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The Quality Imperative

Does knowledge equal change?

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DOES KNOWLEDGE EQUAL CHANGE?
HIV/AIDS Education and Behaviour Change

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"**Schools can provide the best defence against HIV infection. They offer the best mechanism to deliver HIV prevention information, as well as the long term educational and social skills that protect against infection**. With knowledge so critical in the fight against HIV/AIDS, the best defence against the epidemic is keeping vulnerable young people, especially girls, in school." *(Carol Bellamy, Executive Director of UNICEF, February 2004)*

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1 Introduction

In a field depressed by mounting evidence of HIV/AIDS impact in many countries, the importance of links between HIV/AIDS education and behaviour change cannot be underestimated: Not only do such interventions seem intuitively right, they are central to our belief in the 'window of hope' offered by young people making better informed decisions about the avoidance of risk. We readily and reasonably assume that improved literacy will allow those at risk to understand and judge their options better and that improved retention in school will increase their chances of survival. We place our faith in the evidence of a country like Uganda, citing the gratifying rate of decline in ANC prevalence rates and seek to confirm that this change must be rooted, at least in part, in years of incremental learning and knowledge acquisition amongst young people[i].

This paper sets out to demonstrate that clear links exist between HIV/AIDS education, both inside and outside the education system, and levels of awareness and knowledge about HIV/AIDS and associated risk behaviour. It also examines evidence of consequent behaviour change in relation to such information and linked understanding of the risks posed by HIV/AIDS. While the first objective is comparatively easily achieved, the second is somewhat more difficult to realize, not least because of the limited number of relevant studies available and the diversity of approach within these, evidenced in a mix of experimental[ii] and observational studies[iii].

In reviewing the available research, we are mindful that a survey must be considered sound in terms of its sampling frame, study design and survey methodology if it is to be effective in benchmarking and measuring the type and extent of behaviour change that we are concerned with here. Such surveys are in short supply however, and we have had to balance the few available with a number of smaller surveys where the design has not perhaps been as sound. We have been careful too to avoid attaching too much importance to certain of the more contradictory findings we have encountered in this meta-analysis, given that in several cases these were based on very small samples in uncertain circumstances - and often many years ago, relative to the dynamics of the AIDS era. Instead, we have attempted to find the common threads that weave their way through this quite complex web of information, and establish some balance of probability in respect of the key question: Does HIV/AIDS education, in its widest sense, lead to positive behaviour change?

In doing so, we have endeavored to identify behavioural and biological indicators of change in order to better judge whether or not change has occurred. We have also examined the convergent communications channels available to influence the young, and address the question of whether knowledge in and of itself leads to behaviour change. In doing so, we note the limitations of the research and the fact that there are few longitudinal studies available to confirm the *sustainability* of any change, a crucial but neglected issue perhaps because of its cost and complexity. We have reviewed a number of studies and provided a scattergram analysis of their outcomes in respect of increased knowledge, commitment to behaviour change and evidence of such change; the scarcity of these studies may reflect both lack of activity in this field and the difficulty in confirming and interpreting behaviour change. The coincidental publication and availability of a very comprehensive study[iv] on HIV and sexual behaviour among young South Africans has enriched this process and allowed us to crystallize a number of important issues, as has a second new paper on evidence from rural Uganda[1] and a third from the Global Campaign for Education[2] .

We began this analysis concerned that there was little data, the more so because our initial review of available studies suggested a high degree of ambivalence in their findings on causal links with behaviour change; we were disturbed too by the existence of some studies showing a positive correlation between levels of education and prevalence and were concerned that we would be unable to report some real connection. However, while we acknowledge that in pursuit of pressing deadlines we may have unintentionally overlooked some studies, and done insufficient justice to others, we are pleased to report that the wider and more recent our range of enquiry, the more positive it became.

[i] For the purpose of this paper, young people are defined as those of both genders in the population, between the ages of 15 and 24.
[ii] Field and clinical trials, RCTs, etc
[iii] Cross-sectional studies and longitudinal studies, etc
[iv] HIV and sexual behaviour among young South Africans: A national survey of 15-24 year olds

Consequently, we are able to introduce an analysis that confirms clear links exist between HIV/AIDS education, levels of awareness and knowledge about HIV/AIDS, and associated risk behaviour. It also confirms, to a satisfactory degree, evidence of behaviour change, although we have made a number of observations about the danger of assuming such change - and its sustainability - based on a single, self-reported response. Most importantly though, it strongly suggests that that the general cognitive and social gains from a basic education are the most important factor in protecting adolescents and young adults from infection (Global Campaign for Education, 2004).

2 Research Methodology and Limitations

The primary research methodology involved an internet-based search of available literature on this subject. Specifically, major research depositories[v] were consulted. One of the main sources of information was a meta analysis undertaken by the Policy Project; this lists all HIV/AIDS evaluation studies undertaken, including studies on HIV/AIDS and Education, as of March 2002. In addition, a number of other studies were accessed and reviewed; three of these, on Uganda and South Africa as well as the Global Campaign for Education report, were noteworthy both for their scale and very recent publication, in March and April 2004 respectively. Given the time available for the study, this research methodology had some inherent limitations, which can be summarised as follows:

2.1 Information sources for this study were limited to what was available online, and limited to the searches that were conducted;

2.2 At the time of the study, the results of one of the most important RCT studies on behaviour change (the so-called Masaka trials) had not been published;

2.3 This study, a meta analysis in itself, is based on the conclusions and information presented in other studies. As such, it does not contain any raw or new data, and its conclusions are not based on empirical data.

3 Indicators of Behaviour Change

Parker (2003)[3] postulated that behaviour change approaches assume that individuals move from an existing condition of HIV exposure (or, we would add, risk-related activity) to a condition of lower risk by adopting a range of risk reducing strategies. Such action assumes sufficient knowledge of the options to distinguish between high risk and low risk behaviours, the capacity to make an informed judgement and a climate in which such freedom of choice can be exercised. Whether or not one may also assume that once taken, such choice remains constant over time and that the individual concerned is comparatively safe from harm, requires an exponential leap of faith however.

Parker (2003) suggests that the concept of behaviour change has long been the rallying cry of HIV/AIDS interventions and campaigns, while Airhihenbuwa (1999)[4] notes that this model has led to a focus on the individual rather than on the social context within which the individual functions. Emphasis has certainly been placed on Knowledge, Attitude, Practice and Behaviour (KAPB) interventions, in which people need knowledge in order to change their attitudes and finally alter their practices and behaviour; the problem is that even if people have the knowledge, they may not have the incentive or power to change their behaviour (Barnett & Whiteside, 2002)[5]. Whatever the theoretical framework, this is complex and confusing territory and we are left with the question of what simple indicators can be defined and captured to show that behaviour change has actually taken place, both as a direct response to interventions designed to influence or modify behaviour, and in the longer term?

Sustainability is another, more elusive dimension of behaviour change and may be more difficult to both achieve and report, as individuals grow beyond adolescence into more complex relationships and socio-economic circumstances. It is for this reason that we require the cognitive skills and capacity to process information and make difficult (often peer-influenced) choices. However we must acknowledge that this will also require conditions conducive to multi-dimensional risk-reduction and the will to sustain this over a period of dynamic social, biological and socio-economic change – including entry into marriage and the attendant assumption of a risk-free sexual environment.

[v] For example, www.dec.org and www.id21.org

We have identified indicators of action or response that might reasonably be reported in response to a well constructed set of survey questions. We have divided these into two categories of indicator, behavioural and biological, but have not attempted to infer any order or sequence to these responses; equally, we have not attempted to explore the complexities of the contexts within which these actions might or might not occur, but assume that these issues would be addressed in any study of behaviour change. For the purpose of this paper these might include:

3.1 *Behavioural Indicators:*

- Perception of vulnerability;
- Acquisition of knowledge for self-efficacy;
- Increase in STI/HIV testing (VCT);
- Abstinence/secondary abstinence;
- Delayed sexual debut;
- Faithfulness;
- Reduced number of sexual partners;
- Increased condom use;
- Consistent condom use;
- Decline in casual sex/decrease in non-regular sexual partners.

3.2 *Biological Indicators:*

- Non-penetrative sex;
- Use of HIV barrier methods[vi];
- Cohort pregnancy rates;
- Cohort STI rates;
- Cohort HIV prevalence;
- Avoidance of unsafe blood transfusion/needle sharing.

The question that arises therefore is whether or not some or all of these indicators of changed behaviour are evident in the studies reported here, and if so, whether these can be linked to HIV/AIDS education per se.

4 Convergent Channels: The Message and the Media

Low-Beer and Stoneburner (2000)[6] classify channels of communication for the acquisition of HIV/AIDS knowledge into three groups:

- Mass – Radio, TV, newspapers, pamphlets etc;
- Institutional – Religious, school, health clinic etc;
- Personal – Friend/relative, community, workplace etc.

In a 2000 study of six high prevalence countries in East and Southern Africa, including Uganda, Kenya, Zambia, Malawi, Tanzania and Zimbabwe, Low-Beer and Stoneburner found that despite different HIV and behavioural trends, measures or awareness of AIDS were consistently high - over 90% - in all these countries. In order to establish the source of knowledge by communication channel, they classified these as vertical sources (media and institutional) and horizontal sources (social networks of friends and family). They found considerable differences by country in their analysis of communication channel effectiveness, but interestingly found that social networks of friends and family dominated in Uganda in contrast to all the other countries studied, in which media and institutional sources dominated. Whether Uganda's dramatically declining prevalence rates are coincidental is a moot point, but it is interesting that the percentage of Ugandans (91.5% of men and 86.4% of women) who know someone with AIDS or who has died of AIDS is *substantially* higher than equivalent percentages in the other countries studied. We have already argued that behaviour change may require a trigger, perhaps a traumatic or life-changing experience, in order to 'operationalize' the latent messages absorbed through a variety of sources; in Uganda for example, the same study shows 19.7% of men 15 to 24 who knew someone with AIDS started using condoms, compared to 4.9% of condom-using men in the same age group who did not know someone with AIDS.

[vi] Increased *rates/consistency* of condom use are reflected as behavioural indicators, but use may also be considered a biological indicator

In terms of the sources of these comparatively high levels of awareness and knowledge, there is limited evidence that this emanates primarily from formal education in the classroom, although several studies cited the wider school community (including teachers and peers) as an important source of information. Chapter 6 of the South African National Survey of 15 to 24 year olds (Pettitfor, et al 2004) cites 18% of respondents talking to teachers and classmates in the 'classroom' about HIV/AIDS, while 32% said they had learned the most about HIV/AIDS from these sources. In fact, the research suggests unsurprisingly that knowledge and risk-reducing skills are acquired from a complex network of formal and informal sources, *including* but not limited to the education system. What does appear to hold true is that the cognitive and literacy skills required to make informed choices in respect of HIV/AIDS risk and behaviour change, are substantively based on levels of education and literacy. Thus the inherent value of formal education in this context is to enhance skills required to process the HIV/AIDS education on offer, and make sense of the proliferation of related messages from a variety of media sources. This suggests that access to, and retention in, the school system is indeed the uniquely important 'social vaccine' so often referred to by Kelly, Stoneburner and Low-Beer (2000, 2001)[7].

But if education, and the education system, is only one of many influences on behaviour, what then are the others?

As the HIV and sexual behaviour study of young South Africans will show, the messages come from all angles and ricochet in the conscious and subconscious minds of everyone who sees and hears them. Absorption may be tempered by AIDS information fatigue or indifferent messaging, but it is clear the net effect is very high levels of awareness reported in virtually every study available. Which bit worked may remain a mystery, since the 'market' for these messages is constituted by millions of individuals of variable age, whose receptivity and sensitivity to the content of the information may literally change from day to day.

