



Alma-Ata: Rebirth and Revision 4

30 years after Alma-Ata: has primary health care worked in countries?

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This is the fourth in a [Series](#) of eight papers about Alma-Ata: rebirth and revision

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We assessed progress for primary health care in countries since Alma-Ata. First we analysed life expectancy relative to national income and HIV prevalence to identify overachieving and underachieving countries. Then we focused on the 30 low-income and middle-income countries with the highest average yearly reduction of mortality among children less than 5 years of age, describing coverage and equity of primary health care as well as non-health sector actions. These 30 countries have scaled up selective primary health care (eg, immunisation, family planning), and 14 have progressed to comprehensive primary health care, marked by high coverage of skilled attendance at birth. Good governance and progress in non-health sectors are seen in almost all of the 14 countries identified with a comprehensive primary health care system. However, these 30 countries include those that are making progress despite very low income per person, political instability, and high HIV/AIDS prevalence. Thailand has the highest average yearly reduction in mortality among children less than 5 years of age (8·5%) and has achieved universal coverage of immunisation and skilled birth attendance, with low inequity. Lessons learned from all these countries include the need for a nationally agreed package of prioritised and phased primary health care that all stakeholders are committed to implementing, attention to district management systems, and consistent investment in primary health-care extension workers linked to the health system. More detailed analysis and evaluation within and across countries would be invaluable in guiding investments for primary health care, and expediting progress towards the Millennium Development Goals and “health for all”.

Alma-Ata—worldwide rhetoric and country reality

Although an understanding of worldwide trends and policy shifts is important, improvements in health depend on what happens at national, subnational, and district levels and, ultimately, in the communities in which families live and die. In the past three decades, great progress has been made.¹ For a girl born in Alma-Ata in 1978, the risk of dying before her fifth birthday was 7·3%. This risk for a baby born in 2008 in what is now Almaty, Kazakhstan is less than half at 2·9%. This reduction is similar to the worldwide average reduction during the past 30 years, with mortality for children less than 5 years of age decreasing from 145 per 1000 before the Alma-Ata Declaration to 72 per 1000 live births now (a 50% reduction). However, the reduction has been less in the least developed countries (42%) than in the richest countries (77%). Similar patterns exist for maternal mortality and life expectancy.

National data are important to track regional and worldwide trends but, most importantly, should be used for appropriate action within countries and to ensure governments are accountable for provision of services to the poorest citizens. James Grant, Director of UNICEF at the time of the first-child survival revolution, placed great emphasis on objective measures of progress, using national data as an important impetus for action, notably through yearly reports ranking countries' progress such as *Progress of Nations* and *State of the World's Children*.¹ Countdown to 2015² represents a further iteration in the measurement of country progress, returning to some of

the core Alma-Ata principles, including tracking equity and progress in other sectors (such as education, water, and sanitation). Although few of the 68 Countdown priority countries are on track for Millennium Development Goals (MDGs) 4 and 5,³ a substantial number of low-income countries, some not included in the Countdown list, have made major progress in the past 30 years in delivery of primary health-care services at high coverage, and reduced maternal and child deaths. Some of these countries provide examples of sustained success in the presence of poverty, political instability, or high HIV/AIDS prevalence. An improved understanding of the factors associated with such progress could help to expedite progress in other countries. For some large countries, such as India, where each state can be larger than some countries and between-state variation is enormous, well-achieving states, such as Kerala, contrast with those where child mortality is at least five-fold higher.⁴

Analyses across countries with data at the national level have many caveats. A central tenet of the Alma-Ata Declaration is that progress in health depends on many factors—ie, economics, education, nutrition, health system, and culture—and is closely linked to governance, social justice, and changes in other sectors.¹ Attribution of cause and effect over time at national level is particularly difficult with the wide range of factors that might have changed. Changes and possible associations could also be masked by shifts in definitions and data quality with time. Country-level analysis masks intra-country variation. Despite these caveats, we set out to

For the *Progress of Nations and State of the World's Children* report see <http://www.unicef.org/publications/>

assess progress in primary health care in countries since Alma-Ata, and identify common themes and lessons learnt from those that have overachieved or underachieved, particularly for pathways to build comprehensive and equitable primary health-care systems associated with mortality reduction.

Data inputs and methods

We used data from Countdown to 2015,³ UN databases, mainly UNICEF,⁵ and other sources for this analysis (webtable 1). We analysed data from 90 countries with a Gross National Income (GNI) per person of less than US\$10 000 and at least 100 000 births per year, to focus on what works at scale in low-income and middle-income countries (figure 1). We assessed present life expectancy in relation to GNI per person and HIV/AIDS prevalence to identify overachievers and underachievers.

