WORLD POPULATION MONITORING 2003

Population, education and development

DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS
POPULATION DIVISION

WORLD POPULATION MONITORING 2003

Population, education and development

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NOTE

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries..

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The term "country" as used in the text of the present publication also refers, as appropriate, to territories or areas.

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PREFACE

The present report, *World Population Monitoring, 2003: Population Education and Development*, has been prepared in response to Economic and Social Council resolution 1995/55, in which the Council endorsed the terms of reference and the topic-oriented and prioritized multi-year work programme proposed by the Commission on Population and Development at its twenty-eighth session.[1] According to the multi-year work programme, which was to serve as a framework for the assessment of the progress achieved in the implementation of the Programme of Action of the International Conference on Population and Development (1994)[2], a series of reports on a special set of themes would be prepared annually. The Commission, in its decision 2000/1,[3] decided that the special theme for the Commission at its thirty-sixth session in 2003 should be "Population, education and development", which is the subject of the present report.

Education plays a key role in national development and is an essential component of national well-being. Through education, individuals are empowered to make choices that affect their health and survivorship and that of their children, as well as the number and spacing of their children and their place of residence and work. The Programme of Action of the International Conference on Population and Development called on Governments to ensure universal access to primary education before 2015 (para. 11.6) and ensure access by females to education beyond the primary level (para. 11.8). Education has an impact on society through a variety of paths. The present report emphasizes one of those paths: the interrelationships between education and population, and their resulting effects on development. The report investigates such topics as trends in population, including trends in the total and school-age populations and trends in school enrolment, literacy and educational attainment; education and entry into reproductive life; the interrelationships between education and fertility; education, health and mortality; education and international migration; and finally progress in meeting the international goals. The presentation of each topic is followed by a concluding section that summarizes the major points and messages of the study.

As requested by the Economic and Social Council, the Population Division, Department of Economic and Social Affairs of the United Nations Secretariat, annually prepares the world population monitoring report on the theme of that year's session of the Commission. The full report is accompanied by a summarized version, the "concise report" (E/CN.9/2003/2). Each of the reports is presented and discussed at the Commission and then revised for publication. The present volume is the revised version of the full report on the theme "Population, education and development".[4]

World Population Monitoring, 2003 was prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations. The Population Division gratefully acknowledges the UNESCO Institute for Statistics for its contribution to chapter VI on achieving the goals of Education for All.

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NOTES

[1] *See Official Records of the Economic and Social Council, 1995, Supplement* No. 7 (E/1995/27), annexes I and II.

[2] *Report of the International Conference on Population and Development, Cairo, 5-13 September 1994* (United Nations publication, Sales No. E.95.XIII.18), chap. I, resolution 1, annex.

[3] See *Official Records of the Economic and Social Council, 2000, Supplement No. 5* (E/2000/25), chap. I, sect. B.

[4] The revised version of the concise report is also available as a United Nations publication, *Population, Education and Development: The Concise Report* (Sales No. E.03.XIII.11).

SOURCES, METHODS AND CLASSIFICATIONS

Data on global and regional demographic trends used in the present report are taken from the 2000 Revision of the official United Nations population estimates and projections *World Population Prospects: The 2000 Revision.*[1] Country data are taken from the same report, national sources or various United Nations sources, as appropriate. The population estimates and projections, which are prepared biennially by the Population Division of the Department of Economic and Social Affairs (DESA), provide the standard and consistent set of population figures which are used throughout the United Nations system as the basis for activities requiring population information. Population policy data are taken from *National Population Policies, 2001* the population policy databank maintained by the Population Division.[2]

The countries and areas, which are identified as the statistical units by the Statistics Division of the Department of Economic and Social Affairs and covered by the estimates and projections mentioned above, are grouped geographically into six major areas: Africa, Asia, Europe, Latin America and the Caribbean, Northern America and Oceania. Those major areas are further divided geographically into 21 regions. In addition, the regions are summarized, for statistical convenience, into two general groups: more developed and less developed. The less developed regions include all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean, Melanesia, Micronesia and Polynesia. The more developed regions comprise Northern America, Japan, Europe and Australia/New Zealand. Other groupings are used as appropriate to the subject matter.

NOTES

[1] Vol. I, *Comprehensive Tables.* (United Nations publication, Sales No. E.01.XIII.8 and Corr.1).
[2] United Nations publication, Sales No. E.02.XIII.12.

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Symbols of United Nations documents are composed of capital letters combined with figures.

Various symbols have been used in the tables throughout this report, as follows:

Two dots (..) indicate that data are not available or are not separately reported.

An em dash (—) indicates that the population is less than 500 persons.

A hyphen (-) indicates that the item is not applicable.

A minus sign (-) before a figure indicates a decrease.

A full stop (.) is used to indicate decimals.

Use of a hyphen (-) between years, for example, 1995-2000, signifies the full period involved, from 1 July of the beginning year to 1 July of the end year.

Details and percentages in tables do not necessarily add to totals because of rounding.

Countries and areas are grouped geographically into six major areas: Africa; Asia; Europe; Latin America and the Caribbean; Northern America; and Oceania. Those major areas are further divided geographically into 21 regions. In addition, the regions are classified as belonging, for statistical convenience, to either of two general groups: more developed and less developed regions. The less developed regions include all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean, Melanesia, Micronesia and Polynesia. The more developed regions comprise Northern America, Japan, Europe and Australia/New Zealand.

The group of least developed countries as defined by the United Nations General Assembly in 1998, comprised 49 countries: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, the Central African Republic, Chad, the Comoros, the Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, the Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, the Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, the Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, the Sudan, Togo, Tuvalu, Uganda, the United Republic of Tanzania, Vanuatu, Yemen and Zambia.

Where data are provided by UNESCO, the following regional groupings have been used:

Arab States and North Africa: Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Mauritania, Morocco, Oman, Occupied Palestinian Territory, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen.

Central Asia: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan.

Central and Eastern Europe: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Republic of Moldova, Russian Federation, Slovakia, Slovenia, The former Yugoslav Republic of Macedonia, Turkey, Ukraine, Yugoslavia.

East Asia and the Pacific: Australia, Cambodia, China, Cook Islands, Democratic People's Republic of Korea, Fiji, Indonesia, Japan, Kiribati, Lao People's, Democratic Republic, Malaysia, Marshall Islands, Myanmar, Nauru, Niue, New Zealand, Papua New Guinea, Philippines, Republic of Korea, Samoa, Solomon Islands, Thailand, Tonga, Tuvalu, Vanuatu, Viet Nam.

Latin America and the Caribbean: Anguilla, Antigua and Barbuda, Aruba, Argentina, Bahamas, Barbados, Belize, Bermuda, Bolivia, British Virgin Islands, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, Uruguay, Venezuela.

North America and Western Europe: Andorra, Austria, Belgium, Canada, Cyprus, Denmark, Spain, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America.

South and West Asia: Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan, Sri Lanka.

Sub-Saharan Africa: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Côte d'Ivoire, Comoros, Congo, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, Togo, Uganda, Rwanda, Sao Tome and Principe, Seychelles, Somalia, South Africa, Swaziland, United Republic of Tanzania, Zambia, Zimbabwe.

The following abbreviations have been used:

AIDS	acquired immunodeficiency syndrome
AIR	apparent intake rate
CAP	Certificat d'aptitude professionelle
CID	Center for International Development at Harvard University
CSE	Certificate of Secondary Education
ECLAC	Economic Commission for Latin America and the Caribbean
EFA	Education for All
EU	European Union
FFS	Fertility and Family Survey
GER	gross enrolment ratio
GNI	gross national income
GNP	gross national product
GPI	gender parity index
HIPC	Heavily Indebted Poor Countries
HIV	human immunodeficiency virus
HSMP	Highly Skilled Migrant Programme
IEC	information, education and communication
IIE	Institute of International Education
ISCED	International Standard Classification of Education
IT	information technology

NAFTA	North Atlantic Free Trade Agreement
NER	net enrolment ratio
NFE	non-formal education
NHANES	National Health and Nutrition Examination Survey
NIR	net intake rate
OECD	Organization for Economic Cooperation and Development
ORS	oral rehydration solution
STD	sexually transmitted disease
TFR	total fertility rate
UNESCO	United Nations Educational, Scientific and Cultural Organization
USSR	former Union of Soviet Socialist Republics

INTRODUCTION

· From the founding of the United Nations, education has been recognized as one of the essential underpinnings of human development and societal progress. The right to education is proclaimed in the Universal Declaration of Human Rights (box 1),[1] and the International Covenant on Economic, Social and Cultural Rights,[2] and the International Covenant on Civil and Political Rights. The importance of education for population and for individual development has been strongly endorsed at major United Nations conferences and summits. The World Conference on Education for All, convened in Jomtien, Thailand, in 1990, established goals and strategies to achieve Education for All (EFA). Recently, at the World Education Forum (Dakar, 2000), the Millennium Summit in 2000 and the special session of the General Assembly on children in 2002, the international community of nations explicitly recognized that education, especially primary schooling, is critical for achieving social and demographic progress, sustained economic development and gender equality. Achieving universal primary education and eliminating gender disparities in education are among the key objectives of the United Nations Millennium Declaration (2000).[3]

Box. The right to education: Article 26 of the Universal Declaration of Human Rights[1]

Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.

Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace.

Parents have a prior right to choose the kind of education that shall be given to their children.

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[1]General Assembly resolution 217 A (III).

The importance of education has also been stressed in the series of international population conferences. Principle 10 of the Programme of Action of the International Conference on Population and Development (1994) states, "Everyone has the right to education, which shall be directed to the full development of human resources, and human dignity and potential, with particular attention to women and the girl child. Education should be designed to strengthen respect for human rights and fundamental freedoms, including those relating to population and development. The best interests of the child shall be the guiding principle of those responsible for his or her education and guidance; that responsibility lies in the first place with the parents."[4] The Programme of Action also identified education as one of the most important means of empowering women with the knowledge, skills and self-confidence necessary to participate fully in the development process. Education was also seen as a key factor in sustainable development that is at the same time a component of well-being and a factor in the development of well-being through its links with demographic as well as economic and social factors.

The Programme of Action adopted quantitative goals related to education, endorsing the Education for All goal regarding the elimination of illiteracy, and also called for universal access to primary education before 2015 and the elimination of the gender gap in primary and secondary education by 2005. In 1999, the key actions for further implementation of the Programme of Action of the International Conference on Population and Development[5] further specified an intermediate goal of achieving by 2010 a net primary school enrolment ratio for children of both sexes of at least 90 per cent, and also noted a particular need for improving the retention rate of girls in primary and secondary schools.

·' In the field of population studies, it has long been recognized that education is strongly related to a broad range of demographic behaviours. The spread of education throughout a population has been shown to be of central importance for the long-term demographic transi-

tion from high to low levels of fertility. Caldwell (1980), in particular, has maintained that high levels of fertility would nowhere persist for long once a society achieved "mass education", that is, once a large majority of children were sent to school. More recent trends have generally borne this out (Lloyd, Kaufman and Hewitt, 2000).

At present, educational attainment is strongly related to differences between countries in levels of fertility and mortality (figures 1-3), and education is also strongly related to national income per capita (figure 4). In general, such cross-national associations may reflect the effects of education on demography and the economy, and the effects of demographic and economic factors on education, as well as the joint effects of other factors that may separately influence education, economic and demographic variables. In fact, a substantial body of research has been directed towards examining each of these possibilities, and it is generally accepted that education both influences and, over time, is influenced by demographic and economic factors.

The present report provides a review and update of the relationships between education and the main demographic areas, in the context of development, with attention to entry into reproductive life; fertility, desired family size and family planning; mortality and health; and migration, with a focus on international migration. The report also examines is progress towards meeting the goals of Education for All.

Figure 1. Total fertility rate by mean years of education

Figure 2. Life expectancy at birth by mean years of education

$R^2 = 0.82$

O   Countries with high HIV prevalence

Life expectancy at birth, 2000-2005 (y-axis)

Years of education, adults, year 2000 (x-axis)

NOTE: Countries with estimated HIV prevalence above 10 per cent for adults aged 15-49 are shown separately and are not included in the regression equation.

Figure 3. Under-five mortality rate (Q5) by mean years of education

R²=0.73

Q5 in 2000-2005 (per 1,000)

Mean years of education, adults, year 2000

Figure 4. Gross domestic product (GDP) per capita by mean years of education

Figure showing a scatter plot with GDP per capita (constant 1995 US$, log scale) on the y-axis ranging from 100 to 100,000, and Mean years of education (population aged 15+) on the x-axis ranging from 0 to 12. A trend line shows positive correlation with $R^2 = 0.78$.

Mean years of education *(population aged 15+)*

Sources: R. L. Barro, and J. Lee, *International Data on Educational Attainment: Updates and Implications*. CID Working Paper No. 42 (Cambridge, Massachusetts, Harvard University, 2000); and *World Development Indicators* (CD-ROM) (Washington, D.C., World Bank, n.d.).

NOTES: GDP = gross domestic product
US$ = United States dollars

NOTES

[1] General Assembly resolution 217A (III).

[2] General Assembly resolution 2200A (XXI).

[3] See General Assembly resolution 55/2.

[4] *Report of the International Conference on Population and Development, Cairo, 5-13 September 1994* (United Nations publication, Sales No. E.95.XIII.18) chap. I, resolution 1, annex.

[5] General Assembly resolution 5-21/2, annex.

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I. TRENDS IN POPULATION, EDUCATION AND DEVELOPMENT

Chapter I provides an overview of trends in population and educational attainment and a consideration of the interrelationships between population and education and other major aspects of social and economic development. Later chapters examine these interrelationships in more depth for each of the major components of demographic change — fertility, mortality and migration — and chapter VI examines educational trends and future challenges in more detail.

A. POPULATION TRENDS

Recent efforts to expand access to education have coincided with extraordinary growth in population numbers. No century has witnessed such rapid population growth as did the twentieth century. From an estimated 1.6 billion inhabitants in 1900, the world population increased more than three fold, rising to 6.1 billion at the end of the century, with most of the increase occurring after 1950 (table 1). The rapid growth was propelled by dramatic declines in mortality, especially in the less developed regions. The average life expectancy at birth in the world, which was 46 years during the period 1950-1955, increased to 66 years during the period 2000-2005 (table 2). The increase in life expectancy was even greater in the less developed regions, where it rose from 41 years to 64 years, as compared with an increase from 66 to 76 years in the more developed regions. Since the decline in mortality began before the onset of fertility decline in most regions, the pace of population growth increased. Consequently, world population has grown by nearly 2 and one half times since 1950, with a peak growth rate of 2.04 per cent per year during the period 1965-1970 and a peak annual increment of 86 million persons during the period 1985-1990. With the onset of sustained fertility declines in most regions, the global growth rate of population has decreased significantly from its peak, yet the annual increment to the world population is still 77 million during 2000-2005. Total world population is projected to reach 9.3 billion by 2050 (figure 5).[1] Although the world population will still be growing at that time, both the growth rate (at 0.5 per cent per year) and the annual addition to population numbers (at 43 million) will be substantially lower than they are today.

TABLE 1. WORLD POPULATION BY MAJOR AREA, 1950-2050

Major area	1950	1975	2000	2025	2050
	Population (millions)				
World	2 519	4 066	6 057	7 937	9 322
More developed regions	814	1 048	1 191	1 219	1 181
Less developed regions	1 706	3 017	4 865	6 718	8 141
Africa	221	406	794	1 358	2 000
Asia	1 399	2 397	3 672	4 777	5 428
Europe	548	676	727	684	603
Latin America and the Caribbean	167	322	519	695	806
Northern America	172	243	314	384	438
Oceania	13	21	31	40	47
	Percentage distribution				
World	100.0	100.0	100.0	100.0	100.0
More developed regions	32.3	25.8	19.7	15.4	12.7
Less developed regions	67.7	74.2	80.3	84.6	87.3
Africa	8.8	10.0	13.1	17.1	21.5
Asia	55.5	58.9	60.6	60.2	58.2
Europe	21.8	16.6	12.0	8.6	6.5
Latin America and the Caribbean	6.6	7.9	8.6	8.8	8.6
Northern America	6.8	6.0	5.2	4.8	4.7
Oceania	0.5	0.5	0.5	0.5	0.5

Source: World Population Prospects: The 2000 Revision, vol. I, Comprehensive Tables (United Nations publication, Sales No. E.01.XIII.8, and Corr.1).

TABLE 2. POPULATION GROWTH RATE, LIFE EXPECTANCY AT BIRTH AND TOTAL FERTILITY RATE,
BY MAJOR AREA, 1950-2050

Major area	1950-1955	1975-1980	2000-2005	2025-2030	2045-2050
Growth rate (per thousand)					
World	1.8	1.7	1.2	0.8	0.5
More developed regions	1.2	0.6	0.2	0.0	-0.2
Less developed regions	2.1	2.1	1.5	1.0	0.6
Africa	2.2	2.8	2.3	1.8	1.3
Latin America and Caribbean	2.7	2.3	1.4	0.8	0.4
Northern America	1.7	0.9	0.9	0.6	0.5
Europe	1.0	0.5	-0.2	-0.4	-0.6
Oceania	2.2	1.1	1.2	0.8	0.5
Asia	1.9	1.9	1.3	0.7	0.3
Life expectancy at birth (years, for both sexes)					
World	46.5	59.8	66.0	72.4	76.0
More developed regions	66.2	72.3	75.6	80.0	82.1
Less developed regions	41.0	56.8	64.1	70.9	75.0
Africa	37.8	48.3	51.3	62.0	69.5
Latin America and Caribbean	51.4	63.0	70.4	75.0	77.8
Northern America	68.9	73.4	77.7	81.1	82.7
Europe	65.7	71.5	73.7	78.4	80.8
Oceania	60.9	67.7	74.4	78.4	80.6
Asia	41.3	58.4	67.4	73.9	77.1
Total fertility rate (children)					
World	5.0	3.9	2.7	2.3	2.1
More developed regions	2.8	1.9	1.5	1.7	1.9
Less developed regions	6.2	4.6	2.9	2.4	2.2
Africa	6.7	6.6	5.0	3.3	2.4
Latin America and Caribbean	5.9	4.5	2.5	2.1	2.1
Northern America	3.5	1.8	1.9	2.0	2.1
Europe	2.7	2.0	1.3	1.6	1.8
Oceania	3.9	2.8	2.4	2.2	2.1
Asia	5.9	4.2	2.5	2.1	2.1

Source: World Population Prospects: The 2000 Revision, vol. I, *Comprehensive Tables* (United Nations publication,
Sales No. E.01.XIII.8, and Corr.1).

Figure 5. Estimated and projected world population: 1950-2050

Source: *World Population Prospects: The 2000 Revision,* vol. I, *Comprehensive Tables* (United Nations publication, Sales No. E.01.III.8 and Corr.1).

Following the same trend as the population at large, the school-age population has been growing rapidly. Although school systems vary from one country to another, typically primary school students are expected to be aged 6-11 years, secondary-school students 12-17 years and students in tertiary levels 18-23 years. These age groupings will be employed here to discuss growth in the school-age population. In 2000, the school-age population, at 2 billion, was 2.3 times as large as in 1950 (887 million). During the first part of that period, the school-age population increased even more rapidly than did the population as a whole, and the school-age share of the total population grew from 35 per cent in 1950 to 38 per cent in 1975 before declining to reach 34 per cent in 2000 (table 3). Between 2000 and 2050, the school-age population is projected to increase at a slower pace, reaching 2.3 billion (25 per cent of the total population) according to the medium-variant population projections of the United Nations. However, fertility could plausibly follow the trends assumed in either the high- or the low-variant projection. If the former, the school-age population would reach 3.1 billion by 2050 (28 per cent of the total); if the latter, it would fall to 1.6 billion (21 per cent of the total).

TABLE 3. SCHOOL AGE POPULATION, 6-11, 12-17 AND 18-23 YEARS OF AGE, WORLD,
1950-2050

Sex	Age	1950	1975	2000	2025	2050
			Population (millions)			
Males	6-11	161	300	372	393	400
	12-17	153	261	358	385	398
	18-23	138	228	319	372	395
	6-23	452	788	1 048	1 151	1 193
Females	6-11	155	285	351	375	383
	12-17	146	248	339	367	381
	18-23	133	218	304	354	379
	6-23	434	750	995	1 097	1 142
Both sexes	6-11	316	585	723	769	783
	12-17	298	508	697	753	778
	18-23	272	446	623	726	773
	6-23	887	1 538	2 043	2 248	2 335
			Percentage of the total population			
Both sexes	6-11	12.6	14.4	11.9	9.7	8.4
	12-17	11.8	12.5	11.5	9.5	8.3
	18-23	10.8	11.0	10.3	9.2	8.3
	6-23	35.2	37.8	33.7	28.3	25.0

Source: World Population Prospects: The 2000 Revision, vol. I, Comprehensive Tables (United Nations publication, Sales No. E.01.XIII.8 and Corr.1).

Within the school-age group of 6 to 23 years, the distribution by age has changed only slightly during the past five decades. The primary-school-age *population* increased from 316 million in 1950, comprising 12.6 per cent of the total population, to 723 million in 2000, comprising 11.9 per cent of the total population; at the end of the 50-year period the number of children was 2.3 times the number at the beginning. However, owing to fertility decline, the primary school age population is projected to increase only by about 10 per cent, to 783 million, at the end of the next five decades. By 2050, this group will make up 8.4 per cent of the world population. The secondary-school-age population increased from 298 million in 1950 to 697 million in 2000, comprising about 11.5 per cent of the world population. By 2050, it is expected to increase to 778 million, 8.3 per cent of the total population.

1. Trends by major area and development region

Owing to the higher level of fertility and the large population base, most of the annual in-crease in the total world population and school-age population has been occurring in the less developed regions. This trend is expected to continue. Thus, with a total fertility rate of 3.8 births per woman in 1985-1990, the less developed regions were already adding 92 per cent of the total annual increment to the world population, whereas the more developed regions, with a total fertility of 1.8 births per woman, accounted for only 8 per cent of the world annual increment during that period. In 2000-2005, the total fertility rate in the less developed regions was estimated at 2.9 births, as compared with to 1.5 births in the more developed regions. During the period 2000-2005, 97 per cent of the population growth is taking place in the less developed regions. By 2025-2030, the population of the more developed regions is projected, under the medium-variant projection, to start declining, and the entire annual increment to the world population will occur in the less developed regions.

Owing to the different stages in the demographic transition in which the major areas find themselves, their growth paths differ considera-

bly, resulting in significant shifts in the geographical distribution of the world population. In 1950, 68 per cent of the world population resided in the less developed regions. The proportion has grown to 80 per cent at the present time and is projected to increase to 87 per cent in 2050 (table 1).

No major area is expected to experience as large a proportional increase in population as Africa. Africa's population is expected to increase from 794 million in 2000 to 2.0 billion in 2050, according to the medium fertility variant. Its share of the world population will increase from 13 per cent in 2000 to 21 per cent in 2050. In the same period, the European population is projected to decline from 727 million to 603 million and its share of the world population to drop from 12 to 6 per cent. So while the population of Europe was more than double that of Africa in 1950, the population of Africa is expected to be more than triple that of Europe a century later. The share of the world population in other regions will experience less marked changes over the projection period.

As a result of those changes, the world of 2050 is likely to be one in which Africa and Asia are home to more than 80 per cent of the population. China and India together will shelter about one third of the world population.

Increasingly, the large majority of the school-age population resides in the less developed regions (table 4). In 1950, 72 per cent of the school-age population (6-23 years) was living in the less developed regions and 28 per cent in the more developed regions. In 2000, 86 per cent of the school resided in the less developed regions, and by 2050, the less developed regions will be home to 90 per cent of the school-age population. The regional trends are similar when one focuses on the individual age groups at the primary, secondary and tertiary levels of education. For example, in 1950, 74 per cent of the children of primary school age were living in the less developed regions. By 2000, the proportion had increased to 88 per cent, and it is expected that by 2050, 91 per cent of the population of primary school age will live in the less developed regions.

TABLE 4. DISTRIBUTION OF THE SCHOOL-AGE POPULATION (AGES 6-23 YEARS) BY MAJOR AREA, 1950-2050

Major area	1950	1975	2000	2025	2050
			Millions		
World	887	1 538	2 043	2 248	2 335
More developed regions	252	316	284	226	222
Less developed regions	635	1 222	1 759	2 022	2 113
Africa	87	167	334	537	660
Asia	515	951	1 258	1 304	1 273
Europe	170	199	173	117	103
Latin America and the Caribbean	64	133	189	196	193
Northern America	47	81	79	83	95
Oceania	4	7	9	10	11
			Percentage		
World	100.0	100.0	100.0	100.0	100.0
More developed regions	28.4	20.5	13.9	10.0	9.5
Less developed regions	71.6	79.5	86.1	90.0	90.5
Africa	9.8	10.8	16.4	23.9	28.3
Asia	58.1	61.8	61.6	58.0	54.5
Europe	19.2	12.9	8.5	5.2	4.4
Latin America and the Caribbean	7.2	8.6	9.3	8.7	8.2
Northern America	5.3	5.3	3.9	3.7	4.1
Oceania	0.4	0.5	0.4	0.5	0.5

Source: World Population Prospects: The 2000 Revision, vol. I, Comprehensive Tables (United Nations publication, Sales No. E.01.XIII.8 and Corr.1).

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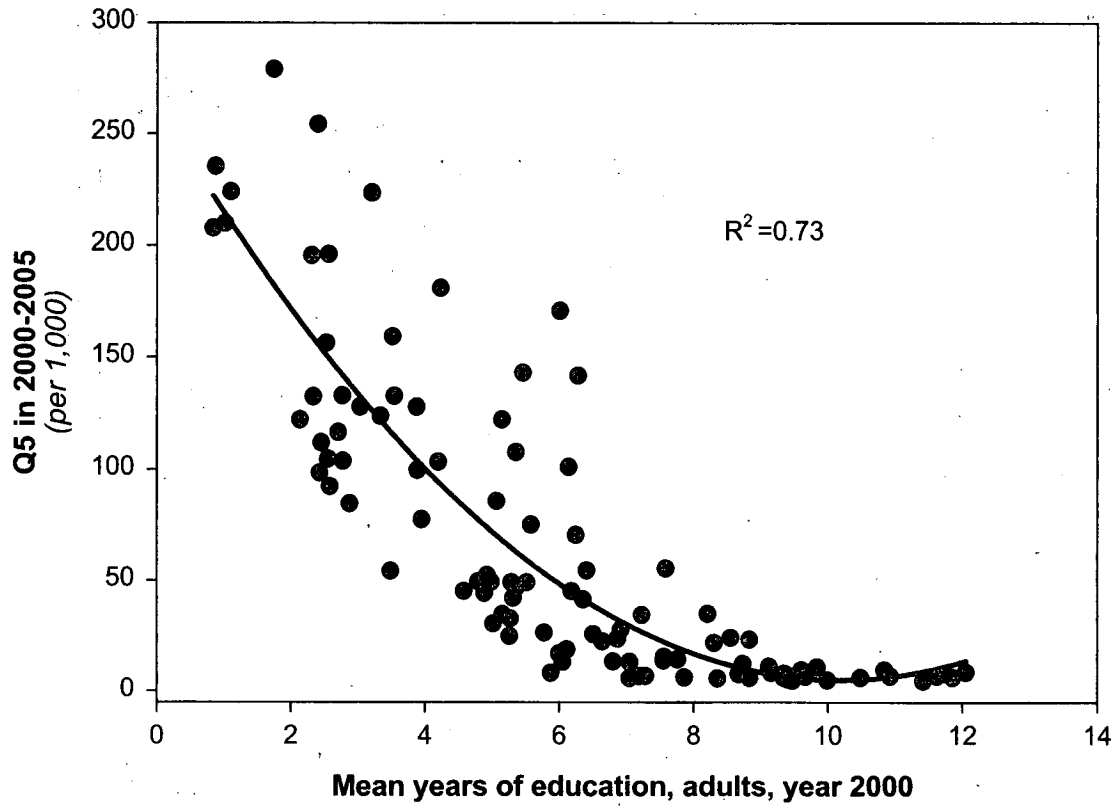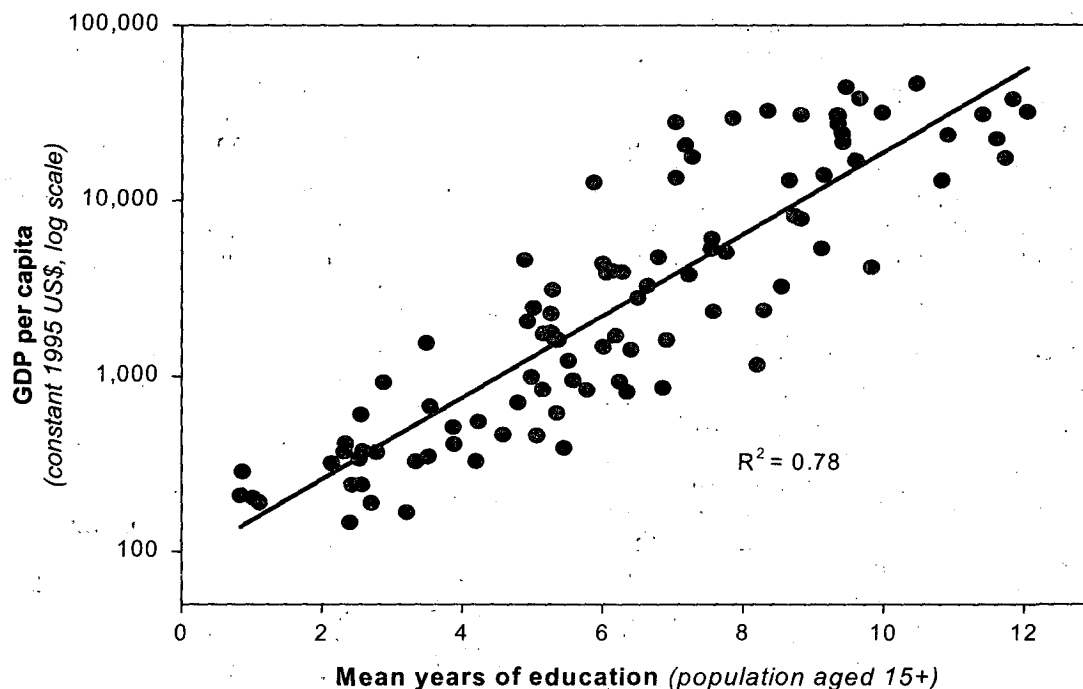The large majority of the world school-age population lives in Africa and Asia, and the predominance of those regions is increasing. In 1950, 58 per cent of the school-age population lived in Asia. Asia was followed by Europe, with 19 per cent of the school-age population, and Africa, with 10 per cent. By 2000, the regional distribution of the school-age population had shifted. Whereas Asia's share of the world school-age population remained in the range of 60 to 62 per cent, Europe's share declined to 8 per cent, or less than half of its share in 1950. Meanwhile, Africa's share of the world's school-age population increased to 16 per cent in 2000. By 2050, Asia (with 55 per cent) and Africa (with 28 per cent) together are projected to be home to 83 per cent of the world school-age population. They will be followed by Latin America and the Caribbean, whose share of the world school-age population has remained at 7 to 8 per cent during the estimation and projection period. Europe's share of the world school-age population will further decrease to 4 per cent.

In 1993, nine of the most populous developing countries of the world undertook the E-9 Initiative to attain the Education for All goals, both as a matter of fundamental human rights and as a strategy to curb population growth (United Nations Educational, Scientific and Cultural Organization, 1993). Those nine countries — Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Nigeria and Pakistan — have among the largest school-age populations in the world (table 5). The share of their respective populations that is of school age ranges between 30 and 43 per cent. For some of the countries, reaching the Education for All goals will be a daunting task. The school-age populations of Nigeria and Pakistan are projected to increase by two thirds between 2000 and 2050. However, in other countries, where fertility has already fallen to moderate or low levels, demography will be a lesser factor. For example, during the next 50 years, the school-age population is projected to decline, by 23 per cent in China and by 10 per cent in Mexico.

TABLE 5. PROJECTED CHANGE IN SIZE OF THE SCHOOL-AGE POPULATION, 2000 AND 2050, FOR NINE POPULOUS DEVELOPING COUNTRIES

| Country | School age population, ages 6-23 (millions) | | | | Percentage of population in school-age years | |
| | 2000 | 2050 | Change | | 2000 | 2050 |
			Absolute	Percentage		
China	378 869	290 381	-88 488	-23	30	20
India	371 357	374 839	3 482	1	37	24
Indonesia	77 373	73 722	-3 651	-5	36	24
Brazil	60 653	58 571	-2 082	-3	36	24
Pakistan	57 596	94 905	37 310	65	41	28
Bangladesh	56 447	68 773	12 325	22	41	26
Nigeria	49 089	82 882	33 793	69	43	30
Mexico	37 390	33 819	-3 571	-10	38	23
Egypt	27 106	27 377	271	1	40	24

Source: World Population Prospects: The 2000 Revision, vol. I, Comprehensive Tables. (United Nations publication, Sales. No. E.01.XIII.8 and Corr.1).

NOTE: Based on medium-variant population projections of the United Nations.

2. Trends in fertility and mortality in relation to the school-age population

The chances of survival from birth to school age and to adulthood have increased greatly since 1950. The increase in survival has lead to a larger school-age population and therefore a larger burden on the education sector, particularly in the less developed regions. At the same time, lower mortality means that less of society's investment in children's education is lost to premature death. More of the children who enter

school are surviving to become educated adults, parents and, eventually, elders.

At the mortality levels prevailing in 1950-1955, nearly one fourth of the children born died before they even reached the age to go to school ("early school age" refers here to ages 5-9, or 7.5 years on average).[2] By 2000-2005, survival to early school age had increased to 92 per cent, and it is expected that by 2045-2050, 97 per cent of children will survive to early school age (table

6, panel A). The gap in early childhood mortality between the more and less developed regions has narrowed since 1950-1955, although a significant gap remains. At the earlier dates, 95 per cent of children in the more developed regions survived to early school age, as compared to 71 per cent in the less developed regions, and only 66 per cent in the least developed countries. By 2000-2005, the proportions surviving to early school age in those three groups of countries were 99, 91 and 84 per cent respectively.

TABLE 6. SURVIVAL RATIOS TO SCHOOL AGE AND TO AGES 20-24 AND 60-64, 1950-2050:
WORLD AND DEVELOPMENT REGIONS

Years	World			More developed regions			Less developed regions			Least developed countries		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
A. Survival from birth to early school age[a]												
1950-1955	0.76	0.75	0.77	0.95	0.95	0.95	0.71	0.71	0.72	0.66	0.65	0.66
1975-1980	0.87	0.87	0.87	0.98	0.98	0.99	0.85	0.85	0.85	0.76	0.76	0.77
2000-2005	0.92	0.92	0.92	0.99	0.99	0.99	0.91	0.91	0.91	0.84	0.84	0.84
2020-2025	0.95	0.95	0.95	0.99	0.99	0.99	0.94	0.94	0.95	0.91	0.90	0.91
2045-2050	0.97	0.97	0.98	0.99	0.99	0.99	0.97	0.97	0.97	0.96	0.95	0.96
B. Survival from early school age to young adulthood[a]												
1950-1955	0.93	0.94	0.93	0.98	0.98	0.98	0.92	0.92	0.91	0.89	0.89	0.88
1975-1980	0.97	0.97	0.97	0.99	0.99	0.99	0.97	0.97	0.97	0.92	0.92	0.92
2000-2005	0.98	0.98	0.98	0.99	0.99	1.00	0.98	0.98	0.98	0.95	0.95	0.95
2020-2025	0.99	0.99	0.99	1.00	1.00	1.00	0.9	0.98	0.99	0.97	0.97	0.97
2045-2050	0.99	0.99	0.99	1.00	1.00	1.00	0.9	0.99	0.99	0.99	0.98	0.99
C. Survival from young adulthood through the prime working ages[a]												
1950-1955	0.59	0.55	0.63	0.75	0.70	0.80	0.52	0.49	0.55	0.47	0.44	0.49
1975-1980	0.74	0.70	0.78	0.81	0.75	0.88	0.71	0.68	0.74	0.58	0.55	0.60
2000-2005	0.79	0.75	0.83	0.85	0.79	0.90	0.77	0.74	0.80	0.59	0.56	0.61
2020-2025	0.84	0.81	0.87	0.90	0.86	0.93	0.82	0.80	0.85	0.70	0.68	0.72
2045-2050	0.88	0.85	0.90	0.92	0.90	0.95	0.87	0.85	0.89	0.80	0.78	0.82

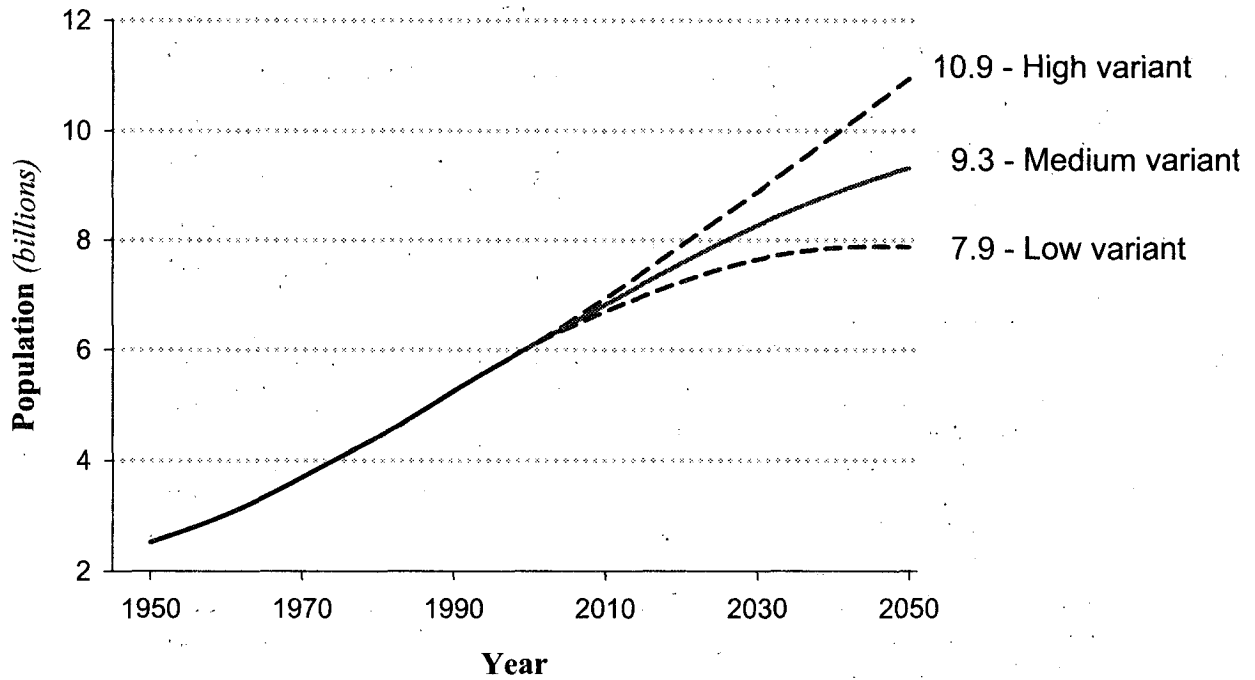Source: Based on survival estimates and projections from World Population Prospects: The 2000 Revision, vol. I, Comprehensive Tables (United Nations publication, Sales No. E.01.XIII.8 and Corr.1).

NOTE: based on ratios for both sexes.

[a] Early school age refers to age group 5-9 years; young adulthood refers to age group 20-24; prime working ages refers to age groups 20-24 to 60-64.

Mortality within the school-age years is generally lower than at other ages, although in high-mortality settings the risk of death is significant even during that period of life. For example, at the mortality levels of the less developed regions in 1950-1955, an estimated 8 per cent of children who survived to early school age died before

they reached young adulthood (ages 20-24), and in the least developed countries 11 per cent did not survive that long. By 2000-2005, those risks have dropped to 5 per cent in the least developed countries and to 2 per cent in the less developed regions as a whole (table 6, panel B).

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Declines in mortality and in fertility have both had major effects on the growth in the school-age population since 1950. If mortality had remained at the levels of 1950-1955 and fertility had followed its actual course, the world primary and secondary school-age population would have been about one fourth smaller in 2000 than it actually was (figure 6). If, on the other hand, fertility had remained at 1950-1955 levels but mortality had followed its actual course, the number of children of primary and secondary school age would have been, by 2000, about one and one half times its actual size.

Figure 6. Effects of fertility and mortality change on growth of the population aged 6-17 years, 1950 to 2000: actual growth and hypothetical growth if mortality and fertility had remained at 1950-1955 levels

With fertility constant at 1950-1955 level, actual mortality

Actual

With mortality constant at 1950-1955 level, actual fertility
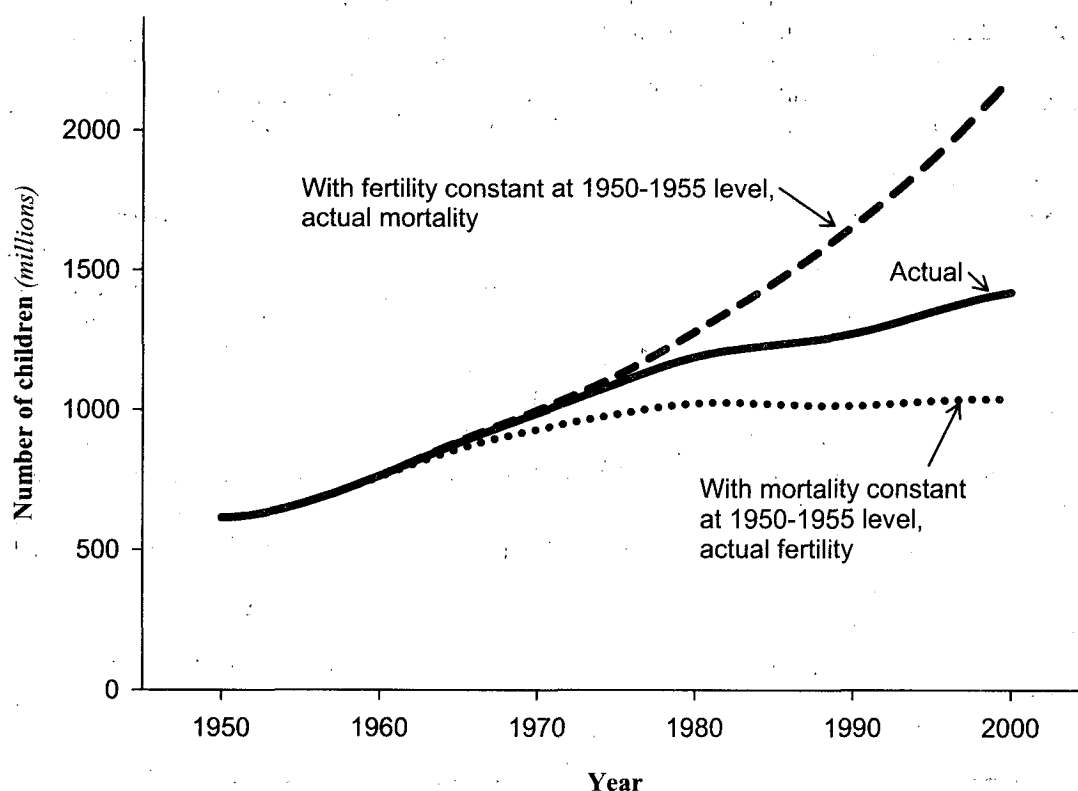
Source: Population Division of the United Nations.

If education is considered as an investment, then it is clear that high levels of adult mortality will tend to lower the returns on that investment because the benefits of education are primarily long-term ones that are realized during adult life. At the mortality rates prevailing in the less developed regions in 1950-1955, of those who reached early adulthood (ages 20-24), about half could expect to survive to the late working ages (60-64 years). In the more developed regions, about three quarters survived (table 6, panel C). By 2000-2005, survival between those ages had improved to 85 per cent in the more developed regions and to 77 per cent in the less developed regions, but only to about 60 per cent in the least developed countries.

Major improvements in later childhood and working-age mortality occurred in the 25-year

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period between 1950-1955 and 1970-1975, but progress in the following 25 years was much slower (figure 7). In fact, in the least developed countries survival was no better — and at some ages it is worse — in 2000-2005 than it was 25 years earlier. The lack of recent progress in the group of least developed countries is primarily due to the Human Immunodeficiency Virus/ Acquired immunodeficiency syndrome (HIV/ AIDS), which has substantially increased adult mortality levels in the countries hardest hit by the epidemic. Declines in working-age mortality also stalled or reversed direction in some of the more developed countries, especially for men in a number of Eastern European countries (United Nations, 2001). While declining mortality is expected to increase the economic returns on education, making a heavy investment in children's education more attractive to the parents and communities that bear the costs, the converse is also true. The effects of HIV/AIDS in particular have probably led to a substantial decrease in lifetime returns to education in the countries hardest hit by the epidemic. For instance, Jamison, Sachs and Wang (2001) estimate that for a man with 12 years of education in Botswana, expected lifetime income would be roughly two-thirds higher without the increased mortality risk due to HIV/AIDS.[3]

Figure 7. Of those reaching early school age, the percentage dying before or during the prime working ages, given mortality rates of 1950-1955, 1975-1980 and 2000-2005

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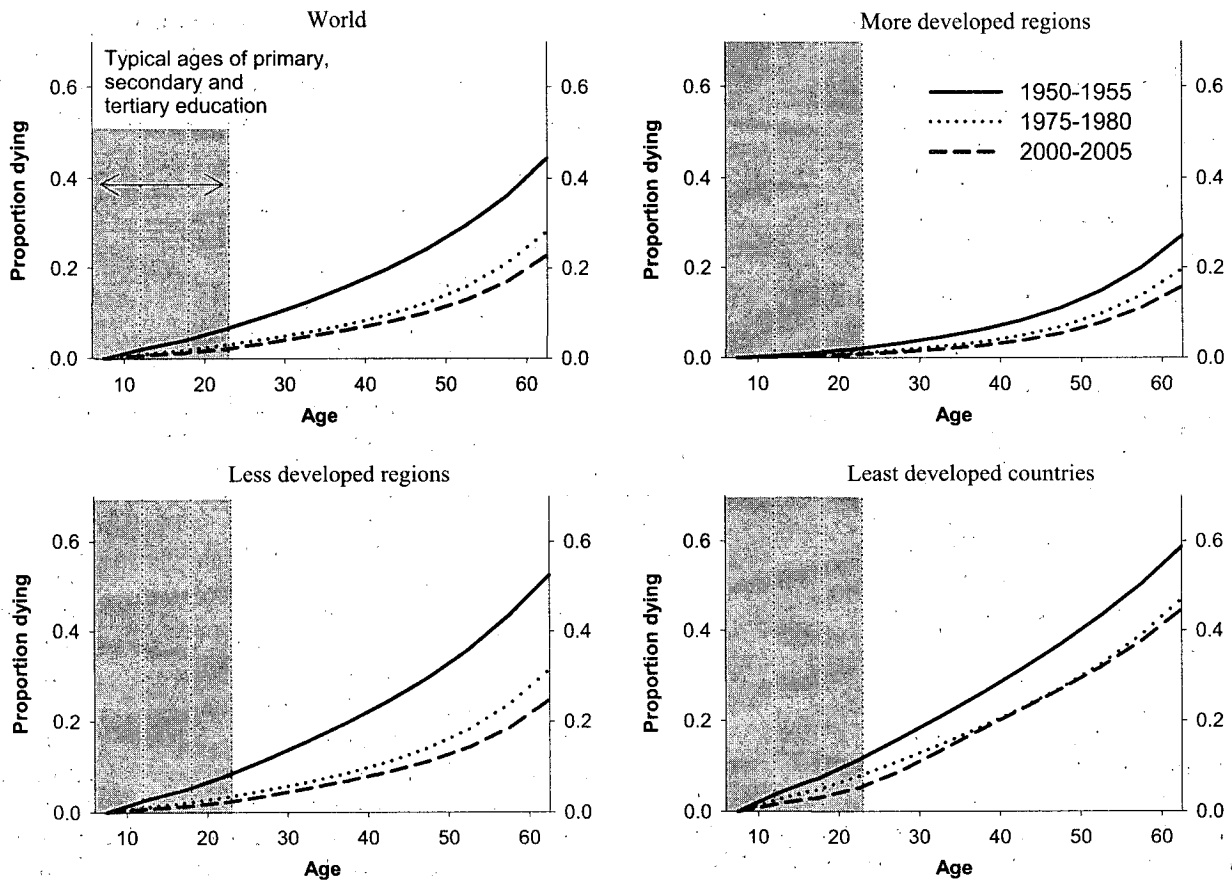
Thus, table 6 shows that even at the mortality rates prevailing today, the risk of mortality during the prime working ages is substantial, especially in the least developed countries. Although further improvements in mortality are projected to occur in all regions, the events of the recent past demonstrate that such progress cannot be taken for granted.

In summary, during the past five decades, the world has witnessed huge growth of the school-age population. The less developed regions of Africa and Asia are home to an increasing proportion of the world population as well as the school-age population. This change in the distribution of the world school-age population means that it is increasingly the less developed regions, and particularly the poorest countries, that face the burden of a rapidly expanding potential demand for schooling. The success of Governments in those regions in achieving the education goals of the Programme of Action of the International Conference on Population and Development, Education for All and the United Nations Millennium Declaration will depend on the resources that can be mobilized to reach them.

B. TRENDS IN EDUCATION

Section B provides an overview of educational attainment worldwide, based on several of the indicators for which information is most widely available and which are relevant for assessing progress towards the goals of the International Conference on Population and Development as well as those of the Education for All initiative and the Millennium Development Goals. The indicators examined here are enrolment ratios and, for adults, illiteracy and years of schooling. Chapter VI provides a more extended review of progress in education, considering such additional aspects as quality of schooling.

1. Trends in enrolment ratios

Enrolment ratios are among the most frequently used indicators of educational development. Since enrolment may be quite different from actual attendance and completion, however, these statistics are, in general, considered in conjunction with other educational indicators. The net enrolment ratio (NER) refers to the enrolment of the official age group for a given level of education expressed as a percentage of the corresponding population. Its purpose is to show the extent of participation in a given level of education by the children or young persons belonging to the official age group corresponding to that level of education.

The gross enrolment ratio (GER) refers to the total enrolment in a specific level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. It shows the general level of participation in a given level of education and is often used as a substitute for the NER when data on enrolment by age are not available. A comparison between the GER and NER can also indicate the extent of under-age and (much more often) over-age enrolment. At the primary level,[4] the GER sometimes rises substantially above 100, which is usually a sign that many children who enroll in primary school do not complete the sequence on time; the count of enrolled students may include many who attend school irregularly and many who need to repeat a grade. Thus, although a low GER unambiguously indicates that many school-age children are not attending school, at the upper end of the scale, a primary GER that is near 100 may in some cases be associated with better educational outcomes overall than a GER that is substantially above 100. Nevertheless, a GER of 100 or above does at least indicate the educational system's capacity to provide education to the large majority of school-age children.

Although the NER and GER are well-defined indicators, there are often problems associated with the data, especially with regards to the availability of data on enrolment by age and to data quality. For certain countries, it is difficult to survey all schools, especially those in remote areas. Private schooling, whose growth is an important development in several countries, is often not recorded or is incompletely covered. Over reporting of enrolment by schools for financial reasons is another problem found in some countries. In addition, comparisons over time can be affected by changes in educational systems within countries as well as by changes

in the classification of educational systems employed for international comparisons.[5]

(a) Total enrolment

World total enrolment at the primary level increased from 411 million in 1970 to 683 million in 1999. The growth took place exclusively in the less developed regions, where primary enrolment increased from 313 million in 1970 to 597 million in 1999 (table 7). In fact, rates of enrolment in primary education are increasing in the developing countries taken together: in the nine years following the World Conference on Education for All in Jomtien, Thailand, between 1990 and 1999, the primary education total enrolment grew at about 1 and one half times the pace observed during the 1980s.

Total enrolment in secondary education grew by 103 million throughout the world between 1990 and 1999. The less developed regions account for nearly all of the increase (table 7). Secondary enrolment grew during the 1990s at almost twice the pace of the 1980s, reflecting the efforts of Governments to expand participation in education beyond primary school age.

TABLE 7. TOTAL ENROLMENT IN PRIMARY AND SECONDARY EDUCATION, 1970-1998

	Total enrolment (thousands)							
Development regions	Primary education				Secondary education			
	1970	1980	1990	1999	1970	1980	1990	1999
World total	411	541	599	683	169	264	315	417
More developed regions[a]	98	92	91	86	84	105	107	112
Less developed regions	313	449	508	597	85	159	208	305

Sources: For 1970 and 1980: *UNESCO Statistical Yearbook, 1999* (Lanham, Maryland, Bernan Press, and Paris, UNESCO, 1999), table II.S.3; for 1990 and 1999: calculated from *EFA Global Monitoring Report, 2002: Education for All — Is the World on Track?* (Paris, UNESCO, 2002).

NOTE: Regional groupings correspond to those used by the United Nations Educational, Scientific and Cultural Organization and differ somewhat from those used elsewhere in the present report. See *UNESCO Statistical Yearbook, 1999,* pp. 1-6 to 1-10.

[a] Including countries with economies in transition.

(b) Gross enrolment ratios

The gross enrolment ratio in primary education in the less developed regions increased from 99 in 1990 to 101 in 1999 (table 8), and the GER in secondary education increased from 41 to 56 (table 9). In some regions, such as Latin America and the Caribbean, the gain in the GER was large for both primary and secondary school. In sub-Saharan Africa, the gain was minimal for primary education. This was, nevertheless, an improvement over the decade of the 1980s (figure 8), when many African countries experienced a decline in the GER for primary school as deteriorating economies and structural adjustment measures sometimes resulted in reduced investment in education.

According to the most recent estimates by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the GER in primary school was 95 or more in three fourths of the countries with available data in 1999. In the more developed regions, nearly all countries with data had a GER of 100 or above by 1999, but more than one fifth of the countries in the less developed regions still had a primary GER below 80 (table 10).

In 1999, the proportion of countries with a GER of 80 or more at the secondary level was over 40 per cent for the world, but was only about 20 per cent in the less developed countries. In close to half of the less developed countries, the GER in secondary education was still below 50 (table 10).

TABLE 8. GROSS ENROLMENT RATIOS IN PRIMARY EDUCATION, 1970-1999

Regions[a]	Gross enrolment ratios (per hundred)			
	1970	1980	1990	1999
World total..................................	90	96	99	100
More developed regions[a]..............	99	101	100	99
Countries with economies in transition	..	..	92	91
Less developed regions..................	81	95	99	101
Arab States and North Africa[b]...	64	79	80	91
East Asia and Oceania[c].............	91	110	118	106
Latin America and the Caribbean'	106	104	104	126
South and West Asia	70	76	92	99
Sub-Saharan Africa[d].................	52	79	77	81

Sources: For 1970 and 1980: UNESCO Statistical Yearbook, 1999 (Lanham, Maryland, Bernan Press, and Paris, UNESCO, 1999), table II.S.5; and for 1990 and 1999: EFA Global Monitoring Report, 2002: Education for All — Is the World on Track? (Paris, UNESCO, 2002).

NOTE: Regional groupings correspond to those used by United Nations Educational, Scientific and Cultural Organization and differ somewhat from those used elsewhere in the present report (see UNESCO 1999, 2002).

[a] Including countries with economies in transition.
[b] Including Somalia before 1990.
[c] For 1990 and 1999, adjusted from source to exclude Australia, Japan and New Zealand.
[d] Including Djibouti, Mauritania and Sudan before 1990.

TABLE 9. GROSS ENROLMENT RATIOS IN SECONDARY EDUCATION, 1970-1999

Regions	Gross enrolment ratios (per hundred)			
	1970	1980	1990	1999
World total	36	47	51	62
More developed regions[a]............................	76	89	92	93
Countries with economies in transition	..	..	87	74
Less developed regions	23	35	41	56
Arab States and North Africa[b]	20	39	50	60
East Asia and Oceania[c].......................	25	44	48	62
Latin America and the Caribbean.......	27	44	49	82
South and West Asia	23	28	40	52
Sub-Saharan Africa[d]..........................	7	18	20	24

Sources: For 1970 and 1980: UNESCO Statistical Yearbook, 1999 (Lanham, Maryland, Bernan Press, and Paris, UNESCO, 1999), table II.S.5; and for 1990 and 1999: EFA Global Monitoring Report, 2002: Education for ALL — Is the World on Track? (Paris, UNESCO, 2002).

NOTE: Regional groupings correspond to those used by United Nations Educational, Scientific and Cultural Organization and differ somewhat from those used elsewhere in the present report. See UNESCO (1999, 2002).

[a] Including countries with economies in transition.
[b] Including Somalia before 1990.
[c] For 1990 and 1999, adjusted from source to exclude Australia, Japan and New Zealand.
[d] Including Djibouti, Mauritania and Sudan before 1990.

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Figure 8. Primary school gross enrolment ratio (GER) in developing countries, 1970-1999
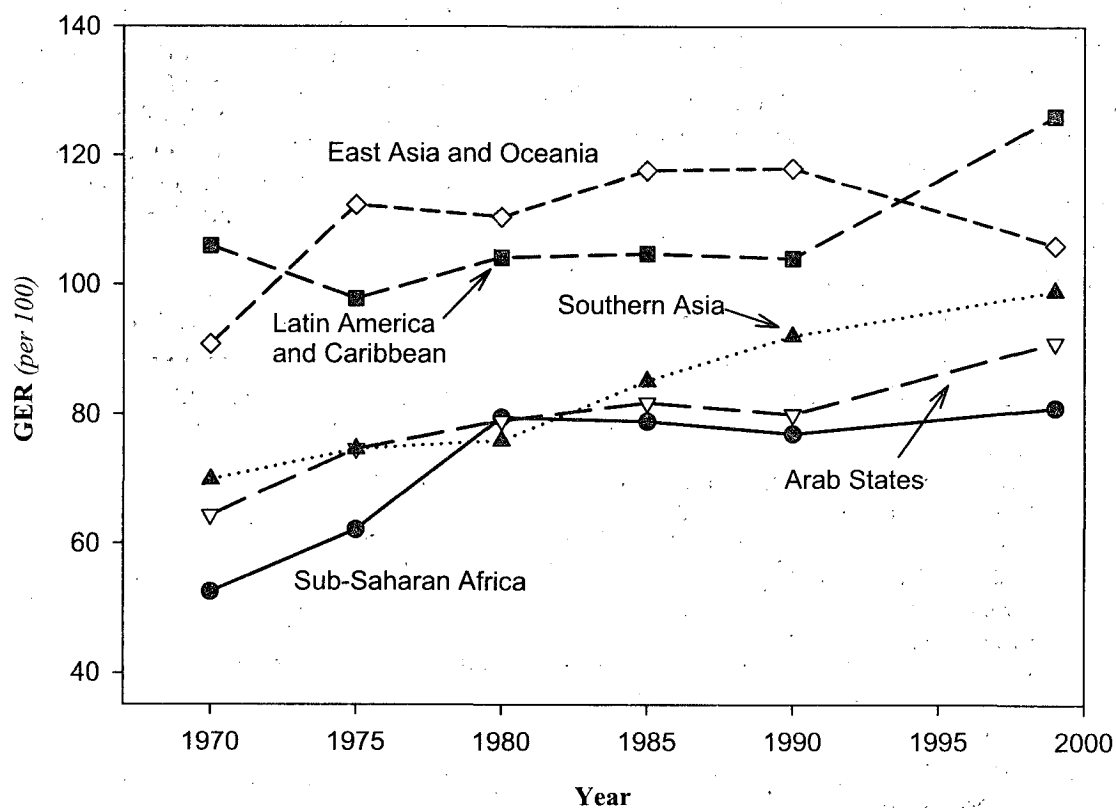
Sources: Table 8; and *UNESCO Statistical Yearbook, 1999* (Lanham, Maryland, Bernan Press, and Paris, UNESCO, 1999).

TABLE 10. DISTRIBUTION OF COUNTRIES ACORDING TO THE GROSS ENROLMENT RATIO (GER) FOR PRIMARY AND SECONDARY SCHOOL, 1999

| | Primary education | | | | Secondary education | | | |
| | Percentage of countries with GER | | | Number of | Percentage of countries with GER | | | Number of |
Development regions	95 or over	80-94	less than 80	Countries	80 or over	50-79	less than 50	countries
World total	74	11	15	160	43	25	31	153
More developed countries[a]	96	4	0	46	91	9	0	46
Less developed countries	65	14	21	114	22	33	45	107

Source: UNESCO Institute for Statistics, statistical tables, available from http://www.uis.unesco.org. Path: Statistical tables/Education/ Gross and New Enrolment Ratios, primary; or Gross and Net Enrolment ratios, secondary (accessed 28 December 2002).

NOTE: For some countries, data are for the 1998/1999 school year, if data for the 1999/2000 school year were not available.

[a] Including countries with economies in transition.

(c) Net enrolment ratios

By 1999, the average net enrolment ratio in primary education was over 80 for the world as a whole. The average NER was 96 in the highly industrialized regions of North America and Western Europe and in Latin America and the Caribbean, although East Asia and Oceania were not far below that level. The ratio was lowest in sub-Saharan Africa (57) and Central Asia (69) (table 11).

By 1999, about one fourth of the less developed countries for which estimates were available had achieved a net enrolment ratio in primary education of 95 or over, while in 40 per cent of the countries the NER was below 80 (table 12). Regarding the NER in secondary school, the median ratio for countries with data was 68 worldwide. Thirty per cent of all countries with data had achieved a ratio of 80 or more, but most of them were in the more developed regions. In the less developed regions, under 5 per cent of countries had reached that level, and over half the countries had secondary NERs below 50 (table 12).

TABLE 11. NET ENROLMENT RATIOS IN PRIMARY AND SECONDARY EDUCATION, 1999

Regions[a]	Primary[a]	Secondary[b]
World	83	68
Countries with economies in transition	79	..
Developed countries[c]	97	..
Developing countries[c]	82	..
Arab States and North Africa	79	67
Central and Eastern Europe	87	85
Central Asia	69	..
East Asia and Oceania	93	55
Latin America and the Caribbean	96	61
North America and Western Europe	96	89
South and West Asia	79	..
Sub-Saharan Africa	57	21

Source: EFA Global Monitoring Report, 2002: Education for All — Is the World on Track? (Paris, UNESCO, 2002).

NOTE: Regional groupings correspond to those used by UNESCO and differ somewhat from those used elsewhere in the present report.

[a] Weighted means.
[b] Median values.
[c] Excluding countries with economies in transition.

TABLE 12. DISTRIBUTION OF COUNTRIES ACCORDING TO THE NET ENROLMENT RATIO (NER) FOR PRIMARY AND SECONDARY SCHOOL, 1999

	Primary education				Secondary education			
	Percentage of countries with NER:			Number of Countries	Percentage of countries with NER:			Number of countries
Development regions	95 or over	80-94	less than 80		80 or over	50-79	less than 50	
World total	37	35	29	139	30	36	34	109
More developed countries[a]	60	40	0	40	79	21	0	38
Less developed countries	27	32	40	99	4	44	52	71

Source: UNESCO Institute for Statistics, statistical tables, available from http://www.uis.unesco.org. Path: Statistical tables/Education/Gross and Net Enrolment Ratios, primary; or Gross and Net Enrolment ratios, secondary (accessed 28 December 2002).

NOTE: For some countries, data are for the 1998/1999 school year, if data for the 1999/2000 school year were not available.

[a] Including countries with economies in transition.

