

## 4.B. Grounding in a broader framework of determinants of health

By David I. Hay\*

### Introduction

The Feinstein *et al.* paper summarises an extensive review of literature that examines the hypothesis that education has impacts on health. The authors organise their presentation of findings by highlighting three types of research studies: those that attempt to show robust evidence of causal relationships; those that are primarily associational; and, those studies that explore process issues in education and health relationships.

This paper provides comments on Feinstein *et al.* In particular, the comments provide overall feedback, highlight relevant alternative perspectives on issues covered in the paper, and also make some suggestions for additions and next steps. Section-by-section comments are preceded by some brief general comments and then organised according to the section organisation of Feinstein *et al.* paper. The comments on Feinstein *et al.* follow a general overview of relationships between education and health.

### Context: relationships between education and health

Along with occupation and income, education is a common indicator of socioeconomic status. Relationships between socioeconomic status and health have been widely studied for many years primarily by epidemiologists and social scientists (*e.g.* sociologists and economists). Studies have examined relationships using single indicators, multiple indicators, and combinations of indicators into indices of socioeconomic status.

Each of these three indicators of socioeconomic status has a distinct relationship with health, but at the same time, education, occupation and income are also highly interrelated. There is also a temporal dimension to their relationship, *i.e.* an education level is achieved that enables an occupation level to be attained that returns a level of income.

Educational attainment is set relatively early in the life course compared to levels of occupation or income. It is more likely that it is the years immediately prior to retirement from the labour force that a person would attain their highest level of occupational status or prestige, and level of income. This life course “stability” to education makes it a preferred indicator of socioeconomic status.

Another reason education is a preferred indicator is that it contributes to the interpretation of causal direction in relationships with health measures. Beyond early adulthood, changes in health can have far fewer consequences for educational level than

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\* David Hay, Canadian Policy Research Network, 600-250 Albert Street, Ottawa, Ontario, K1P 6M1, Canada.

health changes can have for occupation and income level. Thus it is much safer to interpret evidence from cross-sectional studies of bivariate relationships between education and health as social causation rather than social selection.

There is abundant research evidence of direct and indirect relationships between education and health. Education is generally measured by years of schooling and/or level attained (*i.e.* high school, O- and A-levels, college, etc.). Measures of educational quality are far less common and almost non-existent in this research area. Health is measured in many ways – morbidity, mortality, self-rated health, physical conditions, physical functioning, mental conditions, and so on. While education and health relationships do differ depending on the measure of health, the consistency of a finding between education and health, across many different health measures, is an indicator of the durability of the relationship.

Understanding the strength of observed relationships between education and health is not simple, nor are relationships linear. For example, relationships can be different for individuals at different income levels. At lower levels of income (*e.g.* “poverty” levels), education can have little effect on health, suggesting that educational levels are unable to mediate the stronger effect of material conditions. Also, relationships differ according to one’s age, gender, ethnicity, culture, and so on. There are some indications of patterns to these differences (*e.g.* women showing stronger associations between education and mental health), but generally the differences are inconsistent and not predictable. What is important is to include these types of variables in models testing education and health relationships to reveal the strength of interrelationships, instances of co-linearity, and the presence and strength of intervening variables.

Explanations for positive relationships between education and health fall into two general areas. First, it is reasoned that skills and knowledge increase with increasing years of education. Specifically, information processing and critical thinking skills improve giving individuals a greater degree of command and control over resources that influence health. These can include things like social skills that enable more successful interactions with social institutions and service providers. Second, educational level gives individuals important credentials that return benefits of social status and social standing. This can contribute to enriched social networks, higher levels of social capital, and “health-enhancing” socialisation, among other benefits. Of course these things will vary greatly by age, gender, culture, ethnicity, and so on.