Table 1: *Key Information Sources on HIV/AIDS among Secondary Students in Botswana, Malawi and Uganda*

Information source	Botswana		Malawi		Uganda	
	Female	Male	Female	Male	Female	Male
Radio	75	70	73	87	48	68
Print media	43	39	21	23	47	34
Posters	7	3	8	9	1	2
TV	26	37	9	11	34	29
Parents	27	24	20	18	44	29
Medical personnel	42	47	3	0	27	40
Friends	8	12	19	10	29	21
Teachers	46	48	50	50	33	45
Relatives	1	6	8	4	6	3
Church	9	5	24	14	8	11
Other	0	0	0	0	1	2

Source: Bennell, Hyde and Swainson (2002). Synthesis of the Findings and Recommendations of Three Country Studies

The comparative importance of key information sources also varies considerably by country, as Bennell, Hyde and Swainson (2002)[8] show; among secondary school students in Botswana, Malawi and Uganda, radio was the most widely cited source in all three countries. Interestingly, teachers ranked second in both Botswana and Malawi for both genders yet teachers only managed fifth place among male students in Uganda and second among female students there, reinforcing the view that HIV/AIDS education in schools is not necessarily the principal reason for that country's declining prevalence. If we divide these sources into the mass, institutional and personal channels described above, we find that the mass channel is roughly twice as important as institutional channels and three to five times as important as personal channels. However, personal channels in Uganda are very much more important than those in Botswana and Malawi, confirming Low-Beer and Stoneburner's findings (Stoneburner, Low-Beer, 2001) on the comparative importance of these social networks in Uganda. The influence of churches and faith-based organizations as an information source is low, with the exception of Malawi, emphasizing again the importance of local context and influence.

Can we deconstruct this complex equation and say that media and institutional sources influence behaviour change *more* than social networks and formative experiences, or that HIV/AIDS education in schools works in isolation from information gleaned from newspapers or roadside billboards? Certainly not; but we can say with surety that *all* these channels converge and contribute to the internal decision support system upon which every young person must ultimately rely. After all, as the South African study will show, the most commonly cited source of HIV/AIDS knowledge was school (32% of respondents); the caveat is that in this case 'school' was defined as a source including teachers, classmates, the classroom and the school – in other words, a vertical and horizontal mix of institutional and personal channels.

But can we say that schools have a unique role in HIV/AIDS education? The answer, we would argue, is almost certainly yes inasmuch as it is the school, assuming some acceptable degree of access, retention and quality, which will provide the cognitive and processing skills to facilitate the use of the information available, from whatever source.

Given the complexity of the media, what of the message? As much as we would like to report the success of curricular design and cite best practice, there is little information available to provide this level of detail. In a three-country comparative study on Botswana, Malawi and Uganda (Bennell, Hyde and Swainson 2002), it notes that the formal curriculum on HIV/AIDS has a number of common weaknesses: While the primary curriculum in Botswana with respect to HIV/AIDS is adequate, there are important concepts or facts that are missing; namely, the active promotion of abstinence (or delay of sexual initiation) and life skills that will help children to avoid sex if they want to. There is also relatively little systematic coverage of the emotional changes that occur during puberty and adolescence, for example. In Malawi, the study found that HIV/AIDS are infused into carrier subjects such as Health and Science Education, while in secondary schools the main carrier subject is biology and HIV/AIDS topics are only covered under the topic 'sexually transmitted diseases'; however it notes that in 1997, the MOEST[vii] in Malawi also began to develop Life Skills Education (LSE) as part of youth reproductive health, although this was only introduced into primary schools in early 2000. LSE was designed as a stand-alone subject for one hour a week but was initially only offered in Standard 4, with teaching and learning materials for Standards 5 to 8 in development for introduction from 2002. And while there has been a long-standing life skills project in Uganda, life skills have not yet been fully integrated into primary education. A new primary education curriculum was introduced during 2000 in which Integrated Science has been organised into eight themes, three of which (Human Health, the Human Body, Community-Population and Family Life) are relevant to HIV/AIDS education. However, the coverage of HIV/AIDS is surprisingly sparse; it is first mentioned under the Human Health theme in the second term of P7, in other words just before the student leaves primary school.

This last statement is intriguing in that it appears to suggest that whatever may have motivated behaviour change in Uganda - and there is firm evidence of significant changes in sexual behaviour, especially among young people (Asiimwe-Okiror et al, 1997)[9] - it is may not be directly attributable to education in school as the comparative three-country table below suggests. However, we need to underscore two important contextualizing facts: First, the populations showing such change as there was, attended school during years when education quality was very poor (as it still is, in most cases) and, second, this school attendance occurred at a time when there was almost no HIV education whatsoever, either in principle or in practice. We contend that these facts in combination confirm the positive impact of education and the educative process within a school system.

Table 2: ***Teaching of HIV/AIDS topics at secondary schools: percentage in agreement***

Country	STUDENTS Topics on HIV/AIDS are well taught			TEACHERS - Teachers are confident teaching about HIV/AIDS topics		
	Female	Male	All	Female	Male	All
Botswana	42	46	44	30	29	29
Malawi	41	30	35	33	9	17
Uganda	23	24	24	14	28	22

Source: Bennell , Hyde and Swainson. (2002)

[vii] Ministry of Education, Science and Technology, Malawi

5 Does Knowledge Equal Change?

Over the past two decades, very many millions of dollars have been invested in behavioural interventions providing information, education and communication to motivate behaviour change amongst young people. Parker (2003) suggests that although many of these have made impacts on knowledge and awareness, and have contributed to overall HIV risk reduction, they have been insufficient to the task of ensuring the rapid changes necessary for containing the HIV epidemic in many countries. We would reflect however that the process of cultural and social change - in effect the re-engineering of value systems - are complex and incremental and do not in fact occur rapidly; there is in fact little prospect of the rapid or 'quick fix' solutions envisaged in very many interventions and to believe this is to excite a crisis of expectation that will not be met.

That high levels of awareness and even knowledge of HIV/AIDS exist fairly universally *is* clear from the research: De Walque (2004) says very strong correlation exists between education levels and health outcomes, even after controlling for incomes, and has been recognized as a robust empirical observation in the social sciences and economic literature[viii]. However, he goes on to say the question of the mechanisms driving this correlation remain challenging. De Walque (2004) notes that his paper is one of the first to report robust evidence that for young cohorts in Africa there is now a negative gradient between education and HIV infection, suggesting that the effect of education only emerges over time. Indeed, he says that out of 27 studies reviewed by Hargreaves et al (2002)[10], only one by Fontanet (Fontanet et al, 2000), among sugar estate workers in Ethiopia, reported a significantly negative association between HIV infection and education.

De Walque's paper shows that after more than a decade of prevention campaigns about the dangers of the epidemic, there has been a substantial evolution in the HIV/education gradient - particularly among young females. These findings reveal that educated individuals have been more responsive to HIV/AIDS education campaigns.

In the most recent study available – a National Survey of the HIV and Sexual Behaviour of nearly 12000 15-24 year old South Africans (Pettifor et al., 2004)[11] - see Chapter 6 of this paper - almost 100% had heard of HIV/AIDS while 94% reported they knew of ways to avoid HIV infection. Indeed, 63% claimed they had changed their sexual behaviour based on this knowledge; while this is extremely encouraging, it also implies that 37% of the sample who knew about HIV/AIDS, as well as 31% who said they knew of ways to avoid it, had *not* changed their behaviour in spite of this knowledge. However the possibility must also be acknowledged that their behaviour was already, or might be assumed to be, risk-free and hence they did not see any reason to change it; this raises the point that the majority of the population must already limit high-risk behaviour, because otherwise HIV prevalence would be even higher. That said, the pattern of high knowledge versus comparatively lower levels of response to it - manifest in some measure of behaviour change - characterised the research and will be discussed further.

We have used the example of the South African study to show that the path from knowledge to action is not a simple one: Airhihenbuwa[12] argues that the simple, linear relationship between individual knowledge and action does not take into account the variation among the political, socio-economic and cultural contexts that prevail. He suggests that sexual activity is not a rational straight-line undertaking, noting that emotions cause many deviations. George Bernard Shaw accurately described as 'brute sanity' the way in which we inflate our expectations by showing others the rational way and then expect them to follow it, without allowing for the predictable complication of all sorts of emotional sidetracks and detours. We would add the complex vertical and horizontal communications context in which young people exist, and note that this will be conditioned by the political, socio-economic and - particularly - cultural influences that both Airhihenbuwa and Shaw describe. And to this we should add the influence of religious institutions, and the often convergent messages of abstinence, faithfulness and - critically - condom use. Bennell, Hyde and Swainson (2002) suggests that that the church appears to play comparatively little role in disseminating information about HIV/AIDS among young people, at least in Uganda, Malawi and Botswana; however, Liebowitz[13] emphasizes that

[viii] Deaton and Paxson (1999), Fuchs V (1982) and Lleras-Muney (2001)

churches and faith-based organizations are able to reach into the heart of communities in a way that no other organizations can[ix].

While there is clear evidence that direct and indirect links exist between HIV/AIDS 'education', increased knowledge and behaviour change or risk avoidance, there are also a number of contradictory studies that we must contend with, suggesting that HIV prevalence in fact raises by education category. In Malawi, for example, the 2003 ANC data shows *increased* HIV-prevalence with increased educational attainment: Rates rose from 19.2% for those with no education and 19.1% for those with primary level education, to 23.2% for those with secondary education and 27.9% for those with post-secondary education, as Table 3 will show. However, in reviewing this table, we should add that this education level data may be misleading and may not in fact provide positive correlation, since 'education level' only means that the respondent *started* this level, and does not imply that they completed it.

Table 3: ***HIV Prevalence by level of education, Malawi 2003***

Education Level	Total Sampled	HIV+	% HIV+	95% CI
None	1,921	369	19.2	17.5-21.1
Primary	4,785	913	19.1	18.0-20.2
Secondary	1,201	279	23.2	20.9-25.7
Post Secondary	68	19	27.9	17.7-40.1
Total	**7,977**	**1,581**	**19.8**	**19.0-20.7**

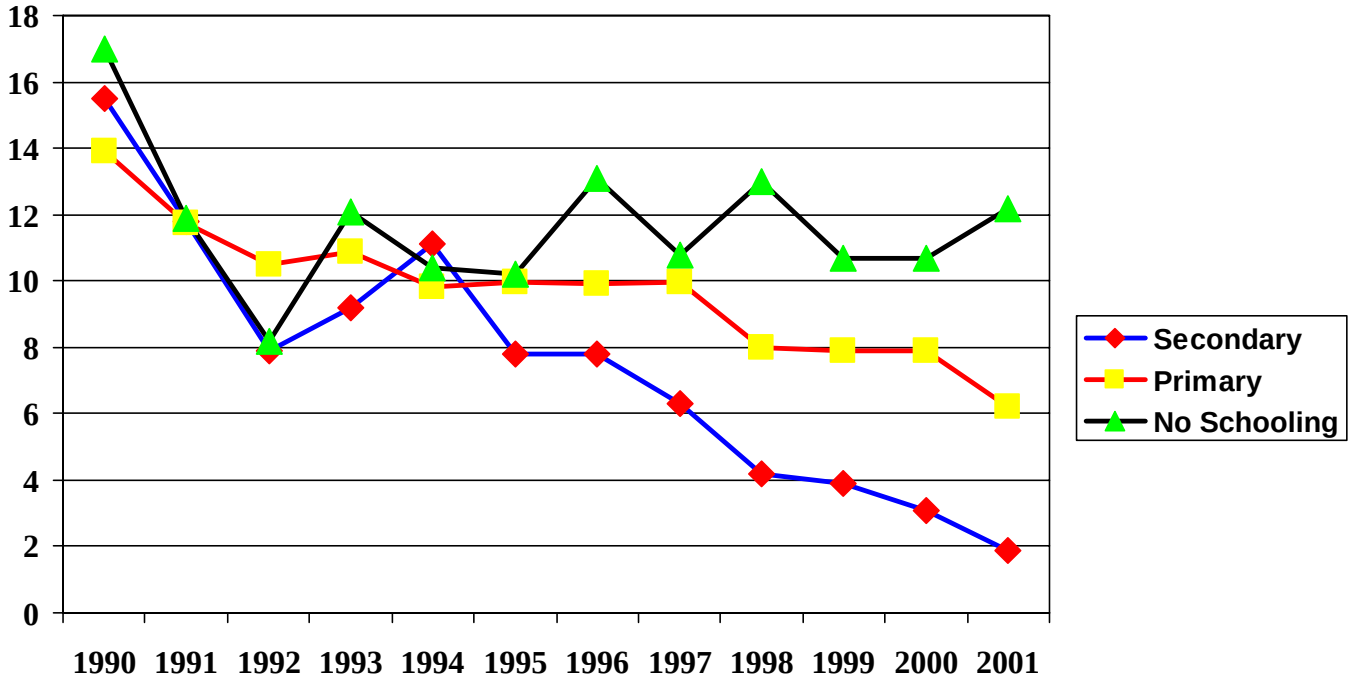
Source: Malawi National AIDS Commission, Malawi Ministry of Health and Population, ANC data 2003

It is fair to observe that educational conditions in Malawi, in this instance, are comparatively poor and we need to remind ourselves that simply being in a school may not in fact be entirely 'protective' if it seriously sub-standard. The absence of any real difference in HIV prevalence levels between children with no education and those with primary education suggests that primary school children in these conditions may not, in practice, be acquiring the AIDS-literacy and life skills necessary to understand the options and make choices. However we must assume some functional level of literacy at secondary and tertiary levels, where HIV prevalence is significantly higher; this is not easily explained, but we must recognize that those (in a very small sub-sample) with post-secondary education levels are of an age, quite probably with associated levels of income and social mobility that puts them at comparatively high risk - particularly given the limited HIV/AIDS and life skills education they will have had at primary and secondary levels many years before. In light of incremental improvements in the quality and availability of HIV/AIDS messaging and education in the last decade, as well as greater community awareness, we must conclude that even sub-standard schooling might be somewhat protective by orienting young people to follow directions, postpone gratification, and build up some vision of a future.

