World Health Organization

Sexual and Reproductive Health 2

Journal paper

Journal paper

Sexual behaviour in context: a global perspective*

Kaye Wellings, Martine Collumbien, Emma Slaymaker, Susheela Singh, Zoé Hodges, Dhaval Patel, Nathalie Bajos

Research aimed at investigating sexual behaviour and assessing interventions to improve sexual health has increased in recent decades. The resulting data, despite regional differences in quantity and quality, provide a historically unique opportunity to describe patterns of sexual behaviour and their implications for attempts to protect sexual health at the beginning of the 21st century. In this paper we present original analyses of sexual behaviour data from 59 countries for which they were available. The data show substantial diversity in sexual behaviour by region and sex. No universal trend towards earlier sexual intercourse has occurred, but the shift towards later marriage in most countries has led to an increase in premarital sex, the prevalence of which is generally higher in developed countries than in developing countries, and is higher in men than in women. Monogamy is the dominant pattern everywhere, but having had two or more sexual partners in the past year is more common in men than in women, and reported rates are higher in industrialised than in non-industrialised countries. Condom use has increased in prevalence almost everywhere, but rates remain low in many developing countries.

The huge regional variation indicates mainly social and economic determinants of sexual behaviour, which have implications for intervention. Although individual behaviour change is central to improving sexual health, efforts are also needed to address the broader determinants of sexual behaviour, particularly those that relate to the social context. The evidence from behavioural interventions is that no general approach to sexual-health promotion will work everywhere and no single-component intervention will work anywhere. Comprehensive behavioural interventions are needed that take account of the social context in mounting individual-level programmes, attempt to modify social norms to support uptake and maintenance of behaviour change, and tackle the structural factors that contribute to risky sexual behaviour.

The ability of individuals or couples to pursue a fulfilling and safe sex life is central to achievement of sexual health. Creation of supportive environments in which safe sexual behaviour can take place is vital if the Millennium Development Goals (MDGs) for sexual equality, maternal health, and HIV/AIDS are to be achieved.[1] Conventionally, public health has focused on adverse outcomes of sexual behaviour. As important determinants of fertility patterns and transmission of sexually transmitted infections, sexual behaviours contribute substantially to the burden of disease.[2–4] The past decade has seen growing attention in the international policy arena to sexual rights, and new standards are being formulated for the creation and maintenance of a sexually healthy society, invoking values of dignity, respect, and choice.[5] Information about sexual behaviour is essential to the design and assessment of interventions to improve sexual health. Importantly, too, empirical evidence is needed to correct myths in public perception of behaviours. Yet despite being scrutinised everywhere, sexual behaviour poses challenges for scientific enquiry. The same paradox is seen in relation to intervention; sexual activity is strongly regulated in virtually every society, but its modification to improve sexual health has proved difficult.

The need to predict and prevent transmission of HIV has provided a valuable impetus to both sexual behaviour and intervention studies in the past two decades.[6,7] Data are sparser in some regions than others, in particular those with low HIV prevalence or strong prohibitions surrounding sex, or both. African countries, for example, have received hugely disproportionate attention from researchers compared with Asian countries, and

* This is a pre-print copy of a paper published in the journal *The Lancet*: *Kaye Wellings, Martine Collumbien, Emma Slaymaker, Susheela Singh, Zoé Hodges, Dhaval Patel, Nathalie Bajos.* Sexual behaviour in context: a global perspective. The Lancet Sexual and Reproductive Health Series, October 2006.

so the evidence base is partial. Even so, a reasonable global impression can be gained from the large number of developing countries with comparable data (those for which a Demographic and Health Survey (DHS) has been undertaken[8]), and from other countries with comparable national surveys. Data are accumulating too, from assessments of the effect of interventions to improve sexual health.

The resulting evidence provides a historically unique opportunity to take stock of sexual behaviour and efforts to protect sexual health at the beginning of the 21st century. Sexual behaviour changes in response to both secular and non-secular social forces. Recent decades have seen large socioeconomic changes in poverty, education, and employment. Demographic changes have taken place, in the age structure of populations, in the timing of marriage, and in the scale of mobility and migration between and within countries, including seasonal labour, rural-to-urban movement, and social disruption due to war and political instabilities. Attitudes to sexual behaviour have altered in many countries.[9,10] Worldwide communications, including the internet,[11] have had a bearing on social norms, transporting sexual images from more liberal to more conservative societies, especially those in which advances in information technology have been rapid.[12]

Advances in contraception have increasingly freed sexual expression from its reproductive consequences. Policy and legislation that govern health-care systems and public-health strategies have also wrought changes;[13] access to family-planning services has increased, and few areas have been unaffected by efforts to prevent HIV transmission. We describe current trends and patterns in important variables of sexual behaviour, and their implications for sexual-health status and the design of sexual-health interventions. We present our key messages in panel 1.

Cross-national comparisons

We compare data for entire countries (panel 2 and table 1) and in so doing we pay less attention to the substantial variability within countries. Our choice of indicators shows a concern with sexual health and human rights, but is also determined by availability of comparable data. Age at sexual initiation is of public health interest, since early initiation is more likely to be non-consensual and to be subsequently regretted,[31–33] less likely to be protected against unplanned pregnancy and infection, and associated with larger lifetime numbers of sexual partners.[34–36] Risk behaviours for sexually transmitted infections, such as multiple partnerships and sex between men are included as are prevalence estimates of transactional sex, since clients of sex workers are important bridging groups in the transmission of sexually transmitted infections and HIV to wider sexual networks. We include condom use as a marker of safer sex.

Panel 1: Key messages

- Information about sexual behaviour is essential to inform preventive strategies and to correct myths in public perceptions of sexual behaviour. Increased research in this area in the past two decades provides a historically unique opportunity to take stock of sexual behaviour, and efforts to safeguard it, at the beginning of the 21st century. Gaps in knowledge remain, especially in Asia and the middle east, where obstacles to sexual-behaviour research remain.
- Trends towards earlier sexual experience are less pronounced and less widespread than sometimes supposed (in many developing countries the trend is towards later onset of sexual activity for women), but the trend towards later marriage has led to an increase in the prevalence of premarital sex.
- Most people are married and married people have the most sex. Sexual activity in young single people tends to be sporadic, but is greater in industrialised countries than in developing countries.
- Monogamy is the dominant pattern in most regions; but reporting of multiple partnerships is more common in men than in women, and geneally more common in developed countries than in developing countries.
- Striking differences between men and women in sexual activity are explained in part by a tendency for men to over-report and women to under-report, but patterns of age mixing and the age structures of populations also help explain the difference, especially in African countries.
- Marriage does not reliably safeguard sexual-health status. Married women find negotiation of safer sex and use of condoms for family planning more difficult than do single women. Very early sexual experience within marriage can be coercive and traumatic.
- Condom use is increasing—in some cases, such as in Uganda, strikingly so—but in many developing countries, rates of use remain low.
- Factors that determine variations and trends in sexual behaviour are environmental and include shifts in poverty, education, and employment; demographic trends such as the changing age structure of populations and the trend towards later marriage; increased migration between and within countries; globalisation of mass media; advances in contraception and access to family-planning services; and public-health HIV and sexually transmitted disease prevention strategies.
- Public-health interventions should address the broader determinants of sexual behaviour, such as gender, poverty, and mobility, in addition to individual behaviour change.
- Risk-reduction messages should respect diversity and preserve choice. Selective emphasis on different aspects of the ABC strategy needs to be tailored to individuals and settings. Young people need to be helped to achieve the best timing of first sex, but first sexual experiences are often forced, or even sold.
- School-based sex education improves awareness of risk and knowledge of risk reduction strategies, increases self-effectiveness and intention to practice safer sex, and delays rather than hastens the onset of sexual activity.
- No general approach to sexual-health promotion will work everywhere, and no single-component intervention will work anywhere. We need to know not only whether interventions work, but why and how they do so in particular social contexts. Comprehensive behavioural interventions are needed that take account of the social context, attempt to modify social norms to support uptake and maintenance of behaviour change, and tackle the structural factors that contribute to risky sexual behaviour.

Panel 2: Methods

Search strategy

We reviewed medical, public health, and social science research by searching Embase, MEDLINE, Popline, PubMed, and Web of Science electronic databases for articles published between 1996 and 2006 using the key words "sexual behaviour" and "sexual behaviour change". We also contacted experts in sexual behaviour studies, we hand-searched AIDS, *The Lancet*, and *Social Science and Medicine*, we found references cited by key papers, and accessed web-based information through Internet sites that are commonly used in the context of sexual health.

We searched the Cochrane Database of Systematic Reviews and the Database of Abstracts of Reviews of Effects for systematic reviews published in the past 10 years (from 1996 onwards). Terms used to identify reviews in the Cochrane Database of Systematic Reviews, and those that were successful in identifying relevant reviews were used subsequently to search the Database of Abstracts of Reviews of Effects: (MESH terms) "sexual behaviour", "contraception"; (free text terms) "sex"*, "sex* near behavio*", "sex* near risk*", "sex* near safe*", "behavio*", "barrier*". We included reviews that reported sexual behaviour outcomes or outcomes that are closely associated with sexual behaviour, for example, sexual partnerships (eg, reductions in partner numbers, monogamy, exclusivity), sexual practices (eg, abstinence, condom use, non-penetrative sex), or changes in behavioural determinants associated with either of these (eg, empowerment, self-efficacy, resistance to peer pressure, alternative income generation for commercial sex workers). The results of the reviews were summarised by population group, with emphasis given to reviews done most recently and those providing useful information regarding the essential components of successful interventions.

Analysis of sexual behaviour data

Almost all estimates presented in this paper are made on the basis of original analysis of available survey data.[8,14–18] We sought datasets from nationally representative population-based surveys undertaken since the mid-1990s. Table 1 shows the number of countries for which data are available and estimates were obtained. The main sources of data were surveys by the MEASURE DHS (Demographic and Health Surveys) project.[8] We have also used data from national surveys from Australia,[14] the UK,[15] France,[16] USA,[17] and from an EU-sponsored series of surveys in western Europe.[18] We have used published estimates from Reproductive Health Surveys,[19–23] from a national survey from Chile[24] and from surveys from China[25] and the USA.[25,26]

More surveys, and more standard measures, were available for African countries than for any other region.[8] Data for developed and middle-income countries were the most difficult to obtain because these surveys are not standardised and are done by many different groups, with no standard archiving procedures. Data were analysed with Stata version 9.2. Data from surveys of ever-married women were weighted to produce estimates of age at marriage for all women. Throughout the paper, when we refer to marriage, we include all cohabiting relationships, irrespective of legal marital status.

The choice of indicators was guided by the need to describe key aspects of sexual behaviour relevant to reproductive and sexual health. We report median age at first intercourse and at first marriage. We describe trends in first sexual intercourse using the percentage of the population who first had sexual intercourse before age 15 years. This measure has advantages compared with median age at first intercourse (the age by which half have had sex) since it can be calculated for a younger cohort. We also calculate the proportion of the total population who had intercourse before marriage or cohabitation. We examine entry into marriage using lifetable methods, and describe progression from first sex to marriage in terms of the person-years of life spent in the different states (never had sex, had sex and not yet married).

Patterns of sexual partnerships are described by combining data from two sources. First, using sexual behaviour data, we calculated the proportion who, in the year before the survey, had no partner, one partner, and more than one partner, by age group for men and women. Second, we used 2005 population-estimates from the UN Population Division database[27] for all countries to derive population pyramids onto which the patterns of partnership formation were superimposed. We report sexual activity in the previous 4 weeks, by marital status. Our one measure of safer sex, the proportion of sexually active men and women who used a condom on the most recent occasion of sex, is presented for at least two time points.

Accuracy of sexual behaviour estimates

All survey data based on self reports are susceptible to error. Sexual behaviour surveys might suffer more than others in this respect, since they are especially prone to a social desirability bias—the tendency for participants to respond according to social expectations of what is right. Many surveys find that the number of partners reported by men greatly exceeds that reported by women. This difference could be because: women under-report or men over-report, or both; men are having sex with women in age-groups or geographical areas not included in the survey sample, or both; or that with women with large numbers of partners, such as sex workers, are under-represented in the sample.[7,28,29]

Few opportunities exist to assess internal or external consistency of the data. The broad scope of the DHS restricts the number of questions asked about sexual behaviour and hence the scope for assessment of the internal consistency of responses. Similarly, since most countries have only one source of data, few opportunities exist for triangulation between surveys. The quality of the data obtained can, however, be enhanced by use of well designed questionnaires and well trained interviewers. Most of the data used in this paper come from large surveys done by experienced teams. Many of the surveys (most of the DHS and some of the European surveys) used questionnaires based on a common protocol, which increases the comparability of results. Most data come from face-to-face interviews, apart from those in high-income countries, for which telephone interviews and computer-assisted self-interviewing techniques have sometimes been used.

Changes in social attitudes affect the comparability of results between surveys, since what is being captured might indicate increased ease of reporting as well as a change in the behaviour itself. When we describe trends in age at first sex and first marriage by comparison of the experiences of groups born at different times, we have, where possible, pooled the data from two (or more) surveys. By pooling data the sample size is increased, which diminishes sampling error and reduces reporting bias between two surveys; trends in more recent behaviours are harder to determine. Wording of questions has in some cases changed between surveys so that, for some indicators, data from earlier surveys are not strictly comparable with those from surveys done more recently.[3,30]

Almost everywhere, sexual activity begins for most men and women in the later teenage years (ages 15–19 years), but regional and sex variations between men and women are substantial (table 2). For women, median age at first intercourse is low in regions in which early marriage is the norm (for example, in south Asia, central, west, and east Africa), and high in Latin America and in some countries of the middle east and southeast Asia. For men, age at first intercourse is, in general, not linked to age at marriage. In most African and Asian countries, men start to have sex later than do women. Gender differences are most pronounced in the less industrialised countries.

None of these data suggest a universal trend towards sex at a young age. The trends are complex and vary greatly with male or female sex. The proportion of women who report early intercourse (before age 15 years) decreased significantly or remained stable between the late 1970s and the late 1990s in four of five countries for which comparisons can be made (figure 1). For men, the proportion either remained stable or increased during that period. The increase was significant in several Latin American and African countries. In societies in which first intercourse still occurs mainly within marriage, the trend towards later marriage has been accompanied by a trend towards later sex in young women,[37] and is particularly a feature of countries in Africa and south Asia (figure 2). In some industrialised countries, sexual activity before age 15 years has become more common in recent decades (though the prevalence is lower than in other regions and the increase is not generally significant).

The trend towards later marriage in many countries has also led to an increase in the prevalence of premarital sexual intercourse.[38] Again, large regional and sex differences in prevalence exist (figure 3). As shown in figure 4, on average, the time between first sexual intercourse and living with a partner is longer for men than for women (typically 3–6 years compared with 0–2 years, respectively) apart from in industrialised countries, in which the time is about the same for both (about 5 years). Trends in the average time spent between first sexual experience and settling with a marital or cohabiting partner result from changes in both the proportion who have first sexual intercourse before marriage, and the changing interval between these two events. Although the number of countries in which first sexual intercourse and marriage coincide is diminishing[39] a clear increase in the intervening period is taking place in only very few countries, again, notably in the more industrialised (figure 2).