There are measurement issues that can compromise our understanding of education and health relationships. Measuring education primarily as an individual attribute is not without consequence. For example, household educational level may be very different from an individual’s educational level. What could be the relative contributions to health outcomes of these different levels of education? Heavy reliance on quantitative measures of education means that it is primarily adult populations that have been studied. Children and youth who have not yet completed basic formal schooling fail to “score” with measures of school completion level, for example. Using quantitative measures of education such as years of schooling also makes it difficult to interpret the particular meaning of observed relationships. For example, if people with 12 years of education have better health than those with 11 years of education, is it the additional year that makes the difference, or that 12 years generally denote high school completion? The achievement of the credential, a high-school diploma, is an important social outcome with broad implications, one of which could include better health. Further, in this particular

example, the measure of health, *e.g.* mental or physical, could also contribute to confounding our understanding.

The focus on measuring the educational attributes of individuals, like years of schooling and credentials achieved, and then relating these to a social outcome like health, can also bias orientations to any suggested changes or interventions toward the level of education of the individual. To some extent it also promotes a lack of connection between individual agency and how individual agency operates in social and cultural contexts. Education and learning opportunities are fostered in supportive environments of committed parents, community organisations, policy makers and governments that can develop and support the appropriate family settings and community institutions, be they for early learning, formal schooling, post-secondary education, lifelong learning, and so on.

### Comments on Feinstein *et al.* paper

From the overview of the organisation of Feinstein *et al.* provided above, it is clear that their review of the relationship between education and health is comprehensive. For example, the report runs to over 100 pages and the contents of over 60 different journal titles were searched. Internet searches were undertaken, seminal work was examined and other literature reviews were mined for important references. “Well-known” researchers in the area were identified and relevant work obtained. As well, country representatives and contacts for the OECD Social Outcomes of Learning (SOL) project were approached and relevant work solicited.

The depth of the review, however, is less clear. While the seminal work and work identified by the OECD SOL background document cover literature from the past 20 years or more, journal reviews focused on work from only the last 3 to 5 years. Also, given the substantial breadth of education and health issues reviewed, almost all of which have bodies of research sufficient to support paper length reviews of their own, it is difficult to discern if all work of importance has been noted or referenced in this paper. The authors should clearly identify the seminal and well-known work, including previous literature reviews, and then explicitly remark on how and what any additional literature has added to these “baseline” understandings.

### *Conceptual issues*

Section 4.2 of Feinstein *et al.* presents and discusses a conceptual framework for the links between education and health. The intent of Section 4.2 is to provide an overview of key areas and issues with respect to the pathways for the health effects of educational inputs. The authors’ goal is to synthesise diverse perspectives from many literatures to maximise the strengths of each, while at the same time presenting a “relatively simple model” that is accessible to policy makers. The model is reproduced in Figure 4.2.1 above.