In contrast to the Malawi study however, HIV prevalence by education category in rural Uganda 1990-2001 – see graph 1 below (De Walque 2004) shows that while there was some convergence in the early to mid nineteen-nineties, there is now clear evidence of reducing prevalence associated with both primary and secondary education.

[ix] For Uganda it is also worth consulting the HEARD 2002 paper by Liebowitz (2002) on The Impact of Faith-Based Organizations on HIV/AIDS Prevention and Mitigation in Africa.

Graph 1: ***HIV Prevalence (%) by Education Category, Medical Research Council General Population Cohort, Rural Uganda, 1990—2001 (Individuals aged 18-29)***

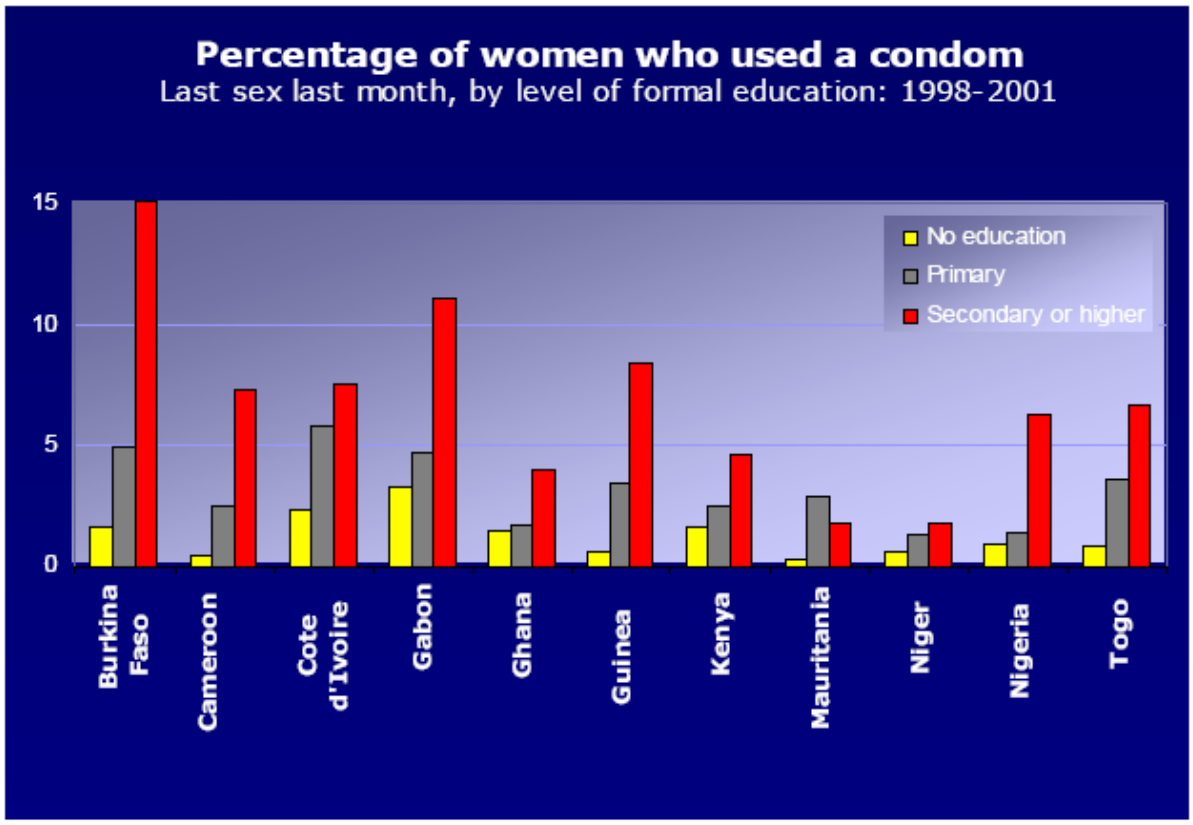


(Note: Primary education is some primary education [Grades 1-7]; Secondary is secondary education [Grades 8-13] or above)

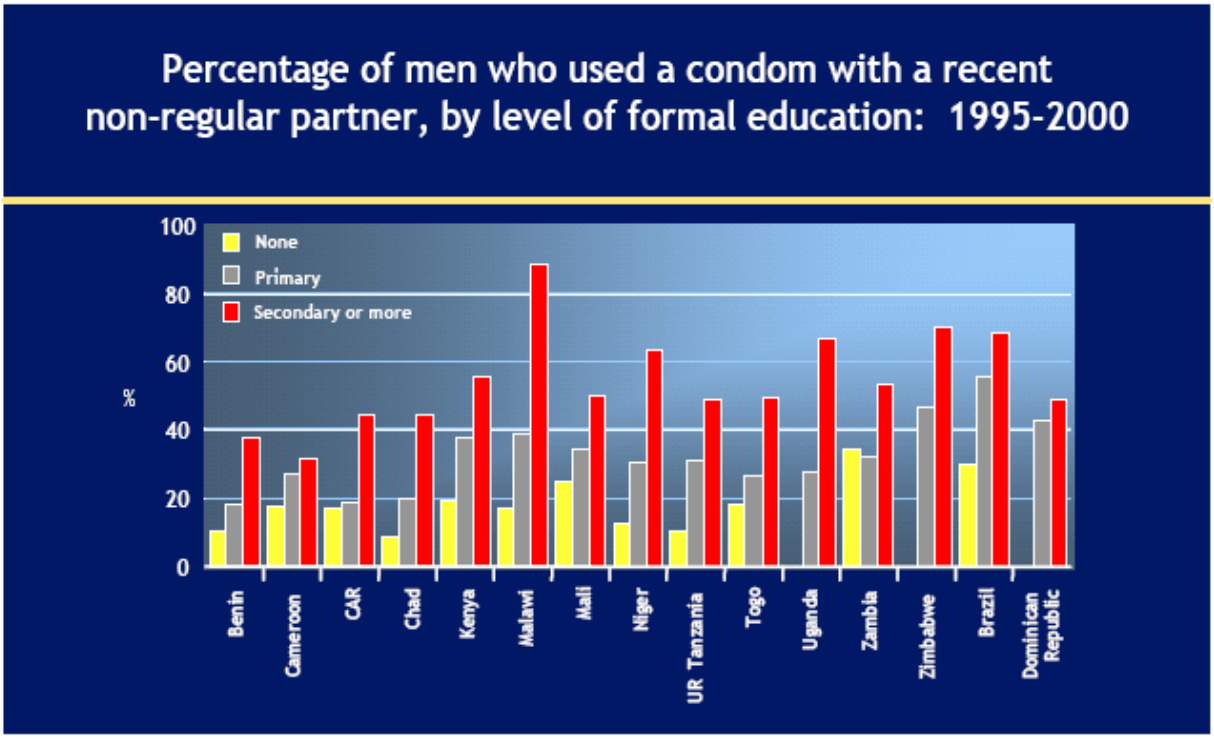
Source: De Walque (2004)

Add to this the reported percentage condom use by education level for men and women shown in the Global Campaign for Education report (Global Campaign for Education, 2004), see graphs 2 and 3 below, which show quite overwhelmingly that there is a direct correlation.

Graph 2: ***Percentage of women who use a condom, during last sex last month***



Graph 3: ***Percentage of men who used a condom with a recent non-regular partner***



Sources: Women's condom use: GCE graphic using DHS data from www.statcompiler.com.
Men's condom use: UNAIDS/WHO graphic using DHS and UNICEF data from www.macrointernational.com.

Does knowledge equal change? The studies discussed above present contrasting views and give pause for thought, but reasons for the differences may be difficult to pin down. Low-Beer and Stoneburner (2002)[14] state that there has been a distinctive behavioural response and decline in HIV prevalence in Uganda in the 1990s compared other countries in Sub-Saharan Africa, but add that this coincides with a significant shift from mass and institutional to personal channels for AIDS

communication – not seen to the same extent in other countries. The quality of the education in general and HIV/AIDS education in particular in Malawi may also be a factor, but we may never know with certainty.

We would argue that this conflicting evidence may be a function of country-specific education, socio-economic and cultural contexts, including the influence of the church. It should also be seen in relation to the maturity of the epidemic and the personal impact that this may provide; we have already noted that the very high levels of personal experience of AIDS mortality in Uganda, for example. What is important is that over two decades into the AIDS crisis, there is a *growing* body of evidence pointing to a negative correlation between HIV education - from whatever source - and HIV prevalence. It might be argued that such evidence is long overdue, given the lack of it to date (Hargreaves, 2003); in fact, what it might suggest is the need to revisit a range of research sites and attempt to measure change - positive and negative - over time perhaps considering the range of behavioural and biological indicators of change we have listed earlier.

However contradictory aspects of these data may appear to be, it does not divert from the growing certainty, and factually supported view, that retention within a functional education system - ideally of the kind envisaged in EFA - will provide the quality of education and skills development necessary to reduce or eliminate sexual and lifestyle risk. Or as the Global Campaign for Education report cited below puts it, the general cognitive and social gains from a basic education are the most important factor in protecting adolescents and young adults from infection.

6 Stop Press: HIV and Sexual Behaviour in South Africans and Global Campaign for Education Report

6.1 HIV and Sexual Behaviour among Young South Africans: A National Survey of 15-24 year olds

A nationally representative household survey of young South Africans 15 to 24 years was conducted from March to August 2003 and published in April 2004, offering an unprecedented insight into HIV infection trends and related determinants and risk behaviours among young people (Pettifor, Rees, Steffenson, Hlongwa-Madikizela, MacPhail, Vermaak, Kleinschmidt, 2004). A total of 11 904 young people drawn from a three-stage, disproportionate, stratified national sample were interviewed and also tested for HIV using the Orasure® Oral Specimen Collection Device and associated protocols.

The survey found that HIV prevalence was 10.2% [95% CI 9.3-11.3] in this age group; prevalence was higher among women (15.5%) than men (4.8%) and was also higher for women in the 20-24 year old age group (16.5%) than the 15-19 year old age group (4.8%). The importance of this survey in relation to HIV/AIDS education and behaviour change is its size and detailed data on knowledge, perception of risk and behaviour change. The survey postulates that the key antecedents of behaviour change, such as knowledge, attitudes and beliefs must change before youth will change their sexual behaviour to protect themselves from HIV/AIDS. Key outcomes of direct interest include the following:

6.1.1 HIV Knowledge:

- Over 99% had heard of HIV/AIDS;
- 94% reported that they believed there were ways to avoid HIV infection and could describe some of these;
- 77% stated that condoms could be used to prevent HIV;
- 63% said they had changed their personal behaviour in some way to prevent getting HIV.

Table 4: ***Knowledge of Different HIV Prevention Methods by Gender and Age***

		Total	Gender by age group			
			Male		Female	
			Age Group		Age Group	
			15-19	20-24	15-19	20-24
What can a person do to avoid getting HIV, the virus that causes AIDS? (unprompted)	Use condoms during sex	77%	74%	82%	74%	78%
	Do not have sex at all	41%	41%	35%	46%	40%
	Have one faithful partner	10%	7%	12%	9%	13%
	No multiple partners	7%	4%	8%	7%	9%
	Avoid Blood transfusions	6%	6%	6%	7%	4%
	Do not share needles	4%	5%	3%	4%	3%
	Other	5%	6%	5%	6%	4%
	Nothing you can do	6%	10%	5%	6%	5%
	Total	**11 904**	**3 556**	**2 131**	**3 682**	**2 535**

Source: Pettifor, Rees, Steffenson, Hlongwa-Madikizela, MacPhail, Vermaak, Kleinschmidt, 2004

6.1.2 Communication:

- 44% reported that they had talked to their parents or guardians about sex;
- The most commonly cited source of HIV knowledge, for 32%, was school (although the school source was defined in the survey as teachers, classmates, classrooms and school);
- The second and third most cited sources were said to TV (19%) and radio (17%);
- Knowledge about contraception or pregnancy prevention was learned principally from health care workers/nurses/doctors/clinics (22%), compared to 17% from school, 15% from parents/guardians and 9% from friends.

