causation, such as case control studies and RCTs. It's remarkable how little these groups work together, value, or even read each other's work. For instance, their journals are separate, as are their conferences, and we found them noticeably derogatory about each other.

3.2.7 Findings are less widely applicable in education than in medicine

The two issues here are fidelity and external validity (defined in Table 3 below).

Table 3: Barriers to generalisability

<p>Fidelity</p>	<p>Did all beneficiaries receive the same intervention? Fidelity is high if 20 patients are given the same pill in the same dosage and in the same way. It is lower if they all have breast cancer removed, because (a) the surgery may be performed differently by different surgeons, and (b) the patients may have different conditions. Fidelity is lower still for mentally ill patients receiving a ‘talking therapy’, since clearly the therapist responds to what the patient says, which will be different in each case.</p> <p>Fidelity is low whenever there is scope for people to change what is done. Fidelity is generally low in educational settings, because:</p> <ul style="list-style-type: none"> - Teachers differ in their styles - Teachers respond to their students, so effectively students get a range of interventions - The resources available in schools vary e.g., no blackboard - Local contexts such as parental involvement in education vary
<p>External validity</p>	<p>If an intervention (say, providing books) works in one context, will it work elsewhere? External validity considers whether the results of an experiment will be valid outside the context in which the experiment was done.</p> <p>External validity is high in physics – the speed of light is the same in Japan as in Jamaica (although external validity is not always high even in physics: gravity’s strength varies between Sweden and Singapore). People often say that external validity is high in medicine (‘everybody reacts the same way to a pill’) though this isn’t always true – for example, people of different races, sizes and genders metabolise drugs differently. External validity is low whenever context is important, as it is for most for ‘social’ interventions, including education. For instance, treating children for intestinal worms dramatically reduces illness (and hence school absenteeism) in Kenya,¹⁷ but won’t achieve much in the Bronx since school absenteeism there has very different causes.</p>

3.3 Dissemination: not effective in education

Dissemination ‘pushes’ material to users, and also allows them to ‘pull’ (find) it when they want.

Formal ‘push’ channels are much less established in education than in medicine: few journals or conferences reliably reach users (teachers, policy-makers etc.). In part, this is probably because there is much less evidence to share, and because medical ‘push’ channels are subsidised (sometimes covertly) by pharmaceutical companies.¹⁸ But evidence in education is shared amongst academics and other producers: however there is so little attempt to share it with users that one senior interviewee derided education research as ‘an echo chamber’.

Education also seems to have a poor ‘pull’ system, in that it’s hard to find evidence. The separation between the two groups of academic researchers have different journals. And much non-academic material is unpublished or published in unlikely places and incomparable formats.

3.4 Use: evidence little used in education

The primary barrier to using evidence in education is simply its scarcity, along with ignorance about what has been produced and a range of cognitive biases.

Barriers to usage in medicine include some of the same biases and barriers as in education, including the facts that evidence is complicated and practitioners are busy. So medicine has ‘clinical practice guidelines’ – short summaries produced for practitioners by governments, regulators and professional bodies. There is no equivalent in education (as far as we know); teachers normally have a curriculum, and sometimes scripted lessons, though these are quite different.

Education could perhaps benefit from evidence-based guidelines for handling particular situations, e.g., a child often removed from school by parents, falling behind in mathematics, or whose behaviour suddenly changes (which may indicate a problem at home, such as domestic violence). Similarly, some areas of health have introduced checklists with surprisingly large success, yet these have not been tried (to our knowledge) in education.