Most people are married and married people have the most sex (figure 5). Sexual activity in single people tends to be sporadic and, in most regions, many fewer than half unmarried non-virgins report having had sex in the past month. Single men and women in many African countries are fairly sexually inactive, with two-thirds reporting recent sexual activity compared with three-quarters of those in industrialised countries.

	Existence of data established	Data obtained	Published estimates obtained	Unable to include*
Countries with ≥1 survey of:				
All women	76	48	7	20
Ever-married women	4	5†	-	-
Men	65	44	4	17
Countries with > survey of:				
Women	39	27	1	8
Men	25	18	1	4

For three countries we were unable to obtain the most recent or most comprehensive data and so used alternative data.

*Report or dataset unobtainable or published estimates unsuitable or both. †Data for all women in one country available but unobtainable; estimates from an ever-married sample presented in their place.

Table 1: Availability of survey data

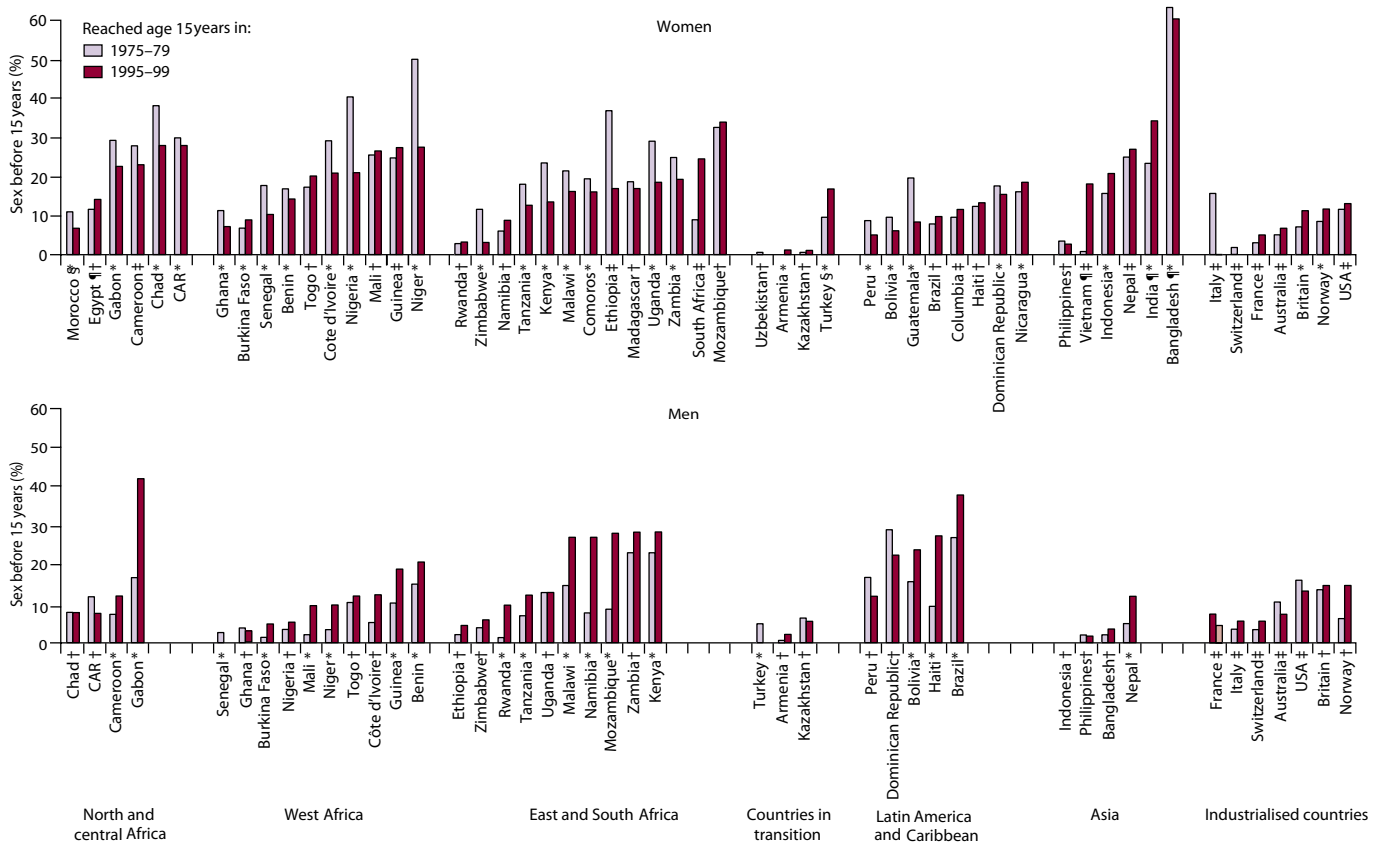


Figure 1: Percentage who had sex before age 15 years: comparison between two time points
Difference between groups: *p<0·05, †p≥0·5, ‡Test not possible. §Age at first marriage used as a proxy for age at first sex. ¶Ever-married sample and age at first marriage used as a proxy for age at first sex.

	Men			Women		
	Median age at first SI (years, IQR)	% had SI before age 15 years (95% CI)	Median age at first marriage (years, IQR)	Median age at first SI (years, IQR)	% had SI before age 15 years (95% CI)	Median age at first marriage (years, IQR)
Central Africa						
Central African Republic	17·5 (15·5–18·5)		23 (19·0–27·0)	15·5 (14·5–17·5)	30·3 (27·6–33·1)	17 (15·0–20·0)
Cameroon	18·5 (16·5–20·5)	8·8 (6·6–10·9)	25 (21·0–30·0)	15·5 (14·5–17·5)	30·7 (27·8–33·5)	17 (15·0–20·0)
Chad	18·5 (16·5–20·5)	5·2 (2·6–7·8)	22·01 (19·0–25·0)	15·5 (14·5–17·5)	39 (36·3–41·8)	15·01 (14·0–18·0)
Egypt	..	..	..	..	..	19 (16·0–22·0)
Gabon	17·5 (14·5–18·5)	..	24 (20·0–29·0)	15·5 (14·5–17·5)	..	19 (16·0–25·0)
Morocco						22 (17·0–30·0)
West Africa						
Benin	17·5 (15·5–19·5)	16·9 (13·6–20·2)	24 (20·0–28·0)	17·5 (15·5–18·5)	15·1 (13·2–17·0)	18·01 (16·0–21·0)
Burkina Faso	20·5 (17·5–22·5)	2·5 (1·2–3·8)	25 (21·0–28·0)	17·5 (15·5–18·5)	9·8 (8·3–11·4)	17·01 (16·0–19·0)
Côte d'Ivoire	18·5 (16·5–20·5)	7·7 (3·2–12·1)	26 (22·0–32·0)	15·5 (14·5–17·5)	29·6 (25·0–34·3)	18 (15·0–22·0)
Ghana	19·5 (17·5–22·5)	4·3 (2·5–6·1)	24 (21·0–28·0)	17·5 (16·5–19·5)	10·6 (8·4–12·9)	19 (16·0–22·0)
Guinea	17·5 (16·5–20·5)	..	26 (21·0–30·0)	15·5 (14·5–17·5)	..	16 (14·0–18·0)
Mali	19·5 (17·5–21·5)	5·5 (3·4–7·6)	25(22·0–29·0)	15·5 (14·5–17·5)	28·5 (26·4–30·6)	16 (15·0–18·0)
Niger	20·5 (17·5–23·5)	4 (1·8–6·2)	22·01 (19·0–26·0)	15·5 (14·5–16·5)	46·6 (43·0–50·2)	15·01 (14·0–16·0)
Nigeria	20·5 (18·5–24·5)	5·5 (2·3–8·8)	27 (21·0–30·0)	15·5 (14·5–18·5)	39·4 (35·4–43·4)	15·01 (14·0–20·0)
Senegal	20·5 (18·5–24·5)	..	29·01 (25·0–32·0)	17·5 (15·5–19·5)	16·9 (14·4–19·3)	17·01 (15·0–21·0)
Togo	18·5 (16·5–20·5)	7·7 (4·9–10·4)	24 (21·0–29·0)	17·5 (15·5–18·5)	18·7 (16·4–21·0)	18·01 (16·0–21·0)
East and South Africa						
Comoros				18·5 (15·5–23·5)	18 (14·1–21·9)	19·01 (16·0–25·0)
Ethiopia	18·5 (15·5–20·5)	4·2 (0·7–7·8)	24 (20·0–27·0)	15·5 (14·5–17·5)	31·5 (27·2–35·7)	15·01 (14·0–18·0)
Kenya	16·5 (14·5–18·5)	26 (23·0–29·0)	25 (22·0–28·0)	17·5 (15·5–19·5)	19 (17·3–20·7)	19 (17·0–23·0)
Madagascar	..	..	..	16·5 (15·5–19·5)	20·9 (18·3–23·5)	19 (16·0–22·0)
Malawi	17·5 (15·5–20·5)	13·5 (10·2–16·8)	23 (20·0–25·0)	16·5 (15·5–18·5)	20·6 (18·0–23·2)	17·01 (15·0–19·0)
Mozambique	18·5 (16·5–19·5)	13·5 (9·5–17·5)	21·01 (18·0–25·0)	15·5 (14·5–17·5)	32·8 (29·3–36·3)	17 (15·0–20·0)
Namibia	18·5 (16·5–20·5)	6·9 (3·9–9·9)	29·01 (25·0–35·0)	18·5 (16·5–20·5)	5·4 (3·8–7·0)	26·01 (20·0–)
Rwanda	18·5 (17·5–21·5)	3·2 (0·8–5·7)	25 (22·0–28·0)	20·5 (18·5–22·5)	3 (2·0–4·0)	20·01 (18·0–23·0)
South Africa	..	..	..	17·5 (16·5–19·5)	..	24·01 (19·0–)
Tanzania	18·5 (16·5–20·5)	9·3 (7·6–11·0)	24 (21·0–28·0)	16·5 (15·5–18·5)	15·6 (14·0–17·1)	18·01 (16·0–21·0)
Uganda	17·5 (15·5–20·5)	15·5 (12·2–18·8)	22 (20·0–25·0)	16·5 (14·5–18·5)	27·8 (25·3–30·2)	17·01 (15·0–20·0)
Zambia	16·5 (15·5–20·5)	22·6 (18·9–26·4)	23 (21·0–27·0)	16·5 (15·5–18·5)	22·9 (20·7–25·2)	18 (16·0–21·0)
Zimbabwe	19·5 (17·5–21·5)	6 (4·0–8·1)	24 (22·0–28·0)	18·5 (16·5–20·5)	10·1 (8·4–11·7)	19 (17·0–22·0)
Countries in transition						
Armenia	20·5 (18·5–22·5)	1·6 (0–3·4)	24 (22·0–26·0)	20·5 (18·5–22·5)	0·2 (0–0·4)	20·01 (18·0–22·0)
Kazakhstan	20·5 (17·5–22·5)	3·6 (0·1–7·0)	23·01 (21·0–27·0)	20·5 (18·5–22·5)	0·4 (0·0–0·8)	21 (19·0–23·0)
Turkey	18·5 (16·5–20·5)	..	24 (22·0–26·0)	..	..	20 (17·0–23·0)
Uzbekistan	..	..	..	20·5 (18·5–21·5)	..	20·01 (18·0–21·0)
Latin America and Caribbean						
Bolivia	17·5 (15·5–18·5)	19 (16·0–21·9)	23 (20·0–27·0)	18·5 (16·5–20·5)	9·2 (8·1–10·3)	20 (17·0–24·0)
Brazil	16·5 (14·5–18·5)	29·6 (23·7–35·4)	24 (21·0–28·0)	18·5 (16·5–21·5)	8·8 (7·5–10·2)	20·01 (18·0–25·0)
Chile*	17	..	..	20·2	..	..
Colombia	..	..	..	18·5 (16·5–22·5)	9·7 (8·9–10·5)	21·01 (18·0–27·0)
Dominican Republic	16·5 (14·5–18·5)	29·9 (25·5–34·4)	23 (20·0–27·0)	18·5 (16·5–22·5)	14·1 (12·8–15·4)	19·01 (16·0–23·0)
Guatemala	..	..	..	18·5 (15·5–20·5)	..	19 (16·0–22·0)
Haiti	17·5 (15·5–19·5)	16·5 (12·2–20·8)	26 (22·0–32·0)	18·5 (16·5–20·5)	10·9 (8·7–13·1)	20 (17·0–24·0)
Nicaragua	..	..	..	17·5 (15·5–20·5)	17 (15·6–18·5)	18 (15·0–21·0)
Peru	16·5 (15·5–18·5)	20·9 (15·8–26·0)	23 (21·0–30·0)	18·5 (16·5–22·5)	8·3 (7·6–9·0)	21 (18·0–26·0)
Asia						
Bangladesh	22·5 (18·5–26·5)	..	23 (20·0–26·0)	..	..	14 (13·0–16·0)
India	..	..	..	..	..	16 (15·0–19·0)
Indonesia	24·5 (21·5–27·5)	..	24·01 (21·0–27·0)	18·5 (16·5–21·5)	..	18·01 (16·0–21·0)
Nepal	18·5 (16·5–21·5)	9·1 (5·6–12·5)	20 (17·0–22·0)	16·5 (15·5–18·5)	21·9 (19·6–24·1)	16·01 (15·0–18·0)
Philippines	20·5 (18·5–23·5)	2·6 (1·3–3·8)	24 (21·0–29·0)	21·5 (18·5–26·5)	3·3 (2·6–4·0)	22 (18·0–26·0)
Vietnam	..	..	..	..	..	20 (18·0–22·0)
Industrialised countries						
Australia	17·5 (16·5–18·5)	13 (9·5–17·6)	29 (24·0–)	17·5 (16·5–19·5)	6·5 (3·9–10·8)	24 (22·0–30·0)
Britain	16·5 (15·5–18·5)	12·5 (10·3–14·7)	24 (21·0–28·0)	17·5 (16·5–18·5)	6·9 (5·4–8·4)	22 (20·0–25·0)
France	17·5 (16·5–19·5)	7·2 (4·5–11·1)	..	18·5 (17·5–19·5)	5·9 (3·5–9·9)	..
Italy	17·5 (17·5–18·5)	4 (2·0–11·8)	..	18·5 (18·5–21·5)	2·8 (1·3–6·2)	..
Norway	18·5 (16·5–20·5)	5·5 (3·3–8·9)	..	17·5 (16·5–19·5)	9·6 (7·0–13·1)	..
Switzerland	18·5 (16·5–20·5)	6·8 (4·1–10·8)	..	18·5 (17·5–20·5)	3·4 (1·8–6·2)	..
USA	17·3 (15·7–18·8)	17·8 (17·0–18·8)	27·9 (23·3–)	17·5 (15·9–19·6)	12·6 (12·0–13·2)	24·8 (21·3–30·9)

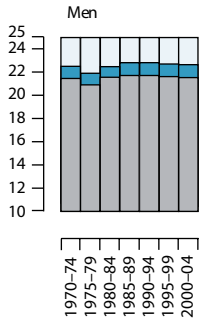
*Age at first sexual intercourse (SI) refers to the group born between 1964 and 1968. Some data for South Africa, Namibia, USA, and Australia cannot be calculated because less than three quarters are married. Published data used for Chile only, original analyses for all other countries.