Table 5: ***Source of HIV/AIDS Knowledge for Youth by Gender and Age***

		Total	**Gender by age group**			
			Male		**Female**	
			Age Group		**Age Group**	
			15-19	**20-24**	**15-19**	**20-24**
From which ONE source (people, places, or media) have you learned the MOST about HIV/AIDS? (unprompted)	Teachers/Classmates/Classroom/ School	32%	37%	23%	44%	22%
	TV	19%	19%	24%	15%	19%
	Radio	17%	18%	22%	10%	18%
	Health worker/Nurse/Doctor/Clinic	12%	8%	12%	10%	18%
	Community members/Neighbors/ Community meetings	6%	6%	6%	7%	5%
	Newspapers/Magazines/ Books/ Library	4%	4%	3%	4%	4%
	Parents/Guardians/Mother/Father	4%	3%	3%	4%	6%
	Friends	2%	2%	2%	2%	2%
	Other	5%	2%	4%	4%	5%
	Not heard of HIV/AIDS	0%	1%	0%	0%	0%
	Total	**11 904**	**3 556**	**2 131**	**3 682**	**2 535**

Source: Pettifor, Rees, Steffenson, Hlongwa-Madikizela, MacPhail, Vermaak, Kleinschmidt, 2004

6.1.3 Perceived Risk:

- When asked about their risk of HIV infection, 36% stated that they were at no risk;
- 35% indicated they were at small risk, 12% indicated moderate risk and 14% stated that they were at high risk of HIV infection;
- Young women (18%) saw themselves at greater risk than young men (11%).

Table 6: ***Self Perceived HIV Risk by Gender and Age***

		Total	Gender		Age group		Gender by age group			
							Male		Female	
			Male	Female	15-19	20-24	Age group		Age group	
							15-19	20-24	15-19	20-24
What do you think your chances of getting HIV/AIDS are?	No risk at all	36%	40%	33%	44%	28%	47%	31%	40%	25%
	Small	35%	36%	34%	33%	38%	33%	41%	33%	35%
	Moderate	12%	11%	12%	10%	15%	10%	13%	9%	16%
	Great	14%	11%	18%	12%	17%	8%	14%	17%	20%
	Already know HIV status	1%	1%	2%	1%	2%	1%	1%	1%	3%
	Do not know	0%	0%	0%	0%	1%	0%	0%	0%	1%
	Youth has never heard of HIV	0%	1%	0%	0%	0%	1%	0%	0%	0%
	Total	**11 904**	**5 687**	**6 217**	**7 238**	**4 666**	**3 556**	**2 131**	**3 682**	**2 535**

Source: Pettifor, Rees, Steffenson, Hlongwa-Madikizela, MacPhail, Vermaak, Kleinschmidt, 2004

Given these high levels of awareness and communication, with a significant reliance on 'school' in the broadest sense as the leading but not only source of knowledge, we may be surprised that 71% of respondents were confident that they were either HIV risk-free (36%) or at small risk (35%). Ironically, there was no increase in perceived risk as risk behaviours increase: 62% of HIV *positive* respondents stated that they had either no chance or a small chance of contracting HIV, confirming that youth already infected also remain unaware of their risk.

Table 7: ***Self Reported Behaviour Change by Gender and Age***

		Total	Gender by age group			
			Male		Female	
			Age Group		Age Group	
			15-19	20-24	15-19	20-24
How did you change your behaviour to prevent getting HIV/AIDS? (unprompted)	Use Condoms	20%	17%	32%	12%	23%
	Reduce number of partners	14%	12%	24%	8%	13%
	Abstain from sex	13%	14%	9%	17%	12%
	Being faithful to one partner	11%	5%	9%	11%	21%
	Delay having first sex	7%	10%	3%	13%	2%
	Talked to friends about sex, relationships & risk of HIV	2%	1%	1%	3%	1%
	Talked to partner about sex, relationships & risk of HIV	2%	1%	1%	1%	3%
	Do not share needles	1%	1%	1%	2%	1%
	Got an HIV Test	1%	0%	1%	1%	2%
	Talked to parents about sex, relationships & risk of HIV	1%	0%	2%	2%	1%
	Choose only healthy looking partners	1%	1%	2%	0%	1%
	Other	3%	4%	3%	4%	3%
	Not changed behaviour	37%	44%	30%	39%	32%
	Total	**11 904**	**3 556**	**2 131**	**3 682**	**2 535**

Source: Pettifor, Rees, Steffenson, Hlongwa-Madikizela, MacPhail, Vermaak, Kleinschmidt, 2004

In light of the high levels of knowledge both of HIV and ways to avoid it, we might be forgiven for assuming that behaviour change would follow and reflect these levels; indeed, 63% of the respondents insist they have changed their behaviour to avoid HIV. While we might be cheered by the reported 52% rate of condom use at last sex, how can we rationalise this rate in an environment where 87% of young people say condoms are very easy to get, and 6% say they are somewhat easy to get - and where HIV awareness is close to 100% and knowledge of ways to avoid it top 94%. Drawing on some of the indicators of behaviour change discussed earlier, the survey shows, regrettably, that this is not the case:

6.1.4 Pregnancy:

- 34% of all young women 15-24 report ever having been pregnant, including the sexually inexperienced (15% of 15-19 years olds and 53% of 20-24 year olds);
- Among the 68% of women who reported ever having had sex, 49% reported ever having been pregnant;
- The mean age of first pregnancy was 18.5 years;
- 66% of those who have ever been pregnant reported having been pregnant when they did not want to be.

6.1.5 Condom Use:

- Of the 67% of respondents who reported ever having sex, only 52% reported that they had used a condom the last time they had sex (57% of men and 48% of females);
- Of those who reported having had sex in the past 12 months (56% of all young people), 33% reported that they always used a condom with their most recent sexual partner while 31% reported they never used a condom with their most recent sexual partner;
- 87% of the total sample said that condoms were very easy to get and another 6% said they were somewhat easy to get.

6.1.6 Partner Numbers:

- Among the sexually active group, 35% indicated that they have had only one lifetime partner;
- Among those reporting sexual intercourse in the past 12 months, 27% indicated that they had more than one partner in this time.

6.1.7 Sexual Debut:

- Among young people who reported ever having had sex, the mean age of first sex was 16.7 years and the median was 17 years;
- 8% of all young people reported having had sex at less than 15 years of age.

6.1.8 HIV Positive Youth:

- 10.2% of all young people between the ages of 15 and 24 were HIV positive;
- Of this group, 77% were women;
- Interestingly, 10.2% of HIV positive youth reported they had never had vaginal or anal sex;
- Of real relevance, in the group 20-24 years of age, HIV positive youth were significantly less likely to have completed high school compared to HIV negative youth (23% vs 41%);
- HIV positive youth were also significantly more likely to report being unemployed compared to their HIV negative counterparts (56% vs 29%).

Does this large, comprehensive and very recent study confirm or contradict the evidence already presented? We conclude that in almost every respect it confirms the basic proposition that:

- Awareness of HIV/AIDS is almost universal;
- Knowledge is acquired from a multitude of diverse sources and channels;
- School, in a community sense, is a primary source of knowledge;
- Knowledge of ways to avoid HIV infection is very high, if somewhat flawed;
- Knowledge itself does not guarantee appropriate or linked behaviour change;
- Biological indicators, such as pregnancy, confirm sporadic condom use and risk avoidance;
- There is little increase in perceptions of personal risk in spite of high risk behaviours;
- School retention increases capacity to acquire and process knowledge required to reduce risk.

6.2 Global Campaign for Education Report

A second new report entitled *Learning to survive: How education for all would save millions of young people from HIV/AIDS*, was published in April 2004 (Global Campaign on Education, 2004), providing additional and wide-ranging evidence of links between HIV/AIDS, education and behaviour change. It states that education is so strongly predictive of better knowledge, safer behaviour and reduced infection rates that it has been described as a 'social vaccine' (Vandemoortele, Delamonica, 2000)[15]; the report adds that the general cognitive and social gains from a basic education are the most

important factor in protecting adolescents and young adults from infection. Indeed, the report claims that if all children received a complete primary education, the economic impact of HIV/AIDS could be greatly reduced and around 700 000 cases of HIV in young adults could be prevented each year; the report notes that these figures are only broad estimates based on the limited data currently available. However the report goes on to cite compelling evidence of these links:

- Literate young women are three-times more likely than illiterate women to know that a healthy-looking person can have AIDS and four-times more likely to know the main ways to avoid HIV, according to a 32-country UN study (Vandemoortele, Delamonica, 2000);
- Evidence from 17 African and 4 Latin American countries shows better educated young women delay their sexual debuts and are more likely to require their partners to use condoms[16];
- Young women with some schooling are nearly five-times as likely as their uneducated peers to have used a condom the last time they had sex;
- 36% of young adults in low-income countries are without a complete primary education yet are likely to experience 55% of new HIV cases for that age group;
- School-based interventions had a clearer impact on age at first sex and the number of sexual partners than any other measure, and had an equally strong impact on condom use as peer counselling, workplace education and voluntary counselling and testing;
- A review of 113 studies from 5 continents found that school-based AIDS education that focus on specific age-appropriate behavioural objectives are effective in reducing early sexual activity and high risk behaviour;
- School-based programs will work best when the school itself is working properly; but chances of success are slim unless educators are involved in designing school-based prevention classes and receive specific training and support to implement them.

This important report introduces an added dimension in flagging the under-delivery of the resources required to achieve UPE and consequent limitation of the potential that this has for HIV risk reduction. This is central to the debate, since all the growing evidence of links between education and behaviour change will be rendered inconsequential if delivery does not follow. The aggregation of direct and indirect evidence of knowledge-driven behaviour change found in this report gives context to the South African study reviewed above, and confirms that research undertaken in the last few years (reflective of improved HIV/AIDS education and messaging) is significantly more positive about linked behaviour change than studies undertaken in the preceding decade.

7 Weighing the Evidence: The Good, the Bad and the Uncertain

It is clear that there has been a massive international investment in HIV/AIDS education, involving curriculum change, materials development and training, both inside and outside the formal classroom. This international effort addresses - with some definitional inconsistency - sex, sexuality, sexual reproductive health, life skills, gender, preventive education, HIV/AIDS education and much more, but may be light on relationships, emotional stress and coping skills. Although there is limited evidence, we would suggest that one recurrent and perhaps inevitable flaw in this activity is to treat all adolescents in the same way. Parker (2003) notes for example that in may instances, a large proportion within any given heterogeneous group, may already be 'doing the right thing' and should be maintaining their current practices rather than changing them. The point he makes is that we are not dealing with a homogeneous population and that in the same way that we must take account of contextual diversity, we must understand and factor the differentials of risk among young people.

The other issue that must be considered is the heterogeneity of teachers and other education providers inside and outside the school: The assumption that the curriculum and materials developed to provide cognitive and life skills can be simply and effectively delivered to young people, depends in practice on a diverse group of educators with variable levels of training, confidence and capacity. Throw into this mix sex, reproductive health and high risk practices and we begin to explore the personal value systems and prejudices of many teachers who might actually be too embarrassed to discuss these topics with their *own* children. Since teachers, in the widest sense, are central to the education effort, we might add that they avoid many of these issues for two important reasons: First, the taboo in many cultures about discussing these things with young people, especially those of the opposite sex; and second, the fear that if they do deal with these issues, parents will regard them as encouraging promiscuity (or even of being personally promiscuous). We would add that this is a universal

phenomenon and have encountered teachers in areas as diverse as the Far East, Eastern Europe and the Caribbean who express exactly the same fears and anxieties as teachers in Africa. Perhaps their concerns and difficulties tell us more about human nature in general than about sex and reproductive health education in particular.

While personal exposure to HIV morbidity, AIDS mortality and their related impact on the education system is breaking down resistance and discomfort of this kind, the fact is that behaviour change is predicated on the capacity of this group to deliver the message in a way that motivates and inspires. It is important that we remember this when confronting variable evidence of behaviour change from affected countries.