2. Trends in literacy

In assessing literacy levels, it is important to define literacy in a way that is relevant to the local context and at the same time permits international comparisons. In fact, literacy has been given a variety of interpretations over the years. During the 1990s, a broader concept of literacy as functional competence in society gained prominence. Many contemporary definitions consider multiple levels and kinds of literacy. The impact of technology and the consequent need for more people to become technologically literate is a one example. Visual literacy including the ability to read graphs and diagrams is another.

Minimal definitions, however, continue to be used, especially for international comparisons. Most countries follow the UNESCO standard definition of basic literacy, although the criteria and methods used during actual data collection to determine whether a person is literate or not may vary from country to country. According to the revised recommendation concerning the *International Standard Classification of Education 1997* (UNESCO, 1997), the adult literacy rate is defined as the percentage of the population aged 15 years or over who can both read and write with understanding a short simple statement about his/her everyday life.

Most countries in the more developed regions no longer routinely gather data about basic literacy according to the UNESCO definition because such basic literacy has become almost universal. Instead, the member countries of the Organisation for Economic Co-operation and Development (OECD) are paying increased attention to the problem of functional illiteracy. In general, they use broader definitions of literacy.

Literacy is usually estimated on the basis of self-declaration or declaration by the head of the household during surveys or census-taking. This approach has the advantage of requiring only a few easy-to-administer questions. However, it also sometimes gives rise to concerns about the reliability and comparability of the data.

(a) Adult illiteracy

Over the thirty-year period between 1970 and 2000, estimated adult basic illiteracy rates in the world declined from 37 to 20 per cent, mostly owing to the effects of increases in primary school enrolments. By 2015, adult illiteracy is projected to decrease further to 15 per cent (table 13). Even though there has been substantial progress in all regions, illiteracy remains common in much of the developing world. In 2000, about one fourth of the adults in the less developed regions were illiterate, and almost half of the adults in the least developed countries. The level was 45 per cent in South and Western Asia, 40 per cent in sub-Saharan Africa and in the Arab States and North Africa, and under 15 per cent in Eastern Asia and Oceania and in Latin America and the Caribbean. Within regions, there are large differences between countries. In 2000 in Africa, for instance, while a group of countries could be found with rates of 50 per cent or more, in other countries such as Réunion, South Africa and Zimbabwe the rates were below 15 per cent.

The South and West Asia region has fallen behind Africa and Western Asia in the pace of reduction of illiteracy. It was only in the early 1990s that South and West Asia crossed the 50 per cent literacy threshold, and the level is projected still to be 34 per cent by 2015 (table 13). In sub-Saharan Africa, where the adult illiteracy rate exceeded that of South and West Asia in 1970, the level projected for 2015 is 26 per cent.

Despite the worldwide gains observed in literacy rates, the number of adult illiterates remains very high and almost constant because of the impact of population growth. In 1990, some 879 million adults in the world were illiterate; by the year 2000, their number is estimated to have declined only slightly, to 862 million. The number of illiterate adults increased between 1990 and 2000 in sub-Saharan Africa, the Arab States and North Africa, and South and West Asia, and in the least developed countries and South and West Asia that number is expected to continue growing through 2015 (table 13).

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Regions	Year	Population aged 15 years and over						
		Illiteracy rate (percentage)				Illiterate population (millions)		
		Both sexes (1)	Male (2)	Female (3)	Gender gap (3)-(2) (4)	Both sexes (5)	Male (6)	Female (7)
World	1970	37	29	45	16	847	327	520
	1990	25	18	31	13	879	325	554
	2000	20	15	26	11	862	313	549
	2015	15	11	19	8	799	292	507
More developed regions[a]	1970	5.5	3.2	7.6	4.4	43	12	31
	1990	2.3	1.5	3.1	1.6	22	7	15
	2000	1.4	1.0	1.9	0.9	15	5	10
	2015	0.7	0.6	0.8	0.2	8	3	5
Less developed regions	1970	52	40	65	24	804	315	489
	1990	33	24	42	18	857	318	539
	2000	26	19	34	15	847	308	539
	2015	19	14	24	10	792	289	503
Least developed countries	1970	73	62	84	23	128	54	74
	1990	57	46	68	22	165	66	99
	2000	48	38	58	20	185	73	112
	2015	36	28	44	15	207	82	125
Arab States and North Africa	1970	71	57	85	29	48	19	29
	1990	50	36	64	28	62	23	39
	2000	40	28	52	24	67	24	43
	2015	28	20	37	17	71	25	46
East Asia and Oceania	1970	43	29	56	27	295	104	192
	1990	20	12	28	16	231	71	160
	2000	13	8	19	12	185	53	132
	2015	7	4	10	6	113	30	83
Latin America and the Caribbean	1970	26	22	30	8	43	18	25
	1990	15	13	17	3	42	18	24
	2000	11	10	12	2	39	17	22
	2015	7	7	7	1	33	15	18
South and West Asia	1970	68	55	82	27	301	126	175
	1990	52	40	66	25	382	152	230
	2000	45	34	56	23	412	160	253
	2015	34	25	44	18	437	166	271
Sub-Saharan Africa	1970	72	62	82	19	108	45	62
	1990	51	41	61	20	131	52	80
	2000	40	31	48	17	136	53	83
	2015	26	20	32	11	133	52	81

Source: UNESCO Institute for Statistics, Estimates and projections of youth and adult illiteracy, July 2002 assessment.

NOTES: Regional groupings correspond to those used by UNESCO and differ somewhat from those used elsewhere in the present report. More developed regions and countries with economies in transition include: North America, Europe (not including Cyprus, Malta or Turkey), Central Asia (except Mongolia), Australia, Japan and New Zealand. Less developed regions include all countries not included in the more developed and transition group. Population data are based on United Nations population estimates, 2000.

[a] Including countries with economies in transition.

(b) Youth illiteracy

The youth illiteracy rate, which refers to the rate for the 15-24 age group, reflects the outcome of the more recent basic education process. According to UNESCO estimates, the world youth illiteracy rate is estimated to have dropped from 25 per cent in 1970 to 16 per cent in 1990 and 13 per cent in 2000 (table 14). If this trend continues, the rate is likely to decline to 10 per cent by the year 2015. In absolute numbers, the youth illiterate population in the world decreased from an estimated 157 million in 1990 to some 141 million in 2000, and is projected to decline to 113 million in 2015.

For the less developed regions as a whole, the youth illiteracy rate is estimated to have decreased from 19 to 16 per cent during the period 1990 to 2000 and is expected to fall to 11 per cent in 2015 if current trends continue. Progress in young adult literacy has also been seen in the least developed countries, where the illiteracy rate is estimated to have decreased from 44 to 35 per cent during the 1990s and is projected to decline to 23 per cent by 2015. Among the developing regions, the current estimates of youth literacy rates range from only 3 per cent in East Asia and Oceania to 30 per cent in South and West Asia (table 14).

TABLE 14. YOUTH ILLITERACY RATE, ILLITERATE POPULATION AND GENDER GAP, 1970-2015

		Population aged 15-24 years						
		Illiteracy rate (percentage)				Illiterate population (millions)		
		Both sexes (1)	Male (2)	Female (3)	Gender gap (3)-(2) (4)	Both sexes (5)	Male (6)	Female (7)
Regions	Year							
World	1970	25	18	33	15	168	61	107
	1990	16	12	20	8	157	60	97
	2000	13	10	17	7	141	55	86
	2015	10	7	12	4	113	46	67
More developed regions[a]	1970	1.0	0.8	1.2	0.4	2	1	1
	1990	0.4	0.4	0.5	0.1	1	0	0
	2000	0.3	0.3	0.3	0.1	0	0	0
	2015	0.2	0.2	0.2	0.0	0	0	0
Less developed regions	1970	34	24	44	20	166	60	106
	1990	19	14	24	10	157	60	97
	2000	16	12	20	8	140	54	86
	2015	11	9	13	5	113	45	67
Least developed countries	1970	63	50	75	25	36	15	22
	1990	44	35	53	19	44	18	27
	2000	35	27	42	15	46	18	28
	2015	23	19	27	8	44	18	26
Arab States and North Africa	1970	57	41	74	33	13	5	8
	1990	34	23	45	22	14	5	9
	2000	24	17	31	15	13	5	8
	2015	15	11	19	7	10	4	6
East Asia and Oceania	1970	17	9	25	17	37	10	27
	1990	5	3	7	4	18	6	12
	2000	3	2	4	2	9	3	6
	2015	1	1	2	1	4	2	2
Latin America and the Caribbean	1970	16	14	18	3	8	4	5
	1990	7	7	7	0	6	3	3
	2000	5	5	5	-1	5	3	2
	2015	3	3	3	-1	3	2	1

TABLE 14 (*continued*)

Regions	Year	Illiteracy rate (percentage)				Illiterate population (millions)		
		Both sexes (1)	Male (2)	Female (3)	Gender gap (3)-(2) (4)	Both sexes (5)	Male (6)	Female (7)
South and West Asia	1970	57	43	72	29	77	30	47
	1990	38	29	49	20	87	34	53
	2000	30	23	39	16	83	32	51
	2015	21	16	26	10	69	27	42
Sub-Saharan Africa	1970	59	47	71	24	29	12	18
	1990	33	26	41	15	31	12	19
	2000	24	19	29	10	30	12	18
	2015	14	12	17	5	26	11	15

Population aged 15-24 years

Source: UNESCO Institute for Statistics, Estimates and projections of youth and adult illiteracy, July 2002 assessment.

NOTES: Regional groupings correspond to those used by UNESCO and differ somewhat from those used elsewhere in the present report. More developed regions and countries with economies in transition include: North America, Europe (not including Cyprus, Malta or Turkey), Central Asia (except Mongolia), Australia, Japan and New Zealand. Less developed regions included all countries not includes in the more developed and transition group. Population data are based on United Nations population estimates, 2000.

[a] Including countries with economies in transition.

3. Educational attainment

The educational attainment of the adult population has been estimated and projected by Barro and Lee (2000) for 1960-2000, using a perpetual inventory method in which census and survey observations on levels and years of education attained (as compiled by UNESCO and other sources) are used as benchmark stocks and new school entrants are used as flows that are added to the stocks, with an appropriate time lag.[6] The estimates should not be regarded as exact, given the lack of data for some countries and the assumptions required to derive the estimates for all dates, but they do provide a basis for a broad comparison of educational attainment and trends across both more and less developed regions.

Considering the average for all countries with data available, between 1970 and 2000 the proportion of population aged 15 and over with no school and with only primary schooling decreased, while the proportion reaching secondary or higher levels of education increased (table

I.15). An estimated 57 per cent of the total adult population had completed primary school in 2000, 85 per cent in more developed countries and 43 per cent in developing countries.

Among the developing regions, Western Asia and North Africa and Latin America and the Caribbean are the regions exhibiting the greatest declines in the proportion of the adult population with no schooling between 1970 and 2000. Those same regions and South Asia show the largest increases in the proportions reaching the secondary or higher educational levels (table 15).

The estimated average number of years of education attained by the adult population increased at the world level from 5.2 years in 1970 to 6.7 years in 2000. Although the attainment gap between more and less developed countries narrowed somewhat, it remains large, at 4.6 years in 2000 (an average of 9.7 years attained in the more developed countries and 5.1 years in developing countries). As of 2000, average attainment 3.5 years was lowest in sub-Saharan Africa.

TABLE 15. EDUCATIONAL ATTAINMENT AND AVERAGE YEARS OF SCHOOL OF THE POPULATION
AGED 15 YEARS AND OVER, 1970-2000

Region (N of countries with data)	Year	Highest level attained				Primary complete or more	Average years of school			
		No School	Any Primary	Any Secondary	Any Higher		Both sexes	Females	Males	Gender ratio
	Year	(percentage)								100x(8)/(9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
World (109)	1970	31	40	24	5	49	5.2	4.7	5.6	85
	1990	26	30	34	10	56	6.4	5.9	6.9	86
	2000	24	32	31	13	57	6.7	6.1	7.2	85
More developed countries (36)	1970	4	47	40	9	77	7.9	7.6	8.2	93
	1990	4	27	51	19	84	9.4	9.2	9.7	95
	2000	3	27	45	25	85	9.7	9.6	9.9	97
Developing countries (73)	1970	56	33	9	2	23	2.7	1.9	3.4	57
	1990	42	32	22	5	37	4.4	3.6	5.2	69
	2000	34	35	25	7	43	5.1	4.3	5.9	73
Western Asia and North Africa (11)	1970	70	18	11	2	19	2.1	1.4	2.8	51
	1990	43	28	24	6	39	4.4	3.6	5.2	69
	2000	32	30	30	9	49	5.4	4.7	6.2	76
Sub-Saharan Africa (22)	1970	64	27	9	1	16	2.1	1.6	2.6	60
	1990	46	38	15	1	24	3.1	2.5	3.8	65
	2000	43	38	17	2	28	3.5	3.0	4.0	74
Latin America and the Caribbean (23)	1970	31	52	14	3	35	3.8	3.5	4.1	85
	1990	17	53	21	8	43	5.3	5.2	5.4	97
	2000	15	50	25	11	50	6.1	5.8	6.3	92
East Asia and Oceania (10)	1970	35	49	13	3	36	3.8	3.1	4.5	68
	1990	26	36	30	7	56	5.8	5.3	6.4	84
	2000	20	36	33	12	63	6.7	6.2	7.2	86
South Asia (7)	1970	69	23	6	1	16	2.1	1.1	3.0	37
	1990	55	21	21	3	31	3.9	2.6	5.0	52
	2000	45	28	23	4	37	4.6	3.4	5.7	59

Source: R. J. Barro and J. Lee International Data on Educational Attainment: Updates and Implications. CID Working Paper No. 42 Cambridge, Massachusetts (Harvard University, 2000).

4. Gender disparities in education

(a) Gender disparities in enrolment

The gender parity index (GPI) is the ratio of the enrolment ratio for girls to the enrolment ratio for boys. Based on gross enrolment ratios, the GPI in the developed countries is near one for primary enrolments and slightly above one for secondary enrolments; the latter indicates a higher enrolment ratio for girls than boys. However, in most developing countries a substantial gender gap in enrolment in favour of boys remains at both the primary and secondary levels of education (tables 16 and 17).

TABLE 16. GROSS ENROLMENT RATIOS IN PRIMARY SCHOOL BY SEX AND GENDER PARITY INDEX
1990 AND 1999

Region	1990			1999		
	Boys	Girls	GPI	Boys	Girls	GPI
World	106	93	0.88	104	97	0.93
Countries with economies in transition	92	92	1.00	91	90	0.99
Developed countries[a]	105	105	1.00	103	102	0.99
Developing countries	107	92	0.86	105	96	0.92
Arab States and North Africa	90	71	0.79	97	85	0.88
Central and Eastern Europe	104	100	0.96	96	93	0.96
Central Asia	86	88	1.02	89	88	0.99
East Asia and Oceania	120	114	0.95	106	106	1.00
Latin America and the Caribbean	105	103	0.98	128	125	0.98
North America and Western Europe	105	105	1.00	103	102	0.99
South and West Asia	104	78	0.75	108	90	0.84
Sub-Saharan Africa	87	68	0.79	86	76	0.89

Source: EFA Global Monitoring Report 2002: Education for All — Is the World On Track? (Paris, UNESCO, 2002).
NOTE: Regional groupings correspond to those used by UNESCO and differ somewhat from those used elsewhere in the present report. GPI = gender parity index.

[a] Excluding countries with economies in transition.

TABLE 17. GROSS ENROLMENT RATIOS IN SECONDARY SCHOOL BY SEX AND
GENDER PARITY INDEX, 1990 AND 1999

Region	1990			1999		
	Boys	Girls	GPI	Boys	Girls	GPI
World	55	46	0.83	65	60	0.93
Countries with economies in transition	87	89	1.02	73	76	1.04
Developed countries[a]	94	96	1.02	105	108	1.03
Developing countries	47	35	0.75	59	52	0.89
Arab States and North Africa	57	44	0.78	63	58	0.92
Central and Eastern Europe	80	79	0.98	79	80	1.00
Central Asia	89	86	0.98	44	43	0.99
East Asia and Oceania	54	46	0.84	67	63	0.94
Latin America and the Caribbean	48	50	1.04	80	86	1.08
North America and Western Europe	94	95	1.02	104	107	1.03
South and West Asia	49	30	0.61	59	44	0.75
Sub-Saharan Africa	23	18	0.79	26	22	0.85

Source: EFA Global Monitoring Report, 2002: Education for All — Is the World On Track? (Paris, UNESCO, 2002).
NOTE: Regional groupings correspond to those used by UNESCO and differ somewhat from those used elsewhere in the present report. GPI = gender parity index.

[a] Excluding countries with economies in transition.

From 1990 to 1999, the GPI in the developing countries increased from 0.86 to 0.92 for primary school age enrolments and from 0.75 to 0.89 for secondary school enrolments. The proportion of girls in the total primary and secondary enrolments remains considerably lower than that of boys in many parts of the developing world, notably in South and West Asia, where the GPI for primary school was still 0.84 in 1999 and the GPI for secondary school was lower at 0.75. Substantial gender gaps also remain in the Arab States and North Africa and in sub-Saharan Africa. Nevertheless, gender gaps in primary-school-age enrolment are significantly lower in Latin America and the Caribbean and in East Asia and Oceania, where the gap is currently closing and in some countries is nonexistent (table 16). For secondary school enrolments, the

GPI is already above one in Latin America and the Caribbean (table 17). For Africa and Asia in particular, there are large differences between countries in the degree of gender disparity in enrolment ratios (figures 9 and 10). Even in Africa and Asia, there are some countries where enrolment ratios for girls exceed those for boys, although disparities to the disadvantage of girls are both more common and in general much larger. The range in values of the GPI is greater for secondary school than for primary-school enrolments. In the more developed countries and in Latin America and the Caribbean secondary enrolments for girls exceed those for boys in a majority of cases. However, in a majority of African and Asian countries girls have substantially lower enrolment ratios than boys at both the primary and secondary levels.

Figure 9. Primary school gender parity index (GPI): distance from equality
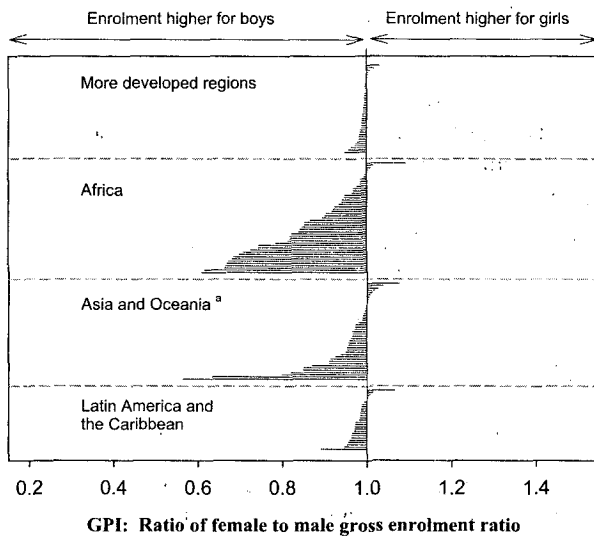
GPI: Ratio of female to male gross enrolment ratio

Source: UNESCO Institute for Statistics (2002).
a Excluding Japan, which is included in the more developed group.
NOTE: Each narrow bar represents, for a single country, the distance of the gender parity index from equality. Latest available date for each country, 1998/1999 to 1999/2000.

Figure 10. Secondary school gender parity index (GPI): distance from equality
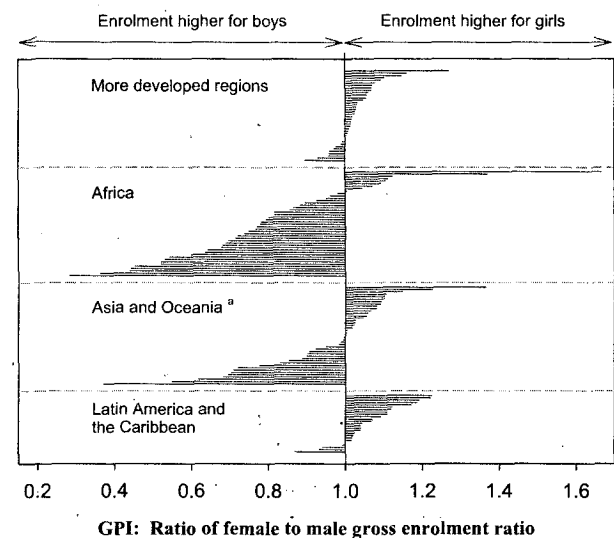
GPI: Ratio of female to male gross enrolment ratio

Source: UNESCO Institute for Statistics (2002).
a Excluding Japan, which is included in the more developed group.
Note: Each narrow bar represents, for a single country, the distance of the gender parity index from equality. Latest available date for each country, 1998/1999 to 1999/2000.

(b) Gender disparities in literacy

In general, gender disparities in education are relatively higher at the level of the adult population than for children currently attending school.

However, a trend towards lower gender literacy gaps can be observed in all regions of the world (table 13). During the 1990s, the gender gap in adult illiteracy rates decreased globally from 13

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percentage points in 1990 to 11 points in 2000 and is projected to decrease further to 8 points in 2015. For the less developed regions taken together, the gender gap declined from 18 percentage points in 1990 to 15 in 2000 and is projected to fall to 10 in 2015. With the exception of Latin America and the Caribbean, however, where the gap is almost closed, in all other developing regions women remain disproportionately disadvantaged in terms of literacy. The gap is over 10 percentage points in East Asia and Oceania, over 15 percentage points in sub-Saharan Africa and well over 20 percentage points in both South and West Asia and in the Arab States and North Africa.

Large gender disparities for young adults can also be found in sub-Saharan Africa, the Arab States and North Africa and South and West Asia,

with gender gaps in youth illiteracy of 10, 15 and 16 percentage points respectively in the year 2000 (table 14). Conversely, the gender gap in youth illiteracy in this same year was estimated to be only 2 percentage points in East Asia and Oceania, and was slightly in the favour of young women in Latin America and the Caribbean. In 26 countries the female youth illiteracy rate is estimated to be at least 20 percentage points higher than that of the corresponding male population in 2000. A substantial number of countries, on the other hand, have already achieved gender equality in literacy rates among the youth population or are close to this goal, including many of the countries with large populations such as Brazil, China, Indonesia and Mexico (figure 11).

Figure 11. Gender gap in youth illiteracy: 2000

Male minus female illiteracy at ages 15-24 (*percentage points*)
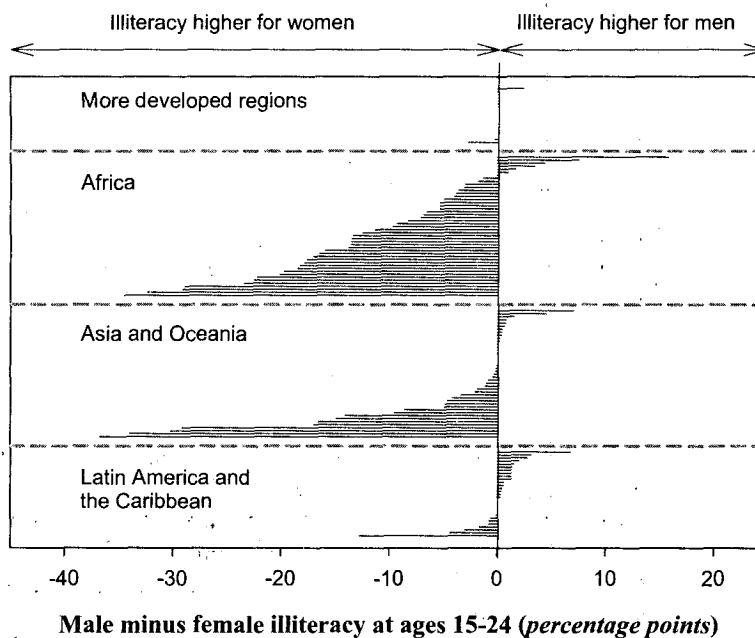
Source: UNESCO Institute for Statistics (2002).

(c) Gender disparities in educational attainment

As would be expected from the patterns discussed above, gender gaps in adult educational attainment are small in the more developed countries and in Latin America and the Caribbean. Other areas still have substantial gender gaps. In South Asia, where the gap is largest, the average woman had received about 60 per cent as much schooling as the average man as of year 2000. In the areas with sizeable gender gaps, the gaps have generally become smaller over time, a pattern consistent with those for enrolment and illiteracy, as reviewed in sections B.4 (a) and B.4 (b).

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C. INTERRELATIONSHIPS BETWEEN POPULATION, EDUCATION AND DEVELOPMENT

In the decades following World War II, education was a high priority for many Governments, and educational systems underwent a rapid expansion. By the 1980s, however, faltering economies, debt-service burdens and structural adjustment programmes led some countries to reduce the provision of public services, including education. For example, Madagascar slashed government spending on education by one half in order to service its debt (Mingat and Winter, 2002). It was generally in the poor countries where education budgets suffered the most (figure 12), and enrolment ratios declined in some cases, especially in sub-Saharan Africa.

Figure 12. Public spending on education as a percentage of gross domestic product, by national level of income per capita, 1960-1998
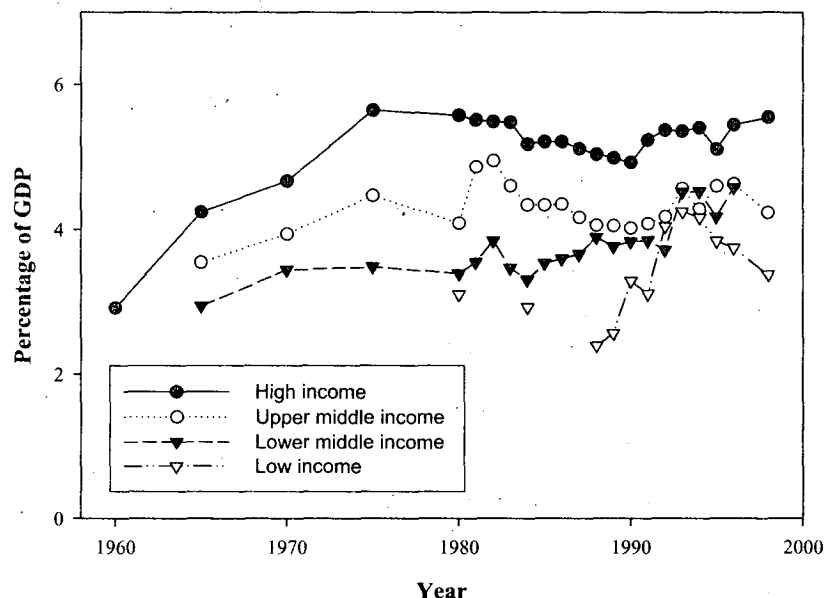
Source: World Bank, *World Development Indicators, 2002,* CD-ROM (Washington, D.C., 2002).

During the period after World War II, the understanding of the process of development was evolving in ways that accorded education a more prominent role. Initially, professional economists concerned with development focused mainly on growth in output as the indicator of progress and especially on industrialization and trade issues as determinants of growth. While there was surely a consensus that a high level of economic development could not be achieved with a largely illiterate populace, formal economic models generally omitted any attention to "human capital" as a determinant of economic growth. This gradually changed. A growing number of analysts pointed to evidence that human capital — particularly education and health — had important economic benefits society-wide. Beyond that, the whole concept of development was shifting from a narrow economic focus to one that encompassed the broader relationships between socio-economic development, poverty and the consequences for the environment. There was, too, a greater recognition that, over and above its strictly economic effects, education helped foster progress towards other goals such as better health and longer life, participation in civil society and access to a wider range of opportunities.

Research has established that education boosts individual incomes in a wide variety of settings, although the size of the return varies over time and place. Psacharopoulos and Patrinos (2002), reviewing numerous studies in countries at all levels of development, found an average private

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return on completion of primary education of 27 per cent. Relative rates of return on an additional year of schooling tend to be higher in countries with lower per capita incomes. Average returns on schooling are highest in Latin America and the Caribbean and sub-Saharan Africa, followed by Asia. Where traditional practices or other factors limit the participation of women in the labour force or constrain the types of employment in which women can engage, the return on investment from female education is reduced. Overall, however, women receive a higher return to investment in schooling than men.

The preceding estimates of economic rates of return to education do not generally factor in the effects of adult mortality. As noted above, high adult mortality lowers the expected returns to education. While this effect is trivial in low-mortality settings, it can be significant where mortality levels are high. Recent evidence also indicates that decisions to stay in school are sensitive to expected economic returns, and the latter effect is sufficiently large to suggest that in high-mortality settings mortality decline could help boost enrolment rates significantly through its effects on expected economic returns (Meltzer, 1992 and 2001; Jamison, Sachs and Wang, 2001). Other researchers have considered the mutual relationships of health, education and economic returns. Increased weight at birth and better health and nutrition, particularly for young children, have been found to improve children's learning and contribute to earnings in adulthood. (Alderman, Hoddinott and Kinsey, 2002; Behrman and Rosenzweig, 2002; Food and Nutrition Information Center, 2001).

Cross-national macro economic studies have confirmed that education has important positive effects on productivity and economic growth (Sianesi and Van Reenen, 2002). Although for lack of better indicators most studies employ indicators of school attendance or levels and years completed, the quality of education — which varies greatly — also has a major effect on economic outcomes (Barro, 2002; Hanushek and Kimko, 2000; Sianesi and Van Reenen, 2002). It does not follow from the results that education by itself is sufficient to achieve

economic growth in the absence of enabling institutional and civil conditions, and there may be a threshold level of education before faster economic growth can be expected (Azariadis and Drazen, 1990). However, countries that have attempted to boost economic growth while neglecting investment in human capital have not succeeded in achieving sustained economic advances over the longer term (Ranis, Stewart and Ramirez, 2000; United Nations, 2000).

An important motive for examining the relationships at the macro or aggregate level is the possibility of identifying the benefits of education beyond those accruing to individuals — benefits that spill over to others in society. There is evidence that primary education contributes to better natural resource management, including conservation of the topical rain forest and more rapid technological adaptation and innovation (Godoy, and Contreras, 2001); and that primary education is linked to the greater diffusion of information, which is crucial for boosting productivity. The greater productivity of individual workers has also been found to enhance the productivity of co-workers, while higher levels of worker education facilitate the discovery, adaptation and use of more efficient production processes (Mingat and Tan, 1996). The effects of education — especially women's education — on lowering fertility and mortality have been found to enhance economic growth as well (Birdsall, Kelley and Sinding, 2001; Sianesi and Van Reenen, 2002).

Mingat and Tan (1996) concluded that rates of return varied not only by level of schooling but also by level of development. For low-income countries, primary education was the best investment, while in middle-income countries, where primary education tends already to be more widely available, increased investment in secondary education yielded the highest social returns. Among high-income countries, returns were greatest for tertiary education. This suggests that in low-income settings, primary education deserves priority in the allocation of resources. The World Bank (1995) has argued that, based on such evidence, many countries have misallocated spending between education subsectors, with relatively too many resources going to secondary and university education.

Other studies investigated the role of primary education in reducing poverty and income inequality. The overwhelming conclusion of those studies was that primary education is a potent means of reducing poverty and inequality, with marked benefits for the most disadvantaged segments of society (Thomas, 2000; O'Connell and Birdsall, 2001). Many studies have found a high correlation between income inequality and inequality in the distribution of literacy (O'Connell and Birdsall, 2001; OECD and Statistics Canada, 2000). An important conclusion was that the expansion of educational opportunities is one of the most powerful tools Governments have for promoting both income growth and equality.

How have developing countries fared in providing education in the face of rapid population growth? Despite demographic pressures in many developing countries during the period 1960-1980, school enrolment grew at an unprecedented pace, enrolment ratios rose and class sizes generally declined. Schultz (1987) found that, controlling for per capita income, enrolment ratios were no lower in countries where the proportion of population of school age was high — if anything, the reverse was true for primary schooling. Effects of rapid growth in the school-age population on school quality were less clear, but probably negative. Direct measures of national differences and trends in school quality are not available for most developing countries. The cross-national evidence suggests school expenditures generally do not increase in response to an increase in the size of the school-age cohort; that is, spending per school-age child tends to be lower where the "demographic burden" is greater. The study by Schultz found that where the school-age population was relatively large, there was a tendency for teacher/student ratios to be somewhat lower, and teacher salaries and public expenditures per child were substantially lower. There are also examples of shorter-term surges in child cohort size inducing dramatic school crowding and teacher shortages, such as that which occurred during the baby boom in the United States during the 1950s and 1960s. In addition, a rapidly growing school-age population implies a greater need to train more teachers each year, which tends to result in a

greater proportion of inexperienced teachers — and research shows that teacher experience matters for student achievement (see chapter VI). When national differences in educational expenses are divided into component parts, Mingat and Tan (1998) found, with data for 1975-1993, that richer countries provided more resources for education per school-age child and that their smaller demographic burden contributed between 17 and 32 per cent of the richer countries' advantage. There appears to be little or no evidence that the financing of education has diverted funds from other productive investments. Furthermore, the share of educational expenditures in gross domestic product appears to be unrelated to demographic growth per se.

Despite government support for education, families bear significant educational costs. A surge in enrolments that temporarily overwhelmed schools when fees were removed suggests that school fees actually keep children out of school (New York Times, 2003; Watson and Buston, 2001). Even where there are no direct school fees, families face indirect costs for such things as supplies and clothing that can be very difficult for poor families to meet. Estimates compiled by the World Bank indicate that families in developing countries bear a significant share of the costs of educating their children. Based on data for 41 countries, private spending accounted for nearly one quarter of all expenditures on education in developing countries, as compared with 11 per cent in developed countries (Patrinos, 1999). In some developing countries, the estimated share borne by private households was over half. Families also forego the benefit of the work that children would do if they were not in school, which for older children may be considerable.

Education features prominently in discussions of the demographic transition from high to low levels of fertility. The costliness of education also enters into economists' explanations of why more affluent couples, who have the resources to afford more children, usually instead have fewer, choosing to invest more heavily in a smaller number of children (Becker and Lewis, 1973). Caldwell argues that the role of education in the demographic transition involves much

more than monetary costs, and that the advent of mass education profoundly affects relationships between generations throughout society: "In the absence of schooling, all members of the family are clearly producers — battlers in the family's struggle for survival ... . With schooling, ... the society regards the child as a future rather than a present producer, and ... it expects the family to protect the society's investment in the child for that future. Family relationships adjust to this expectation. Reinforcing changes occur in the wider society: legislation to protect children typically accelerates in the first years of universal schooling" (Caldwell, 1982, p. 304).

What is the impact of family size on the amount of education children receive? Studies of the relationship have often found effects that were not statistically significant, but when effects were significant, children in large families usually had lower educational participation and attainment (Kelley, 1996). Results suggest that this relationship is weak by comparison to other factors — household poverty, for instance — that independently affect children's schooling. The relationship between family size and parental investment in children has been observed to vary according to level of development, phase of the demographic transition, level of government social expenditures and cultural factors (Lloyd, 1994). Indeed, in some circumstances, little or no relationship can be expected between family size and children's education. In settings where schools are not available or accessible (physically or financially), parents have little possibility of investing in their children's education, whether their family is large or small. In addition, if parents perceive that the schooling available to their children is of poor quality or that there would be little payoff in the form of a better job, then they have a relatively weak incentive to invest. However, such conditions are certainly less prevalent than they were in the past and, as noted earlier, recent empirical studies indicate that financial returns to schooling are typically high in developing countries. Family size is likely to have the most effect on children's schooling when schooling is perceived to be available and advantageous but is costly in relation to family resources. When families lack

resources, they may choose to concentrate on sending only some of their children to school, and in some settings this can mean that girls in large families receive the least schooling (Lloyd, 1994). Governments play a crucial role in expanding educational opportunities for children in poor families. At any particular level of development, the greater the extent to which child services are subsidized by the State, the less important are constraints on parental resources for child investment (Lloyd, 1994, p. 186).

D. CONCLUSIONS

The challenges to improving education are enormous. Many countries have made substantial progress in expanding school enrolments, improving school completion rates and eliminating gender disparities. Nevertheless many countries remain far from achieving the goals of Education for All. The United Nations Educational, Scientific and Cultural Organization's most recent assessment is that, of 154 countries with data available, 83 have already achieved or have a good chance of achieving by 2015 the Education for All quantitative goals regarding primary net enrolment, adult illiteracy and gender parity in primary enrolments. Forty-three countries, with 36 per cent of the world population, have made progress but are likely to miss at least one goal, and 28 countries, with 22 per cent of the world population, are at serious risk of not meeting any of the goals (UNESCO, 2002). The greatest challenges are to enrol girls and children in rural areas, and to ensure that once enrolled, children remain in school. One study calculated that the annual additional cost of achieving education for all by 2015 was an estimated 9.1 billion United States dollars ($) (1998 dollars) (Delamonica, Mehrotra and Vandemoortele, 2001).

There is abundant empirical evidence demonstrating the strong positive associations between the educational attainment and socioeconomic status of individuals and the social and economic progress of societies. Experience has also shown that stressing the educational needs of girls and women translates into better nutrition for the entire population, improved health, lower fertility and poverty reduction.

NOTES

[1] Figures presented in the text are from the medium-variant population projection. World population is expected to continue growing in all fertility variants. In the medium fertility variant, which assumes that fertility will reach 2.15 births per woman by 2045-2050, global population is projected to reach 9 billion in 2043 and 9.3 billion in 2050 (figure 5). Nonetheless, future population size is sensitive to small but sustained deviations in fertility. For example, a low fertility variant in which fertility is about half a child lower than in the medium-fertility variant results in a population that declines to 7.9 billion. In contrast, a high-fertility variant scenario in which fertility is higher by about a half a child than in the medium-fertility variant produces a population of 10.9 billion in 2050.

[2] The figures cited in this section are derived from the survival ratios used in the United Nations estimates and projections of population, *World Population Prospects: The 2000 Revision,* vol. I, *Comprehensive Tables* (United Nations publication, Sales No. E.01.XIII.8 and Corr.1). The ratios represent survival from birth to age 0-4, and for successive 5-year age groups (0-4 to 5-9, 10-14 to 15-19, etc.).

[3] The calculation should not be taken as highly precise, but was based on reasonable assumptions regarding lifetime earnings and increased mortality due to HIV/AIDS.

[4] Systems of primary education vary, but in most countries (about three fourths) completion of primary schooling is expected to require 5-7 years of school attendance. Six years is the most common duration. The length and nature of schooling defined as "basic" also differs from one country to another, varying from a minimum of 3 to 4 years of primary school to a nine-year programme, or sometimes the completion of full secondary schooling.

[5] The International Standard Classification of Education (ISCED) was first adopted during the 1970s and was revised in 1997 (UNESCO, 1997).

[6] For persons aged 15 and over, 141 countries have at least 1 observation, and 72 countries have 3 or more observations. The total number of observations between 1960 and 1995 is 354. Most of the missing observations were estimated by using information on school enrolment ratios and the structure of population by age groups.

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II. EDUCATION AND ENTRY INTO REPRODUCTIVE LIFE

The impact of education on reproductive behaviour is strong and pervasive, particularly in delaying entry into reproductive life. Boys and girls who stay in school are found to postpone marriage, delay the onset of sexual activity (at least for girls) and have children later. Education has an important influence on the many factors which themselves affect marriage and reproductive life. Education is often a prerequisite for a good job and social mobility. Even as schooling deters early marriage, it gives young men and especially women a level of independence not previously experienced and provides them with opportunities for socialization outside of the family environment. Chapter II draws on recent survey data and research to review the extent to which education affects the timing of marriage and cohabitation, sexual initiation and childbearing.

The decision to marry and the timing of marriage depend partly on the perceived costs and rewards of marriage and its alternatives. In settings where union formation requires considerable economic independence, which usually derives from education and the accumulation of knowledge and skills necessary for an attractive job, the opportunity cost of early marriage without substantial educational attainment can be significant. Low educational attainment can result in a poorer job, less earning power and a lower standard of living. The tendency for educated persons to marry educated persons (Mare, 1991) can also provide an inducement to stay in school longer since low educational attainment can result in a less advantageous choice of a spouse than might have been possible.

In societies where arranged marriages are common, education is likely to increase the child's role in choosing whom to marry and when. An educated man with an independent income may have more say than a man with no education who is dependent on kin's resources. Likewise, an educated woman has more say in the decision of whether to marry, and whom and when to marry, than a woman with no education, even in societies where arranged marriages are common (Jejeebhoy, 1995).

The decision to marry is not based merely on economic considerations that derive from high educational attainment. Marriage is subject to cultural norms, including those aimed at preventing premarital childbearing, advancing kinship comity and bonds, lineage perpetuity and parents' eagerness for grandchildren reflecting the desire for generational contemporaneity. Young men and women may truncate schooling to marry since marriage is often seen as incompatible with school enrolment. Moreover, the effects of such incompatibility are more substantial for women than for men. For instance, a study of high school graduates in the United States of America concerning the effects of marriage and parenthood on the likelihood of graduating from college found that marriage is more detrimental to the educational careers of women than to those of men (Teachman and Polonko, 1988). Another study in the United States found that early marriage and childbearing elevate a woman's risk of leaving high school prematurely (Astone and Upchurch, 1994).

In societies where opportunities for employment are available for educated women, women may not only stay in school longer but may also postpone early marriage to participate in the labour force (Jejeebhoy, 1995); their experience and education can also enhance their potential as economic contributors when they get married. However, in settings where opportunities deriving from extended schooling are few, the economic incentives for prolonged schooling weaken and the alternatives to marriage are limited, especially when women's social and economic security is dependent on affiliation to a male relative. In such settings, young women are likely to forego educational attainment and marry at an early age.

A. MARRIAGE, ONSET OF SEXUAL ACTIVITY AND CHLDBEARING FOR WOMEN

Several studies have demonstrated the role of education in the timing of young people's marriages, initiation of sexual activity and childbearing (Blanc, 2000; Gage and Meekers, 1994;

Meekers and Ahmed, 2000; United Nations, 2002). Data from Demographic and Health Surveys conducted in the 1990s for 28 sub-Saharan African countries, 12 Asian countries and 13 countries in Latin America and the Caribbean show that early age at marriage, onset of sexual activity and childbirth are more common among women with no education than among their educated peers (table 18). In most cases the proportion of women aged 20-24 years who by age 20 were married, had had sex or given birth decreased regularly as the level of education attained increased. There are some exceptions: in Colombia, Comoros, Indonesia and the Philippines, for at least one of the indicators the percentages are higher by 5 percentage points or more for those with primary education than for those with none. However, the percentage of women who marry or give birth before age 20 is substantially lower for those with a secondary education. For instance, in the African countries, an average of 75 per cent of those with no education had married by age 20, while 60 per cent of those with a primary education and only 30 per cent of those with a secondary education had done so. In the other regions as well, on average a large majority of those with no education had married by age 20, while most of those with a secondary education had not.

Within regions, there is considerable variation in timing of marriage, sexual onset and birth, and the strength of the relationship with education also varies. In 8 of 28 countries in sub-Saharan Africa (Benin, Burundi, Cameroon, Central African Republic, Côte d'Ivoire, Ghana,

Mozambique and Togo), the level of education has little impact on the age of sexual onset, as shown by the small difference between the proportion of women with no education who initiated sex before age 20, and that for women with secondary education or higher.

Although women with a secondary or higher education are less likely to marry or give birth early, in most countries a majority of educated women initiate sexual activity at an early age. In Africa, for example, among women 20-24 years of age with a secondary education or higher, on average 64 per cent had had sex by age 20, compared to 30 per cent who were married by age 20 and 27 per cent who had had a birth by age 20.

Differentials between women with no education and those with a secondary or higher education are larger with regard to marriage than with respect to either sexual onset or childbearing. For instance, in Africa, the difference between women with no education and those with a secondary or higher education is, on average, 45 percentage points for marriage by age 20, 19 percentage points for initiation of sexual intercourse and 34 percentage points for giving birth. The comparable figures for Latin America and the Caribbean are 38, 32 and 34 percentage points respectively, while those for Asia are 32, 19 and 28 percentage points. In addition, educational attainment appears to play a greater role in delaying marriage in Africa than in Asia and Latin America and the Caribbean, while it is more strongly associated with delayed sexual onset in Latin America and the Caribbean than in Africa.

TABLE 18. PERCENTAGE OF WOMEN AGED 20-24 WHO BY AGE 20 HAD EVER MARRIED,
HAD INITIATED SEX OR HAD GIVEN BIRTH, BY EDUCATIONAL LEVEL

Major area and country	Year	Married by age 20 Highest educational level			Ever had sex by age 20 Highest educational level			Had a birth by age 20 Highest educational level		
		No Education	Primary	Secondary +	No Education	Primary	Secondary +	No Education	Primary	Secondary +
Africa		75	60	30	83	79	64	61	53	27
Benin	1996	76	55	19	88	85	79	57	44	14
Burkina Faso	1998-99	92	73	25	90	82	66	67	57	24
Burundi	1987	46	41	22	46	43	39	28	26	21
Cameroon	1998	95	66	41	92	92	90	75	63	37
Central African Republic	1994-95	78	74	62	94	95	90	63	63	55
Chad	1996-97	90	83	58	93	88	77	74	70	45

TABLE 18. (*continued*)

Major area and country	Year	Married by age 20 Highest educational level			Ever had sex by age 20 Highest educational level			Had a birth by age 20 Highest educational level		
		No Education	Primary	Secondary +	No Education	Primary	Secondary +	No Education	Primary	Secondary +
Comoros	1996	46	50	22	48	57	32	36	35	13
Côte d'Ivoire	1998-99	62	49	21	92	95	87	62	64	27
Egypt	2000	61	53	24	..	..	..	45	39	14
Ethiopia	2000	72	58	32	72	56	41	48	42	20
Ghana	1998	68	64	49	84	86	79	52	48	34
Guinea	1999	87	65	38	88	82	68	73	59	31
Kenya	1998	82	58	22	87	87	64	61	59	24
Madagascar	1997	77	63	48	92	85	76	74	60	39
Malawi	2000	87	81	29	90	87	62	70	69	28
Mali	1996	89	70	35	93	89	76	75	63	30
Morocco	1992	42	26	12	..	..	..	27	15	5
Mozambique	1997	82	79	33	91	92	83	67	67	36
Namibia	1992	49	28	9	84	70	57	61	52	30
Niger	1998	92	72	37	90	87	49	76	63	28
Nigeria	1999	92	56	25	85	68	54	77	47	18
Rwanda	1992	52	33	8	59	41	16	37	23	8
Senegal	1997	66	35	13	64	47	25	53	36	12
Togo	1998	67	47	16	87	88	84	54	37	11
Uganda	1995	86	79	43	89	89	78	72	71	41
United Republic of Tanzania	1999	85	60	19	91	86	60	68	57	18
Zambia	1996	77	76	39	88	93	74	68	72	46
Zimbabwe	1999	95	72	43	..	78	55	81	70	35
Asia		**69**	**62**	**37**	**62**	**65**	**43**	**50**	**47**	**22**
Armenia	2000	..	..	37	..	..	37		..	26
Bangladesh	1996-97	89	85	53	..	..	..	76	72	36
India	1998-99	86	75	42	..	..	..	67	58	28
Indonesia	1997	58	66	28	58	66	28	39	46	17
Kazakhstan	1999	..	..	40	..	..	50	..	..	22
Kyrgyzstan	1997	..	..	58	..	..	59	..	..	37
Nepal	2001	87	75	52	85	76	51	61	54	32
Pakistan	1990-91	59	43	17	..	..	..	39	32	11
Philippines	1998	40	53	22	43	54	23	26	42	16
Turkey	1998	60	53	23	..	..	..	46	33	11
Uzbekistan	1996	..	..	56	..	..	56	..	..	25
Yemen	1991-92	70	49	14	..	..	..	46	34	1
Latin America and the Caribbean		**69**	**63**	**31**	**76**	**71**	**44**	**58**	**53**	**23**
Bolivia	1998	66	59	29	80	71	45	53	57	27
Brazil	1996	79	51	33	..	69	58	70	45	26
Colombia	2000	48	62	29	..	83	64	49	61	27
Dominican Rep	1996	89	77	32	88	81	40	73	61	19
Ecuador	1987	54	64	30	..	70	37	46	53	23
El Salvador	1985	79	67	24	61	56	22	..	..	..
Guatemala	1999	76	60	34	80	66	38	69	50	21
Haiti	1994-95	69	51	24	77	65	50	47	38	15
Mexico	1987	72	65	26	73	66	28	69	53	18
Nicaragua	1997-98	83	83	49	79	82	49	73	70	34
Paraguay	1990	58	53	25	..	73	46	51	49	22
Peru	2000	57	63	24	72	76	46	59	57	21
Trinidad and Tobago	1987	..	65	49	..	68	51	..	44	24

Source: Demographic and Health Survey (Calverton, Maryland, Macro International, Inc.).

NOTES: Two dots (..) = fewer than 50 cases. Regional averages are unweighted.

However, average proportions conceal the variations within regions. Among women with no education, at least 70 per cent were married by age 20 in 18 of 28 countries in Africa, in 4 of 8 countries in Asia and in 6 of 12 countries in Latin America and the Caribbean. In 6 African countries, at least 90 per cent of women with no education were married by age 20. Among women with a secondary or higher education, at least half were married by age 20 in two African and four Asian countries. However, a lack of education does not translate into early marriage in countries such as Burundi, Colombia, Comoros, Morocco, Namibia and the Philippines, where the proportion of women who married by age 20 is 50 per cent or less among women with no education. Thus patterns of marriage also depend on factors other than education, including social and cultural norms.

With regard to variations across countries in the timing of first births, in Africa, the proportion of women aged 20-24 with a secondary or higher education who had had a birth by age 20 ranges from about 12 per cent or less in Morocco, Rwanda, Senegal and Togo to at least 45 per cent in Central African Republic, Chad and Zambia. The percentage is 30 or more in about two fifths of the African countries. By contrast, in other regions the comparable percentages are above 30 in only 3 Asian countries (Bangladesh, Kyrgyzstan and Nepal) and in one country, in Latin American and the Caribbean (Nicaragua). While education is strongly associated with the postponement of first births in the majority of countries, its role is small in a few countries, such as Burundi and the Central African Republic.

B. MARRIAGE AND ONSET OF SEXUAL ACTIVITY AMONG MEN

The pattern of entry into marriage before age 20 is different for men than for women. In all educational attainment categories, the proportion married by age 20 is lower among men (table 19) than among women (table 18), reflecting a gender gap in the timing of marriage, as established by previous research. While in most countries the proportion married by age 20 decreases as the education level attained increases, there are exceptions. In Ghana, for example, the proportion of men with a secondary or higher education that were married by age 20 is higher (12 per cent) than the proportion among men with no education (8 per cent). In addition, in comparison with the pattern for women, for men the difference in the proportion marrying before age 20 is smaller between those with no education and those with a secondary or higher education. The difference is 10 percentage points or less in over half (11 of 20) of the countries in table 19 for which this comparison can be made.

TABLE 19. PERCENTAGE OF MEN AGED 20-24 WHO WERE FIRST MARRIED OR HAD INITIATED SEX BEFORE AGE 20, BY EDUCATIONAL LEVEL

Major area and country	Year of survey	Married by age 20 (percentage) Highest educational level			Ever had sex by age 20 (percentage) Highest educational level		
		No education	Primary	Secondary +	No education	Primary	Secondary +
Africa		**21**	**15**	**9**	**64**	**72**	**73**
Benin	1996	24	14	5	77	73	77
Burkina Faso	1998-99	13	7	3	45	58	58
Cameroon	1998	24	15	14	56	82	90
Côte d'Ivoire	1989-99	18	5	6	76	86	87
Central African Republic	1994	21	40	19	74	89	91
Chad	1997	30	21	25	62	64	77
Comoros	1996	..	5	14	..	55	68
Ghana	1998	8	14	12	..	59	55
Guinea	1999	17	2	7	65	83	89
Kenya	1998	..	10	4	..	80	80

TABLE 19. (continued)

Major area and country	Year of survey	Married by age 20 (percentage)			Ever had sex by age 20 (percentage)		
		Highest educational level			Highest educational level		
		No education	Primary	Secondary +	No education	Primary	Secondary +
Mali	1996	12	22	6	52	79	83
Niger	1998	28	18	8	47	44	51
Mozambique	1997	49	30	13	81.	86	86
Nigeria	1999	26	20	4	50	59	53
Senegal	1997	6	0	0	45	57	54
Togo	1998	18	13	5	70	75	79
Uganda	1995	31	34	15	65	83	80
United Rep of Tanzania.	1999	25	11	5	76	84	67
Zambia	1996	15	12	9	91	84	79
Zimbabwe	1999	..	17	4	..	66	53
Asia		..	10	7	..	61	63
Armenia	2000	:.	..	5	..	..	49
Kazakhstan	1999	..	10	9	..	61	77
Latin America and the Caribbean		27	26	15	75	79	85
Bolivia	1998	..	38	15	..	76	79
Brazil	1996	..	15	12	..	88	88
Dominican Republic	1996	19	24	11	70	81	84
Haiti	1994	16	12	13	74	68	79
Nicaragua	1997	47	46	29	81	91	95
Peru	1996	..	23	13	..	68	83

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

NOTES: Two dots (..) = fewer than 20 cases. Regional averages are unweighted.

Unlike the pattern for women, for men in Africa and in Latin America and the Caribbean, the likelihood of an early onset of sexual activity typically increases as the educational level attained increases. In Africa, however, among those with no education a larger proportion of women initiate sex early (83 per cent) compared to men (64 per cent), while for those with a secondary or higher education the proportion initiating sexual activity is lower among women (64 per cent) than among men (73 per cent). Education thus appears to deter women from early onset of sexual activity but to foster it among men. The pattern also reflects the limited degree of freedom among school-going girls as compared with that for boys, which is common in most societies.

C. ONSET OF SEXUAL ACTIVITY BEFORE AGE 18

Sexual onset before age 18 is of concern because it can pose health risks to both men and women, and may interfere with schooling and the development of essential economic and social skills. Such sexual relations usually occur before adolescents have acquired adequate information about sexually transmitted diseases (STDs), before they have gained experience and skills in self-protection and, often, before they can gain access to health services and contraceptive supplies.

In the majority of countries more women initiate sexual activity before age 18 than at ages 18-19 (annex table A.II.1 and figure 13). Education has a strong effect on postponing the onset of sexual activity to ages later than 18 years. On

Figure 13. Proportion of women aged 20-24 who initiated sex before or within marriage, by educational level
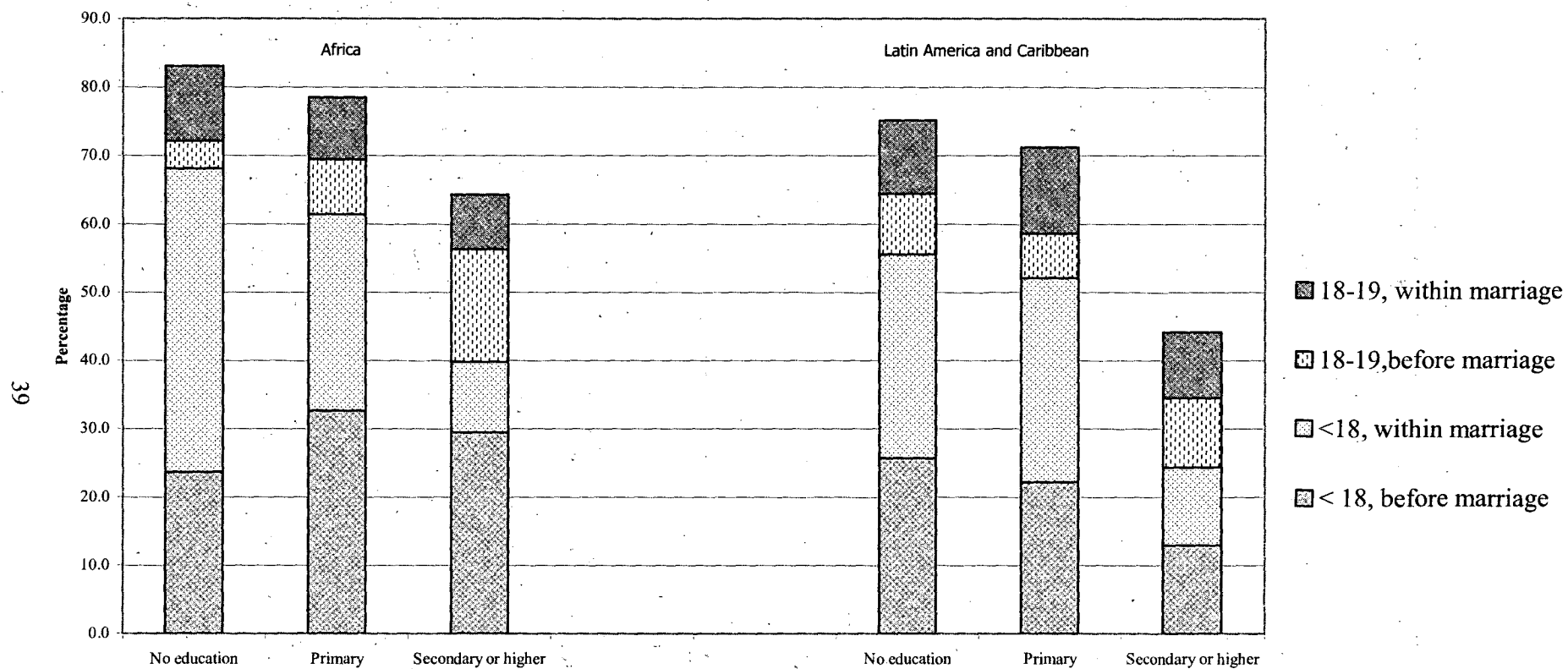
Source: *Demographic and Health Surveys* (Calverton, Maryland, Macro International, Inc.).

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average, in sub-Saharan Africa, 68 per cent of women aged 20-24 who had no education were sexually experienced by age 18, whereas the corresponding proportion among those with secondary or higher education was 39 per cent. The same relationship holds for Latin America and the Caribbean where, on average, 58 per cent of women with no education had sex before age 18 as compared with 24 per cent among those with a secondary or higher education. Sexual initiation at ages 18-19 tends to be more common among educated women than among women with no education.

Sexual onset among men is different. Among men aged 20-24 the percentage initiating sex before age 18 increases with education in most African countries and in all Latin American and Caribbean countries (annex table A.II.2).

With regard to gender differentials, among those with no education, substantially more women than men initiate sex before age 18 almost everywhere that a comparison can be made (annex tables A.II.1 and A.II.2). In most African countries this is also true for those with a primary education. However, for those with a secondary or higher education, a larger percentage of men than women initiate sex before age 18 in most countries; the latter contrasts are both more consistent and larger in size in Latin America and the Caribbean than in Africa.

Similar patterns of sexual initiation have been observed in the developed countries (Bajos and Durand, 2001; Frost and others, 2001; Maticka-Tyndale, McKay, and Barret, 2001; Wellings, 2001). In the United States, among girls who did not complete high school, 84 per cent had had intercourse before age 18 (table 20), as compared with 72 per cent among those who completed high school and 46 per cent among those who finished college. Among women and men with no secondary qualification in the United Kingdom of Great Britain and Northern Ireland, more than 75 per cent had initiated sexual activity by age 18, as compared with 55 per cent or less among their peers who had attained an advanced certificate. More than 65 per cent of males and females with a high school certificate (*brevet*) in France had initiated sexual activity, as compared with 47 per cent among female students and 59 per cent

among male students with a secondary-leaving certificate (*baccalauréat*). In Romania, women aged 20-24 with only a primary education were much more likely to have had sex (87 per cent) than their peers with twelve or more years of education (64 per cent). By contrast, among men, sexual experience was most common for those with the highest levels of education (Serbanescu and Morris, 1998). In Greenland, 83 per cent of the students in vocational training or in the tenth grade of public elementary school had had their sexual debut. Among the sexually experienced, over half reported first having sex before the age of 15 years (Werdelin, Misfeldt and Olsen, 1992). In France, the United Kingdom and the United States, education acts as a stronger restraint on early sexual initiation for women than for men.

Insofar as sexual onset occurs while individuals are still in school, it is likely that the age at first intercourse will vary by school type, such as coeducational or single-sex schools, boarding or day schools, private or public, and religious or non-religious schools. The amount of research into the effects of school type on reproductive behaviour and into the effects of early entry into reproductive life on continuing education is limited. Available evidence indicates that adolescent students in religious, private, single-sex and academic schools tend to initiate sexual activity later than their peers in non-religious, public, coeducational and vocational schools. In Argentina, for instance, a survey of students aged 15-18 showed that 18 per cent of those in religious schools had had intercourse, compared to 41 per cent in private non-religious schools and 45 per cent in public schools (Necchi, Schufer and Mendez Ribas, 2000). In Sweden, among first-year high school students with a median age of 16 years, 60 per cent of the students in practical programmes (vocational-technical) had had sexual intercourse as compared with 37 per cent of students in college preparatory programmes (Haggstrom-Nordin, Hanson, and Tyden, 2002). In Kenya, a larger proportion of adolescent students in vocational schools had had sexual intercourse than their peers in secondary schools (Kiragu, 1991). In Nigeria, 40 per cent of adolescents in coeducational schools were sexually active, compared to 19 per cent in boys' schools

TABLE 20. PERCENTAGE OF WOMEN AND MEN AGED 20-24 WHO INITIATED SEX BEFORE AGE 20, BY EDUCATIONAL LEVEL, SELECTED DEVELOPED COUNTRIES

Country and educational level	Year	Women			Men		
		Total	< 18	18-19	Total	< 18	18-19
United States[a]	**1995**						
High school incomplete		95	84	12	50	48	2
High school		89	72	17	78	66	12
College incomplete		74	55	19	68	58	9
College 4+		65	46	20	..	..	..
United Kingdom	**1990-91**						
No secondary qualification		87	76	11	88	79	9
O-level/CSE		82	62	20	85	67	18
A-level +		74	42	32	79	55	23
France	**1992**						
Brevet		89	67	22	91	72	19
CAP		94	65	28	80	60	20
Baccalauréat		79	47	32	95	59	35
Superieur		80	38	43	86	55	31

Sources: Nathalie Bajos and Sandrine Durand, *Teenage Sexual and Reproductive Behaviour in Developed Countries: Country Report for France*, Occasional Report No. 5 (New York and Washington, D.C., The Alan Guttmacher Institute, 2001); Kaye Wellings, *Teenage Sexual and Reproductive Behaviour in Developed Countries: Country Report for Great Britain*, Occasional Report No. 6 (New York and Washington, D.C., The Alan Guttmacher Institute, 2001); and Jennifer Frost and others, *Teenage Sexual and Reproductive Behaviour in Developed Countries: Country Report for the United States*, Occasional Report No. 8 (New York and Washington, D.C., The Alan Guttmacher Institute, 2001).

NOTES: Two dots (..) indicate data missing. CAP = Certificat d'aptitude professionelle; CSE = Certificate of Secondary Education.

[a] Data for males based on men aged 15-19 at time of survey.

and 8 per cent in girls' schools (Oladapo and Brieger, 1997). A study in Chile of secondary school students aged below 19 years showed that 39 per cent of males and 10 per cent of females in public schools reported having had sexual relations, while among private school students, 18 per cent of males and 4 per cent of females had done so (Molina and others, 1987).

In the more developed countries, as in developing countries, later age at first birth is correlated with high educational attainment. In the United Kingdom, women aged 20-24 who left school without a secondary qualification were almost 20 times more likely than women who attained an advanced-level certificate to have had a birth by age 20 (Wellings, 2001). In Japan, women with a junior college education had first

births 15 months later than women with high school education, while women with a university degree had first births two years later than women with a junior college degree (Small and Kerns, 1993). In Norway, the occupational and educational activities of women younger than 30 years old were found to influence the timing of first births, with women attending educational institutions being far less likely to have borne a child than women who were gainfully employed (Kravdal, 1994).