To assess changes in mortality with time, we further narrowed our focus on countries with a GNI per person of less than \$5000 in 2006 (figure 1) and ranked these 80 countries according to their average yearly rate of reduction in mortality among children age less than 5 years from 1990 to 2005. We identified 30 countries with the best average yearly rate of reductions. For these countries, we assessed changes in total fertility rate and maternal mortality ratio as outcome measures.⁶ We recognise that both selective and comprehensive primary health care entail a complex array of indicators. We selected immunisation coverage with three injections of diphtheria, pertussis, and tetanus (DPT3), and contraceptive prevalence rate as indicators of selective primary health-care implementation, and skilled birth attendance coverage as a marker of the development of a comprehensive primary health-care system. We also assessed equity with skilled birth attendance coverage across income groups because this indicator has the highest disparity according to income quintiles and therefore serves as a proxy for overall inequity in primary health-care services.^{7,8} As indicators of intersectoral actions in support of primary health care, we used access to clean water and gender inequality in literacy. Government spending on health and education compared with defence was used as an indicator of commitment to social welfare.

Overachieving and underachieving countries for life expectancy relative to national income

Figure 2 shows a strong association between life expectancy and GNI per person. Among the 90 low-income and middle-income countries, the highest life expectancy is 78 years in Cuba and the lowest is 41 years in Zambia, closely followed by 42 years in Zimbabwe, where life expectancy continues to decrease precipitously. Many countries with a life expectancy greater than that expected for GNI per person have had the most rapid reductions in mortality rates for children less than 5 years of age, which is unsurprising because reduced child mortality is a major component of increased life expectancy.

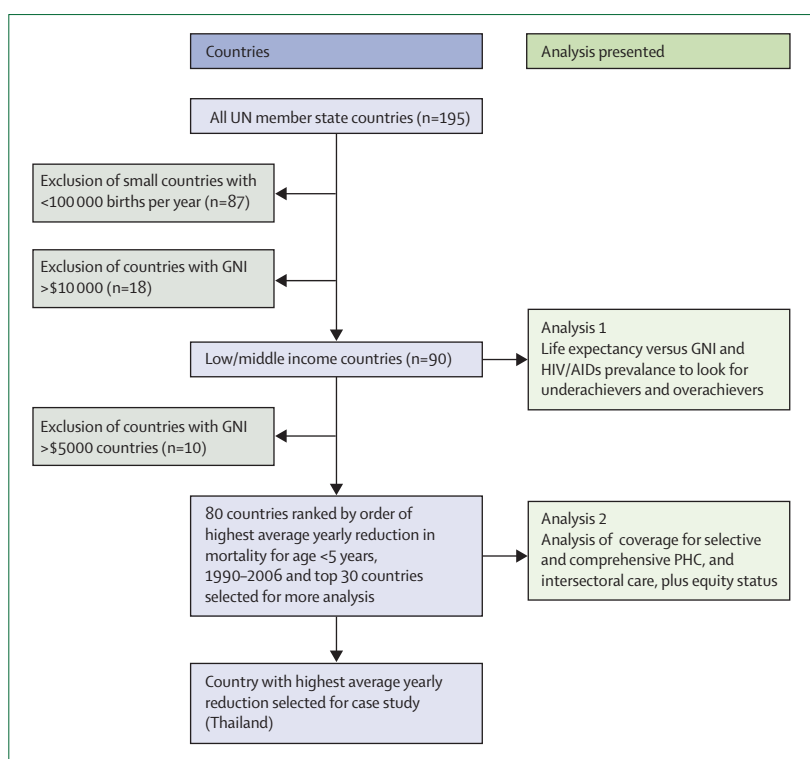


Figure 1: Flow diagram of countries included in the analyses
GNI=Gross National Income per person. PHC=primary health care.

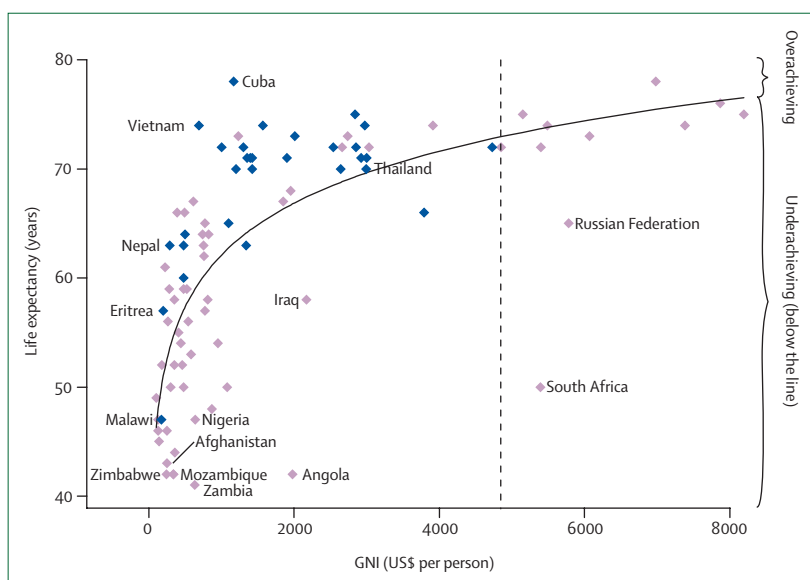


Figure 2: Life expectancy in 90 countries with more than 100 000 births per year with Gross National Income (GNI) per person of less than US\$10 000 in 2006

Blue symbols are the 30 low-income countries listed in table 1. The fitted line represents the regression curve of life expectancy versus log GNI.