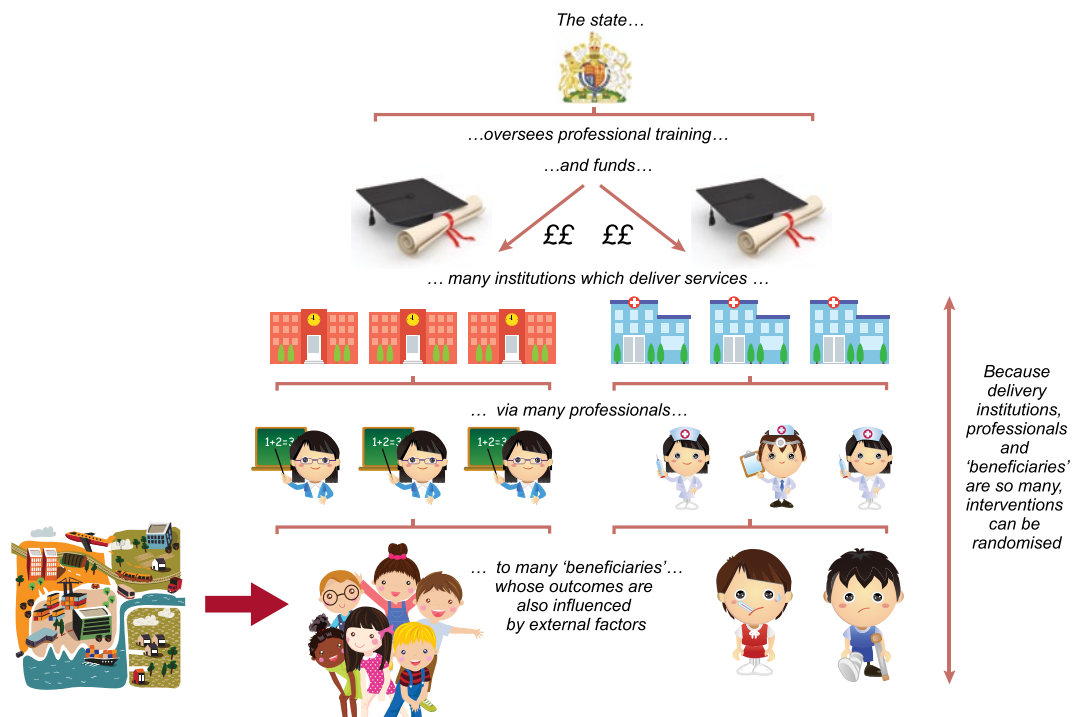
4 Evidence-based medicine as a model for education

‘I would like to stress how very far ahead the medical profession [...] is of other professions. What other profession encourages publications about its error and experimental investigations into the effect of their actions? Which magistrate, judge, or headmaster has encouraged RCTs into their ‘therapeutic’ and ‘deterrent’ actions?’

- Archie Cochrane¹⁹

Lessons from medicine are particularly relevant to education because health and education have such similar delivery systems. For example, every functioning government in the world has ministries for health and education, both health and education are delivered by trained practitioners (teachers, doctors), operating in institutions (schools, hospitals) which provide interventions (operations, lessons) to beneficiaries (students, patients) who know less about what they need than practitioners do. This strengthens our suspicion that lessons can be transferred.

Figure 4: Similarities between delivery systems in health and education



Current debates in education about performance and measurement are similar to those in medicine about 60 years ago. Teachers and educationalists often object to measurement on the grounds of the individuality of the people they serve, on the basis that they know what’s best, because the true value of their work would elude measurement, and because findings from one situation couldn’t possibly be used elsewhere. All these objections were made by medical practitioners, and all have been overcome.

It is particularly surprising that, of all professions, medicine was so early to become evidence-driven. Doctors have always had high status – their opinions have always attracted respect – so it's remarkable that they willingly make their judgements subservient to the data.

**'What's the difference between a doctor and God?
God doesn't think he's a doctor.'**

– standard joke

We do not pretend that medicine is perfect; many significant problems with evidence in medicine remain, and we recite some in this document. Some arise from commercial interests of the pharmaceutical industry, for which there is no parallel in education and hence may be avoidable in education.

4.1 Changes in performance: some examples in health and education

Health

Despite the problems, it's clear that performance in medicine has dramatically improved, and below are some examples. (These graphs don't establish causation, of course, though there are many documented instances of practice changing as the result of better evidence).