Table 2: Age at first sexual intercourse and marriage, for men and women born between 1965 and 1969, by country

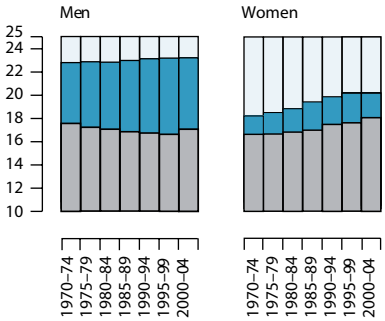
Figure 2: Sexual experience and relationships between ages 10 and 25 years, by successive age-groups in selected countries. Vertical axes show person-years of age, and horizontal axes show people who reached the age of 25 years in years shown.
*Data not available for women. †Data not available for men

Asia

Bangladesh*

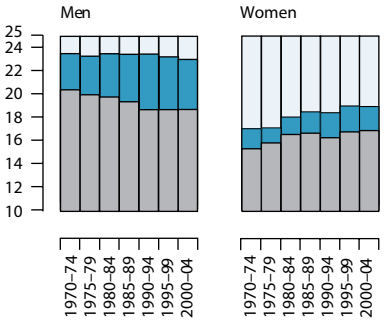


Kenya

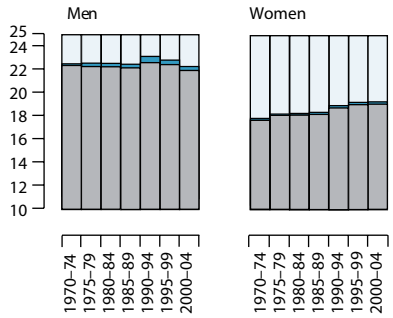


Central and West Africa

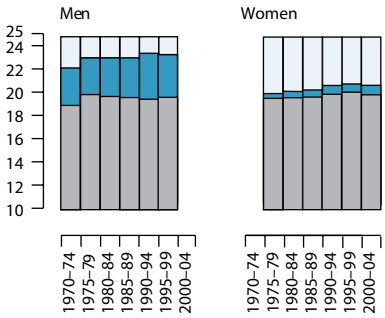
Cameroon



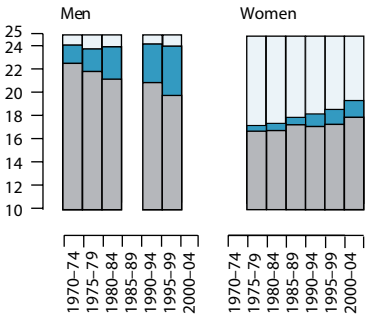
Indonesia



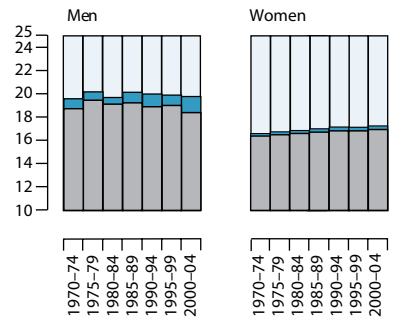
Rwanda



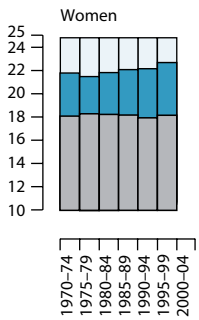
Nigeria



Nepal

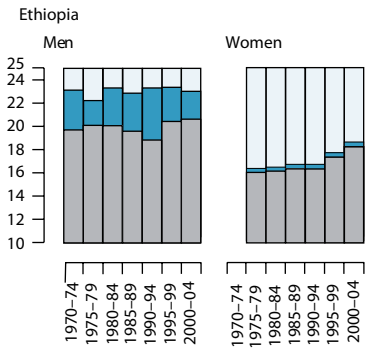


South Africa†

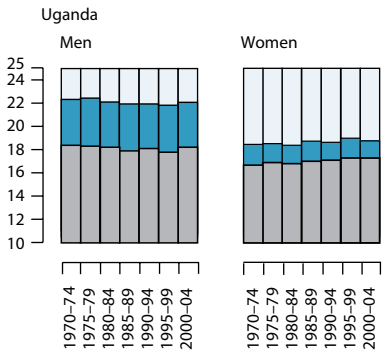


East and South Africa

Ethiopia



Uganda



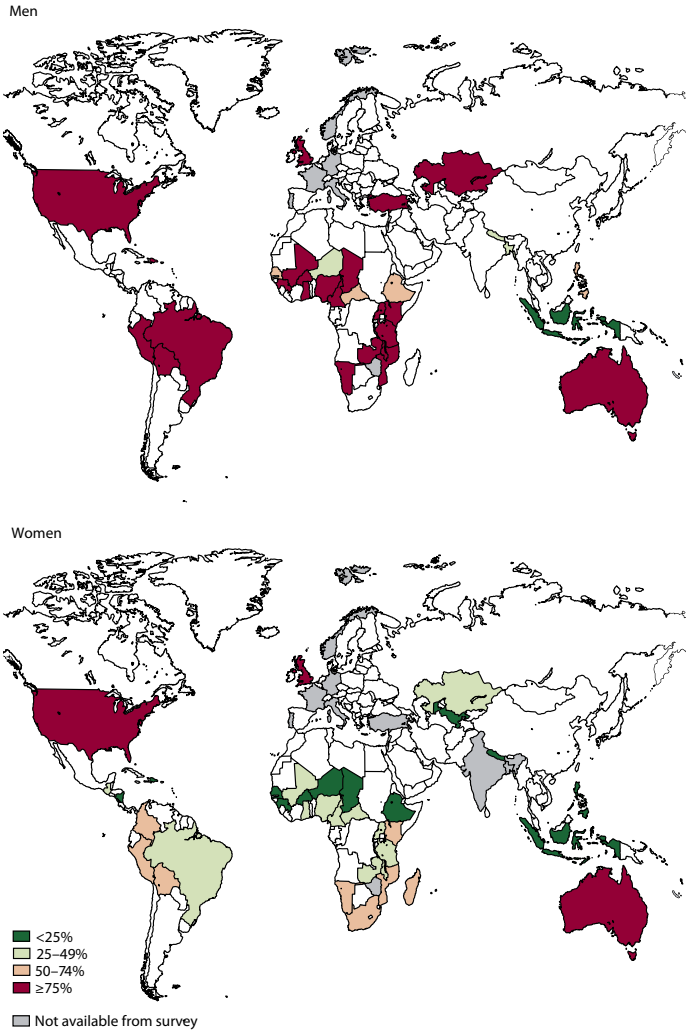


Figure 3: Percentage of ever-married men and women born in 1965–1966 who had sex before marriage

Much is made of the effect on sexual health of the growing prevalence of sex outside marriage; yet marriage does not reliably safeguard sexual-health status. In Uganda, married women constitute the population group in whom HIV transmission is increasing most rapidly. A study in Kenya and Zambia showed that the sexual-health benefits of marriage for women were offset by higher frequency of intercourse, lower rates of condom use, and their husbands' risk behaviour.[40] Married women find negotiation of safer sex more difficult than do single women[41,42] and few married women use condoms for family planning.[43] Nor can marriage be relied on to ensure safer early sexual experience. In Asian countries where early marriage is encouraged to protect young women's honour, early sexual experiences can be coercive and traumatic and, with respect to early pregnancy, dangerous for mother and child.[44]

Monogamy is the dominant pattern in most regions of the world (figure 6). Despite substantial regional variation in the prevalence of multiple partnerships, which is generally higher in industrialised countries, most people report having only one recent sexual partner. The data show pronounced asymmetry between men and women (figure 6). Worldwide, men report more multiple partnerships than do women; only in some industrialised countries are the proportions of men and women who report multiple partnerships more-or-less equal. Reporting bias[45] doubtless accounts for some of the difference between the sexes. However, in Africa, where young people vastly outnumber older people (figure 6), the difference between men and women can be largely explained by the age structure and patterns of age mixing (i.e., older men having sex with younger women). In African countries, in the younger age-groups (those aged 15–19 years), sexual activity is higher in women; more men than women report having had no partner in the past year. In older age-groups (those aged ≥ 20 years), the reverse is true; women are predominantly monogamous, but large proportions of men report having more than one sexual partner. The partners of these men are likely to be the monogamous women from the younger age-group. Median age differences between spouses in Africa are high; 9·2 years in west Africa, 7·4 years in north and central Africa, and 5·5 years in east and southern Africa (age of non-spousal partners is not recorded) (table 3).

By contrast, in South America (especially in Brazil) more men than women report having one or more recent sexual partners in all age-groups. These findings beg the question of who the men are having sex with. With a median age difference between partners of 4 years, patterns of age mixing and age structure do not account for the difference, and less than 1% of Brazilian men reported sex workers amongst their past three partners. The Latin macho culture might encourage men to over-report, and women to under-report, sexual activity.

	Mean age gap between spouses Years (95% CI)
Central Africa	
Cameroon 2004 DHS	10·3 (9·9–10·7)
Chad 2004 DHS	10·8 (10·2–11·4)
West Africa	
Benin 2001 DHS	9·5 (9·1–9·9)
Burkina Faso 2003 DHS	14·7 (13·8–15·6)
Ghana 2003 DHS	8 (7·7–8·3)
Mali 2001 DHS	13·2 (12·9-13·5)
Nigeria 2003 DHS	12·1 (11·5–12·7)
East and South Africa	
Ethiopia 2000 DHS	9·3 (9·0–9·5)
Kenya 2003 DHS	7·7 (7·4–8·0)
Malawi 2000 DHS	6·3 (6·1–6·5)
Mozambique 2003 DHS	7·3 (7·0–7·6)
Namibia 2000 DHS	9·4 (8·6–0·2)
Rwanda 2000 DHS	6·7 (6·3–7·1)
Tanzania 2005 DHS	7·5 (7·0–8·0)
Uganda 2001 DHS	7·7 (7·3–8·1)
Zambia 2002 DHS	7·2 (7·0–7·4)
Zimbabwe 1999 DHS	9·1 (8·6–9·6)
Countries in transition	
Armenia 2000 DHS	4·3 (4·2–4·4)
Kazakhstan 1999 DHS	2·7 (2·5–2·9)
Latin America and Caribbean	
Bolivia 2003 DHS	3·2 (3·1–3·3)
Colombia 2005 DHS	4·5 (4·4–4·6)
Dominican Republic 2002 DHS	5·8 (5·8–5·8)
Haiti 2000 DHS	6·3 (5·9–6·7)
Nicaragua 2001 DHS	5·3 (5·0–5·4)
Peru 2004 DHS	3·9 (3·6–4·2)
Asia	
Nepal 2001 DHS*	4·6 (4·5–4·8)
Philippines 2003 DHS	3·2 (3·1–3·3)
Industrialised countries	
Australia 2002 ASHR	1·9
USA 2002 NSFG	2·2

DHS=Demographic and Health Surveys. ASHR=Australian Study of health and Relationships. NSFG=National survey of Family Growth. *Indicates ever-married sample.

Table 3: Age difference between married men and women, by country

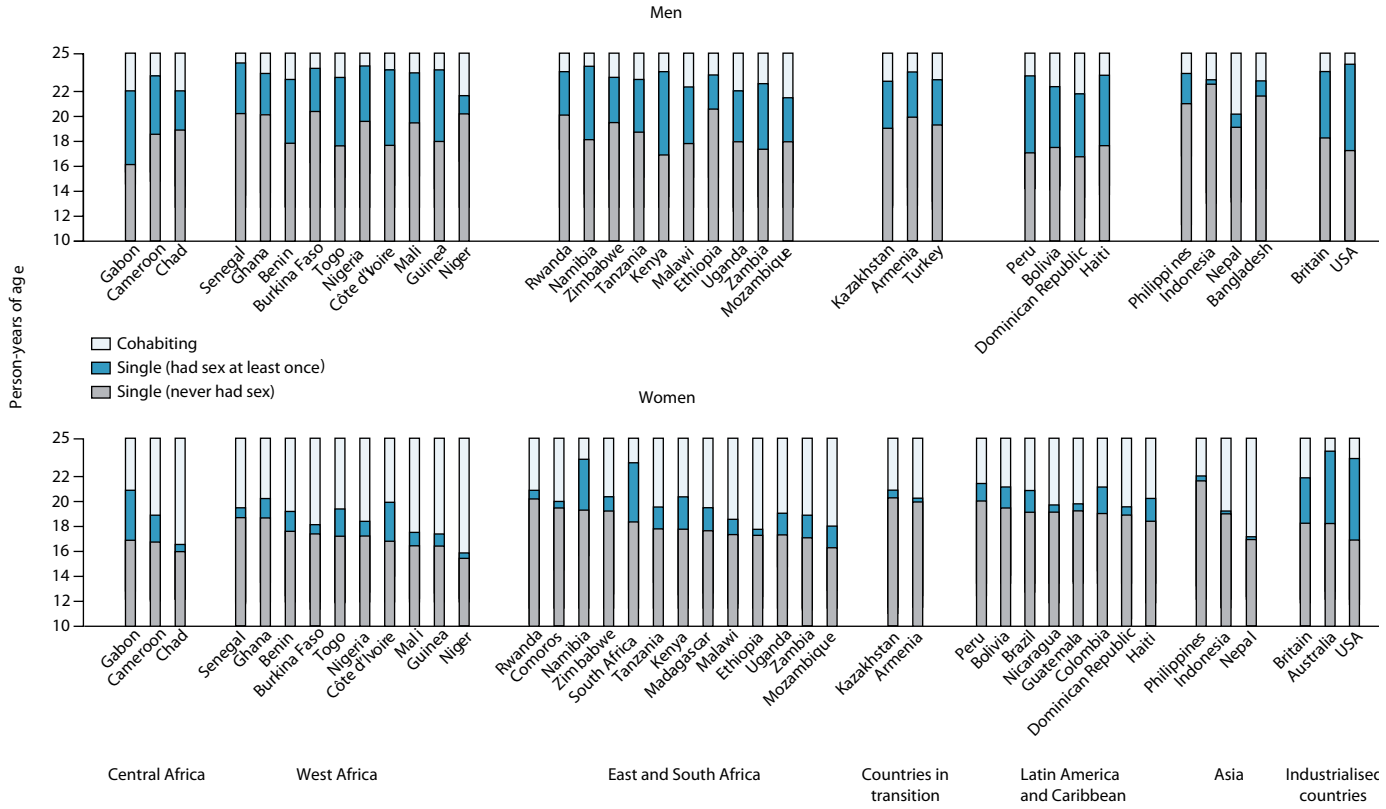


Figure 4: Sexual experience and cohabitation between ages 10 and 25 years for people who reached the age of 25 years in 1995–1999