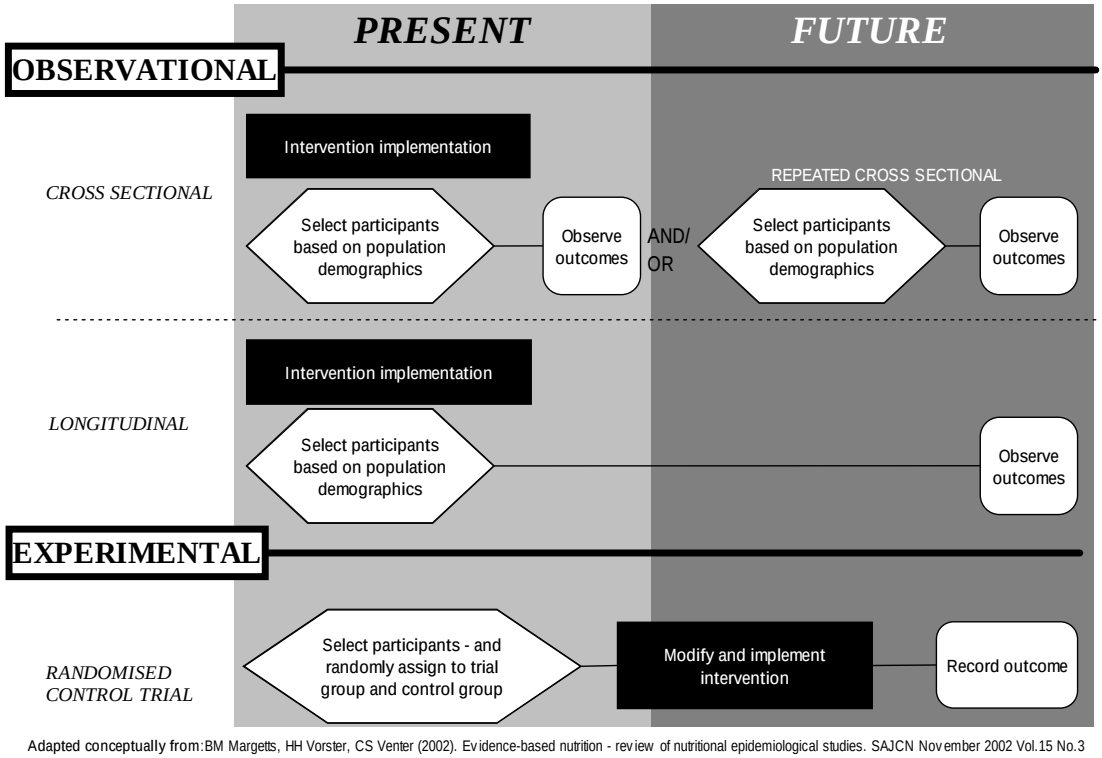
We now consider one of the main sources of information for this study, a meta analysis undertaken by the Policy Project; this lists HIV/AIDS evaluation studies undertaken, including studies on HIV/AIDS and education, as of March 2002. However, we note that all of these studies (see Scattergram 1) took place in the 'last century'. In fact, the real evolution in preventive HIV education occurred quite late in the 1990s and has accelerated somewhat more since 2000. In other words, these studies were surveying how education impacted knowledge and change *before* the real impact of HIV/AIDS was fully understood, and in a time when it was thought that HIV prevalence would plateau below 20%. These are important contextual points to bear this in mind when analysing the results of these studies.

Before attempting to compare or understand the results of the surveys presented in the Excel spreadsheet (see Appendix 4), it was necessary to understand the different types of study design mentioned in this spreadsheet (column E of the spreadsheet). A brief desktop review revealed that, broadly, two types of studies are distinguished (Margetts, Vorster and Venter, 2002)[17]:

a) **Experimental studies**, such as field trials, clinical trials, randomised control trials (RCTs); and
b) **Observational studies,** such as cross-sectional studies (prevalence studies), case-control studies, cohort studies (longitudinal studies)

The main difference between these is that in observational studies, neither the participants nor the intervention are manipulated in any way. In an experimental study, the intervention is 'applied' to a selection of participants (trial group); outcomes are then measured in the trial group as compared to a control group.

Figure 1: ***Sampling and intervention time order for the main types of study designs***



Adapted conceptually from: BM Margetts, HH Vorster, CS Venter (2002). Evidence-based nutrition - review of nutritional epidemiological studies. SAJCN November 2002 Vol.15 No.3

7.1 Observations

7.1.1 Complications in study design classification/categorisations

From the literature that was studied, it is clear that there are neither definitive guidelines for classification and definition, or precise guidelines for designing studies to measure behaviour change for school-based programmes. There are many nuances within broad categories of study design types, but these make comparisons difficult and lead to the difficulties noted earlier in deriving evidence of behaviour change in relation to information and increased understanding of the risks posed by HIV/AIDS. This view is echoed by the NRSMG[x] in their draft set of Guidelines where they state that *there are many study designs and the terminology is not standardised. Major textbooks often have their own favourite recommendations and not even such simple words as retrospective and prospective are unambiguous'*.[xi] The NRSMG study group's draft set of Guidelines provides an algorithm for determining how best to categorise studies of health care interventions. From this algorithm (see Appendix 2), it is clear that there are many different kinds of studies to evaluate health care interventions (either observational or experimental), and that no clear set of definitions or methodologies for sampling exist.

7.1.2 Classification of surveys that were undertaken

The surveys that have been included in the Excel spreadsheet (see Appendix 4) have been placed relative to each other in a scattergram format below. It should be noted that scattergram 'positioning' was based on the summary analysis provided by the Futures Group in their research and notated on the spreadsheet. As such, this is a form of meta-analysis and its accuracy depends in turn on the accuracy[xii] of the Futures Group summary analysis.

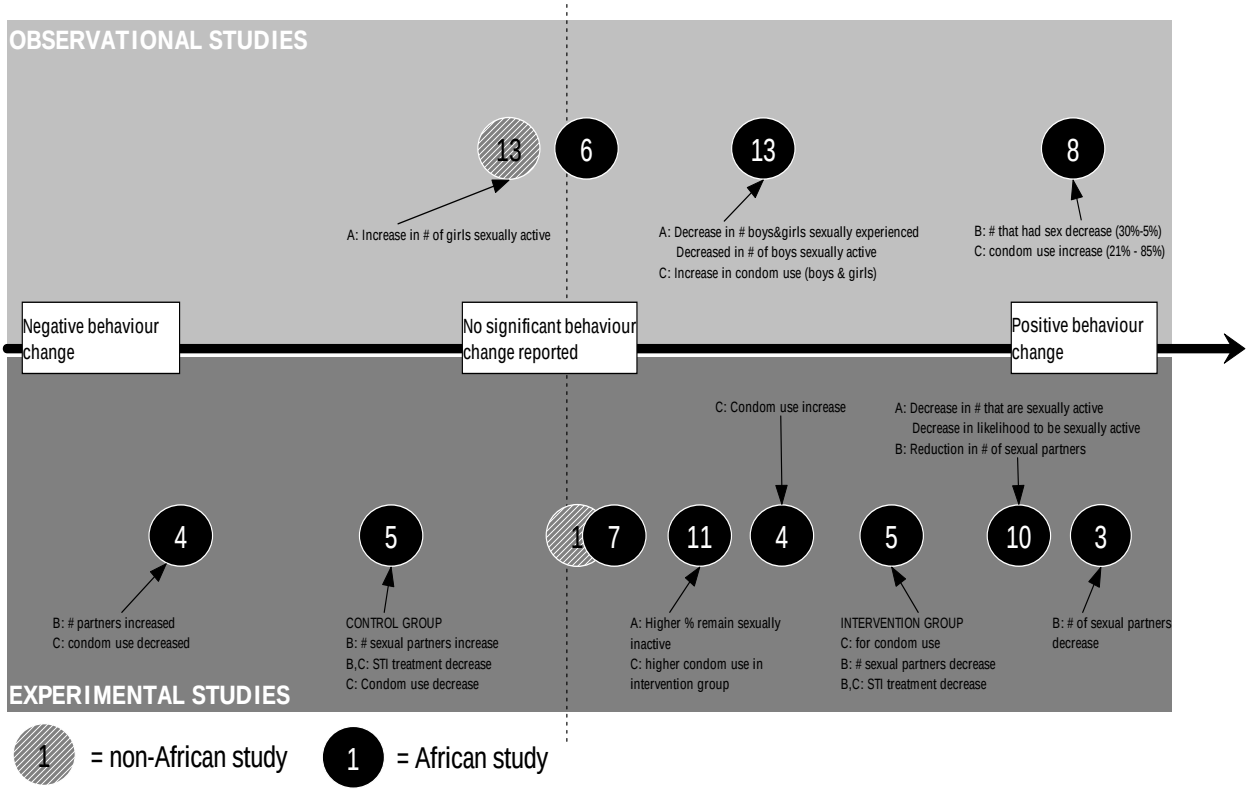
The scattergram depicts the evaluation study design type (experimental/observational) in relation to type of behaviour change. It should be noted that due to the variety of survey methodologies and sampling frame designs, it was impossible to use "study design type" as a criterion to categorise non-randomised studies, as suggested by the NRSMG. Thus, it was decided to use only the two main categories of study (experimental and observational) in this scattergram.

[x] The Cochrane Non-randomised Studies Methods Group (NRSMG) was set up to make recommendations and write a set of guidelines about when and how to include non-randomised studies in systematic reviews of health care interventions

[xi] From: http://www.cochrane.dk/nrsmg/docs/chap3.rtf

[xii] This accuracy was not independently verified, as it proved difficult to assess all of the conference papers mentioned in the summary analysis

Figure 2: ***Scattergram noting type of study design and type of behaviour change reported, for all studies where behaviour change was measured***



Key:

1 Aplasca et al. (1992), School-based AIDS prevention program; Philippines
2 Caceres et al. (1990), Short STD/AIDS program on knowledge, attitudes, and intended behaviour, Peru
3 Fawole et al. (1996), School-based education program, Nigeria
4 Fitzgerald et al. (1996), Face-to-face sex education, Namibia
5 Harvey et al. (1993/94), Drama-based programs/education, South Africa
6 Kinsman (1996/98), AIDS education program, Uganda
7 Klepp et al. (1992/93), School-based education, Tanzania
8 Makelele et al. (10/97;11/98;12/99), IE&C, Zambia
9 Re et al. (1995), Sexual education, Argentina
10 Shuey et al. (1994/96), primary school health and peer education program, Uganda
11 Stanton et al. (1996/97), School-based education, Namibia
12 Watts et al. (1999), Costing of school interventions on STI/HIV, Cameroon
13 Wedderburn et al. (1994 & 96), School-based education program, Jamaica

Scattergram Analysis

Several points arise from the scattergram analysis of the 13 studies reviewed in the Futures Group summary contained in the spreadsheet in Appendix 4:

a) All 13 studies were grouped under the category of Behaviour Change and the Sub-Category of School Based Studies;
b) 10 of the 13 studies were African, while one (Peru,2) was focused on the cost analysis of an educational program manual for teachers and students, and does not warrant inclusion;
c) Of the 3 observational studies, the Zambian study (8) showed significant positive behaviour change with reduced numbers having sex and increased condom use. The Ugandan study (6) showed no significant behaviour change, while the Jamaican study (13) was confusingly split: It showed an increase in the number of sexually active girls (negative behaviour change) but a decrease in the number of sexually active boys and girls, and an increase in condom use (positive behaviour change). This is a good example of a small study that may confuse more than inform;

d) Of the experimental studies, 2 of these were firmly located in negative behaviour change territory: The worst of these, from Namibia (4), showed gratifying increases in knowledge but alarming increases in the number of sexual partners and a decrease in condom use; it provides evidence of increased negative behaviour in the intervention group compared to the control group. While this is a small study of 262 and 253 secondary school students respectively, it provides ammunition for those who have concerns about such interventions. In the second study, from South Africa (5), a drama intervention in 10 secondary schools, the control group and intervention groups split, with the former showing an increase in the reported number of sexual partners and decrease in condom use, while there was an encouraging decrease in the treatment of STIs;
e) 6 experimental studies were grouped on the positive behaviour side of the scattergram, plus intervention group from the South African study (5) who showed a decrease in the number of sexual partners, and increase in condom use and a decline in STI treatment. There was little difference between the intervention and control groups in the percentage of students who had initiated sexual activity before and after the interventions in this South African study however. The Philippines study (1) hovers on the cusp of no significant behaviour change: After implementation of the AIDS prevention program, statistically significant effects favouring the intervention group were observed in knowledge and attitudes toward people with AIDS, but there was no statistically significant overall effect on intended preventive behaviour (although the program appeared to delay the students' intended onset of sexual activity).
f) Of the other 5, three - the Tanzanian (7) and two Namibian (11 & 4) studies - showed marginal to fair positive behaviour change. In Tanzania, the difference between intervention and comparison sites was not statistically significant; in the first Namibian study (11) a the number of students in the intervention group who remained sexually inactive after one year was more than double that of the control group and condom use was up. In the second Namibian study (4) there was an increase in condom use from 7% to 22% and a decrease in HIV seroconversion rates;
g) The two final and most positive studies were those from Uganda (10) and Nigeria (3). In the former, there was a decrease in the number likely to be sexually active and were actually sexually active as well as a reduction in the number of sexual partners overall. And in Nigeria, the mean number of reported sexual partners among the experimental students decreased significantly while increasing among the controls; and a higher proportion of students in the experimental than in the control group reported that they used condoms during their last sexual exposure.