D. CONTEXT OF SEXUAL INITIATION

While prolonged schooling tends to delay marriage substantially, its effects on early sexual initiation are smaller. Onset of sexual activity before age 20 and within marriage is more fre-

quent among women with no education than among their schooled peers (table 21 and figure 13). Available data show a higher frequency of sexual initiation within marriage in Asia than in Africa or Latin America and the Caribbean. In a majority of African countries, a higher proportion of educated than of uneducated women initiated sexual activity before marriage and prior to age 20. In Latin America and the Caribbean, the patterns of premarital sexual activity are somewhat different: both premarital and marital sexual initiation before age 20 are most common among the least educated women, except in Brazil and Colombia.

TABLE 21. PERCENTAGE OF WOMEN AGED 20-24 WHO INITIATED SEX BEFORE MARRIAGE
OR WITHIN MARRIAGE AND BEFORE AGE 20, BY EDUCATIONAL LEVEL

Major area and Country	Year	No education Marital context		Primary Marital context		Secondary + Marital context	
		Before marriage	Within marriage	Before marriage	Within marriage	Before marriage	Within marriage
Africa		**28**	**55**	**41**	**38**	**46**	**18**
Benin	1996	41	47	61	24	73	6
Burkina Faso	1998-99	25	65	37	44	54	12
Burundi	1987	8	38	13	30	23	16
Cameroon	1998	7	84	58	34	74	18
Central African Republic	1994-95	46	48	49	46	49	42
Chad	1996-97	14	79	23	64	32	44
Comoros	1996	9	39	18	38	14	18
Côte d'Ivoire	1994	53	40	75	22	78	14
Ethiopia	2000	9	64	9	47	13	28
Ghana	1998	39	45	57	29	52	27
Guinea	1999	23	65	39	44	42	26
Kenya	1998	37	50	65	22	57	7
Madagascar	1997	52	40	50	36	52	24
Mali	1996	21	73	35	54	52	24
Mozambique	1997	36	55	46	46	73	10
Namibia	1992	60	24	56	14	52	4
Niger	1992	2	88	10	77	22	26
Nigeria	1999	7	78	33	35	41	13
Rwanda	1992	14	46	12	29	11	6
Senegal	1997	9	55	20	27	14	11
Togo	1998	56	31	66	21	78	6
Uganda	1995	36	54	49	39	60	18
United Republic of Tanzania	1999	34	57	57	30	48	12
Zambia	1996	34	54	51	42	56	18
Zimbabwe	1999	14	72	27	51	27	29
Asia		**5**	**64**	**4**	**69**	**6**	**43**
Indonesia	1997	2	70	3	77	2	45
Kazakhstan	1999	..	..	..	..	22	28
Kyrgyzstan	1997	..	..	..	..	6	53
Nepal	2001	1	89	1	84	2	62
Philippines	1998	11	32	8	46	5	18
Uzbekistan	1996	..	..	..	..	2	54

TABLE 21. (continued)

Major area and Country	Year	No education Marital context Before marriage	No education Marital context Within marriage	Primary Marital context Before marriage	Primary Marital context Within marriage	Secondary + Marital context Before marriage	Secondary + Marital context Within marriage
Latin America and the Caribbean		**35**	**41**	**29**	**43**	**23**	**21**
Bolivia	1998	42	38	39	32	28	16
Brazil	1996	32	48	39	29	41	17
Colombia	2000	46	28	46	37	51	14
Dominican Republic	1996	18	71	21	61	13	26
Ecuador	1987	38	35	25	45	13	24
El Salvador	1985	18	44	16	40	9	13
Guatemala	1999	29	51	22	44	15	23
Haiti	1994-95	48	29	39	26	36	14
Mexico	1987	16	56	15	52	8	20
Nicaragua	1997-98	18	61	15	67	11	38
Paraguay	1990	36	35	38	35	28	17
Peru	2000	39	32	41	35	35	11
Trinidad and Tobago	1987	60	0	17	50	11	40

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.)
NOTE: Regional averages are unweighted.

Among men, the incidence of premarital sexual initiation increases as the level of education increases (table 22). In Africa, among men with no education, on average slightly more than half initiated sex before marriage and before age 20, compared to two thirds among those with a secondary or higher education. Only in Benin and Zambia is the incidence of premarital sexual activity higher among men with no education than among educated men. The relationship for Latin America and Caribbean countries is similar to that in Africa, except that the incidence of premarital sexual activity is, on average, higher than in African countries.

As among women, men with no education are more likely to begin sexual activity within marriage than are their educated peers. However, in contrast to the pattern for women, at all educational levels men who begin sexual activity before age 20 are much more likely to do so before than after they marry.

TABLE 22. PERCENTAGE OF MEN AGED 20-24 WHO INITIATED INTERCOURSE BEFORE MARRIAGE OR WITHIN MARRIAGE, BY EDUCATIONAL LEVEL

Major area and country	Year	No education Context at first sex Before marriage	No education Context at first sex Before marriage	Primary Context at first sex Before marriage	Primary Context at first sex Within marriage	Secondary + Context at first sex Before marriage	Secondary + Context at first sex Within marriage
Africa		**52**	**11**	**64**	**9**	**69**	**4**
Benin	1996	71	5	68	5	75	1
Burkina Faso	1999	43	3	57	1	58	17
Cameroon	1998	..	..	74	8	84	6
Central African Republic	1994	59	14	73	16	85	6
Chad	1997	41	21	50	13	65	12
Comoros	1996	..	..	53	2	58	10
Côte d'Ivoire	1998-99	..	..	62	38	83	4

TABLE 22. (continued)

| Major area and country | Year | No education Context at first sex | | Primary Context at first sex | | Secondary + Context at first sex | |
		Before marriage	Before marriage	Before marriage	Within marriage	Before marriage	Within marriage
Ghana	1998	..	..	..	..	48	7
Guinea	1999	55	10	82	2	87	2
Kenya	1998	..	..	79	1	79	1
Mali	1996	44	8	62	17	79	4
Mozambique	1997	61	21	72	14	84	2
Niger	1998	27	20	31	13	46	4
Nigeria	1999	32	18	43	16	52	1
Senegal	1997	42	3	57	0	54	0
Togo	1998	65	4	69	6	77	1
Uganda	1995	54	11	70	13	74	6
United Republic of Tanzania	1999	..	..	79	4	67	0
Zambia	1996	86	4	81	3	78	1
Zimbabwe	1999	..	..	60	6	51	2
Asia							
Kazakhstan	1999	..	..	57	4	73	4
Latin America and the Caribbean		69	8	71	7	82	3
Dominican Republic	1996	..	..	71	10	84	0
Brazil	1996	..	..	84	4	87	1
Nicaragua	1997-98	68	13	82	10	88	7
Haiti	1994-95	71	3	65	3	78	1
Bolivia	1998	..	..	65	12	75	5
Peru	1996	..	..	61	7	79	4

Source: Demographic and Health Survey (Calverton, Maryland, Macro International, Inc.).
NOTE: Two dots (..) = Missing, or sample size less than 25 in education category.

E. FIRST BIRTHS WITHIN OR OUTSIDE MARRIAGE

The marital context within which a first birth occurs is important to the well-being of both mother and child. Unmarried adolescents are less likely to seek prenatal care for various reasons, such as being too shy to undergo a clinical exam, being afraid of parents' reaction, being unaware of the pregnancy or of the existence of prenatal care, or being in school (Omuga and Ojwang, 1990). In the three major areas (Africa, Asia, Latin America and the Caribbean), first births before age 20 occur more often within than before marriage for women in all education categories; Namibia is an exception (table 23 and figure 14). Women with no education are the most likely to have their first births at a young age and within marriage. For instance, in Africa 56 per cent of women with no education had a birth within marriage and before age 20. This compares with 43 per cent among women with a primary education and 20 per cent among those with a secondary or higher education.

A different pattern emerges when attention is focused on women who have given birth before age 18. Both premarital and marital first births before age 18 are most common among women with no education in a majority of countries in all major areas (Africa, Asia and Latin America). However, premarital first births before age 18 occur most frequently among women with a primary education in Bolivia, Cameroon, the Central African Republic, Côte d'Ivoire, the

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TABLE 23. PERCENTAGE OF WOMEN AGED 20-24 WHO HAD A FIRST BIRTH BEFORE MARRIAGE
OR WITHIN MARRIAGE, BY EDUCATIONAL LEVEL

Major area Country	Year	No education Context of first birth		Primary Context of first birth		Secondary + Context of first birth	
		Before marriage	Within marriage	Before marriage	Within marriage	Before Marriage	Within marriage
Africa		8	56	11	43	10	20
Benin	1996	4	53	6	38	7	7
Burkina Faso	1998-99	7	60	8	50	11	14
Burundi	1987	2	26	2	23	10	12
Cameroon	1998	2	73	19	44	20	17
Central African Republic	1994-95	7	56	12	51	13	42
Chad	1996-97	1	72	3	66	8	38
Comoros	1996	0	36	1	34	2	11
Côte d'Ivoire	1994	22	47	31	34	24	19
Egypt	2000	0	76	0	69	0	45
Ethiopia	2000	1	47	0	41	1	19
Ghana	1998	7	45	6	42	5	29
Guinea	1999	6	67	10	49	8	23
Kenya	1998	11	49	21	38	14	11
Madagascar	1997	17	57	16	44	10	29
Mali	1996	5	70	12	51	11	19
Mozambique	1997	12	55	12	55	16	20
Namibia	1992	32	29	34	18	25	4
Niger	1998	2	74	7	56	4	24
Nigeria	1999	7	70	8	39	2	16
Rwanda	1992	2	35	4	19	2	6
Senegal	1997	7	47	13	23	7	5
Togo	1998	6	47	5	32	3	8
Uganda	1995	8	64	11	59	13	28
United Republic of Tanzania	1999	5	62	17	40	5	12
Zambia	1996	9	59	15	58	20	25
Zimbabwe	1999	15	67	14	56	9	26
Asia		0	71	0	69	0	37
Bangladesh	1996-97	0	92	0	88	0	64
Indonesia	1997	0	72	0	80	0	47
Kazakhstan	1999	..	..	..	..	1	21
Kyrgyzstan	1997	..	..	..	..	1	36
Nepal	2001	0	92	0	85	0	65
Pakistan	1990-91	0	75	0	61	0	35
Philippines	1998	0	26	1	41	1	15
Turkey	1998	0	64	0	69	0	38
Uzbekistan	1996	..	..	..	..	0	25
Yemen	1991-92	0	78	0	59	0	24
Latin America and the Caribbean		10	51	7	46	4	20
Bolivia	1998	14	39	15	42	7	20
Brazil	1996	14	65	8	37	5	21
Colombia	2000	14	35	13	48	8	20
Dominican Republic	1996	..	72	3	58	1	18
Ecuador	1987	16	30	6	47	2	21
Guatemala	1999	8	61	4	45	1	20
Haiti	1994-95	4	44	4	34	1	14
Mexico	1987	7	62	4	49	2	16
Nicaragua	1997-98	3	70	2	67	2	33
Paraguay	1990	..	..	12	37	7	16
Peru	2000	13	45	10	47	6	15
Trinidad and Tobago	1987	..	..	3	41	0	23

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).
NOTES: Regional averages are unweighted. Two dots (..) indicate data missing or fewer than 18 cases in category.

Figure 14. Proportion of women aged 20-24 who had first birth before or within marriage, by educational level
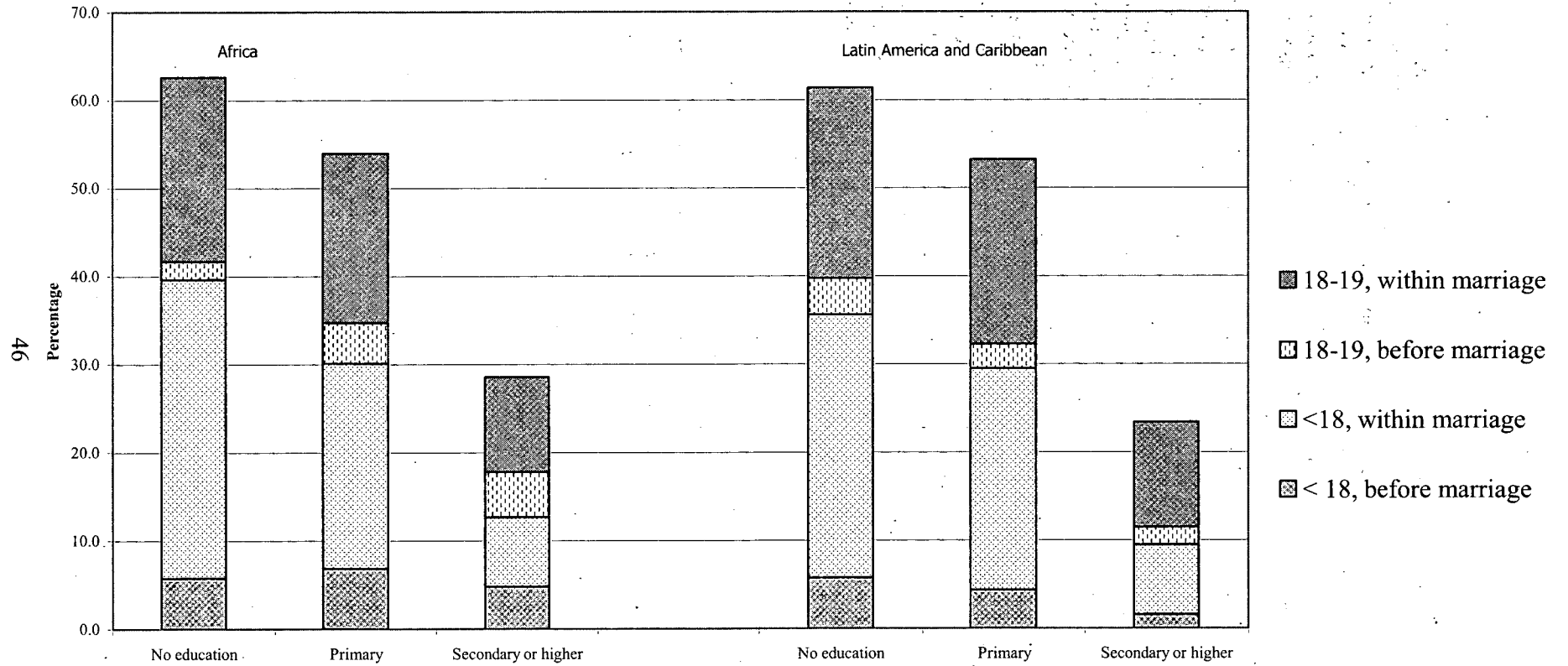
Source: *Demographic and Health Surveys* (Calverton, Maryland, Macro International, Inc.).

United Republic of Tanzania, Paraguay and Zambia. Girls in primary school are sometimes old enough to be at risk of premarital pregnancy because late entry into school and grade repetition extend their primary schooling to coincide with their physical maturation (Meekers and Ahmed, 2000; Mensch and Lloyd, 1998). In other cases, premarital sexual initiation and pregnancy may occur after girls leave school. In some settings where primary-leaving examinations ration entry into a smaller number of secondary schools (Appleton, 1995), the dropout rate at the end of primary school is high, especially for girls (Appleton, 1991).

F. EDUCATION AND CONTRACEPTIVE USE

The use of contraception is critical in protecting against undesired pregnancy, and the use of condoms also provides substantial protection against sexually transmitted infections. In the developed countries, data on contraceptive use are more important than data on sexual activity in explaining variation in levels of adolescent pregnancy and childbearing (Darroch, Singh, and Frost, 2001).

Awareness and use of contraception vary by educational attainment and, in some societies, by marital status. Educated women are likely to have superior knowledge of contraceptive methods and of how to obtain them. Recent data show that in sub-Saharan African and in Latin America and the Caribbean contraceptive use among unmarried women aged 15-19 who are sexually active and among married women in the same age group increases as the level of education attained increases (table 24). In Africa, for instance, 20 per cent of adolescent unmarried women with no education are currently using contraception, compared to 57 per cent among those with a secondary or higher education. The use of contraception is lower among married women than among sexually active unmarried women. In Africa, 7 per cent of uneducated married women use contraception compared with 27 per cent among educated married women. As among women, current use of contraception among sexually active men aged 20-24 rises as the educational level increases (table 25), and is higher among unmarried than currently married men.

TABLE 24. PERCENTAGE CURRENTLY USING CONTRACEPTION, BY EDUCATIONAL LEVEL, AMONG SEXUALLY ACTIVE WOMEN AGED 15-19

Major area and country	Year of survey	Unmarried			Currently married		
		Highest educational level			Highest educational level		
		No education	Primary	Secondary	No education	Primary	Secondary
Africa		20	32	57	7	15	27
Benin	1996	32	50	69	11	5	..
Burkina Faso	1998-99	37	52	..	6	22	..
Cameroon	1998	..	57	84	0	15	38
Central African Republic	1994-95	8	25	55	9	13	25
Comoros	1996	..	..	..	7	14	.. ..
Côte d'Ivoire	1998-99	35	59	86	4	28	..
Ethiopia	2000	29	..	..	2	8	15
Ghana	1998	..	..	59	10	21	24
Guinea	1999	33	36	70	3	5	..
Kenya	1998	..	29	37	16	17	28
Madagascar	1997	2	13	52	0	6	19
Malawi	2000	..	18	22	11	15	28
Mali	1996	11	32	54	3	12	25
Morocco	1992	..	..	..	18	35	43
Mozambique	1997	0	6	..	0	1	..
Niger	1998	..	..	..	6	10	..

TABLE 24. (*continued*)

Major area and country	Year of survey	Unmarried Highest educational level			Currently married Highest educational level		
		No education	Primary	Secondary	No education	Primary	Secondary
Nigeria	1999	..	..	49	2	8	11
Togo	1998	22	48	80	13	17	..
Uganda	1995	..	18	..	8	9	28
United Republic of Tanzania	1999	7	28	..	3	15	..
Zambia	1996	..	13	28	12	16	25
Zimbabwe	1999	..	..	..	..	41	45
Asia							
Kazakhstan	1999	..	..	60	..	..	39
Kyrgyzstan	1997	..	..	..	..	..	29
Philippines	1998	0	19	..	2	5	..
Latin America and the Caribbean		..	46	73	17	34	45
Brazil	1996	..	53	70	..	36	65
Colombia	2000	..	75	83	..	55	60
Dominican Republic	1996	..	39	86	22	37	33
Guatemala	1999	..	..	..	4	14	39
Haiti	1994-95	..	10	49	7	9	21
Nicaragua	1997-98	..	..	..	33	38	47
Peru	2000	..	51	80	..	50	52

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

NOTES: Two dots (..) indicate data missing or less than 20 cases in educational category; sexually active = those who reported having had sexual intercourse within 28 days before the survey; unmarried = women who have never married and those who are currently separated, divorced or widowed; and married = women who are currently married or are in informal or consensual unions.

TABLE 25. PERCENTAGE CURRENTLY USING CONTRACEPTION, BY EDUCATIONAL LEVEL, AMONG SEXUALLY ACTIVE MEN AGED 20-24

Major area and country	Year of survey	Unmarried Highest educational level			Currently married Highest educational level		
		No education	Primary	Secondary	No education	Primary	Secondary
Africa		33	47	61	16	23	51
Benin	1996	57	43	97	27	13	..
Burkina Faso	1999	54	79	91	18	30	..
Cameroon	1998	..	78	82	..	19	44
Central African Republic	1994	..	14	49	..	28	56
Chad	1997	3	9	40	10	20	41
Comoros	1996	..	40	17	..	..	..
Côte d'Ivoire	1998-1999	..	59	89	31	..	..

TABLE 25. (continued)

Major area and country	Year of survey	Unmarried Highest educational level			Currently married Highest educational level		
		No Education	Primary	Secondary	No education	Primary	Secondary
Guinea	1999	51	66	83	16	..	..
Kenya	1998	..	70	73	..	41	60
Mali	1996	7	49	85	18	34	..
Mozambique	1997	..	8	45	17	6	..
Niger	1998	..	..	71	7	10	33
Nigeria	1999	..	47	50	0	10	..
Rwanda	1992	..	..	0	..	22	..
Senegal	1997	..	..	0	3	12	..
United Republic of Tanzania	1999	..	30	..	16	23	..
Togo	1998	29	62	84	26	28	74
Zambia	1996	..	35	69	..	25	44
Zimbabwe	1999	..	63	78	..	48	57
Asia							
Kazakhstan	1999	..	66	93	..	42	80
Latin America and Caribbean		..	56	73	39	49	64
Bolivia	1998	..	90	71	..	42	61
Brazil	1996	..	46	83	..	79	75
Dominican Republic	1996	..	58	71	..	54	55
Haiti	1994-1995	..	51	76	..	19	54
Nicaragua	1997-1998	..	37	56	39	58	74
Peru	1996	..	..	82	..	46	68

Sources: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

NOTES: Two dots (..) indicate date are missing or fewer than 15 cases in educational category; sexually active = those who reported having had sexual intercourse within 28 days before the survey; unmarried = women who have never married and those who are currently separated, divorced or widowed; married = women who are currently married or are in informal or consensual unions.

In the developed countries, the use of contraception also varies by educational level (table 26). In the United States, the percentage of young men and women who did not use contraception at sexual initiation was larger among those who did not complete high school than among those who completed their secondary education. A wide education gap in the use of contraception at first sexual onset was also observed in the United Kingdom, for both men and women. While in the developed countries modern methods of contraception are predominantly used, the type of method used at sexual initiation varies by educational level. In France, for example, use of the pill was more common and use of the condom less common among men and women enrolled in vocational schools as compared with students in academic schools.

In most countries, there is no information about how education affects the use of abortion among adolescents. Available evidence indicates that in both developed and developing countries, a significant proportion of teenagers who become pregnant resolve the pregnancy by abortion. In Costa Rica,

TABLE 26. PERCENTAGE OF WOMEN AND MEN AGED 15-19 AND 20-24 WHO USED CONTRACEPTION AT FIRST SEX, BY EDUCATIONAL LEVEL

Country and Contraceptive method	Year	Age group	Women			Men		
			Level of education					
United States	1995	15-19	High school incomplete	High school complete	College incomplete	High school incomplete	High school complete	College incomplete
Male condom			61	65	70	57	67	74
Oral contraceptives			8	7	11	11	8	5
Other method			4	8	2	3	4	12
No method			28	20	17	29	21	9
United Kingdom[a]	1990-91	20-24	None***	O-level/CSE	A-level +	None[c]	O-level/CSE	A-level +
Male condom			27	42	42	23	40	49
Withdrawal			8	3	8	4	7	5
Rhythm			0	0	0	2	1	0
Other			14	23	30	7	18	22
No method			51	32	20	63	34	24
France[b]	1992	15-18	Regular schools	Professional cycle	Vocational training	Regular schools	Professional cycle	Vocational training
Oral contraceptives			14	19	35	19	21	26
Condoms			60	53	46	62	64	52
Foam/jelly/cream/ Suppository			1	2	1	0	1	1
Withdrawal			4	5	5	4	3	4
Rhythm			1	1	2	1	0	0
Method not reported			11	8	3	9	7	7
No method used			10	12	10	5	4	9

Sources: Nathalie Bajos and Sandrine Durand. 2001. *Teenage Sexual and Reproductive Behaviour in Developed Countries: Country Report for France,* Occasional Report No. 5 (New York and Washington, D.C., The Alan Guttmacher Institute, 2001); Kaye Wellings, *Teenage Sexual and Reproductive Behavior in Developed Countries: Country Report for Great Britain.* Occasional Report No. 6 (New York and Washington, D.C., The Alan Guttmacher Institute.Frost, 2001); Jennifer Frost and others, *Teenage Sexual and Reproductive Behaviour in Developed Countries: Country Report for The United States,* Occasional Report No. 8 (New York and Washington, D.C., The Alan Guttmacher Institute, 2001).

NOTE: CSE = Certificate of Secondary Education.
[a] Women and men aged 20-24
[b] Women and men aged 15-18
[c] No secondary qualification.

for example, 13 per cent of all abortions occurred among adolescent mothers (Castillo, 1993). In the mid-1990s, 69 per cent of pregnancies among teenagers 15-19 years of age were resolved by abortion in Sweden, compared to 35 per cent in the United States, 39 per cent in the United Kingdom, 46 per cent in Canada and 51 per cent in France (Darroch, Singh and Frost, 2001). The use of abortion is likely to be more common among more educated than among less educated women. In France, a 1994 survey (Analyse des Comportements Sexuels des Jeunes) showed the abortion level to be particularly high among students in vocational schools (Bajos and Durand, 2001).

G. TRENDS IN ENTRY INTO REPRODUCTIVE LIFE

Many social, economic and contextual changes that have occurred during the past three decades may have affected entry into reproductive life. Global and national attention to adolescent reproductive health and behaviour has increased tremendously, along with the widespread publicity surrounding HIV/AIDS. Responses to those events have changed over time, and it is likely that similar variation can also be expected across social groups, especially by educational strata.

A comparison over time of the average proportions of women aged 20-24 who were married to or had cohabited with a man by age 20 is shown in table 27, for countries that have had at least two surveys. The data show that, while in Africa early marriage declined across all educational categories, it increased in Latin America and the Caribbean among women in each educational stratum (table 27). However, variations between countries are wide, and some countries show little change over time. The greatest declines in the proportion of women marrying by age 20 occurred across all educational categories in Côte d'Ivoire, Senegal and Togo, and among women with secondary or higher education in Burkina Faso. The largest increases occurred among women with no education in Bolivia and Brazil; among women with primary education in Colombia and Peru; and among women with a secondary or higher education in Brazil, Ghana and Zimbabwe. In some of the countries, the increase in the proportion ever married by age 20 appears to reflect an increase in informal or consensual unions, especially in Latin America and the Caribbean. In Peru, for example, between 1986 and 2000, the proportion of women aged 20-24 who were in consensual unions increased from 22 per cent to 30 per cent (Instituto Nacional de Estadística e Informática and Measure/DHS+, 2001; Instituto Nacional de Estadística and Institute for Resource Development, 1988). In Ghana, the percentage of women aged 20-24 who were in consensual unions increased from 6 per cent in 1988 to 19 per cent in 1998 (Ghana Statistical Service and Institute for Resource Development/Macro Systems, 1989; Ghana Statistical Service and Macro International, Inc., 1999). That increase was disproportionately large among women with a secondary or higher education compared to women with a primary or no education. The proportion of women aged 20-24 who were in consensual unions increased from 6 per cent to 22 per cent among women with a secondary or higher education, compared to an increase from 6 per cent to 9 per cent among women with no education (Macro International, Inc., 2002). The data point to a shift towards cohabitation or informal unions at an early age among educated women even as they defer formal marriage.

TABLE 27. TRENDS IN PERCENTAGE OF WOMEN AGED 20-24 WHO WERE FIRST MARRIED BEFORE AGE 20, BY EDUCATIONAL LEVEL

| Major area and country | Earlier year | Later year | Highest educational level | | | | | |
| | | | No education | | Primary | | Secondary + | |
			Earlier year	Later year	Earlier year	Later year	Earlier year	Later year
Africa			**85**	**82**	**69**	**63**	**33**	**31**
Burkina Faso	1992-93	1998-99	93	92	71	73	45	25
Cameroon	1991	1998	94	95	85	66	46	41
Côte d'Ivoire	1994	1998-99	69	62	55	49	32	21
Ghana	1988	1998	74	68	63	64	30	49
Kenya	1989	1998	82	82	59	58	32	22
Mali	1987	1996	93	89	89	70	..	35
Niger	1992	1998	94	92	84	72	31	37
Nigeria	1990	1999	92	92	69	56	33	25

TABLE 27. (*continued*)

| Major area and country | Earlier year | Later year | Highest educational level | | | | | |
| | | | No education | | Primary | | Secondary + | |
			Earlier year	Later year	Earlier year	Later year	Earlier year	Later year
Senegal	1986	1997	82	66	46	35	28	13
Togo	1988	1998	80	67	59	47	29	16
Uganda	1988-89	1995	83	86	76	79	40	43
United Republic of Tanzania	1992	1999	84	85	60	60	21	19
Zambia	1992	1996	82	77	74	76	35	39
Zimbabwe	1988	1999	85	..	76	72	30	43
Asia								
Philippines	1993	1998	57	40	50	53	23	22
Latin America and Caribbean			65	69	56	62	27	30
Bolivia	1989	1998	47	66	54	59	30	29
Brazil	1986	1996	62	79	49	51	17	33
Colombia	1990	2000	54	48	49	62	30	29
Dominican Republic	1986	1996	88	89	73	77	27	32
Guatemala	1987	1999	76	76	61	60	28	34
Peru	1986	2000	60	57	51	63	27	24

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).
NOTE: Two dots (..) indicate data missing, or sample size less than 50 in education category.

Trends in the initiation of sexual activity be- fore age 20, for 21 countries that have had at least two surveys, show that in sub-Saharan Africa, on average, sexual onset has changed little among women with all levels of educational attainment (table 28 and figure 15). In Latin America and the Caribbean, sexual onset before age 20 has, in general, increased across all educational strata. The increase in the onset of sexual activity before age 18 is more pronounced than at ages 18-19. In addition, the largest increase in the proportion initiating sexual activity before age 18 is among educated women, particularly those with a secondary or higher education.

Trends in the initiation of sexual activity vary within regions, suggesting responses to events over time that are unique to each country. For example, in countries such as Uganda where the response to the spread of HIV/AIDS has been to create mass awareness of the epidemic, the attendant declines in sexual onset may apply to all women irrespective of attained educational level, albeit at a different pace for each educational stratum.

Trends in the incidence of first births before age 20 are similar to those for marriage. Whereas the prevalence of first births has declined across all educational categories in sub-Saharan Africa, it has increased across all educational strata in Latin America and the Caribbean (table 29 and figure 16). Declines in the proportion of women with a birth by age 20 are especially marked in Kenya, Senegal and Togo. In sub-Saharan Africa, the largest decline in first births before age 20 occurred at ages under 18, and declines were greatest for women with no education or a primary education. Conversely, in Latin America and the Caribbean, the largest increase in the prevalence of first births before age 20 also occurred at ages under 18, especially for women with primary schooling.

TABLE 28. TRENDS IN PERCENTAGE OF WOMEN AGED 20-24 WHO INITIATED SEX
BEFORE AGE 20, BY EDUCATIONAL LEVEL, SELECTED DEVELOPING COUNTRIES

			Highest educational level					
			No education		Primary		Secondary +	
	Earlier	Later	Earlier	Later	Earlier	Later	Earlier	Later
Country	year	year	year	year	year	year	year	year
Africa								
Burkina Faso	1992-93	1998-99	91	90	86	82	67	66
Cameroon	1991	1998	88	92	91	92	88	90
Ghana	1988	1998	94	84	89	86	83	79
Kenya	1989	1998	86	87	84	87	68	64
Mali	1987	1996	86	93	89	89	..	76
Niger	1992	1998	90	94	87	79	49	43
Nigeria	1990	1999	86	85	73	68	67	54
Togo	1988	1998	93	87	89	88	91	84
Uganda	1988-89	1995	94	89	94	89	80	78
United Republic of Tanzania	1992	1999	88	91	81	86	50	60
Zambia	1992	1996	87	88	91	93	73	74
Zimbabwe	1988	1999	88	85	87	78	51	55
Asia								
Philippines	1993	1998	57	43	50	54	23	23
Latin America and the Caribbean								
Bolivia	1989	1998	61	80	70	71	47	45
Brazil	1986	1996	66	80	56	69	29	58
Colombia	1990	2000	82	74	62	83	41	64
Dominican Republic	1986	1996	87	88	76	80	30	40
Guatemala	1987	1999	77	80	65	66	30	38
Peru	1986	2000	64	72	66	76	38	46

Source: Demographic and Health Surveys (Calverton, Maryland: Macro International, Inc).
NOTE: Two dots (..) indicate data are missing, or based on fewer than 50 cases

Figure 15. Trends in the proportion of women aged 20-24 who initiated sex before age 20, by educational level, major areas
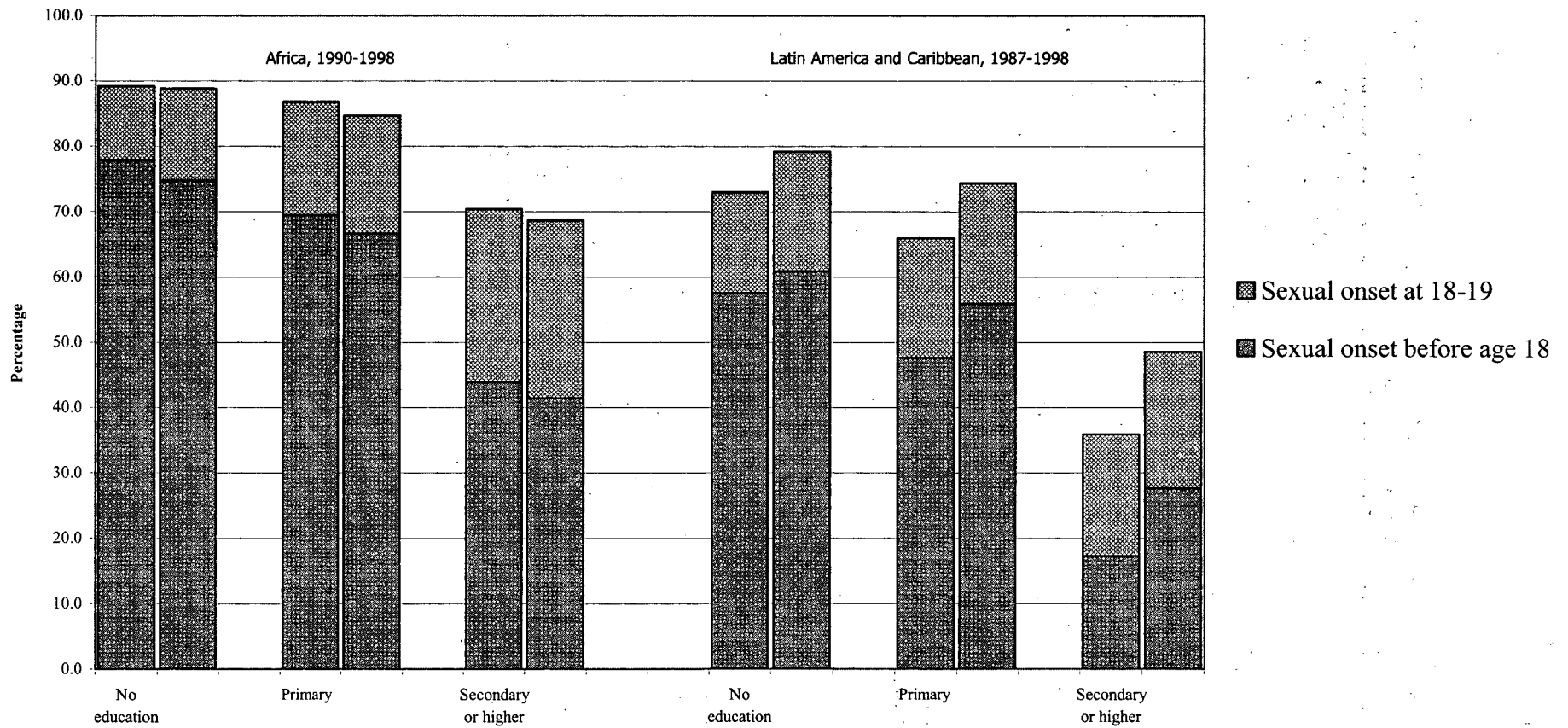
Source: Demographic and Health Surveys (Calverton, Maryland; Macro International, Inc.).

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TABLE 29. TRENDS IN PERCENTAGE OF WOMEN AGED 20-24 WHOSE FIRST BIRTH OCCURRED BEFORE AGE 20, BY EDUCATIONAL LEVEL

| | | | Highest educational level | | | | | |
| | | | No education | | Primary | | Secondary + | |
Country	Earlier year	Later year	Earlier year	Later year	Earlier year	Later year	Earlier year	Later year
Africa								
Burkina Faso	1992-93	1998-99	68	67	57	57	23	24
Cameroon	1991	1998	83	75	79	63	44	37
Ghana	1988	1998	60	52	51	48	16	34
Kenya	1989	1998	76	61	69	59	38	24
Mali	1987	1996	69	75	63	63	..	30
Niger	1992	1998	78	76	73	63	28	28
Nigeria	1990	1999	72	77	56	47	27	18
Senegal	1986	1997	69	53	40	36	29	12
Togo	1988	1998	69	54	53	37	32	11
Uganda	1995	1988-89	72	74	71	71	41	40
United Republic of Tanzania	1992	1999	71	68	57	57	22	18
Zambia	1992	1996	66	68	71	72	41	46
Zimbabwe	1988	1999	68	..	71	70	28	35
Asia								
Philippines	1993	1998	41	..	39	42	16	16
Latin America and the Caribbean								
Bolivia	1989	1998	44	53	49	57	27	27
Brazil	1986	1996	61	70	39	45	11	26
Colombia	1990	2000	58	..	45	61	21	27
Dominican Republic	1986	1996	80	73	56	61	17	19
Guatemala	1987	1999	66	69	53	50	17	21
Peru	1986	2000	55	59	44	57	22	21

Source: Demographic and Health Surveys (Calverton, Maryland,: Macro International, Inc.).

NOTE: Two dots (..) indicate fewer than 40 cases in educational category.

Figure 16. Proportion of women aged 20-24 whose first birth occurred before age 20, by educational level
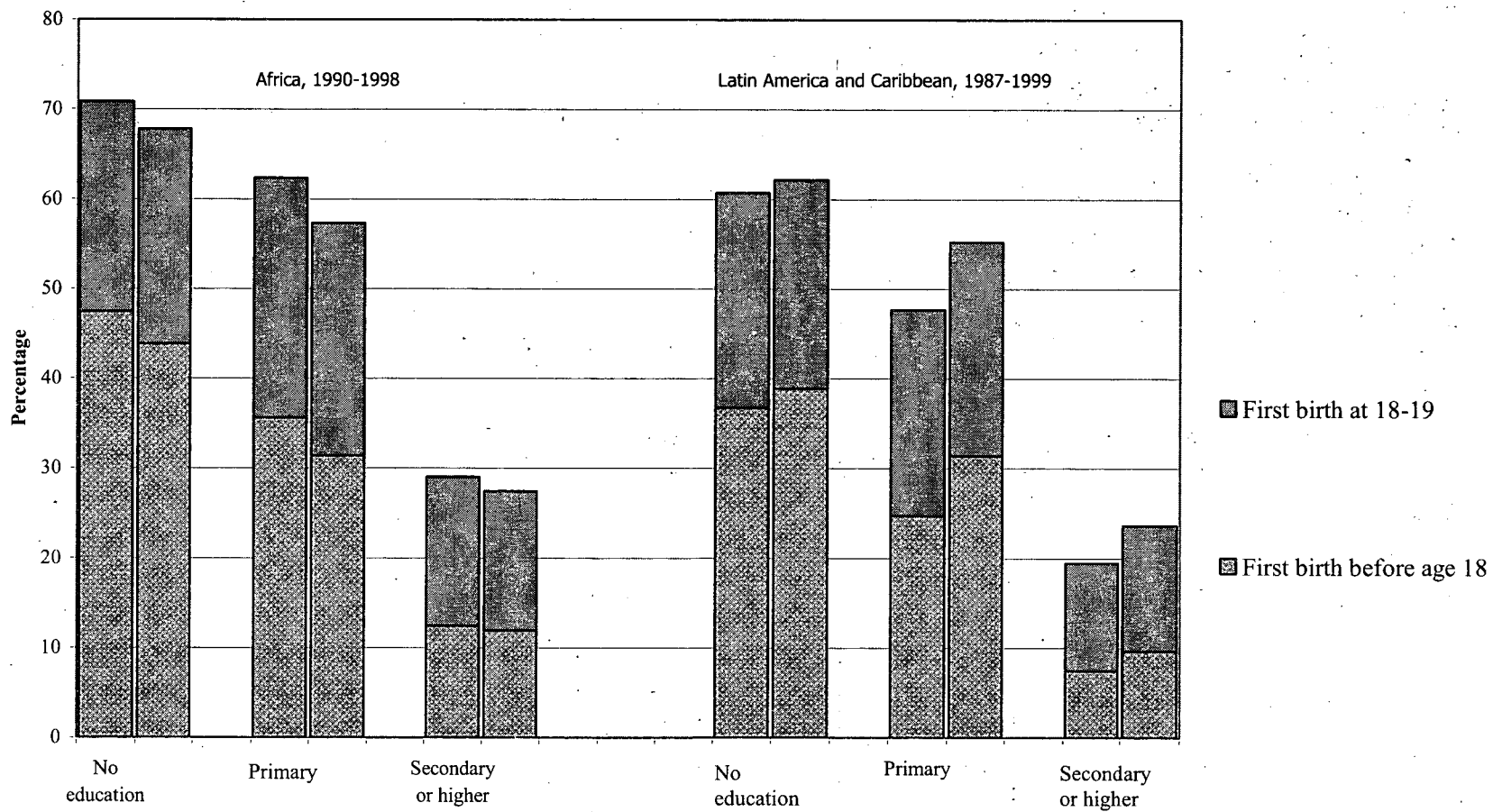
Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

H. SUMMARY AND CONCLUSIONS

The international community has long recognized the role of education in affecting the marital and reproductive lives of men and women. For example, the Programme of Action of the International Conference on Population and Development states that the increase in the education of women and girls contributes to greater empowerment of women, to a postponement of the age of marriage and to a reduction in the size of families.

The present study adds further evidence to general findings that education delays marriage and childbearing, not only for women, but also for men. Education also delays the onset of sexual activity for women; however, the evidence for men is less clear. Educated women and men are likely to have greater knowledge of contraceptive methods and of how to use them effectively.

Although women with a secondary or higher education are less likely to marry or give birth early, a majority of them begin sexual activity before age 20 in most countries considered here. Educational attainment for women is also related to postponement of sexual relations to later ages. However, the effect of education is not as strong as that for marriage or for childbearing. In addition, among men, those who are more educated marry later than their less educated counterparts. However, in contrast to women, data show that educated men initiate sexual activity earlier, and this is particularly the case at higher levels of education.

In the developing countries, contraceptive behaviour varies considerably across educational strata, with better-educated men and women consistently having a higher prevalence than women with little or no formal education. Even a small amount of schooling has a significant impact on contraceptive behaviour. In the developed countries, where contraceptive behaviour is already high, differentials in contraceptive use are small.

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ANNEX TABLES

TABLE A.II.1. PERCENTAGE OF WOMEN AGED 20-24 WHO INITIATED SEX BEFORE AGE 20,
BY EDUCATIONAL LEVEL IN SELECTED DEVELOPING COUNTRIES

		Highest educational level								
		No education Age at first sex			Primary Age at first sex			Secondary + Age at first sex		
Major area and country	Year	Total	< 18	18-19	Total	< 18	18-19	Total	< 18	18-19
Africa		**83**	**68**	**15**	**79**	**61**	**17**	**64**	**39**	**25**
Benin	1996	88	65	23	85	65	21	79	41	38
Burkina Faso	1998-99	90	74	15	82	59	22	66	30	36
Burundi	1987	46	15	31	43	18	24	39	19	20
Cameroon	1998	92	81	11	92	82	10	90	69	22
Central African Republic	1994-95	94	80	13	95	84	12	90	73	17
Chad	1996-97	93	80	12	88	75	13	77	51	26
Comoros	1996	48	39	9	57	39	17	32	20	12
Côte d'Ivoire	1998-99	92	75	17	95	81	13	87	63	23
Ethiopia	2000	72	55	17	56	43	13	41	25	16
Ghana	1998	84	63	21	86	63	23	79	52	27
Guinea	1999	88	77	11	82	71	12	68	44	24
Kenya	1998	87	65	22	87	69	18	64	38	26
Madagascar	1997	92	82	10	85	67	19	76	48	28
Malawi	2000	90	75	15	87	66	21	62	34	28
Mali	1996	93	84	9	89	76	14	76	48	29
Mozambique	1997	91	81	10	92	78	14	83	56	27
Namibia	1992	84	62	21	70	51	19	57	31	26
Niger	1992	90	85	6	87	78	9	49	29	20
Nigeria	1990	86	76	11	73	56	18	67	39	28
Nigeria	1999	85	77	8	68	51	17	54	30	24
Rwanda	1992	59	34	25	41	17	24	16	5	11
Senegal	1997	64	52	13	47	31	16	25	12	14
Togo	1998	87	69	18	88	63	25	84	51	33
Uganda	1995	89	77	13	89	73	15	78	50	28
United Republic of Tanzania	1999	91	71	20	86	67	19	60	28	31
Zambia	1996	88	71	17	93	79	14	74	51	23
Zimbabwe	1999	..	..	..	78	54	24	55	25	31
Asia		**62**	**45**	**17**	**65**	**46**	**19**	**43**	**19**	**24**
Armenia	2000	..	..	..	..	..	..	37	19	18
Indonesia	1997	58	44	14	66	45	21	28	14	14
Kazakhstan	1999	..	..	..	..	..	..	50	25	25
Kyrgyzstan	1997	..	..	..	..	..	..	59	22	37
Nepal	2001	85	69	17	76	59	17	51	29	22
Philippines	1998	43	24	19	54	35	18	23	10	13
Uzbekistan	1996	..	..	..	..	..	..	56	16	40
Latin America and the Caribbean		**76**	**58**	**18**	**71**	**52**	**19**	**44**	**24**	**20**
Bolivia	1998	80	44	36	71	53	18	45	24	21
Brazil	1996	..	..	..	69	50	19	58	39	19
Colombia	2000	..	..	..	83	66	16	64	38	26
Dominican Republic	1996	88	80	8	81	62	19	40	23	17
Ecuador	1987	..	..	..	70	50	20	37	19	18
El Salvador	1985	61	48	13	56	40	16	22	7	15
Guatemala	1999	80	63	17	66	45	21	38	17	21
Haiti	1994-95	77	55	22	65	45	20	50	29	21
Mexico	1987	73	55	18	66	43	24	28	13	15
Nicaragua	1997-98	79	69	10	82	67	15	49	31	18
Paraguay	1990	..	..	..	73	51	22	46	23	23
Peru	2000	72	53	18	76	59	17	46	26	21
Trinidad and Tobago	1987	..	..	..	68	47	21	51	28	23

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).
NOTES: Regional averages are unweighted. Two dots (..) indicate data are missing, or based on fewer than 50 cases.

TABLE A.II.2. PERCENTAGE OF MEN AGED 20-24 WHO INITIATED SEX BEFORE AGE 20,
BY EDUCATIONAL LEVEL

		Highest educational level								
		No education			Primary			Secondary +		
		Age at first sex			Age at first sex			Age at first sex		
Mayor area and country	Years of survey	Total	Before age 18	At age 18-19	Total	Before age 18	At aged 18-19	Total	Before age 18	At age 18-19
Africa		**64**	**46**	**18**	**72**	**49**	**23**	**73**	**52**	**21**
Benin	1996	77	56	20	73	52	22	77	57	19
Burkina Faso	1999	45	30	15	58	30	28	58	36	22
Cameroon	1998	56	28	28	82	57	25	90	70	20
Côte d'Ivoire	1989-99	76	40	36	86	57	29	87	65	22
Central African Republic	1994	74	62	12	89	65	24	91	66	25
Chad	1997	62	43	19	64	38	26	77	56	21
Comoros	1996	..	..	..	55	47	8	68	52	16
Ghana	1998	..	..	..	59	35	24	55	31	24
Guinea	1999	65	49	16	83	63	21	89	62	26
Kenya	1998	..	..	..	80	70	10	80	64	16
Mali	1996	52	29	23	79	37	42	83	67	16
Niger	1998	47	27	20	44	28	16	51	23	28
Mozambique	1997	81	63	19	86	58	29	86	70	17
Nigeria	1999	50	31	19	59	34	25	53	38	15
Senegal	1997	45	29	16	57	41	15	54	35	18
Togo	1998	70	47	23	75	50	25	79	51	28
Uganda	1995	65	61	4	83	58	25	80	56	24
United Republic of Tanzania	1999	76	59	17	84	58	26	67	38	29
Zambia	1996	91	86	4	84	70	14	79	68	12
Zimbabwe	1999	..	..	..	66	39	27	53	28	25
Asia										
Armenia	2000	..	..	..	..	..	..	49	26	23
Kazakhstan	1999	..	..	..	61	34	27	77	46	31
Latin America and the Caribbean		**75**	**55**	**20**	**79**	**63**	**16**	**85**	**68**	**17**
Bolivia	1998	..	..	..	76	64	12	79	63	17
Brazil	1996	..	..	..	88	70	18	88	78	11
Dominican Republic	1996	70	45	25	81	61	20	84	63	21
Haiti	1994	74	51	23	68	43	25	79	61	18
Nicaragua	1997	81	68	13	91	82	10	95	82	13
Peru	1996	..	..	..	68	56	12	83	61	22

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

NOTES: Regional averages are unweighted. Two dots (..) indicate fewer than 25 cases.

TABLE A.II.3. PROPORTION OF WOMEN AGED 20-24 WHOSE FIRST BIRTH
OCCURRED BEFORE AGE 20, BY EDUCATIONAL LEVEL

		Highest educational level								
		No education			Primary			Secondary +		
	Year of	Age at 1st birth			Age at 1st birth			Age at 1st birth		
Major area and country	survey	Total	< 18	18-19	Total	< 18	18-19	Total	< 18	18-19
Africa		**61**	**38**	**23**	**53**	**29**	**24**	**27**	**11**	**15**
Benin	1996	57	27	30	44	21	24	14	7	7
Burkina Faso	1998-99	67	36	30	57	27	31	24	11	14
Burundi	1987	28	7	20	26	9	17	21	3	18
Cameroon	1998	75	54	22	63	39	24	37	18	19
Central African Republic	1994-95	63	40	23	63	39	24	55	31	24
Chad	1996-97	74	49	25	70	42	28	45	20	25
Comoros	1996	36	23	13	35	19	15	13	7	6
Côte d'Ivoire	1998-99	62	38	24	64	42	22	27	16	12
Egypt	2000	45	24	20	39	17	22	14	3	11
Ethiopia	2000	48	27	22	42	23	18	20	11	9
Ghana	1998	52	31	21	48	22	26	34	15	19
Guinea	1999	73	52	20	59	41	18	31	20	11
Kenya	1998	61	42	18	59	30	28	24	9	15
Madagascar	1997	74	50	23	60	34	26	39	17	22
Malawi	2000	70	44	26	69	32	37	28	10	18
Mali	1996	75	51	24	63	38	26	30	15	15
Morocco	1992	27	11	16	15	4	11	5	2	4
Mozambique	1997	67	44	23	67	45	22	36	12	24
Namibia	1992	61	36	24	52	24	28	30	10	20
Niger	1998	76	51	25	63	38	26	28	16	11
Nigeria	1999	77	55	22	47	31	16	18	8	10
Rwanda	1992	37	16	21	23	7	16	8	1	7
Senegal	1997	53	35	19	36	17	19	12	4	7
Togo	1998	54	27	27	37	19	18	11	2	9
Uganda	1995	72	46	26	71	42	28	41	16	25
United Republic of Tanzania	1999	68	40	28	57	25	31	18	2	16
Zambia	1996	68	40	28	72	42	30	46	22	24
Zimbabwe	1999	81	61	20	70	35	35	35	11	24
Asia		**50**	**34**	**16**	**47**	**26**	**21**	**22**	**7**	**15**
Armenia	2000	..	..	..	..	..	..	26	8	18
Bangladesh	1996-97	76	61	16	72	54	18	36	19	17
India	1998-99	67	45	21	58	34	24	28	11	17
Indonesia	1997	39	31	8	46	22	24	17	5	12
Kazakhstan	1999	..	..	..	..	..	..	22	6	16
Kyrgyzstan	1997	..	..	..	..	..	..	37	4	32
Nepal	2001	61	32	29	54	29	25	32	14	18
Pakistan	1990-91	39	25	15	32	12	20	11	3	8
Philippines	1998	26	23	3	42	19	24	16	4	11
Turkey	1998	46	23	23	33	14	19	11	4	7
Uzbekistan	1996	..	..	..	..	..	..	25	3	23
Yemen	1991-92	46	30	15	34	22	12	1	0	1
Latin America and the Caribbean		**58**	**34**	**24**	**53**	**29**	**24**	**23**	**9**	**14**
Bolivia	1998	53	19	34	57	29	28	27	11	16
Brazil	1996	70	49	21	45	24	20	26	12	14
Colombia	2000	49	45	4	61	38	24	27	13	15
Dominican Republic	1996	73	52	21	61	38	24	19	6	13
Ecuador	1987	46	19	27	53	28	25	23	8	15
Guatemala	1999	69	40	29	50	27	23	21	8	13
Haiti	1994-95	47	28	19	38	17	22	15	6	9
Mexico	1987	69	51	17	53	31	23	18	7	10
Nicaragua	1997-98	73	50	23	70	45	24	34	16	18
Paraguay	1990	51	10	41	49	21	28	22	10	13
Peru	2000	59	28	31	57	33	23	21	8	13
Trinidad and Tobago	1987	..	..	..	44	23	21	24	8	15

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

NOTE: Regional averages are unweighted.

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III. INTERRELATIONS BETWEEN EDUCATION AND FERTILITY

Introduction

Education has a strong impact in reducing fertility, both at the individual and the societal level. The fertility preferences and behaviour of both men and women are greatly influenced by educational attainment. In general, increased education brings about lower fertility. Women's education stands out as a significant factor in reducing fertility, even after taking into account other relevant factors such as the husband's education and the household's socio-economic characteristics, particularly in the developing countries (Jejeebhoy, 1995; United Nations, 1995).

The mechanisms underlying the relationship between education and fertility are not only biological, but also psychological and behavioural, and may be described using the "synthesis" framework of Easterlin (Easterlin and Crimmins, 1985). According to that framework, fertility outcomes are determined by the supply of children, the demand for children and finally, the costs of contraception (United Nations, 1995). The supply of children refers to the number of children or surviving children that a couple *can* have (biologically), given prevailing customs governing marriage and other behaviours that can affect fertility but are not aimed at determining family size. Education can have both a positive and a negative effect on the supply of children. When a country is at the early stages of the demographic transition (that is, when there is little or no deliberate control over reproduction), a small amount of education tends to raise the supply of children because it increases fecundity through better nutrition and maternal health. It also tends to erode traditional practices that depress fertility, such as post-partum abstinence and prolonged breastfeeding. On the other hand, education may reduce the supply of children by delaying marriage or cohabitation, which results in a shortening of a woman's overall length of time to pregnancy, and/or by delaying the time to first birth. The demand for children refers to the number of children a couple wants to have. Better-educated women generally want smaller families because education shapes and changes

their values, attitudes and norms as well as the perceived costs of raising children. Lastly, the cost of contraception refers to the perceived and actual barriers to the use of contraception for implementing fertility preferences. Education tends to reduce such costs because it increases awareness, access, affordability and efficient use of contraception.

Cross-nationally, fertility is higher in countries whose populations have lower overall education levels. At the individual level, on the other hand, the relationship varies depending on the level of economic development, the region, the stage in the demographic transition, and the social and cultural structure of the country or society, including the degree of gender stratification (Jejeebhoy, 1995; United Nations, 1995; Weinberger, 1987). The relationship between individual education and fertility is most likely to be negative in countries with higher levels of development and with the fertility transition well under way. In countries with low per capita income, in the least literate settings and in places where the fertility transition has not begun yet or is at its early stages, curvilinear relationships have been found — that is, a small amount of education leads to higher fertility or no change in fertility. Even within countries, the relationship differs between the more developed and urban areas and the less developed and rural areas.

The relationship between individual education and fertility evolves over time, following the course of the fertility transition. In countries that are pre-transitional or just at the start of the fertility transition, the relationship is usually weak. Over time, fertility gaps by educational level tend to widen because fertility falls first among the most educated groups and last among the poorly educated ones. As the fertility transition proceeds, fertility differentials tend to narrow owing to diffusion processes and expanded access to family planning services, which eventually leads to a convergence in the fertility of all the educational subgroups (Cleland, 2002).

The present chapter reviews and updates the empirical relationship between fertility and education. Recent survey data are used to investigate the relationships between education and observed fertility levels, fertility preferences and fertility regulation. The focus is mainly on the effects of women's education on fertility, owing to data availability constraints, but a brief review of the role of men's education in fertility is also provided.

A. EDUCATION AND OBSERVED FERTILITY LEVELS

1. Current fertility

As of 1995-2000, levels of fertility for the 187 countries and areas of the world varied from above 5 children per woman (48 countries) to 2.1 children or less per woman (64 countries) (United Nations, 2001). The 48 countries with high fertility are located mainly in sub-Saharan Africa; most also belong to the group of least developed countries. The 64 countries with replacement-level fertility or below are, for the most part, developed countries; they are located mainly in Eastern Asia, Europe and Northern America. Countries in Western Asia and Oceania generally exhibit fertility levels between 4 and 5 children per woman. Countries in Northern Africa, South-central and South-eastern Asia, and Latin America and the Caribbean have low to medium fertility levels, with average total fertility rates (TFRs) between 3 and 4 children per woman.

Women's education is a major source of fertility differentials. At the aggregate level, a very clear pattern emerges: countries in which women have higher literacy rates and overall educational attainment have lower TFRs than countries whose populations have lower education levels (figures 1 and 17). A country's overall level of education affects the TFR in both developing and developed countries. Moreover, this effect continues to be significant when other characteristics are controlled. For example, in the European countries with economies in transition — Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Russian Federation and Slovakia — the higher the proportion of women aged 18-22 enrolled in post-secondary education, the lower the country's TFR, independently of the possible effect of other social and economic factors (United Nations, 2000a).

There is also a marked relationship between education and fertility for individuals within countries. With a very few exceptions, current fertility levels decrease from one educational level to the next, as shown by the data available for the 71 countries shown in table 30. Among the less developed countries, some regional patterns can be observed. The countries in Latin America and the Caribbean have the largest fertility differentials by education, as better educated women have more knowledge, more socio-economic advantages and attitudes towards reproduction that are much less fatalistic than those of less educated women (Castro Martín and Juárez, 1995; United Nations, 1987; United Nations, 1995; Weinberger, 1987).

As a result, better-educated women are much more able to translate their fertility desires into reality, through the use of efficient methods of contraception. In the region, women with a secondary or higher education have on average more than 3 children fewer than women with no education, leading to a fertility level among the least educated women more than twice as high as that of highly educated women. Women with a secondary or higher education bear around 2.6 children per woman as compared with 4.5 among women with a primary education and 5.8 among women with no education.

In sub-Saharan Africa and Western Asia, women with a secondary or higher education bear around 3.5 children per woman as compared with 6.4 among women with no education. Thus, in those regions, women with a secondary or higher education bear almost 3 children fewer than women with no education, on average. In Northern Africa, the most educated women bear around 2 children fewer than women with no education, on average. In Eastern, South-central and South-eastern Asia, the education differentials tend to be smaller, although there are exceptions such as Nepal and the Lao People's Democratic Republic.

Figure 17. Total fertility rate by female literacy
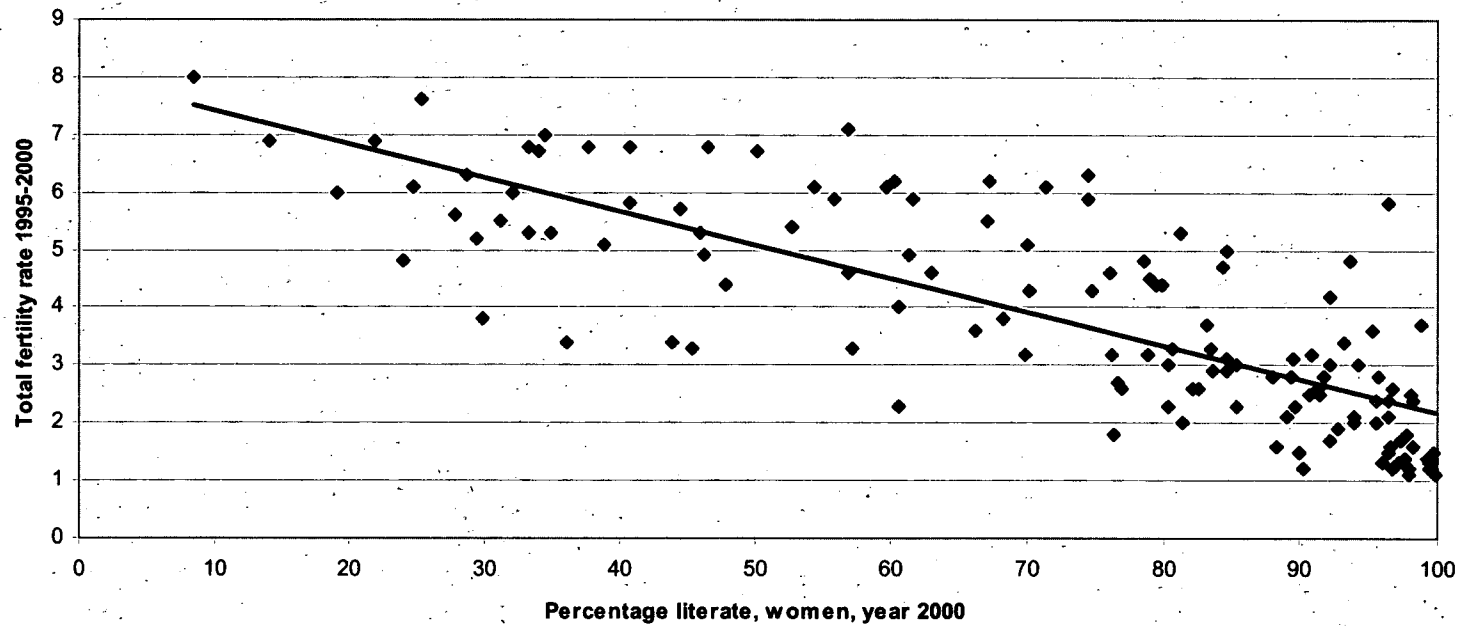
Sources: Female literacy: United Nations Population Division, *Population, Resources, Environment and Development Databank* 3.0 version CD-ROM (POP/DB/PRED/2001); and TFR: *World Population Prospects: The 2000 Revision,* vol. I, *Comprehensive Tables* (United Nations publication, Sales No. E.01.XIII.8 and Corr.1).