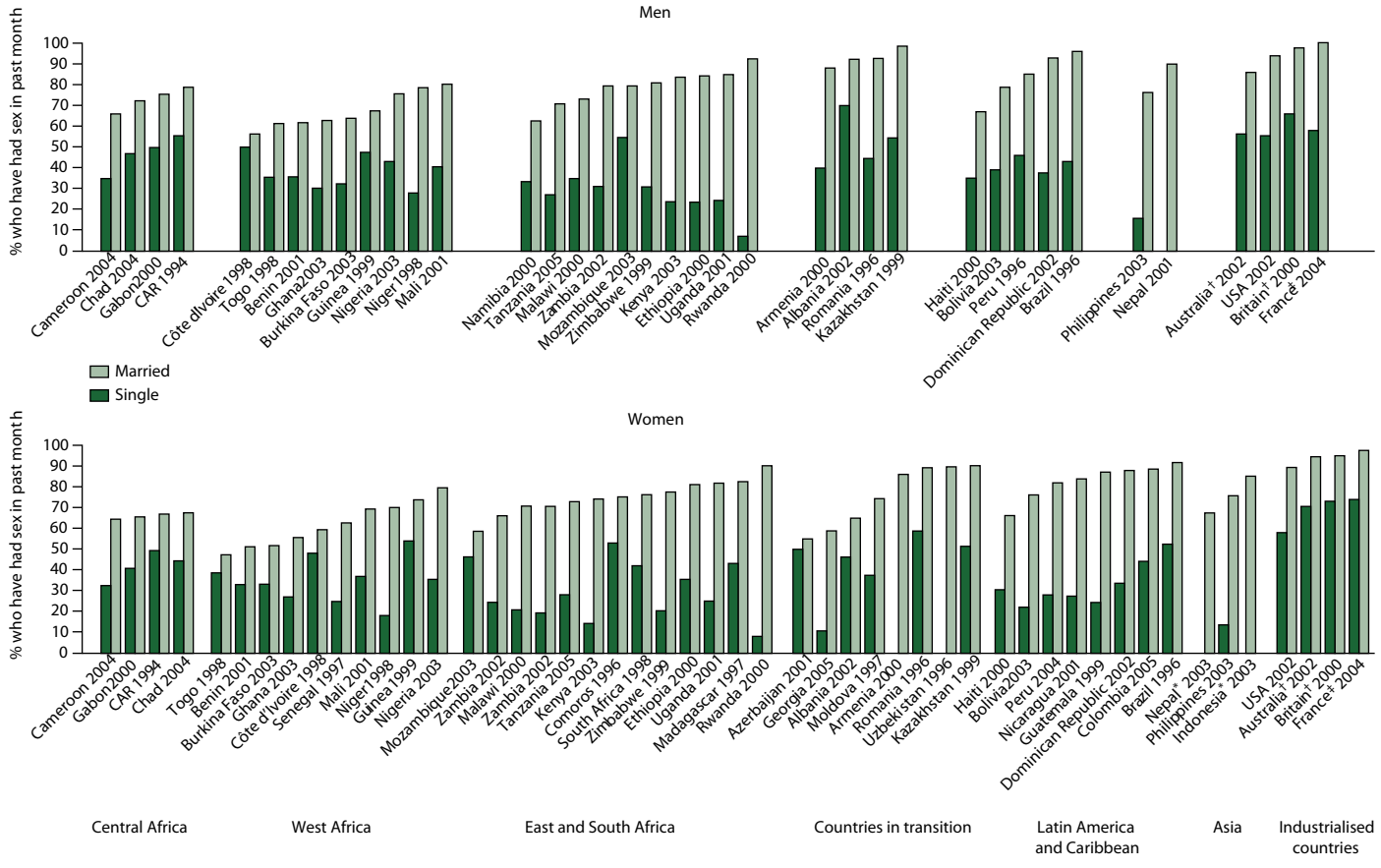


Figure 5: Percentage of 15–24 year olds who had sex in the 4 weeks preceding survey, by marital status
CAR=Central African Republic. Denominator for single people excludes those who have never had sex. Single refers to people who have never married. Married refers to people currently married. *Only ever-married women surveyed. †Respondents aged 16–24 years. ‡Respondents aged 18–24 years

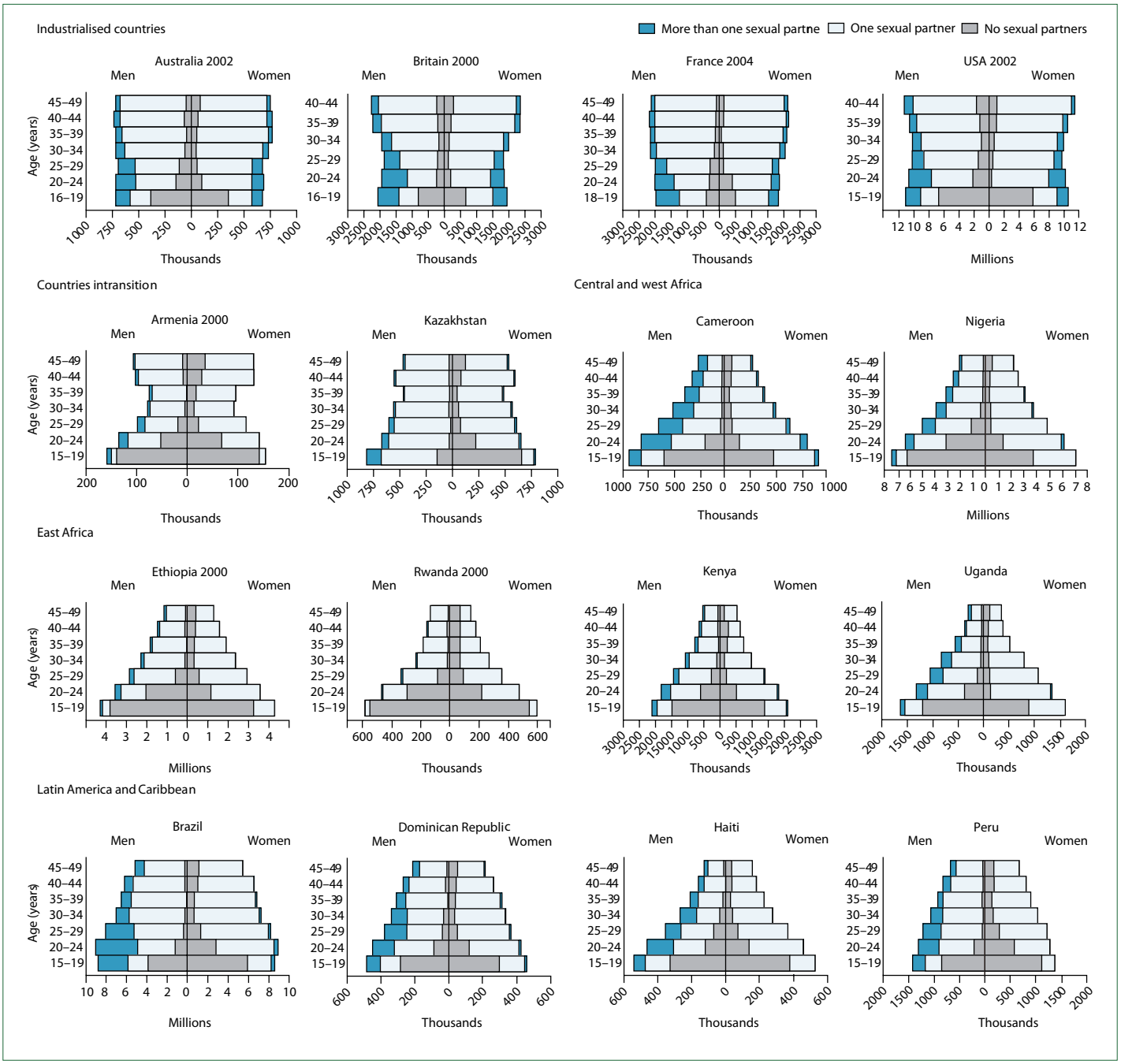


Figure 6: Population distribution by age and sex and number of sexual partners in the past year
These charts present results obtained by applying survey-based proportions to UN population estimates for the year 2005.[27]
Population numbers are shown in thousands, or in millions, depending on the country

These data do not capture whether partnerships exist concurrently or serially. Concurrent sexual partnerships (those that overlap in time) allow more rapid spread of sexually transmitted infections than do the same rate of new sequential partnerships. Evidence is available that, although lifetime numbers of partners might be lower, concurrent relationships in men in some African countries might have been more common and of longer duration than in other regions.[46–50] Many men who have sex with men have also had sex with women[51] and, apart from in developed countries, are unlikely to identify as being homosexual[52] The socially censored nature of same-sex activity could lead to under-reporting and might also account for the absence of such activity from the research agenda. A recent review of the prevalence of same-sex activity in men identified 67 studies,[53] none of which were from Africa, the middle east, or the English-speaking Caribbean. Estimates of lifetime prevalence of sexual intercourse with men ranged from 3–5% of men in east Asia 6–12% in south and southeast Asia, 6–15% for eastern Europe, 20% for Latin America.[53] The prevalence is 6% in the UK[15] and 5% in France.[54] About half those with lifetime homosexual experience report having had male partners in the past year.[53]

The proportion of sexually active young people who report using a condom for their most recent sexual intercourse is higher for men than for women (figure 7). Much of this difference is because young women's partners are more likely to be their husbands, with whom condoms are less often used.[48,55] In most countries for which two estimates are available, condom use at last sexual intercourse is increasing—in some cases, for example in Uganda, strikingly so. Use of condoms to prevent pregnancy increased from 5% to 19% of single women in 19 African countries between 1993 and 2001, and use of a condom at last intercourse increased from 19% to 28% during the same period.[43] In industrialised countries, rates of condom use are generally higher than those in non-industrialised countries, especially in women. The increase in condom use in recent years has also been substantial in industrialised countries. No comparative data are available for the consistency with which condoms are used.

In countries with wide differences between men and women in the prevalence of premarital sexual inter-course, young men are more

likely to report having intercourse with sex workers.[44] Estimates of the proportion of men who are clients of sex workers range from 1% to 14% dependent on region.[30] Varying operational definitions of sex work frustrate efforts to interpret prevalence at different times and in different places. The continuum of sexual exchange ranges from expectation of gifts or favours within personal relationships, to more formal trading of sex for money.[56] The proportion who reported having "sex in exchange for money, gifts, or favours"[30] in the past year is highest in countries in central and southern Africa (medians 13·6% and 11·3%, respectively), followed by eastern and west Africa (9·8% and 8·9%, respectively).[30] More recent African surveys that used the more restricted definition of paying for sex[30] have reported reduced prevalence. In the Caribbean, 6–7% of men reported having paid for sex, and estimates for Latin America, eastern and western Europe, and central Asia were less than 3%. Cautious estimates are available for northern Africa and the middle east (1–3%), south Asia (3–5%), southeast Asia (3–10%), and China and Hong Kong (11%).[30]

Estimates from the WHO study on gender-based violence of lifetime prevalence of sexual violence by an intimate partner range between 10% and 50%.[57] DHS data lend support to this finding; between 11% and 49% of women say they cannot always refuse sex. In more than half the WHO settings, more than 30% of women who reported first sexual intercourse before age 15 years described having been forced into it, and three-quarters of women who had been abused since the age of 15 years identified the perpetrator as their intimate partner.

Explanations for the variation

The regional variation in sexual behaviour underlines the powerful role of environmental factors in shaping behaviour and its consequences for sexual health. Through the interplay between demographic and structural factors, social norms, and public policies, spatial differences can be properly understood. One of the most notable features of the data, for example, is the striking gender difference in sexual behaviour. Women might be disadvantaged in protecting their sexual health if their partner is older than them, of higher status than them,[58,59] or if they are beholden to a man for favours, goods, or money in return for sex.[60,61] Women's power to maintain monogamous relationships might be diminished in locations in which they outnumber men with whom they might have sex. Women might outnumber men in this way as a result of the age structures of populations and patterns of age mixing, or where cultural practices such as polygyny are prevalent[10,62,63] and where high levels of imprisonment of black men distort sex ratios in predominantly African-American communities—as in the USA for example.[64]

Poverty, deprivation, and unemployment work with gender relations to promote change of partner, con-currency, and unprotected sex.[64,65] Economic adversity restricts the power of men and women to take control of their health;[66] deprivation and unemployment might drive men and women to sell sex[10,12,67,68] or travel greater distances to work. Being away from home is associated in both developed and developing countries with concurrency of partnerships[69] and an increase in risk behaviours.[46,70–73] Possibly the most powerful influences on human