While the dissimilarity of the studies militates against any clear analytical outcome and the evidence is mixed, on balance they confirm that there are quite strong and demonstrable links between education (in the widest sense) and positive behaviour change. It should be remembered that these studies - some of them quite small in scale - were carried out in the mid to late-1990s and, as we have noted above, are somewhat ‘dated’ in respect of the evolving dynamics of the pandemic and the education response to it. As importantly, few provided evidence of change over time; this is a critical feature of such studies and calls into question how we can claim or substantiate behaviour change based on a single ‘snapshot’ of attitudes and behaviour. In addition to these short comments, we would offer the following observations:

7.1.3 Not all surveys are created equal

The NRSMG make the important point, in their draft Guidelines, that it is ‘relatively more important to identify those studies which are methodologically sound and large’, than trying to compare every behaviour change survey/program evaluation result in order to determine trends. The latter approach, due for example to suspect survey methodology and sampling frame design, might lead to bias in comparing survey results, and an inability to objectively explain, a) conflicting results or, b) a lack of results. However, we note that good indicative information can be provided by small studies that are methodologically sound; indeed, it would be counterproductive to postpone interventions and curriculum developments pending the availability of rigorous scientific large studies. The science of linking preventive education with outcomes should not blind us to the urgency of the task, but equally the urgency of the task should not encourage us to rush blindly forward.

The nature of the crisis suggests perhaps that we must aim to achieve a good balance between these two approaches. In reviewing the comparative value and importance of studies we would suggest that it would also be important to know:

- Who commissioned the studies?
- Whether they were commissioned for purely academic or applied scientific interest?
- Whose 'property' these are and what use has been made of them?
- Whether the country Ministry of Education concerned had been involved in the study's commissioning and/or in its subsequent use?

This latter point is important not least because a growing number of ministries of education have expressed concern that research takes place in their countries about which they know little or nothing, and to which they have little or no access. This is likely to lead to increased controls on the external commissioning of research and insistence that results are accessible to all concerned.

7.1.4 Cost benefit analysis

Only 2 of the 13 studies in the spreadsheet addressed the issue of cost versus benefit. Cost-benefit analyses are important, but before assessing cost-benefit there is a need to ensure that an objective and standardised method for determining benefit (outcome/impact of a school- based intervention) has been agreed. Once this has been done, it will be possible to assess cost versus benefit in a more objective way.

7.1.5 Evidence of behaviour change, impact or outcome

Due to the non-standardised way in which behaviour change has been measured (where it has been measured), we cannot draw a linear conclusion by stating that a lack of *reported* behaviour change is necessarily an accurate reflection of actual behaviour change (or lack thereof), and thus a measure of program effectiveness (or lack thereof).

But the larger problem with studies of this type is the way in which they rely on *reported* behaviour change (such as condom use, abstinence, delayed sex, etc). We have no indication of what controls have been built in to monitor truthfulness or consistency of response (for example, blind questions or the reformulation of the same question in different ways, etc). There is also the issue of the response bias to contend with; that is to say, giving the response that the respondent thinks the researcher would like or which shows the respondent in a better light. Such issues are problematic in any self-reporting methodology, but may be considerably more so in this research area than in others, because of the taboos, assumed judgements and bias associated with sexuality. In the final analysis, the only sure way of finding out whether the programs had a beneficial impact is to test for HIV, with all relevant and necessary protocol and ethical considerations.

7.1.6 Standardised methodology to review/evaluate IEC school-based programs

Although UNAIDS has published a set of guidelines on how to conduct second generation surveillance (UNAIDS, 2000)[18], and the FHI model for behavioural surveillance is generally accepted for purposes of epidemiological surveillance at a population or sub-population level, there is a need for more precise evaluation tools for school-based programs. It might be helpful to link with the work done by the Cochrane Non-randomised Studies Methods Group (NRSMG)[xiii], among others, in this regard.

The issue of standardised methodology raises a number of questions however, and we must consider how answers can be found that will inform these guidelines and guide such research in future. Questions include:

- How these studies deal with other related health issues, such as, for example, the way better educated young women are more likely to be better health carers for themselves and for their children (facts reflected in every DHS)? Does this methodology suggest any approach that might be helpful?
- Do any of these studies give information on the duration/intensity/type/frequency of teaching of the program concerned, the preparation or training of teachers and the availability of materials? Do they say anything about the ages of the beneficiaries and, in particular, when the interventions took place in relation to adolescence (and were there any differences in outcomes depending on when the programs started)?

[xiii] For more information, please refer to the website: http://www.cochrane.dk/nrsmg/

- Were the studies concerned only with sexuality and aspects of related behaviour change, or did any of them research issues of stigma, discrimination, human rights and peer pressure, for example? We note that in this domain, all these issues are so interrelated that a narrow focus on school programs may de-contextualize the situation and limit our understanding. We note the issues of stigma and peer pressure (with its own forms of stigma) are particularly relevant and should be addressed.
- Did the studies try to find out what *kind* of education the beneficiaries were getting, a) at home and, b) on the 'street', beyond just asking *where* they got their information? Did they have any means of evaluating media influence, the gender double standards of society, the conflicting messages and the general social context?
- Was any information captured on the availability of health and testing services: How youth friendly these were, the availability of supplies and how confidentiality issues were handled, for example? A narrow focus on the content of the school (or other education) program may not unearth all that is occurring, what causal links there may be and where these are. This suggests the need for extensive regression analysis to examine these relationships more clearly.
- Was there any examination of the teaching methodology? By this we note the tendency to teach the factual side of the problem (the nuts and bolts of reproductive health and science of the virus, for example) and skim or avoid the critical issues of relationships, emotional stress and coping skills. We need to establish these trends to help inform improved training, curriculum focus and materials development and ensure that teachers are not 'passing the buck' by making the convenient assumption that HIV and related subjects will be taught by their peers through a number of carrier subjects or somewhere else in the curriculum.

8 Conclusions

On balance, this review of the growing body of evidence confirms that clear links exist between HIV/AIDS education and levels of awareness and knowledge about HIV/AIDS and associated risk behaviour. We believe it also shows that the inherent value of formal education in this context is to enhance skills required to process the HIV/AIDS education on offer, and make sense of the proliferation of related messages from a variety of media sources. In other words, it strongly suggests that the cognitive and literacy skills required to make informed choices in respect of HIV/AIDS risk and behaviour change, are substantively based on levels of education and literacy.

In this regard, the review of available evidence confirms the contention, as the Global Campaign for Education puts it, that the general cognitive and social gains from a basic education are the most important factor in protecting adolescents and young adults from infection. This reinforces the importance of the EFA and MDG goals, confirming that education lays the substratum that allows the internalisation of other messages about HIV/AIDS; as we note: *It is not what one learns that is important, but that one has learned.*

The second conclusion is that there may be a watershed between the evidence of the 1990s and that of the new century: Many of the earlier studies are ambivalent about the reported outcomes and the scale of much of the research may limit its reliability; indeed, one or two show *positive* correlation between levels of education and HIV prevalence, and have fostered some misapprehension about HIV/AIDS interventions in quarters that might wish these away. By contrast, the large and very recent South African study shows indisputable evidence of related behaviour change, a finding supported by the de Walque study from rural Uganda and the Global Campaign for Education report – all published in late 2003 and early 2004. This suggests, as we already postulated, that this trend towards more evidence of increased knowledge - functional AIDS literacy - and linked behaviour change, is related to the improvement in the quality of education generally and HIV/AIDS education in particular over the last 10 years or so. In other words, the learning environment and the quality of the education, educators and messages have radically transformed in many cases, relative to the conditions that obtained when those sampled by earlier research were in school. Directly linked to this, the proliferation of media support - inside and outside the classroom - as well as the quality and consistency of messaging and the extent of its reach, have created an entirely different socio-educational environment from that of the last decade.

The third conclusion is that, even if there is still ambivalence in some quarters about the links, notwithstanding this increasing weight of evidence, we cannot postpone the use of education as a channel for raising awareness while we indulge ourselves in the need to demonstrate more clearly defined causal links than presently exist. Indeed, we would argue that the evidence already to hand puts its value beyond question and we should get on with both increased support for education and its role *and* improving the quality of the research that confirms this.

Fourth is the conclusion is that studies of this type are problematic in the way in which they rely on *reported* behaviour change. We have no indication of what controls have been built in to monitor truthfulness or consistency of response and note the issue of response bias, in which the respondent may provide answers that they think the researcher would like or which show them in a better (less reprehensible?) light. We recognize that such issues complicate any self-reporting methodology, but note that it may be a greater problem in this research area than in others. In noting that the only sure way of finding out whether the programs have had a beneficial impact is to test for HIV, we point to the success of the South African study which tested all respondents, with interesting results. The fifth and linked conclusion is that studies that attempt to establish levels of behaviour change based on a single snapshot of attitude and activity are bound to provide limited results and insights. While we acknowledge that longitudinal and other studies designed to benchmark and track the sustainability of change over time are complex and expensive, we will continue to have a superficial understanding of response to education and other influences until we can resolve this. Again the South African study can be commended for its commitment to this research process and determination to find a reliable way to move forward from its benchmark, and link with similar studies - past and planned - in the same country.

Finally, we conclude that it is now imperative to establish an international, prioritized research agenda. We have already noted the difficulties of the non-standardised way in which behaviour change has been measured (where it has been measured) in many of the studies, for example. We have noted too that in the literature that was studied, there are neither definitive guidelines for classification and definition, nor precise guidelines to measure behaviour change for school-based programmes. These issues point to the need to underpin what is now quite staggering international expenditure in the HIV/AIDS field, with research guidelines capable of ensuring a reliable and sustained research output competent to facilitate measurement and monitoring in this dynamic field; this suggests the need for an agenda or framework within which researchers can minimize expensive duplication and focus on the key issues in a comprehensive and comprehensible way.

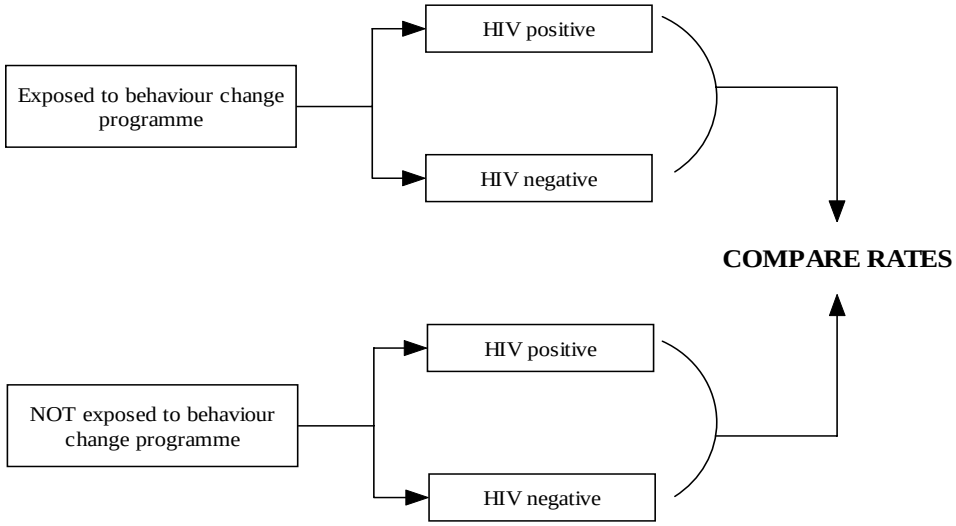
Appendix 1: Comparative Advantages of Observational and Experimental Studies

1 Observational Studies

1.1 Longitudinal study (cohort study)

A longitudinal study can be classified as the "purest form" of observational study. In a study of this kind, a sample group of persons (cohort) is identified within a larger group who are part of an intervention (during or after their involvement in the intervention, which is not subject to pre-selection). The health outcomes and behaviour of this cohort is then tracked over a period of time. An alternative definition suggests that 'in a longitudinal study, subjects are followed over time with continuous or repeated monitoring of risk factors or health outcomes' (Coggon, Rose, and Barker, 1997) [19]. It should be noted that often, two cohorts are chosen, and the results from these two cohorts are compared, as visually illustrated below. (One cohort exposed to the intervention vs another cohort not exposed to the intervention).