Figure 5: Crude death rate for infectious diseases – United States 1900-1996²⁰

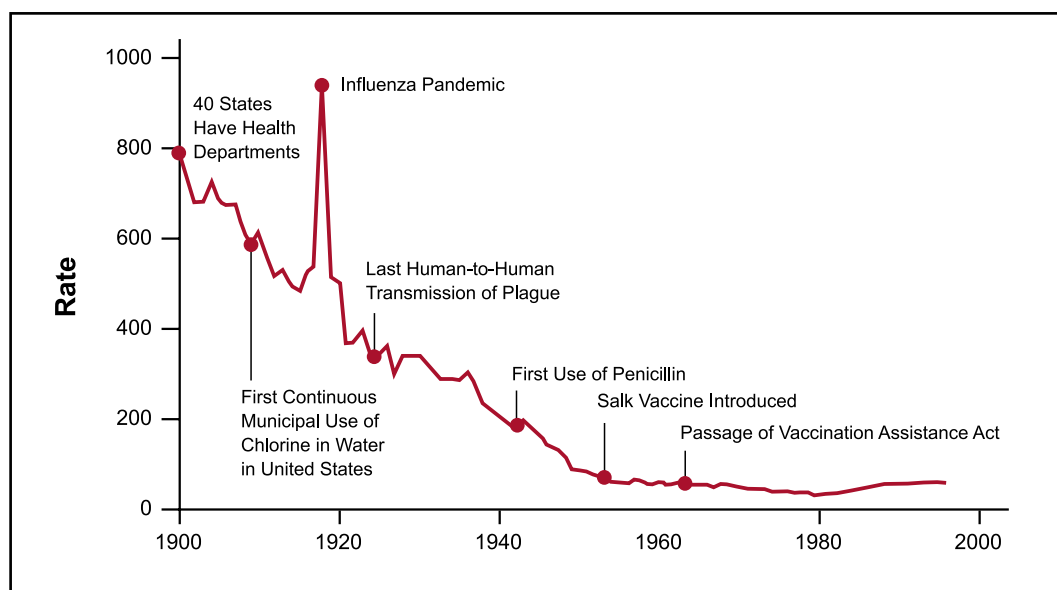


Figure 6: Global annual reported cases of Polio, and Pol3 vaccine coverage, 1980 – 2012 (World Health Organization, 2012)²¹