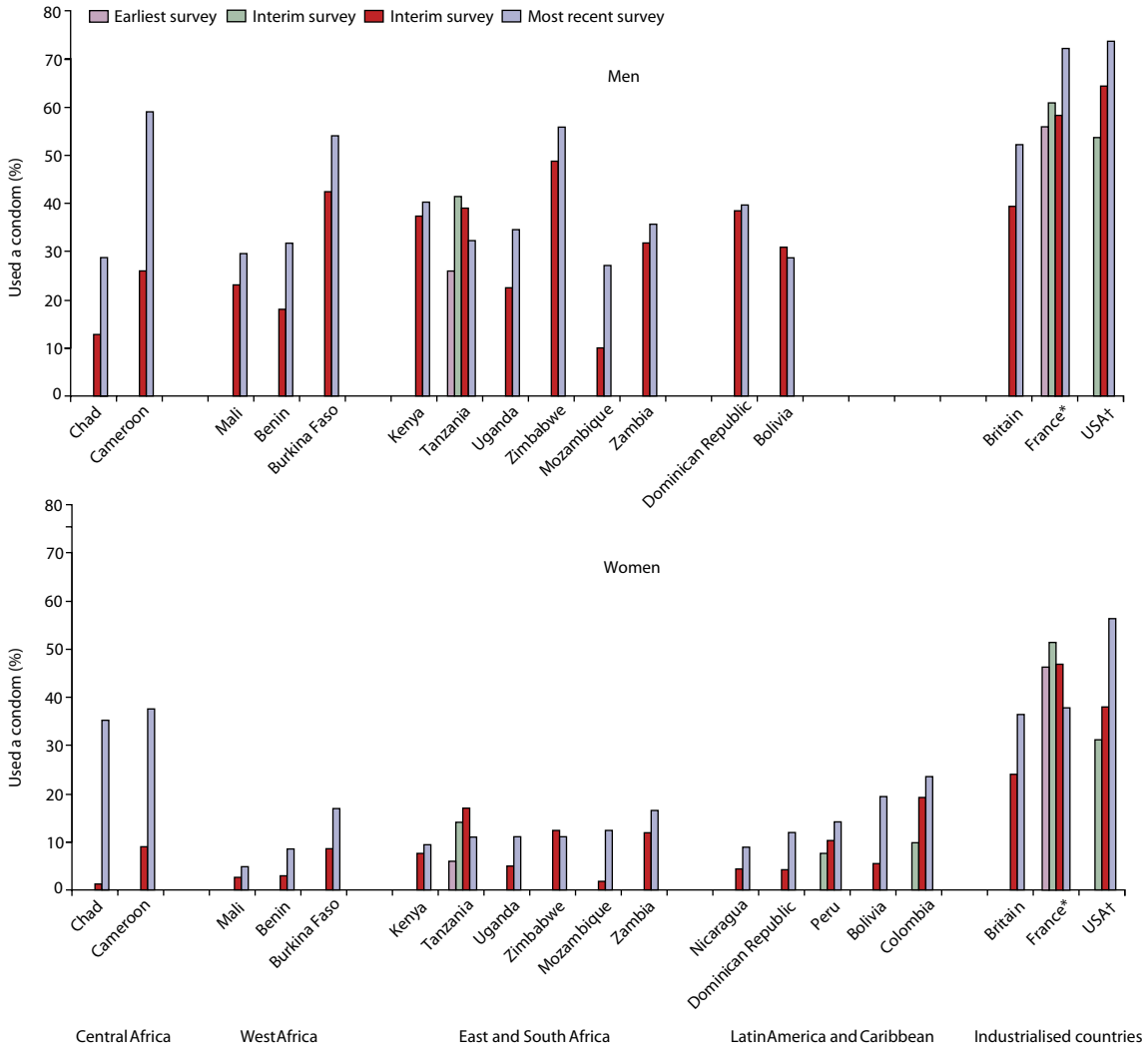


Figure 7: Percentage of 15–24 year-olds who reported condom use at last sex in successive surveys
*18–24 year-olds. †15–19 year-olds only; comparable data are available for 15–24 year-old men and women only for 2002: 58% for men, 44% for women. Data shown are for respondents who reported being sexually active in past year

sexuality are the social norms that govern its expression. Morals, taboos, laws, and religious beliefs used by societies worldwide circumscribe and radically determine the sexual behaviour of their citizens. The scale of the regional diversity in sexual behaviour is matched only by the range of cultural constraints on practice. In some societies, for example, homosexual behaviour is celebrated in public parades of pride; in others it carries the death penalty. In some countries, such as Brazil, condoms are available to young people in schools; in others, for example in parts of Indonesia, their possession is a criminal offence.[12] Such strictures hinder attempts by men and women to protect their sexual health. The sexual double standard, whereby restraint is expected of women, whereas excesses are tolerated for men, compounds the problems for both men and women.[44,74–77]

Interventions to improve sexual health

With the diversity of sexual behaviour, a range of preventive strategies are needed to protect sexual health. And in view of the importance of the broader determinants on sexual behaviour, approaches focusing exclusively on expectations of individual behaviour change are unlikely to produce substantial improvements in sexual-health status. They are especially inappropriate to poor country circumstances, where sex is more likely to be tied to livelihoods, duty, and survival,[78] and where individual agency is restricted. In wealthier countries, personal choice is greater than in poorer countries, yet power inequalities persist.[79] Numerous calls have been made for public-health interventions to pay greater heed to the social context within which sexual intercourse occurs.[78,80–83] Interventions encouraging adoption of risk reduction practices remain a cornerstone of sexual-health promotion but the evidence shows that they need to go beyond mere provision of information to be effective (table 4). Systematic reviews have focused mainly on assessment of interventions to change individual behaviour and show increased effectiveness where information is supplemented by skill building and counselling, such as use of condoms and safe sex negotiation[86,91,93,96,97] where theory guides design,[92,94] where several delivery methods are used,[85,96,97] and where context and the need for sustainability are taken into account.[94–97]

Review	Participants	Setting	Intervention	Key messages	Key quality issues
Men who have sex with men					
Herbst[84] (2005)	Men who have sex with men	USA,* Puerto Rico, Canada, Mexico, England, Scotland, New Zealand, Australia, Brazil, Russia, Bulgaria	Individual, group† and community interventions	Characteristics associated with success: Theoretical basis Interpersonal-skills training Skills training delivered by role plays or lectures Multiple delivery methods Greater intervention exposure complexity (number of sessions, duration and time span)	English language reports only
Johnson[15] (2002)	Men who have sex with men	USA,* Australia, New Zealand, Canada	Individual, group† and community interventions	Characteristics associated with success: Community interventions Targeting young populations Interpersonal-skills training	English language reports only Limited reporting of review processes Limited quality assessment Individual study results not reported
Rees[85] (2004)	Men who have sex with men	USA, UK*	Complex interventions‡ multiple techniques: counselling, workshops, peer involvement, and social marketing	Peer-led community based interventions had implementation problems (recruitment and retention of peer educators); indicative of difficulty in transferring an intervention from one context (USA) to another (UK)	English language reports only
Heterosexual adults					
Albarracin[86] (2003)	Men and women§	USA,* other (not specified)	Persuasive communication (verbal, written, or visual)	Communication including skill-related information and attitudinal messages associated with greater behaviour change Messages more successful in men and urban dwellers than in women and rural dwellers and when targeted approaches used	No language restrictions reported Limited detail of individual studies
Elwy[87] (2002)	Men aged ≥15 years	USA,* Brazil, Britain, Australia, India, Kenya, Mozambique, Namibia, Senegal, Thailand	Social and behavioural interventions	Interventions targeting men within their occupational context showed positive behavioural effect	None
Logan[88] (2002)	Men and women¶ at high risk	USA*	Individual, group† or peer-led interventions	For women, interventions incorporating social and cultural components most effective	No unpublished material No language restrictions reported No quality assessment
Mize[89] (2002)	Women aged ≥15 years	USA*	Group and individual interventions	Analysis by ethnicity identified issues that might be considered in programme design and implementation. Need for operational definitions of culturally specific components highlighted	English language reports only No quality assessment Pooling without consideration of study design. Individual study results not reported
Neumann[90] (2002)	Men and women¶ >21 years	USA*	Social and behavioural† interventions at individual, group,† and community levels	Group interventions associated with stronger effect on behaviour than individual interventions	Inclusion criteria not strictly adhered to. No detail of individual studies
Rotheram-Borus[91] (2000)	Men and women	USA,* Thailand, Uganda, Kenya, Tanzania, Trinidad, Malawi, Puerto Rico	Social cognitive programmes†, sexually transmitted infection treatment, voluntary HIV counselling and testing	Voluntary counselling and testing studies showed positive behavioural effect. Several effective social cognitive programmes included HIV testing as part of strategy	Limited details of search strategy No language restrictions reported Reviewing processes not reported No quality assessment
Shepherd[92] (1999)	Women aged 13–64 years predominantly high risk	USA,* India, Canada	Educational interventions often with additional focus on substance abuse	Combined information provision and skills development had greater beneficial effect than information only. Greater attention needed to gender culture issues	No language restrictions reported Unpublished reports not accessed Limited reporting of review processes
Weinhardt[93] (1999)	Men and women aged 23–39 years	Rwanda, USA,* Holland, Kenya, Zaire, Uganda, Italy, The Gambia	Voluntary HIV counselling and testing	Participants who learned that they were HIV positive reduced their sexual risk behaviour, but those who received a negative test result did not modify their behaviour any more than those who did not test	Reviewing processes not reported Pooling despite heterogeneity

(Continues on next page)

(Continued fr om previous page)

Drug users ‖					
Coyle [94] (1999)	Intravenous drug users out of treatment	USA*	Street based outreach risk reduction programmes	Hidden populations should be targeted on the street or in other settings frequented by them	Limited details of search strategy Reviewing processes not reported No quality assessment No consideration for heterogeneity
Gibson [95] (1998)	Intravenous drug users in or out of treatment	USA,* Australia	Individual counselling, group, voluntary HIV counselling and testing, street outreach, social	Characteristics associated with success: Intense and sustained interventions More stable and motivated subgroups	Limited details of search strategy English language reports only Statistical significance not reported No detail for assessment of outcomes in primary studies
Semaan [96] (2002)	Intravenous drug users and non-injecting drug users	USA*	Social and behavioural* interventions	Intervention recipients more likely to reduce sexual-risk behaviours than comparison groups	Pooling despite heterogeneity
Van Empelen [97] (2003)	Intravenous drug users and non-injecting drug users in or out of treatment	USA,* Australia	Psychosocial and behavioural interventions (individual, group and community)	Characteristics associated with success: Use of multiple theories and methods Inclusion of peers Rehearsal of skills Element of sustainability Social context must be considered	No language or date restrictions reported
Young people					
Kirby [98] (2006)	Young people aged 9–24 years	USA,* Canada, Netherlands, Norway, Spain, UK, Belize, Brazil, Chile, Jamaica, Kenya, Mexico, Namibia, Nigeria, South Africa, Tanzania, Thailand, Zambia	Curriculum and group-based education programmes typically focused on pregnancy or HIV and sexually transmitted infection prevention behaviours	Features relating to development, content, and implementation of curriculum associated with success	No language restrictions reported Limited quality assessment Vote-counting method used for data synthesis No formal consideration of heterogeneity
Mullen [99] (2002)	Adolescents aged 13–19 years (sexually experienced)	USA*	Behavioural* or social programmes done in and out of the classroom	Interventions targeting single ethnic groups outside of the classroom showed larger effects than those with mixed ethnic groups in either setting	Inclusion criteria not strictly adhered to. Limited reporting of reviewing processes Pooling despite heterogeneity

*Half or more than half the primary studies were undertaken in this setting. †More than half the primary studies examined interventions of this type. ‡All were direct contact interventions according to CHAPS framework. §Most participants defined themselves as heterosexual, but homosexual participants were also included. ¶More than half the primary studies examined only these participants. ||All included systematic reviews reported outcomes related to sexual behaviour change.

Table 4: Summary table for effectiveness of interventions

Individual-based interventions also need to be targeted to be successful.[88] Men have been successfully targeted in occupational contexts with consequent reduction in sexual-risk taking.[87] Young people are most commonly targeted in schools and the evidence is that curriculum-based sex education does not increase risky sexual behaviour as many fear.[98] Systematic reviews have shown school-based sex education to lead to improved awareness of risk and knowledge of risk reduction strategies, increased self-effectiveness and intention to adopt safer sex behaviours,[98] and to delay, rather than hasten, the onset of sexual activity. Broad-spectrum strategies to achieve behaviour change, with mass-media communication, have proved effective in increasing awareness and knowledge, and in reducing high-risk behaviour.[100] In this context, techniques used in social marketing, which target individuals according to their lifestyles, values, and risk status are an improvement on conventional targeting approaches with demographic characteristics alone.[101–103]

Tailoring of behaviour-change interventions to individual needs and circumstances is also essential. A range of messages is needed that respect diversity and preserve choice. Enough studies have shown that first intercourse is retrospectively regretted by many women, and some men,[104] for efforts to help young people to achieve the best timing of first sex to be justified. Yet, abstinence might not be an option where first sexual relations are forced,[31,44] where the sexual abuse of adolescents is common,[105] and where financial circumstances force young people to sell sex. Moreover, people do not adhere to only one type of sexual behaviour. Many men who have sex with men also have sex with women, and different preventive strategies might be used for these two behaviours.[106] Broader sexual repertoires need to be taken into account. The issue of recommending non-penetrative sex (such as mutual masturbation) is seldom tackled.[107,108] Risk reduction messages need to take account of the diverse reasons for having sexual intercourse[109] and for changing sexual behaviour.

Reviews of individual-based interventions also emphasise the importance of interventions to address social norms that act against safer sex.[88,89,91] The effects of behaviour change interventions will be transient if participants return to an unsupportive environment. Actions such as deferring or denying sex are not intrinsically rewarding and need to be supported by group norms. Community interventions have been effective in mobilising local groups in support of preventive strategies. The prompt response from homosexual communities to the prevention of HIV/AIDS in industrialised countries in the early 1980s owed much to the preexistence of non-governmental organisation (NGO) infrastructures and to the visibility and mobilisation of homosexual men. The evidence is that information gained through social networks is more salient, and more likely to lead to behaviour change, than that conveyed by more impersonal agencies.[110]

Where population groups are marginalised and NGOs and community-based service programmes are weak, the starting point might be the informal groups in which norms are maintained. Preventive programmes that use naturally occurring social networks have reduced risky behaviour in homosexual men in Russia,[111] increased contraceptive use in married women in Bangladesh,[112] increased condom use in sex workers in India,[113] and have proved more effective in changing norms than more orthodox approaches using conventional health care and field workers. Strong social prohibitions and sanctions, especially those underpinned by legislation, might present greater challenges. In general, laws protect the young and those vulnerable to coercion and exploitation, but they might also impede safer sex practices. If practices are illegal, they are more likely to be engaged in a furtive or clandestine

Panel 3: 100% condom-use programme in Thailand

The 100% condom-use programme in Thailand, implemented nationally in 1991, has been widely recognised and documented as an impressive success in achievement of behaviour change. The programme aimed to bring about 100% condom use in commercial sex. Brothel owners, brothel-based sex workers, and their clients were targeted with simultaneous National AIDS Education and Condom Promotion Campaigns[125] that used the mass media and workplace programmes. Condoms were made freely available at all sex establishments.

The programme was linked to a longstanding government venereal-disease programme in each province. Sex workers receive regular physical check-ups for sexually transmitted infections, and free condoms. Men who presented with a sexually transmitted infection were asked to name the sex establishment that was the source of infection as evidence of non-compliance with the policy. Public-health officials encouraged sex workers to be tested and treated, venereal-disease units provided extensive contact tracing, and law-enforcement authorities took any necessary legal action against brothel owners.[125] Co-ordination between national and local government, public-health officials, and brothel owners was a strong characteristic of the programme. Although prostitution is illegal in Thailand, there has long been tacit cultural acceptance of patronage of sex workers. No attempt was made to eliminate commercial sex or change public morality. With a high level of political commitment and no fear of religious sensitivities, a pragmatic approach to condom promotion was possible.