Figure 3: *Comparative Cohort Studies*



Source: Observational Study Designs: http://www.sunmed.org/Obser.html

1.1.1 Advantages of Longitudinal Study

- Causal inferences can be drawn (i.e. impact or changes can be attributed to a specific cause, or intervention)
- Of all the observational study design types, this type of study provides the strongest evidence of a causal relationship with the intervention

1.1.2 Disadvantages of Longitudinal Study

- Expensive
- Time consuming
- Sample is not always selected to represent the distribution in the entire population
- Logistically the most difficult (need to track people over time) – there is a loss due to the need to follow-up with the same persons over time

1.2 Cross sectional study (prevalence study)

A compromise to the pure longitudinal study is a cross sectional study. As explained, a longitudinal study collects information on participants over a specified time interval. In comparison, a **cross-sectional study** collects data on participants at some fixed time (or repeated points in time, in which case it is referred to as a *repeated cross sectional study*).

This study design is "is a research **design** in which participants are assessed or evaluated at a particular time in their lives" (Griffith, 2003)[20]. A participant group is chosen from a larger population. This participant group that has been exposed to a certain intervention is studied. The prevalence of outcome/s of this intervention in the participant group is studied and analyzed (for example the prevalence of persons who have used condoms*). For example: a cross sectional study might be used to determine if one type of behaviour change intervention among in-school youth is more effective than another type of intervention.*

1.2.1 Advantages of a Cross Sectional Study (Griffith, 2003)

- Because participants are studied over a short period of time, the study is considerably less expensive than a longitudinal study
- This type of study can be performed quickly
- Because the study is conducted over a short period of time, attrition of participants is not a concern
- Cross sectional studies are less prone to participant error about recall, due to the quick nature of the design
- Exposure bias does not tend to be a problem in cross sectional studies
- Because a large number of participants are used, there will still be data if some participants drop out of the study
- Repeated cross sectional surveys can be used for surveillance and monitoring, provided that the measure is sensitive to change (Margetts, Vorster and Venter, 2002)

1.2.2 Disadvantages of a Cross Sectional Study (Griffith, 2003)

- In this type of study, the researcher often finds it difficult to determine cause and effect, because only a short period of time is studied
- It can be difficult to sort out whether the outcome (behaviour change) or exposure (to behaviour change intervention) came first
- Inferences must be made in a cross sectional study
- Cross sectional studies can be prone to sample distortion bias.

2 Experimental Studies

2.1 Randomised Control Trial (RCT)

A valid determination of impact requires comparing outcomes of a group of individuals who have participated in an intervention with an equivalent group of people who have not participated (control or comparison group). In theory, the best way to do this is by means of a *randomized control trial*, where individuals are assigned at random to the trial group or control group (Rossi and Freeman, 1993). Outcomes measures, chosen on the basis of program objectives, are observed at some interval after the intervention ends, with any differences between groups attributable to the program: that is, the program can be said to have caused the observed differences[xiv].

2.1.1 Advantages of RTC

- Inferences must be made in a cross sectional study
- Causal inferences can be determined most clearly, since the effect of the intervention can directly be observed and recorded
- It provides a true measure of change, as the true measure of the effect of the intervention is the difference in change between the trial group and the control group
- Produces the most reliable evidence about the effectiveness of interventions

2.1.2 Disadvantages of RTC

- It is time consuming and expensive

[xiv] Accessed online at http://www11.hrdc-drhc.gc.ca/pls/edd/QEE_78007.htm

- There are some ethical considerations to take into account in terms of the ethics of assigning persons randomly to benefit from, or not benefit from, interventions that could improve their health status
- Participant compliance is required
- Actual randomisation may be difficult to assess
- Large sample size is required

2.2 Quasi-experimental

The main difference between RTC and quasi-experimental, is that in quasi-experimental, the assignment of persons to the trial group or control group is not done randomly. *Quasi-experimental* is defined as "experiments that have interventions, outcome measures, and experimental units (participants), but do not use random assignment to create the comparisons from which treatment-caused change is inferred" (Cook & Campbell, 1979, p. 6)[xv].

There is a fundamental methodological difference between randomised and non-randomised studies. A proper randomisation ensures that there are no systematic differences (selection bias) between the two compared groups[xvi].

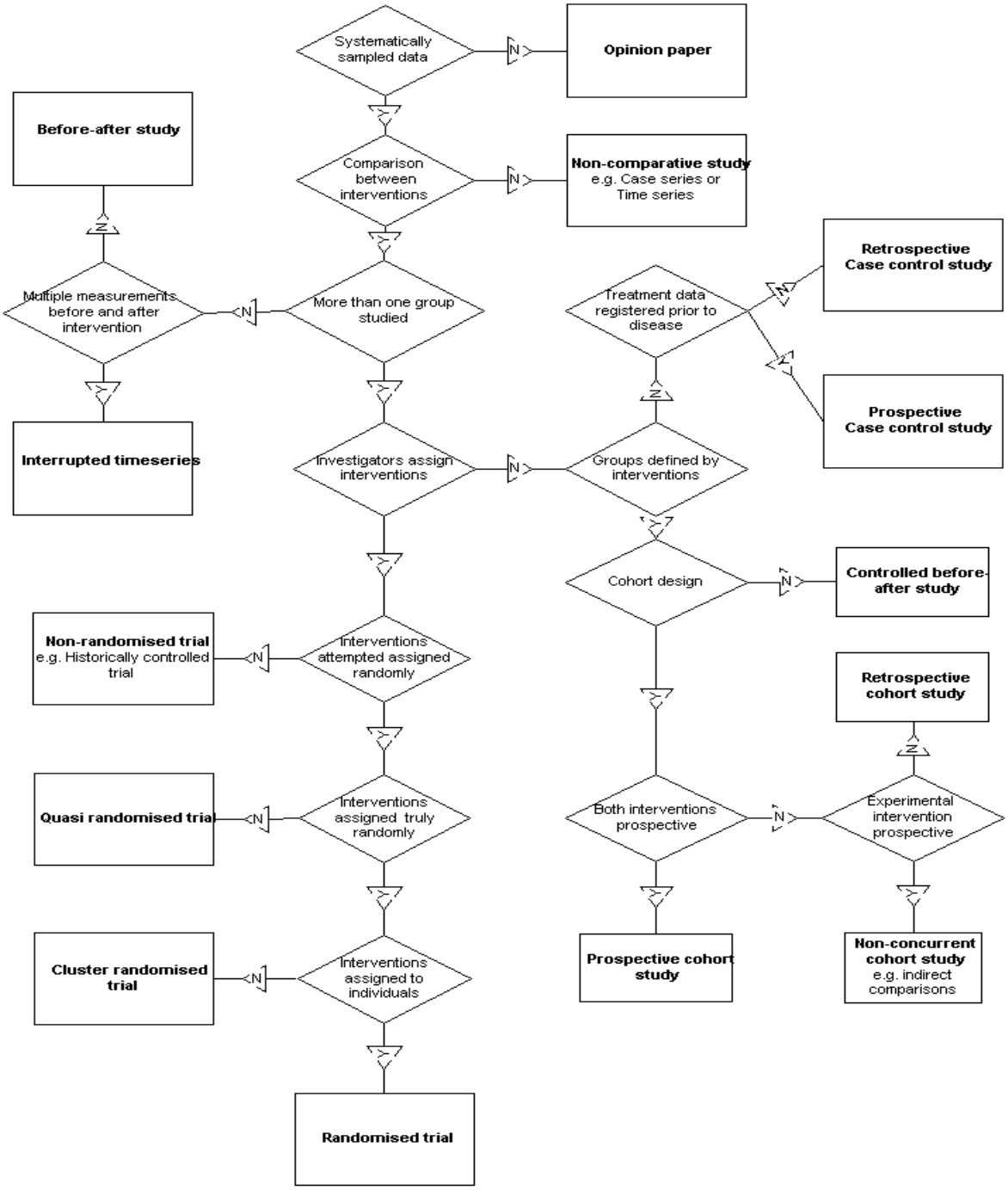
Due to the difficulties and ethical considerations involved in RCT, quasi-experimental studies are often the "golden middle way". The most common *quasi-experimental m*ethod involves constructing a comparison group of individuals who are comparable to participants. This can be done in different ways (a) by statistically controlling for differences between groups during data analysis; (b) by matching participants and non-participants according to key traits (such as age, sex and education) believed to influence the outcomes of interest; or both. The idea is to approximate random assignment as closely as possible by attempting to minimize or control for differences between the groups[xvii].

The advantages and disadvantages of quasi-experimental study designs are similar to that of RCT studies.

[xv] Accessed online at http://www.psych.utah.edu/psych5500/lectures/2000/17-Quasi-Exp/tsld003.htm
[xvi] Accessed online at http://www.cochrane.dk/nrsmg/docs/chap3.rtf
[xvii] Accessed online at http://www11.hrdc-drhc.gc.ca/pls/edd/QEE_78007.htm

Appendix 2: Design Algorithm for Studies of Health Care Interventions

Figure: Design algorithm for studies of health care interventions



From: http://www.cochrane.dk/nrsmg/docs/chap2fig.gif (Draft chapters for the Guidelines on Non-randomised studies in Cochrane reviews)

Appendix 3: Checklist for Interpreting Behaviour Change Surveys

In light of the complexity of interpretation across such disparate studies, we have taken the view that a checklist of key questions might prove useful to the design and commission of future studies. These might include the following (this list is adapted from a list developed by Margetts, Vorster and Venter, 2002):

1 **General Questions**
- Does the literature review justify the study?
- Is there a clear study aim, with a clear hypothesis?
- Do the hypotheses clearly define exposure and outcome, and other variables that need to be measured?

2 **Sampling, study size and power**
- Is the sample recruitment process clear, regarding the following:
  - How participants were selected?
  - Are exclusion/inclusion criteria clear?
  - What was the population or sampling frame?
  - Response rate (loss to follow-up) – for RCT study?
  - Reasons for non-compliance?
- Sample characteristics:
  - Are these adequately described?
- Sample size and power:
  - Has sample size been justified?

3 **Information and quality of data**
- Methods of assessing interventions:
  - Are the methods described clearly?
  - Could the study be repeated based on information provided?
  - Has the intervention been described clearly?
- Have the methods been validated:
  - What validation information has been given?
  - Is it sufficient and specific to the purpose for which measure is being used?

4 **Methods of assessing outcome**
- How has the outcome been measured?
- Are the methods valid (sensitive and specific, accurate and precise)?

5 **Analysis**
- Can you follow the analysis?
- Are the tables and text clear?

6 **Interpretation**
- Discussion:
  - Is the discussion fair and balanced?
  - Have they covered the strengths and weaknesses of their study?
  - Have they compared their results with the published literature?

7 **Conclusions**
- Are they justified and appropriate to the results as presented?