TABLE 30. TOTAL FERTILITY RATES, BY WOMEN'S LEVEL OF EDUCATION

Region and country	Year	Level of education				Differences in TFR		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
Sub-Saharan Africa								
Benin	1996	7.0	5.0	3.2	6.3	3.8	1.8	2.0
Burkina Faso	1998	7.1	5.4	2.9	6.8	4.2	2.5	1.7
Cameroon	1998	6.6	5.3	3.6	5.2	3.0	1.7	1.3
Cape Verde	1998	6.9	4.3	2.2	4.0	4.7	2.1	2.6
Central African Republic	1995	5.2	5.3	3.9	5.1	1.3	1.4	-0.1
Chad	1997	6.7	<-	6.5 ->	6.6	0.2	..	0.2
Comoros	1996	5.8	5.3	3.6	5.1	2.2	1.7	0.5
Côte d'Ivoire	1998	6.1	4.7	2.3	5.2	3.8	2.4	1.4
Eritrea	1995	6.9	5.1	3.0	6.1	3.9	2.1	1.8
Ethiopia	2000	6.2	5.1	3.1	5.9	3.1	2.0	1.1
Gabon	2000	5.2	5.3	3.5	4.3	1.7	1.8	-0.1
Ghana	1998	5.8	4.9	3.6	4.6	2.2	1.3	0.9
Guinea	1999	5.9	4.8	3.5	5.5	2.4	1.3	1.1
Kenya	1998	5.8	5.1	3.5	4.7	2.3	1.6	0.7
Madagascar	1997	6.8	6.5	4.2	6.0	2.6	2.3	0.3
Malawi	2000	7.3	6.4	3.0	6.3	4.3	3.4	0.9
Mali	1996	7.1	6.5	4.1	6.7	3.0	2.4	0.6
Mauritania	2000	5.3	4.6	3.5	4.7	1.8	1.1	0.7
Mozambique	1997	5.8	5.7	3.7	5.6	2.1	2.0	0.1
Namibia	1992	6.6	5.9	4.1	5.4	2.5	1.8	0.7
Niger	1998	7.8	6.7	4.6	7.5	3.2	2.1	1.1
Nigeria	1999	6.1	5.6	4.5	5.2	1.6	1.1	0.5
Rwanda	2000	7.1	6.8	4.6	6.8	2.5	2.2	0.3
Senegal	1997	6.3	5.2	3.1	5.7	3.2	2.1	1.1
South Africa	1998	4.5	3.7	2.5	2.9	2.0	1.2	0.8
Togo	1998	6.5	4.8	2.7	5.4	3.8	2.1	1.7
Uganda	2000	7.8	7.3	3.9	6.9	3.9	3.4	0.5
United Republic of Tanzania	1999	6.5	<-	5.0 ->	5.6	1.5	..	1.5
Zambia	1996	6.8	6.7	4.5	6.1	2.3	2.2	0.1
Zimbabwe	1999	5.2	4.5	3.2	4.0	2.0	1.3	0.7
Mean		6.4	5.5	3.7	5.5	2.7	1.8	0.9

TABLE 30. (*continued*)

Region and country	Year	Level of education				Differences in TFR		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
Northern Africa								
Egypt	2000	4.1	3.6	3.2	3.5	0.9	0.4	0.5
Morocco	1995	4.0	2.4	1.9	3.3	2.1	0.5	1.6
Sudan	1990	5.9	4.9	3.3	5.0	2.6	1.6	1.0
Mean		*4.7*	*3.6*	*2.8*	*3.9*	*1.9*	*0.8*	*1.0*
Eastern, South-central and South-eastern Asia								
Bangladesh	1999	4.1	3.3	2.4	3.3	1.7	0.9	0.8
Cambodia	2000	4.5	4.0	2.9	4.0	1.6	1.1	0.5
India	1998	3.5	2.6	2.1	2.9	1.4	0.5	0.9
Indonesia	1997	2.7	3.2	2.7	2.8	0.0	0.5	-0.5
Kazakhstan	1999	..	2.4	1.9	2.1	..	0.5	..
Kyrgyzstan	1997	..	3.7	3.0	3.4	..	0.7	..
Lao People's Democratic Republic	2000	6.2	4.7	3.3	4.9	2.9	1.4	1.5
Mongolia	1998	<- 3.4 ->		3.1	3.1	0.3	0.3	..
Nepal	2001	4.8	3.2	2.2	4.1	2.6	1.0	1.6
Philippines	1998	5.0	5.0	3.3	3.7	1.7	1.7	0.0
Turkmenistan	2000	<- 3.0 ->		2.6	2.9	0.4	0.4	..
Uzbekistan	1996	..	3.5	3.0	3.3	..	0.5	..
Viet Nam	1997	4.0	2.9	2.3	2.8	1.7	0.6	1.1
Mean		*4.1*	*3.5*	*2.7*	*3.3*	*1.4*	*0.8*	*0.6*
Western Asia								
Armenia	2000	..	2.2	1.8	1.7	..	0.4	..
Bahrain	1995	7.0	3.6	3.0	3.2	4.0	0.6	3.4
Jordan	1997	4.6	4.5	4.3	4.4	0.3	0.2	0.1
Kuwait	1996	5.7	5.3	3.8	4.1	1.9	1.5	0.4
Oman	1995	8.6	7.5	4.3	7.1	4.3	3.2	1.1
Qatar	1998	6.5	4.1	3.7	3.9	2.8	0.4	2.4
Saudi Arabia	1996	7.4	5.8	5.1	5.7	2.3	0.7	1.6
Turkey	1998	3.9	2.6	1.6	2.6	2.3	1.0	1.3

TABLE 30. (continued)

Region and country	Year	Level of education				Differences in TFR		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
United Arab Emirates	1995	7.3	5.3	3.8	4.9	3.5	1.5	2.0
Yemen...	1997	6.9	5.1	3.1	6.5	3.8	2.0	1.8
Mean		6.4	4.6	3.5	4.4	2.9	1.1	1.9
Eastern Europe								
Republic of Moldova	2000	2.1	2.0	1.6	1.8	0.5	0.4	0.1
Romania..	1999	<-	2.5 ->	1.2	1.3	1.3	1.3	..
Mean		2.3	2.3	1.4	1.6	0.9	0.9	0.1
Latin America and the Caribbean								
Bolivia..	1998	7.1	5.8	3.1	4.2	4.0	2.7	1.3
Brazil..	1996	5.0	3.3	2.0	2.5	3.0	1.3	1.7
Colombia.......................................	2000	4.0	3.6	2.2	2.6	1.8	1.4	0.4
Dominican Republic	1996	5.0	3.7	2.4	3.2	2.6	1.3	1.3
Ecuador	1999	6.2	4.4	2.7	3.6	3.5	1.7	1.8
El Salvador....................................	1998	5.0	4.1	2.8	3.6	2.2	1.3	0.9
Guatemala	1998	6.8	5.2	2.9	5.0	3.9	2.3	1.6
Haiti	2000	6.4	5.1	2.5	4.7	3.9	2.6	1.3
Honduras.......................................	1996	7.1	5.3	2.9	4.9	4.2	2.4	1.8
Nicaragua......................................	1998	6.1	4.5	2.5	3.9	3.6	2.0	1.6
Paraguay..	1996	<-	5.4 ->	3.0	4.4	2.4	2.4	..
Peru	2000	5.1	4.0	2.2	2.9	2.9	1.8	1.1
Mean		5.8	4.5	2.6	3.8	3.2	1.9	1.2
Oceania								
Papua New Guinea.........................	1996	5.0	5.0	3.9	4.8	1.1	1.1	0.0

Sources: Unites States Centers for Disease Control and Prevention, Reproductive Health Surveys (Atlanta, Georgia); Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.); Gulf Family Health Surveys (Council of Health Ministers of the Gulf Cooperation Council States).

NOTES: Two dots (..) indicate that there were not enough cases to compute the value for the corresponding category. The mean regional values assume that when two educational categories have a combined value, each educational category has the combined value.

It is worth noting that the regional fertility differentials by education mask wide disparities among countries. Thus, while the difference between the TFR of the least educated women and that of the most educated women is 4 children or more in Bahrain, Bolivia, Burkina Faso, Cape Verde, Honduras, Malawi and Oman, it is less than one child in Egypt, Indonesia and Jordan (see selected countries in figure 18).

Figure 18. Women's education and current fertility

☐ No education ▦ Primary ☐ Secondary or higher
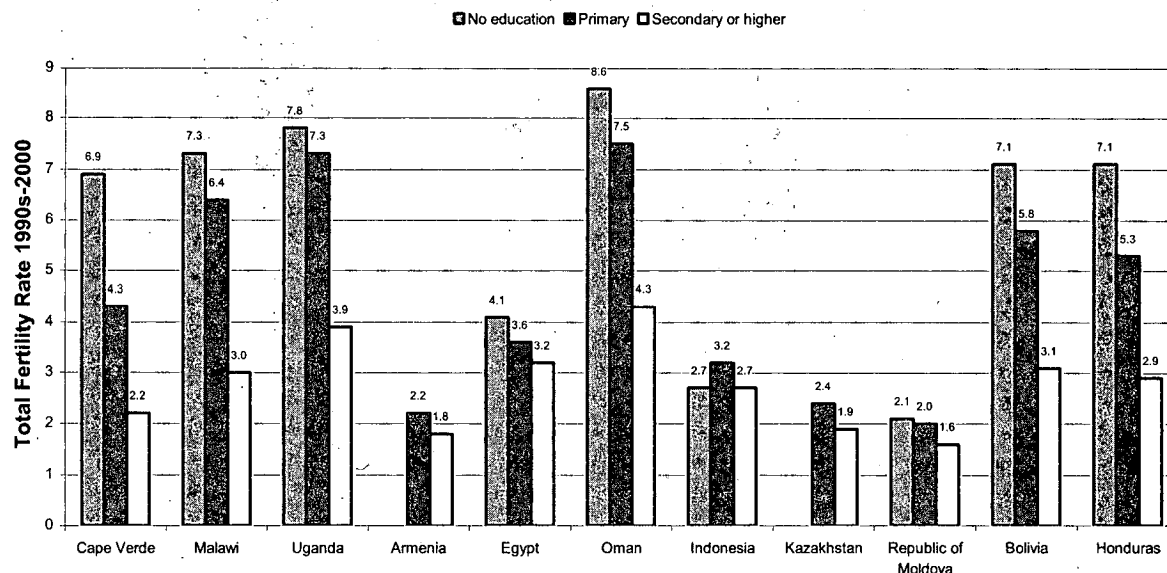
Source: Based on table 30: United States Centers for Disease Control and Prevention, Reproductive Health Surveys (Atlanta, Georgia): Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.); and Gulf Family Health Survey (Council of Health Ministers of the Gulf Cooperation Council States).

In the great majority of the developing countries, the difference in TFR between women with some education and women with a secondary or higher education is greater than that between women with some education and women with no education (table 30). Except in Latin America and the Caribbean and Western Asia, the difference in fertility between women with no education and those with primary schooling averages one child or less.

In the developed countries, differentials in current fertility by educational level also exist, although they are small compared to those in developing countries. In Eastern Europe and the other countries with economies in transition, the difference between women in the highest educational category and women in the lowest educational category is around one child or less. In the other developed countries, education affects current fertility mainly through its influence on the timing of the first birth: more educated women have a lower number of children at the time they are interviewed because they have their first birth at a later age (Daguet, 2000; Schoenmaeckers and Lodewijcx, 1999 and 2000). For example, in Italy in the 1990s, the mean age at first birth among women aged 35 and older was 22.5 in the lowest educational group compared to 28.2 in the highest educational group. In Spain, the corresponding ages were 24.4 and 25.8, respectively. In the Scandinavian countries, the mean age at first birth varied from 21.0 to 21.7 in the lowest educational group and from 25.4 to 25.7 in the highest educational group. The delaying effect of education on the onset of childbearing is also manifested in the percentages of women with a first birth by a certain age; these percentages decrease from one educational level to the next one above it (figures 19a and 19b).

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Figure 19a. Percentage of women with a first birth by age 22, by educational level, 1990s
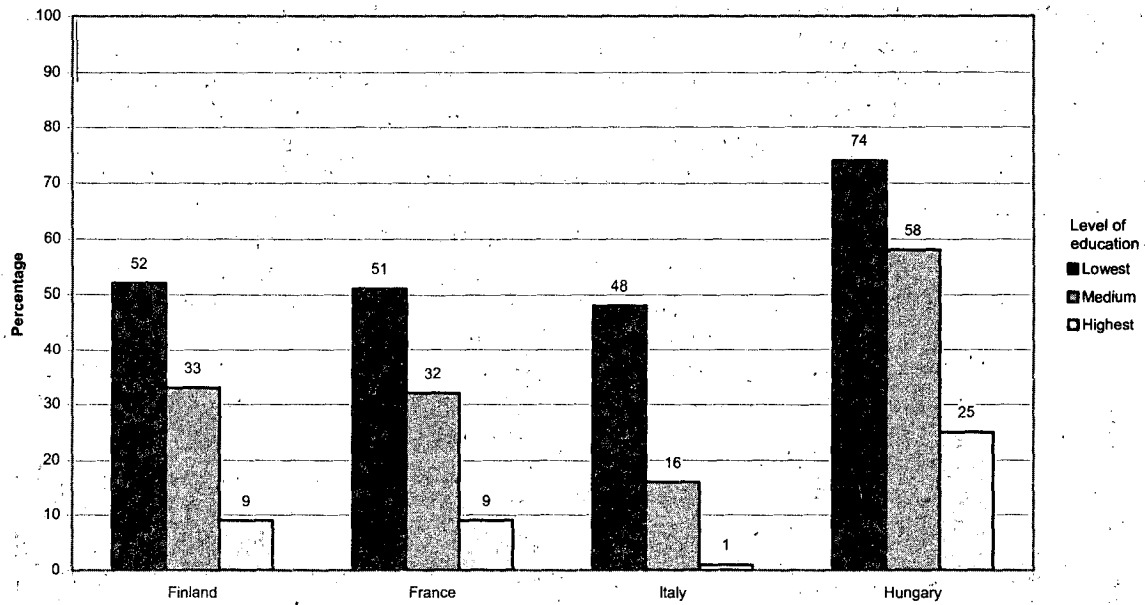
Source: Based on R. Schoenmaeckers and E. Lodewijcx, "Demographic behaviour in Europe: some results from FFS country reports and suggestions for further research", figure 4.5b, *European Journal of Population*, vol. 15.

Figure 19b. Percentage of women with a first birth by age 28, by educational level, 1990s
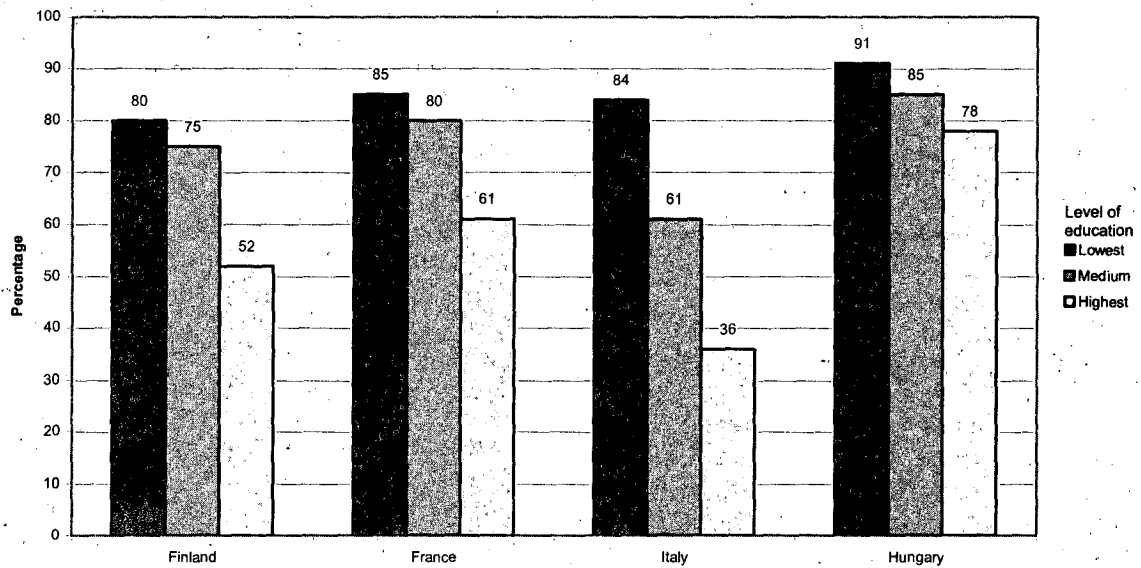
Source: Based on R. Schoenmaeckers and E. Lodewijcx, "Demographic behaviour in Europe: some results from FFS country reports and suggestions for further research", figure 4.5b, *European Journal of Population*, vol. 15.

Childlessness is on the rise in the low-fertility developed countries (United Nations, 2002). Education also exerts a significant influence on childlessness, except in Eastern European countries and those with economies in transition. Thus, in Northern America, Southern Europe, Western Europe and to a lesser extent Northern Europe, women with more education have a greater probability of remaining childless, independently of their cohort of birth (age at the time of interview), partnership status (whether they had ever had a partner) and other social characteristics (Beets and Dourleijn, 1999). The effect of education is usually smallest in the countries of Northern Europe and largest in the countries of Northern America and Western Europe, followed by the countries of Southern Europe. For example, in the United States in the 1990s, the proportion of women who were childless at age 30 varied from 17 per cent among those who had less than a high school diploma to 56 per cent among those who had a post-secondary degree (Martin, 2000).

2. Completed fertility

(a) Women

Completed fertility is the cumulative fertility — the mean number of children ever born — of women who have reached the end of their childbearing span. The cumulative fertility of women aged 40 or over at the time of the interview usually serves as a proxy for the level of completed fertility. In the developing countries, higher education is related to lower completed family size (figures 20a to 20d), although variations in completed fertility by educational level are not as great as the variations in current fertility. As is the case for current fertility, the gap in completed fertility between more educated and less educated women varies by region. Latin America and the Caribbean, Northern Africa and Western Asia display the largest differentials: in those regions, women with a secondary or higher education ultimately have 3 to 5 children fewer than women with no education. In sub-Saharan Africa, South-central Asia and South-eastern Asia, the difference in completed fertility between the most educated group and the group with no education is lower, usually between 1

and 2 children. In several countries women with primary schooling have higher completed fertility than those with no education — such differences amount to one-third child or more in Cameroon, Indonesia, Madagascar, Nigeria and Uganda. In those same countries, except Indonesia, current fertility (the TFR) is lower for those with primary schooling than for the uneducated. For sub-Saharan Africa, the comparison between completed and current fertility indicates that the education differentials in fertility have been widening during the recent past, as fertility declines have occurred mainly among the groups of women who have been to school.

In the developed countries of Northern and Western Europe, the completed fertility of the cohorts of women born in the 1930s and the 1940s is consistently negatively associated with educational level (Björklund, 2001). Recent data collected by the European Fertility and Family Surveys show that for the cohorts of women born in the 1950s, this pattern still holds true for the majority of the developed countries (figure 21a). However, the fertility differentials by education exhibit two major differences from that found in the developing countries. First, the gap in completed fertility level between women in the lowest and those in the highest educational group is much smaller in developed countries — it is usually less than one child. Second, fertility differentials by education have become less pronounced in many countries, such as Canada, Belgium, Hungary, Italy, Latvia, Norway, Portugal, Slovenia, Spain and Sweden, where women in the highest educational group (with a post-secondary degree) have an equal or even greater number of children than women in the medium educational group (with a secondary-school diploma). Thus, in the developed countries, in spite of the relatively late start at childbearing and higher rate of childlessness at a certain age (age 30, for example), women with a university degree end up with more or less the same number of children as women with a high school diploma. (Schoenmaeckers and Lodewijckx, 2000). First, and to a lesser extent higher-order, birth rates after age 25 or 30 have recently been found to be higher among women

Figure 20a. Women's completed fertility by educational level, in sub-Saharan Africa, late 1990s-early 2000s
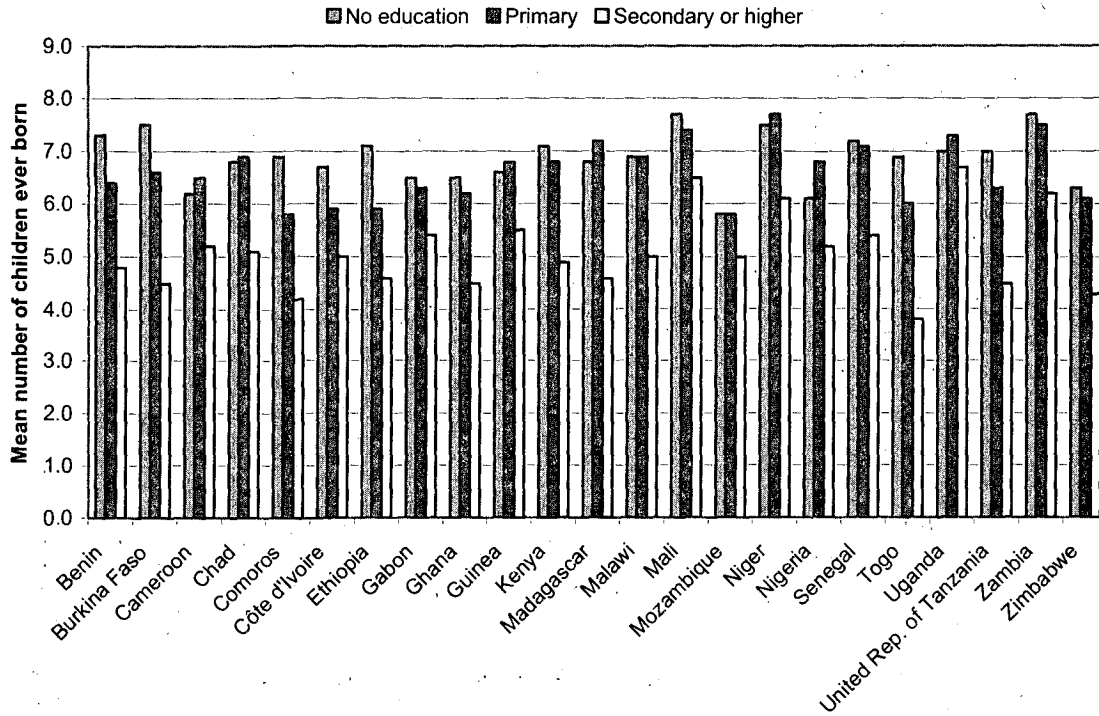
☒ No education ▧ Primary ☐ Secondary or higher

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

Figure 20b. Women's completed fertility, by educational level, in Northern Africa and South-central and Western Asia, late 1990s-early 2000s
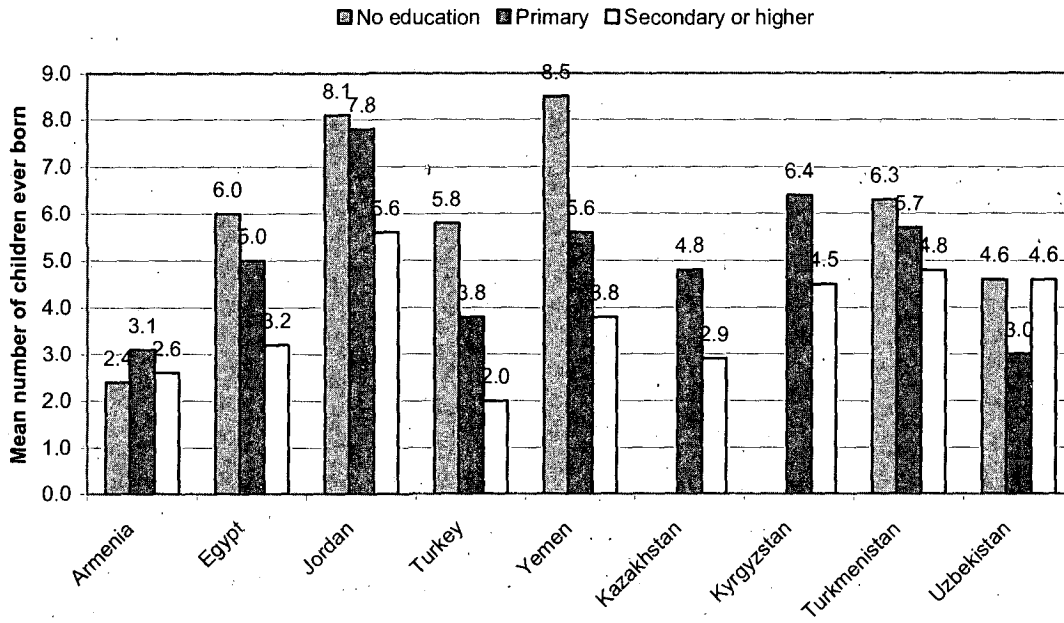
☒ No education ▧ Primary ☐ Secondary or higher

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

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Figure 20c. Women's completed fertility, by educational level, in South-central and South-eastern Asia, late 1990s-early 2000s
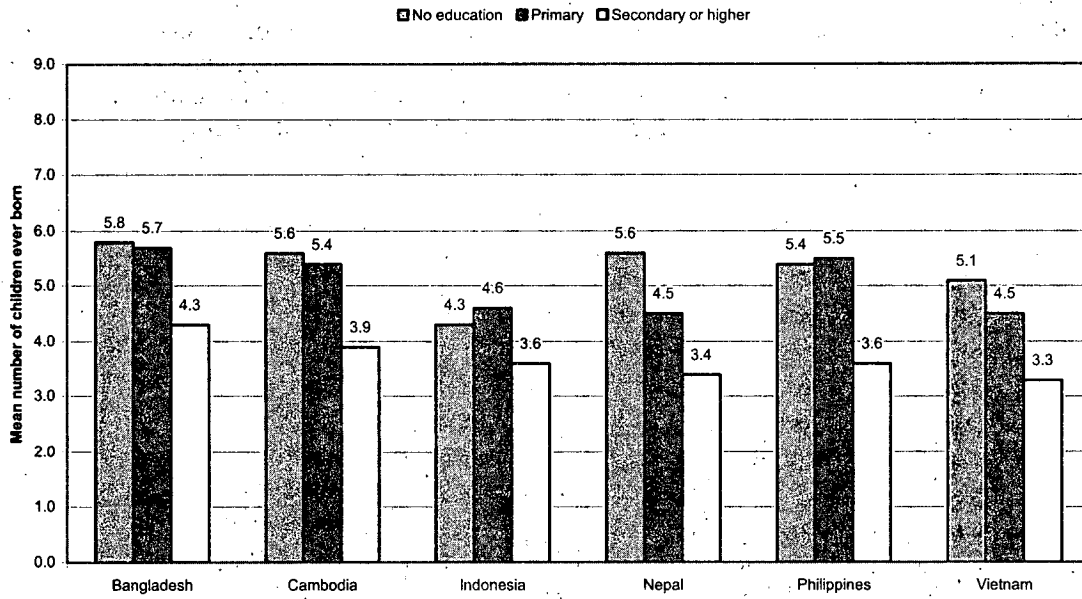
□ No education   ■ Primary   □ Secondary or higher

	Bangladesh	Cambodia	Indonesia	Nepal	Philippines	Vietnam
No education	5.8	5.6	4.3	5.6	5.4	5.1
Primary	5.7	5.4	4.6	4.5	5.5	4.5
Secondary or higher	4.3	3.9	3.6	3.4	3.6	3.3

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

Figure 20d. Women's completed fertility, by educational level, in Latin America and the Caribbean, late 1990s-early 2000s
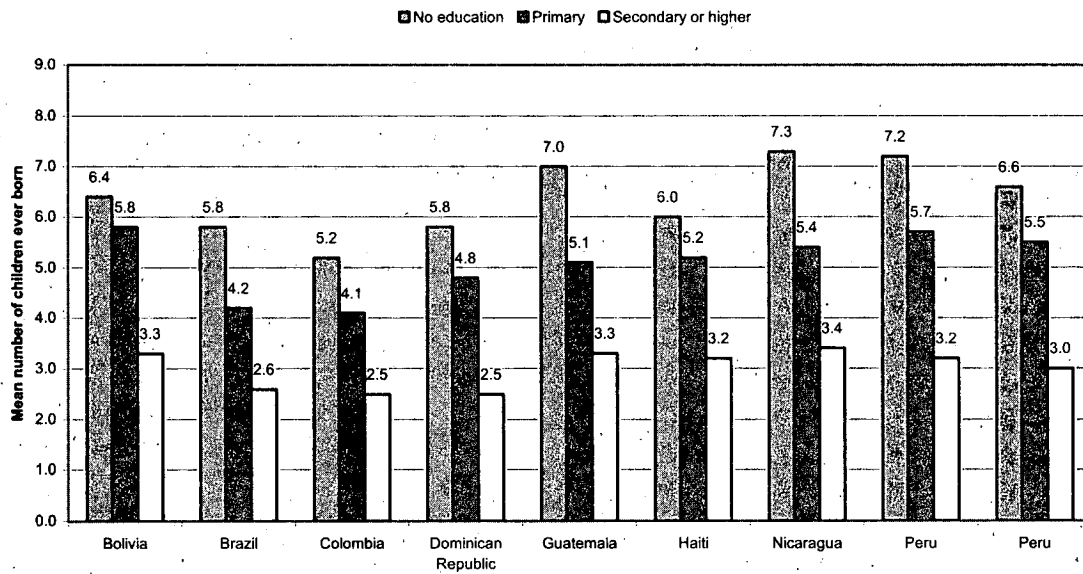
□ No education   ■ Primary   □ Secondary or higher

	Bolivia	Brazil	Colombia	Dominican Republic	Guatemala	Haiti	Nicaragua	Peru	Peru
No education	6.4	5.8	5.2	5.8	7.0	6.0	7.3	7.2	6.6
Primary	5.8	4.2	4.1	4.8	5.1	5.2	5.4	5.7	5.5
Secondary or higher	3.3	2.6	2.5	2.5	3.3	3.2	3.4	3.2	3.0

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

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with a university degree as compared with less educated women in Europe (Kravdal, 2001; Santow and Bracher, 2001). Similarly, in the United States from the 1970s to the 1990s, first birth rates after age 30 increased for women with four-year university degrees but not for women with a lower educational level (Martin, 2000).

Nonetheless, in most European countries highly educated women reaching the end of the reproductive years during the late 1990s bore under 2 children on average (figure 21a). In some countries, such as Austria, even women with relatively little education have experienced below-replacement fertility.

Figure 21a. Women's completed fertility, by educational level, in Europe and Northern America, 1990s

□ lowest educ.   ▨ medium educ.   ▢ highest educ.
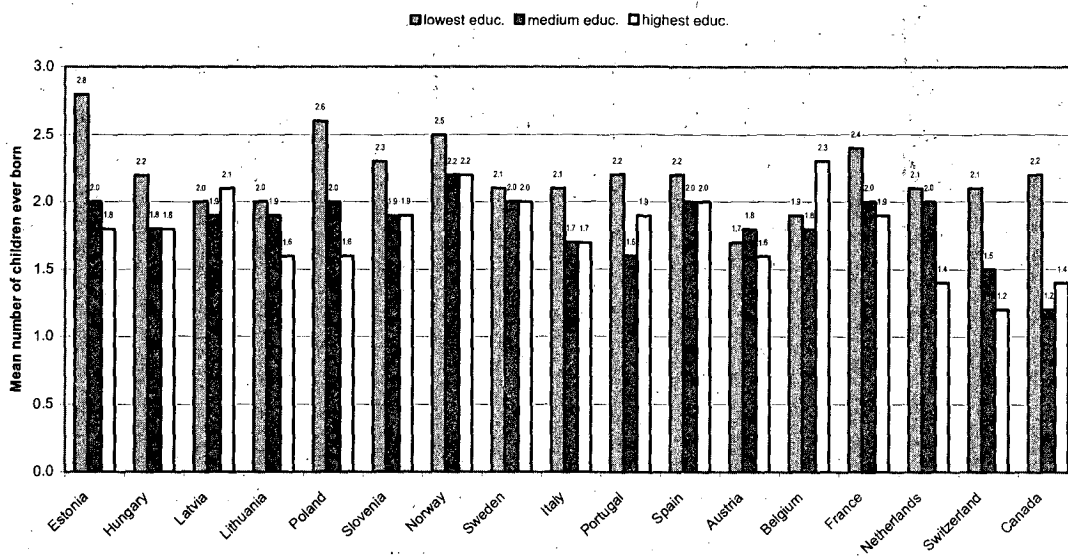
Source: Fertility and Family Surveys for Europe (Economic Commission for Europe, 1992-2000).

(b) Men

In the developing countries, fertility data for men comparable to the data for women are not commonly available. What has usually been undertaken is the analysis of the role played by the husband's education in the fertility of their wives. The interpretation given to the effects of the husband's education tends to differ from that given to women's education. The husband's education is regarded as a proxy for household income and family socio-economic status, while the wife's education is regarded at least partly as an indicator of women's status and autonomy. In general, analyses of the effect of the husband's education on marital fertility reveal the husband's education also has a negative effect on the number of children ever born to a couple, but

that its effect is weaker than that of the wife's education (United Nations, 1995).

In the more developed countries, for the cohort of men born in the 1950s there is no clear pattern in the relationship between their completed fertility and their educational level (figure 21b). In some countries, such as Estonia, France, Hungary, Italy, and Lithuania completed fertility clearly decreases with educational level. On the other hand, in Latvia, male completed fertility clearly increases with educational level. In other countries, such as Norway and Switzerland, the major difference is between the group of least educated men and the group of high school graduates and college graduates. However, in other countries, men with a medium-level education report either the lowest completed

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fertility (in Poland, Slovenia and Spain) or the highest completed fertility (in Belgium, Canada, the Netherlands and Sweden). The commonality between these countries, though, is that any difference in completed fertility between different educational groups is very slight among men, especially when compared to the differences observed among women.

Figure 21b. Men's completed fertility, by educational level, in Europe and Northern America, 1990s

□ lowest educ. ■ medium educ. □ highest educ.
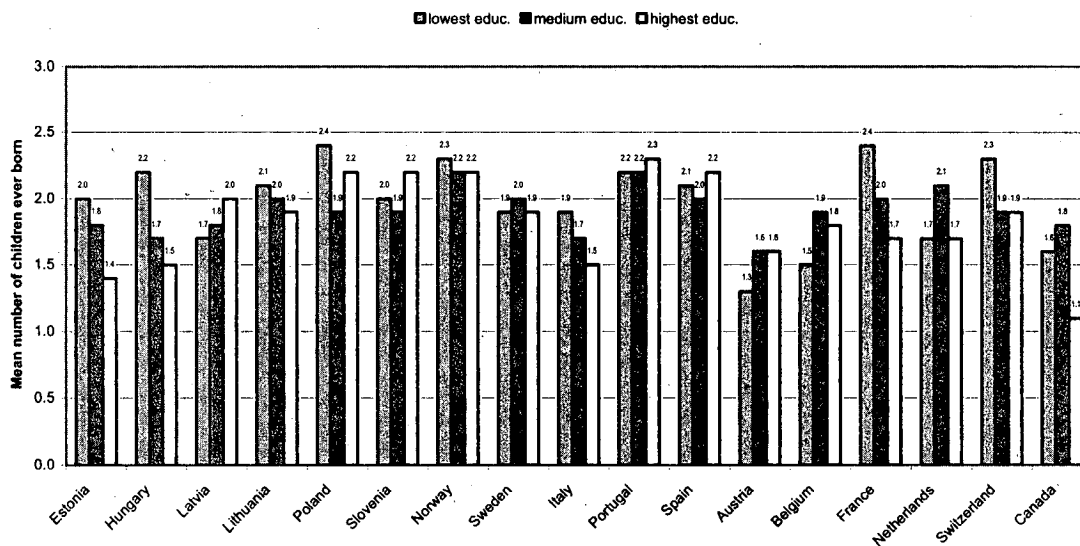
Source: Fertility and Family Surveys for Europe (Economic Commission for Europe, 1992-2000).

3. Trends in the relationship between education and fertility

As stated previously, evidence indicates that the relationship between education and fertility evolves during the fertility transition. Cleland (2002) shows that while the link between education and fertility has almost disappeared in such low-fertility settings such as Japan, Northern America, the former Soviet Union and Western Europe, fertility differentials by education are still wide in the highest fertility regions — sub-Saharan Africa, Northern Africa and Western Asia. Figure 22 shows that countries with a higher TFR tend to have large differences in current fertility between the most and least educated women. Given its level of development, Latin America and the Caribbean exhibits wider than expected fertility differentials by education. However, within that region, the gap is larger among countries with higher levels of fertility than among those with lower fertility, which is consistent with the findings for other developing countries.

A United Nations (1995) study comparing trends in fertility levels by education in the 1970s, 1980s and the 1990s showed clearly the pattern of narrowing fertility differentials by education in the majority of the countries of Northern Africa, Asia and Latin America and the Caribbean. Prominent among those regions was sub-Saharan Africa, with many of its countries still experiencing a widening of the fertility gap over time precisely because they were just starting to experience fertility decline. This pattern was reconfirmed by a recent United Nations study (2002) showing that from the early 1990s to the late 1990s or later, some countries with a moderate level of fertility (TFR between 2.1 and 5 children per woman) experienced a widening in their fertility differentials by education (for example, Bangladesh, Bolivia, India, Philippines, Morocco), while others experienced a narrowing of

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the fertility gap owing to a faster fertility decline among women with no education than among those with a secondary or higher education (for example, Brazil, Colombia, the Dominican Republic, Egypt, Ghana, Guatemala, Kenya, and Peru). The results depended more or less on each country's stage in the fertility transition.

Figure 22. Difference in total fertility rate between women with no education and women with a secondary or higher education, by country's TFR level
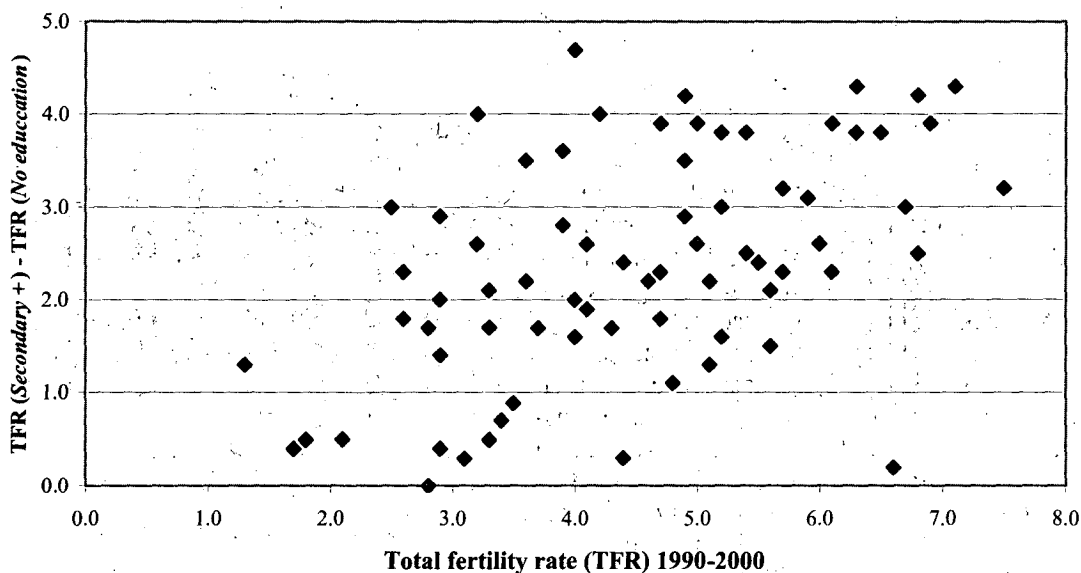
Source: Based on figure 18 and table 30.

4. Adolescent childbearing

Adolescent fertility accounts for about one fifth of the births in many developing countries. In addition, women who start having children during adolescence ultimately tend to have larger families. Pregnancy and childbearing during adolescence — defined by the World Health Organization as between 10 and 19 years of age — carry higher health risks than those incurred by older women owing to teenagers' physiological and social immaturity as well as their lack of access to appropriate prenatal and obstetrical care. Adolescent mothers, particularly the youngest and those giving birth for the first time, are more likely to face life-threatening pregnancy- and childbirth-related problems such as pre-eclampsia (or toxemia), anaemia, haemorrhage, delayed and obstructed labour, physiological trauma such as uterine rupture and rectovaginal fistulae and tears, and infection (Zabin and Kiragu, 1998). Women aged 15-19 are twice as likely to die from childbirth as women in their twenties; those under 15 are five times as likely to die (United Nations, 1991). Infants born to adolescents also have higher rates of morbidity and mortality. As a result of some of the health problems experienced by adolescent women during pregnancy and childbirth, their births are more likely to be premature and of low birth weight, and may suffer from neurological problems and foetal growth retardation. In sub-Saharan Africa, children born to women younger than 15 have been found to be two times more likely to be of low birth-weight than those born to women aged 24-30 (reported by Zabin and Kiragu, 1998). The risk of dying before the first birthday can be as much as 80 per cent higher among infants born to women younger than 20 as compared with those born to older women (McDevitt and others, 1996, Bicego and Ahmad, 1996). Moreover, high proportions of

adolescent pregnancies are unplanned (Singh, 1998) and, as a result, many pregnant adolescents resort to abortion, often performed in unsafe conditions that jeopardize their lives.

Apart from its adverse health consequences, adolescent childbearing also undermines women's life options through loss of socio-economic opportunities, such as continuing their education and obtaining well-paid employment. In many developing countries, for example, teenagers who get pregnant cannot remain in school, and they rarely return to complete their education. As such, adolescent mothers and their children are more likely to live in poor social and economic environments.

The effects of education on adolescent fertility thus have the potential to offer important benefits for young women and their future families. Education has been shown to change young women's aspirations for themselves and their children and to lower their family size preferences (Singh, 1998) and, as seen in chapter II, education delays marriage and increases adolescent contraceptive use. On average, in Africa and Latin America and the Caribbean, 60 per cent of young women with no education have become mothers by the time they reach the age of 20, and in Asia the average is 50 per cent. Furthermore, an average of 35 to 40 per cent already have a child before the age of 18. By contrast, young women who have attended secondary school are less than half as likely to become mothers before age 20, and only about one fourth as likely to have a child by the age of 18.

B. EDUCATION AND FERTILITY PREFERENCES

Fertility preferences provide important information on family size choices and norms and on reproductive intentions. They are a major determinant of fertility behaviour because it is the desire to implement those preferences that provides couples, and women in particular, with a motivation for adopting contraception, the ultimate means for regulating fertility.

1. Ideal number of children

The ideal number of children, an indicator of fertility preferences, refers to women's personal wishes in terms of family size. Table 31 presents women's mean ideal number of children according to their level of education in selected developing countries. The women were asked to state the number of children they would like to have in their entire life, if they could choose exactly that number and if they were to start childbearing afresh. Family-size preferences vary considerably across regions but also across countries within some of the regions. Sub-Saharan Africa has the highest mean ideal number of children and the greatest variation across countries. The desired family size varies from between 3 and 4 in South Africa, Kenya and Zimbabwe to above 8 in Chad and Niger. On average, women residing in sub-Saharan Africa desire families of more than 5 children. The ideal number of children is slightly lower but also varies greatly in Western Asia (5 on average) and in Northern Africa (4 on average). In Northern Africa, the ideal family size ranges from 2.9 in Egypt to 5.8 in Sudan, while in Western Asia, it ranges from 2.5 in Turkey to 6.6 in Saudi Arabia. Family size preferences are much lower and less variable in Latin America and the Caribbean (2.8 children on average) and the rest of Asia and Oceania (3.3 children on average).

Table 31 also shows that women with more education systematically desire smaller families. Differentials in the mean ideal number of children are greatest in sub-Saharan Africa, where women with no education desire, on average, to have 2.3 children more than women with a secondary or higher education and 1.3 children more than women with a primary education. Northern Africa and Western Asia follow, with the gap between the least educated and the most educated women being 1.4 and 1.8 children respectively, and the gap between women with no education and those with primary education being about one child. In the rest of Asia, Latin America and the Caribbean, and Oceania, differentials in ideal number of children from one level of education to another are smaller — less than one child.

In general, in the developed countries educational differentials in desired family size follow the same pattern as for completed fertility, for both men and women (figures 21a, 21b, 23a, 23b), although the educational differentials in desired family size are usually smaller.

TABLE 31. IDEAL NUMBER OF CHILDREN, BY WOMEN'S LEVEL OF EDUCATION

Region and country	Year	Level of education				Difference in ideal number		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
Sub-Saharan Africa								
Benin	1996	6.1	4.4	3.5	5.5	2.6	0.9	1.7
Burkina Faso	1998	6.0	4.8	3.5	5.6	2.5	1.3	1.2
Cameroon	1998	8.0	6.2	4.8	6.0	3.2	1.4	1.8
Central African Republic	1995	7.0	6.1	5.2	6.4	1.8	0.9	0.9
Chad	1997	8.8	7.2	5.7	8.3	3.1	1.5	1.6
Comoros	1996	5.8	5.0	4.5	5.3	1.3	0.5	0.8
Côte d'Ivoire	1998	6.0	4.9	3.9	5.4	2.1	1.0	1.1
Eritrea	1995	6.8	5.0	4.2	6.0	2.6	0.8	1.8
Ethiopia	2000	5.7	4.4	3.5	5.3	2.2	0.9	1.3
Gabon	2000	5.7	5.4	4.5	4.9	1.2	0.9	0.3
Ghana	1998	5.4	4.2	3.7	4.3	1.7	0.5	1.2
Guinea	1999	6.0	4.6	4.2	5.7	1.8	0.4	1.4
Kenya	1998	5.2	3.9	3.2	3.8	2.0	0.7	1.3
Madagascar	1997	7.0	5.5	3.8	5.3	3.2	1.7	1.5
Malawi	2000	6.1	4.9	3.4	5.0	2.7	1.5	1.2
Mali	1996	6.9	5.7	4.5	6.6	2.4	1.2	1.2
Mauritania	2000	7.4	5.2	4.6	6.2	2.8	0.6	2.2
Mozambique	1997	6.6	5.5	3.4	5.9	3.2	2.1	1.1
Namibia	1992	6.6	5.4	4.0	5.0	2.6	1.4	1.2
Niger	1998	8.6	6.8	5.2	8.2	3.4	1.6	1.8
Nigeria	1999	7.7	6.0	5.0	6.2	2.7	1.0	1.7
Rwanda	2000	5.2	4.9	4.1	4.9	1.1	0.8	0.3
Senegal	1997	5.8	4.6	4.0	5.3	1.8	0.6	1.2
South Africa	1998	4.3	3.3	2.6	2.9	1.7	0.7	1.0
Togo	1998	5.3	4.1	3.3	4.5	2.0	0.8	1.2
Uganda	2000	5.9	4.8	3.8	4.8	2.1	1.0	1.1
United Republic of Tanzania	1999	6.6	5.0	4.0	5.3	2.6	1.0	1.6
Zambia	1996	6.4	5.6	4.2	5.3	2.2	1.4	0.8
Zimbabwe	1999	5.7	4.6	3.2	3.9	2.5	1.4	1.1
Mean		6.4	5.1	4.1	5.4	2.3	1.1	1.3

TABLE 31. (continued)

Region and country	Year	Level of education				Difference in ideal number		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
Northern Africa								
Egypt	2000	3.3	2.9	2.6	2.9	0.7	0.3	0.4
Morocco	1995	3.7	2.7	2.5	3.2	1.2	0.2	1.0
Sudan	1990	6.8	5.5	4.6	5.8	2.2	0.9	1.3
Mean		4.6	3.7	3.2	4.0	1.4	0.5	0.9
Eastern, South-central and South-eastern Asia								
Bangladesh	1999	2.7	2.5	2.3	2.5	0.4	0.2	0.2
Cambodia	2000	3.8	3.6	3.1	3.6	0.7	0.5	0.2
India	1998	2.9	2.5	2.1	2.7	0.8	0.4	0.4
Indonesia	1997	3.3	2.9	2.7	2.9	0.6	0.2	0.4
Kazakhstan	1999	..	2.8	2.7	2.8	..	0.1	..
Kyrgyzstan	1997	..	3.8	3.5	3.7	..	0.3	..
Lao People's Democratic Republic	2000	4.4	3.9	3.2	3.9	1.2	0.7	0.5
Mongolia	1998	<-	3.3 ->	3.3	3.3	0.0	0.0	..
Nepal	2001	2.8	2.3	2.0	2.6	0.8	0.3	0.5
Philippines	1998	5.1	3.5	3.0	3.2	2.1	0.5	1.6
Sri Lanka	1993	3.2	3.1	2.7	2.8	0.5	0.4	0.1
Turkmenistan	2000	<-	5.1 ->	3.6	4.6	1.5	1.5	..
Uzbekistan	1996	..	3.8	3.4	3.6	..	0.4	..
Viet Nam	1997	3.1	2.6	2.2	2.4	0.9	0.4	0.5
Mean		3.6	3.3	2.8	3.2	0.8	0.5	0.3
Western Asia								
Armenia	2000	..	2.7	2.7	2.7	..	0.0	..
Bahrain	1995	6.0	5.0	4.4	4.8	1.6	0.6	1.0
Jordan	1997	4.8	4.5	4.2	4.2	0.6	0.3	0.3
Kuwait	1996	7.8	6.8	5.2	5.7	2.6	1.6	1.0
Oman	1995	7.4	6.0	4.8	6.4	2.6	1.2	1.4
Qatar	1998	7.1	6.3	5.5	5.9	1.6	0.8	0.8

TABLE 31. *(continued)*

Region and country	Year	Level of education				Difference in ideal number		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
Saudi Arabia..	1996	7.6	6.6	5.5	6.6	2.1	1.1	1.0
Turkey..	1998	2.9	2.4	2.1	2.5	0.8	0.3	0.5
United Arab Emirates.........................	1995	7.0	6.0	5.0	5.7	2.0	1.0	1.0
Yemen..	1997	4.6	4.0	3.9	4.5	0.7	0.1	0.6
Mean..		*6.1*	*5.0*	*4.3*	*4.9*	*1.8*	*0.7*	*1.1*
Latin America and the Caribbean								
Bolivia...	1998	2.7	2.6	2.5	2.6	0.2	0.1	0.1
Brazil...	1996	2.7	2.5	2.2	2.3	0.5	0.3	0.2
Colombia..	2000	2.9	2.5	2.1	2.3	0.8	0.4	0.4
Dominican Republic	1996	3.7	3.3	2.9	3.2	0.8	0.4	0.4
Guatemala	1998	4.4	3.4	2.7	3.4	1.7	0.7	1.0
Haiti	2000	3.5	3.1	2.7	3.1	0.8	0.4	0.4
Honduras..	1996	3.7	3.2	2.6	3.0	1.1	0.6	0.5
Nicaragua...	1998	3.7	2.9	2.3	2.2	1.4	0.6	0.8
Paraguay..	1996	<-	4.0 ->	3.1	3.6	0.9	0.9	..
Peru	2000	2.9	2.6	2.3	2.3	0.6	0.3	0.3
Mean..		*3.4*	*3.0*	*2.5*	*2.8*	*0.9*	*0.5*	*0.4*
Oceania								
Papua New Guinea.............................	1996	3.8	3.4	3.2	3.5	0.6	0.2	0.4

Sources: United States Centers for Disease Control and Prevention Reproductive Health Surveys; Demographic and Health Surveys; Gulf Family Health Surveys.

NOTES: Two dots (..) indicate means that there were not enough cases to compute the value for the corresponding category. The mean regional values assume that when two educational categories have a combined value, each educational category has the combined value.

Figure 23a. Women's desired family size by educational level, in Europe and Northern America, 1990s

Level of education:
☒ lowest   ▓ medium   ☐ highest
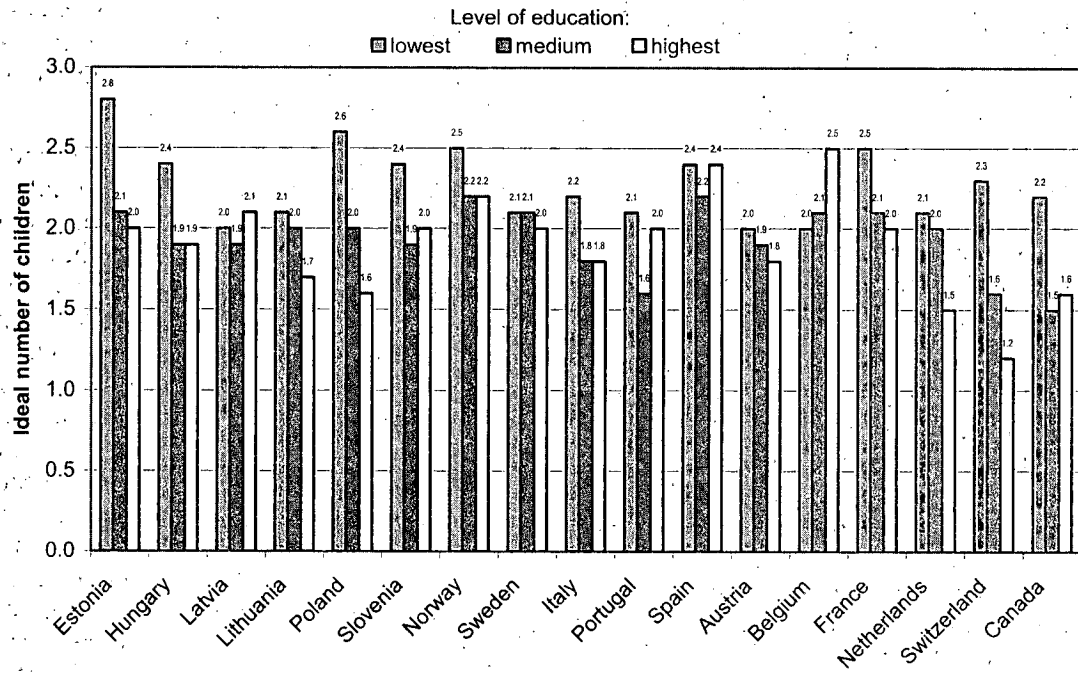
Source: Fertility and Family Surveys for Europe (Economic Commission for Europe, 1992-2000).

Figure 23b. Men's desired family size by educational level in Europe and Northern America, 1990s

Level of education:
☐ lowest   ▓ medium   ☐ highest
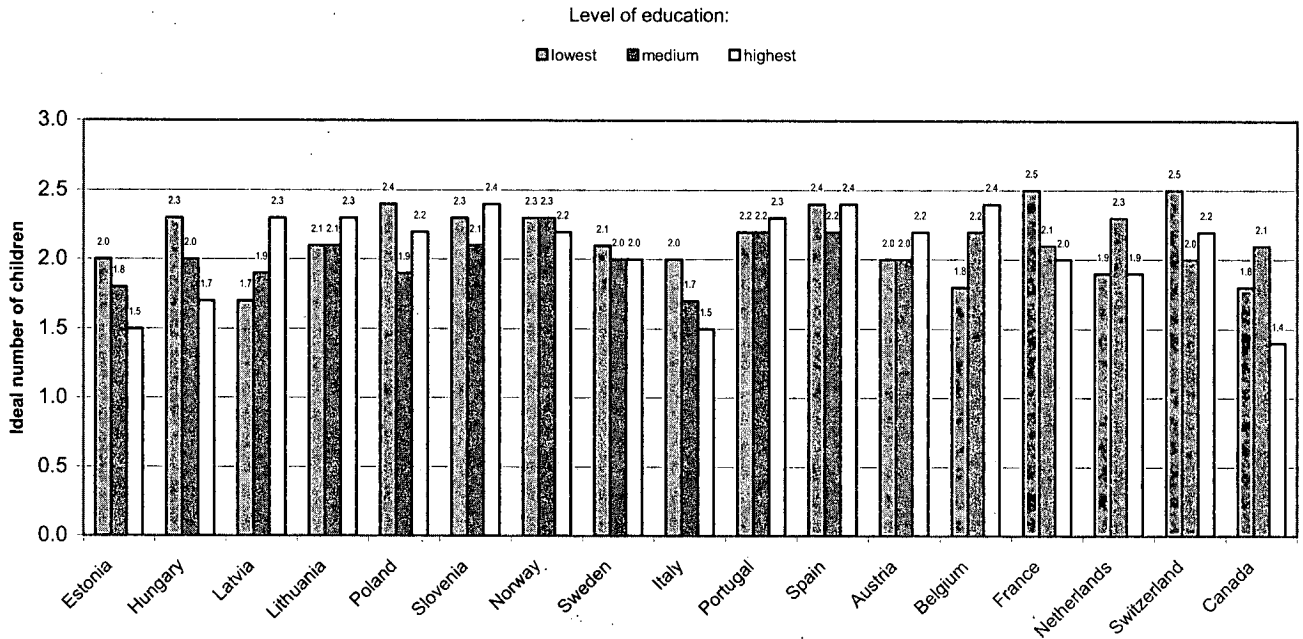
Source: Fertility and Family Surveys for Europe (Economic Commission for Europe, 1992-2000).

2. Wanted fertility

Another measure of fertility preferences is the total wanted fertility rate. This measure is a hypothetical rate that reflects the number of births a woman would have by age 50, if during her lifetime she bore children at currently observed fertility rates but if all the unwanted births that she reports were prevented. It is calculated in the same manner as the conventional total fertility rate, except that births that are declared to be unwanted are excluded from the numerator. Births that were wanted later than they occurred are included in the wanted TFR.

Table 32 presents women's total wanted fertility rates according to their level of education in selected developing countries. These hypothetical fertility rates vary across regions and countries but not as much as the actual fertility rates and the desired family size. Again, sub-Saharan Africa has the highest total wanted fertility rates (4.8 children on average among the countries with data). The other regions that are represented in the table have wanted fertility rates between 2.5 and 3.9 children.

Women's total wanted fertility rates decrease with their level of education. Differentials in the wanted fertility rates are greatest in sub-Saharan Africa, where women with no education have wanted fertility rates about 2.3 children higher than women with a secondary or higher education. In Latin America and the Caribbean, that difference is about 1.5 children and is less than one child in the other regions.

The comparison of the total wanted fertility rates with the TFRs presented in (table 30) provides a measure of the gap between desired and actual fertility. This comparison shows that rates of wanted fertility are substantially lower than actual fertility rates and that the gap varies across educational subgroups. The gap is much wider among women with no education or primary education than among women with a secondary or higher education. This is particularly true in Latin America and the Caribbean, where the difference between wanted fertility rates and actual fertility rates among women with no education is almost four times as large as the difference among highly educated women, comparing countries for which both rates are available. In most countries of the region, actual fertility rates exceed wanted fertility rates by 2 to 3 children among the least educated women.

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TABLE 32. TOTAL WANTED FERTILITY RATES, BY WOMEN'S LEVEL OF EDUCATION

Region and country	Year	Level of education				Difference in TWFR		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
Sub-Saharan Africa								
Benin	1996	5.6	4.0	2.3	5.0	3.3	1.7	1.6
Burkina Faso	1998	6.3	4.2	2.5	6.0	3.8	1.7	2.1
Cameroon	1998	6.3	4.5	3.1	4.6	3.2	1.4	1.8
Central African Republic	1995	4.8	4.9	3.6	4.7	1.2	1.3	-0.1
Chad	1997	6.5	<-	5.7 ->	6.3	0.8	..	0.8
Comoros	1996	4.2	3.6	3.0	3.7	1.2	0.6	0.6
Côte d'Ivoire	1998	5.4	3.9	1.9	4.5	3.5	2.0	1.5
Eritrea	1995	6.4	4.6	2.6	5.7	3.8	2.0	1.8
Ethiopia	2000	5.3	4.2	2.5	4.9	2.8	1.7	1.1
Gabon	2000	4.5	4.4	2.9	3.5	1.6	1.5	0.1
Ghana	1998	4.9	3.8	2.9	3.7	2.0	0.9	1.1
Guinea	1999	5.4	4.3	2.8	5.0	2.6	1.5	1.1
Kenya	1998	4.4	3.6	2.8	3.5	1.6	0.8	0.8
Madagascar	1997	6.0	5.8	3.6	5.2	2.4	2.2	0.2
Malawi	2000	6.1	5.2	2.8	5.2	3.3	2.4	0.9
Mali	1996	6.4	5.4	3.4	6.0	3.0	2.0	1.0
Mauritania	2000	5.0	4.0	3.0	4.3	2.0	1.0	1.0
Mozambique	1997	4.7	5.0	3.0	4.7	1.7	2.0	-0.3
Namibia	1992	5.9	5.3	3.7	4.8	2.2	1.6	0.6
Niger	1998	7.6	6.3	4.3	7.2	3.3	2.0	1.3
Nigeria	1999	5.8	5.1	4.1	4.8	1.7	1.0	0.7
Rwanda	2000	5.0	4.8	4.0	4.7	1.0	0.8	0.2
Senegal	1997	5.2	3.5	2.5	4.6	2.7	1.0	1.7
South Africa	1998	3.3	2.9	2.0	2.3	1.3	0.9	0.4
Togo	1998	5.3	3.6	2.1	4.2	3.2	1.5	1.7
Uganda	2000	6.3	5.6	3.2	5.3	3.1	2.4	0.7
United Republic of Tanzania	1999	5.6	<-	4.4 ->	4.8	1.2	..	1.2
Zambia	1996	6.0	5.7	3.9	5.2	2.1	1.8	0.3
Zimbabwe	1999	4.6	3.8	2.9	3.4	1.7	0.9	0.8
Mean		5.5	4.6	3.2	4.8	2.3	1.4	0.9

TABLE 32. (continued)

Region and country	Year	Level of education				Difference in TWFR		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
Northern Africa								
Egypt	2000	3.3	2.6	2.8	2.9	0.5	-0.2	0.7
Morocco	1995	2.7	1.6	1.6	2.2	1.1	0.0	1.1
Mean		*3.0*	*2.1*	*2.2*	*2.6*	*0.8*	*-0.1*	*0.9*
Eastern, South-central and South-eastern Asia								
Bangladesh	1999	2.8	2.2	1.8	2.2	1.0	0.4	0.6
Cambodia	2000	3.4	3.2	2.6	3.1	0.8	0.6	0.2
India	1998	2.5	2.0	1.7	2.1	0.8	0.3	0.5
Indonesia	1997	2.3	2.7	2.2	2.4	0.1	0.5	-0.4
Kazakhstan	1999	..	2.2	1.7	1.9	..	0.5	..
Kyrgyzstan	1997	..	3.3	2.8	3.1	..	0.5	..
Mongolia	1998	<- 2.8 ->		2.7	2.7	0.1	0.1	..
Nepal	2001	3.0	2.0	1.7	2.5	1.3	0.3	1.0
Philippines	1998	3.9	3.3	2.6	2.7	1.3	0.7	0.6
Turkmenistan	2000	<- 2.8 ->		2.4	2.7	0.4	0.4	..
Uzbekistan	1996	..	3.2	2.8	3.1	..	0.4	..
Mean		*2.9*	*2.7*	*2.3*	*2.6*	*0.7*	*0.4*	*0.3*
Western Asia								
Armenia	2000	..	1.5	1.4	1.5	..	0.1	..
Jordan	1997	2.9	2.8	2.9	2.9	0.0	-0.1	0.1
Turkey	1998	2.4	2.0	1.5	1.9	0.9	0.5	0.4
Yemen	1997	5.0	3.7	2.4	4.6	2.6	1.3	1.3
Mean		*3.4*	*2.5*	*2.1*	*2.7*	*1.3*	*0.4*	*0.9*
Latin America and the Caribbean								
Bolivia	1998	3.8	3.1	2.3	2.5	1.5	0.8	0.7
Brazil	1996	2.7	2.1	1.6	1.8	1.1	0.5	0.6
Colombia	2000	2.0	2.3	1.7	1.8	0.3	0.6	-0.3
Dominican Republic	1996	3.1	2.9	2.1	3.2	1.0	0.8	0.2
Ecuador	1999	3.9	3.0	2.2	2.6	1.7	0.8	0.9

TABLE 32. (continued)

Region and country	Year	Level of education				Difference in TWFR		
		No education	Primary	Secondary or higher	Total	(No educ) - Sec+	(Primary) - Sec+	(No educ) - Primary
El Salvador	1998	4.1	3.5	2.4	3.0	1.7	1.1	0.6
Guatemala	1998	5.7	4.1	2.5	4.1	3.2	1.6	1.6
Haiti	2000	3.7	3.2	1.8	2.7	1.9	1.4	0.5
Nicaragua	1998	3.7	2.8	1.9	2.5	1.8	0.9	0.9
Paraguay	1996	<- 5.0 ->		2.8	4.1	2.2	2.2	..
Peru	2000	3.0	2.3	1.6	1.8	1.4	0.7	0.7
Mean		3.7	3.1	2.1	2.7	1.6	1.0	0.6
Oceania								
Papua New Guinea	1996	4.1	3.9	3.3	3.9	0.8	0.6	0.2

Source: Demographic and Health Surveys; Gulf Family Health Surveys.