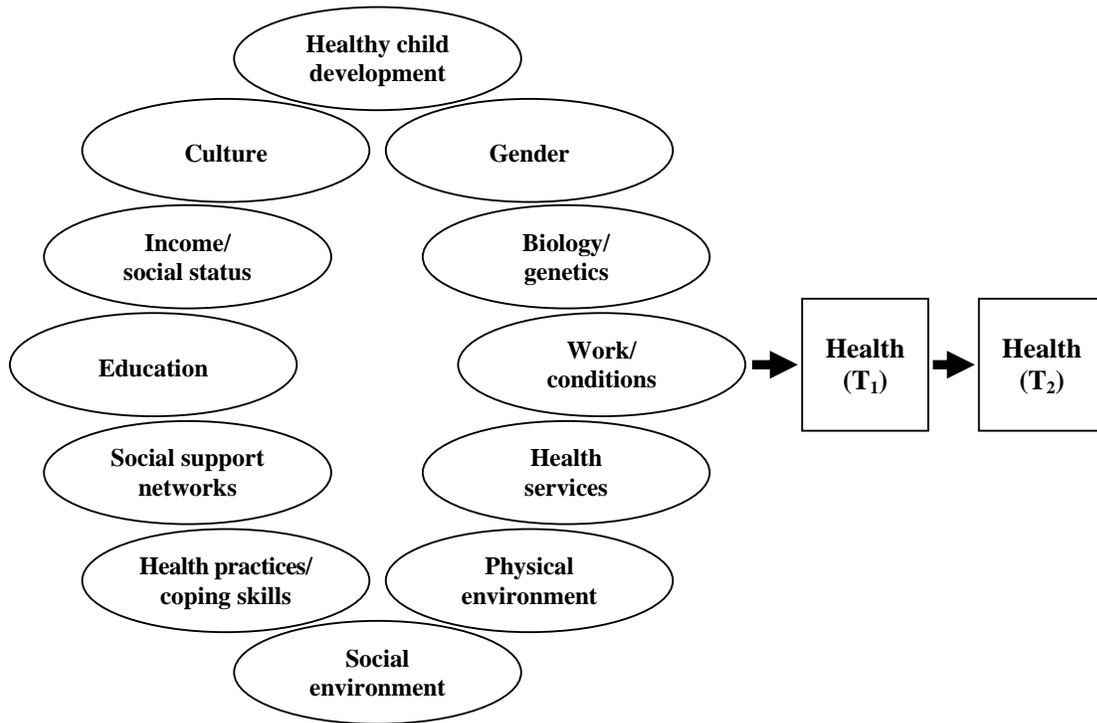
The authors recognise that education does not act on health in isolation from other factors. The model proposes that education has impacts on the individual (the self), within a social context. Key features of context that are mentioned include physical structure and environment (*e.g.* housing, neighbourhoods, employment, etc.), inequality, social position, gender, relationships, and so on. The model further outlines that educational effects on the self, shaped within various social contexts, can then be further influenced

(or mediated in the language of Feinstein *et al.*) by lifestyles (*i.e.* health behaviours such as diet, physical activity, substance abuse, etc.) and service use (*i.e.* the use of preventive and curative health services, and the processes by which they are used). The bulk of Section 4.2 is a considered discussion of the evidence behind these particular features of the self, context, lifestyles and service use and their relationships with health.

The evidence presented is sufficient to accept the soundness of the model presented. In the attempt at model simplification, however, the complexity of the interrelationships between many of the key features is obscured. It does not take a very careful reading of Section 4.2 for this complexity to be inferred. This is not necessarily an argument for presenting a more complex model, but it does make one wonder if the simple model will indeed be as useful to policy makers as the authors suggest.

The model presented also, curiously, ignores the many models in the social epidemiological and public health literatures that outline the “determinants of health”. In these models, education is one of a number of high-level determinants. The determinants are a complex of variables, and research studies have great difficulty in reliably sorting out the relative importance of the determinants in predicting variation in health. Many times the relative importance or strength of the relationship of the determinant with health is dependent on the aspect or measure of health that is used. To be fair, however, in some respects the model presented by Feinstein *et al.* can be interpreted as a simplification of models representing the determinants of health. The determinants of health are represented in Figure 4.B.1 below.

Figure 4.B.1. Determinants of health



One thing the Feinstein *et al.* model definitely fails to address is a more dynamic view of the world, in particular a temporal dimension. For example, from longitudinal studies we know that the single best predictor of current health status (*i.e.* health at  $T_2$ ) is prior health status (*i.e.* health at  $T_1$ ) (Hay, 1994) (see Figure 4.B.1). The strength of this prediction depends on the amount of time between the two measurement points, but the association generally holds. When prior health status is included in longitudinal studies investigating the influence of social determinants on health, and effects on health from variables such as education are found, the effects are marginal in comparison to the effect of prior health status. This does not mean that social variables such as education are not important – as the abundant evidence reviewed by Feinstein *et al.* makes very clear – but it raises the crucial question of when they are important. The implication is that many social determinants have their largest affect on health very early in an individual’s life. This is indeed part of the rationale for the research and policy focus on the “early years”, including early childhood education and development (Canadian Institute for Health Information, 2004).