The success of the campaign was evidenced by an increase in condom use and a decrease in commercial sex and rates of sexually transmitted infection in sex workers and their clients.[125] The most convincing evidence is the rate of new HIV infections in 21-year-old conscripts in northern Thailand, which fell from 3·3 per 100 person-years to 0·3 per 100 person-years between 1991 and 1995.[124] Condom use in these men rose from 61·0% to 92·5% in the same period.[126] The proportion of indirect sex workers (those working from bars, restaurants, etc) increased from half to almost two-thirds, in the first half of the 1990s.[124] Although the focus was on making sexual intercourse with sex workers safer, a substantial reduction took place in both supply and demand for sex work. Fear of AIDS might have stopped women entering the trade, and more women started working as indirect sex workers charging higher rates.[127] Casual sex with both men and women with low levels of protection increased.[126] The proportion of northern Thai army conscripts who report visits to sex workers fell, and decreased even more sharply in older men[126] from 81% in 1991 to 64% in 1995. The success of the Thai programme is attributable to efforts made on several fronts. Strategies limited to voluntary individual behaviour change would have been unlikely to achieve such radical change without sociostructural changes.

manner, and opportunities for protection are constrained. The success of preventive strategies is heavily dependent on acceptance of the reality of sexual practices that are socially censured. Condom use is uncommon in sex workers in India[113,114] for example, where commercial sex is heavily socially proscribed. By contrast, condom use is near-universal in those in Kampala[115] and in Mexico,[116] where public-health agencies have actively and openly engaged in co-operation with female sex workers. The mass media have been powerful in shifting social norms and, in some instances, achieving legislative reform. In the Lebanon, where homosexuality is illegal, a popular weekly television programme includes a homosexual voice.[117] In South Africa, the strategic use of entertainment as education, media advocacy, and social mobilisation to change public opinion and influence decision-makers has led to implementation of the Domestic Violence Act.[118]

To address the broader structural determinants of sexual behaviour is daunting. To do so demands a broader definition of public health than many might feel comfortable working within. Social determinants are the least amenable to intervention. Structural factors such as poverty, unemployment, and gender are difficult to modify, and social and political norms are slow to shift.[63,81,83,119] Yet, efforts are being made to address forces such as gender and poverty in innovative ways. These efforts include mainstreaming of HIV and sexual health services in development; empowerment of sex workers to avoid sex work through business and information-technology training; and integration of sexual-health education into microfinance schemes.[120] Success has also been achieved in tackling of social attitudes, for example, those of young men towards fatherhood, relationships, and contraception.[121,122]

Addressing of structural determinants, particularly poverty, demands the involvement of social as well as health sectors, and so requires co-ordination and collaboration across sectors and agencies, and with other social interventions. The range of people to be engaged in partnership is broad and includes economists, politicians, industry, the judiciary, and NGOs. A way of ensuring that joint action takes place is to make it not merely a generalised goal of interventions, but an explicit component of the programme (as in the case of the UK Teenage Pregnancy Strategy[123]). Intervention at a structural level needs political will and commitment,[124] not least to dismantle legal and other obstacles to pursue strategies to protect sexual health. The successes of Thailand and Uganda in reducing HIV rates show the importance of political leadership (panels 3 and 4).

The evidence shows that, where improvements in sexual health have been achieved, a combination of factors has contributed to the success. Behaviour change in Thailand and Uganda, for example, has been attributed to an array of preventive policies and strategies, mounted by different agencies, with strong partnerships between the media, government, NGOs, sex workers, people living with HIV/AIDS, and international and local public-health agencies, endorsed at the highest political level. Yet, the polarity of views on abstinence, be faithful, and use condoms (ABC) strategies,[131] about which of these three elements has contributed most to reductions in rates of HIV in Uganda or teenage pregnancy in the USA (panels 4 and 5), stems from a search for single-factor explanations to support particular ideological positions. The preoccupation with ABC strategies has the negative effect of distracting attention from the need for broader, integrated programmes in which all components are mutually reinforcing.

The mix of components in national programmes needs to be tailored to the local context.[148] Comparisons of HIV policy in different countries[104,132,149,150] show the importance of ensuring that public health approaches are culturally appropriate and timely. In Brazil, for example, the adoption of sex positive approaches and explicit condom promotion has been well managed and has ignited little political controversy.[149] In

Panel 4: HIV in Uganda

Uganda's success in reducing HIV prevalence[115,128] and improving reproductive-health status[129] compared with neighbouring countries has been attributed to the selective emphasis on the abstinence and being faithful strands of the ABC strategy in the country's HIV programmes.[34] The suggestion has been made that later onset of sexual activity and a reduction in non-regular sexual partners (a 65% reduction from 1991 to 1998) have been more important than condom use in curbing the HIV epidemic.[130] These conclusions have been interpreted as providing evidence of the merit of abstinence-based approaches to HIV prevention generally.[130,131]

Several features of Uganda's epidemiological situation and social-context suggest that Uganda's success should not be attributed to a few specific interventions. The first feature relates to the timing of events. The fall in prevalence of HIV corresponds to a drop in incidence from the beginning of 1985, when Uganda did not have public national HIV-prevention programmes in place. Furthermore, as our data show, the trend towards older age at first intercourse occurred gradually for women from the 1970s to the present—i.e., before the start of HIV-prevention programmes—for men remarkably little change in age at first intercourse has taken place in recent decades. However, evidence shows that other changes in behaviour have taken place. Condoms were cautiously and gradually introduced in Uganda[132] and were largely unavailable to the general population during the 1980s, but rates of condom use were high in high-risk groups, such as sex workers.[115]

These behaviour changes have been attributed to successful public education campaigns in Uganda. Public-health agencies gained the confidence of communities by galvanising support from local leaders and the church for the Love Carefully and Zero Grazing messages,[133] and only later introduced condom-promotion messages to the programme. Yet awareness of the severity of AIDS, its effect on family and friends,[134] and the willingness of those affected to publicly endorse behaviour change also played their part.[133] Moreover, many have pointed to the broader factors that have contributed to the reduction in HIV prevalence in Uganda, many of which preceded current HIV-prevention programmes.[128] These include successful assimilation of scientific knowledge about modes of transmission,[135] re-establishment of community life with restored civil stability at the end of the Ugandan civil war in 1986, which substantially reduced prevalence of sexually transmitted infections,[129,136] and two decades of strong policy support.[128]

Uganda was the first African nation to establish a national AIDS programme[137] and the response to the epidemic went beyond individual-level factors. Factors included concerted and integrated efforts made at community level, including mobilisation of local groups, widespread participation of several NGOs in HIV prevention, collaborative partnerships with religious groups and community activists, ample funding, and openness about the scale of the problem and commitment to tackling it at the highest political level. It is the lessons from this joint approach that are most valuably transferred to other settings.[137]

Panel 5: Teenage pregnancy rates in the USA

Rates of teenage pregnancy in the USA are high by comparison with those in other industrialised countries, but have fallen by 30% in the past decade, from a peak of 117 per 1000 in 1990, to 82 per 1000 in 2001.[138,139] Some studies have suggested that most of the reduction results from increased uptake of abstinence,[140,141] most from increased use of reliable methods of contraception;[142] some from both equally,[143] whereas others provide evidence that changes in economic factors are responsible, notably the welfare reforms introduced by the Clinton administration.[144]

If progress is to be sustained, the role of the two main determinants of reduction in pregnancy—ie, delay in sexual initiation and improvements in contraceptive use—needs to be clearly understood. An early study showed that some 25% of the decline in pregnancy in 15–19 year olds between 1988 and 1995 was attributable to delay in sexual initiation and 75% to improvements in contraceptive use, including a shift towards use of more effective contraceptive methods, and a reduction in the proportion who did not use any method.[138] A more recent study of high-school students aged 15–17 years, which took into account contraceptive method mix and failure rates,[145] showed that these two factors each accounted for about 50% of the fall in the pregnancy rate between 1991 and 2001 for these younger teens. This study had the advantage of accurately matching the time during which the decline in pregnancy occurred, and took into consideration trends in contraceptive method mix, but was unable to include adolescents aged 18–19 years, and had to assume that failure rates were unchanged during this period, since the most recent failure rates are for 1995. Results from a new study that used national survey data for 1995 and 2002 show that in all 15–19 year-olds, improvements in contraceptive method use accounts for 86% of the fall in pregnancy rates between 1995 and 2002, whereas a decrease in the percentage of teens who were sexually active accounts for 14% of the pregnancy rate decline.[146] All of this contribution occurs in young adolescents ages 15–17 years.[146]

No reliable evidence is available that abstinence-only sex education is responsible for changes in sexual behaviour of the extent that would explain the drop in teenage pregnancy. Moreover, several factors are likely to determine adolescents' motivation to prevent pregnancy, and therefore no one approach or change would account for the fall that has occurred so far. To sustain the decline in teenage pregnancy, experts recommend that attention is given to a range of risk factors, such as poverty, absence of opportunity, and need to increase specific skills to use contraceptives effectively and to postpone sexual activity.[147]

Botswana, by contrast, the premature introduction of condom messages to promote condom use without attention to cultural norms served to undermine public confidence in public-health agencies.[132] Attention needs to be given to the feasibility and acceptability of interventions that have worked in one setting before introducing them into another. Too often, locally successful models are scaled up without communication and engagement with wider structures and forces.[151] Transferability of interventions is now being tested across areas of India with the roll-out of the Sonagachi project, [152] an acclaimed community-mobilisation strategy that involves the active participation of Calcutta's female brothel-based sex workers. Since most commercial sex in India is street based,[113] generalisability of this strategy will be put to the test.

An assessment of interventions that adapt elements of the Sonagachi project and the Thai 100% condom programme (panel 3) to the Dominican context,[152] compared the effects of community solidarity with and without changes in government policy and showed them to be greater and more sustained when changes in government policy were included in the model. More intervention studies of this kind are needed to assess the effect, not of a single-component intervention in one setting, but of more than one approach, drawing on components from different models in different combinations and in settings other than those in which they originated.

The adoption of multifaceted interventions with a balanced emphasis on changes to individual behaviour and the social context has implications for what counts as evidence of effectiveness. First, the broader the scope of the intervention, the less well it lends itself to assessment by experimental methods that are widely regarded as essential to prove effect.[153,154] Yet a broad scope is what is needed. Interaction and synergy between components need to be seen as valued goals of behavioural interventions rather than obstacles to experimental research. Controlled trials might be the assessment method of choice for individual-based interventions, but in the case of those that tackle social-contextual factors, more can be learned from country case studies that document the experience of implementation of programmes in specific settings. Second, strategic decisions with respect to sexual-health promotion need to be based on a strong understanding of process.[155] The emphasis must be not be only on which approaches work, but also on why and how they do so in particular social contexts.

Third, policy-makers and programme designers might need to abandon their preoccupation with seeing progress towards biomedical endpoints as a measure of success.[156] The link between sexual behaviour and rates of HIV and other sexually transmitted diseases and unplanned pregnancy is anyway not always easily drawn. Comparative studies have failed to explain the heterogeneity of HIV transmission in Africa[157] and developed countries[54,158] in terms of differences in sexual behaviour, and assessment studies have not always shown a link between behaviour change and health outcomes.[159] Where the goals of interventions are predominantly social, a reappraisal of the choice of endpoints is essential. When strong evidence exists of a link between changes in the social context and an improvement in sexual health status, achievements that relate to domestic violence,[118] gender empowerment,[160] and changes in social norms[121] can be seen as valid interim endpoints. Failure to recognise them as such might prevent potentially useful interventions from being scaled up,[161] which in turn has implications for the timescale of assessments, the length of which has to take account of the slower process of social change.

Conclusions

This is the first time an attempt has been made to bring together comprehensive survey data for sexual behaviour from around the world. The data show perhaps less change over time than might have been supposed. People who fear a tide of youthful promiscuity might take heart from the fact that trends towards early and premarital sex are neither as pronounced nor as prevalent as is sometimes assumed. Similarly, the apparent absence of an association between regional variations in sexual behaviour and in sexual-health status might also be counterintuitive. In particular, the comparatively high prevalence of multiple partnerships in developed countries, compared with parts of the world with far higher rates of sexually transmitted infections and HIV, such as African countries, might hold some surprises. Only rates of condom use are predictably lower in countries with lower sexual-health status, and this is likely to be attributable to factors relating to access and service provision. The data make a powerful case for an intervention focus on the broader determinants of sexual health, such as poverty and mobility, but especially gender inequality.

The comparative data are important in countering misinformation and quelling fears relating to sexual behaviour. The selection of public-health messages needs to be guided by epidemiological evidence rather than by myths and moral stances. The greatest challenge to sexual-health promotion in almost all countries comes from opposition from conservative forces to harm-reduction strategies. Governments tend to be wary of controversy and, faced with resistance from groups with a strong moral agenda, shy away from supporting interventions other than those with orthodox approaches. Policy-makers and programme planners need strong evidence of beneficial effect to make the case to address stigmatised groups and adopt messages that do not support the dominant ethos of monogamous, procreative, and heterosexual sex. Policy-makers and programme planners need to be able to show that the effect on sexual-health status of providing services to unmarried young women, supplying condoms, decriminalising commercial sex and homosexual activity, and prosecuting people who commit sexual violence is likely to be beneficial rather than detrimental, and that to do otherwise will force stigmatised behaviours underground, leaving the most vulnerable people unprotected. Scientific evidence of effectiveness will counter misconceptions (for example, that sex education encourages promiscuity).

Sexuality is an essential part of human nature and its expression needs to be affirmed rather than denied if public-health messages are to be heeded. As we have seen, men and women have sex for different reasons and in different ways in different settings. This diversity needs to be respected in a range of approaches tailored to whole societies, and to particular groups and individuals within them. Public-health strategies include health promotion, social marketing, media advocacy, legislative activities, and community empowerment. Strategies used should enable people to make their own choices, rather than have them imposed on them. Goals related to the improvement of sexual health need to be linked with development goals, and the lynchpin here is partnership between statutory agencies, between sectors, and between national and local agencies, underpinned by political leadership.

Evidence from behavioural interventions shows that no general approach to sexual-health promotion will work everywhere and no single-component intervention is likely to work anywhere. Comprehensive multilevel, multipartner behavioural interventions are needed that take account of the social context in mounting individual-level programmes, attempt to modify social norms to support uptake and maintenance of behaviour change, and tackle the structural factors that contribute to risky sexual behaviour.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgments

We thank Joanna Busza, John Cleland, Roger Ingham, Shireen Jejeebhoy, Simon Lewin, Cicely Marston, Sandra McDonagh, Justin Parkhurst, Nono Simelela, Lindsey Gilroy, Alfred Spira, James Trussell and Ravi Verma for commenting on earlier drafts of this paper; Ahmet Gulmezoglu and Anna Glasier for guidance with this paper, Lawrence Finer and Suzette Audam for their assistance with data analysis; and the UK Department for International Development for funding ES and MC during the time this paper was written.

References

1 Bernstein S, CJ Hansen, for the UN Millennium *Project. Public choices, private decisions: sexual and reproductive health and the Millennium Development Goals*. 2006. http://www.unmillennium project.org/documents/MP_Sexual_Health_screen-final.pdf. (accessed Sept 22, 2006).

2 Ezzati M, Vander Hoorn S, Rodgers A, Lopez AD, Mathers CD, Murray CJL. Estimates of global and regional potential health gains from reducing multiple major risk factors. *Lancet* 2003; 362: 271–80.

3 Slaymaker E. A critique of international indicators of sexual risk behaviour. *Sex Transm Infect* 2004; 80 (suppl II): 13–21.

4 Collumbien M, Gerressu M, Cleland J. Non use and use of ineffective methods of contraception. In: Ezzati M, Lopez A, Rodgers A, Murray C, eds. *Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors.* Geneva: World Health Organization, 2004: 1255–320.