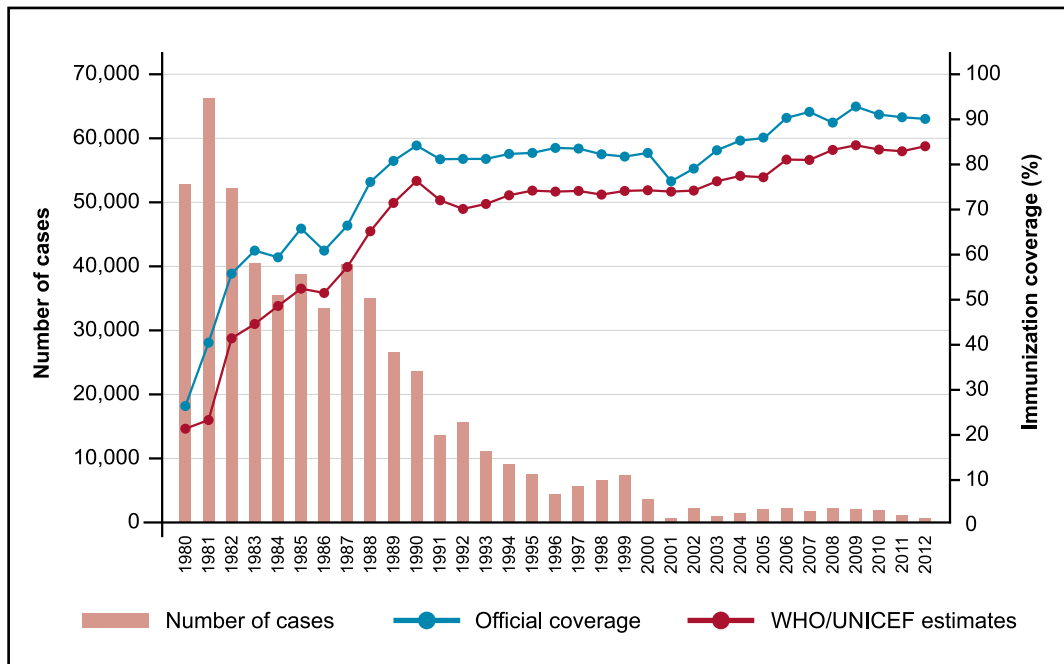
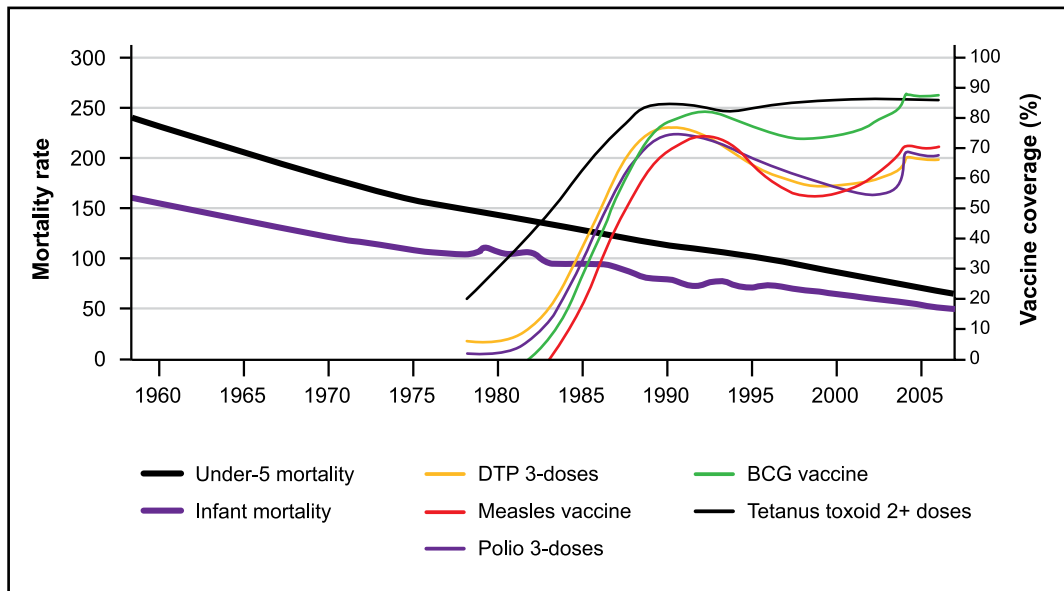


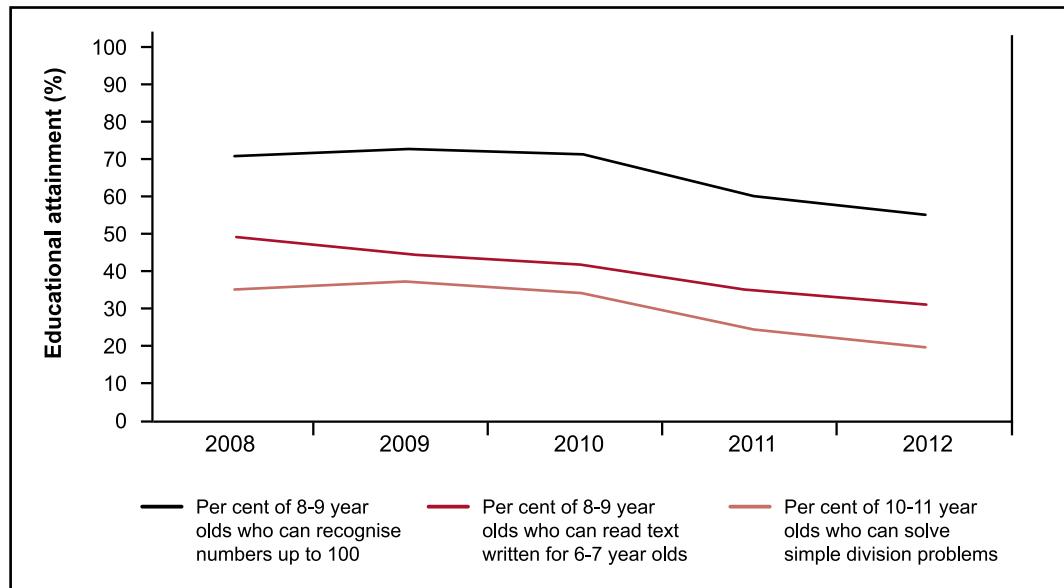
Figure 7: Under five mortality and infant mortality against vaccination coverage in India²²