### ***Methodological issues***

Section 4.3 of Feinstein *et al.* identifies how research is classified for the review, as associational, casual, or process-oriented (*i.e.* research that explores explanatory variables in the education and health relationship). These classifications are defined and described and the types of evidence and their underlying research methods and statistical techniques employed are outlined. Again, the reader can be confident that the authors have applied fairly rigorous criteria in including and assessing the literature, and that the findings are robust as a result.

### ***Strength of evidence***

As the above overview of the relationship between education and health identified, and as Feinstein *et al.* also clearly state, the preponderance of the evidence is that there is a consistent, durable, high-quality and robust relationship between education and health. This holds across time, place, and variability in measures of education (some) and health (much).

The evidence for direct effects of education on health (Section 4.8) begins with four subsections looking at research using mortality, physical health conditions, mental health and well-being, and self-rated health. Again, while findings are generally consistent, they do vary. It would be useful to capture that variance, for example by showing the range of effect sizes across similar studies. This is important to consider when assessing where educational interventions may be most successful in changing health outcomes.

The fifth subsection reviews the evidence on intergenerational educational effects, *i.e.* the impact of parental education on child health outcomes and on preventive health behaviours. The authors conclude that the relationship is robust for child health outcomes, but not for the take-up of preventive health behaviours.

Other subsections (in Section 4.9) review relationships between education and health for various well-known risk factors: smoking, alcohol consumption, obesity, nutrition/diet, physical activity, illicit drugs and sexual health. The authors note that there is good evidence that education contributes to better health outcomes in the presence of the first five risk factors on that list, but not on the last two. This finding is qualified for

the risk factor of nutrition/diet by a comment that generally poor nutritional data reduces the reliability of this finding.

The last subsection examines the effect of education on service use and concludes that higher education increases the likelihood that preventive and curative services will be used, but it is dependent on the type of service or care provided. Interestingly, there is not a corresponding discussion of service need to assess whether or not increased use of services is actually justified on health grounds.

Section 4.10 examines evidence on the indirect effects of education on health. In summary, education has been shown to moderate occupational health risks such as stress and working conditions; parental education is related to neighbourhood choice and conditions, but that individual and household characteristics are probably more important for health; education does increase stocks of social capital and social connectedness, two concepts that have shown evidence of relationships with health; education has been shown to moderate relationships between income inequality and health; and, increased levels of education are positively related to income, and increased levels of income are positively related to health.

It should be noted that some of the evidence in Section 4.10 is merely associational, but the authors conclude that this is sufficient to suggest a pathway exists. For example, in the subsection on income, the relationship of education and income is stated as common knowledge, along with evidence that income matters for health. Without studies that measure and relate education and income simultaneously with health measures, this may be a minor evidentiary “leap of faith”.

The last four subsections in Section 4.11 cover cognitions and social resources: beliefs about health and health care, self-concepts, inter-temporal choices, and resilience. While there is some evidence showing findings of relationships, it would seem that the magnitude of effects is smaller and that the findings are generally more inconsistent and less robust.

A general comment on how the evidence is presented in Sections 4.8 to 4.11 is that it is difficult to discern the size of effects, even when they are stated. For example, when it is reported that the effect is a “five percentage point difference in health outcome”, a point of reference is not given. The important information to allow interpretation of the size of the effect is missing. So in the five percentage point example, is this from 5 to 10% for one group while the other group has no change, *i.e.* a doubling in outcome as a result of an educational “treatment”? Or is this a change from 80 to 85%, perhaps a significant change, but far less considerable compared to the first example? These instances in the report require clarification.

### ***Scoping of data***

Section 4.5 (and Appendix 4.2) of Feinstein *et al.* provides a review of the currently available international data that could support investigations of the relationship between education and health. There is also a brief statement on desired data requirements for such studies. Combining the authors’ suggestions with my own, desired data sets would have among other things: longitudinal and developmental dimensions; sufficient sample size to permit multivariate comparative analyses; coverage of the life course (*i.e.* from the prenatal period to death); coverage of measures for different types of learning (*i.e.* family, intergenerational, institutional, adult learning, etc.); sufficient information for the study of at-risk and vulnerable population groups; and, a comprehensive range of the complex of

other variables identified so effects can be parsed across variables and the relative strength discerned.