5 Miller AM, Vance CS. Sexuality, Human Rights, and Health. *Health Hum Rights* 2004; 7: 5–16.

6 Hubert M, Bajos N, Sandfort T, eds. *Sexual behaviour and HIV/AIDS in Europe*. London: University College London Press, 1998.

7 Cleland J, Ferry B, eds. *Sexual behaviour and AIDS in the developing world*. Geneva: World Health Organization, 1995.

8 Demographic and Health Surveys. MEASURE DHS, 1984–present. http://measuredhs.com (accessed Oct 6, 2006).

9 Zheng Z, Zhou Y, Zheng L, et al. Sexual behaviour and contraceptive use among unmarried young women migrant workers in five cities in China. *Repro Health Matters* 2001; 9: 118–27.

10 Mufune P. *Changing patterns of sexuality in northern Na*mibia*: implications for the transmission of HIV/AIDS*. 2003; 5: 425–38.

11 Cameron KA, Salazar LF, Bernhardt JM, Burgess-Whitman N, Wingood GM. Adolescents' experience with sex on the web: results from online focus groups. *J Adolesc* 2005; 28: 535–40.

12 Simon S, Paxton SJ. Sexual risk attitudes and behaviours among young adult Indonesians. *Cult He*alth S*ex* 2004; 6: 393–409.

13 Parker RG, Easton D, Klein CH. Structural barriers and facilitators in HIV prevention: a review of international research. *AIDS* 2000; 14: S22–32.

14 Smith MA, Rissel CE, Richters J, Grulich AE, De Visser R. The rationale and methods of the Australian Study of Health and Relationships. *Aust N Z J Public Health* 2003; 27: 106–16.

15 Johnson A, Mercer C, Erens B, et al. Sexual behaviour in Britain: partnerships, practices, and HIV risk behaviours. *Lancet* 2001; 358: 1835–42.

16 Beltzer N, Lagarde M, Wu Zhou X, Vongmany N, Gremy I. Les Connaissances, Attitudes, Croyances et Comportements Face au VIH/sida en Ile de France - Evolutions 1992, 1994, 1998, 2001, 2004. Paris: Observatoire Régional de Santé d'Ile de France, 2005.

17 Groves RM, Benson G, Mosher WD, et al, for the US Centers for Disease Control. Plan and operation of cycle 6 of the National Survey of Family Growth. *Vital Health Stat* 2005; 42: 1–86.

18 Facultes Universitaires Saint-Louis à Bruxelles Centre d'études sociologiques. EU New Encounter Module Project. May 13 2003: http:// centres.fusl.ac.be/CES/document/SIDA_AC2/EN/rechsida.AC21.html (accessed Sept 22, 2006).

19 Herold J, Seither R, Ylli A, et al. Reproductive health survey Albania 2002: preliminary report. Atlanta US Centers for Disease Control and Prevention, 2003.

20 Serbanescu F, Imnadze P, Bokhua Z, Nutsubidze N, Jackson D, Morris L. Reproductive health survey Georgia 2005: preliminary report. Atlanta: US Centers for Disease Control and Prevention, 2005.

21 Serbanescu F, Morris L. Young adult reproductive health survey Romania 1996: final report. Atlanta: US Centers for Disease Control and Prevention, 1998.

22 Serbanescu F, Morris L, Stratila M, Bivol O. Reproductive health survey Moldova 1997: final report. Atlanta: US Centers for Disease Control and Prevention, 1998.

23 Serbanescu F, Morris L, Rahimova S, Stupp P. Reproductive health survey Azerbaijan 2001: final report. Atlanta: US Centers for Disease Control and Prevention, 2003.

24 Arredondo A, Goldstein E, Pia Olivera M, Bozon M, Giraud M, Messiah A. Estudio nacional de compotamiento sexual: primeros analisis. Chile: Gobierno de Chile Ministerio de Salud, 2000.

25 Liu D, Ng M, Zhou L, Haeberle E. Sexual behaviour in modern China: report on nationwide survey of 20 000 men and women 1997. New York: The Continuum Publishing Company, 1997.

26 Biddlecom A. Trends in sexual behaviours and infections among young people in the United States. *Sex Transm Infect* 2004; 80 (suppl 2): 74–79.

27 UN Population Division. World population prospects: The 2004 revision population database, 2004.

28 Curtis SL, Sutherland EG. Measuring sexual behaviour in the era of HIV/AIDS: the experience of Demographic and Health Surveys and similar enquiries. *Sex Transm Infect* 2004; 80 (Suppl 2): 22–7.

29 Nnko S, Boerma JT, Urassa M, Mwaluko G, Zaba B. Secretive females or swaggering males? An assessment of the quality of sexual partnership reporting in rural Tanzania. *Soc Sci Med* 2004; 59: 299–310.

30 Carael M, Slaymaker E, Lyerla R, Sarkar S. Clients of sex workers in different regions of the world: hard to count. *Sex Transm Infect* 2006; 82 (suppl 3): 26–33.

31 Ayiemba EH. The effect of health education programmes on adolescent sexual behaviour: a case study of Nairobi city adolescents. 2001; 16: 87–103.

32 Wight D, Henderson M, Raab G, et al. Extent of regretted first intercourse among young teenagers in Scotland: a cross sectional survey. *BMJ* 2000; 44: 1245–44.

33 Dickson N, Paul C, Herbison P, Silva P. First intercourse: age, coercion and later regrets reported by a birth cohort. *BMJ* 1998; 316: 29–33.

34 Genuis SJ, Genuis SK. Adolescent behaviour should be priority [commentary]. *BMJ* 2004; 328: 894.

35 Harrison A, Cleland J, Gouws E, Frohlich J. Early sexual debut among young men in rural South Africa: heightened vulnerability to sexual risk? *Sex Transm Infect* 2005; 81: 259–61.

36 Giesecke J, Scalia Tomba G, Göthberg M. Sexual behaviour related to the spread of sexually transmitted diseases: a population based survey. *Int J STD AIDS* 1992; 3: 255–60.

37 National Research Council, Institute of Medicine. Panel on transitions to adulthood in developing countries. In CB Lloyd, ed. Growing up global: the changing transitions to adulthood in developing countries. Washington, DC: The National Academies Press, 2005.

38 Mensch BS, Grant MJ, Blanc AK. The changing context of sexual initiation in sub-Saharan Africa. Policy Research Division working paper. New York: Population Council, 2005.

39 Population Reference Bureau. The world's youth 2000. Washington DC: Measure Communication, 2000.

40 Clark S. Early marriage and HIV risks in sub-Saharan Africa. *Stud Fam Plann* 2004; 35: 149–60.

41 Lagarde E, Pison G, Enel C. Knowledge, attitudes and perception of AIDS in rural Senegal: relationship to sexual behaviour and behaviour change. *AIDS* 1996; 10: 327–34.

42 Sangi Haghpeykar H, Poindexter AN, Young A, Levesque JE, Horth F. Extra relational sex among Hispanic women and their condom related behaviours and attitudes. *AIDS Care* 2003; 15: 505–12.

43 Cleland J, Ali MM. Sexual abstinence, contraception, and condom use by young African women: a secondary analysis of survey data. *Lancet* (in press).

44 Brown A, Jejeebhoy SJ, Shah I, Yount KM. Sexual relations among young people in developing countries: evidence from WHO case studies: special programme of research, development and research training in human reproduction. Geneva: World Health Organization, 2001.

45 Konings E, Bantebya G, Carael M, Bagenda D, Mertens T. Validating population surveys for the measurement of HIV/STD prevention indicators. *AIDS* 1995; 9: 375–82.

46 Mwaluko G, Urassa M, Isingo R, Zaba B, Boerma JT. Trends in HIV and sexual behaviour in a longitudinal study in a rural population in Tanzania, 1994–2000. *AIDS* 2003; 17: 2645–51.

47 Kapiga SH, Lugalla JL. Sexual behaviour patterns and condom use in Tanzania: results from the 1996 Demographic and Health Survey. *AIDS Care* 2002; 14: 455–69.

48 Ferguson A, Pere M, Morris C, Ngugi E, Moses S. Sexual patterning and condom use among a group of HIV vulnerable men in Thika, Kenya. *Sex Transm Infect* 2004; 80: 435–39.

49 Williams BG, Taljaard D, Campbell CM, Gouws E, Ndhlovu L. Changing patterns of knowledge, reported behaviour and sexually transmitted infections in a South African gold mining community. *AIDS* 2003; 17: 2099–107.

50 Leridon H, van Zessen G, Hubert M. The Europeans and their sexual partners. In Hubert M, Bajos N, Sanfordt T. Sexual behaviour and HIV/AIDS in Europe. London: UCL Press, 1998.

51 Verma RK, Collumbien M. Homosexual activity among rural Indian men: implications for HIV interventions. *AIDS* 2004; 18: 1845–47.

52 Asthana S, Oostvogels R. The social construction of male 'homosexuality' in India: implications for HIV transmission and prevention. S*oc Sci Med* 2001; 52: 707–21.

53 Caceres C, Konda K, Pecheny M, Chatterjee A, Lyerla R. Estimating the number of men who have sex with men in low and middle income countries. 2006; 82 (suppl 3): 3–9.

54 Bajos N, Wadsworth J, Dudcot B, et al. Sexual behaviour in HIV epidemiology: Comparative analysis in France and Britain. *AIDS* 1995; 9: 735–43.

55 Adrien A, Leaune V, Dassa C, Perron M. Sexual behaviour, condom use and HIV risk situations in the general population of Quebec. *Int J STD AIDS* 2001; 12: 108–15.

56 Busza J. For love or money: the role of exchange in young people's sexual relationships. In: Ingham R, Aggleton P, eds. Promoting young people's sexual health: international perspectives. London: Routledge, 2006: 134–52.

57 Garcia-Moreno C, Jansen HA, Ellsberg M, Herse L, Watts C. WHO Multi-country study on women's health and domestic violence against women. Geneva: World Health Organization, 2005.

58 Bajos N, Marquet J. Research on HIV sexual risk: social relations-based approach in a cross-cultural perspective. *Soc Sci Med* 2000; 50: 1533–46.

59 Kordoutis PS, Loumakou M, Sarafidou JO. Heterosexual relationship characteristics, condom use and safe sex practices. *AIDS Care* 2000; 12: 767–82.

60 Soler H, Quadagno D, Sly DF, Riehman KS, Eberstein IW, Harrison DF. Relationship dynamics, ethnicity and condom use among low-income women. *F Plann Perspect* 2000; 32: 82–8, 101.

61 Pulerwitz J, Amaro H, De Jong W, Gortmaker SL, Rudd R. Relationship power, condom use and HIV risk among women in the USA. *AIDS Care* 2002; 14: 789–800.

62 Halton K, Ratcliffe AA, Morison L, West B, Shaw M. Herpes simplex 2 risk among women in a polygynous setting in rural West Africa. *AIDS* 2003; 17: 97–103.

63 Slap GB, Lot L, Huang B, Daniyam CA, Zink TM. Sexual behaviour of adolescents in Nigeria: cross sectional survey of secondary school students. *BMJ* 2003; 326: 15–20.

64 Adimora AA, Schoenbach VJ. Contextual factors and the black-white disparity in heterosexual HIV transmission. *Epidemiology* 2002; 13: 707–12.

65 Buvé A, Bishikwabo-Nsarhaza K. The spread and effect of HIV-1 in sub-Saharan Africa. *Lancet* 2002; 395: 2011–17.

66 Blankenship KM, Friedman SR, Dworkin S, Mantell JE. Structural interventions: concepts, challenges and opportunities for research. *J Urban Health* 2006; 83: 59–72.

67 Dunkle KI, Jewkes RK, Brown HC, Gray GE, McIntryre JA. Transactional sex among women in Soweto, South Africa: prevalence, risk factors and association with HIV infection. Soc Sci Med 2004; 59: 1581–92.

68 Gregson S, Zhuwau T, Anderson RM, Chandiwana SKSSaM. Is there evidence for behaviour change in response to AIDS in rural Zimbabwe? *Soc Sci Med* 1998; 46: 321–30.

69 Coffee MP, Garnett GP, Mlilo M, Voeten HA, Chandiwana S, Gregson S. Patterns of movement and risk of HIV infection in rural Zimbabwe. *J Infect Dis* 2005; 191 (suppl 1): S159–67.

70 Furber AS, Newell JN, Lubben MM. A systematic review of current knowledge of HIV epidemiology and of sexual behaviour in Nepal. *Trop Med Int Health* 2002; 7: 140–48.

71 Agha S. Sexual behaviour among truck drivers in Pakistan. *Cult Health Sex* 2002; 4: 191–206.

72 Nyanzi S, Nyanzi B, Kalina B, Pool R. Mobility, sexual networks and exchange among bodabodamen in southwest Uganda. *Cult Health Sex* 2004; 6: 239–54.

73 Puri MC, Busza J. In forests and factories: sexual behaviour among young migrant workers in Nepal. Cult Health Sex 2004; 6: 145–58.

74 MacPhail C. Challenging dominant norms of masculinity for HIV prevention. 2003; 2: 141–49.

75 Global Coalition on Women and AIDS: Joint United Nations programme on HIV/AIDS. HIV prevention and protection efforts are failing women and girls. Geneva: The Joint United Nations Programme on HIV/AIDS, 2004.

76 Seeley J, Grellier R, Barnett T. Gender and HIV AIDS impact mitigation in sub-Saharan Africa: recognising the constraints. Sahara J 2004; 1: 87–98.

77 Tangmunkongvorakul A, Kane R, Wellings K. Gender double standards in young people attending sexual health services in Northern Thailand. *Cult Health Sex* 2005; 7: 361–73.

78 Barnett T, Parkhurst J. HIV AIDS: sex, abstinence, and behaviour change. *Lancet Infect Dis* 2005; 5: 590–93.

79 Marie A. L'Afrique des individus. Paris: Edition Karthala, 1997.

80 Richens J, Imrie J, Weiss H. Human immunodeficiency virus risk: is it possible to dissuade people from having unsafe sex? *J R Stat Soc Ser A Stat Soc* 2003; 166 (part 2): 207–15.

81 Lesch E, Kruger L. Mothers, daughters and sexual agency in one low-income South African community. *Soc Sci Med* 2005; 61: 1072–82.

82 Roberts AB, Oyun C, Batnasan E, Laing L. Exploring the social and cultural context of sexual health for young people in Mongolia: implications for health promotion. Soc Sci Med 2005; 60: 1487–98.

83 Adimora AA, Schoenbach VJ. Social context, sexual networks, and racial disparities in rates of sexually transmitted infections. *J Infect Dis* 2005; 191 (suppl 1): S115–22.

84 Herbst JH, Sherba RT, Crepaz N, et al. A meta-analytic review of HIV behavioral interventions for reducing sexual risk behavior of men who have sex with men. *J Acquir Immune Defic Syndr* 2005; 39: 228–41.