Education

Taking the example of India (for which good statistics are available), educational attainment has *decreased*, despite the introduction of a tax and legislation to ensure that children have access to education.²³

Figure 8: Declining educational attainment from 2008 – 2012 in Indian government schools²⁴



Live Mint and the Wall Street Journal reported that ‘the proportion of all children in class five [10 years old] who can read a class two [seven years old] level text has declined by almost 15 percentage points since 2005. Similarly, the proportion of students in class 8 [13 year olds] who can do divisions [sic] has declined by almost 23 percentage points during the same period.’

4.2 Parallels between delivery systems in health and education

The significant parallels between the delivery systems in health and education include:

- **Funding:** In most countries, some level of healthcare and education is provided by governments, provided universally, and funded by taxation. These are often supplemented by private sector providers. Both systems absorb large amounts of public funding.
- **Delivery model:** Both have many practitioners (teachers, doctors, nurses) in institutions (schools, hospitals, clinics), serving beneficiaries (students, patients). As a result, many interventions in both systems can be randomised.
- **Training:** Generally, practitioners in both systems are trained, and the training is overseen by government, and often practitioners need to be registered with a professional body overseen by government.
- **Information:** In both systems, there is substantial information asymmetry – doctors and teachers (should) both know more about what the patient or student needs than the patient or student does. Hence the patient or student often cannot assess the treatment they receive. (This is quite different to business, where the customer states what they want and the provider isn’t asked for a view of whether they’re correct.) This asymmetry can lead to patrician behaviour, and hence requires regulation or inspection to ensure quality.

- **Incentives:** Providers of both public healthcare and education have little financial incentive to perform well (in contrast to, say, businesses).
- **Lifestyle influences on outcomes:** In both health and education, outcomes are affected not only by the delivery system (teachers in schools, nurses in clinics), but also outside influences such as parenting style and culture, or diet and exercise.
- **Potential to randomise:** Interventions in both health and education can be tested empirically because they both have many similar ‘units’: there are many similar deliverers (teachers, doctors), many similar recipients (students, patients) and many similar institutions (schools, clinics). This allows evaluations of many interventions to have adequate sample sizes, and can be randomised. This wouldn’t be the case for, say, species conservation or legislative systems which are too few and too heterogeneous.

These parallels make medicine much more analogous to education than many public services (e.g., providing roads) and other work funded philanthropically (e.g., species conservation or defending human rights).

4.3 Differences between delivery systems in health and education

Of course there are many ways in which education differs from health, which is why this project seeks only to learn from health rather than to transplant its entire evidence system into education. Differences include:

- **Delivery model:** Education is largely a ‘batch process’ in that students are taught in groups, whereas healthcare is generally delivered to an individual. Education is also normally delivered proactively: children are schooled irrespective of their circumstances. Healthcare is generally reactive, with patients being seen only when they have a condition. (Public health work, e.g., vaccination campaigns, is both proactive and batch, and hence a subject for further study in this project).
- **Referral to specialists:** In health, patients are often referred by a generalist to a specialist. The education system generally does not work on a referral basis (with the possible exception of remedial classes): there are few specialist teachers who provide support for ‘conditions’ such as poor spelling or high potential in mathematics.
- **Goals/desired outcomes:** There is less agreement about the goals of education beyond basic literacy and numeracy (the accumulation of knowledge? high incomes? better jobs?) than in health. Furthermore, health outcomes are more apparent (the disappearance of my rash) and often transpire more quickly. By contrast, outcomes of education may take many decades.
- **Level of education of practitioners:** Teachers are generally not trained as long or as well as health professionals: in many LEDCs, many teachers are not trained at all.²⁵ Health practitioners (in MEDCs and to some extent elsewhere) are encouraged or required to have continuing professional development (CPD) and take exams as they become more specialised. Teaching hospitals allow students to learn from real cases, and doctors in MEDCs are trained to use

evidence and interpret clinical trials. This, with other factors, encourages practitioners to produce evidence. However, training for nurses and physiotherapists is lower than for doctors and hence these groups are more interesting for this study.