Appendix 4: Scatter gram Analysis: Literature Database

Table 8: F*rom Literature Database for Evaluating HIV/AIDS Interventions, compiled by: Lori Bollinger, Katharine Cooper-Arnold, and John Stover, March 2002*

Author	Year of Intervention	Country	Primary Intervention	Study Design	Sample Size	Population	Location	Months of Intervention	Results
Aplasca et al.	1992	Philippines	school-based AIDS prevention program	cluster-RCT	804	high school students	4 public high schools	2	At baseline, 11% of students (20% males and 4% females) reported ever having had sexual intercourse (mean age 14 years). Among these, condom use was low (24%). After implementation of the AIDS prevention program, statistically significant effects favoring the intervention group were observed in knowledge and attitudes toward people with AIDS. While there was no statistically significant overall effect on intended preventive behavior, the program appeared to delay the students' intended onset of sexual activity.
Caceres et al.	1990	Peru	short STD/AIDS program on knowledge, attitudes, and intended behavior	quasi-experimental	1,213	secondary school students	14 secondary schools, Lima, Peru	3	Cost/educational program manual (teachers/students) was $2. Cost exclusive of research expenses was $3/student reached.
Fawole et al.	1996	Nigeria	school-based education program	quasi-experimental	440 (223 - intervention; 217 - controls	secondary school students	secondary school	6	At post-test, intervention students exhibited greater knowledge about HIV/AIDS transmission and prevention ($p<0.05$). Intervention students were less likely to feel AIDS is a "white man's" disease and were more likely to be tolerant of people living with the disease ($p< 0.05$). After the intervention, the mean number of reported sexual partners among the experimental students significantly decreased from 1.51 to 1.06 and increased from 1.3 to 1.39 among the controls. A higher proportion of students in the experimental (29 [53.7%]) than in the control group (34 [42.5%]) reported that they used condoms during their last sexual exposure.
Fitzgerald et al.	1996	Namibia	face-to-face sex education	RT-C	262-intervention; 253-delay-control	students in grade 9 or 11 between 15-18 years attending 1 of 10 secondary schools	10 secondary schools	6	Knowledge increased significantly among intervention compared to control youth (88% vs. 82% correct response, $p< 0.0001$). Percentage of youth reporting frequent use of condoms (always/usually) increased from 61% at baseline to 77% at follow-up for intervention groups compared with 64% to 68% at follow-up for control groups. Percentage of sexually active males using condoms decreased from baseline to follow-up in both the intervention (87% to 79%) and control (68% to 67%) groups; percentage of sexually active females using condoms increased in

Author	Year of Intervention	Country	Primary Intervention	Study Design	Sample Size	Population	Location	Months of Intervention	Results
									the intervention (67% to 77%) and decreased in the control (66% to 64%) group. Percentage of sexually active males who had sex in the past 6 months increased from baseline to follow-up for both intervention (63% to 72%) and control (55% to 66%) groups; sex with >two sexual partners increased for intervention (18% to 23%) and decreased for the control (23% to 15%) groups. Percentage of sexually active females who had sex in the past 6 months increased from baseline to follow-up for both intervention (52% to 65%) and control (54% to 62%) groups; sex with >two sexual partners increased for intervention (15% to 17%) and decreased for the control (15% to 9%) groups.
Harvey et al.	1993/1994	South Africa	drama-based programs/education	randomized community trial	1,080 - pre-intervention survey; 699 - post-intervention survey	high-school students	10 schools in five districts in KwaZulu	6	In schools receiving the drama program, improvements in behavior were demonstrated: in the drama (intervention) group, of students reporting sexual activity, condom nonuse decreased from 61.8% to 45%, students who had more than one different sexual partner in the last 3 months decreased from 58.0% to 54.9%, and the percentage of students treated for an STI decreased from 24.8% to 18.9%. For the booklet only (control) group, of students reporting sexual activity, condom nonuse increased from 54.9% to 58%, students who had more than one different sexual partner in the last 3 months increased from 43.1% to 47.0%, and the percentage of students treated for an STI decreased from 19.6% to 19.0%. There was little difference between the intervention and control groups in the percentage of students who had initiated sexual activity before and after the interventions.
Kinsman	1996-1998	Uganda	AIDS education program	longitudinal - with a control group	3,500	students aged 12-16 years	primary/secondary schools	24	No statistically significant difference was shown between the intervention and control schools for any of the key variables examined relating to knowledge, attitudes, and intended behavior.
Klepp et al.	1992-1993	Tanzania	School-based education	RCT	1,063	sixth-grade students	urban and rural	12	At follow-up, students at intervention sites reported significantly better scores regarding AIDS information, knowledge, and attitudes towards people with AIDS; students from intervention sites reported more restrictive attitudes regarding intentions to engage in sexual intercourse, but the difference between intervention and comparison sites was not statistically significant; there was a nonsignificant decrease in number reporting sexual debut during the previous year in the intervention group (7% vs.17%).

Author	Year of Intervention	Country	Primary Intervention	Study Design	Sample Size	Population	Location	Months of Intervention	Results
Makelele et al.	10/97;11/98;12/99	Zambia	IE&C	repeated cross sectional	1997-964; 1998-905; 1999-396	males/females 6th & 7th grade students (10-18 years)	3 primary schools	26 months between baseline and second evaluation	In 1997,among 964 children, 30% had sex and 21% used condoms; in 1998, among 905 children, 16% had sex and 60% used condoms; in 1999, among 396 of the initial group, 5% had sex and 85% used condoms.
Re et al.	1995	Argentina	sexual education	survey questionnaires	859 (questionaires)	students 11-20 years	secondary schools - Buenos Aires	<12	Of 859 questionnaires analyzed, 150 (17%) indicated students had initiated sexual relations; of those 150, 49 (33%) had begun at 16 years or younger. Students do not use condoms regularly because they neither perceive themselves at risk, nor recognize condoms as a contraceptive method, and/or they do not trust its protection.
Shuey et al.	1994-1996	Uganda	primary school health and peer education program	repeated cross-sectional	Intervention -287 pre-intervention; 280 post-intervention; control - 113 pre-intervention; 120 post-intervention	upper primary school students: average age 14 years	38 primary schools	24	In 1994, 42.9% (123/287) of students in the intervention group described themselves as sexually active compared with 25.7% (29/113) of the control; in 1996, 11.1% (31/280) of the intervention group described themselves as sexually active compared with 26.7% (31/120) of the control. In 1994, mean age of first intercourse was 11.3 years (range 6-19, SD=2.9) in the intervention group and 12.4 years (range 9-18, SD=2.5) in the control; in 1996, mean age was 10.9 years (range 6-17, SD=2.9) in the intervention group and 12.5 years (range 7-17, SD=2.7) in the control. Students in the intervention group were 3.9 times more likely to be sexually active in 1994 than in 1996 ($p<0.001$); Both males (RR=2.45, $p<0.001$) and females (RR=1.76, $p<0.001$) were more likely to be sexually active in 1994 than in 1996. In 1994, 23% (28/123) of students in the intervention group who had been sexually active stated that they had participated in sex in the past month compared with 42% (12/29) of those sexually active in the control group; in 1996, 65% (20/61) of those sexually active in the intervention group had participated in sex in the previous month compared with 78% (25/32) of the controls. Of those sexually active in the intervention group, the average number of sexual partners was 2.2 (range 1-15, SD=2.3) in 1994 and 1.4 (range 1-3, SD=0.6) in 1996; in the control group, the average number of partners was 2.1 (range 1-8, SD=1.8) in 1994 and 2.0 (range =1-15, SD=2.3) in 1996. Of those with a family member with AIDS in the intervention group, 54% (39/72) were sexually active in 1994 and 8% (8/100) in 1996; in the control group, 33% (8/24) were sexually active in 1994 and 45% (17/38) in 1996.

Author	Year of Intervention	Country	Primary Intervention	Study Design	Sample Size	Population	Location	Months of Intervention	Results
Stanton et al.	1996-1997	Namibia	School-based education	RCT	515	students aged 15-18 years	mixed urban and rural	12	Rates of either abstinence or sex with a condom were not statistically different between control and intervention groups at follow-up. Among sexually inexperienced youth, higher percentage of intervention youth (17%) than control youth (9%) ($p< 0.05$) remained sexually inexperienced one year later. Among virgins who subsequently initiated sex in immediate post-intervention period, intervention youth (18%) were more likely than control youth (10%) to use a condom ($p< 0.05$). Additional HIV-related risk behaviors, intentions to use condoms, and perceptions of the ability to use condoms were positively affected by the intervention.
Watts et al.	1999	Cameroon	costing of school interventions on STI/HIV	cost analysis		in-school youth	schools		In-school intervention ranged from $1.40 to $7.90/student (US$ 2000). Unit costs were dependent upon the extent of in-school curriculum development and intensity of contact.
Wedderburn et al.	1994 and 1996	Jamaica	school-based education program	cross-sectional	1994-556 (283 boys, 273 girls); 1996-561 (288 boys, 273 girls)	youth aged 12-14 years	secondary school	24	Knowledge of at least two HIV prevention methods increased significantly ($p<0.001$) among both boys (71% to 99%) and girls (70% to 94%). Many more adolescent boys reported sexual experience and recent sexual activity than girls. However, declines were reported in boys sexually experienced (59% to 41%, $p<0.001$) and sexually active in the past 12 months (40% to 33%, $p=0.08$). Ten percent of girls reported being sexually experienced (from 11%) and 7% sexually active (from 6%). No difference was seen between urban and rural adolescents. Ninety-three percent of respondents were able to recognize a condom. Among those sexually active, an increase in the number of consistent condom use was reported (boys - 16% to 29%, $p<0.0$; girls - 21% to 35%, $p=0.25$).

References

[1] De Walque D. (2004). *How Does the Impact of an HIV/AIDS Information Campaign Vary with Educational Attainment: Evidence from Rural Uganda*. The World Bank, Development Research Group. Washington DC.

[2] Global Campaign for Education (2004). *Learning to survive: How education for all would save millions of young people from HIV/AIDS*. Global Campaign for Education. Global Campaign for Education. www.campaignforeducation.org.

[3] Parker W. (2003), *Rethinking conceptual approaches to behaviour change: The importance of context*. Centre for AIDS Development, Research and Evaluation. Johannesburg

[4] Airhihenbuwa C.O. et al (1999). *Communication frameworks for HIV//AIDS*.

[5] Barnett, T. and Whiteside, A. (2002). *AIDS in the Twenty-First Century*. HEARD, University of KwaZulu-Natal. Durban

[6] Low-Beer D., Stoneburner R. (2000). *Social Communications and AIDS population behaviour changes in Uganda compared to other countries*. Centre for AIDS Development, Research and Evaluation. Johannesburg

[7] Low-Beer D., Stoneburner R. (2001). *In Search of the Magic Bullet: evaluating and replicating prevention program*, Leadership Forum on HIV prevention, Kaiser Family Health Foundation, Gates Foundation, New York.

[8] Bennell P.S., Hyde K., and Swainson N. (2002). *The impact of the HIV/AIDS epidemic on the education sector in sub-Saharan Africa: A synthesis of the findings and recommendations of three country studies*. Centre for International Education, University of Sussex.

[9] Asiimwe-Okiror G., Musinguzi J., Opio A., Madraa E., Tembo G., Carael M (1997). *Change in sexual behaviour and decline in HIV infection among young pregnant women in urban Uganda.* AIDS 11, 1757-1763

[10] Hargreaves J.R., Glynn J.R. (2002).*Educational attainment and HIV-1 infection in developing countries: a systematic review*. Tropical Medicine and International Health, vol. 7, No 6, pp. 489-498, June 2002.

[11] Pettifor A.E., Rees H.V., Steffenson A., Hlongwa-Madikizela L., MacPhail C., Vermaak K., Kleinschmidt I. (2004). *HIV and sexual behaviour among young South Africans: A national survey of 15-24 year olds*. Johannesburg: Reproductive Health Research Unit, University of the Witwatersrand,

[12] Airhihenbuwa C.O., et al. (1999).*Communication frameworks for HIV/AIDS: A new direction*. UNAIDS/Penn State. Geneva

[13] Liebowitz J. (2002). *The Impact of Faith-Based Organizations on HIV/AIDS Prevention and Mitigation in Africa.* Health Economics & HIV/AIDS Research Division (HEARD), University of KwaZulu Natal.

[14] Low-Beer D & Stoneburner R (2002). *Social communications and AIDS population behaviour changes in Uganda compared to other countries*. Centre for AIDS Development, Research and Evaluation. Johannesburg

[15] Vandemoortele J., Delamonica E. (2000). *Education 'Vaccine' against HIV/AIDS.* Current Issues in Comparative Education 3(1).

[16] UNAIDS/WHO (2000). *Report on the Global HIV/AIDS Epidemic*. UNAIDS. Geneva

[17] Margetts B.M., Vorster H.H., Venter C.S. (2002). *Evidence-based nutrition – review of nutritional epidemiological studies*. SAJCN November 2002 Vol.15 No.3. South Africa

[18] UNAIDS/ WHO (2000). *Second-generation surveillance for HIV: The next decade*. UNAIDS. Geneva

[19] Coggon D., Rose G., Barker D.J.P. (1997). *Epidemiology for the Uninitiated*, Fourth Edition. BMJ Publishing Group. UK

[20] Griffith S. (2003). Accessed online at http://www.arches.uga.edu/~shann44/7000%20Cross%20Sectional%20Study.htm