NOTES: Two dots (..) mean that there were not enough cases to compute the value for the corresponding category. The mean regional values assume that when two educational categories have a combined value, each educational category has the combined value. TWFR = total wanted fertility rates.

C. EDUCATION AND FERTILITY REGULATION

The preceding sections have addressed the supply and demand factors affecting fertility as well as their relationships with education. Section C focuses on contraception, the major means through which the biological supply of children is regulated in order to match the demand for children. As previously stated, the gap between the demand for and supply of children widens as the fertility transition proceeds. Therefore, it is expected that the effect of education on fertility will operate increasingly through contraceptive behaviour in countries undergoing the fertility transition.

1. Current use of contraception

The positive relationship between education and contraceptive use has been extensively documented (see, for example, Castro Martín, 1995; Population Reference Bureau, 2002). This relationship operates in both ways. On the one hand, better educated women are more likely to use contraception because they are more likely to desire smaller families, to be aware and accept that fertility can be regulated and that their reproductive choices can be implemented, to be better informed about contraceptive options and sources and, finally, to have better access to health and family planning services. On the other hand, women who can effectively control their reproductive behaviour (particularly adolescents) can stay longer in school by avoiding unwanted and untimely pregnancies.

Table 33 presents contraceptive prevalence (the percentage using contraception among married or in-union women of reproductive age) for women in selected countries, according to the women's level of education. Contraceptive prevalence varies considerably across regions of the developing world, from a low of 20 per cent in sub-Saharan Africa to approximately 60 per cent or more in Eastern Europe and Latin America and the Caribbean. Northern Africa and Asia have mid-level prevalences of around 40 to 60 per cent.

Contraceptive prevalence also varies considerably across educational strata, with better-educated women consistently using more contraception. In relative terms, contraceptive-use differentials by education are the most marked in sub-Saharan Africa, where the percentage using contraception among women with a secondary or higher education is more than 3 times as high as that among women with no education. In that region, six countries — Cameroon, Eritrea, Ethiopia, Madagascar, Mali and Mozambique — stand out, with contraceptive prevalence among highly educated women being 10 to 14 times that of poorly educated women. Sub-Saharan Africa is also the region with the lowest level of education and the lowest level of contraceptive prevalence. In Northern Africa, Asia and Latin America and the Caribbean, where women's education and contraceptive prevalence are much higher, the contraceptive prevalence ratio between the most educated and the least educated women is around 1.5 on average. In Eastern Europe, where contraceptive prevalence is already high, differentials in contraceptive use are smaller. Even a small amount of schooling has a significant impact on contraceptive behaviour. The same result was also found in earlier studies (United Nations, 1987; United Nations, 1995).

TABLE 33. PERCENTAGE OF MARRIED OR IN-UNION WOMEN USING CONTRACEPTION, BY WOMEN'S LEVEL OF EDUCATION

Region and country	Year	Level of education				Ratio		
		No education	Primary	Secondary or higher	Total	(Sec+) / No educ	(Sec+) / Primary	(Primary) / No educ
Sub-Saharan Africa								
Benin	1996	13.3	23.6	36.8	16.4	2.8	1.6	1.8
Burkina Faso	1998	9.7	23.1	52.2	11.9	5.4	2.3	2.4
Cameroon	1998	3.2	20.4	41.6	19.3	13.0	2.0	6.4
Cape Verde	1998	43.7	51.1	76.0	52.9	1.7	1.5	1.2
Central African Republic	1995	10.1	16.5	34.1	14.8	3.4	2.1	1.6
Chad	1997	2.7	7.5	24.3	4.1	9.0	3.2	2.8
Comoros	1996	16.8	25.9	35.1	21.0	2.1	1.4	1.5
Côte d'Ivoire	1998	7.7	25.2	40.3	15.0	5.2	1.6	3.3
Eritrea	1995	4.2	16.5	39.9	8.0	9.5	2.4	3.9
Ethiopia	2000	4.6	16.4	44.8	8.1	9.7	2.7	3.6
Gabon	2000	8.5	22.0	44.1	32.7	5.2	2.0	2.6
Ghana	1998	13.2	20.3	29.3	22.0	2.2	1.4	1.5
Guinea	1999	4.0	13.3	27.0	6.2	6.8	2.0	3.3
Kenya	1998	22.8	34.5	56.7	39.0	2.5	1.6	1.5
Madagascar	1997	3.0	16.2	42.3	19.4	14.1	2.6	5.4
Malawi	2000	26.0	31.3	45.1	30.6	1.7	1.4	1.2
Mali	1996	3.7	16.1	41.3	6.7	11.2	2.6	4.4
Mauritania	2000	3.6	11.3	23.3	8.0	6.5	2.1	3.1
Mozambique	1997	3.0	6.7	30.2	5.6	10.1	4.5	2.2
Namibia	1992	16.8	21.1	48.1	28.9	2.9	2.3	1.3
Niger	1998	6.4	17.5	39.9	8.2	6.2	2.3	2.7
Nigeria	1999	6.0	19.9	30.9	15.3	5.2	1.6	3.3
Rwanda	2000	8.1	12.2	34.3	13.2	4.2	2.8	1.5
Senegal	1997	8.4	21.9	43.0	12.9	5.1	2.0	2.6
South Africa	1998	35.1	49.8	69.7	62.1	2.0	1.4	1.4
Togo	1998	20.6	25.2	33.6	23.5	1.6	1.3	1.2
Uganda	2000	13.2	21.2	49.1	22.8	3.7	2.3	1.6
United Republic of Tanzania	1999	14.0	24.0	42.8	22.3	3.1	1.8	1.7
Zambia	1996	17.1	23.4	39.9	25.9	2.3	1.7	1.4
Zimbabwe	1999	40.8	48.8	60.8	53.5	1.5	1.2	1.2
Mean		13.0	22.8	41.9	21.0	3.2	1.8	1.7

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TABLE 33. (*continued*)

Region and country	Year	No education	Primary	Secondary or higher	Total	(Sec+) / No educ	(Sec+) / Primary	(Primary) / No educ
Northern Africa								
Egypt	2000	51.5	57.4	61.2	56.1	1.2	1.1	1.1
Morocco	1995	44.5	62.8	65.7	50.3	1.5	1.0	1.4
Sudan	1990	3.2	12.4	22.8	8.7	7.1	1.8	3.9
Mean		*33.1*	*44.2*	*49.9*	*38.4*	*1.5*	*1.1*	*1.3*
Eastern, South-central and South-eastern Asia								
Bangladesh	1999	51.0	53.1	59.1	53.8	1.2	1.1	1.0
Cambodia	2000	19.3	23.4	35.0	23.8	1.8	1.5	1.2
India	1998	42.9	55.5	55.2	48.2	1.3	1.0	1.3
Indonesia	1997	44.2	57.8	62.3	57.4	1.4	1.1	1.3
Kazakhstan	1999	..	63.5	67.5	66.1	..	1.1	..
Kyrgyzstan	1997	..	58.2	60.8	59.5	..	1.0	..
Lao People's Democratic Republic	2000	13.2	39.4	47.7	32.2	3.6	1.2	3.0
Mongolia	1998	<-	45.7 ->	61.1	59.9	1.3	1.3	..
Nepal	2001	36.6	41.8	51.1	39.3	1.4	1.2	1.1
Philippines	1998	15.3	41.1	50.2	46.5	3.3	1.2	2.7
Sri Lanka	1993	58.2	68.9	66.1	66.1	1.1	1.0	1.2
Turkmenistan	2000	<-	60.1 ->	65.5	61.8	1.1	1.1	..
Uzbekistan	1996	..	53.0	59.9	55.6	..	1.1	..
Viet Nam	1997	52.9	70.8	82.1	75.3	1.6	1.2	1.3
Mean		*39.9*	*52.3*	*58.8*	*53.3*	*1.5*	*1.1*	*1.3*
Western Asia								
Armenia	2000	..	50.2	61.3	60.5	..	1.2	..
Bahrain	1995	49.1	60.9	66.0	61.8	1.3	1.1	1.2
Jordan	1997	37.0	49.0	55.1	52.6	1.5	1.1	1.3
Kuwait	1996	34.5	44.0	53.7	50.2	1.6	1.2	1.3
Oman	1995	19.1	24.9	32.0	23.7	1.7	1.3	1.3
Qatar	1998	26.4	36.8	49.4	43.2	1.9	1.3	1.4
Saudi Arabia	1996	20.6	36.3	43.1	31.8	2.1	1.2	1.8

TABLE 33. (*continued*)

Region and country	Year	Level of education				Ratio		
		No education	Primary	Secondary or higher	Total	(Sec+) / No educ	(Sec+) / Primary	(Primary) / No educ
Turkey	1998	50.4	67.1	75.3	63.9	1.5	1.1	1.3
United Arab Emirates	1995	20.6	28.6	31.6	27.5	1.5	1.1	1.4
Yemen	1997	18.1	32.6	43.4	20.8	2.4	1.3	1.8
Mean		*30.6*	*43.0*	*51.1*	*43.6*	*1.7*	*1.2*	*1.4*
Eastern Europe								
Republic of Moldova	2000	67.7	74.8	75.7	73.7	1.1	1.0	1.1
Romania	1999	<-	50.9 ->	66.5	63.8	1.3	1.3	..
Mean		*59.3*	*62.9*	*71.1*	*68.8*	*1.2*	*1.1*	*1.1*
Latin America and the Caribbean								
Bolivia	1998	19.4	38.1	61.9	48.3	3.2	1.6	2.0
Brazil	1996	64.1	71.9	81.8	76.7	1.3	1.1	1.1
Colombia	2000	72.7	77.0	77.2	76.9	1.1	1.0	1.1
Dominican Republic	1996	53.1	64.4	65.2	63.7	1.2	1.0	1.2
Ecuador	1999	45.8	60.5	72.8	65.8	1.6	1.2	1.3
El Salvador	1998	49.6	57.1	67.1	59.7	1.4	1.2	1.2
Guatemala	1998	19.4	38.4	68.0	38.2	3.5	1.8	2.0
Haiti	2000	20.2	29.3	39.3	28.1	1.9	1.3	1.5
Honduras	1996	34.8	48.3	64.4	50.0	1.9	1.3	1.4
Jamaica	1997	63.1	67.3	68.1	65.9	1.1	1.0	1.1
Nicaragua	1998	46.3	59.3	68.9	60.3	1.5	1.2	1.3
Paraguay	1996	<-	45.0 ->	64.4	50.7	1.4	1.4	..
Peru	2000	50.2	63.5	74.9	68.9	1.5	1.2	1.3
Mean		*44.9*	*55.4*	*67.2*	*57.9*	*1.5*	*1.2*	*1.2*
Oceania								
Papua New Guinea	1996	18.6	27.5	44.6	25.9	2.4	1.6	1.5

Sources: Unites States Centers for Disease Control and Prevention, Reproductive Health Surveys (Atlanta, Georgia); Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.); Gulf Family Health Surveys (Council of Health Ministers of the Gulf Cooperation Council States).

NOTES: Two dots (..) mean that there were not enough cases to compute the value for the corresponding category. The mean regional values assume that when two educational categories have a combined value, each educational category has the combined value.

2. Unmet need for family planning

The gap between fertility preferences and contraceptive use is often termed the "unmet need for family planning". The percentage or number of women with an unmet need gives an estimate of the potential unsatisfied demand for family planning. Decreasing unmet need was one of the major goals set by the Programme of Action of the International Conference on Population and Development.

Unmet need exists mainly in the developing world. An estimated 113.6 million women in the developing world — 105.2 million married or in-union women and 8.4 million unmarried women — have an unmet need for family planning (Ross and Winfrey, 2002). These women would like to postpone or terminate childbearing, but they are exposed to the risk of un-intended pregnancy because they are not using any method of contraception.

Table 34 shows the percentage of married or in-union women with an unmet need for family planning in selected developing countries, according to women's educational level. At the regional level, unmet need varies in the opposite direction from contraceptive prevalence. Unmet need is the highest in sub-Saharan Africa where, on average, 23 per cent of the women with a need for contraception are not using it. The mean percentage with unmet need is 16 to 19 in the other regions. At the country level, Comoros, Ethiopia, Mauritania, Senegal and Togo in Africa; Cambodia, Lao People's Democratic Republic and Yemen in Asia; and Haiti in the Caribbean have the highest levels of unmet need (more than 30 per cent).

TABLE 34. PERCENTAGE OF MARRIED OR IN-UNION WOMEN WITH AN UNMET NEED FOR FAMILY PLANNING, BY WOMEN'S LEVEL OF EDUCATION

Region and country	Year	Level of education			
		No education	Primary	Secondary or higher	Total
Sub-Saharan Africa					
Benin	1996	25.4	29.5	20.8	25.7
Burkina Faso	1998	26.0	27.6	15.6	25.8
Cameroon	1998	12.8	15.1	10.3	13.0
Central African Republic	1995	12.2	18.8	29.2	16.2
Chad	1997	8.5	12.5	17.0	9.4
Comoros	1996	37.9	34.2	19.1	34.6
Côte d'Ivoire	1998	28.8	27.2	20.5	27.7
Eritrea	1995	26.7	31.0	26.9	27.5
Ethiopia	2000	35.3	41.6	29.1	35.8
Gabon	2000	32.9	33.5	23.2	28.0
Ghana	1998	23.7	26.5	21.0	23.0
Guinea	1999	23.8	28.2	24.9	24.2
Kenya	1998	24.7	27.8	15.1	23.9
Madagascar	1997	23.8	29.5	19.0	25.6
Malawi	2000	30.8	29.8	24.3	29.7
Mali	1996	25.8	27.0	20.9	25.7
Mauritania	2000	26.7	37.3	34.4	31.6
Mozambique	1997	5.3	8.0	3.1	6.7
Namibia	1992	26.0	24.9	19.9	23.5
Niger	1998	16.3	20.7	15.7	16.6
Nigeria	1999	15.6	21.7	17.6	13.3

Table 34. (*continued*)

Region and country	Year	Level of education			
		No education	Primary	Secondary or higher	Total
Rwanda	2000	35.9	36.8	27.1	17.7
Senegal	1997	31.9	39.3	27.3	32.6
South Africa	1998	25.3	19.0	11.3	15.0
Togo	1998	31.9	36.0	24.2	32.3
Uganda	2000	34.5	37.3	21.9	24.4
United Republic of Tanzania	1999	18.4	17.3	10.6	17.2
Zambia	1996	24.4	28.1	23.7	18.3
Zimbabwe	1999	16.1	16.1	9.1	12.9
Mean		*24.4*	*27.0*	*20.1*	*22.7*
Northern Africa					
Egypt	2000	14.0	11.1	7.4	11.2
Morocco	1995	18.4	13.5	7.8	16.1
Sudan	1990	27.8	31.7	44.0	28.9
Mean		*20.1*	*18.8*	*19.7*	*18.7*
Eastern, South-central and South-eastern Asia					
Bangladesh	1999	16.6	16.1	12.4	15.3
Cambodia	2000	34.8	33.2	25.8	32.6
India	1998	16.2	14.4	15.8	15.8
Indonesia	1997	9.1	9.9	7.7	9.2
Kazakhstan	1999	..	10.1	7.8	8.7
Kyrgyzstan	1997	..	12.3	11.0	11.6
Lao People's Democratic Republic	2000	49.9	37.0	27.3	39.5
Mongolia	1998	<-	12.7 ->	9.6	9.9
Nepal	2001	28.4	28.9	23.3	27.8
Philippines	1998	28.4	23.9	17.3	19.8
Turkmenistan	2000	<-	10.3 ->	9.7	10.1
Uzbekistan	1996	..	14.5	12.4	13.7
Viet Nam	1997	12.3	8.6	4.7	6.9
Mean		*21.9*	*17.8*	*14.2*	*17.0*
Western Asia					
Armenia	2000	..	14.9	11.6	11.8
Jordan	1997	20.2	17.8	12.8	14.2
Turkey	1998	15.7	8.7	6.1	10.1
Yemen	1997	39.8	33.6	27.8	38.6
Mean		*25.2*	*18.8*	*14.6*	*18.7*
Eastern Europe					
Romania	1999	<-	8.2 ->	6.8	7.0

Table 34. (*continued*)

Region and country	Year	Level of education			
		No education	Primary	Secondary or higher	Total
Latin America and the Caribbean					
Bolivia.................................	1998	40.8	35.1	16.4	26.1
Brazil..................................	1996	15.4	9.2	5.0	7.3
Colombia..............................	2000	10.2	7.1	5.2	6.2
Dominican Republic	1996	20.4	12.9	9.8	12.5
Ecuador...............................	1999	20.6	12.9	6.1	10.0
El Salvador...........................	1998	15.0	10.0	4.3	8.2
Guatemala............................	1998	28.8	24.0	11.7	23.1
Haiti	2000	41.7	40.9	33.2	39.8
Honduras..............................	1996	21.1	11.6	3.3	11.0
Nicaragua.............................	1998	21.7	16.2	9.5	14.7
Paraguay	1996	<- 23.8 ->		8.9	19.2
Peru...................................	2000	16.5	13.5	7.3	10.2
Mean..............................		*23.0*	*18.1*	*10.1*	*15.7*

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).
NOTES: Two dots (..) indicate that there were not enough cases to compute the value for the corresponding category. The mean regional values assume that when two educational categories have a combined value, each educational category has the combined value.

The comparison of unmet need across educational groups shows that in general unmet need decreases with education: it is highest among women with no formal schooling and lowest among those with a secondary or higher education. One notable exception to this pattern is sub-Saharan Africa, where in many countries unmet need first increases and then decreases from one education group to the next. The curvilinear relationship between unmet need and education found in sub-Saharan Africa corresponds to the curvilinear relationship that an earlier study found in the same region (United Nations, 2000b). The relationship is a representation of an historical process whereby a widening gap between fertility desires and the supply of children precedes the onset of sustained fertility decline. An increase in contraceptive prevalence is initially accompanied by a rise in unmet need in settings where contraceptive prevalence is low, whereas a further increase in prevalence is accompanied by a decline in unmet need in settings where contraceptive prevalence is at medium or high levels.

A recent study of the state of unmet need at the end of the century shows that unmet need for family planning has been decreasing significantly over the past decade (Westoff, 2001). In some countries, the decline has been impressive: examples include Egypt, where unmet need dropped from 25 to 11 per cent in 11 years; Jordan, where it dropped from 22 to 14 per cent in 7 years; and Kazakhstan, where it dropped from 16 to 9 per cent in less than 5 years. Three countries in sub-Saharan Africa have experienced the greatest decline over a period of 10 years: Ghana, where unmet need dropped from 35 to 23 per cent; Kenya, where it dropped from 38 to 24 per cent; and Zimbabwe, where it dropped from 22 to 9 per cent. In the countries of Northern Africa, Asia and Latin America and the Caribbean, unmet need decreased in all three educational groups, even though unmet need remained highest among women with no education and lowest among women with a secondary or higher education. In sub-Saharan Africa, however, the decline in unmet need was observed mainly among women with some formal education. The main exceptions were Côte d'Ivoire, Ghana, Kenya, Rwanda, Togo, Zambia and Zimbabwe, where women with no education also experienced declines in unmet need (Westoff, 2001).

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D. SUMMARY AND CONCLUSIONS

Education affects the level of fertility: on average, those with more education exhibit lower levels of fertility than those with less education. This relationship is especially strong in developing countries. In developed countries, those with more years of education exhibit older ages at first birth and higher levels of childlessness.

Women's education is strongly associated with fertility preferences and contraceptive use. Better-educated women desire smaller families and are more likely to be using contraception. In addition, better-educated adolescents exhibit lower levels of fertility, which in many developing countries makes up a substantial proportion of all births.

In summary, the spread of education throughout a population is of central importance for the long-term transition from high to low levels of fertility, and consequently from high to low levels of population growth. High levels of fertility are unlikely to persist for long once a society has achieved "mass education", that is, once a large majority of children are sent to school.

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IV. HEALTH, MORTALITY AND EDUCATION

Both developed and developing countries have achieved major gains in health and survival during the twentieth century. However, those benefits did not accrue evenly across socio-economic groups. Whether measured in absolute or relative terms, socio-economic differentials in health and mortality exist in practically all countries, both rich and poor, regardless of overall national progress with respect to health and mortality. Further, the differentials appear to be widening, rather than narrowing, even as overall levels of health and mortality improve (Valkonen, 1999). Of the socio-economic variables that have been found to be associated with differentials in health and mortality, education has been among the strongest and the most consistent. Wherever the relationship has been examined, better-educated people and their households appear to stay healthier and live longer lives. The children of educated mothers, for example, are more likely to survive through childhood than the children of uneducated mothers. Similarly, adults themselves experience better health and survival if they are better educated. In general, the higher the level of education, the better the chances of survival.

The consistency of the association between mortality and education across contexts is indicated in table 35, which is a compilation of indicators of mortality by education for selected countries and periods. Although the measures of both mortality risks and education differ across countries in the data that are presented, there is a distinct pattern of better survival as education levels rise. In certain cases changes in mortality that are associated with moving across education categories are very large, in Benin, Bolivia, Indonesia and Mali, where child mortality risks at the highest level of education are half or less of those at the next lower level. In other cases, such as Austria, Canada, and Zimbabwe (1994 and 1998), the mortality differential between the two highest levels of education is not as high. Table 35 also suggests that the size of education differentials in mortality varies over time. In Colombia, for example, it appears that the relative infant mortality advantage that mothers with a primary education had over their uneducated counterparts increased

sharply between 1990 and 1996, declining again thereafter. There are similar changes for several other countries shown in the table.

The strength of education as a possible policy lever in social and economic development has been recognized at both the national and international levels. A number of major internationally agreed documents such as the Programme of Action adopted at the International Conference on Population and Development (United Nations, 1995 chap. I, resolution 1, annex), the United Nations Millennium Declaration (General Assembly resolution 55/2), the United Nations Declaration of Commitment on HIV/AIDS (General Assembly resolution 26-S/2, annex) and the Dakar Framework for Action (UNESCO, 2000) have therefore emphasized the importance of educational access and equity in improving health and survival. Progress towards achieving the education goals set forth in those documents has, however, been slow. The World Education Forum (UNESCO, 2000) estimated that, in the year 2000, more than 113 million children did not have access to primary education, 880 million adults were illiterate, gender discrimination continued to permeate education systems, and the quality of learning and the acquisition of human values and skills fell far short of the aspirations and needs of individuals and societies. The Forum therefore warned, in the Dakar Framework for Action: Education for All: Meeting Our Collective Commitments, that without accelerated progress towards education for all, national and internationally agreed targets for poverty reduction would be missed, and inequalities between countries and within societies would widen (UNESCO, 2000, para. 5). A recent review of the progress made towards the Education for All goals also concluded that the picture that emerges is uniformly bleak and that all of the major quantitative targets have been missed by a wide margin, raising serious questions about the attainability of the 2015 goals (Watkins, 2000). The implications for health and mortality of the persistence and any further widening of education differentials are dire, given the powerful association between education, health and mortality.

TABLE 35. EDUCATION DIFFERENTIALS IN VARIOUS MORTALITY INDICATORS:
SELECTED COUNTRIES AND YEARS

| Country | Year/period | Education variable/category | Mortality indicator | Mortality rates (per thousand population) and percentage increase in mortality from level in next higher education category | |
				Rate	Percentage increase
Austria	1985-1989	Approx. 9 years	Infant mortality rate	11.8	22
		3 years vocational		9.7	13
		Lower secondary		8.6	12
		Higher education		7.7	
	1995-1998	Approx. 9 years		7.2	60
		3 years vocational		4.5	-2
		Lower secondary		4.6	15
		Higher education		4.0	
Benin	1996	No education	Under-five mortality (5q0)	193.7	-26
		Primary		263.2	243
		Secondary or higher		76.7	
Bolivia	1989	None/ primary	Under-five mortality (5q0)	178.6	14
		Secondary		156.9	124
		Higher		70	
	1994	None/ primary		187.1	22
		Secondary		152.9	123
		Higher		68.7	
	1998	None/ primary		153.9	32
		Secondary		116.4	115
		Higher		54.1	
Canada		0-10 years	Foeto-infant mortality rate	11.1	8
		11 years		10.3	36
		12-13 years		7.6	19
		14 or more years		6.4	
Cameroon	1991	No education	Under-five mortality (5q0)	198.1	104
		Primary		97.1	21
		Secondary and higher		80.3	
	1998	No education		198.4	56
		Primary		127.5	42
		Secondary and higher		89.7	
Croatia	1979-1982	None/ primary	Infant mortality rate	26.3	80
		Secondary		14.6	30
		Higher		11.2	
	1987-1990	None/ primary		17.1	58
		Secondary		10.8	46
		Higher		7.4	
Colombia	1986	No education	Under-five mortality (5q0)	71.5	29
		Primary		55.6	82
		Secondary and higher		30.6	
	1990	No education		74.3	103
		Primary		36.6	44
		Secondary and higher		25.5	
	1995	No education		48.3	12
		Primary		43.2	46
		Secondary and higher		29.6	
	2000	No education		43.7	33
		Primary		32.8	46
		Secondary and higher		22.5	

TABLE 35. (continued).

| Country | Year/period | Mothers' Education | | Mortality rates (per thousand population) and percentage increase in mortality from level in next higher education category | |
		Education variable/category	Mortality indicator	Rate	Percentage increase
Hungary	1980-1983	0-7 years	Under-five mortality (5q0)	38.5	73
		8 years		22.3	32
		9-12 years		16.9	13
		13+ years		14.9	
	1994-1996	0-7 years		25.6	106
		8 years		12.4	57
		9-12 years		7.9	14
		13+ years		6.9	
Indonesia	1987	No education	Under-five mortality (5q0)	144.2	26
		Primary		114	139
		Secondary and higher		47.7	
	1991	No education		131.3	13
		Primary		116.2	148
		Secondary and higher		46.8	
	1994	No education		131.2	34
		Primary		97.7	93
		Secondary and higher		50.7	
	1997	No education		108.3	37
		Primary		78.9	124
		Secondary and higher		35.2	
Mali	1987	No education	Under-five mortality (5q0)	289.9	46
		Primary		199.1	101
		Secondary and higher		99	
	1995/1996	No education		265	29
		Primary		204.7	100
		Secondary and higher		102.3	
Yemen	1991/1992	No education	Under five mortality (5q0)	141	53
		Primary		92	89
		Secondary and higher		49	
	1997	No education		126	38
		Primary		92	30
		Secondary and higher		71	
Zimbabwe	1988	No education	Under five mortality (5q0)	122	51
		Primary		81	77
		Secondary and higher		46	
	1994	No education		93.1	18
		Primary		78.7	39
		Secondary and higher		56.6	
	1998	No education		118.8	27
		Primary		93.9	19
		Secondary and higher		78.7	

Source: For Austria, Croatia and Hungary, data are from Masuy-Stroobant, "Trends in differentials in foeto-infant mortality in Europe", SPED-UCL Working Paper No. 14 (Louvain-la-Neuve, Belgium, University of Louvain, 2001); for Canada, data are from Jiajian Chen and others, "Maternal education and fetal and infant mortality in Quebec", *Health Reports*, vol. 10, No. 2 (Autumn); for Benin, Bolivia, Cameroon, Colombia, Indonesia, Mali, Yemen and Zimbabwe, data are from Measure/DHS or Macro International, Inc., country reports based on the Demographic and Health Surveys for the respective countries.

The present chapter synthesizes the available evidence on the relationship between education and health. Section A comprises an overview of contextual and measurement issues that are important in understanding the empirical evidence. Section B covers the relationship between education and health in the more developed regions of the world; and section C covers that relationship in the less developed regions. For the more developed regions, the focus is on education differentials in adult mortality, for which reasonable volumes of data exist. For the less developed regions, the emphasis is on maternal education differentials in mortality under the age of 5 years, referred to throughout the present chapter as under-five mortality or child mortality. Section D reviews education differentials associated with two specific causes of ill health and mortality in developing countries — maternal causes and the human immunodeficiency virus and the acquired immune deficiency syndrome. Although the present chapter focuses primarily on the impact of education on health, in section D the inverse relationship, that is, the impact of HIV/AIDS on education, is briefly addressed. The emphasis throughout the chapter is on the relative differentials in health and mortality across various levels of education. Although absolute differences in health and mortality across socio-economic groups have sometimes been examined in the literature, as observed by Valkonen (1999, p. 296), "epidemiologists and other researchers usually base their analysis on relative differences, and conclusions on widening differentials often concern relative differences, even though this is not explicitly stated". Perhaps the strongest advantage of the relative differential approach is that it indicates how the worst performing groups are doing relative to what has been achieved within a specific environment.

A. CONCEPTUAL, MEASUREMENT AND ANALYTICAL ISSUES

A variety of measurement, conceptual and analytical issues obfuscate the relationship between education and health. A fundamental source of complexity is the inconsistency in approach across studies and a lack of uniformity in the measurement of education and health status.

In developed countries, the number of years of schooling has often been used as an indicator of education status because there is sufficient variability in years of schooling, and the variable can be reliably measured. In contrast, studies of the education-health relationship in developing countries have often used information on whether an individual has attended or completed a particular category or type of education — usually primary, middle, or secondary and higher. The number of years of schooling included under such categories as "primary education" may vary over time and across contexts, making an interpretation of empirical relationships between education and health difficult. Similarly, when the number of years of schooling is used, respondents may not accurately recall the number of years of education that a deceased individual obtained.

If, as argued in the literature, education provides people with the knowledge and the power with which to modify their exposure to health risks (Caldwell 1979), then the content of the education that is received should matter as much as the number of years spent in the classroom. Measures of education typically do not reflect variation in the type of education, the pedagogical approach, or the content of the curriculum. Even if the particular teaching approach does not affect the relationship between education and health, changes in education policy and variation in the approach to education over time, such as those that have occurred in a number of developing countries since the 1980s, are likely to influence the nature, strength and trends in that relationship. Nevertheless, these changes are not captured in analyses of the education-health relationship.

With respect to the measurement of health and mortality, a broad range of variables has been used. They include the risk of death, self-perceived health, the presence of a number of illnesses, disability and psychological well-being. Often, the particular measures that are used have varied across studies, thus making cross-country and time series comparisons difficult. A primary issue with health measures is that most depend on individuals' own assessment of their health. Reports of health may therefore be

biased, and the extent of such bias is likely to be at least partly dependent, on the level of education of the respondent.

An important aspect of the relationship between education and health is the fact that the effects of education can either accrue to the individual who receives the education or to other persons related to the recipient. The effects can also be intergenerational. A woman's education has thus been shown to have a major effect on the health and mortality of her children. Although the level of education, as measured by schooling variables, often does not change in adulthood, considerable additional learning or modification of the knowledge base can take place outside the classroom. In the period between her education and the birth of her children, for example, a woman is likely to undergo various life experiences that may modify the direct impact of her education. In addition, employment, residence, income and characteristics of other family members are likely to influence this relationship. Since educational status often determines occupation, employment, incomes, household living circumstances, and access to health and related infrastructure — all of which can directly influence health — it is difficult to extricate the impact of education on health from that of other variables. Much of the research that has attempted to explain the relationship between education and health and mortality has therefore also included controls for the impact of other related factors.

In recognition of the complexity of the relationship between education and health and the dearth of easy explanations, Deaton and Paxson (1999 p. 34) have observed that the relationship is not the same for men and women; that it is not the same for young adults and older adults; that it is different over long time periods and over the business cycle; and that it is different across countries versus over time. Similarly, Valkonen (1989) has noted that the explanations for socio-economic differentials in health and mortality are likely to be different for different causes of death and in different countries and time periods, with no universally valid explanations.

B. RELATIONSHIP BETWEEN EDUCATION AND HEALTH IN THE MORE DEVELOPED REGIONS

At the end of the twentieth century, life expectancy in the more developed regions was estimated to have been about 75 years. However, the level across major areas ranged from a low of 68 years for Eastern Europe to a high of about 78 years for Western Europe (United Nations, 2001). This variation across major areas conceals even larger differentials in health and mortality risk across socio-economic groups. Education, in particular, remains a strong predictor of the health and mortality experience of individuals and their households in developed countries. Education differentials in health and mortality are not limited to any particular stage of life. They exist during adulthood as well as childhood. Even foetal health and mortality have been shown to vary by mother's education status (Hoyert, 1996; Raum and others, 2001). Recent research on education differentials in health and mortality in developed countries has, however, focused mainly on adulthood, perhaps because infant and child mortality are currently very low in most countries and thus of less policy significance than differentials in adult health and mortality. The present section therefore reviews the evidence on education differentials in adult health and mortality and the associated factors.

1. Data availability

The availability of nationally representative and reliable data for evaluating the relationship between education and health varies across developed countries. Data have rarely been collected in developed countries for the specific objective of examining education differentials in health and mortality. However, in recent decades there has been tremendous growth in efforts to collect data on broader social class differentials in health and mortality, with education being an important part of those differentials. By extracting data from larger data sets, or by linking data from several sources, researchers have been able to construct comprehensive profiles of the education-health relationship in a number of developed countries. The seminal analysis by Kitagawa and Hauser (1973) of socio-economic differentials in mortal-

ity in the United States in the 1960s, for example, matched census data and vital statistics to provide early insight into the extent and pattern of socio-economic differentials in mortality in the United States. More recently, the NHANES I Epidemiologic Follow-up Study (NHEFS) and the National Longitudinal Mortality Survey (NLMS) have provided data on socio-economic aspects of health and mortality in the United States during the 1970s and the 1980s. A number of population-wide surveys have also been used in Europe in analyses of education differentials in health and mortality for such countries as Denmark, Finland, France, the Netherlands, Norway, Sweden and the United Kingdom (England and Wales). Valkonen has concisely summarized the key findings from many of these data sets in various publications on the topic (Valkonen, 1987, 1989, 1992, 1999, 2000 and 2001). Data matching was also used in an analysis of education and mortality risks among adults in Russia (Shkolnikov and others, 1998). Data gathered in 21 countries through the World Health Organization's MONICA Project (Monitoring cardiovascular diseases) have also provided insight into the role of education status in cardiovascular morbidity and mortality in developed countries (Molarius and others, 2000; Osler and others, 2000; Ferrario and others, 2001). A number of smaller data sets used in studies of education differentials in health and mortality are reported in the literature; although many of them are based on smaller samples, they still yield a wealth of information, especially on disease-specific aspects of the relationship between education and health. An important constraint in available data, however, is often the limited comparability across contexts and time. Data have often focused on different adult ages and different time periods and cannot always be disaggregated by sex. Those limitations make it difficult to reach firm conclusions about generalized patterns in education differentials in health and mortality in the developed world.

2. Mortality

Education differentials in adult mortality have been noted in virtually all developed countries for which data exist. Practically everywhere, the relationship between education and the risk of mortality is decidedly negative. The existence of education and other social class differentials in health and mortality appear to be independent of the particular development policy.

Some of the most compelling evidence of education differentials in health and mortality in Europe comes from data on Eastern Europe, in particular from Russia. Table 36 shows the ratios of the age-specific mortality rate at ages 20-39, 40-49 and 60-69 for lower educational groups relative to the upper educational groups in Russia in 1979 and 1989. In both 1979 and 1989 and in all three age groups, groups with a lower level of education experienced higher mortality than more highly educated persons. The differentials in mortality are larger for younger adults than for those aged 60-69 years. For each age group and for both women and men, the relative advantage of the more highly educated group increased between 1979 and 1989. Education differentials are also larger for men than for women at all ages and in both years. There is little consistency in the sex-specific variation in relative ratios over time or by age. Estimates of partial life expectancy (between age 20 and 69 years) by education, and the change therein (table 37), also show that education differentials in life expectancy between ages 20 and 69 years are larger for males than for females and that the differential widened between 1979 and 1989. Shkolnikov and others (1998) estimated that the differentials in life expectancy amount to a 9.2 per cent reduction in male mortality and 7.3 per cent reduction in female mortality for each additional year of education. Education differentials in mortality elsewhere in Eastern Europe have also been observed to be larger than those in Western Europe (Bobak, 1999). Kalediene and Petrauskiene (2000), for example, found inequalities in life expectancy in Lithuania to be highly correlated with education. In the Czech Republic, education differentials in mortality are not only large, but they have also widened over time (Blazek and Dzurova, 1997; Bobak and others, 1997). Between 1980-1981 and 1995, the education differential in mortality in the Czech Republic widened markedly. In that period, mortality among men aged 40 to 64 years with a primary education increased by 77 per cent, in contrast to a 4 per cent decline in mortality for men with a university education. Similar though less pronounced widening occurred among females.

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TABLE 36. RATIOS OF AGE-SPECIFIC MORTALITY RATE OF LOWER EDUCATED
CLASS RELATIVE TO UPPER EDUCATIONAL GROUP, RUSSIA, 1979 AND 1989

| | Ratios (age-specific mortality rate of lower educated group divided by the rate of upper educated groups) | | | |
| | Males | | Females | |
Age group	1979	1989	1979	1989
20-39	2.07	2.25	1.96	2.12
40-59	1.81	2.15	1.55	1.95
60-69	1.25	1.45	1.09	1.28

Source: V. M. Shkolnikov and others, "Educational level and adult mortality in Russia: an analysis of routine data, 1979 to 1994", Social Science and Medicine, vol. 47, No. 3, table 4.

TABLE 37. EDUCATION DIFFERENTIALS IN LIFE EXPECTANCY BETWEEN AGES 29
AND 69: RUSSIA, 1979 AND 1989

| | Life expectancy between age 29 and 69 (years) | | | |
| | 1979 | | 1989 | |
Educational attainment	Males	Females	Males	Females
Primary, incomplete primary and incomplete secondary	38.0	45.9	39.4	45.6
Secondary...	39.1	46.0	40.8	46.3
Secondary special.....................................	42.7	47.2	44.1	47.7
Higher and incomplete higher.....................	44.4	47.5	45.6	48.0
Education differential (highest minus lowest categories)...	6.4	1.6	6.2	2.4

Source: V. M. Shkolnikov and others, "Educational level and adult mortality in Russia: an analysis of routine data, 1979 to 1994", Social Science and Medicine, vol. 47. No. 3, table 3.

For the rest of Europe, evidence on education differentials across countries suggests that there are both similarities and differences in the size and pattern of education differentials in mortality. In Denmark, Norway and Sweden, for example, differentials are relatively small, but they are larger for Finland, France Italy and the United Kingdom (England and Wales) (Kunst and Mackenbach, 1994). Whereas data for Finland for the period 1971-1995 indicate a six-year survival advantage of men with a tertiary education over men with only a primary education (Valkonen, 2000), evidence for France for the period 1976-1980 suggests that men who are poorly educated experienced 50 per cent higher mortality than more highly educated men (Desplanques, 1976 and

1984). More recent data suggest that by 1986-1990, education differentials in mortality had widened further in France so that poorly educated men were experiencing mortality that was 75 per cent higher than that of highly educated men (Kunst, 1997).

Data from a study on Denmark, Finland, France, Norway, Sweden and the United Kingdom (England and Wales), covering men and women aged 35 to 44 years, found education differentials in mortality to be similar among men across all six countries, but different among females (Valkonen, 1989). Each additional year of education was associated with an 8 to 9 per cent lower death rate among men. Among women, however, education differentials in mortality var-

ied more across countries, although the overall size was smaller.

Table 38 compares, for Finland, the relative risks of death, by age, for persons with a primary education and for those with a tertiary education. The data are presented for two time periods, 1972-1974 and 1993-1995. For all ages represented, those with only a primary education experience higher mortality than those with a tertiary education. Among those aged 35 to 49 years in 1972-1974, persons with a lower level of education experienced mortality that was 2.2 times the mortality of those with a tertiary education.

The risk of mortality for those with a primary education relative to those with a tertiary education increased to 3.4 during the period 1993-1995. An increasing relative risk for those with less education is evident for all age groups except those aged 75 years and above, for whom the relative risk remains the same. The pattern of consistently higher mortality among the less-educated groups and the increase in the relative advantage of the more highly educated group over time, with younger cohorts showing larger education differentials than older cohorts, is consistent with the pattern observed for Russia.

TABLE 38. TRENDS IN EDUCATION DIFFERENTIALS IN AGE-SPECIFIC MORTALITY, FINLAND, 1972-1974 AND 1993-1995

| | Excess mortality (deaths per 100,000) and odds[a] of dying for males with primary education, relative to those with tertiary education | | | | |
| | Age (years) | | | | |
Time period	35-49	50-64	65-74	75+	All ages
1972-1974	320 (2.2)	817 (1.6)	1 490 (1.4)	3 165 (1.3)	994 (1.4)
1993-1995	347 (3.4)	678 (2.0)	1 641 (1.7)	2 704 (1.3)	928 (1.5)

Source T. Valkonen, "The widening differentials in adult mortality by socio-economic status and their causes", in *Health and Mortality: Issues of Global Concern* (United Nations publication, Sales No. E.99.XIII.17), table 55.
[a] Relative odds shown in parenthesis.

Education differentials in mortality in Northern America are similar to the patterns found in Europe, although differences also exist. In the United States, for which extensive research analyses have been performed on the levels and patterns of education differentials in adult mortality, there is evidence of large, persistent and widening education differentials in mortality (Elo and Preston, 1996; Pappas and others, 1993; Feldman and others 1989; Kunst, 1997). Pappas and others (1993), examining United States data for 1986 and comparing them with the data used in the Kitagawa and Hauser study of 1960 (Kitagawa and Hauser, 1973), found that poor and poorly educated persons aged 25 to 64 years had higher rates of death than wealthier or better educated persons and that those differentials had increased between 1960 to 1986. Over the same period, education differentials in mortality among men doubled, with much more moderate increases among females. Feldman and others

(1989), using data for middle-aged and older whites in the United States, also found a widening education differential in male but not in female mortality between 1960 and 1984.

Elo and Preston (1996), confirmed similar relationships for the United States in the period between 1979 and 1985. Table 39 summarizes the death rates for males and females and for the two age groups — 25 to 64 years and 65 to 89 years — examined in their study. The data show that mortality among working-age men who had not completed high school was more than twice as high as for working-age men who had completed a university education. In almost all cases, lower levels of educational attainment were associated with higher mortality. Further illustration of the pattern of educational differentials in mortality in the United States is provided in figure 24, which plots the life-table estimates of sex-specific expected years of life at various ages. The data are

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taken from an analysis of education-specific estimates of life expectancy and age-specific disability in the elderly population in the United States between 1982 and 1991, using samples drawn from persons enrolled in the Medicare programme in the United States (Manton, Stallard and Corder, 1997). It is clear from the figure that education differentials in the United States persist through the late years of life. Males with low educational levels consistently experience the lowest prospects of survival across all ages and over time. Highly educated women experience the best prospects of survival into late adulthood. The survival advantage of highly educated women has increased over time and at all ages represented. Although education differentials in life expectancy persist into the late adult ages, and the relative differentials across education categories remain about the same, absolute differences in expected years of life are small.

TABLE 39. DEATH RATES (PER 1,000) AND MALE/FEMALE RATIOS OF RATES BY AGE, SEX AND EDUCATIONAL ATTAINMENT: UNITED STATES, 1979-1985

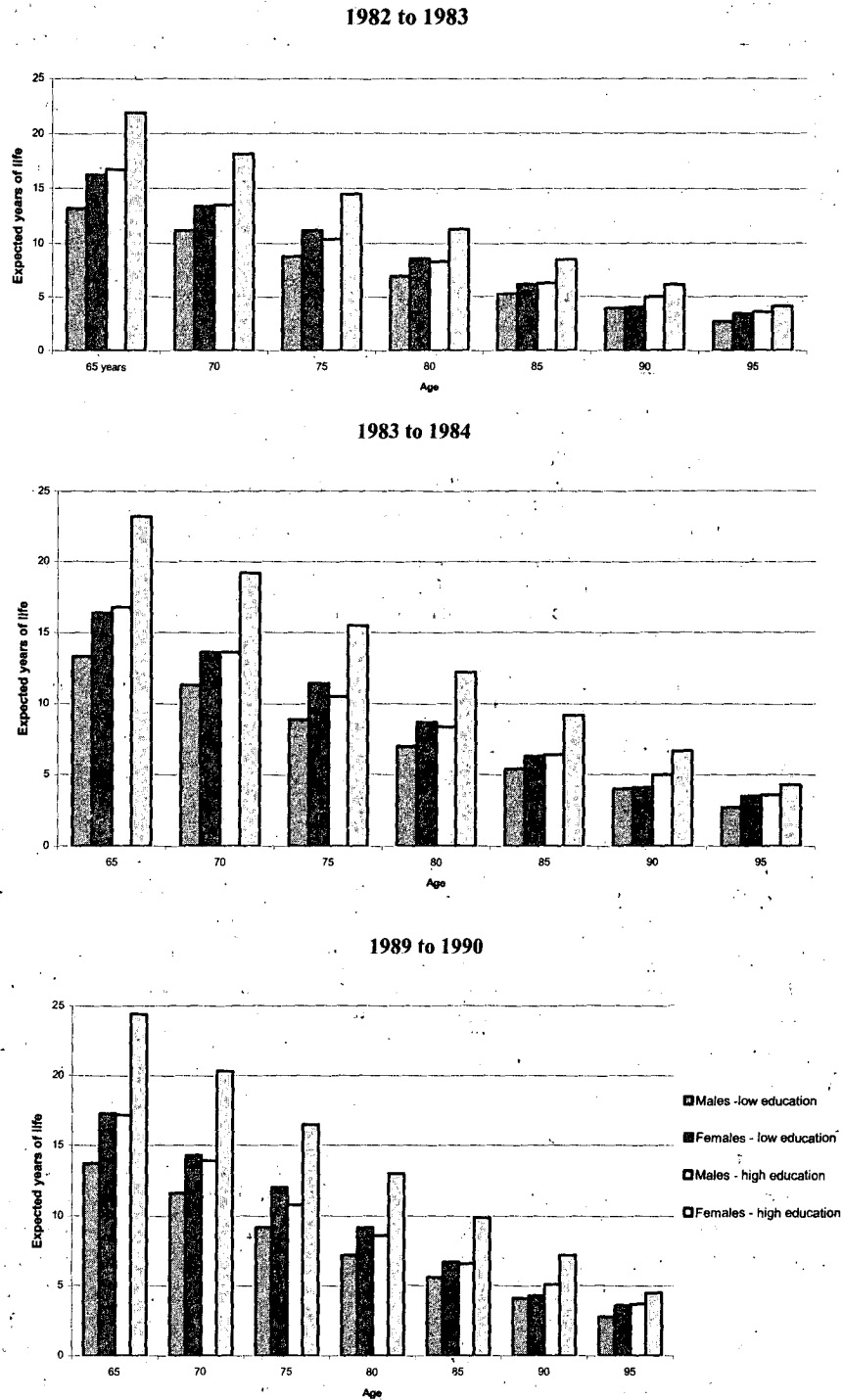| Years of school completed | Age-specific mortality rate (per 1,000) | | Male/female ratio |
	Males	Females	
Persons aged 25-64 years			
0 - 8	7.41	3.69	2.01
9-11	7.05	3.51	2.01
12	4.96	2.45	2.02
13	4.71	2.55	1.85
16 and higher	3.33	2.06	1.62
Persons aged 65-89 years			
0-7	59.29	32.77	1.81
8	61.91	30.05	2.06
9-11	59.20	29.21	2.03
12	53.42	29.66	1.80
13	49.04	25.89	1.89
16 and higher	40.66	23.80	1.71

Source I. Elo and S. H. Preston (1996) "Educational differentials in mortality in the United States, 1979-1985", Social Science and Medicine, vol. 42, No. 1.
NOTE: Data based on public use sample of the National Longitudinal Mortality Survey.

An apparent difference between the United States and Europe is the responsiveness of mortality to years of schooling, which is quite similar for men and women in the United States. However, in European countries, men appear to be more responsive to additional education than women. Table 40 shows, for the United States and six European countries, estimates of the percentage reduction in mortality that is attributable to one additional year of education. Large sex differentials in life years are gained from an additional year of education for Denmark, Hungary and Sweden. In all cases, except in England and Wales, men gain more longevity from an additional year of education than women. At each level of education and for both younger and older adults, the risk of mortality for females remains well below male mortality risk, which is about twice as high as female mortality at almost all education levels.

**Figure 24. Life expectancy at specified ages by education: males
and females, United States, 1982-1983, 1983-1984 and 1989-1990**

1982 to 1983

1983 to 1984

1989 to 1990

☐Males -low education

☐Females - low education

☐Males - high education

☐Females - high education

Source: K. Manton., E. Stallard and L. Corder, "Education-specific estimates of life
expectancy and age-specific disability in the U. S. elderly population", *Journal of Aging
and Health*, vol. 9, No. 4.

TABLE 40. ESTIMATED PERCENTAGE REDUCTION OF MORTALITY PER ONE-YEAR
INCREASE IN EDUCATION, BY SEX AND COUNTRY: PERSONS AGED 35-54

Country and period	Males	Females	Difference (male-female)
Europe			
Denmark, 1971-1980	8.1	3.8	4.3
Finland, 1971-1980	9.2	6.1	3.1
England & Wales, 1971-1981	7.4	7.8	-0.4
Hungary, 1978-1981	8.2	2.2	6.0
Norway, 1971-1980	8.6	5.8	2.8
Sweden, 1971-1980	8.0	4.8	3.2
United States, 1979-85	7.7	7.3	-0.4

Source: I. Elo, and S. H. Preston, "Educational differentials in mortality in the
United States, 1979-1985", Social Science and Medicine, vol. 42, No. 1.
    NOTE: Data for countries other than the United States are based on T.
Valkonen, "Adult mortality and level of education: a comparison of six countries",
in Health Inequalities in European Countries, Proceedings of European Science
Foundation Workshops held in London 1984-86, J. Fox, ed. (Aldershot, United
Kingdom, Gower, 1989), table 7.2. Calculations for the United States are based on
the public use sample of the National Longitudinal Mortality Survey.

Investigations of education differentials in mortality have been less extensive in Canada than in the United States. However, recent research analysing income differentials — which are likely to reflect strongly education differentials — suggests that between 1971 and 1996 there was a strong gradient where the richest quintile had the lowest mortality and the poorest had the highest (Wilkins, Berthelot and Ng 2001). If income differentials in survival in Canada closely track education differentials, then, contrary to patterns found in Europe and the United States, education differentials in mortality in Canada may have narrowed in recent years.

A study of socio-economic differentials in mortality in New Zealand confirms the negative association between education and mortality in Oceania, although mortality levels among those in educational categories in the middle appeared to differ much less than mortality levels at the lower and higher ends. As stated in the study, the highest and lowest educational categories stood out from the remaining categories, giving the impression of a stepped gradient of mortality. (Blakely, 2001, p. 234).

3. Health status and related factors

The strong education differentials in mortality discussed above suggest that the underlying risk of ill health is also likely to be higher among the less educated. Researchers have examined this relationship using a variety of indicators of health status. Valkonen, Sihvonen and Lahelma (1997), examining the relationship between education and disability-free life expectancy in Finland between 1986 and 1990, found that better-educated men and women were also more likely to be free of disability than their less educated counterparts. Lahelma and others (1994) and Lahelma, Rahkonen and Huuhka (1997), using data from two pooled nationwide surveys conducted in 1986 and in 1994, also found sharp educational disparities in illness and self-assessed health among males and females in Finland, Norway and Sweden. The gap in health between the highest and lowest educational groups was largest for Norwegian men and smallest for Finnish women. In Finland, men's health status varied more widely by educational status than women's health status, although male differentials in health were observed to have flattened over time, while those for women remained stable (Lahelma, Rahkonen and

Huuka, 1997, p. 795). A number of studies have also indicated a close association between education and self-rated health in Eastern European countries. Bobak and others (2000) examining data from the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland and the Russia Federation, found that education differentials in self-rated health existed across those countries and that persons who had primary or vocational schooling were more likely to perceive themselves in poor health than those with a secondary or university education.

Guralnik and others (1993), using a slightly different measure-active life expectancy, or the expectation of healthy life years — found wide differentials in health across educational groups in the United States. The active life expectancy advantage for older persons with higher a education relative to those with lower levels was on the order of 2.5 to 4.6 years. A recent study of the evolution of mortality in Canada also shows that self-perceived health is closely related to education status. The proportion of Canadians aged 18 or older who report themselves to be in poor or fair health decreases monotonically by educational attainment. One quarter of those with less than a secondary education fall in this category as compared with 8 per cent of those in post secondary education (Tremblay and others, 2002).

The one cause that is probably most closely associated with the widening of education differentials in mortality in developed countries in recent decades is cardiovascular disease. The incidence of cardiovascular disease has been associated with lower education in many studies (Smith and others, 1998; Kunst and others, 1998; Osler and others, 2000). For example, in a study conducted in Scotland, Smith and others (1998) found that cardiovascular disease was the cause of death most strongly associated with education. Martikainen and others (2001), analysing social class differentials in mortality in Finland between the 1970s and 1990s, showed that there was a slower rate of decline in mortality from cardiovascular diseases among manual classes. They observed that the manual classes probably benefited less from the introduction of new methods of treatment and secondary prevention of cardiovascular diseases than the non-manual classes. Since

the manual classes are generally comprised of less-educated persons, this explanation is likely to apply equally well in explaining differences in mortality across education groups. Education was also found to be a stronger determinant of cardiovascular disease than income or occupation, and the relationship is particularly strong among women (Winkleby and others, 1992). This suggests that although recent technological advances in cardiovascular disease detection and treatment may be more accessible to those with higher incomes, prevention through better education may still be an important method of control.

Findings from a recent study of the relationship between education and the risk of developing acute coronary syndromes (Pitsavos and others, 2002) suggest some mechanisms through which education may work to affect cardiovascular morbidity. The authors found that those in low educational groups were less likely to adopt treatment for hypertension, less likely to be physically active and more likely to be heavy smokers. It is well known that lifestyle plays an important role in the existence of differentials in health and mortality. In Denmark, for example, data examined by Prescott and others (1998) suggest a potential role for tobacco use among females. Inception of smoking occurs at an earlier age, and the volume smoked and depth of inhalation has increased. In contrast, male exposure has remained constant, thus accounting for a narrowing of the mortality gap between men and women. Similar factors probably account for the wider education differentials that exist for male than female mortality. Preston (1996) suggests that in the United States, a reduction in smoking among the educated classes, especially among men, who have been faster to abandon smoking than women, may have contributed to widening the education differential in mortality among men (Preston, 1996). Kilander and others (2001) also report, for Sweden, that smoking, lack of physical activity and dietary factors accounted for more than one half of the excess risk of cancer mortality among less-educated groups. A similar finding is reported by Osler and others (2000), who found that between 1982 and 1992, increases in education differentials in cardiovascular risk in Denmark were associated with a decline in the prevalence of smoking among educated classes and with a corresponding in-

crease in smoking among the least educated women. Valkonen (1989) has also noted that in France, where wide education differentials in mortality prevail, mortality from cancers of the upper digestive tract and cirrhosis of the liver, for which alcohol is the main risk factor, has been found to be several times higher among unskilled labourers than among higher level employees. Social class differentials in mortality in Finland, and particularly in France, are larger than in other western European countries and are also likely to be associated with alcohol-related causes (Valkonen, 2001, p. 233). Infectious and parasitic diseases, respiratory diseases, accidents, violence, suicide and causes directly related to alcohol appear to be the causes of death associated with the widest education differentials in the Russian Federation (Shkolnikov and others, 1998).

A discussion of education differentials in adult mortality would be incomplete without mention of the interaction of education with such intermediate variables as income, employment and occupation. It has been suggested that the wider educational differentials in male mortality found in most parts of the developed world may reflect the role of income. Elo and Preston (1996) found that for the United States, income was an important mediator of the education-health relationship. The moderating effect was more pronounced among men than among women. An interaction between income and education is also suggested for New Zealand. The negative association between income and mortality was practically neutralized after controlling for education, with the neutralization being particularly pronounced among females (Blakely, 2001). Shkolnikov and others (1998), suggest that in the Russian Federation, unlike in the West, income may be a less important mediator of the relationship between education and health owing to a much weaker relationship between education and earnings. They state that in the Russian Federation, many of the jobs requiring the greatest number of years of education, such as medicine, did not result in the highest incomes. Instead of income, they suggest that such lifestyle factors as smoking and alcohol consumption may play more significant mediating roles in the Russian Federation.

4. Summary and Conclusions

The preceding section suggests that despite major declines in overall mortality levels in developed countries, sizeable differentials exist in adult mortality by educational attainment. The basis for these differentials may differ across countries, but they appear to be related to such intermediate variables as differences in health behaviour and the underlying disease structure. Lifestyle factors, such as smoking and alcohol consumption, and socio-economic factors, such as income and employment, also play a role. Educated persons may experience lower risks of ill health and mortality, not only because they are more knowledgeable about health-promoting behaviour but also because they represent a selection of those healthy enough or privileged enough in childhood to have completed their education (Currie and Hyson, 1999). This view is consistent with the finding by various researchers that childhood illness has a negative impact on later life achievement, particularly, on education (Wadsworth, 1986). Valkonen (2001), in this regard, has also observed that the same factors that make it easier for individuals to achieve higher socio-economic positions, such as high parental social class, good school performance and certain psychological and physical characteristics, may also influence their life styles and health-related behaviour. The link between health and education may therefore reflect, not simply the health choices people make, but also, as synthesized by Lynch and others (1997), how those choices are situated within economic, historical, family, cultural and political contexts. Those contexts, they observe, exert important influences on both the process of choice and the types of behavioural options that are available and appropriate.

Education, nevertheless, appears to have an important influence in its own right, especially among women who, in many developed contexts, exhibit weaker education differentials in mortality once a certain minimum level of education has been attained. Women's response to educational inputs may therefore be very elastic at lower levels of education but fairly inelastic at higher levels. In essence, a little education makes a big difference to health and mortality. The same is not true for males, for whom wide differentials persist even at higher levels of edu-

cation. The reasons for the persistence and widening of education differentials in mortality and health in developed countries even at relatively low levels of mortality can perhaps best be summarized by the explanation of persistent social class differentials in mortality in Europe in Kunst and others (1998, p. 1640). Kunst notes that with the replacement of infectious and other traditional diseases by diseases of affluence, higher social classes seem to have changed their life styles and living conditions in ways that protect them against the new causes of death.

C. EDUCATION-HEALTH DIFFERENTIALS IN THE LESS DEVELOPED REGIONS

The present section shifts the focus away from adult mortality and turns to an examination of education differentials in child mortality in the less developed regions. The emphasis on childhood mortality in the less developed regions is necessitated by the dearth of data on adult mortality in those regions; however, it is also necessary because childhood mortality, specifically the probability of dying between birth and age 5 (under-five mortality), continues to be a source of considerable avoidable mortality in those countries.

Education, especially that of mothers, has been found to significantly differentiate the levels of child mortality, which are more closely associated with maternal education than with any other socio-economic factor (United Nations, 1985). As stated by Caldwell (1999 p. 7), the early evidence showed that even in areas with little access to modern medicine, chances of a child's survival rose steadily and linearly with the educational level of their mothers. Section C therefore focuses on the relationship between mothers' education — received mostly during their childhood — and the health and survival of their children a generation later. Other aspects of the relationship between education and health in developing countries are also examined.

1. Data sources

Most developing countries lack reliable vital registration systems with which to record health and mortality data by socio-economic characteristics of the deceased. However, the early indica-

tion of a strong relationship between mother's education and infant and child health led to an emphasis on the use of surveys and censuses to collect child health and mortality data that could be disaggregated by the educational level of the mother. The World Fertility Surveys (WFS), for example, collected data that documented very large socio-economic differentials in childhood mortality for most of the 41 countries participating in the surveys. Although those surveys provided a wealth of data with which to analyse educational differentials in childhood mortality, the data were limited in their coverage of information on intermediate variables, such as individual health behaviour and access to health care by education status. Demographic and health data, collected by more than 150 Demographic and Health Surveys since the early 1980s, have provided much-needed additional data, especially on correlates of education differentials in childhood mortality. Those data form the basis of the remarks in the present section.

2. Maternal education and child mortality

Using data from the World Fertility Surveys and the early data from the Demographic and Health Surveys, Cleland and others (1991) documented strong evidence of absolute and relative differences in childhood mortality by maternal education in a number of developing countries (table 41). For some countries such as Ecuador, Egypt and the Sudan, both absolute and relative differences in mortality increased. In other countries, absolute differences narrowed. However, the child survival advantage that women with a primary education had over those with no education widened in all countries except Senegal and the Dominican Republic. In general, the children of mothers with no education were, on average, 1.5 times more likely to die before the age of five years than the children of primary school leavers. Child mortality differentials were even wider between mothers with a primary education and those with a secondary education, with little indication of a convergence in child mortality levels across education groups over time (Cleland and others, 1991, p.144).

TABLE 41. DIFFERENCES IN OVERALL CHIDHOOD MORTALITY BETWEEN THE CHILDREN
OF MOTHERS WITH NO EDUCATION AND THOSE WITH PRIMARY SCHOOLING,
APROXIMATELY 1975 AND 1985

	Absolute differences in under-five mortality (5q0) between uneducated women and those with primary education (deaths per 1,000)		Ratio of childhood mortality for mothers with primary education to those with no education	
	Approximate period			
Country	1975	1985	1975	1985
Colombia...................	34	18	1.33	1.37
Dominican Republic	61	34	1.54	1.37
Ecuador.....................	19	52	1.16	1.59
Egypt........................	18	38	1.10	1.41
Indonesia..................	9	27	1.05	1.27
Mexico.....................	40	39	1.59	1.61
Morocco...................	79	53	2.04	1.96
Peru.........................	62	47	1.43	1.37
Senegal.....................	153	73	2.22	1.56
Sudan (North)..........	17	46	1.12	1.45
Thailand...................	40	20	1.49	1.41
Tunisia	42	23	1.59	1.43

Source: John G. Cleland and others, "Socio-economic inequalities in childhood mortality: the 1970s
compared with the 1980s", in *Demographic and Health Surveys World Conference, 5-7 August 1991,
Washington, D.C., Proceedings,* vol. I (Columbia, Maryland, Institute for Resource Development/Macro
International, Inc.), table 7.

Table 42, presents similar data from 113 Demographic and Health Surveys that have been conducted in developing countries. The table reveals continued differentials in childhood mortality by maternal education, with data from practically all countries showing that mothers with no education have higher relative risks of childhood mortality than mothers with primary education. Similarly, mothers with a primary education show higher childhood mortality than those with a secondary or higher education. Secondary-primary differentials are generally larger than the differentials between those with no education and those with primary education.