The good news is that there are lots of datasets that are listed as relevant. The not-so-good news is that only a few of these datasets have more than a few of the desired criteria that are listed above. In particular, only one data set has any information on children, and this is beginning at age 9.

Section 4.5 could benefit from a discussion of types of evidence and their sources. For example, what sufficiently constitutes appropriate evidence? What type of evidence is required? By whom? For what purposes? For what reasons? Raphael (2000) classifies evidence into three categories – investigative (quantitative), interactive (qualitative) and critical (reflective). Investigative evidence is predominant and seen broadly as legitimate, sometimes discounting the contributions of the other two types. Raphael argues for contributions from all three types of evidence.

Section 4.5 does not address research methods, but a comment is warranted all the same. Over the last number of years there has been a rise in the production of systematic reviews, particularly in the medical and public health sciences. Systematic reviews are a method whereby a large volume of studies are reviewed and synthesised, and as such is a form of meta-analysis. Of particular note for Feinstein *et al.*, if they are not already aware, are the systematic reviews undertaken by the Community Guide, a programme of the Centers for Disease Control and Prevention in the United States. Many of the reviews investigate the effectiveness of interventions addressing risk factors and the social environment, including educational interventions (Anderson *et al.*, 2003).

### ***Policy implications***

In Section 4.6, the authors state that their review of the evidence of the relationship between education and health “suggests that the impact of education on health is substantive and universal”. Further, the authors conclude that “an expansion of [educational] supply and uptake would bring considerable public benefits”. This statement is qualified by a recognition that the complexity of the relationship is not sufficiently understood, particularly the timing and quality of education to be delivered. Even with this qualification, however, it is the conclusion of this reviewer that “considerable public benefits” is probably an overstatement, or at least is still unknown.

Given the evidence that has been presented, what has been learned? Notwithstanding the over 100 pages of scholarly review, our understanding that education is a good thing, with many benefits for individuals, families, communities and societies, has not been either removed nor substantially reinforced. Looking at education in relation to a particular desired outcome such as improved health raises more questions than answers.

For example, does this review point to particular levels and/or types of education that will make a substantial difference for health? Not generally, and the places where it does are fairly focused on particular interventions in particular situations for particular health reasons (*e.g.* use of preventive health services or activities that address risk factors). From the number of studies and the quality of data and measurement, marginal health returns are bound to be small, even if they are able to be estimated.

What level of education is a sufficient condition for a reasonable level of health? Is it high school, college, or what? We probably do not know precisely, but if we did, would we endeavour to require and provide, for example, a college level education to all

individuals, no matter what the individual and social “needs” are? Is it functional for everyone to have a college education, given the division of labour and labour force requirements in advanced capitalist societies? What would be the intended and unintended consequences of such a policy?

The strength of the policy conclusions that can be taken from this review are in two areas. First, education remains a good thing and societies should endeavour to provide the conditions, social context, and educational services to support their populations in achieving appropriate and substantial levels of education. Second, marginal gains in social outcomes can be a by-product of education and learning, and one of these social outcomes is certainly health. The evidence from the Feinstein *et al.* review points to particular types of education to be provided for particular purposes to be able to maximise health as a social outcome of learning.

### **Summary**

There is substantial evidence that education matters for many social outcomes, including health. It is also clear that the relationship is complex such that causal mechanisms and pathways are difficult to study and understand. This is partially due to limitations of available data, difficulties in translating multidimensional social concepts into adequate measures, and the challenges of finding research methods and statistical techniques that can appropriately deal with social complexity. These issues need to be addressed, however, if research is to provide information for policy makers that they can understand and use, and also recognise as information that is reliable and valid.

## *References*

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