85 Rees R, Kavanagh J, Burchett H, et al. HIV health promotion and men who have sex with men (MSM): a systematic review of research relevant to the development and implementation of effective and appropriate interventions. London: Research Unit EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, 2004.

86 Albarracin D, McNatt PS, Klein CT, Ho RM, Mitchell AL, Kumkale GT. Persuasive communications to change actions: an analysis of behavioral and cognitive impact in HIV prevention. *Health Psychol* 2003; 22: 166–77.

87 Elwy AR, Hart GJ, Hawkes S, Petticrew M. Effectiveness of interventions to prevent sexually transmitted infections and human immunodeficiency virus in heterosexual men: a systematic review. *Arch Intern Med* 2002; 162: 1818–30.

88 Logan TK, Cole J, Leukefeld C. Women, sex, and HIV: social and contextual factors, meta-analysis of published interventions, and implications for practice and research. *Psychol Bull* 2002; 128: 851–85.

89 Mize SJ, Robinson BE, Bockting WO, Scheltema KE. Meta-analysis of the effectiveness of HIV prevention interventions for women. *AIDS Care* 2002; 14: 163–80.

90 Neumann MS, Johnson WD, Semaan S, et al. Review and meta-analysis of HIV prevention intervention research for heterosexual adult populations in the United States. *J Acquir Immune Defic Syndr* 2002; 30 (suppl 1): S106–17.

91 Rotheram-Borus MJ, Cantwell S, Newman PA. HIV prevention programs with heterosexuals. *AIDS* 2000; 14 (suppl 2):S59–67.

92 Shepherd J, Weston R, Peersman G, Napuli IZ. Interventions for encouraging sexual lifestyles and behaviours intended to prevent cervical cancer. *Cochrane Database Syst Rev* 2000; 2: CD001035.

93 Weinhardt LS, Carey MP, Johnson BT, Bickham NL. Effects of HIV counseling and testing on sexual risk behavior: a meta-analytic review of published research, 1985–1997. *Am J Public Health* 1999; 89: 1397–405.

94 Coyle SL, Needle RH, Normand J. Outreach-based HIV prevention for injecting drug users: a review of published outcome data. Public Health 1999; 113 (suppl 1): 19–30.

95 Gibson DR, McCusker J, Chesney M. Effectiveness of psychosocial interventions in preventing HIV risk behaviour in injecting drug users. *AIDS* 1998; 12: 919–29.

96 Semaan S, Des Jarlais DC, Sogolow E, et al. A meta-analysis of the effect of HIV prevention interventions on the sex behaviors of drug users in the United States. *J Acquir Immune Defic Syndr* 2002; 30 (suppl 1): S73–93.

97 van Empelen P, Kok G, van Kesteren NM, van den Borne B, Bos AE, Schaalma HP. Effective methods to change sex-risk among drug users: a review of psychosocial interventions. *Soc Sci Med* 2003; 57: 1593–608.

98 Kirby D, Laris BA, Rolleri L. Impact of sex and HIV education programs on sexual behaviors of youth in developing and developed countries: FHI youth research working paper no 2. North Carolina: Family Health International (Youth Net Program), 2006.

99 Mullen PD, Ramirez G, Strouse D, Hedges LV, Sogolow E. Meta-analysis of the effects of behavioral HIV prevention interventions on the sexual risk behavior of sexually experienced adolescents in controlled studies in the United States. *J Acquir Immune Defic Syndr* 2002; 30 (suppl 1): S94–105.

100 Bertrand JT, O'Reilly K, Denison J, Anhang R, Sweat M. Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviors in developing countries. *Health Educ Res* 2006; 21: 567–97.

101 Grier S, Bryant CA. Social marketing in public health. *Annu Rev Public Health* 2005; 26: 319–39.

102 Slater MD. Theory and method in health audience segmentation. 1996; 1: 267–83.

103 Chapman S. Evaluating social marketing interventions. In: Thorogood M, Coombes Y, eds. Evaluating health promotion: practice and methods, 2nd edn. Oxford: Oxford University Press, 2004: 93–109.

104 Wellings K, Nanchahal K, Macdowall W, et al. Sexual behaviour in Britain: early heterosexual experience. *Lancet* 2001; 358: 1843–50.

105 Patel V, Andrews G, Pierre T, Kamat N. *Gender, sexual abuse and risk behaviours in adolescents: a cross-sectional survey in schools in Goa, India.* In: Bott S, Jejeebhoy S, Shah I, Puri C, eds. Towards adulthood: exploring the sexual and reproductive health of adolescents in south Asia. Geneva: World Health Organization, 2003: 99–102.

106 Amirkhanian YA, Kelly JA, Kukharsky A, et al. Patterns of HIV risk behavior in a large community sample of Russian men who have sex with men: an emerging epidemic. *AIDS* 2001; 15: 407–12.

107 Anonymous. Warning: teenagers may view non coital sex as a safe option. *Contracept Technol Update* 2005; 26: 4.

108 Donovan B, Ross MW. Preventing HIV: determinants of sexual behaviour. *Lancet* 2000; 355: 1897–901.

109 Ingham R. *The importance of context in understanding and seeking to promote sexual health.* In: Ingham R, Aggleton P, eds. Sexual health of young people in developing countries. London: Routledge, 2006: 155–73.

110 McIntyre JA. Sex, pregnancy, hormones, and HIV. *Lancet* 2005; 366: 1141–42.

111 Amirkhanian YA, Kelly JA, McAuliffe TL. Identifying, recruiting, and assessing social networks at high risk for HIV AIDS: methodology, practice, and a case study in St Petersburg, Russia. *AIDS Care* 2005; 17: 58–75.

112 Kincaid DL. Social networks, ideation and contraceptive behaviour in Bangladesh: a longitudinal analysis. *Soc Sci Med* 2000; 50: 215–31.

113 Dandona R, Dandona L, Gutierrez JP, et al. High risk of HIV in non-brothel based female sex workers in India. *BMC Public Health* 2005; 5: 87.

114 Singh CM, Verma BL. Sexual behaviour and condom usage in some high risk groups of district Jhansi (U.P). *Indian J Prev Soc Med* 2004; 35: 179–83.

115 Bowley DM. Action is still needed to stem heterosexual transmission of HIV in Africa letter. *BMJ* 2002; 324: 1586.

116 del Rio C, Sepúlveda J. AIDS in Mexico: lessons learned and implications for developing countries. *AIDS* 2002; 16: 1445–57.

117 Hélie A. Holy Hatred. *Reprod Health Matters* 2004; 12: 120–24.

118 Usdin S, Scheepers E, Goldstein S, Japhet G. Achieving social change on gender-based violence: A report on the impact evaluation of Soul City's fourth series. *Soc Sci Med* 2005; 61: 2434–45.

119 Halperin DT, Steiner MJ, Cassell MM, Green EC, Hearst N. The time has come for common ground on preventing sexual transmission of HIV. *Lancet* 2004; 364: 1913–15.

120 Schuler S, Hashemi S, Riley A. The influence of women's changing roles and status in Bangladesh's fertility transition: evidence from a study of credit programmes and contraceptive use. *World Development* 1997; 25: 563–75.

121 Barker G, Nascimento M, Segundo M, Pulerwitz J. How do we know if men have changed? promoting and measuring attitude change with young men: lessons from program H in Latin America. Washington: Oxfam, 2000.

122 Verma RK, Pulerwitz J, Mahendra VS, Khandekar S, Barker G. Promoting gender equity among young men to reduce HIV and violence risk: positive experiences of Yari dosti in India. *Sex Health Exch* 2005; 2: 5–6.

123 Wilkinson P, French R, Kane R, et al. Teenage conceptions, abortions, and births in England, 1994–2003, and the national teenage pregnancy strategy. *Lancet* (in press).

124 Joint UN Programme on HIV/AIDS. Relationships of HIV and STD declines in Thailand to behavioural change: a synthesis of existing studies. Geneva: Joint UN programme on HIV/AIDS, 1998.

125 Joint UN Programme on HIV/AIDS. Evaluation of the 100% Condom Programme in Thailand. UNAIDS case study. Geneva: Joint UN programme on HIV/AIDS, 2000.

126 Nelson KE, Celentano DD, Eiumtrakol S, et al. Changes in sexual behavior and a decline in HIV infection among young men in Thailand. *N Engl J Med* 1996; 335: 297–303.

127 Hanenberg R, Rojanapithayakorn W. Changes in prostitution and the AIDS epidemic in Thailand. *AIDS Care* 1998; 10: 69–79.

128 Low-Beer D, Stoneburner RL. Behaviour and communication change in reducing HIV: is Uganda unique? Johannesburg: Centre for AIDS Development, Research and Evaluation [CADRE], 2004.

129 Ahmed FH, Prada E, Bankole A, Singh S, Wulf D. Reducing unintended pregnancy and unsafe abortion in Uganda. Alan Guttmacher Institute: New York, 2005.

130 Alonso A, de Irala J. Strategies in HIV prevention: the A-B-C approach. *Lancet* 2004; 364: 1033.

131 Rifkin W. Strategies in HIV prevention: the A-B-C approach *Lancet* 2004; 364: 1033.

132 Allen T, Heald S. HIV/AIDS policy in Africa: What has worked in Uganda and what has failed in Botswana? *J Int Dev* 2004; 16: 1141–54.

133 Parkhurst JO, Lush L. The political environment of HIV: lessons from a comparison of Uganda and South Africa. *Soc Sci Med* 2004; 59: 1913–24.

134 Macintyre K, Brown L, Sosler S. It's not what you know but who you knew: examining the relationship between behavior change and decline in HIV infection in Africa. *AIDS Educ Prev* 2001; 13: 160–74.

135 Powles J, Day N. Syndromic STI and behaviour-change interventions in Uganda. *Lancet* 2003; 361: 2086.

136 Korenromp EL, Bakker R, de Vlas SJ, Gray RH, Wawer MJ. HIV dynamics and behaviour change as determinants of the impact of sexually transmitted disease treatment on HIV transmission in the context of the Rakai trial. *AIDS* 2002; 16: 2209–18.

137 Parkhurst JO. The Ugandan success story? Evidence and claims of HIV-1 prevention. *Lancet* 2002; 360: 78–80.

138 Darroch JE, Singh S. Why is teenage pregnancy declining? The roles of abstinence, sexual activity, and contraceptive use. New York: Alan Guttmacher Institute, 1999.

139 Finer LB, Henshaw SK. Disparities in rates of unintended pregnancy in the United States 1994 and 2001. *Persp on Sexual and Repr Health* 2006; 38: 90–96.

140 Mohn JK, Tingle LR, Finger R. An analysis of the causes of the decline in non-marital birth and pregnancy rates for teens from 1991 to 1995. *Adolesc Fam Health* 1995; 3: 39–47.

141 Jones JM, Toffler W, Reed B. The declines in adolescent pregnancy, birth and abortion rates in the 1990s: what factors are responsible? In: Fanwood, NJ: Consortium of state Physicians Resource Councils, 1999.

142 Saul R. Teen pregnancy: progress meets politics: *The Guttmacher Review* 1999; 2: 6–9.

143 Kauffman RB, Spitz AM, Strauss LT, et al. The decline in US teen pregnancy rates: 1990–1995. *Pediatrics* 1998; 102: 1141–47.

144 US National Institutes of Health. Interventions to prevent HIV risk behaviors: NIH consensus statement. 1997; 15: 15–16.

145 Santelli JS, Abma J, Ventura S, et al. Can changes in sexual behaviors among high school students explain the decline in teen pregnancy rates in the 1990s? *J Adolesc Health* 2004; 35: 80–90.

146 Santelli JS, Lindberg LD, Singh S, Finer LB. Recent declines in adolescent pregnancy in the United States: more abstinence or better contraceptive use? *Am J Public Health* (in press).

147 Donovan P. Falling teen pregnancy, birth rates: what's behind the decline? *The Guttmacher Review* 1998; 1: 6–9.

148 Agyei-Mensah S. The HIV/AIDS epidemic in sub Saharan Africa: homogeneity or heterogeneity? *Nor Geogr Tidsskr* 2005; 59: 14–25.

149 Okie S. Fighting HIV: lessons from Brazil. *N Engl J Med* 2006; 354: 1977–81.

150 Wellings K. *Evaluating AIDS public education in Europe: a cross-national comparison.* In: Hornik R, ed. Public health communication: evidence for behavior change. London: Lawrence Erlbaum Associates, 2002: 131–46.

151 Kim JC, Watts CH. Gaining a foothold: tackling poverty, gender inequality, and HIV in Africa. *BMJ* 2005; 331: 769–72.

152 Kerrigan D, Moreno L, Rosario S, et al. Environmental-structural interventions to reduce HIV/STI risk among female sex workers in the Dominican republic. *J Public Health* 2006; 96: 120–25.

153 Lambert H. Accounting for EBM: notions of evidence in medicine. *Soc Sci Med* 2006; 62: 2633–45.

154 Lambert H, Gordon EJ, Bogdan-Lovis EA. Introduction: Gift horse or Trojan horse? Social science perspectives on evidence-based health care. *Soc Sci Med* 2006; 62: 2613–20.

155 Coombes Y, Thorogood M. Introduction. In: Thorogood M, Coombes Y, eds. Evaluating health promotion: practice and methods, 2nd ed. Oxford: Oxford University Press, 2004.

156 Ellis S, Grey A. Prevention of sexually transmitted infections: a review of reviews into the effectiveness of non-clinical interventions. London: Health Development Agency, 2004.

157 Ferry B, Carael M, Buve A, Auvert B, Laourou M. Comparison of key parameters of sexual behaviour in four African urban populations with different levels of HIV infection: The multicentre study of factors determining the different prevalences of HIV in sub-Saharan Africa. *AIDS* 2001; 15 (suppl 4): S41–50.

158 Michael RT, Wadsworth J, Feinleib J, Johnson AM, Laumann E, Wellings K. Private sexual behaviour, public opinion, and public health policy related to sexually transmitted diseases: A US British comparison. *Am J Public Health* 1998; 88: 749–54.

159 Quigley MA, Kamali A, Kinsman J, Kamulegeya I, Nakiyingi-Miiro J. The impact of attending a behavioural intervention on HIV incidence in Masaka, Uganda. *AIDS* 2004; 18: 2055–63.

160 Kim J, Watts C, Hargreaves J, et al. Women's economic empowerment can reduce gender-based violence: results from the IMAGE study, a cluster randomized trial in South Africa. XVI International AIDS Conference, Toronto, 13–18 Aug, 2006 (abstr THPE0683).

161 Bonell C, Hargreaves J, Strange V, Pronyk P, Porter J. Should structural interventions be evaluated using RCTs? The case of HIV prevention. *Soc Sci Med* 2006; 63: 1135–42.

For more information, please contact:
Department of Reproductive Health and Research
World Health Organization
Avenue Appia 20, CH-1211 Geneva 27
Switzerland
Fax: +41 22 791 4171
E-mail: reproductivehealth@who.int
www.who.int/reproductive-health