To examine the levels and patterns of differentials presented in table 42 more closely, figures 25 to 29 present visual summaries using box plots for groupings of major areas of the world. For each survey, a box plot presents the level of under-five mortality for mothers with no education (represented by a diamond), the average
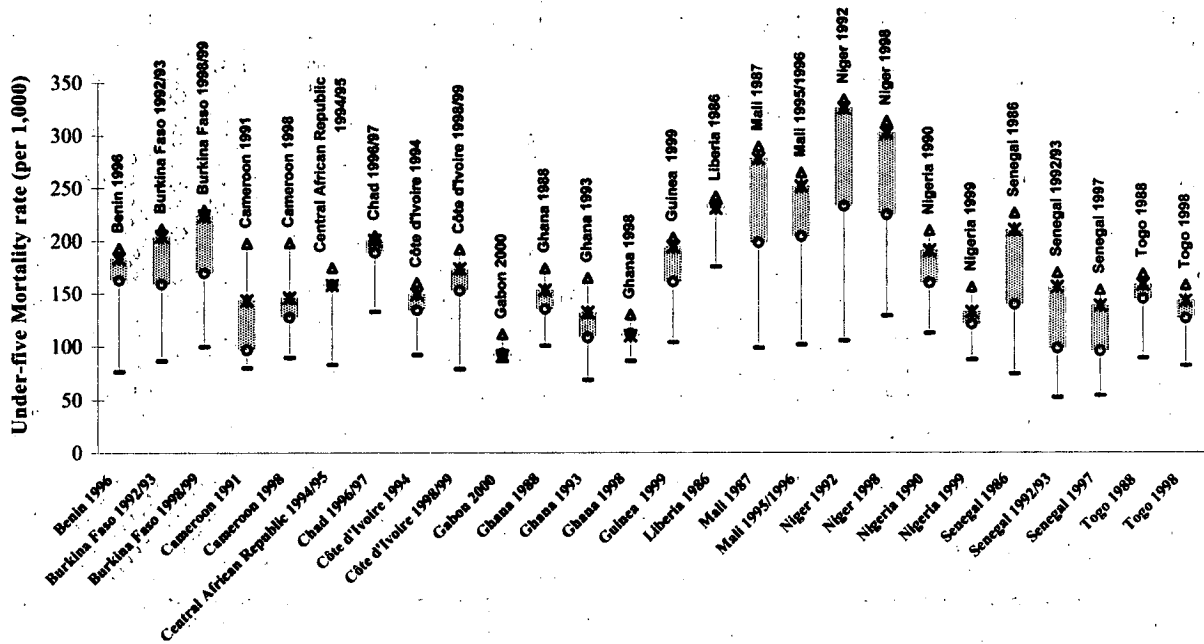
level of under-five mortality for the entire population (represented by an "o"), the level of under-five mortality among mothers with only primary education (represented by an "x"), and under-five mortality among those with secondary or higher education (represented by a hyphen "-"). Shaded boxes signify situations in which mothers who have attained a primary education exhibit child mortality levels that are lower than the average level reported for the country. This would result largely because higher mortality among uneducated mothers pulls up the average level of under-five mortality. In contrast, unshaded boxes indicate contexts in which the child mortality risk of those with a primary education is higher than the average risk for all mothers. This reverse pattern results when a large proportion of mothers have attained higher educational and lower child mortality levels, thus bringing down the average experience of all women. The pattern is particularly evident for the countries represented from Latin America and the Caribbean.

TABLE 42. EDUCATION DIFFERENTIALS IN UNDER-FIVE MORTALITY, 1980 TO 2000

Africa	Year of survey	Under-five mortality rate (per 000)	Relative ratios No Education/ Primary	Primary/ Secondary
Africa				
Eastern Africa				
Burundi	1987	183.5	1.1	2.5
Comoros	1996	112.6	1.1	1.2
Eritrea	1995	152.5	1.0	1.2
Ethiopia	2000	187.8	1.4	1.3
Kenya	1993	93.2	0.9	2.0
	1998	105.2	1.0	2.0
	1989	91.2	1.3	1.3
Madagascar	1992	177.8	1.4	1.3
	1997	163.9	1.2	1.6
Malawi	1992	239.7	1.1	1.4
	2000	202.7	1.0	1.8
Mozambique	1997	218.7	1.1	2.0
Rwanda	1992	162.6	1.2	1.3
Uganda	1988	187.1	1.1	1.2
	1995	156.2	1.1	1.8
	2000/2001	156.8	1.2	1.7
United Republic of Tanzania	1992	153.5	1.1	1.4
	1996	144.8	1.2	1.4
	1999	161.1	1.0	2.6
Zambia	1992	177.9	1.2	1.3
	1996	192.1	1.2	1.4
Zimbabwe	1988	84.7	1.4	1.4
	1994	75.9	1.1	1.4
	1999	90.3	1.3	1.1
Middle Africa				
Central African Republic	1994/1995	158.6	1.1	1.9
Chad	1996/1997	201.1	1.1	1.4
Northern Africa				
Egypt	1988	131.6	1.4	2.4
	1992	107.8	1.4	1.9
	1995	95.9	1.3	2.1
	2000	69.2	1.2	1.8
Morocco	1987	116.7	2.0	1.0
	1992	83.9	1.5	2.7
Sudan	1990	134.9	1.2	1.1
Tunisia	1988	73.2	1.4	1.6
Southern Africa				
Botswana	1988	55.2	1.2	1.0
Namibia	1992	91.8	0.9	1.2
Western Africa				
Benin	1996	183.9	1.2	1.9
Burkina Faso	1992/1993	204.5	1.3	1.6
	1998/1999	224.1	1.2	1.2
Cameroon	1991	144.0	2.2	1.0
	1998	146.3	1.4	1.5
Côte d'Ivoire	1994	149.9	1.3	1.3
	1998/1999	174.3	1.3	1.5
Gabon	2000	91.4	1.1	0.9
Ghana	1988	153.8	1.2	0.9
	1993	132.8	1.3	1.5
	1998	110.4	0.9	1.4
Guinea	1999	195.1	1.4	1.3
Liberia	1986	230.9	1.1	1.3
Mali	1987	278.3	1.9	1.0
	1995/1996	252.2	1.2	1.9
Niger	1992	326.2	1.2	2.4
	1998	302.6	1.4	1.4
Nigeria	1990	191.3	1.1	1.3
	1999	133.3	1.1	1.3
Senegal	1986	210.6	1.4	1.3
	1992/1993	156.9	1.4	1.8
	1997	139.4	1.5	1.8
Togo	1988	159.7	1.1	1.5
	1998	143.8	1.2	1.3
Average (Africa)			1.2	1.5

Asia	Year of survey	Under-five mortality rate (per 000)	Relative ratios No Education/ Primary	Primary/ Secondary
Asia				
South-central Asia				
Bangladesh	1993/1994	149.7	1.4	1.4
	1996/1997	127.8	1.3	1.4
	1999/2000	110.0	1.3	1.5
India	1992/1993	118.8	1.6	1.6
	1998/1999	101.4	1.5	1.7
Kyrgyz Republic	1997	75.8	-	3.4
Nepal	1996	139.2	1.5	1.6
	2001	108.4	1.6	1.5
Pakistan	1990/1991	120.4	1.2	1.7
Sri Lanka	1987	42.4	1.7	1.2
Turkmenistan	2000	88.3	4.5	0.3
South-eastern Asia				
Cambodia	2000	121.6	1.1	1.6
Indonesia	1987	110.3	1.3	2.4
	1991	107.0	1.1	2.5
	1994	92.8	1.3	1.9
	1997	70.6	1.4	2.2
Philippines	1993	63.5	1.9	1.9
	1998	54.9	1.9	1.9
Thailand	1987	49.0	1.6	2.4
Vietnam	1997	45.9	1.3	1.6
Western Asia				
Jordan	1990	42.4	0.9	1.3
	1997	34.0	1.5	1.4
Turkey	1993	80.5	1.5	2.5
	1988	59.7	1.5	1.8
Yemen	1991/1992	137.1	1.5	1.9
	1997	121.0	1.4	1.3
Average (Asia)			1.5	1.8

Latin America and the Caribbean	Year of survey	Under-five mortality rate (per 000)	Relative ratios No Education/ Primary	Primary/ Secondary
Latin America and the Caribbean				
Caribbean				
Dominican Republic	1986	92.1	1.4	1.6
	1991	62.5	1.2	2.3
	1996	61.0	1.8	2.1
Haiti	1994/1995	140.6	1.3	1.3
	2000	137.7	1.1	1.9
Trinidad and Tobago	1987	33.8	2.4	0.7
Central America				
El Salvador	1985	87.2	1.7	2.6
Guatemala	1987	120.1	1.3	2.5
	1995	79.2	1.4	2.5
	1998/1999	64.6	1.3	1.4
Nicaragua	1997/1998	56.0	1.5	1.7
South America				
Bolivia	1989	140.8	1.1	2.2
	1994	132.1	1.2	2.2
	1998	99.1	1.3	2.2
Brazil	1986	96.2	1.4	3.8
	1991	110.1	1.4	2.9
	1996	56.7	1.8	1.8
Colombia	1986	50.0	1.3	1.8
	1990	35.0	2.0	1.4
	1995	37.4	1.1	1.5
	2000	28.0	1.3	1.5
Ecuador	1987	89.7	1.7	1.9
Paraguay	1990	46.6	1.5	1.7
Peru	1986	114.7	1.3	2.5
	1992	91.5	1.3	2.7
	1996	68.4	1.3	2.3
	2000	60.4	1.4	2.2
Average (Latin America and the Caribbean)			1.4	2.0

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

Figure 25. Maternal education differentials in under-five mortality: Western and Middle Africa

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

A box plot has been prepared for each country surveyed; some countries are represented more than once. Each box plot consists of a box with vertical bars (tails) extending from its lower and upper ends.

A hyphen (-) = average 5q0 among mothers with secondary or higher education

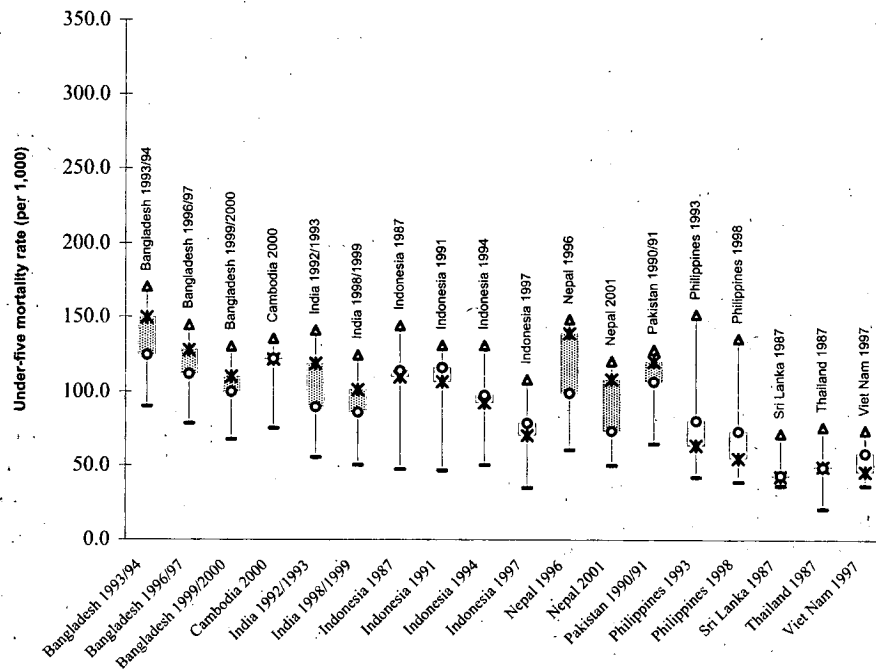A diamond (♦) = average 5q0 among mothers with no education

A circle (o) = average 5q0, entire population

An (x) = average 5q0 among mothers with primary education

Shaded box = average child mortality risk for mothers with primary education is lower than average for entire population

Unshaded box = child mortality risk for mothers with primary education is higher than average for all mothers.

Figure 26. Maternal education differentials in under-five mortality: other sub-Saharan Africa

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

A box plot has been prepared for each country surveyed; some countries are represented more than once. Each box plot consists of a box with vertical bars (tails) extending from its lower and upper ends.

A hyphen (-) = average 5q0 among mothers with secondary or higher education

A diamond (♦) = average 5q0 among mothers with no education

A circle (o) = average 5q0, entire population

An (x) = average 5q0 among mothers with primary education

Shaded box = average child mortality risk for mothers with primary education is lower than average for entire population

Unshaded box = child mortality risk for mothers with primary education is higher than average for all mothers.

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Figure 27. Maternal education differentials in under-five mortality:
Latin America and the Caribbean

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

A box plot has been prepared for each country surveyed; some countries are represented more than once. Each box plot consists of a box with vertical bars (tails) extending from its lower and upper ends.

A hyphen (-) = average 5q0 among mothers with secondary or higher education.

A diamond (♦) = average 5q0 among mothers with no education.

A circle (o) = average 5q0, entire population.

An (x) = average 5q0 among mothers with primary education.

Shaded box = average child mortality risk for mothers with primary education is lower than average for entire population.

Unshaded box = child mortality risk for mothers with primary education is higher than average for all mothers.

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Figure 28. Maternal education differentials in under-five mortality: North Africa, Western Asia and Central Asia

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

A box plot has been prepared for each country surveyed; some countries are represented more than once. Each box plot consists of a box with vertical bars (tails) extending from its lower and upper ends.

A hyphen (-) = average 5q0 among mothers with secondary or higher education

A diamond (♦) = average 5q0 among mothers with no education

A circle (o) = average 5q0, entire population

An (x) = average 5q0 among mothers with primary education

Shaded box = average child mortality risk for mothers with primary education is lower than average for entire population

Unshaded box = child mortality risk for mothers with primary education is higher than average for all mothers.

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Figure 29. Maternal education differentials in under-five mortality: other Asia

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

A box plot has been prepared for each country surveyed; some countries are represented more than once. Each box plot consists of a box with vertical bars (tails) extending from its lower and upper ends.

A hyphen (-) = average 5q0 among mothers with secondary or higher education

A diamond (♦) = average 5q0 among mothers with no education

A circle (o) = average 5q0, entire population

An (x) = average 5q0 among mothers with primary education

Shaded box = average child mortality risk for mothers with primary education is lower than average for entire population

Unshaded box = child mortality risk for mothers with primary education is higher than average for all mothers.

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The box plots depict the uniformity with which under-five mortality occurs, which is clearly the highest among mothers with no education and the lowest for those with secondary or higher education. There are few exceptions to this pattern. Similarly, there are also sizeable differentials in the under-five mortality risk between those who have only a primary education and those with a secondary education. Notable exceptions are Gabon (2000), Botswana (1988), Sri Lanka (1987) and Trinidad and Tobago (1987). The size of the differential between those with no education and those with a secondary and higher education (the distance between the two ends of the tails) differs considerably by country. For example, Botswana (1988), Colombia (1995 and 2000), Ghana (1988), Jordan (1990), Namibia (1992) and Zimbabwe (1994) all show very small education differentials in under-five mortality. In contrast, there are monumental child mortality differentials in some countries — depicted by lengthy tails. This is the case in Africa, especially in Mali and Niger, but also in Madagascar, Malawi, and Mozambique. In East and South Asia, all countries, with the exception of Sri Lanka (1987) and Viet Nam (1997) show significant differentials in child mortality by education of mother. The differentials are highest in Indonesia and the Philippines. In Latin America and the Caribbean, differentials are generally wide except for Colombia, Guatemala in 1998/1999, Nicaragua, Paraguay and Trinidad and Tobago.

The survival prospects of children of uneducated mothers are not adversely affected to the same extent in all countries or even within specific areas. The levels of child mortality vary considerably among those with no education, across and within areas, as is shown by the varying heights of the upper tails of the box plots. In contrast, the child mortality experience of mothers with a secondary and higher education is much more similar across countries. This suggests that education is a powerful equalizer — neutralizing much of the negative environmental, socio-economic and cultural factors that predispose mothers from different contexts to high child mortality. Even where under-five mortality levels are very high, suggesting that the overall health and development context may not be conducive to child survival, educated persons demonstrate child mortality levels that are significantly lower than uneducated persons. In the highest mortality countries shown in figure 25 (Mali and Niger), the lower tails of the box plots are remarkably long, showing that educated mothers are able to achieve much lower child mortality levels than average, despite living in a high mortality-risk-environment.

Trends in the levels of differentials over time, as shown by elongation or contraction of the vertical bars, can also be assessed from the figures. In most African countries, differentials appear to have narrowed or stayed the same over time. The only exceptions are Kenya, Uganda and the United Republic of Tanzania, where small increases in the education differential in mortality are evident. In Egypt, where education differentials in child mortality were very wide in 1988, there has been a narrowing of differentials as the level of child mortality has declined. Several countries in Latin America and the Caribbean also show a narrowing of the education differentials in child mortality over time. In Yemen as well, there is a striking reduction in the mortality differential between 1991/1992 and 1997. A large part of that narrowing, however, is the result of an increase in the child mortality among mothers with a secondary and higher education. The factors underlying the increase are unclear.

Despite the consistency in the findings regarding the relationship between maternal education and child mortality, the pathways through which education operates are poorly understood. As in the case of developed countries, the acquisition of an education represents not just additional knowledge, but also changes in behaviour, residence, occupation and other socio-economic attributes that directly or indirectly affect health and mortality. Caldwell (1979) has suggested that a mother's education influences child health and mortality by empowering the woman to make healthy decisions in the care of her child. It has also been suggested that formal education may facilitate knowledge and use of the available health-care facilities, although it is not always clear whether this occurs because educated people can afford better care or because schooling undermines their belief in less effective traditional remedies (United Nations, 1995).

It is believed that two important mechanisms through which education influences health and mortality in developing countries are change in health behaviour and the utilization of health services. For example, using data from the India 1992-1993 National Family Health Survey, Govindasamy and Ramesh (1997), analysed the relationship of education to child health practices and child mortality in India, with controls for other background characteristics. Introducing background variables such as residence, mother's work status, caste and religion, sex, birth order and the age of the child into their analysis, they observed that mothers' education continued to be a powerful, positive and significant predictor of the utilization of child health care services in India. Their results showed that the children of mothers with a middle school and higher education were much more likely to be taken to a health facility for treatment of acute respiratory infections and diarrhoea, and they were also more likely to be treated with oral rehydration salts and to be fully vaccinated. They found a particularly strong effect of education on the likelihood of receiving maternal health care services, with women who had a middle school and higher education being almost eight times more likely than non-educated women to receive antenatal care, eight times more likely to receive a tetanus toxoid injection, five times more likely to have received iron/folic acid during the pregnancy and eight times more likely to have delivered in a health-care institution.

Table 43 summarizes the evidence with respect to mothers' knowledge of oral rehydration solution (ORS), which is an important intervention in reducing morbidity and mortality from dehydration caused by diarrhoea. The table ranks countries according to the proportion of uneducated mothers who know about ORS. Except for a handful of countries for which differentials are negligible (Egypt, Nepal, Nicaragua, Jordan and Haiti, for example) uneducated women are much less likely to know about ORS than highly educated mothers. Many of the countries in which knowledge of ORS is poorest among uneducated women (less than 50 per cent of uneducated women knowing about ORS) are also countries with moderate to high under-five mortality risks. Seven out of the 11 countries in this category are

in Western Africa. In Burkina Faso, Niger, Peru and the Philippines, where knowledge of ORS among uneducated mothers is lowest among the countries examined, there are also large differentials across education groups. Surprisingly, there is little education differential in knowledge of ORS in Gabon and Senegal, where knowledge of ORS, even among highly educated mothers, is only around 50 per cent. It is unclear whether this is a reflection of the inability of programmes to reach mothers in those countries or whether aspects of the education curriculum or social and environmental factors play a role.

Developing countries also have large maternal education differentials with respect to children's immunization status. In general, educated mothers are more likely than uneducated mothers to have their children immunized. This disparity is demonstrated in table 44 for immunization against one important childhood disease — measles — which is a well known cause of morbidity and mortality in developing countries. Measles immunization coverage remains well below complete for most countries in the developing world. The countries with the highest immunization coverage (lower panel of table 44), which are also perhaps those in which national immunization programmes have been most assiduously implemented, also show the smallest differentials by education. However, in the countries with the poorest measles immunization coverage (Chad, Ethiopia, Madagascar, Niger and Nigeria), differentials across education groups are large. In those countries, barely 1 in 4 children born to uneducated mothers received the measles immunization, thus subjecting them to higher than average risks of morbidity and mortality from measles and its complications.

The children of poorly educated mothers are also more likely to be at a nutritional disadvantage relative to the children of better-educated mothers. For practically all countries, larger proportions of the children of uneducated mothers are below two standard deviations of their ideal weight for age than the children of educated mothers. Similar differentials exist when mothers with primary education are compared with those who have a higher education (table 45). The combination of malnutrition, inadequate

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TABLE 43. PERCENTAGE DISTRIBUTION OF MOTHERS WITH BIRTHS IN THE 5 YEARS
BEFORE THE SURVEY WHO KNOW ABOUT ORAL REHYDRATION SALTS,
BY EDUCATIONAL LEVEL OF MOTHER

| Country and year of survey | Percentage of mothers who know about oral rehydration salts | | | Difference Secondary-None |
	None	Primary	Secondary	
Egypt 2000	98.3	98.2	98.3	0.0
Nepal 2001	97.0	99.4	99.9	2.9
Nicaragua 1997/98	95.9	96.8	99.0	3.1
Jordan 1997	95.0	98.6	99.2	4.2
Haiti 2000	93.3	98.8	99.2	5.9
Zimbabwe 1999	91.9	95.3	98.7	6.8
Zambia 1996	88.9	94.2	98.6	9.7
Brazil 1996	87.4	83.2	83.1	-4.3
Uganda 2000/01	86.9	92.8	96.5	9.6
Dominican Republic 1996	85.8	94.2	97.4	11.6
Pakistan 1990/91	85.1	97.9	98.9	13.8
Guatemala 1998/99	83.7	89.6	97.9	14.2
Morocco 1992	81.8	95.9	96.7	14.9
Indonesia 1997	81.7	92.6	97.8	16.1
Guatemala 1995	78.4	89.4	92.6	14.2
United Republic of Tanzania 1996	78.1	90.8	91.8	13.7
Colombia 2000	77.7	87.6	94.8	17.1
Malawi 2000	76.7	88.3	98.0	21.3
Rwanda 1992	76.4	82.7	93.7	17.3
United Republic of Tanzania 1992	73.5	82.0	92.6	19.1
Paraguay 1990	73.4	88.6	94.3	20.9
Zambia 1992	72.0	85.6	95.6	23.6
Guinea 1999	71.6	90.0	97.0	25.4
Yemen 1997	71.4	89.4	95.6	24.2
Malawi 1992	70.2	82.6	91.1	20.9
Namibia 1992	69.3	78.5	77.7	8.4
Bolivia 1998	68.2	79.1	95.7	27.5
Kenya 1993	67.0	72.5	83.6	16.6
Ghana 1998	66.4	83.2	95.4	29.0
Ethiopia 2000	61.5	81.5	96.4	34.9
Chad 1996/97	59.8	87.2	96.3	36.5
Senegal 1997	58.4	70.4	80.8	22.4
Turkmenistan 2000	58.4	84.0	94.7	36.3
Philippines 1998	57.9	91.5	94.0	36.1
Côte d'Ivoire 1998/99	49.7	68.0	78.6	28.9
Niger 1992	48.7	71.5	90.4	41.7
Peru 2000	47.9	67.8	88.9	41.0
Philippines 1993	41.5	82.7	83.9	42.4
Gabon 2000	39.5	48.3	50.6	11.1
Cambodia 2000	35.6	51.8	74.9	39.3
Senegal 1992/93	34.6	53.0	53.9	19.3
Burkina Faso 1992/93	31.3	54.5	80.0	48.7
Cameroon 1991	18.4	39.2	56.7	38.3
Madagascar 1992	16.8	28.3	55.6	38.8
Nigeria 1990	2.1	3.9	2.8	0.7

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

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TABLE 44. MATERNAL EDUCATION DIFFERENTIALS IN CHILDHOOD IMMUNIZATION AGAINST MEASLES: COUNTRIES WITH THE LOWEST AND HIGHEST COVERAGE LEVELS AMONG CHILDREN OF UNEDUCATED MOTHERS

Country	Mother's education			Difference: secondary minus primary
	None	Primary	Secondary	
	(Proportion of children immunized)			

Countries with the 10 lowest levels of measles immunization coverage for the children of mothers with no education

	None	Primary	Secondary	Difference
Chad 1996/97	19.0	31.9	55.7	36.7
Nigeria 1999	20.7	49.5	70.6	49.9
Madagascar 1997	20.9	48.9	64.9	44.0
Ethiopia 2000	22.1	37.7	61.7	39.6
Niger 1992	25.2	44.3	78.4	53.2
India 1992/1993	30.1	51.3	71.3	41.2
Paraguay 1990	31.8	54.6	71.1	39.3
Niger 1998	31.8	47.8	73.9	42.1
Philippines 1998	32.1	70.7	83.9	51.8
Cameroon 1998	33.5	57.0	73.1	39.6

Countries with the 10 highest levels of measles immunization for children of uneducated mothers

	None	Primary	Secondary	Difference
Zimbabwe 1994	78.9	84.3	91.6	12.7
Malawi 2000	79.2	83.8	93.4	14.2
Brazil 1991	79.3	81.7	96.3	17.0
Malawi 1992	79.7	91.9	98.2	18.5
Egypt 1995	82.1	89.0	97.1	15.0
Zambia 1996	84.3	84.1	95.4	11.1
Jordan 1990	84.8	89.8	90.7	5.9
Jordan 1997	85.8	90.8	90.1	4.3
Rwanda 1992	87.5	90.8	99.3	11.8
Egypt 2000	95.4	97.3	97.9	2.5

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

immunization coverage and maternal lack of knowledge of health interventions are likely to work in a synergistic manner to subject the children of uneducated or poorly educated mothers to morbidity and mortality risks that exceed the levels faced by better-educated mothers.

As in developed countries, factors other than health variables underlie the relationship between maternal education and child mortality in developing countries. Researchers have, for example, attempted to isolate the role played by the father's education or by other attributes of the father that may indirectly affect the relationship between maternal education and child mortality.

The United Nations (1985), for example, examined the role of paternal education in child survival, concluding that fathers' education is important, but not quite as important as that of the mother, in mediating child mortality risks. In particular, not only were the effects of fathers' education found to be of less importance, but they were also found to wane more sharply when other variables such as income were considered. This suggests that, whereas a mother's education may work more directly by enhancing her ability to take decisions that are health-giving, a father's education operates through other socioeconomic variables.

TABLE 45. EDUCATION DIFFERENTIALS IN THE PROPORTION OF CHILDREN WHO ARE
2 OR MORE STANDARD DEVIATIONS BELOW IDEAL WEIGHT FOR AGE

	Education status of mothers			Differentials	
	No education	Primary education	Secondary and higher		
Region/Country	Percentage of children who are 2 or more standard deviations below ideal weight for age			Difference (no education-primary)	Difference (primary-secondary)
Sub-Saharan Africa					
Benin 1996	8.1	7.0	4.6	1.1	2.4
Burkina Faso 1998/99	9.6	8.3	2.9	1.3	5.4
Cameroon 1998	6.0	5.8	2.4	0.2	3.4
Central African Republic 1994/95.....	18.7	13.0	4.6	5.7	8.4
Chad 1996/97	17.4	13.8	5.0	3.6	8.8
Comoros 1996	12.5	7.5	3.7	5.0	3.8
Côte d'Ivoire 1994	21.9	8.6	5.1	13.3	3.5
Côte d'Ivoire 1998/99	1.2	0.8	0.2	0.4	0.6
Eritrea 1995	7.7	2.3	0.3	5.4	2.0
Ethiopia 2000	7.8	3.8	0.3	4.0	3.5
Gabon 2000	16.3	11.3	3.7	5.0	7.6
Ghana 1998	9.9	6.2	2.9	3.7	3.3
Guinea 1999	9.9	6.4	3.1	3.5	3.3
Kenya 1998	11.7	10.3	3.7	1.4	6.6
Madagascar 1997	14.0	7.9	5.9	6.1	2.0
Malawi 2000	6.6	4.0	0.2	2.6	3.8
Mali 1996	10.0	5.9	1.9	4.1	4.0
Mozambique 1997	42.4	40.7	13.5	1.7	27.2
Niger 1998	8.7	4.5	2.2	4.2	2.3
Nigeria 1999	7.7	5.4	5.1	2.3	0.3
Senegal 1997	5.4	3.0	0.6	2.4	2.4
Togo 1998	12.7	7.6	2.6	5.1	5.0
Uganda 1995	14.7	8.8	1.6	5.9	7.2
United Republic of Tanzania 1996	13.3	11.6	8.0	1.7	3.6
Zambia 1996	13.8	9.4	4.3	4.4	5.1
Zimbabwe 1994	19.9	11.4	4.4	8.5	7.0
Zimbabwe 1999	11.3	7.5	2.9	3.8	4.6
Western Asia					
Jordan 1997	3.6	2.4	1.0	1.2	1.4
Turkey 1998	3.7	4.1	1.8	-0.4	2.3
Central Asia				0.0	0.0
Kazakhstan 1999	0.0	9.6	2.8	-9.6	6.8
South and Southeast Asia					
Bangladesh 1996/97	53.9	51.0	32.8	2.9	18.2
Bangladesh 2000	15.8	14.2	9.8	1.6	4.4
Cambodia 2000	3.0	2.2	0.9	0.8	1.3
India 1999	26.2	20.4	13.4	5.8	7.0
Indonesia 1994	28.1	24.0	18.7	4.1	5.3
Indonesia 1997	28.6	20.3	16.1	8.3	4.2
Nepal 1996	9.5	10.5	4.2	-1.0	6.3
Viet Nam 1997	11.3	5.8	2.6	5.5	3.2
Latin America and the Caribbean					
Bolivia 1994	9.8	10.2	5.5	-0.4	4.7
Bolivia 1998	15.5	11.2	3.9	4.3	7.3
Brazil 1996	4.3	2.9	0.8	1.4	2.1
Colombia 1995	11.7	5.8	1.2	5.9	4.6
Colombia 2000	5.6	3.7	0.7	1.9	3.0
Dominican Republic 1996	8.9	5.9	1.7	3.0	4.2
Guatemala 1995	16.8	14.9	3.7	1.9	11.2
Haiti 2000	35.7	26.8	10.6	8.9	16.2
Nicaragua 1997/98	9.4	7.4	3.0	2.0	4.4
Peru 1996	12.8	11.8	4.6	1.0	7.2
Peru 2000	6.6	7.0	1.5	-0.4	5.5

Source: Selected Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.)

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D. EDUCATION AND SPECIFIC HEALTH AND MORTALITY RISKS

1. Maternal morbidity and mortality

Although the causes of maternal death are similar around the world, in developing countries low levels of education and the absence of skilled provider care appear to play particularly important roles. The single most important proximate determinant of maternal health and survival is the extent to which women have access to and utilize high-quality maternal health services. Access to and use of qualified medical care at delivery is highly related to the level of education of the mother. Educated mothers are much more likely than uneducated ones to receive good quality care during pregnancy and at delivery. This tendency is clearly demonstrated in developing countries for which data exist. Table 46 shows, for selected countries, the relative odds for mothers who have a secondary or higher education of being attended by qualified medical care during delivery. The top panel of table 46 shows the countries in which the relative advantage of educated women is highest and the lower panel shows countries where this advantage is lowest. In this group of countries, educated mothers are 10 to 25 times more likely to be attended at delivery by a doctor, thus lowering the chances of succumbing to complications that can arise during pregnancy. The education differential in access to qualified care at delivery was particularly large in Mali in 1987. Given the very high under-five mortality rate at that date (278 per 1,000), women in Mali with a secondary education who chose to use qualified medical care at delivery had a better chance of both infant and maternal survival than their uneducated counterparts. This factor, at least in part, accounts for a much lower under-five mortality of 99 per 1,000 among women with a secondary education, as compared with 290 per 1,000 in the non-educated. Countries shown in the lower panel of table 46 show much smaller differentials in access to high-quality medical care at delivery, which suggests that in those countries there may be fewer factors that differentiate educated and uneducated mothers with respect to access to medical care.

The fate of mothers at delivery is particularly grave when they have no one assisting them. This predicament is most common among uneducated women. Table 47 shows that in 12 countries more than one half of all births among uneducated mothers in the five years before the survey were attended by no one or by a relative of the woman. In close to one quarter or more of the births among uneducated women in Burundi (1987), Nigeria (1990), Rwanda (1992) and Uganda (1988 and 2001/2002), women went through the delivery process alone, with no one available to assist. Relatives were the only ones present at delivery in more than one half of the births among uneducated mothers in Bolivia, Ethiopia, Nepal, Yemen and Zambia. In contrast, educated women, especially those with a secondary or higher education, rarely deliver without assistance. The factors that predispose uneducated mothers to a higher probability of having unassisted deliveries is unclear. Income and limited access to qualified care may contribute to the pattern. However, it is more likely that traditional beliefs and practices that require women to demonstrate their strength through labour and delivery play an important role. Uneducated mothers are therefore more likely than their educated counterparts to experience and succumb to complications during their pregnancies.

A fundamental aspect of the interaction of education with health and mortality is through the indirect pathway of fertility reduction. In addition to their greater likelihood of knowing about health interventions and using health services, women with more education marry and enter motherhood later. They have fewer children and thereby reduce the chances of their children's mortality or their orphanhood, with its deleterious consequences for the children (Hobcraft, 1996). In contrast, repeated fertility and poor delivery care among women of lower education status magnify their risk of maternal and child ill health and mortality.

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TABLE 46. COUNTRIES WITH THE HIGHEST AND LOWEST EDUCATION DIFFERENTIALS IN ACCESS TO QUALIFIED MEDICAL CARE AT DELIVERY

| Country and year | Relative odds (comparing mothers with secondary education and those with no education) of being attended at delivery by | |
	A doctor	A nurse/midwife or other professional
Countries where educated mothers have highest odds of being attended by a doctor at delivery		
Mali 1987	25.5	4.1
Philippines 1993	14.8	4.5
Togo 1988	14.6	2.5
Burundi 1987	14.3	4.3
Indonesia 1994	13.8	5.9
Morocco 1992	13.3	3.1
Senegal 1986	12.2	3.2
Haiti 1994/1995	11.4	1.1
Bangladesh 1996/1997	10.6	8.7
Uganda 2000/2001	10.5	3.1
Countries where educated mothers have lowest odds of being attended by a doctor at delivery		
Madagascar 1992	2.1	2.0
Brazil 1996	1.9	0.3
Colombia 1990	1.9	0.4
Niger 1992	1.7	7.0
Jordan 1997	1.6	0.8
Colombia 2000	1.6	0.8
Gabon 2000	1.4	1.0
Turkmenistan 2000	1.1	0.7
Trinidad and Tobago 1987	0.8	1.3
Dominican Republic 1996	0.7	1.8

Source: Selected Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

TABLE 47. PERCENTAGE DISTRIBUTION OF BIRTHS TO UNEDUCATED MOTHERS IN THE 5 YEARS BEFORE THE SURVEY, BY TYPE OF ASSISTANCE AT DELIVERY FOR COUNTRIES IN WHICH MORE THAN 50 PER CENT OF BIRTHS AMONG UNEDUCATED WOMEN WERE ATTENDED BY NO ONE OR BY A RELATIVE

Country	Year of survey	Number of births by women with no education, in the 5 years before the survey	Proportion of births attended by					Percentage of births attended by relative or by no one
			Doctor	Nurse/midwife or other qualified person	Traditional birth attendant	Relative	No one	
Bolivia	1989	1 214	8.1	2.8	14.2	66.6	7.9	74.5
Bolivia	1998	813	17.8	2.8	5.6	68.2	5.1	73.3
Burundi	1987	3 164	0.8	14.8	15.1	40.8	27.6	68.4
Chad	1996/97	5 883	0.6	8.7	39.4	44.2	6.7	50.9
Ethiopia	2000	10 060	-	2.5	30.5	60.8	6.1	66.9
Nepal	2001	5 176	3.7	2.9	25.6	58.2	9.5	67.7
Nigeria	1990	5 158	6.2	11.2	25.4	21.9	34.9	56.8
Rwanda	1992	2 656	2.0	16.5	13.1	42.9	24.2	67.1
Togo	1988	2 101	0.5	32.8	11.0	35.1	18.7	53.8
Uganda	1988	2 091	1.1	22.0	7.9	42.3	26.3	68.6
Uganda	2000/01	1 890	1.2	20.3	17.2	35.7	24.8	60.5
United Republic of Tanzania	1999	907	5.3	20.0	15.9	47.9	10.4	58.3
Yemen	1991/92	6 806	9.5	21.6	-	55.3	8.1	63.4
Yemen	1997	10 439	12.1	4.3	21.9	56.3	5.1	61.4
Zambia	1992	1 079	1.2	20.3	9.7	55.7	12.2	67.9
Zambia	1996	982	1.2	22.8	8.4	58.6	8.7	67.3

Source: Measure/DHS, Demographic and Health Surveys statistical compiler, available from http://.www.measuredhs.com (accessed 15 November 2002).

2. Human immunodeficiency virus and acquired immunodeficiency syndrome

More than a quarter century into the HIV/AIDS epidemic, ignorance and misinformation about the epidemic remain as major stumbling blocks to efforts at control. There is a fast-growing body of literature on the relationship between HIV/AIDS and education. The literature suggests that, although there has been significant overall improvement in the level of knowledge about HIV/AIDS in developing countries, educated persons, especially younger cohorts, have better levels of knowledge and lower rates of infection than the uneducated. Poorly educated persons know less about HIV/AIDS and are more vulnerable to HIV infection, and even when they have information about the disease, they are less likely to feel they have the power to avert its impact.

Limited education, in combination with poverty and economic marginalization, has also been blamed for the particular vulnerability of women to HIV/AIDS. Gilbert and Walker (2002) relate the severity of the HIV/AIDS epidemic in South Africa to the extreme social inequalities that exist in that society. They highlight, in particular the role played by large differentials in educational achievement, with 23 per cent of South African women and 16 per cent of men aged 25 years or over having no education, thereby placing women at particular risk of HIV infection. It has also been suggested that the importance of education among women is also evidenced by the fact that in Uganda, where impressive gains have been made in abating the spread of the HIV/AIDS epidemic, the largest declines in infection rates among women were recorded among those with a secondary or higher education (UNAIDS, 2000).

Recent analyses of Demographic and Health Survey data by the United Nations (2002) and the World Bank (1999) have highlighted the high

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levels of knowledge about aspects of HIV/AIDS in many countries, but they have also reported important differentials in the level of knowledge by level of education. In most countries, nearly all respondents with at least a secondary education have heard about AIDS. However, in 8 out of 34 countries examined, less than one half of all respondents with no education were even aware of HIV/AIDS. Although more education is always associated with greater HIV/AIDS awareness, wherever overall levels of knowledge of HIV/AIDS were high, education levels were less important correlates of HIV/AIDS knowledge (United Nations, 2002). There are strong indications from these recent surveys that more needs to be done to communicate the key messages underlying HIV/AIDS control programmes and that this need is much more pressing among uneducated persons. Table 48 presents a ranking of selected developing countries according to the proportion of uneducated women who believe there is no way to avoid HIV/AIDS. The belief that nothing that can be done to avoid AIDS is greater among the uneducated in a number of high HIV prevalence countries, including Bangladesh, Haiti, India, Mozambique and Zimbabwe. However, for countries for which more than one data point exists, knowledge levels have increased significantly in recent years among both educated and uneducated groups. This is the case for such countries as Bangladesh and Zimbabwe.

A fundamental emphasis in HIV/AIDS control programmes in recent years has been the promotion of condom use as a method of prevention. Most countries surveyed as part of the Demographic and Health Surveys show that knowledge of condoms as a means to prevent transmission has not been well assimilated and that substantial differentials exist across education groups. Table 49 shows the ranking of countries according to the percentages of women who do not know of the use of condoms as a method of preventing HIV transmission. The data show that in almost all surveys, at least one

in five people do not know that condoms protect against HIV/AIDS. Lack of knowledge is more prevalent among those who are uneducated. Seventy per cent or more of women who have attained a secondary or higher education in Bangladesh, Ghana, India, Indonesia, Jordan, Malawi, Nigeria and Turkey report lack of knowledge that condoms help protect against HIV/AIDS. There are only three countries — Brazil, Cambodia and the Dominican Republic — where at least 50 per cent of the uneducated know about condoms for HIV/AIDS prevention. Remarkably, even in Uganda where significant progress has been made in reversing the course of the AIDS epidemic, 51 per cent of women with a secondary education have not "heard the condom message". The factors that make both the educated and the uneducated relatively impervious to the condom message are unclear. Perhaps information education and communication (IEC) messages have failed to reach their targets, or alternatively, those who receive it are rejecting the message. This would be consistent with the observation elsewhere that women may choose to view condoms mainly as contraceptives and not a method of prophylaxis against AIDS (United Nations, 2002, p. 24).

An important aspect of the relationship between HIV/AIDS and education is the threat that the epidemic poses to the survival of education systems and to universal access to education in developing countries. The education systems of high HIV prevalence countries are being challenged by high levels of teacher attrition and absenteeism owing to HIV/AIDS illness and death among teachers. (see box 1). The epidemic inflicts heavy burdens for students and their families, often resulting in declining school enrolments and increasing dropout rates. As education systems are weakened by the HIV/AIDS epidemic and teaching and learning become less effective, health and mortality differentials are likely to become more pronounced. Those who are better educated protect themselves more effectively in adverse health environments.

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TABLE 48. EDUCATION DIFFERENTIALS IN KNOWLEDGE ABOUT HIV/AIDS

Country and year of survey	Percentage of women who do not know any way to avoid HIV/AIDS			Country and year of survey	Percentage of women who do not know any way to avoid HIV/AIDS		
	Education level				Education level		
	No education	Primary	Secondary and higher		No education	Primary	Secondary and higher
Bangladesh 1996/97	53.9	51.0	32.8	Mali, 1996..................	10.0	5.9	1.9
Mozambique 1997	42.4	40.7	13.5	Ghana 1998	9.9	6.2	2.9
Haiti 2000	35.7	26.8	10.6	Guinea 1999..............	9.9	6.4	3.1
Indonesia 1997..............	28.6	20.3	16.1	Bolivia 1994	9.8	10.2	5.5
Indonesia 1994	28.1	24.0	18.7	Burkina Faso 1998/99	9.6	8.3	2.9
India 1999	26.2	20.4	13.4	Nepal 1996	9.5	10.5	4.2
Côte d'Ivoire 1994	21.9	8.6	5.1	Nicaragua 1997/98.....	9.4	7.4	3.0
Zimbabwe 1994	19.9	11.4	4.4	Dominican Republic 1996............	8.9	5.9	1.7
Central African Republic 1994/95	18.7	13.0	4.6	Niger 1998	8.7	4.5	2.2
Chad 1996/97	17.4	13.8	5.0	Benin 1996..................	8.1	7.0	4.6
Guatemala 1995.............	16.8	14.9	3.7	Ethiopia 2000	7.8	3.8	0.3
Gabon 2000	16.3	11.3	3.7	Eritrea 1995	7.7	2.3	0.3
Bangladesh 2000............	15.8	14.2	9.8	Nigeria 1999	7.7	5.4	5.1
Bolivia 1998	15.5	11.2	3.9	Malawi 2000..............	6.6	4.0	0.2
Uganda 1995..................	14.7	8.8	1.6	Peru 2000	6.6	7.0	1.5
Madagascar 1997	14.0	7.9	5.9	Cameroon 1998	6.0	5.8	2.4
Zambia 1996..................	13.8	9.4	4.3	Colombia 2000	5.6	3.7	0.7
United Republic of Tanzania 1996	13.3	11.6	8.0	Senegal 1997	5.4	3.0	0.6
Peru 1996	12.8	11.8	4.6	Brazil 1996	4.3	2.9	0.8
Togo 1998	12.7	7.6	2.6	Turkey 1998	3.7	4.1	1.8
Comoros 1996	12.5	7.5	3.7	Jordan 1997	3.6	2.4	1.0
Kenya 1998....................	11.7	10.3	3.7	Cambodia 2000	3.0	2.2	0.9
Colombia 1995	11.7	5.8	1.2	Côte d'Ivoire 1998/99	1.2	0.8	0.2
Zimbabwe 1999	11.3	7.5	2.9	Kazakhstan 1999........	0.0	9.6	2.8
Viet Nam 1997...............	11.3	5.8	2.6				

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).

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TABLE 49. EDUCATION DIFFERENTIALS IN KNOWLEDGE OF CONDOM USE
AS A METHOD OF AVOIDING HIV/AIDS

Ranking of countries by the percentage of women who do not indicate condom use as a method to avoid HIV/AIDS, by education

All women with secondary education: Country and percentage who do not know about condoms for preventing HIV		All women with no education: country and percentage who do not know about condoms for preventing HIV	
Brazil 1996	11.7	Dominican Republic 1996	34.7
Cambodia 2000	12.9	Cambodia 2000	43.4
Dominican Republic 1996	13.3	Brazil 1996	49.3
Côte d'Ivoire 1998/99	17.4	Malawi 2000	53.8
Gabon 2000	19.0	Colombia 1995	58.7
Colombia 1995	20.3	Zimbabwe 1999	59.0
United Republic of Tanzania 1999	21.9	Nicaragua 1997/98	61.6
Zimbabwe 1999	24.1	Colombia 2000	61.8
Burkina Faso 1998/99	24.3	United Republic of Tanzania 1999	65.5
Brazil 1991[a]	27.9	Zimbabwe 1994	66.5
Ethiopia 2000	28.3	Gabon 2000	70.0
Côte d'Ivoire 1994	28.4	Côte d'Ivoire 1998/99	72.5
Central African Republic 1994/95	30.0	Comoros 1996	77.4
Togo 1998	30.4	Nepal 1996	77.9
Mozambique 1997	30.4	United Republic of Tanzania 1996	78.6
Colombia 2000	31.6	Zambia 1996	79.7
Mali 1995/1996	31.6	Brazil 1991	80.4
Benin 1996	31.6	Haiti 2000	81.1
Malawi 2000	31.8	Senegal 1997	81.9
Zimbabwe 1994	32.4	Kenya 1998	82.1
Eritrea 1995	33.3	Togo 1998	82.4
Comoros 1996	33.4	Burkina Faso 1998/99	82.5
Haiti 2000	35.2	Kazakhstan 1999	82.7
Senegal 1997	35.5	Mali 1995/1996	83.8
Nicaragua 1997/98	35.8	Eritrea 1995	83.9
Guinea 1999	36.0	Guinea 1999	83.9
Cameroon 1998	36.5	Central African Republic 1994/95	84.1
United Republic of Tanzania 1996	37.5	Côte d'Ivoire 1994	84.4
Burkina Faso 1992/93	41.0	Benin 1996	84.9
Niger 1998	41.2	Niger 1998	85.7
Bolivia 1998	45.4	Viet Nam 1997	87.4
Zambia 1996	45.5	Bolivia 1998	87.9
Guatemala 1995	48.4	Burkina Faso 1992/93	89.4
Chad 1996/97	48.9	Ghana 1998	89.9
Kenya 1998	50.5	Guatemala 1995	90.2
Uganda 1995	51.2	Ethiopia 2000	90.3
Madagascar 1997	51.5	Peru 2000	90.7
Peru 1996	53.1	Uganda 1995	91.6
Nepal 1996	54.1	Cameroon 1998	92.9
Peru 2000	55.3	Mozambique 1997	93.5
Bolivia 1994	59.0	Bangladesh 1999/2000	93.6
Kazakhstan 1999	63.0	Bolivia 1994	93.7
Viet Nam 1997	63.3	India 1998/1999	94.1
Senegal 1992/93	68.6	Chad 1996/97	94.2
Ghana 1998	70.0	Turkey 1998	94.6
India 1998/1999	71.9	Madagascar 1997	94.9
Turkey 1998	73.0	Malawi 1992	95.0
Malawi 1992	73.8	Peru 1996	95.2
Nigeria 1999	77.6	Nigeria 1999	96.0
Bangladesh 1999/2000	78.6	Indonesia 1997	98.6
Bangladesh 1996/97	89.6	Bangladesh 1996/97	98.9
Indonesia 1997	93.7	Senegal 1992/93	99.0
Indonesia 1994	95.1	Indonesia 1994	99.6
Jordan 1997	99.6	Jordan 1997	100.0

Source: Demographic and Health Surveys (Calverton, Maryland, Macro International, Inc.).
[a] Northeast Brazil.

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BOX 1. HIV/AIDS AND EDUCATION SYSTEMS

All over the world, HIV/AIDS is causing devastation — destroying communities and families and taking away hope for the future. Particularly severe is the epidemic's impact on schools and education. The epidemic is claiming huge numbers of teachers and other education-related personnel. In 1999, an estimated 860,000 children lost their teachers to AIDS in sub-Saharan Africa. By the late 1990s, the toll had forced the closure of more than 100 educational establishments in the Central African Republic, and, in 2000, AIDS was reported to be the cause of 85 per cent of the 300 teacher deaths occurring there. In Zambia, teacher deaths caused by AIDS are equivalent to about half the total number of new teachers trained annually. As the impact of HIV/AIDS is felt in the productive sector of the economy, government revenues will decline and/or be reallocated, resulting in a smaller education budget.

HIV/AIDS reduces the supply of education by reducing the numbers of teachers who are able to carry out their work and through its impact on the resources available for education. The quality of education is diminished as already scarce human and material resources are stretched even further. In heavily affected areas, there will be fewer teachers working, and those who are employed may be less motivated and frequently absent as they respond to family trauma or illness. The quality of education suffers under the impact of the epidemic as teacher absenteeism, reduced teaching time and the disruption of classroom and college schedules affects the kind of learning that can take place. Teacher education may also suffer as those working in universities and colleges become affected.

The epidemic also reduces the demand for education, as children are withdrawn from school and college in response to rising household expenditure and to provide care for family members. Many families will experience a decline in purchasing power, making expenditures related to schooling impossible.

Of particular concern with respect to the quality of education are issues of equality and rights. There is clear evidence to suggest that the young people most in need are those who suffer first. Girls in particular, young people who use drugs, young homeless people, and young people who lack one or both parents will be among those whose education is most severely disadvantaged by HIV/AIDS.

The epidemic also affects the quality of education because of the strains on the material and human resources of the system and on the health and presence of learners. Additionally, the loss of central and provincial administrators/managers, school mentors and teacher educators in universities and colleges will affect the quality of planning, training and support.

E. SUMMARY AND CONCLUSIONS

Of the socio-economic variables that have been found to be associated with differentials in health and mortality, education is among the strongest and the most consistent. Wherever the relationship has been examined, better-educated people and their family members appear to stay healthier and to live longer lives. However, the reasons for the precise underlying relationships are, in most cases, still uncertain. In particular, it is not apparent whether particular types or aspects of education contribute more to the reduction of health and mortality risks than others. Since education is associated with lower mortality and better health in virtually all contexts, regardless of educational philosophy and orientation, expanded access to educational opportunity, perhaps even without major structural reform, is likely to lead to gains in health and survival. A particularly important suggestion is that for both childhood and adult health and mortality, the education of women — even at relatively low levels — is associated with large differences in health and survival.

It is also apparent from the preceding discussion that education does not remove all barriers to health and survival. Substantial differentials in health-related knowledge and behaviour still exist across developing countries, even among educated persons. As observed by Cleland and Harris (1998), there are few convincing demonstrations that exposure to primary schooling automatically enhances the knowledge, autonomy and power of women in a way that affects their children's health. Instead, as suggested in this chapter, factors such as income and other household circumstances may play a role. It is important to note, however, that in the case of differentials in immunization coverage and HIV/AIDS knowledge, the ability of interventions to reach their intended beneficiaries — both educated and uneducated — may play a critical role.

The existence of large disparities in health and survival, as demonstrated in the present chapter, suggests that internationally agreed targets for the reduction of mortality and the achievement of Health for All goals will probably not occur without major improvements in access to education, especially in the least developed countries.

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V. INTERNATIONAL MIGRATION AND EDUCATION

Over the last 30 years, the volume and significance of international migration has grown rapidly. The number of international migrants worldwide increased from an estimated 75 million in 1965 to 175 million in 2000 (United Nations, 2002). International migrants are not distributed evenly across countries or regions. In 2000, Northern America and Europe hosted 55 per cent of all international migrants. Overall, international migrants constituted 8.7 per cent of the population in the more developed countries in 2000, while they accounted for 1.5 per cent of the population in the less developed countries.

A. EDUCATIONAL ATTAINMENT OF MIGRANTS

The socio-economic characteristics of migrants have been the object of numerous empirical studies, particularly in the main traditional countries of immigration, Australia, Canada and the United States (Borjas, 1994 and 1999; Beggs and Chapman, 1991; Chiswick, 1986). Education has traditionally been identified as a fundamental measure of the contribution of international migrants to the receiving country and the loss to the sending country, together with age and income.

Section A describes the educational attainment of international migrants in selected receiving countries. It examines differentials in education between migrants and non-migrants and among diverse groups of migrants, and it explores gender aspects of migration and education in different settings.

A major constraint to analysing the educational attainment of migrants is the lack of reliable and comparable statistics on the topic. The statistics necessary to describe the socio-economic characteristics of different flows of migrants remain scarce. In receiving countries, population censuses and other household-based inquiries provide a useful source of information to study education jointly with origin and other characteristics of the population covered. Those sources contain information on the characteristics of foreigners or foreign-born persons residing in the country, although most of them do not

yield reliable statistics on migration flows. Section V.A is based on information from censuses and other household-based inquiries conducted in countries where the necessary information is available; namely, from the main receiving countries of Europe, Northern America and Australia and from some selected countries in Latin America and Southern Africa. Comparisons across countries are, however, hindered by the lack of standard classifications. Countries do not necessarily use the same definitions to identify migrants, nor do they apply similar classifications to measure educational attainment. An effort has been made in the present chapter to standardize national education systems according to the International Standard Classification of Education (ISCED 1997), published by UNESCO in 1997.[1] Yet the standardized categories recommended for cross-country comparisons are often too broad to reveal differences in education among groups.

Studies of the determinants and consequences of migration should compare the situation of migrants abroad with that of non-migrants in their countries of origin. However, sending-country perspectives can hardly be analysed with the existing sources of information. A majority of countries do not monitor emigration and very few capture emigrants' socio-economic characteristics. Alternatively, censuses that cover the de jure population do not tabulate information on national residents abroad (United Nations, 1994). In addition, census data do not report of the characteristics of migrants at the time of migration. Cross-sectional data are of little use in the study of the determinants of migration or its consequences for sending countries, since migrants' characteristics may have changed following migration.

1. Migrants and non-migrants in receiving countries

One of the standard propositions in the literature on migration is that economic migrants tend to be favourably self-selected by education or occupation. In an early theoretical study of international migration, Lee (1967) posits that selection will be positive for some streams and negative for

others. Taking all migrants together, selection by education or occupation will tend to be bimodal, with a majority of migrants being in the lowest and highest education groups. The extent of positive selectivity depends on several factors. It is influenced by distance to the country of destination; the greater the distance, the higher the costs and risks of migration and the greater the propensity for positive selection (Chiswick, 2000). Selectivity may also depend on the characteristics of the country of origin relative to the country of destination. To explain the strong variation in education among migrants from different countries of origin in the United States, Borjas (1987; and 1994) suggests that the extent of income inequality in the countries of origin and destination influences who migrates. If income inequality is greater in the country of destination, immigrants will be positively selected; individuals with higher-than-average skills will have an incentive to migrate because returns to education will be higher in the country of destination, other things being equal. If income inequality is greater in the country of originating, immigrants will be negatively selected. However, the economic characteristics of originating and receiving countries are not the only determinants of migrants' origin and skills. Historical links between particular countries or regions also play a role in the national origin of migrants and their characteristics. Migration, especially labour migration, is more likely to occur between a past colonial power and its former colonies, for instance (Sassen, 1988). Finally, the determinants of the demand for migrants (national immigration policies in particular) have a significant influence on migrants' characteristics.

Figure 30 shows the educational attainment of migrants and non-migrants in three traditional countries of immigration (Australia, Canada and the United States) and in selected European countries. The countries do not exhibit a uniform pattern with regard to educational differences by origin. In Australia, immigrants are more polarized than natives in terms of education. The proportion of foreign-born individuals with low levels of education is higher than that of natives, but the share of immigrants holding a higher

education degree is almost double that of natives. Differences by origin were small in Canada in 1996. However, in the United States, immigrants were clearly less educated than natives in 1990. More than 10 per cent of foreign-born individuals in the United States, but less than 2 per cent of natives, had left school before fifth grade, or age 10. However, among those that graduated from high-school (ages 16 to 18), a higher proportion of foreign-born persons went on to finish an advanced tertiary education degree (United States Department of Commerce, 1993, table V.3).

Despite these differences, the traditional countries of immigration attract more educated migrants than the receiving countries of Europe.[2] European countries can be classified into three groups based on educational differentials between migrants and non-migrants. The educational attainment of foreigners is significantly below that of nationals in the main immigration countries of Western Europe — Belgium, France, Germany and the Netherlands. Differentials between nationals and foreigners are significantly larger in those countries than in the traditional countries of immigration. In contrast, foreigners are more educated than nationals in the new immigration countries of Southern Europe — Greece, Italy, Portugal and Spain — where local populations have relatively low levels of education compared to the rest of Europe. Finally, in Denmark, Sweden and the United Kingdom, immigrants are more polarized than nationals; that is, a relatively higher proportion of foreigners are at the low and high ends of the educational scale.

A major limitation in the analysis of the determinants of migrant education is that household-based inquiries do not classify long-term migrants by category. Settlers, migrant workers, members of their families, students, refugees, asylum-seekers and undocumented migrants are considered together, under their foreign or foreign-born status. However, what prompts the decision to migrate also influences the profile of migrants. The existing evidence suggests that migrants admitted for family reunification are, on average, less skilled than the principal applicants (United Nations, 1995). Migrants that would not have migrated for economic reasons to a country attracting highly skilled migrants,

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Figure 30. International migrant and non-migrant populations 15 and older,
by level of education, in selected countries
(Percentage)

Australia 1996 (M)	
(N)	
Canada 1996 (M) a	
(N)	
United States 1990 (M) b	
(N)	
EUROPEAN UNION 2001- TOTAL	
(M)	
(N)	
Western Europe Austria (M)	
(N)	
Belgium (M)	
(N)	
France (M)	
(N)	
Germany (M)	
(N)	
Netherlands (M)	
(N)	
Northern Europe Denmark (M)	
(N)	
Finland (M)	
(N)	
Sweden (M)	
(N)	
United Kingdom (M)	
(N)	
Southern Europe Greece (M)	
(N)	
Italy (M)	
(N)	
Portugal (M)	
(N)	
Spain (M)	
(N)	

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

☐ Lower secondary education or less ▨ Upper secondary education ■ Tertiary education

Sources: Australia: unpublished tabulations from the 1996 Census of Population and Housing, by the Australian Bureau of Statistics; Canada: unpublished tabulations from the 1996 Census of Population (20 per cent sample), by Statistics Canada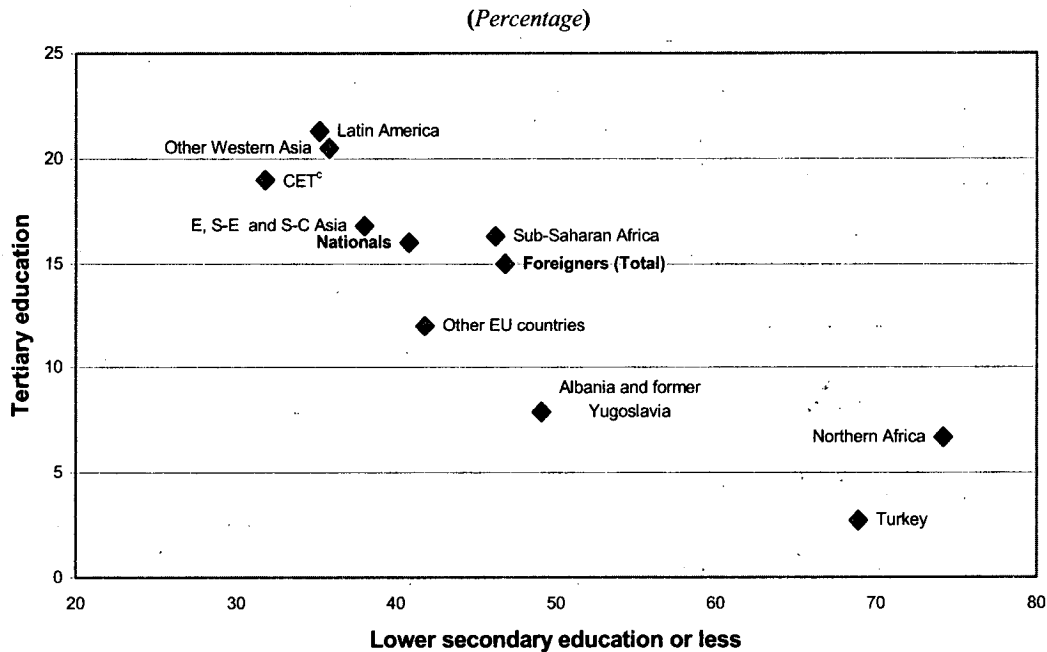; United States: United States Department of Commerce, Bureau of the Census, *1990 Census of Population. The Foreign-Born Population in the United States.* 1990 CP-3-1 (Washington, D.C.) United States Government Printing Office, 1993; European countries: Statistical Office of the European Communities (Eurostat), Labour Force Survey, 2001, unpublished tabulations provided by Eurostat.

NOTE: (M) Migrants; (N) non-migrants. In Australia, Canada and the United States, data refer to foreign-born persons and natives. In Europe, data refer to foreigners and nationals.

[a] Lower secondary education refers to below grade 9; upper secondary refers to grades 9 to 13 and non-university diplomas (trade certificates and other); tertiary refers to university degrees.

[b] Population aged 25 or over only. Lower secondary education refers to below grade 9; upper secondary refers to grades 9-13, high school diploma and some college; tertiary refers to university degrees.

for instance, may do so if they are married to a highly skilled person or if they are moving for political reasons. Although the composition of migrant flows varies considerably across countries, the family component predominated in most of the OECD countries during the 1990s. Between 1993 and 1999, the proportion of family-linked migration ranged from 50 per cent of all migration (Switzerland) to more than 75 per cent (United States) (OECD, 2001c). Refugees accounted for 4 per cent of all flows in Switzerland and 37 per cent of all entries in Sweden.

2. Education level of migrants by national origin

The educational level of international migrants varies widely depending on their region or country of origin. As reported in the literature, selection is positive for some groups and negative for others. However, the relative position of each migrant group in the educational scale varies by receiving region and country. Figure 31 shows the proportion of migrants with low educational levels and the share that hold higher education degrees in the United States and in Canada. Recent migrants from more distant regions, Africa and Asia, are at the top of the educational scale. Even though differences among groups are significantly smaller in Canada than in the United States, the proportion of Africans with a higher education is above that of the native-born and all other migrant groups in both countries. This outcome is influenced by the reasons for migration. Students enrolled in tertiary education programmes constitute a high proportion of African immigrants to Northern America, particularly in the United States (Adeponju, 1991). Individuals born in Latin America and Europe are at the low end of the educational scale. In the United States, the proportion of Mexicans with low educational levels is almost 60 per cent, more than 5 times the share of natives.

Among third-country nationals living in countries of the European Union (EU), individuals from Latin America and from Asian countries, except Turkey, are more educated than European Union nationals (see figure 32). Nationals of sub-Saharan Africa are more polarized; the proportion of Africans with higher education is slightly larger than that of European nationals, but so is their share among the less educated. Finally, about three out of four Northern Africans and almost 70 per cent of Turkish nationals have a low educational level. Thus, the differences in migrant education among European countries observed in figure 30 partly stem from the national origin mix of migrants in each country.[3]

Age is also an intervening factor in the differences observed. Since the national origin mix of migrant flows has changed substantially in the past decades, the age structure of immigrants varies widely by region of origin. In the United States, for instance, more than 30 per cent of individuals born in Europe and the states of the former Union of Soviet Socialist Republics (USSR) were 65 or older in 1990; the elderly constituted 12 per cent of natives but less than 5 per cent of Africans (United States Department of Commerce, 1993, table 1). In Europe, migrant workers from neighbouring countries and from Northern Africa entered mostly before the oil crisis of 1973. Flows of migrants from sub-Saharan Africa and from countries with economies in transition are more recent (United Nations, 1998a).