- **Role of commercial interests:** In education, the role of commercial interests is relatively low – except for private schools, these interests are limited to providing books and other equipment to schools. In contrast, the pharmaceutical industry is pivotal to the evidence system in health. This is so dissimilar to education that we have mostly excluded it from this study. Commercial interests play a smaller role in other parts of health, such as talking therapies and physiotherapy, which are consequently more interesting to this study.
- **Generalisability of findings:** As discussed, external validity and fidelity are generally more problematic in education than in health.
- **Politicisation and ‘barriers to entry’:** Unqualified outsiders often opine about educational methods and politicians often introduce education interventions. This is much rarer in medicine (though does happen in relation to the management of healthcare) – politicians rarely override doctors’ opinions about medical interventions. The ‘barriers to entry’, so to speak, are lower in education than in health.

4.4 Are the differences between health and education too great?

Some commentators suggest that education and health are so fundamentally different that it is impossible to learn from each other. We see those differences, yet retain our suspicion that much can be learnt, as outlined in Table 4.

Table 4: Addressing differences that might challenge the analogy between education and health

Difference between education and medicine: Suggested barrier to learning from medicine	Response: Reason to still pursue learning from medicine
Context is paramount in education, unlike in health, precluding generalisations about education.	This project is particularly interested in parts of health which are highly context-specific, such as mental health. Perhaps one culture views mental illness as possession by the devil, while another views it as a purely physical disease. Clearly this will affect a patient’s situation (they may get locked away) and hence the effect of an intervention. Conversely, some findings about human behaviour have been proven generally applicable (such as response to incentives) which can be applied to teachers and education.

<p>Doctors in MEDCs are highly educated, able to follow complex arguments, trained and self-selected to think of themselves as scientists, and hence can reasonably be expected to read scientific papers.</p>	<p>This may be true for doctors in MEDCs, but health has some practitioners whose levels of education are similar to teachers', nurses', midwives' and physiotherapists'.</p>
<p>Health interventions have very high fidelity. For example, it is easy to be sure that every patient took the same pill.</p>	<p>This is true of pharmaceuticals, on which this project therefore will not focus. But it isn't true of, for example, talking therapies and physiotherapy.</p>
<p>Pharmaceutical companies have strong financial incentives to prove that their drugs work, and so are willing and able to spend on producing supportive evidence.</p>	<p>Indeed, and we largely exclude them from our analysis since they are so dis-analogous. Clearly it's harder to exclude their wider influence e.g., on institutions, conferences, journals and regulation, though we do so where possible.</p>
<p>Medicine is delivered to an individual and/or reactively, making it too different from education.</p>	<p>Though true for some areas of health (e.g., surgery), this isn't true of public health (e.g., vaccinations or behaviour change campaigns) which hence are interesting to this project.</p>
<p>Medicine's intermingling of practice, research and teaching is too different from education to make comparisons meaningful.</p>	<p>Again, this is not true of all medical professions, e.g., nursing or physiotherapy. We also take a brief look at policing, which also has no such intermingling.</p>
<p>It is easy to see whether a medical intervention is working because outcomes are clearly defined and relatively quick (e.g., neonatal survival), unlike in education.</p>	<p>There are many instances in healthcare where outcomes are difficult to detect and/or slow e.g., in mental health or public health. We look at the helpful development in health of making many conditions binary (either you have diabetes or you don't), from which education could perhaps learn.</p>
<p>Medicine has a culture of performance measurement, unlike education.</p>	<p>This was not always the case, and the emergence of EBM involved many stand-up rows. As noted, the objections are remarkably similar to those made now in education, and in some ways it's particularly surprising that medicine, of all disciplines, has welcomed evidence. Hence we look briefly at the history of how evidence gained traction in medicine, and will research this further in the next stage of our work.</p>

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