Despite the lack of adequate statistics in many developing countries, it is clear that the migration of highly educated individuals is not limited to countries in more developed regions. Countries in developing regions requiring technological expertise attract highly educated migrants from both developed and developing countries (see table 50). In the main receiving countries of Latin America, for instance (Argentina, Brazil, Mexico and Venezuela), a sizeable proportion of individuals born in Northern America, or in Europe, in the case of Mexico, and immigrants from selected countries of South America are highly educated. European migration to South America is mostly comprised of settlers that arrived in the region in the early twentieth century. Some 50 per cent of European migrants but less than 15 per cent of Northern American or Southern American migrants were aged 60 and over in the early 1990s (Economic Commission for Latin America and the Caribbean, 2000). In South Africa, where the mining industry has attracted low-skilled migrant workers from other African countries, foreigners from developed countries are highly educated. It

Figure 31. Population by level of education[a] and region of birth in Canada and the United States
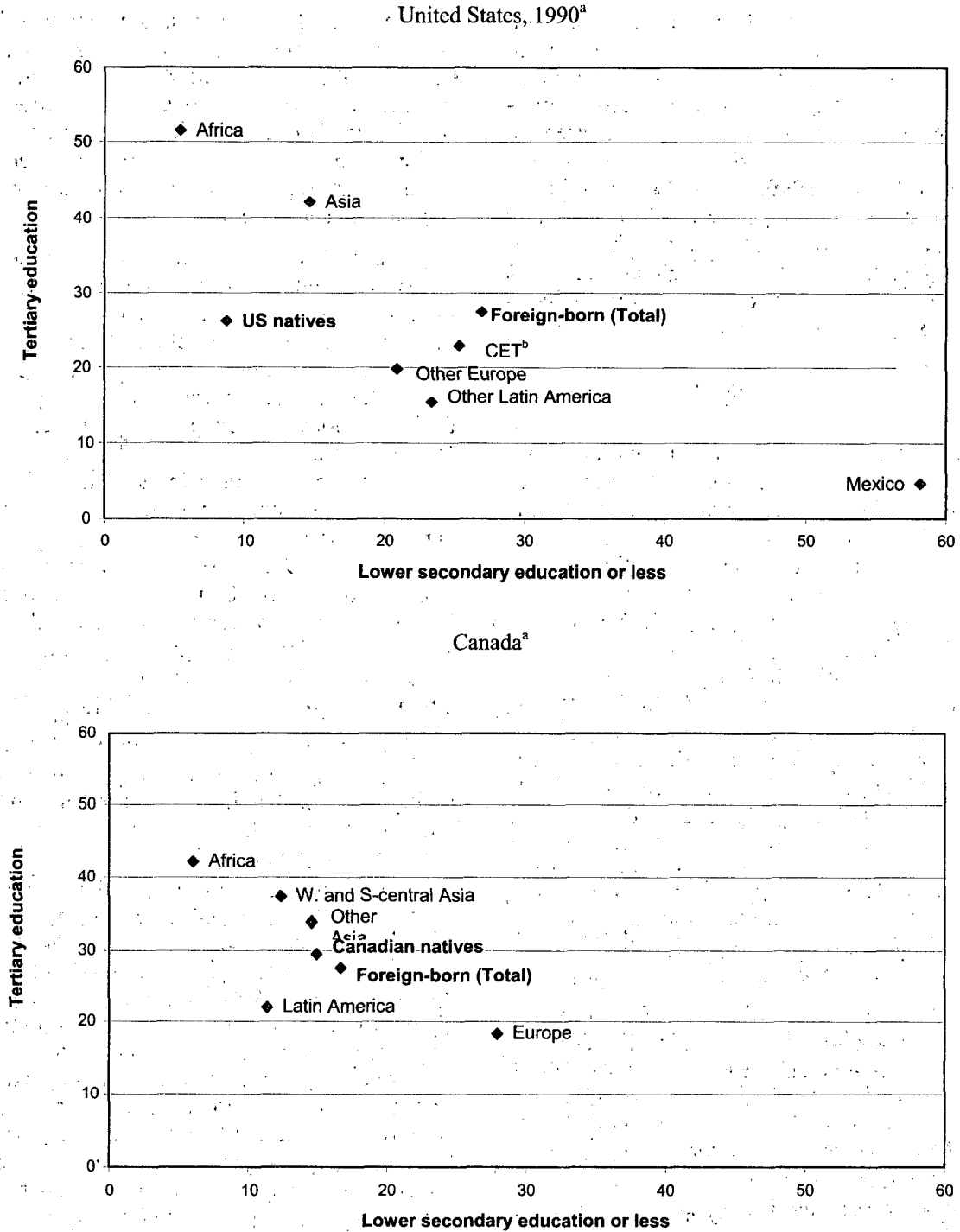
(Percentage)

United States, 1990[a]

Canada[a]

[a] United States: population aged 25 years or over; Canada: population aged 15 years or over. Lower secondary education refers to below grade 9 in both countries. Upper secondary education refers to grades 9-13 and non-university diplomas. Tertiary education refers to university degrees.

[b] Countries with economies in transition, which include the countries of Eastern Europe; the former USSR; and, in Southern Europe, Albania, and the former Yugoslavia.

Figure 32. Population 15 and older by level of education[a] and region of citizenship in selected European countries,[b] 2001

(Percentage)

is not clear whether the use of foreign qualified labour contributes to building technical capacities in these countries or perpetuates the dependency on foreign expertise.

The limited information available suggests that the relationship between educational level and occupational status is not straightforward. In Europe, nationals from Eastern European countries are more educated than nationals of the European Union, but almost 50 per cent of the Eastern European nationals hold a low occupational position compared to 32 per cent of European Union nationals (European Commission, 2002, p. 37). In the United States, the proportion of natives holding managerial and technical positions is higher than that of foreign-born persons, even though the share of highly educated individuals is similar in both groups. In addition, the proportion of individuals in low occupational positions is similar for natives (26 per cent) and for-eign-born persons (27 per cent), although a larger share of the foreign-born has low educational levels. However, 15 per cent of families headed by a foreign-born person, as compared with 10 per cent of all families in the United States, are classified as being below the poverty threshold (United States Department of Commerce, 1993, table 5). The lack of transferable skills, limited language proficiency, a provisional legal status and discrimination are some of the factors that influence migrants' disadvantageous position in the labour market (United Nations, 1998a; Böhning and Zegers de Beijl, 1995). Nevertheless, stronger motivation may operate in migrants' favour in certain contexts (Chiswick, 2000). Against the current background of global economic integration, education systems are becoming increasingly international. This harmonization should facilitate the transferability of skills and reduce the loss of the labour market value of migrants.

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TABLE 50. FOREIGN-BORN POPULATION IN SELECTED LATIN AMERICAN COUNTRIES AND IN SOUTH AFRICA BY ORIGIN AND BY LEVEL OF EDUCATION,[a] 1990-1991
(Percentage)

Country	Region of origin	Primary or less	Lower secondary	Upper secondary and above
A. Latin America				
Argentina	More developed regions			
	Europe	49.7	26.8	19.6
	Northern America	12.9	13.8	71.7
	Less developed regions	55.5	24.8	17.0
Brazil	More developed regions			
	Europe	60.4	12.9	26.6
	Northern America	13.6	9.8	76.4
	Less developed regions	32.1	13.0	54.8
Mexico	More developed regions			
	Europe	14.4	22.0	60.4
	Northern America	40.3	24.6	29.2
	Less developed regions	38.1	6.6	19.9
Venezuela	More developed regions			
	Europe	47.9	14.9	28.8
	Northern America	16.9	11.5	67.8
	Less developed regions	49.1	18.9	23.1
B. Africa				
South Africa	More developed regions			
	Europe	6.9	16.6	59.1
	Northern America	8.8	13.4	59.8
	Less developed regions	44.8	38.0	8.8

Sources: Economic Commission for Latin America and the Caribbean, International Migration in Latin America (IMILA), *Demographic Bulletin* No. 65 (January); 1996 Census of South Africa, unpublished tabulations provided by the Central Statistical Service, Government of South Africa.

NOTE: Percentage of level unknown or unspecified not shown in table. The percentage unknown is particularly high in Mexico, for persons born in less developed countries, and in South Africa.

[a] Primary education or less includes pre-primary education and the first stage of basic education. Lower secondary education typically starts at age 8 or 9 and lasts for 6 to 7 years. Upper secondary education and above includes upper secondary education, which typically begins at the end of full-time compulsory education for those countries that have compulsory education, and tertiary education (university degrees).

3. Gender aspects of migrant origin and education

The gender aspects of international migration have until recently received little attention from researchers and policy makers. However, census data indicate that female migrants constitute nearly half of the foreign-born population at the global level as well as in most regions of the world. In 1990, women constituted 50 per cent of all foreigners or foreign-born persons in the more developed countries and an estimated 46 per cent in the less developed countries (United Nations, 1998a). Table 51 compares the educational attainment of migrants and non-migrants by sex in those developed countries for which information is available. The proportion of individuals with a higher education degree is lowest among migrant women in all countries but Australia, where migrant women and men are more

educated than natives. However, the available data do not display a systematic pattern of sex differentials by origin. Male-female differentials are smaller among migrants than among non-migrants in the European Union and in Canada, for those with upper secondary or tertiary education only, but not in the United States, where sex differentials are greater for migrants at all levels.

Thus, the characteristics of migrant men and women and the outcomes of migration vary considerably according to the socio-cultural context in which migration takes place. Still, this evidence suggests that the migration experience does not preclude positive gains in terms of education for women.

TABLE 51. MIGRANTS AND NON-MIGRANTS BY LEVEL OF EDUCATION[a] AND SEX IN SELECTED EUROPEAN COUNTRIES, AUSTRALIA, CANADA AND THE UNITED STATES
(Percentage)

Region or country	Classification criteria	Year	Lower secondary education or less		Upper secondary education		Tertiary education	
			Male	Female	Male	Female	Male	Female
European Union[b]	Nationals	2001	38.1	44.1	38.8	34.9	17.9	14.2
	Foreigners		45.1	48.1	29.1	24.6	15.1	14.1
Australia	Native	1996	13.5	13.7	66.7	68.4	15.4	13.2
	Foreign-born		14.6	17.9	49.8	51.9	26.6	23.7
Canada	Native	1996	14.7	14.8	51.1	59.6	33.9	25.3
	Foreign-born		14.2	18.9	55.3	56.6	30.5	24.5
United States	Native	1990	10.4	10.4	63.6	68.9	26.0	20.7
	Foreign-born		25.4	27.1	47.6	53.2	27.0	19.7

Sources: Europe: Statistical Office of the European Communities (Eurostat), Labour Force Survey, 2001, unpublished tabulations provided by Eurostat; Australia: unpublished tabulations from the 1996 Census of Population and Housing, by the Australian Bureau of Statistics; Canada: unpublished tabulations from the 1996 Census of Population (20 per cent sample), by Statistics Canada; United States: United States Department of Commerce, Bureau of the Census, 1990 Census of Population: The Foreign-Born Population in the United States, 1990 CP-3-1 (Washington, D.C., United States Government Printing Office, 1993).

NOTE: Percentages of "not stated" or "no answer" are not shown.

[a] Lower secondary or less includes primary education and the first 6 or 7 years of secondary education. Upper secondary education typically begins at the end of full time compulsory education; the entrance age is typically 15-16 years. Post-secondary non-tertiary education is also included in this category. Tertiary education refers to university degrees, including those that do not lead to an advanced research qualification and those that do.

[b] Member countries of the European Union as of 2002 were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

Considerable stratification exists by nationality or place of birth (see table 52). In general, male-female differentials mirror those found in sending regions.[4] Sex differentials in educational level are largest among migrants from sub-Saharan Africa and Asia. In Europe, women from countries with economies in transition are more educated than their male counterparts. In the United States, male-female differentials are influenced by the age structures of the foreign-born population. The education of migrant men and

women is also influenced by migrants' status. Even though the presence of women in international labour migration has grown in recent decades, most are still admitted into a country of destination as dependants of male migrants (United Nations, 2001, pp. 113-114; OECD, 2001a). The category of admission reflects gender roles within the family and in society, but it also influences the opportunities available to different categories of migrants, in terms of access to the labour market or to training programmes.

TABLE 52. MIGRANTS BY LEVEL OF EDUCATION,[a] REGION OF ORIGIN AND SEX IN SELECTED
EUROPEAN COUNTRIES AND THE UNITED STATES
(Percentage)

Country or region of origin	Lower secondary education or less		Upper secondary education		Tertiary education	
	Male	Female	Male	Female	Male	Female
A. European Union[b]						
Africa						
Northern Africa	71.1	78.4	19.3	14.5	8.0	5.1
Sub-Saharan Africa	41.4	51.7	24.1	21.5	19.7	12.7
Asia						
Eastern, South-central and South-eastern Asia	28.3	34.6	28.2	25.3	25.9	21.9
Western Asia						
Turkey	64.6	74.5	24.4	13.8	3.4	1.8
Other Western Asia	32.9	43.5	29.8	22.7	23.8	17.0
Europe and former USSR						
Countries with economies in transition	31.0	30.9	38.9	37.2	18.3	19.7
Other Europe	40.4	42.7	30.9	26.2	17.9	17.7
Latin America and the Caribbean	32.1	38.0	29.8	28.7	21.5	21.2
B. United States						
Africa	3.6	8.2	37.1	52.6	59.3	39.1
Asia						
China	21.9	31.9	38.4	41.0	39.8	27.2
Other Asia	10.7	18.0	40.4	46.0	48.9	35.9
Europe and former USSR						
Countries with economies in transition	21.2	28.3	52.4	53.5	26.4	18.2
Other Europe	19.4	21.8	53.3	62.5	27.3	15.6
Latin America and the Caribbean						
Mexico	57.4	58.8	37.7	36.8	4.8	4.6
Other Latin America and the Caribbean	21.9	24.6	59.0	59.5	19.2	17.4

Sources: Europe: Statistical Office of the European Communities (Eurostat), Labour Force Survey 2001, unpublished tabulations provided by Eurostat; Australia: unpublished tabulations from the 1996 Census of Population and Housing, by the Australian Bureau of Statistics; Canada: unpublished tabulations from the 1996 Census of Population (20 per cent sample), by Statistics Canada; United States: United States Department of Commerce, Bureau of the Census, *1990 Census of Population: The Foreign-Born Population in the United States*, 1990 CP-3-1 (Washington, D.C., United States Government Printing Office, 1993).

NOTE: Percentage of "not stated" or "no answer" not shown.

[a] Lower secondary or less includes primary education and the first 6 or 7 years of secondary education. Upper secondary education typically begins at 15-16 years. Post-secondary non-tertiary education is also included in this category. Tertiary education refers to university degrees.

[b] Countries of the European Union as of 2002 were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

B. INTERNATIONAL MIGRATION FOR EDUCATION

The effects of globalization have become evident as recent years have witnessed a rapid internationalization of educational systems in many countries. Educational institutions, especially those at higher levels, have strengthened courses and programmes relating to global issues and international relations. While many universities have built up partnerships and cooperation with relevant institutions abroad, some have created overseas campuses and centres of their own. Educational institutions are also offering a more international ambience and opportunities for international cultural exchange on campuses. These trends have been paralleled by the increased international mobility of students: a growing number of people are leaving their homeland to study abroad on foreign exchange programmes, scholarships or, more frequently, on their own.

To students, studying abroad has become a more attractive choice than ever. One can gain knowledge and skills that other countries offer in order to achieve a competitive edge in economic markets. Mastery of a foreign language, which students acquire abroad, is often considered an asset for finding a new job or seeking a better career in their home country. In the developing world, those educated abroad can play a leading role, upon their return home, in transferring their knowledge and skills and can contribute to economic development and the modernization of the country.

In addition, admittance of overseas students has some considerable benefits for the countries that receive them. The ethnic and cultural diversity brought by foreign students to institutions is usually considered favourable, as it helps to expose native students to the world. When foreign students arrive with appropriate financial resources, tuition fees are of direct financial benefit to the concerned educational institutions. More recently, from a national perspective, foreign students are increasingly seen as a potentially highly qualified reserve of workers who are familiar with the prevailing social rules, culture and languages of the host country.

The present section of the report focuses on the international mobility of people seeking educational opportunities abroad. Using statistics on foreign students enrolled in recipient countries, the report first examines the levels and trends of international student migration. Secondly, the linkages between the recipient countries and sending countries of students are investigated by analysing the distribution of foreign students by region or country of origin. The third subsection raises emerging issues concerning international student migration.

Before proceeding to the quantitative analysis of student migration, it is important to be aware of potential bias involved in the statistical measurement of foreign students. The data presented in section B define foreign students on the basis of citizenship. Thus, in some countries where foreign students include a large number of foreign permanent residents born in a country, the scale of student migration may be overestimated. This problem in identifying student migration typically applies to the statistics gathered in such countries as Belgium, France, Germany, Japan and Lebanon. Furthermore, it is not possible in most countries to distinguish foreign students who are residents in the country as a result of pre-migration from those who came to the country expressly for the purpose of pursuing their education (OECD, 2001a). Unless otherwise noted, the data analysed in section B refer to students enrolled at the tertiary level of education or higher.[5]

1. Countries of destination of foreign students

Table 53 displays the number of foreign students enrolled in educational institutions in recipient countries that hosted more than 10,000 foreign students. At the end of the 1990s, there were at least 23 such countries in the world. Worldwide, the distribution of foreign students is far from even. The stock of international students is concentrated mostly in developed countries that have relatively large and flexible higher educational systems, which offer foreign students the opportunity to enrol in various types of institutions and programmes.

TABLE 53. NUMBER OF FOREIGN STUDENTS IN HIGHER EDUCATION, ANNUAL PERCENTAGE CHANGE, PROPORTION OF FOREIGN STUDENTS AMONG TOTAL NUMBER OF STUDENTS AND PROPORTION OF WOMEN AMONG FOREIGN STUDENTS, BY COUNTRY OF ENROLMENT, 1990 AND 1998

Host country[a]	Number of foreign students (thousands)		Annual percentage change in foreign students	Percentage of foreign among total students in 1998	Percentage of women among foreign students in 1998
	1990	1998			
Australia	14[b]	73[b,c]	18	13	49
Austria	18	30	6	12	48
Belgium	27	36	4	10[d]	..
Canada	35	36	0	4	43
Denmark	7	12	8	6	59
France	136	133	0	7	..
Germany	107	178	7	8	45
Italy	21	23	1	1	50
Japan	49	77[e]	5	1[f]	46[f]
Jordan	3	11[g]	28	..	..
Lebanon	..	18[h]	..	22[h]	..
Netherlands	9	14	6	..	..
Norway	7	11[h]	10	3[h]	52[h]
Romania	..	13[i]	..	..	..
Russian Federation	136[j]	88[j]	..	2[d]	..
South Africa	..	15	..	2[k]	
Spain	10	33	16	2	50
Sweden	10	24	11	5	56
Switzerland	23	25	1	16	45
Turkey	8	18	11	1	27
Ukraine	..	18	..	1[d]	..
United Kingdom	80	233	14	11	46
United States	407	548[c]	3	4[c]	43[c]

Sources: Various national Government and international publications.

NOTE: Two dots (..) indicate that data are not available.

[a] Countries hosting more than 10,000 students in 1998.
[b] Onshore students.
[c] Data refer to 2000/2001.
[d] Data refer to 1994/1995.
[e] Data refer to Ryugaku-sei (college students) and exclude Shugaku-sei (pre-college students). Data refer to 2000.
[f] Data refer to 1998.
[g] Data refer to 1996.
[h] Data refer to 1995.
[i] Universities only.
[j] Data refer to 1992.
[k] Data refer to 1994.

·The United States stands out as the leading destination for people who seek education abroad. In the academic year 2000/2001, 548,000 foreign students[6] were enrolled in accredited educational institutions at the college level or higher in the United States. The courses are offered in English, a language that many foreign students already know, even if it is not their native tongue. The most recent survey by the Institute of International Education (2001) found that business and management were the most popular fields of study, representing 19 per cent of the total, followed by engineering (15 per cent) and mathematics and computer science (12 per cent). Of the international students enrolled in the United States, 67 per cent drew funds from their personal or family sources.

The United Kingdom is the next largest recipient country of foreign students, with 233,000 students enrolled in 1998. Other countries that hosted more than 100,000 foreign students in the late 1990s included France and Germany. Several other countries in Europe also received a significant number of foreign nationals for the purpose of study. Although the number of foreign students varies considerably between countries, when the number enrolled in the countries of the European Union is grouped together, the total well exceeds the number enrolled in the United States. Some developing countries are also poles of attraction for foreign students. Based on the data available, Jordan, Lebanon and Turkey (Western Asia) and South Africa (Africa) have enrolled a sizeable number of international students.

The growing size of foreign student stocks in many countries over recent years indicates an increase in the international mobility of students. As shown in table 53, all countries listed, with the exception of France, have experienced increases in the number of foreign students during the 1990s. Noteworthy increases characterize several countries in Europe. In the United Kingdom, a key destination for foreign students who wish to study in Europe, the average annual growth rate of international students was 14 per cent between 1990 and 1998. Although on a much smaller scale, Spain recorded annual growth of 16 per cent during the same period,

with the number of foreign students in the country reaching 33,000 in 1998, up from 10,000 in 1990.

In Australia, the number of foreign students enrolled rose more than fivefold between 1990 and 2000, the result of a high average growth of 18 per cent per annum. In the late 1980s, moving away from a policy of controlling the entry of foreign students, the Government of Australia deregulated the educational sector, assisted institutions in establishing and marketing courses for overseas students, and eased visa restrictions for full-fee foreign students (Shu and Hawthorne, 1996). Those measures led the international education and training sector in Australia to grow strongly and accelerate the influx of foreign students to the country. Jordan is another country that recorded a significant increase in the number of foreign students in the early 1990s.

Among the countries surveyed, the proportion of foreign students among total students varied. In the United States, with the largest number of foreign nationals attending schools, foreign students accounted for only 4 per cent of all educational enrolments. In Canada, Italy, Japan, Norway, the Russian Federation, South Africa, Spain, Turkey and Ukraine, foreign students amounted to less than 5 per cent of all students. However, foreign students made up more than 10 per cent of all students in Australia, Austria, Belgium, Lebanon, Switzerland and the United Kingdom. The highest proportion was found in Lebanon (22 per cent) and Switzerland (16 per cent). In the United States, the evidence indicated that foreign students were enrolled in greater proportions at higher academic levels (Institute of International Education, 2001).

Among foreign students enrolled in higher education, men were usually more numerous than women. The difference was generally small, although in Turkey, only 27 per cent of foreign students were women. In contrast, in Nordic countries, (Denmark, Norway and Sweden), female foreign students outnumbered males. The growing presence of women among foreign students is a trend that has been observed recently in many student-receiving countries. For instance, in the United States the proportion of females in the foreign student population has risen

noticeably, from 29 per cent of the total in 1985/1986, to 43 per cent in 2000/2001 (Institute of International Education, 2001). Notwithstanding the rise, the level has not caught up with the feminization of native students in the United States. Of the total students attending higher education in the country, women represented the majority (55 per cent) (United Nations Educational, Scientific and Cultural Organization, 1999).

2. Countries of origin of foreign students

Foreign students come to study from a wide variety of countries that often have geographical, historical and institutional linkages with host countries. Table 54 shows the distribution of foreign students enrolled in major recipient countries by region of origin. Major student recipient countries in Africa and Asia mostly attract students within the region, playing the role of regional hub for higher education. For example, three out of four foreign students in South Africa are from countries in Africa, notably from neighbouring Namibia and Zimbabwe.

In Japan, the overwhelming majority of international students are Asian nationals. In 2000, Chinese and Korean students accounted for 59 per cent and 19 per cent of the total foreign student stock respectively (Government of Japan, 2001). However, those numbers include a non-negligible number of Chinese and Korean long-term residents (*eiju-sha*) who were born in Japan and had therefore not migrated to study in Japan. In Jordan and Lebanon, Palestinians, who are refugees or who come from the Occupied Palestinian Territory, make up a significant proportion of the total foreign student enrolment. Sharing national borders with Europe, Turkey has relatively high numbers of European students. The largest supplier of students for Turkey in the late 1990s was Yugoslavia.[7]

Europe also draws students largely from countries within the region. In most of the countries listed in table 54, students originating in the European region represented the largest proportion of the total, although the value ranged widely among countries. European Union legislation allows its citizens to live and work anywhere in its territory. It is likely that the regional

integration of Europe has furthered the international mobility of students within the countries of the European Union (Organisation for Economic Co-operation and Development, 2001a). Efforts have been made by educational institutions to standardize their curriculum or programmes within the region. Furthermore, the students of European Union nationality attending higher educational institutions are often charged lower tuition fees than non-European Union students and are entitled to receive financial assistance to help pay tuition fees (Government of the United Kingdom, n.d.). Consequently, in the United Kingdom, the enrolment of European students grew more than threefold between 1990 and 1998, and students of Greek nationality became the largest foreign student population, accounting for 12 per cent of the total.

In the case of Germany, Turkish students, representing about 15 per cent of the total enrolment, are the most numerous group. However, that number comprises a large number of descendants of Turkish immigrants who arrived in Germany in the 1950s and 1960s as guest workers and became permanent residents of Germany. Thus, the students were born in Germany and did not cross national borders to pursue study there.

Among major recipient countries of students in Europe, France and Belgium illustrate the historical and linguistic ties that characterize the inflow of foreign students into the countries. A great number of people who came to study in those countries are from French-speaking African countries. Morocco and Algeria are two major suppliers of foreign students to France, whereas students from Morocco and the Congo are numerous in Belgium, in order of magnitude.

Institutional ties remain close among countries with economies in transition. Thus, in the Russian Federation, the highest proportion of foreign students originates in the successor States of the former USSR, notably Kazakhstan, Ukraine and Belarus (in order of magnitude). The Republic of Moldova tops the list of source countries among foreign students who study in Romania.

In the United States, host to the largest number of international students in the world, nearly

TABLE 54. PERCENTAGE DISTRIBUTION OF FOREIGN STUDENTS BY REGION OF ORIGIN

Host country	Year	Africa	Northern America	Latin America and the Caribbean	Asia	Europe	Oceania	Unknown	Total
Africa									
South Africa	1998	76	1	0	8	14	1	-	100
Asia									
Japan	2000	1	2	1	91	4	1	0	100
Jordan	1996	4	0	0	93	2	0	0	100
Lebanon	1995	21	0	0	79	0	0	0	100
Turkey	1998	3	0	0	52	45	0	-	100
Europe									
Austria	1998	3	2	1	13	78	0	2	100
Belgium	1998	30	1	2	7	58	0	2	100
Denmark	1998	3	3	1	10	44	0	39	100
France	1998	50	4	3	13	30	0	1	100
Germany	1998	10	3	2	36	49	0	1	100
Italy	1998	10	1	3	11	72	0	4	100
Netherlands	1998	17	2	8	23	49	0	0	100
Norway	1995	9	6	3	32	36	0	14	100
Romania	1998	6	1	-	14	76	-	2	100
Russian Federation	1998	8	5	5	70	17	-	5	100
Spain	1998	10	8	16	3	60	0	3	100
Sweden	1998	2	5	2	10	60	1	20	100
Switzerland	1998	6	3	3	7	76	0	6	100
Ukraine	1995	21	1	2	44	32	0	-	100
United Kingdom	1998	7	8	1	33	50	1	0	100
Traditional countries of immigration									
Australia	2000/2001[a]	3	5	1	80	7	2	3	100
Canada	1998	15	17	3	37	24	1	3	100
United States	2000/2001	6	5	12	62	15	1	0	100

Sources: United Nations Educational, Scientific and Cultural Organization, database on Education; *1999 Statistical Yearbook* (Paris, UNESCO, 1999); Institute of International Education, *Open Doors 2000/2001* (New York); Economic Commission for Europe, *Trends in Europe and North America, 2001* (Geneva); Ministry of Justice, Government of Japan, *Statistics on the Foreigners Registered in Japan* (Tokyo, 2001); Australia: data provided by Department of Education, Science and Training, Government of Australia.

NOTE: A hyphen (-) indicates that the item is not applicable.

[a] Onshore students.

two thirds of the students were nationals of Asian countries. In order to gain deeper insights, recent trends in the number of foreign students for 6 major source countries or areas are depicted in figure 33 for the period 1985/1986 to 2000/2001. Figure 33 shows the sharp increases in the enrolment of students from China,[8] India, Japan and the Republic of Korea. In particular, since 1997/1998, China has been the leading country of origin of foreign students. Indeed, the United States has been the most popular destination among Chinese who wish to study abroad. Zhang and Wenjun (2001) estimate that out of some 400,000 Chinese who left home for study abroad between 1978 and 1999, 53 per cent studied in the United States and another 17 per cent in Japan. The large growth in the number of Indian students in the United States in the last few years is also noteworthy. In the case of the Republic of Korea, total enrolments dropped temporarily owing to the financial crisis in 1997 but rebounded by 2000/2001.

In the United States, regional economic integration may have also been linked to international student mobility. Since the signing of the North American Free Trade Agreement (NAFTA), the number of Mexican students in the United States has been growing. By 2000/2001, Mexico had become the tenth largest sending country of students (Institute of International Education, 2001).

A large number of Asian students was also a characteristic of student migration to Australia. The education sector in Australia vigorously targeted the Asian market to attract overseas students who can pay full-cost fees (Shu and Hawthorne, 1996). By the late 1990s, the expanding economies of Hong Kong, Special Administrative Region (SAR) of China, Indonesia, Malaysia and Singapore had become Australia's largest sources of international students. Students from those four countries or areas accounted for 47 per cent of total foreign student enrolment in 2000/2001.

Figure 33. Number of foreign students in the United States by selected countries and area of origin, 1985/1986 to 2000/2001
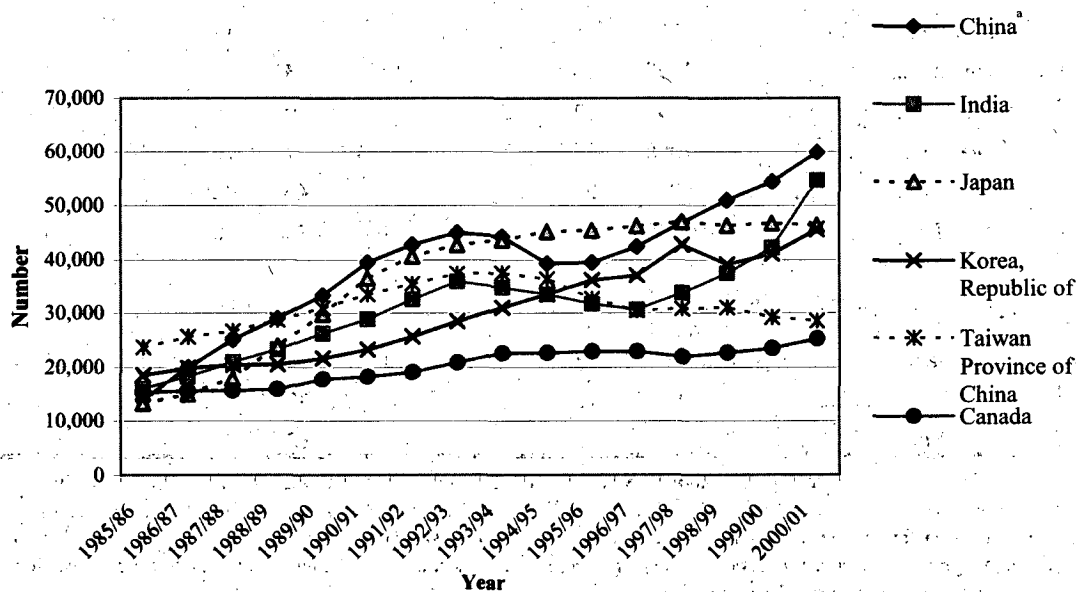
Source: Institute of International Education, *Open Doors 2000/2001* (New York, 2001).

[a] Excluding Taiwan Province of China and Hong Kong SAR.

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3. Student migration as de facto immigration or labour migration

Just a few decades ago, migration for the purpose of education was seen as an opportunity mostly for selected elites who were expected to study for public, rather than individual, gain. Many entered foreign countries with education aid, and upon their return they were expected to become leaders who would maintain close political and trade links with the country where they studied (Borjas, 2002; Shu and Hawthorne, 1996). More recently, however, student migration, with its growing complexity, has developed a momentum of its own. Increasingly, student migration has paved the way for permanent settlement or for a migrant workforce.

In principle, student migration is a movement of a temporary nature: foreign students are expected to return home upon the completion of their studies and not remain in the host country. However, it is common among potential migrants to believe that a student visa will allow them to seek subsequent settlement (Borjas, 2002). In the United States, it was found that a high proportion of foreign students finishing their doctoral studies intended to stay in the country. In particular, the large majority — at least 70 per cent — of students originating in China, India, Peru and the United Kingdom were found to be planning to remain in the country upon completion of their studies (Organisation for Economic Co-operation and Development, 2001a). Indeed, migrants educated in the host country might have a great advantage in finding employment, in terms of their physical presence, degree recognition and language mastery, as well as their familiarity with local institutions. According to the study by Zhang and Wenjun (2001), of the total number of Chinese who studied in the United States between 1978 and 1999, only 14 per cent are estimated to have returned.

The experience of Japan presents an example of how student migration can be used as a channel for clandestine labour migration. In general, once the students are enrolled, the host institutions do not closely monitor their attendance or the progress of their studies. The lack of supervision makes it easy for foreign students to join the local workforce, often in violation of the terms of their student visas. Many are also likely to remain in the country as undocumented migrants to seek employment after their student visas have expired. In Japan, in addition to foreign nationals who receive education on a "college student" status of residence, there are some 27,000 foreigners registered as "pre-college" students (Government of Japan, 2001). Many of those who belong to the latter group state upon their entry that they will study Japanese at language institutions in Japan. However, it has become evident that a considerable number of them do not attend school and instead take up jobs that locals have shunned. As of early 1998, there were an estimated 15,000 foreign nationals who had entered Japan on a pre-college visa, but who had overstayed after its expiration (Government of Japan, 1998).

With the advent of the knowledge-based economy and its phenomenal growth at the end of the twentieth century, the demand for highly skilled workers, especially professionals in information technology, has not been met in many countries. Ensuring human resources in science and technology has become the primary agenda of policy makers and business leaders, who are concerned that a shortage of those skilled workers may hinder competitiveness in a global economy. For example, the Government of Singapore, recognizing that the future of the country depends on building intellectual capital, aims to transform Singapore into a global hub for knowledge-driven industries, under the strategy entitled "Industry 21". To achieve this goal, the Government needs to attract international talent. As a part of that drive, Singapore has tried to interest the world's top foreign academic institutions in setting up their courses in Singapore, so that not only Singaporeans but also foreign professionals and students can pursue advanced studies in the country (Government of Singapore, 2002).

As recruitment of highly skilled professionals has become increasingly competitive, involving both developing and developed countries, foreign students in science and technology have come to be seen by host countries as a reserve for a future qualified migrant workforce. Some countries have already taken measures to attract

foreign students and facilitate their easy access to long-term or permanent migration.

In mid-1999, the Government of Australia reversed its former policy that, on graduation, overseas students were required to leave the country for at least two years before applying for residence (Hugo, 2001). In July 2001, the Government introduced a number of reforms to the student visa programme, including simplification of the procedure for conversion of visas. Thus, successful Australian-educated overseas students with key skills are now able to apply and be granted visas for permanent residence. Overseas students who pay full fees and graduate with a degree in information technology or in some other professional field in demand in Australia have in fact been encouraged to apply for permanent residence (Hugo, 2001).

The United Kingdom is also moving towards the strategy of attracting the best and brightest of the world. The Highly Skilled Migrant Programme (HSMP), launched by the Government in January 2002, is designed to allow individuals with exceptional personal skills to come and work in the United Kingdom (Government of the United Kingdom, 2002). Under this new initiative, international students who are about to graduate from a higher education establishment in the United Kingdom, or who have undertaken postgraduate training are given opportunities to apply directly for work permits.

In the United States, many foreign students are given temporary work authorization on an H-1B visa,[9] and ultimately seek permanent employment (Lowell, 2001). In 2000, primarily as the result of lobbying by the information technology industry, the Congress of the United States passed the American Competitiveness in the Twenty-first Century Act of 2000 and increased the annual cap on H-1B visas. The new legislation also put no numerical caps on issuance of H1-B visas to people who were employed at an "institution of higher education", a "related or affiliated non-profit entity" or "a non-profit research organization or a governmental research organization" and who had recently received a "master's degree or higher degree" from an American university (Tech Law Journal, 2002).

The trends are similar in other countries. In Austria, France and the Republic of Korea, foreign students graduating in the field of information technology can now change their visa status and gain access to the labour market or apply for residence (Organisation for Economic Co-operation and Development, 2001a). New legislation in Germany also allows foreign students to change their residence status if they have successfully passed a qualifying examination. In view of the chronic shortage of highly skilled labour worldwide, it is expected that such conversions of student visa status will soon be relaxed in other countries as well.

C. INTERNATIONAL MIGRATION POLICIES AND EDUCATION

By seeking to encourage certain types of mobility while restricting others, immigration policies influence migrants' skills. Education is frequently taken into consideration in countries that apply selective admission and residence criteria. Such criteria differ significantly by country. Some countries do not have policies with regard to educational achievements per se, but do have policies favouring immigrants with specific skills, which generally require advanced training (see annex to chap. V). The traditional countries of immigration admit immigrants for permanent residence. Some of those countries — Australia and Canada in particular — have maintained their permanent settlement policies through a point system that increasingly favours highly skilled migrants.

In Australia and Canada, applicants for permanent residence must satisfy a points test with scores based on education, work experience, language proficiency and other skills. In Australia, the largest number of points is awarded to an individual with a degree or diploma deemed acceptable in Australia who has at least three years of work experience. Skilled migrants constitute a specific category of permanent migrants. Generally, applicants may qualify if they have a higher education degree (OECD, 2001a). Preferential family members (spouses or de facto partners, dependent children and relatives with special needs) are not subject to the point test in either of these two countries. More distant relatives,

however, are point-tested. The United States, in contrast, does not regulate immigration through a point system, although since 1965 it has had a preference system that recognizes employment-based immigration of skilled workers as a preferential category. However, most visas — more than 70 per cent since the Immigration Act of 1990 — are reserved for family members, whose admission is not subject to skills (United Nations, 1998b). The relatively lower educational level of immigrants in the United States, as compared with Australia and Canada, has been frequently attributed to the different criteria (Borjas 1994; Duleep and Regets, 1992). Borjas (1994) argues that the difference between the average level of education of immigrants in Canada and the United States is partly due to the different national origin mix in the two host countries. The point system would indirectly affect the distribution of visas across countries of origin, rather than the average skill level of migrants coming from a specific country.

Unlike the traditional countries of immigration, the receiving countries of Europe have typically viewed migrants as workers entering the country for a temporary stay. European countries actively recruited unskilled foreign workers to combat labour shortages that ensued after the Second World War. However, much of the temporary immigration has evolved into permanent settlement. When Governments stopped the recruitment of foreign workers after the oil crises of 1973, they made a concession to the long-term presence of migrants by implementing family reunification policies. Common to all those countries has been the lack of selective admission criteria for either workers or family members (United Nations, 1998b). Differences in migrant education among European countries stem more from specific labour demands and the national origin mix of migrants in each country than from diverse national immigration policies.

Since the second half of the 1990s, most countries have enacted legislation placing greater emphasis on migrant skills. Some countries have reinforced selective admission criteria; others have addressed qualifications for family reunification; and most have relaxed restrictions to the movement of highly skilled workers in

specific fields. In May 2002, the Government of Australia announced that it would accept 105,000 immigrants over the next four years, up from 93,000 in 2001-2002. The category with the greatest increase was that of skilled migrants, up to 60,700 from 40,000 in 1996-1997 and 53,000 in 2001-2002 (University of California, Davis, 2002). In Canada, legislation that took effect in 1993 toughened the selection criteria by awarding additional points to upper secondary and university education, but none to those who had not completed basic secondary education (Government of Canada, 1993, p. 3). In the United States, nearly all of the employment visas established by the Immigration Act of 1990 were designated for skilled workers (United Nations, 1998b, p. 94). The Government of the United States has also increased the quota of temporary visas granted to professional immigrants, from 65,000 visas per year in 1990 to 195,000 for 2000 and 2003 (OECD, 2001b). Temporary skilled migrants must have a bachelor's degree or four years of study at the college level.

European countries have also relaxed restrictions on the temporary movement of highly skilled workers. In France, for instance, the immigration law of 1998 created a special status for scientists and scholars and eased general conditions of entry for highly skilled workers in information technologies (Mahroum, 2001). In Denmark, the Netherlands, Sweden and the United Kingdom, highly skilled migrants benefit from tax discounts.

Similar skills-based programmes have been implemented in other countries. Japan, for instance, has relaxed restrictions on the entry of engineers and other specialists, who must have a college degree or at least 10 years of working experience to qualify (see annex table). In Korea, immigration and emigration laws have recently been revised to facilitate the entry of professionals and technicians as well. These migrants must have at least five years of work experience in information technologies or a masters' level degree with at least two years of work experience in the relevant field (OECD, 2001b). In Singapore, foreigners with at least five "ordinary level" school certificates or equivalent qualifications, with five years of working ex-

perience and a salary of at least 1,500 United States dollars ($) per month can apply for permanent residence.

The share of immigrants admitted under a skills-based category increased in most of the preceding countries, with the exception of France and the United States, during the 1990s (OECD, 2001b, table 1, p. 74). Even though the relationship between education and skills is not clear-cut, and immigrants are frequently over-educated for the work they perform, the implementation of increasingly selective admission criteria will most probably influence the educational attainment of the foreign population in receiving countries.

D. SUMMARY AND CONCLUSION

The educational level of international migrants varies widely depending on their region or country of origin. Such variation may be attributed to the distance between country of origin and destination, the reasons for migration and the characteristics of the countries of destination or origin.

A growing number of students are pursuing higher education outside their own countries. Cultural, geographical, historical and institutional ties between sending and recipient countries govern the direction of student mobility. International migration for the purpose of education is likely to be expanded as the value attached to knowledge and skills acquired through overseas education increases and as ensuring sufficient trained human resources become major concerns of policy makers.

The educational attainment of migrants is strongly influenced by international migration policies. Education is one of the factors taken into consideration by countries that apply selective admission and residence criteria. In the past, only some traditional countries of immigration applied such selective criteria. However, since the second half of the 1990s, most countries have enacted legislation that places greater emphasis on migrants' skills. As a result, the share of immigrants admitted under a skills-based category has increased in most countries. Even though skills are not tantamount to education, the implementation of increasingly selective policies will influence the educational level of migrants in receiving countries.

ANNEX TABLES

TABLE A.V. CRITERIA FOR RECRUITMENT AND RESIDENCE OF SKILLED FOREIGN WORKERS IN 20 COUNTRIES

Main categories of workers by country	General admission conditions and specific admissions	Availability of domestic workers as grounds for refusal	Quotas	Authorized length of stay and possibility of renewal	Possibility of family reunification
		AUSTRALIA			
1. Permanent immigration programme 1.1. Skilled-independent 1.2. Skilled-Australian sponsored	Generally post-secondary, but in a small number of cases substantial work experience may be acceptable Minimum requirements on skill, age and English language ability Points test. Applicants are awarded points according to age, skill, English language ability and experience. Additional points awarded for applicants whose skills are in short supply in Australia, e.g. information technology, accountancy and nursing for spouse skills, and where applicable for family links and language skills other than English. Sponsorship (only for the category "skilled Australian sponsored") by a relative who is an Australian citizen or permanent resident[a]	Sponsoring employers must demonstrate that job vacancies cannot be filled market	No. Planning levels adjusted subject to demand and economic and labour market needs	Permanent	Spouses, de facto partners and dependent children receive a visa at the same time as the skilled applicant as part of the family unit. Parents of the skilled applicant may be separately sponsored for permanent entry within capped numbers
2. Temporary immigration programmes (economic stream)[b] Business entry visas and other temporary visas for skilled workers	Nominated by the employer	Yes, for non-key activities (except for skills that are in shortage). This is not required for key activities	No	Business entry visas: up to 4 years. Other temporary visas for skilled workers: up to 2 years. No restrictions on renewal	Members of the family unit may be granted visas to join temporary residence visa holders in Australia. The application can be separate or combined with the main applicant
		AUSTRIA			
Simplified procedure for IT workers	The initial work permit is issued to the firm for a particular job	Yes	Annual quota of 1 000	After one year, the work permit is transferred to the foreign worker (work entitlements) who after 5 years is entitled to permanent residence	Yes

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Main categories of workers by country	General admission conditions and specific admissions	Availability of domestic workers as grounds for refusal	Quotas	Authorized length of stay and possibility of renewal	Possibility of family reunification
		CANADA			
1. Permanent immigration programme					
1.1 Skilled workers	Objective of post-secondary educational level as minimum Selection test that awards points on the basis of criteria such as level of education, linguistic knowledge, skills and experience. Family members of a person who has already settled in Canada receive supplementary points	No	No, but planning ranges are given annually for each immigration category	Permanent	Immediate family members may accompany the principal applicant or may be sponsored at a later date
1.2. Business immigrants (investors, entrepreneurs, self- employed)	Investors must make a minimum investment in a Canadian business, entrepreneurs and self-employed must be able to create jobs in Canada	No		Permanent	Immediate family members may accompany the principal applicant or may be sponsored at a later date
2. Temporary immigration programmes					
2.1. Highly skilled temporary workers	Established by employer to Canadian standards	No	No	3 years maximum (renewable)	Yes. Applications may be made for employment authorization (no validation required)
2.2. Special pilot project for professionals in the field of software development	Post-secondary educational level	No	No	3 years maximum (renewable)	Yes, but not the right to work
2.3. Temporary workers under NAFTA or the Canada-Chile Free Trade Agreement	Post-secondary educational level (list of occupations)	No	No	One year (renewable)	Yes, but not the right to work
		FRANCE			
General requirement	The firm must exist for more than 3 years and have more than F3 million of capital A monthly wage equal to or above F25 000	No	No	For long-term contract, one year (renewable)	Yes, application may be made for a one-year visa and a further application for family reunification
Simplified procedure for IT specialists	A degree in IT or equivalent professional experience and an annual salary above RF180 000	No	No	For short-term contract, 9 mos. (renewable); Total of 5 years	

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Main categories of workers by country	General admission conditions and specific admissions	Availability of domestic workers as grounds for refusal	Quotas	Authorized length of stay and possibility of renewal	Possibility of family reunification
HUNGARY					
Persons with special knowledge and expertise or with professions in which there is a shortage of labour				Working permits are granted. After 3 years of working legally, can obtain permanent residence permits	
IRELAND					
Fast-track scheme for workers with special skills (IT specialists, nurses, construction professionals, etc.)		No	No	2 years (renewable)	Yes, after working in Ireland for only 3 months. Family members can then work if they apply for a work permit
JAPAN					
Engineers and specialists	College degree or at least 10 years work experience (3 years in some specific cases). Salary must be equivalent to that of a Japanese national worker in the same conditions	No	No	1 year or 3 years (renewable)	Yes, but family members are not allowed to work without authorization
KOREA					
Professionals and technicians[c]	At least 5 years work experience in IT or master's degree level, with at least 2 years' work experience in the relevant field	No	No	Duration of stay is now permanent	Yes
MALAYSIA					
Skilled workers, particularly IT specialists	The Government has concerns about maintaining a racial and ethnic balance within its population. Tax waivers and other inducements are offered for returnees	Yes		Visas are granted for those in skilled occupations	

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Main categories of workers by country	General admission conditions and specific admissions	Availability of domestic workers as grounds for refusal	Quotas	Authorized length of stay and possibility of renewal	Possibility of family reunification
		NETHERLANDS			
Fast-track application process for highly skilled, particularly IT specialists	Yearly salary to be at least 50 000 Euro level	There is a national labour market test, but they are exempt from a regional labour market test	No	3 years (renewable). Work contracts may not exceed 4, 5 years	
		NEW ZEALAND			
Work to Residence Programme (2002)			The 2002-2003 Immigration Programme has been set at 45 000 approvals and includes skilled/business (60 per cent)	Permit to live and work is given — the talent visa	
1. Talent (Arts, Culture and Sports) Work Policy	Need to be age 55 years or under; Meet basic health and character requirements; Be employed in a full-time position (30 hours a week or more) for a period at least 24 months; Have a minimum base salary of NZ$45 000 per annum	No		Have a more streamlined approvals process for work permits and visas After working for two years, can make a straight-forward transition to permanent residence	
- People with job offers from "accredited" employers					
- People with job offers from not accredited employers		No		Have to go through a process of obtaining a temporary work permit or applying for residence	
2. Priority Occupations List Work Policy:	Need to have an offer of employment in an occupation that is included on the Priority Occupations list, for at least 24 months, in full-time position (at least 30 hours a week); Have suitable qualification by training or experience; Meet health and character requirements	Yes		Multiple visas or work permit for 30 months. Eligible for permanent residence	
- People in the occupations identified by the Government as "priorities" because of critical skills shortage					

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Main categories of workers by country	General admission conditions and specific admissions	Availability of domestic Workers as grounds For refusal	Quotas	Authorized length of stay and possibility of renewal	Possibility of family reunification
NORWAY					
Work permits delivered to highly qualified workers, or those with special skills	Usually at least 2 years of tertiary education Special skills obtained through work practice may be considered. Applicants must hold a job offer by the employer or a standardized contract of service[d]	Yes, the skill must be absolutely necessary to the activity	No	1 year (renewable) After 3 years, a permanent permit may be issued	
POLAND					
Skilled workers (entrepreneurs, consultants and teachers)				Work permits are granted. Entitled to a renewable two-year right of temporary residence or to apply for permanent residence	
SINGAPORE					
Skilled workers, professionals and entrepreneurs	Depending on their qualifications, the terms and conditions permitting foreigners to stay or work differ substantially Persons with at least 5 "Ordinary Level" school certificates or equivalent qualifications, with 5 years of working experience and a salary of at least S$1 500 per month can apply for permanent residence	Yes		Employment passes are granted for 3 years. Permanent residence is encouraged and may be granted to employment pass and skilled work permit holders and entrepreneurs; they can apply for permanent residence after 6 months, and for citizenship after 2 years of permanent residence	Yes

Main categories of workers by country	General admission conditions and specific admissions	Availability of domestic Workers as grounds For refusal	Quotas	Authorized length of stay and possibility of renewal	Possibility of family reunification
SOUTH AFRICA					
Under the new immigration law (2002) - Foreign skilled workers	Employers can bring skilled foreigners, provided they paid a levy or tax of one to three per cent of the foreigner's salary		Annual quotas set by skill level	Work permits are granted	
SWEDEN					
1. Highly skilled workers and business persons				Residence permits for employment purposes	
2. Scientists, researchers and artists	Must have a job offer with a salary of at least SKr 13 000 a month and have housing		1 000 a month	Temporary international exchange work permits for up to 4 years	
SWITZERLAND					
Skilled workers (outside EEA)[e]	Skills do not refer to a minimum educational level but to skills that are needed and evaluated locally	Yes	Yes, annual quotas	Depends on the sector of activity	Yes, the right to family reunion will be extended to all residence permit holders
UNITED KINGDOM					
Simplified procedure for some highly skilled workers (shortage occupation list), including some IT or communication specialists	UK degree level qualification or higher national diploma plus one year of experience or at least 3 years of work experience in the field for which the permit is delivered	Yes, not applicable in case of renewal[f]	No	The maximum period has been extended to 5 years. After 4 years, the worker has the right to settle (indefinite leave to remain) if they are still in employment	Yes
Highly Skilled Migrant Programme (2002) for non-EU professionals of outstanding ability	Can enter under a point system, based on their qualifications, experience and earning ability and then seek employment	No	No	1 year. Permits can be renewed indefinitely	Yes (spouse, children under 18)
Scheme for innovators (entrepreneurs whose businesses are expected to create exceptional economic benefits [2000])	Meet minimum requirements and pass mark on points-based system	No	No		

Main categories of workers by country	General admission conditions and specific admissions	Availability of domestic Workers as grounds For refusal	Quotas	Authorized length of stay and possibility of renewal	Possibility of family reunification
		UNITED STATES			
1. Permanent immigration Employment-based immigration (Green Card system for professionals with advanced degrees in sciences art or business, priority workers and other skilled workers)	N/A	Yes	Generally limited to 140 000 annual entries (including family members)	Permanent	Yes
2. Temporary immigration H-1B visa programme	Bachelor's degree or 4 years of study at college level. Three years of relevant experience can count as one year of college Having an employment offer under the same conditions as nationals	No	Yes, 195 000 for 3 years beginning with 2001. Jobs in non-profit-making organizations and universities are not included in this quota	Six years. Residence allowed while immigrant application is being considered	Yes, but family members are not allowed to work without authorization
Intra-company transferees				L visas are granted, which allow adjustment to immigrant status	
Treaty investors/traders/key Employees				E visas are granted, which allow adjustment to immigrant status	
Temporary skilled immigrants accepted under NAFTA	Bachelor's degree or 4 years of study at college level. Three years of relevant experience can count as one year of college	No	No, except a quota for Mexican professionals (5 500) until January 2004	One year, renewable indefinitely	Yes

Sources: Organisation for Economic Co-operation and Development, International Mobility of the Highly Skilled (Paris, 2001); and Population Policy data bank maintained by the Population Division of the United Nations Secretariat.

NOTES: IT = information technology.

NAFTA = North American Free Trade Agreement.

F = French franc.

S $ = Singapore dollar.

SKr = Swedish krona.

UK = United Kingdom of Great Britain and Northern Ireland.

EU = European Union.

EEA = European Economic Area.

N/A = not available.

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[a] Applicants who meet the minimum skill, age and English language requirements, but who may not meet the points test can be eligible in the skilled-regional sponsored category if they are sponsored by relatives living in a designated area (Sydney, Newcastle, Wollongong, Perth, Brisbane, the Sunshine Coast and the Gold Coast are not designated areas).

[b] Other more limited programmes (labour agreements, regional headquarters agreements) allow employers to negotiate with the Government the temporary entry (generally for 3 years) of skilled worker.

[c] Immigration and emigration laws have recently been revised to facilitate the entry of personnel from these categories. More deregulation should promote the entry of IT specialists.

[d] The application for a work permit must be lodged from the home country. The Public Employment Service provides assistance to employers who want to recruit staff members from European countries (excluding Nordic countries), especially for doctors, dentists, nurses and engineers. Nordic nationals do not need a permit to work in Norway. Other EU nationals only need an EU residence permit that may be issued while being in Norway.

[e] No minimum skill level is imposed for EEA workers. The free movement of persons between Switzerland and the European Union should enter into force in 2001.

[f] Fast track procedure (50 per cent of applications are clear within a week and 90 per cent in 4 weeks).

NOTES

[1] The 1997 International Classification of Education classifies levels of education in seven main categories: pre-primary education; primary education or first stage of basic education; lower secondary education; upper secondary education; post-secondary, non-tertiary education; first stage of tertiary education; and second stage of tertiary education. In line with the information provided by national sources, the present analysis is based on three broad categories recommended by UNESCO for cross-country comparisons: lower secondary education or less (Low); upper secondary education (Medium); and tertiary education (High).

[2] The Eurostat Labour Force Survey, 2001, and most European population censuses used in the present report record information based on citizenship. Therefore, only the subset of foreign-born persons that had not been naturalized at the time of the survey is included in the analysis.

[3] For instance, owing to historical links with its ex-colonies, the United Kingdom hosts a relatively larger share of foreigners from South-eastern and South-central Asia and from Northern America than the rest of the receiving countries in Europe. In Denmark and Sweden and, in particular, in Austria, citizens of countries with economies in transition constitute 35 to 65 per cent of all foreigners, as opposed to 25 per cent on average in the European Union. In contrast, France hosts the largest community of North Africans, 35 per cent of all foreigners; and in Germany, Turks represent almost 30 per cent of all foreigners (OECD, 2001a).

[4] In 1998, sex differentials in adult literacy and education were the largest in South-central and South-eastern Asia and Africa, to the detriment of women. In countries with economies in transition, in contrast, educational attainment was higher for women than for men (UNESCO Institute for Statistics database, available from http://www.uis.unesco.org [accessed in July 2002]).

[5] According to the International Standard Classification of Education, data refer to education at ISCED level 5 and above. More specifically, tertiary education corresponds to the level of education provided at universities, teachers' colleges and higher professional schools, which requires, as a minimum condition of admission, the successful completion of secondary education or evidence of the attainment of an equivalent level of knowledge (United Nations Educational, Scientific and Cultural Organization, 1999).

[6] International students are those individuals who were enrolled for coursework at a United States institution of higher education under a temporary student visa. They can include spouses or dependants who arrive in the United States with the student if they also take coursework. They do not include refugees, immigrants or permanent residents (Institute of International Education, 2001, p. 3).

[7] As of 4 February 2003, the official name of the Federal Republic of Yugoslavia has been changed to Serbia and Montenegro.

[8] Excluding Hong Kong Special Administrative Region (SAR) of China.

[9] H-1B visas allow foreigners with a baccalaureate or higher degree to work in the United States for up to six years (Lowell, 2001).

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Introduction

The States Members of the United Nations made a commitment to Education for All at the World Conference on Education for All: Meeting Basic Learning Needs held in Jomtien, Thailand in 1990. That commitment was reaffirmed in 2000 at the World Education Forum in Dakar. The Dakar Framework for Action: Education for All: Meeting Our Collective Commitments[1] includes six main goals:

1. **Expand early childhood care and education.** Expand and improve comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children;

2. **Universal primary education.** Ensure that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality;

3. **Promote the acquisition of life skills by young people and adults.** Ensure that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes;

4. **Expand adult literacy.** Achieve a 50 per cent improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults;

5. **Eliminate gender disparities.** Eliminate gender disparities in primary and secondary education by 2005, and achieve gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality;

6. **Enhance educational quality.** Improve all aspects of the quality of education and ensure excellence so that recognized and measurable

learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills.

It can be seen that the goals are directed towards different groups in the population and that achieving them depends on countries' responses to different demographic pressures and trends. Goal 1 addresses pre-school children. Goal 2 is directed at children of primary-school age. Goals 3 and 4 are intended to meet the needs of young persons and adults. Goal 5 is a cross-cutting goal covering gender equality. Goal 6 is concerned with the quality of education and is the only one without a specific demographic focus.

Two of the goals from the Dakar Framework for Action, universal primary education (goal 2) and gender equality (goal 5), were also included in the Millennium Development Goals, and levels of literacy are among the indicators chosen to assess progress towards Education for All and the Millennium Development Goals. A set of core indicators, shown in box 2, has been selected for monitoring progress towards achieving the EFA goals. The United Nations Educational, Scientific and Cultural Organization and the UNESCO Institute for Statistics have been assigned the leading role for monitoring, at the international level, progress towards achieving the goals (see box 3).

The present chapter draws on the information assembled by UNESCO and UIS for the *EFA Global Monitoring Report, 2002: Education for All: Is the World on Track?*[2] Some of the basic statistics were already presented in chapter I. The main purpose of the present chapter is to examine recent trends and progress in greater depth, with attention to selected important issues, including school quality. Issues of data adequacy are also addressed. All education data presented are from the UNESCO Institute for Statistics. Population data are taken from United Nations estimates and projections of population.[3]

Box 2. Core indicators for monitoring progress towards achieving the Education for All goals

Indicator 1. Gross enrolment in early childhood development programmes, including public, private, and community programmes, expressed as a percentage of the official age-group concerned, if any; otherwise the age group 3 to 5.

Indicator 2. Percentage of new entrants to primary grade 1 who have attended some form of organized early childhood development programme.

Indicator 3. Apparent (gross) intake rate: new entrants in primary grade 1 as a percentage of the population of official entry age.

Indicator 4. Net intake rate: new entrants to primary grade 1 who are of the official primary school entrance age as a percentage of the corresponding population.

Indicator 5. Gross enrolment ratio.

Indicator 6. Net enrolment ratio.

Indicator 7. Public current expenditure on primary education (a) as a percentage of GNP; (b) per pupil, as a percentage of GNP per capita.

Indicator 8. Public expenditure on primary education as a percentage of total public expenditure on education.

Indicator 9. Percentage of primary school teachers who are certified (or trained) to teach according to national standards.

Indicator 10. Pupil/teacher ratio.

Indicator 11. The repetition rate: the number of repeaters in a given grade in a given school year expressed as a percentage of enrolment in that grade the previous school year.

Indicator 12. The survival rate to grade five: the percentage of a cohort of pupils who enrolled in the first grade of primary education in a given school year and who eventually reach grade 5.

Indicator 13. Percentage of pupils having reached at least grade four of primary schooling who have mastered a set of nationally defined basic learning competencies.

Indicator 14. Literacy rate of 15-24 year olds.

Indicator 15. Adult literacy rate: the percentage of the population aged 15 or over that is literate.

Indicator 16. Literacy Gender Parity Index.

Source: UNESCO Institute for Statistics.

Box 3. International monitoring of progress towards achieving the Education for All goals

One of the lessons of the decade following the World Conference on Education for All (Jomtien, 1990) was that neither countries nor donors could be held to account for progress towards the goals unless there was a rigorous follow-up mechanism to ensure early warnings where goals were in danger of being missed. The UNESCO Institute for Statistics was assigned an important role in the monitoring process to ensure that reliable data on Education for All would be made available on a regular basis. In 2001, the UNESCO Institute for Statistics created a dedicated EFA team to undertake that task.

Education for All monitoring was further strengthened in 2002 by the formation of an independent monitoring editorial committee and report team based in Paris. The first report to be published under the new arrangements at the UNESCO Institute for Statistics and Paris was the *EFA Global Monitoring Report, 2002*.[a]

The most recent data used in the 2002 *Report* are for the school year 1999/2000, which is the latest year for which the UNESCO Institute for Statistics has a complete set of administrative data from the majority of countries in the world.

In addition to administrative data, the Institute's contribution to the 2002 *Report* includes a wide range of information from other sources, including the United Nations Children's Fund, the World Bank and non-governmental organizations. That information serves to provide context for different countries and regions and also provides insight on issues that administrative data cannot address, such as the influence of family background on education.

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[a] UNESCO, *EFA Global Monitoring Report, 2002: Education for All: Is the World on Track?*.(Paris, UNESCO publishing, 2002).

A. COUNTRY PROGRESS

Goal 1. Expand early childhood care and education

The UNESCO Institute for Statistics collects information for the two core indicators (indicators 1 and 2) relating to early childhood education (see box 2). One is concerned with overall enrolment in formal pre-school programmes, while the other measures the proportion of primary school entrants who have received some formal pre-school education.

The data provided for the two indicators are problematic.[4] Ministries of education may have data only on public education, whereas early childhood provision is often concentrated in the private sector. Moreover, much public provision may be undertaken by other ministries (health ministries, for instance). Data collected by the UNESCO Institute for Statistics concentrates on formal pre-school care for those aged 3 years or over. Some authorities would suggest that data should also be gathered on provision for those under 3 years of age. The Institute collects data about formal provision, but much early childhood care happens within the context of the family.

Demand for early childhood care is linked to both population trends and labour market conditions. High birth rates can be a major contributor to demand for early childhood care. However, in northern countries, although birth rates are low, there are strong pressures for all adults within a household to work, leading to increased demand for early childhood care.

Of 20 countries with an early childhood gross enrolment ratio below 5 per cent, three quarters are located in sub-Saharan Africa. Only four[5] fall outside the region (Algeria, Djibouti, Myanmar and Oman). There are 27 countries with a gross enrolment ratio of 80 per cent or over, the majority of which are in North America and Western Europe. Six countries have a gross enrolment ratio over 100 (Belgium, Cuba, Hungary, Luxembourg, Romania and the Russian Federation). The gross enrolment ratio can be more than 100 because children who are older or younger than the official age group may be in-cluded. For early childhood enrolment, the gross enrolment ratio is as likely to include under-age as well as over-age children, in contrast to the situation for primary and secondary school, where children outside the official age group are mostly over-age children.

Gender disparities vary greatly between countries. The gender parity index (the ratio of female to male rates, where one equals parity) is outside the range of 0.99 to 1.01 in 79 of 123 countries with data available for 1999/2000. Of those 79, the difference favours girls in 46 countries and boys in 34 and, generally, where girls have the higher enrolment the gender gap is larger. Nearly all countries fall within a range of 0.77-1.25 on the parity index. Only in three countries — Congo at 1.47, Morocco at 0.55 and Pakistan at 0.36 — does the index fall outside that range. Therefore, girls are generally more likely than boys to be enrolled in the pro-grammes covered by these indicators.

Goal 2. Universal primary education

Universal primary education is a central goal of Education for All. The goal has been endorsed at many other international meetings, including the International Conference on Population and Development (Cairo, 1994) and it is included among the Millennium Development Goals as well.

Apparent intake rates (AIR) and net intake rates (NIR) are the indicators commonly used to measure the level of access to primary education by children of school-entrance age (see indicators 3 and 4 of box 2). Data for 1999/2000 revealed that of 101 countries for which data were available, 59 had an apparent intake rate above 100 per cent, meaning that those countries enrolled children who were outside (younger or older than) the official entry age for primary schooling. Analysis by level of development and region showed that most countries with an apparent intake rates over 100 per cent are also countries where late entrance is especially common. Relating apparent intake rates to net intake rates, net intake rates was lower than 60 per cent for 17 of the 59 countries with an intake rates above 100 per cent (22 countries were unable to provide age-disaggregated data), suggesting that

for at least 17 countries, over-age children may be displacing children of official entry age.

Two countries (Burkina Faso and Niger) had an apparent intake rates below 50 per cent, indicating that fewer than half of the children of official entry age are entering primary grade one. This may be due to lack of school places (capacity) or an inability to fill those places (problems relating to parental demand for education).

Gross and net enrolment ratios (indicators 5 and 6 in box 2) are the main measures of participation in education. The most recent year for which official administrative data on the gross enrolment ratio in primary education are available is the school year 1999/2000 (figure 34).[6] Latin America and the Caribbean had the highest gross enrolment ratio (126 per cent) and sub-Saharan Africa the lowest (81 per cent). The rate for sub-Saharan Africa was close to the average rates for the least developed countries and the heavily indebted poor countries, which are the focus of a joint World Bank/International Monetary Fund initiative.[7] The two groups include many African countries. Two countries (Burkina Faso and Niger) had a critically low GER of less than 50 per cent, while 45 others had a gross enrolment ratio between 50 per cent and 100 per cent. Many countries had a gross enrolment ratio over 100 per cent.

The net enrolment ratio remains the preferred, though not the sole, international indicator for measuring progress towards universal primary education (figure 35). It measures the level of participation of children of official school age who are enrolled in school. Nine populous developing countries (the E-9 countries)[8] accounted for almost half of the world's out-of-school children in 1999/2000. From a geographical perspective, the situation appears critical in South and West Asia because of the sheer numbers of children who need to be enrolled in school in order to achieve universal primary education. Together with East Asia, those regions include 57 per cent of the total world school-age population.

Net enrolment ratio data are available for 114 countries for 1999/2000. The data show that:

- Two countries (Niger and Angola) had a net enrolment ratio below 30 per cent.

- 15 countries, 12 in sub-Saharan Africa and three in the Arab States and North Africa, had a net enrolment ratio between 30 per cent and 60 per cent.

- 30 countries had a net enrolment ratio between 60 per cent and 90 per cent.

- The remaining 67 countries (58 per cent of the 118 reporting) had a net enrolment ratio above 90 per cent. Of those, 29, mostly OECD countries, had achieved universal primary education.

A clearer picture of the extent of participation in schooling can be gained by considering the gross and net enrolment ratios together, as well as the gap between them. The net enrolment ratio measures the degree to which countries have developed a regular primary education cycle for the official primary-school age group. The difference between the net enrolment ratio and the gross enrolment ratio measures the provision of education to under-age and over-age children. Evidence shows that the gross enrolment ratio is significantly higher than the net enrolment ratio in two main regions, sub-Saharan Africa and Latin America and the Caribbean. This means that early and/or late entrance of pupils as well as high rates of repetition may prevail in those regions. A closer look at a sample of countries with large gaps between the gross enrolment ratio and the net enrolment ratio (table 55) shows that in almost all of them, there was a high intake of children who were outside the official entrance age (AIR-NIR gap); that is, a large proportion of over-age students and a relatively high proportion of repeaters.

The school-survival rate to grade 5, defined as the percentage of children enrolled in grade 1 who reach grade 5, is often used as a proxy for completion of primary schooling, since children who reach grade 5 are more likely to be literate on leaving school. School-survival rates can be calculated for a limited number of countries that have data available for both the 1998/99 and 1999/2000 school years. About half the countries retained four out of five pupils until grade five; some lost half their enrolment or more. For

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Figure 34. Gross enrolment ratios in primary school by region, 1999/2000
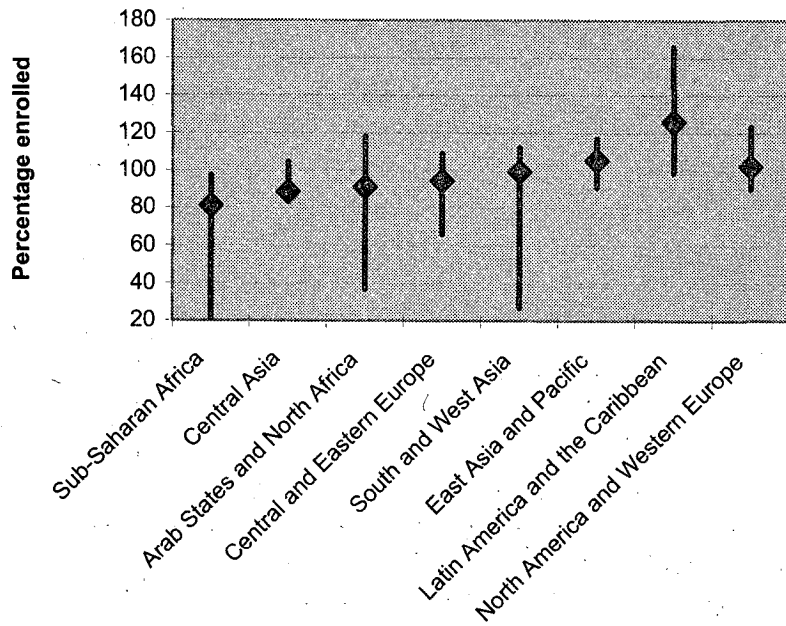
Source: UNESCO Institute for Statistics.
NOTES: Vertical lines = minimum and maximum values.
Diamonds = median values.

Figure 35. Net enrolment ratios in primary school by region, 1999/2000

Source: UNESCO Institute for Statistics.
NOTES: Vertical lines = minimum and maximum values.
Diamonds = median values.

Country	Gap GER-NER (percentage points)	Gap AIR-NIR (percentage points)	Percentage of over-age students in primary	Total percentage of repeaters in primary
			(Percentage)	
Angola	37	47	53.3	29.4
Comoros	29	-	33.3	26.0
Eritrea	21	47	32.0	19.4
Guinea-Bissau	29	78	31.8	24.0
Lao People's Democratic Republic	34	65	29.1	19.7
Lesotho	45	71	42.9	20.4
Madagascar	35	-	33.2	27.9
Mozambique	35	84	38.9	23.7
Rwanda	25	-	18.3	29.1
Swaziland	32	68	24.4	17.1
Togo	32	60	20.8	27.0

Source: UNESCO Institute for Statistics.
NOTE: GER = gross enrolment ratio.
NER = net enrolment ratio.
AIR = apparent intake rate.
NIR = net intake rate.

example, the survival rate in Liberia is 33 per cent; in Uganda, 45 per cent; and in Mozambique, 46 per cent. However, several countries kept almost all of their registered pupils until grade five: Jordan, 98 per cent; and Aruba, China and Thailand, 97 per cent.

Repetition is considered an important aspect of both the quality of education and, along with school survival, of the internal efficiency of the education system. A high proportion of repeaters in a class is likely to lower the quality of the education provided. Furthermore, high repetition rates often point to high dropout rates.

The proportion of repeaters is fairly high in many developing countries. More than 10 per cent of pupils repeat some grade of primary education in more than half of the countries in sub-Saharan Africa. The values range from almost nil in Seychelles to 30 per cent in Rwanda. In the region, repeaters often make up more than one quarter of total enrolments.

Combining apparent intake rates and survival rates gives a measure of the likelihood that children in a given country will both enter education and progress to grade 5. This has been suggested as a possible proxy measure of "completion" of primary education. Among 52 countries where

data are available, only nine (Bahrain, China, the Czech Republic, Eritrea, France, Ireland, Jordan, Saudi Arabia and Thailand) can be considered to have nearly universal completion according to this measure, with both high intakes and survival rates over 95 per cent. In other countries where the intake is high, survival is poorer than in the countries listed above.

A similar measure can be produced by combining a participation rate, such as the gross enrolment ratio, and the school life expectancy.[9] The measure would assess attainment in relation to duration of primary education according to the International Standard Classification of Education, 1997.[10] Such a measure suggests that, in countries such as Eritrea and Tanzania with a gross enrolment ratio less than 100 per cent, a great proportion of students do not complete primary school.

Some 69 countries, including all the developed ones, have a school life expectancy exceeding the duration of primary education. Of these 69, some countries, such as Benin, Cyprus, Ethiopia, Kuwait, Mozambique, Oman and Yugoslavia, have relatively low participation, meaning that not all children are given the chance to enrol or complete their primary educa-

tion. When net enrolment is used in place of gross enrolment, there are 46 countries that are close to universal participation and in which the majority of children enrolled in school will progress to the end of primary education.

The estimation of numbers of out-of-school children has become a central calculation in monitoring Education for All, representing the overall remaining target population for increased educational provision. The number of out-of-school children is based on administrative data and can be calculated from the data submitted by countries and the United Nations *2000 Revision* of the estimates and projections of population. For 1999/2000, an estimated 115 million children of primary school age were not in school. Of those, 50 million were boys and 65 million girls. Almost all the out-of-school children in the world (94 per cent) lived in developing countries. In geographical terms, sub-Saharan Africa and South and West Asia have the most significant concentrations of out-of-school children. Each of the regions accounts for just over one third of the world total.

In 2002, the UNESCO Institute for Statistics examined a way of forecasting the progress required to achieve universal primary education, based on the projection of numbers of out-of-school children. The previous practice centred on projecting enrolment ratios, but it is very difficult to predict future enrolment, given the influence of such factors as teacher supply, school building programmes and population change itself. For 2002, the UNESCO Institute for Statistics carried out a projection of the number of children out of school based on demographic trends and then considered what annual increase in rate of enrolment would be necessary to achieve universal primary education. The determining factor for progress under this model is future population trends rather than past trends in enrolment.

Progress towards universal primary education can be affected strongly by demographic trends, including migration, which is more difficult to forecast than trends in vital rates. In Africa and in some Asian countries, school enrolment, especially in border areas, has been greatly increased by refugees. In other countries, such as the States of the Arabian peninsula, educational provision for migrant workers is an important issue.

HIV/AIDS can have a huge impact on expected educational provision. Illness affects both the supply of teachers and large numbers of pupils. This human tragedy can lead to shortages of teachers in some areas and can affect children's ability to learn.

To minimize the chances of falling short, it is important that countries do more than aim for a straight line progression towards the goal of universal primary education by the agreed target date of 2015. Sudden increases in the demand for education or social and economic crises may make it impossible to keep to a straight-line course. It is better for countries to exceed the expected annual average progression needed to achieve the goal, rather than having to react to crises by making extraordinary efforts to raise school enrolment at a time when few resources are available.

Table 56 shows a list of countries that are currently far from the goal of universal primary education, along with the implied rates of increase in enrolment needed to reach the goal by 2015. A number of other countries, for which 1999/2000 data are not available, may also need to undertake large expansions of school enrolment to match the expansion of their school-age populations: Somalia (4.3 per cent), Yemen (4.2 per cent), Uganda (3.6 per cent), Democratic Republic of the Congo (3.4 per cent), Afghanistan (3.4 per cent), Congo (3.2 per cent), Mali (3.2 per cent), Mauritania (3.1 per cent), Nigeria (2.1 per cent) and Pakistan (2.0 per cent). While such annual increases in enrolment may seem unlikely, there have been several instances of countries that have achieved universal primary education within a few years.

TABLE 56. ANNUAL PROGRESS NEEDED TO ACHIEVE UNIVERSAL PRIMARY EDUCATION

Country	Net enrolment ratio 1999/2000	Annual increase in enrolment required to meet UPE by 2015 (per cent per year)	Average annual school-age population increase 1999-2015 (percentage)	Comments
Niger	21.19	4.93	3.89	Requires strong effort and support to reach UPE by 2015
Djibouti	30.59	4.34	0.50	Great effort needed but favourable population challenge
Ethiopia	31.11	4.31	2.45	Requires strong effort and support to reach UPE by 2015
Burkina Faso	34.63	4.09	3.07	Requires strong effort and support to reach UPE by 2015
Eritrea	40.34	3.73	2.63	Requires strong effort and support to reach UPE by 2015
Burundi	44.46	3.47	2.09	Requires strong effort and support to reach UPE by 2015
United Republic of Tanzania	46.70	3.33	1.78	Requires strong effort and support to reach UPE by 2015
Mozambique	50.11	3.12	1.55	Great effort and support needed but reasonable population challenge
Federal Republic of Yugoslavia [a]	50.63	3.09	-1.94	Great effort and support needed but reasonable population challenge
Comoros	54.78	2.83	2.51	Requires strong effort and support to reach UPE by 2015
Chad	56.62	2.71	3.26	Requires strong effort and support to reach UPE by 2015
Saudi Arabia	57.95	2.63	2.24	Great effort needed but economically capable
Côte d'Ivoire	58.37	2.60	1.40	Great effort and support needed but reasonable population challenge
Lesotho	58.47	2.60	0.13	Great effort needed but favourable population challenge
Oman	65.09	2.18	2.61	Requires strong effort and support to reach UPE by 2015
Kuwait	66.37	2.10	1.15	Great effort needed but economically capable (see GNI per capita)
Madagascar	66.37	2.10	2.54	Requires strong effort and support to reach UPE by 2015
Zambia	66.40	2.10	2.21	Requires strong effort and support to reach UPE by 2015
Malawi	68.51	1.97	1.90	Requires strong effort and support to reach UPE by 2015
Gambia	69.76	1.89	1.91	Requires strong effort and support to reach UPE by 2015
Benin	70.27	1.86	2.22	Requires strong effort and support to reach UPE by 2015

Source: UNESCO Institute for Statistics.
NOTES: UPE = universal primary education.
GNI = gross national income.
[a] As of 4 February 2003, the official name of the Federal Republic of Yugoslavia has been changed to Serbia and Montenegro.

Goal 3. Promote the acquisition of life skills by young people and adults

Goal three is concerned with establishing the need for relevant training opportunities and the encouragement of lifelong learning among the post-compulsory school-age population. There are at present no agreed indicators for this goal, nor is there any international agreement on what forms of education are included in the goal. In the absence of a clear framework for either monitoring or measuring progress against this goal, the UNESCO Institute for Statistics has reviewed the breadth of practice in the area. Their review suggests that life skills cover two dimensions of skills: (a) **generic skills**, such as problem solving, teamwork, communication and self-motivation; and (b) **livelihood or survival**

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skills, including literacy and numeracy, revenue generation, health awareness, environmental awareness and citizenship. Until internationally accepted definitions are found for most of these topics, monitoring should take into account the number of programmes or the number of beneficiaries of such programmes.[11]

Non-formal education is both a complement and a supplement to formal education. It plays a prominent role in all post-compulsory schooling, including life skills, adult literacy and lifelong learning, in particular for children and youth who lack access to school. It is often the only accessible form of education for out-of-school children, marginalized groups and illiterate adults. Efforts to achieve Education for All goals and targets will not be effective without reinforcing the non-formal education system and coordinating non-formal education programmes and developing linkages with formal education.

UNESCO and local partners in Cambodia, India and the United Republic of Tanzania are developing and field-testing a set of international methodologies and software for establishing a non-formal education management information systems. The system is designed to collect, process and analyse data; produce and disseminate directories; and manage information at the national and subnational levels. The system will be used to develop policies, plan and coordinate programmes, and inform and motivate potential learners. As goal three is targeted towards the more socially excluded groups and the adult population, its achievement will be very much affected by major shifts in numbers of migrants and refugees, while monitoring depends on the availability of accurate subnational data.

Goal 4. Expand adult literacy

The UNESCO Institute for Statistics carries out global projections of literacy rates based on information from national censuses and household surveys. Usually respondents are asked either to judge their own literacy or to read a simple sentence. Neither of those tests is sufficient to judge whether someone is fully literate — whether they are able to comprehend complex sentences or to compose significant passages of prose. Recent literacy assessments conducted in many developing countries examine whether a person can carry out different kinds of daily tasks that involve basic literacy and numeracy. Such tasks may include filling in government forms, reading and recognizing addresses or reading and understanding newspapers. In 2003, the UNESCO Institute for Statistics will begin a major programme of work to revise the methods used to assess literacy and produce an improved set of estimates.

In absolute numbers, the world's illiterate adult population continued to increase during the 1980s, from an estimated 870 million in 1980 to 880 million in 1990. It declined slowly in the 1990s to an estimated 862 million at the time of the World Education Forum in Dakar in 2000. The year 1990 therefore represents a turning point in the global fight against illiteracy.

In 1990, sub-Saharan Africa, South and West Asia, the Arab States and North Africa together accounted for 65 per cent of the world's illiterate population. Those regions all experienced absolute increases in the size of their illiterate populations from 1990 to 2000 and by 2000 together accounted for 615 million illiterate adults, or about 70 per cent of the total world illiterate population. Without major changes, the regions will hold 80 per cent of the world's illiterate population by 2015.

South and West Asia had the largest rise in the number of illiterate persons over the 1990s, an increase of 30 million people during the decade. If that trend persists, another 25 million illiterate adults will be added in that region alone between 2000 and 2015. Sub-Saharan Africa and the Arab States and North Africa will experience similar increases in adult illiterate populations if progress in literacy falls behind population growth. HIV/AIDS is also likely to have a major impact in these regions. In 2000, the literacy rates in these regions were far below the average world literacy level of 80 per cent, averaging 60 per cent in sub-Saharan Africa and in the Arab States and North Africa, and 55 per cent in South and West Asia (figure 36).

Figure 36. Adult literacy rates by region, 1980-2015
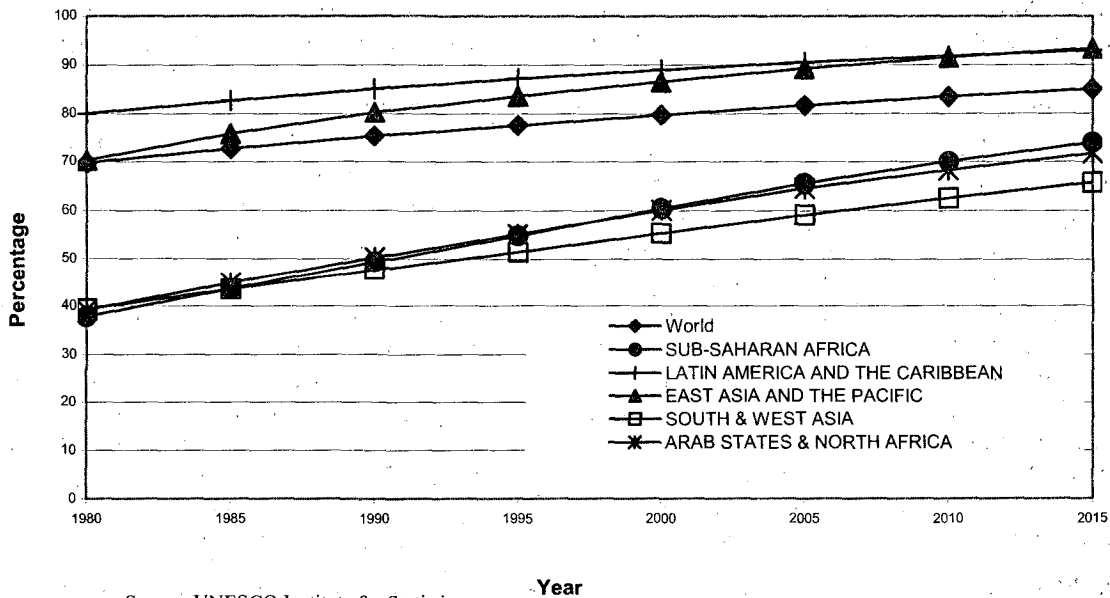
Source: UNESCO Institute for Statistics.

A literacy rate of 70 per cent has been identified as a threshold of sustainability. With over 70 per cent literacy, illiterate people live in a predominantly literate society, increasing the social pressure on them to become literate as well. With less than 50 per cent literacy there will be less pressure for remaining illiterates to achieve literacy. It is expected that the regional averages will cross the threshold of 70 per cent by 2015, with the exception of South and West Asia, where overall literacy may remain below 65 per cent. Of the 26 countries worldwide that are projected to fall short of 70 per cent literacy by 2015, 25 are from the three regions mentioned above.

In 1990, 29 countries for which data are available had literacy rates of less than 50 per cent. In 2000, 21 countries still remained below the 50 per cent threshold (13 in sub-Saharan Africa, 4 in the Arab States and North Africa, 3 in South and West Asia, and one in the Caribbean). It is projected that 6 countries from those regions may remain below 50 per cent literacy by the target year of 2015, established at the World Education Forum in Dakar, unless major efforts are made to universalize basic education among children and youth and to spread literacy among adults. By 2015, all of the countries in East Asia and the Pacific and, except Haiti, in Latin America and the Caribbean are projected to have achieved a sustainable level of literacy.

Literacy rates among women have been improving at a faster rate than among men — from 69 per cent in 1990 to 74 per cent in 2000 for women compared to 82 per cent to 85 per cent for men during the same period. However, most of the world's adult illiterates are women: in 2000 they numbered 549 million compared to 313 million illiterate men, or 64 per cent of the total of 862 million illiterate adults. In the absence of major additional efforts to spread literacy among women, it is estimated that there will still be 507 million illiterate women in 2015 compared to a projected 292 million illiterate men.

In 2000, there were 236 million more illiterate women than illiterate men in a world with only 10 million fewer adult females than males. The gap in numbers is likely to decrease to 215 million by 2015. The disparity between male and female rates of literacy is shrinking globally, but

the pace of progress varies among regions. The gender gap is more pronounced in South and West Asia, sub-Saharan Africa, and the Arab States and North Africa than in other developing regions. The gap was around 23 percentage points in the Arab States and North Africa and in South and West Asia in 2000. There was a 17-percentage-point difference between male and female literacy rates in sub-Saharan Africa. This compares to fewer than 12 points in East Asia and the Pacific and around 2 points in Latin America and the Caribbean. It is projected that the gender gap will decrease to 18 percentage points in South and West Asia and 17 points in the Arab States and North Africa by 2015, while it will be about 12 percentage points in sub-Saharan Africa (see figure 37).

Figure 37. Gender gap in literacy rates, 2000 and 2015

Difference in male and female literacy rates: Percentage points
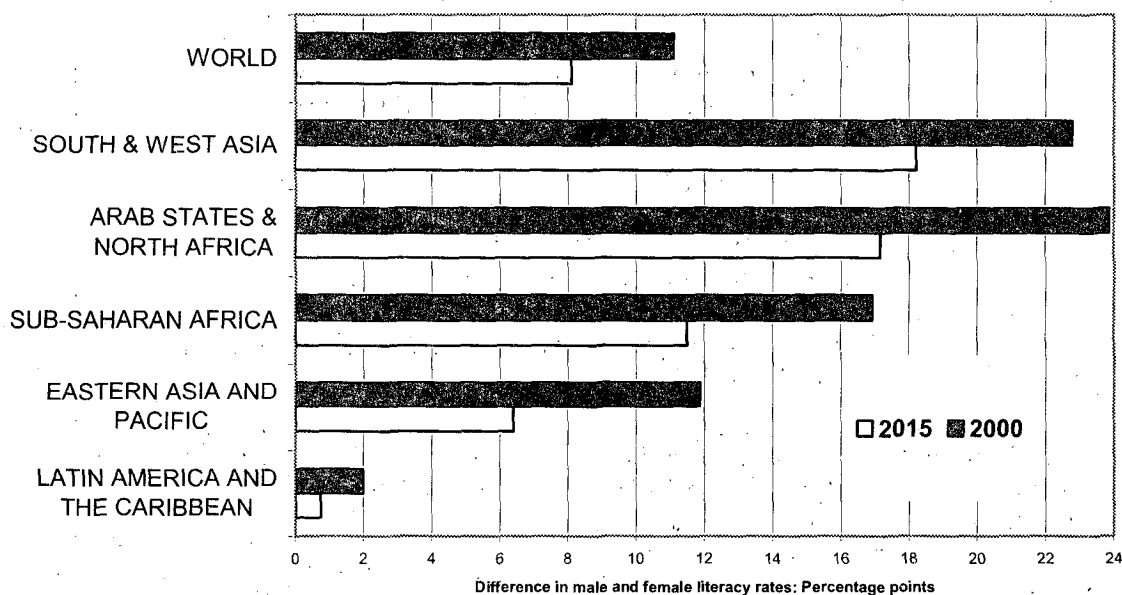
Source: UNESCO Institute for Statistics.

Goal four of the Dakar Framework for Action requires a halving of remaining illiteracy by 2015. If present trends continue, in terms of achieving the goal:

- About 25 developing countries stand a good chance of reaching the goal of a 50 per cent improvement in their national literacy rates, including China, Indonesia, Jordan, Kenya, Oman, the United Republic of Tanzania and Zimbabwe.

- Another 32 countries are poised to achieve an improvement of 40 to 50 per cent, including Algeria, Bahrain, Bolivia, Chile, Ecuador, Ghana, Namibia, Peru, Turkey and Zambia.

- Another 26 countries would show an improvement of 30 to 40 per cent, including Brazil, Chad, El Salvador, Guinea-Bissau, the Lao People's Democratic Republic, Mozambique, Togo and Uganda.

- About 30 countries, including many with the lowest literacy levels, are projected to improve by less than 30 per cent.

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Goal 5. Eliminate gender disparities

The Education for All goal for eliminating gender disparities in primary and secondary education has the earliest target date, 2005. After the World Conference on Education for All in Jomtien, the reduction of gender gaps featured prominently in national education plans, and many countries took initiatives in the 1990s to promote girls' access and participation. Data and indicators illustrate how successful those measures have been (box 4).[12]

Box 4. Measures of gender disparities

Two measures of gender disparities are used in comparing indicators in this report:

- The **gender parity index** (GPI) is the ratio between the female and the male rates (F/M): a GPI of one indicates parity; a GPI between zero and one means disparity in favour of males; a GPI>one means disparity in favour of females. The further the GPI is from one the greater the advantage to one sex or the other.
- The **gender gap** is the difference between the male and the female rate. A negative gap indicates disparity in favour of girls or women. A positive gap indicates disparity in favour of boys or men.

In the present analysis, preference has been given to the GPI since it is less dependent on the magnitude of the indicators studied.

In the 1990s, the number of new entrants to primary education increased by about 11 per cent in the less developed regions. Since the overall population of school-age entrants (age 6) increased by more than 9 per cent during the same period, the intake rate has actually increased by only 2 percentage points. At the global level, the proportion of girls among new entrants has remained stable at 46 per cent, which is below the proportion of girls of school-entry age (49 per cent). The percentage of girls among those entering school ranges from 44 per cent in South and West Asia to 49 per cent in Latin America and the Caribbean. In the period between 1990/1991 and 1999/2000, gender disparities narrowed, particularly in countries with the biggest gaps, such as Benin, Chad, Guinea, Mauritania and Niger — demonstrating that the gender measures taken during the 1990s are having an effect, however moderate.

In terms of their progress towards goal five, countries can be divided into three groups:

(a) **Access to school for girls is lower than for boys**. Most countries fall into this category. In some countries of Central and West Africa, as well as in Ethiopia and Yemen, the apparent intake rate for

girls was three quarters or less than that for boys;

(b) **Gender parity in access has been reached.** This pattern is found in many countries of Latin America and the Caribbean, in some Arab States and in Asia and the Pacific;

(c) **Disparities in access in favour of girls.** In some countries of South and East Africa, slight disparities in favour of girls are noted. Gender imbalances in favour of girls are also observed in some Asian, Latin American and Caribbean countries.

For countries that experienced changes in the gender gap in the gross enrolment ratio between 1990/1991 and 1999/2000, figure 38 shows that progress towards parity was widespread during the 1990s:

- The gender gap narrowed in Benin, Chad, Gambia, and Guinea — among countries with the highest disparities in 1990 — as well as in Comoros and Mauritania. In the Arab States and North Africa, substantial progress was registered in Mauritania, Morocco and the Sudan, and the countries of South and West Asia, Nepal and Pakistan experienced a marked improvement.

- In some countries where disparities favoured girls, the gender parity index moved closer to gender parity. These were mostly Latin American and Caribbean countries, such as Colombia and Nicaragua; Southern African countries, such as Lesotho and Namibia; or countries of the Pacific, such as Samoa.

- Chad and Pakistan report the lowest GPIs in the world (0.61 and 0.63 respectively). Enrolment strongly favours boys, and achieving goal five on gender parity will be extremely difficult.

Disparities in enrolment between girls and boys are usually lower when only those children of regular school age are taken into account, using net enrolment. The differences are slightly more significant in the countries of sub-Saharan Africa and the Arab States and North Africa than

in Latin America and the Caribbean and in Asia. It appears that although more boys are enrolled overall, they also make up more of the over-age pupils. Thus, a higher gross enrolment ratio for boys is partly explained by the fact that boys are more likely than girls to remain in school beyond the official school age.

In the majority of countries, boys also repeat grades more than girls. The countries where girls repeat more than boys are almost all in sub-Saharan Africa, where overall repetition levels above 15 per cent are common. Countries with higher repetition among girls also have the lowest overall enrolment and the greatest disparities in favour of boys in terms of access and enrolment.

Levels of participation in secondary education vary widely between and within regions. In countries where overall enrolment is high, young women are more likely to have an advantage over young men and, conversely, where overall enrolment is low, young men have the edge.

Gross enrolment ratios for 1999/2000 show that the lowest levels of primary and secondary school enrolment, especially for women, are found in Central and West Africa. The situation is more favourable to women in countries of South and East Africa. Gender parity is more common in Latin America and the Caribbean and increasingly in Asia and Pacific and the Arab States and North Africa. The disparities are more pronounced in secondary school than in primary education and indicate that in some regions attention needs to be devoted to boys' school attendance.

Countries that have moderate gender disparities in favour of males (GPI between 0.81 and 0.98) have a reasonable chance of reaching parity by 2005 as established by goal five, but in countries with high disparities in favour of boys (GPI below 0.80), the goal of achieving gender parity in primary and secondary education by 2005 seems unlikely to be reached. The target appears particularly unrealistic for countries with a GPI below 0.60. As is the case for primary education, most of those countries are from Central and West Africa and are members of the group of least developed countries. In all of

Figure 38. Primary education: changes in gender disparities in gross enrolment ratios, 1990/1991 and 1999/2000[a]

Arab States - sub-Saharan Africa

Latin America and Caribbean - Asia and Pacific

them, young women are at a marked disadvantage in terms of participation in secondary education: there are barely two girls enrolled for every three boys, and often only two girls for every four boys. It will take strong and innovative approaches at the national and international levels, integrating the economic, social and cultural dimensions of gender inequity, to begin to redress the situation.

Available net enrolment ratio data for secondary education reinforce the findings from gross enrolment data. Indeed, the positive advantage for girls in countries such as Botswana, Lesotho and Namibia is even more marked. This may well be a result of the demand in those countries for employment of boys. Not only is enrolment lower for boys in those countries, but representation in the over-age group of students is also greater.

Overall, it can be said that the patterns of gender disparity observed in primary education in developing countries become more marked in secondary education. Figure 39 compares the gender parity index of gross enrolment ratios for primary and secondary education. It illustrates the following:

- In countries with large disparities in primary education, the gaps widen in secondary education. Those countries are typically from sub-Saharan Africa and particularly from Central and West Africa, but also include Iraq and Mauritania in the Arab States and North Africa and Cambodia, India and Laos in Asia.

- Countries that are close to or have reached parity in primary education seem to close the gap at the secondary level or show disparities in favour of girls. Most countries of Latin America and the Caribbean, but also some countries in Asia and the Pacific, some Arab countries or areas and various South and Eastern African countries belong to this category.

- Imbalances in favour of girls become sharper in secondary education. This situation is found particularly in Latin America and the Caribbean, as well as in Southern Africa (Lesotho and Namibia) and Asia (Mongolia and the Philippines).

Repetition in secondary education is a concern in many countries, where repeaters make up 10 per cent and more of the student population. In general, male students repeat more than their female peers. However, in sub-Saharan Africa and some countries of South and West Asia, it is girls who are failing to make it through each grade successfully.

All the existing indicators used to assess gender parity measure enrolment. Repetition suggests that disparities in gender result in different degrees of progress of girls and boys through the education system. Further studies and indicators are required to measure the differential impact of such disparities on the school achievement of girls and boys.

It should also be recalled that the education of mothers is a vital factor in ensuring the education of their children. Educated parents provide the central means for ensuring that their culture, traditions and local knowledge are passed on to the next generation. The fifth Education for All goal — eliminating gender disparities — takes on added significance when its benefits for future generations are considered.

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Figure 39. Primary and secondary education: gender disparities in gross enrolment ratios by region, 1999/2000
(GPI = Female GER/Male GER)

Arab States and North Africa - sub-Saharan Africa

Latin America/Caribbean -
Asia and Pacific
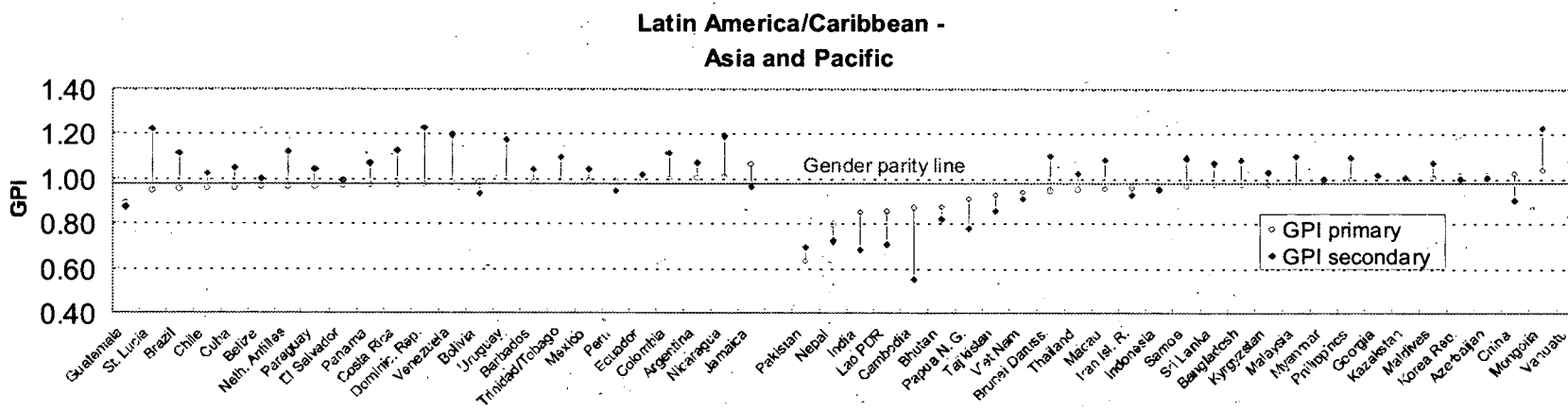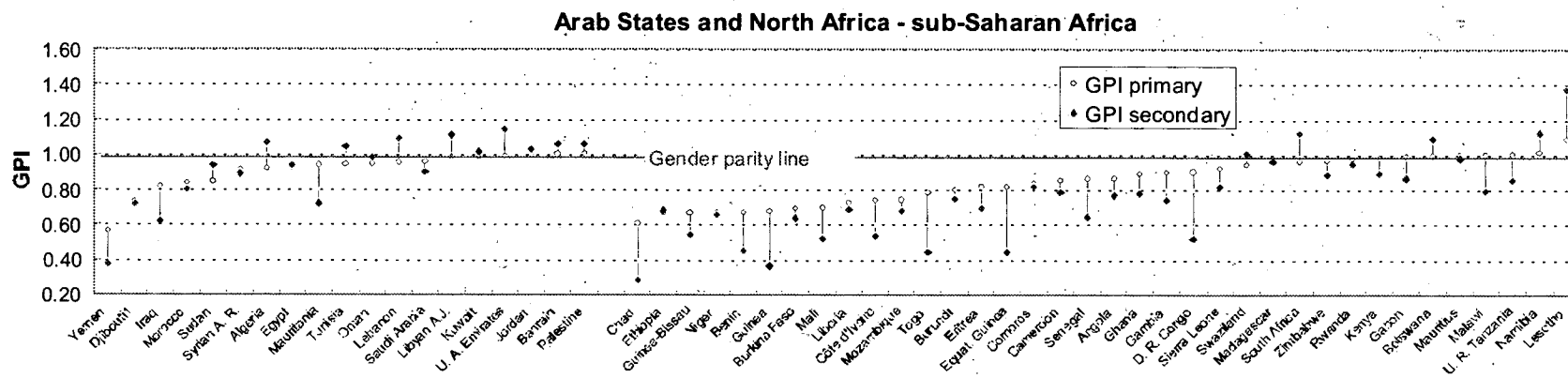
Source: UNESCO Institute for Statistics.
NOTES: GER = gross enrolment ratio.
              GPI = gender parity index.
[1] Data refer to 1998/1999.

Goal 6. Enhance educational quality

Several Education for All goals mention the need for an education of good quality and, like gender, quality is regarded as a theme that cuts across all goals. A framework is required to assess the factors involved, and then a range of indicators can be put in place to reflect each element in the framework. The most appropriate framework would be one that covers the inputs, processes and outputs of the education system.

Many of the existing Education for All indicators, such as those on intake and participation, cover inputs into the educational system, at least as far as numbers of students are concerned. Other inputs that require measurement might include textbooks, school buildings and other facilities.

Process indicators measure the way in which the inputs are turned into outputs. The most widely used process indicator in education is the pupil-to-teacher ratio. This is normally seen as an indicator of class size. However many countries include staff who have no or limited classroom duties in their count, and so it is perhaps better to regard the pupil-teacher ratio as a broader reflection of the human resources that are put into the educational system. Other indicators for which data are available include repetition rates and survival rates, which have been considered above.

Goal six makes explicit reference to one outcome indicator: "measurable learning outcomes". International tests of student achievement are becoming more common in almost all regions of the world. They can provide robust comparable data for a whole region, although access to the data is often limited. The tests are very expensive and are only likely to be carried out among the larger and more affluent of developing countries.

The Southern African Consortium for Monitoring Educational Quality found that pupils from comparatively affluent social backgrounds were more likely to have attained at least a minimum mastery of reading skills (figure 40). Using an index based on family assets (such as type of house or animal stock), it was found that pupils from the wealthiest households were twice as likely to meet minimum reading skills as those from the poorest households. The dis-

parity was particularly marked in Namibia, where only 10 per cent of poor pupils could read compared to 65 per cent of affluent pupils.

An analysis of results from assessments shows links between school and pupil characteristics, and achievement scores (figure 41). For example, how classrooms are organized can influence assessment results: multi-grade classrooms (pupils from different grades in a single classroom) made a positive impact on scores, while schools organized in shifts (often resulting in fewer school hours) had a negative impact on achievement. Other studies on the effect of multi-shift schools and learning achievement have not found conclusive evidence to support this relationship.

Other links found in African assessments included the following:

- Greater access to textbooks was associated with higher scores

- Lack of access to learning materials was related to lower achievement scores

- The most experienced teachers were found in capital cities or large urban areas; the least experienced teachers were found in rural or remote areas

- Extra instruction outside of class increased achievement scores

- Teaching experience mattered

Pupil characteristics also play a very important role in terms of achievement. Pupils with relevant language skills score better on tests. While the gender of the pupil had little impact on scores, residence in an urban or rural area did, to the detriment of those living in rural areas. Characteristics associated with repetition or late entry into school were also cited as having a negative impact on scores.

The data provide much useful information about how pupil circumstances and family background affect school achievement. Nevertheless there is still much to learn about the ways in which achievement is affected by quality of teaching and the school environment. In 2003 the UNESCO Institute for Statistics will be conducting a school survey in countries that are members of the World Education Indicators project.

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Figure 40. Proportion of pupils meeting minimum reading mastery levels by highest and lowest wealth asset score compared to overall national mean score, 1995/1996
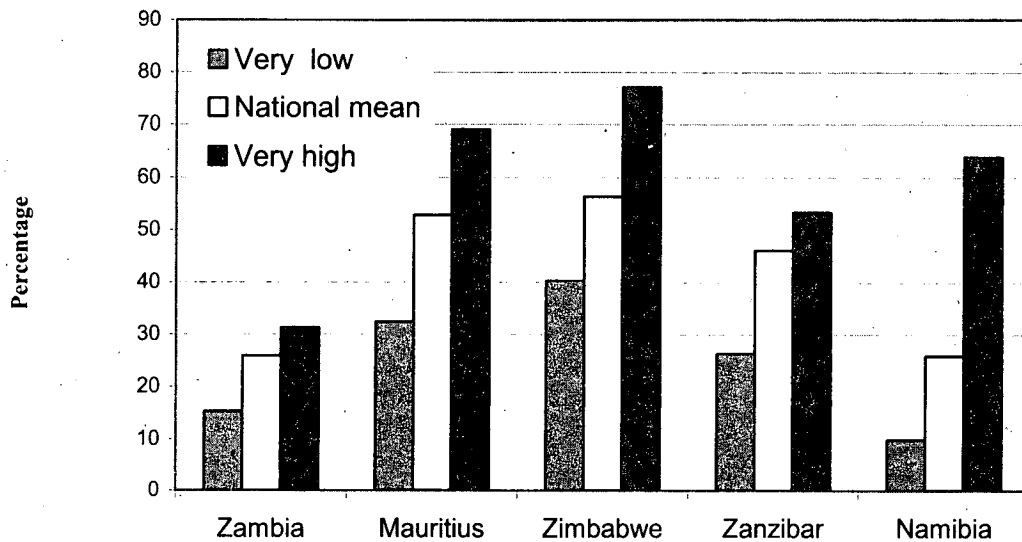
Figure 41. Impact of school organization and pupil characteristics on achievement scores in five francophone African countries, mid-1990s
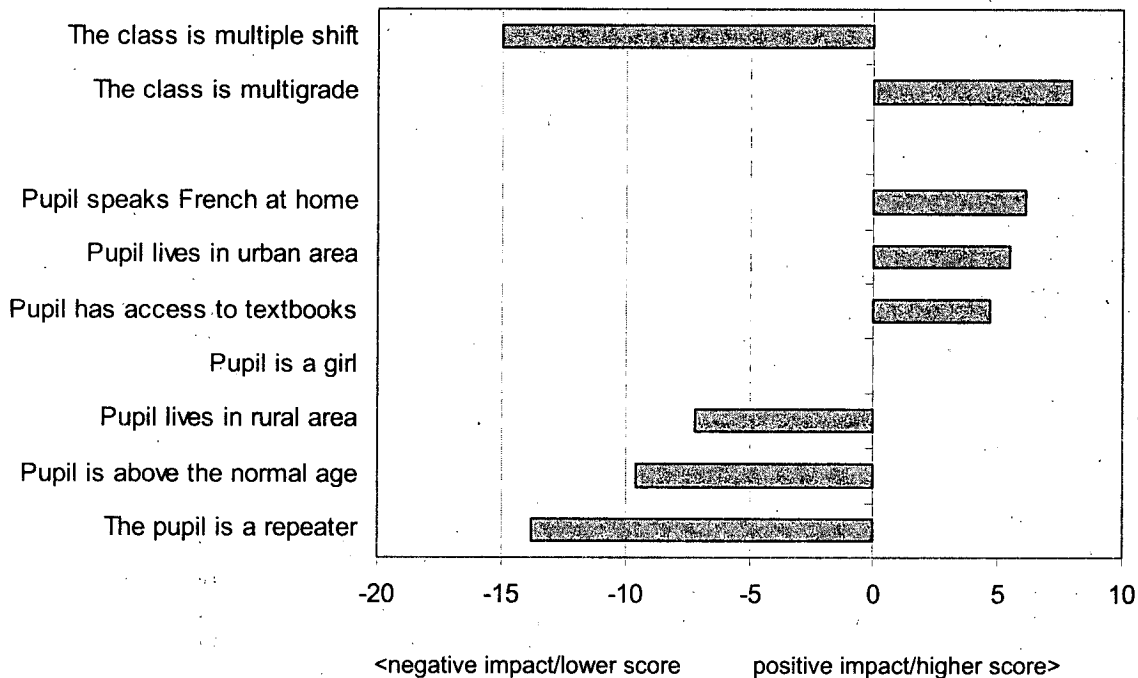
<negative impact/lower score   positive impact/higher score>

B. CONCLUSIONS

In conclusion, a substantial amount of data is available with which to assess countries' progress towards universal primary education (goal two) and the elimination of gender disparities (goal five), but there is much less information for the other goals. For goal one, which concerns early childhood care and education, some information is collected from all countries annually, but its completeness and coverage is in doubt. For goal three, which related to lifelong learning and life skills, the meaning of the whole concept is uncertain, let alone the measurement of progress. Estimates of literacy are available (goal four), but improvements in estimation techniques are desirable. Finally, with regard to educational quality (goal six), international achievement tests provide some information, but indicators to measure progress need to be established in other aspects of educational quality.

Much of the readily available data is concerned with access and participation in education, but there is little data to measure and compare educational outcomes. In 2001 the World Bank began to promote the notion of "completion" to try to identify the extent to which educational systems in different countries produced students who had successfully completed primary education and thus acquired the necessary basic skills in literacy, numeracy and other areas of knowledge. The concept of completion involves counting the number of students who reach grade five of the primary system, but there is some debate as to whether it should also include an element of successful completion or graduation.

The development of outcome measures is also under consideration for several other Education for All goals. For early childhood, measuring school readiness is of interest. The UNESCO Institute of Statistics is promoting coordination and more widespread use of international tests of student achievement. While a considerable amount of information is available on gender disparities in access and participation, it is important to understand how those disparities might affect learning achievement.

Survey data is an important source of help in understanding some of these areas. Surveys of households can examine the influence of parents' backgrounds on children's access to school as well as their attitudes towards learning. Surveys of schools can help understand how different teaching standards and classroom practices affect learning and achievement.

Future patterns of migration, birth rates, and the impact of HIV will all have a critical impact on whether countries achieve Education for All. Countries that do not give due consideration to the likely effects of demographic change on education risk underestimating the challenges that they will face.

In gathering all the information, data quality is very important. When working at the global level, it is vital for data from different countries to be collected on a comparable basis. The UNESCO Institute of Statistics is responsible for the development of the International Standard Classification of Education, which is applied to all its data.

Finally it is important to address the gaps in Education for All data through a collaborative process. Countries should know how their progress towards the Education for All goals will be judged. Although it is important that the measure does not itself become the goal, countries need to use the same criteria. The UNESCO Institute for Statistics believes that countries and donors must come together to agree on Education for All indicators.

NOTES

[1] See United Nations Educational, Scientific and Cultural Organization, Final Report of the World Education Forum, Dakar, Senegal, 26-28 April 2000 (Paris, 2000). Available from http://www.unesco.org/education/efa/ed_for_all/framework.shtml.

[2] United Nations Educational, Scientific and Cultural Organization (Paris, UNESCO Publishing, 2002).

[3] *World* Population *Prospects: The 2000 Revision*, special tabulations.

[4] More fundamentally, there is considerable debate about the scope of this goal. For example the English version of the goal talks about 'care' in early childhood, whereas the French version talks about 'protection'. This phrase seems to suggest that indicators on child development and health should be included. Ministries of Education are unlikely to have easy access to such data.

[5] A fifth country, Ireland, was excluded, as it has since 1998 classified 4 and 5 year olds as being of primary school age.

[6] Population data used for calculations are the revised 2000 data of the United Nations Population Division.

[7] *A Program for Action to Resolve the Debt Problems of the Heavily Indebted Poor Countries — Report of the Managing Director of the IMF and President of the World Bank to the Interim and Development Committees*, (EBS/96/152, Rev.1 and Sec M96-975/1).

[8] E-9: nine high-population developing countries (Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Nigeria, Pakistan) that are participants in the E-9 Initiative to eradicate illiteracy and provide universal primary education (available from http://www.unesco.org/education/e9/initiative.shtml).

[9] School life expectancy is the number of years a child is expected to remain at school, or university, including years spent on repetition. It is the sum of the age-specific enrolment ratios for primary, secondary, post-secondary non-tertiary and tertiary education.

[10] UNESCO, *ISCED 1997* (BPE-98/WS/1).

[11] The joint recommendations of the United Nations Educational, Scientific and Cultural Organization and the International Labour Organization, *Technical Vocational Education and Training for the Twenty-first Century: UNESCO and ILO Recommendations* (2002), are one exception to this observation.

[12] For additional details on measures of gender disparities see UNESCO, Division of Statistics, *Gender-sensitive Education Statistics and Indicators: A Practical Guide.* (Paris, 1997), available from http://www.uis.unesco.org/en/pub/doc/gemd-stat.pdf.

VII. CONCLUSIONS

Education is a vital aspect of population change, social development and economic growth for every society, with an impact on the economic future and social well-being of all individuals. Education is also a globally recognized human right. More than five decades ago, the General Assembly, by its resolution 217/A/III, adopted the Universal Declaration of Human Rights, which states: "Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit" (article 26, para. 1).

The right to education, and the importance of education for societal and individual development, have been repeatedly acknowledged by major United Nations conferences and summits. The centrality of education is clearly reflected in the outcomes of the global United Nations conferences held during the 1990s and in the United Nations Millennium Declaration.[1] The World Conference on Education for All in 1990 established goals and strategies to achieve basic education for all. Starting from that Conference, through the World Education Forum in Dakar in 2000, the Millennium Summit in 2000 and the special session of the General Assembly on children in 2002, the international community of nations has explicitly recognized that education, especially primary schooling, is critical for achieving social and demographic progress, sustained economic development and gender equality. Education is one of the key objectives of the United Nations Millennium Declaration, adopted by the Millennium Assembly in September 2000, in which the General Assembly resolved to ensure that, by 2015, "children everywhere, boys and girls alike, will be able to complete a full course of primary schooling and that girls and boys will have equal access to all levels of education".[2]

In the area of population, building upon the recommendations of the previous United Nations conferences on population, the Programme of Action[3] of the International Conference on Population and Development (1994) called upon Governments to ensure universal access to primary education before 2015 (para. 11.6) and ensure access by girls and women to education beyond the primary level (para. 4.18). In paragraph 11.2 of the Programme of Action, education is defined as a "key factor in sustainable development [which is] at the same time a component of well-being and a factor in the development of well-being through its links with demographic as well as economic and social factors".

Education provides enormous impetus to the development of the poorer countries of the world by offering opportunities for individuals, especially women, to achieve their potential and contribute meaningfully to their communities. Education not only imparts technical information — reading, writing, mathematics, sciences — but also provides opportunities for self-discovery and personal enrichment. For individuals, the knowledge and increased understanding of their place in the world and their community empower them to more effectively realize their desires and achieve their potential. Through education, individuals are better able to enjoy healthy lifestyles, achieve the desired number and spacing of children, undertake the type of work that they wish to undertake and, in sum, better manage their lives. When aggregated, these individual choices, decisions and improvements have powerful effects on national development. No society can consider itself truly developed without its citizens being educated.

Education impacts society along many paths. The present report focuses on one critical avenue — the interrelationships between education and population, and their resulting effects on development. The major conclusions of the report are summarized below within the following areas: (a) interrelationships between population, education and development; (b) expected changes in the school-age population and the achievement of internationally recognized goals; (c) the impact of education on patterns of marriage, onset of sexual activity, fertility and contraceptive use; (d) the relationship between education, health and mor-

tality; and (e) the role of education in international migration.

A. RELATIONSHIPS BETWEEN EDUCATION, POPULATION AND DEVELOPMENT

The following observations concern the relationships between education, population and development:

- Increased education makes an important contribution to societies' economic growth and to the economic fortunes of individuals. Evidence also suggests that for low-income countries, expansion of primary education represents the best investment. For middle-income countries, where primary education is typically already widespread, increased investment in secondary education tends to have a greater impact on economic growth.

- Illiteracy is a powerful predictor of poverty. A large body of research shows that primary education has a catalytic role in improving economic and social conditions among the poorest segments of society, for girls, rural dwellers and minorities. An important conclusion is that the expansion of educational opportunities is one of the most powerful tools that Governments have for promoting both income growth and equality.

- In some settings, the direct economic returns to women's education are limited because women are excluded from many types of employment. Nevertheless, studies of economic returns to education for individuals demonstrate that the returns from increasing women's schooling are, on average, even larger than the returns from increasing men's schooling.

B. GROWTH OF THE SCHOOL-AGE POPULATION AND MEETING THE GOALS: SCHOOL ENROLMENT AND LITERACY

Changes in the school-age population and efforts to meet the Education for All goals are outlined below:

- The enormous growth in the numbers of school-age children has presented a formidable challenge to countries in the less developed regions. Worldwide, the school-age population comprises about 2 billion persons, more than double that of 1950. Close to 90 per cent of the school-age population lives in the less developed regions. In Africa alone, the school-age population comprises million persons, which is nearly quadruple the number in 1950.

- Between 2000 and 2050, nearly 300 million persons are expected to be added to the world's school-age population. Over 350 million — a 20 per cent increase — are expected to be added in the less developed regions. Over 90 per cent of this increase is projected to occur in Africa, whose school-age population is projected to double from 330 million in 2000 to 660 million in 2050. The school-age population of Nigeria alone will increase by 34 million (nearly 70 per cent).

- The school-age population of the more developed regions is expected to decline by over one fifth between 2000 and 2050 — by about 60 million. The school-age population of Europe is projected to decline by 70 million (40 per cent). In contrast, the school-age populations of both Northern America and Australia/New Zealand are expected to rise by 20 per cent, by 16 million in the case of North America, and by 2 million in the case of Australia/New Zealand.

- An estimated 862 million adults in the world were illiterate in 2000. Four countries — Bangladesh, China, India and Pakistan — account for close to two thirds of the world's illiterate population.

- Goal three of the Dakar Framework for Action adopted in 2000 requires a 50 per cent improvement in national literacy rates by 2015. If present trends continue, about 25 developing countries are likely to reach this goal. Another 58 countries are poised to achieve an improvement of 30 to 50 per

cent in their illiteracy rate. The remaining 30 countries, many among those with the lowest literacy levels in the world, are projected to reduce illiteracy by less than 30 per cent.

- Two thirds of the world's illiterate adults are women. Gender gaps remain large in many countries, especially in Africa and Asia. For example, in sub-Saharan Africa in 2000, 29 per cent of young women (aged 15-24) were illiterate, as compared with 19 per cent of young men, and in South and West Asia, the figures were 39 per cent for young women and 23 per cent for young men.

- Literacy rates among women have been improving at a faster pace than among men. However, in 2015, at current trends, there will still be 507 million illiterate women as compared with 292 million illiterate men.

- Progress in improving access to schooling was in general greater during the 1990s than during the 1980s. Nevertheless, as of 1999/2000, an estimated 115 million children of primary-school age were not in school. Nearly all (94 per cent) of those children live in the developing regions.

- In most parts of the world, girls and women have traditionally received less education than boys and men. Over recent decades, substantial progress has been made in all regions in narrowing the gap between boys' and girls' enrolments and the gender gap in literacy. However, the gaps remain large in many countries, especially in Africa and Asia. By contrast, in the more developed regions and in Latin America and the Caribbean, there exist today only small gender gaps in primary and secondary enrolments, and such differences as do exist are usually to the advantage of girls.

- At current rates of progress, 57 countries are unlikely to reach the goal of universal primary education by 2015. Furthermore, 41 of those countries, including some in

Central and Eastern Europe, have experienced some backsliding in recent years.

C. MARRIAGE, ONSET OF SEXUAL RELATIONS, FERTILITY AND FAMILY PLANNING

The following conclusions concern the impact of education on patterns of marriage, onset of sexual activity, fertility and contraceptive use:

- Among both women and men, an early age at first marriage is more common among those with no education than among their educated peers.

- Women's age at onset of sexual activity is higher among those with higher levels of education. The evidence for men, however, is less clear.

- Education of women is a major factor influencing the start of childbearing. In the developing countries, the proportion of adolescents that have started childbearing is 3 to 5 times as high among adolescents with no education as among those with a secondary or higher education.

- The impact of education on fertility is significant, both at the aggregate level and at the individual level. Globally, countries with higher female literacy rates and educational attainment have lower total fertility rates than countries whose populations have lower education levels.

- The impact of family size on children's education in most settings is generally found to be weak in comparison with other social factors, such as household poverty. However, in some countries, unwanted and excess fertility has been found to reduce children's educational attainment, and for adolescent girls, pregnancy often leads to dropping out of school.

- Within countries, fertility decreases as educational attainment increases. The largest fertility differentials by education are found in sub-Saharan Africa, Western Asia and Latin America and the Caribbean, where women with a secondary or higher education ultimately have, on average, about 3 children fewer than women with

no education. Differentials in fertility by educational level are much smaller in developed countries than in developing countries.

- In the developing countries, higher education of the husband is also related to lower completed fertility, but its effect is weaker than that of the wife's education. In the developed countries, there is only a slight difference (less than one half child) between the family size of the least educated men and that of the most educated men.

- The relationship between educational attainment and fertility evolves depending on the stage a society has reached in the fertility transition. The difference in total fertility between the lowest and the highest educated tends to widen at the beginning of the fertility transition. The difference narrows as the fertility transition proceeds further, and as low-fertility norms become diffused throughout the society and family planning services become accessible to all.

- Women with higher levels of education desire smaller families. Education differentials in the ideal number of children are greatest in sub-Saharan Africa, where women with no education desire to have, on average, 2 children more than women with a secondary or higher education.

- In general, women in developing countries want fewer children than they actually have, and this gap varies across educational groups. The gap between desired and actual fertility is larger among women with no education or a primary education than among women with a secondary or higher education. This is particularly true in Latin America and the Caribbean where the difference between wanted fertility rates and actual fertility rates among women with no education is almost twice as large as the difference among highly educated women.

- In the developing countries, contraceptive prevalence varies considerably across educational strata, there consistently being a higher prevalence among better-educated women than among women with low or no formal education. Even a small amount of schooling has a significant impact on contraceptive behaviour. Contraceptive-use differentials by education are most marked in sub-Saharan Africa, the region with the lowest level of education and the lowest level of contraceptive prevalence. In Africa, the proportion using contraception among women with a secondary or higher education is more than 3 times as high as that among women with no education. In the developed countries, where contraceptive prevalence is already high, differentials in contraceptive use are small.

D. HEALTH AND MORTALITY

Issues concerning the relationship between education, health and mortality are presented below:

- Declining mortality has acted to accelerate the growth of the school-age population. Even though this has the short-term effect of requiring the provision of enough teachers and schools, mortality decline also means that less of the costly investment in educating children is lost to premature death. In economic terms, declining mortality increases the returns to the investment in education, since more of the children who receive schooling survive to become productive workers, parents and, eventually, elders.

- Of the socio-economic variables that have been found to be associated with differentials in health and mortality, education is among the strongest and the most consistent. Wherever the relationship has been examined, better-educated people and their family members appear to stay healthier and live longer lives. For example, in many developing countries, the better educated have greater knowledge of how to prevent HIV infection.

- In the more developed regions, education differentials in adult health and mortality

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are well documented. Evidence suggests that education differentials in mortality within developed countries are widening as better-educated persons increase their relative survival advantage over the poorly educated.

- In developing countries, studies have shown that those with less education have higher maternal mortality; children with higher under-five mortality; less knowledge of key health interventions; lower levels of immunization coverage; and lower nutritional status. Access to proper care during pregnancy and delivery is also sharply differentiated by the level of a woman's education.

- HIV/AIDS is a threat to the survival of education systems in many high-prevalence developing countries. High levels of teacher attrition and absenteeism owing to HIV/AIDS-related illness challenge the education systems of such countries. The epidemic inflicts heavy burdens on students and their families, often resulting in declining school enrolments and increasing dropout rates. As education systems are weakened by the HIV/AIDS epidemic, teaching and learning are becoming less effective for large segments of the populations of a growing number of developing countries.

E. International Migration

The following conclusions relate to the role of education in international migration:

- Education is increasingly a key characteristic being taken into consideration by countries that apply admission and residence criteria for immigration, which has long been the case among the traditional countries of immigration (Australia, Canada, New Zealand and the United States). As a result, those countries attract more educated migrants than the receiving countries in Europe. However, since the second half of the 1990s, European and other receiving countries have also been enacting legislation placing emphasis on migrants' skills.

- The educational attainment of migrants varies widely depending on their region or country of origin. The distance between origin and destination, the reasons for migration and the age structure of different groups of migrants are some of the determinants of the differences observed.

- Increasingly, student migration has paved the way for a migrant workforce or for permanent settlement. Migrants educated in the host country might be at an advantage in finding employment locally. In some cases, student migration is used as a channel for clandestine labour migration. As recruitment of highly skilled professionals has become competitive, foreign students, especially those in science and technology, are being seen as part of a qualified migrant workforce.

- Recent years have witnessed increased international mobility among students. The stock of international students is concentrated mostly in developed countries. France, Germany, the United Kingdom and the United States are the leading destinations for people seeking education abroad.

- Foreign students come to study from a wide variety of countries that often have geographical, historical and institutional linkages with host countries. Countries in Africa, Asia and Europe mostly attract students within their respective regions, playing the role of regional hub for higher education. A preponderance of Asian students has been a characteristic of student migration to Australia and the United States.

- In sum, it is abundantly clear that education plays a key role in national development, besides being a prime component of individual well-being. Through education, individuals are empowered to have choices and make decisions, in such areas as work, place of residence, family size, health, lifestyle and personal development. When aggregated, all the individual choices and decisions have dramatic consequences for a

population. As the Secretary-General recently stated, "...without the full development of a country's human resources... development will not take root, and economic growth will not be sustained", for "educated individuals are far more able to contribute to the well-being and advancement of their societies" (Dubai Strategy Forum, 28 October 2002)[4].

NOTES

[1] General Assembly resolution 55/2.

[2] Ibid., para. 19.

[3] *Report of the International Conference on Population and Development, Cairo, 5-13 September 1994* (United Nations publication, Sales No. E.95.XIII.18), chap. I, resolution, annex.

[4] Available from http://www.un.org/apps/sg/sgstats.asp?nid=130.