Overachieving countries will be assessed in detail with the top 30 low-income and middle-income countries for mortality reduction because most of these 30 countries are above the regression curve in figure 2.

See Online for webtable 1

Lessons learned from underachieving countries and those in which primary health care has not been sustained

Although reviews of country success stories are more likely to be publicised, we can still learn from countries where life expectancy is less than that expected on the basis of the GNI. Four distinct categories can be identified among these underachievers.

The first group of countries—eg, Angola, Iraq, and Chad—are examples of countries affected by conflict, where the infrastructure has been damaged or destroyed and the conflict has had a direct effect on life expectancy. Modern warfare increases loss of civilian lives, especially women and children.⁹ Data from Iraq and Angola draw attention to the substantial effect of collateral deaths due to increased infections,¹⁰ malnutrition,¹⁰ and other indirect links with conflict.^{11,12}

The second group of countries—eg, South Africa and Zambia—are countries with very high HIV/AIDS prevalence where, in some cases, an inadequate or delayed response to the threat of disease can overwhelm otherwise well-functioning primary health-care systems. Unsurprisingly, HIV/AIDS prevalence shows a strong negative association with life expectancy. Together GNI and HIV/AIDS prevalence account for more than 70% of the variation in present life expectancy in the 90 low-income and middle-income countries. South Africa, with 20% prevalence, is a clear outlier in figure 2. However, once HIV/AIDS is accounted for, life expectancy

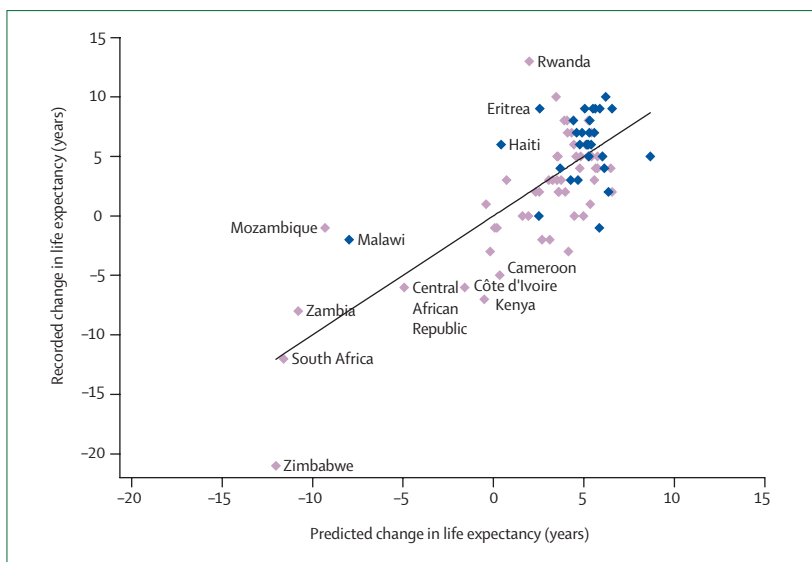


Figure 3: Recorded changes in life expectancy during 1990–2006 versus expected change based on change in Gross Domestic Product (1990–2006) and HIV prevalence (2006)

Graph based on jackknife regression analysis. Blue symbols indicate the 30 low-income countries listed in table 1. Any countries that are below zero on the y axis had a reduction in life expectancy between 1990 and 2006. The line indicates when recorded and predicted changes in life expectancies (based on HIV/AIDS and Gross Domestic Product per person) are equal. Those countries above the line are doing better than expected and those below the line are doing worse than expected—eg, Malawi is predicted to have had a reduction in life expectancy of about 7 years, whereas in practice life expectancy has decreased by 2 years during 1990–2006; therefore the recorded values are better than the predicted values. Five countries (Somalia, Iraq, Libya, Afghanistan, and Serbia) were excluded because of missing data for Gross Domestic Product change.

in 2006, although still less than in 1990, is close to what would be expected based on changes in Gross Domestic Product and disease prevalence (figure 3). HIV/AIDS directly affects progress towards MDGs 4 and 5 in South Africa.¹³ Health services are burdened by the increased workload of providing antiretroviral treatment for half a million of 6 million people with HIV, prevention of mother-to-child transmission, care for ill children, and services for tuberculosis and other complications. The emergence of multidrug-resistant tuberculosis in South Africa is an indication of a primary health-care system that is struggling to meet these challenges and that has high treatment default rates. The severity of the HIV epidemic is often blamed on an absence of effective political leadership. Additionally, the pre-existing weakness of primary health-care and community-based services has hampered an effective response.¹⁴ The HIV/AIDS epidemic is now forcing a revitalisation of primary health-care and community-based services. In particular, community health workers are playing an important part in the provision of counselling, antiretroviral drugs, and home care, and the government is exploring the possibility of a new multipurpose community health worker cadre to reach the urban poor.

In countries with a high HIV/AIDS prevalence, the disease is a serious challenge to health systems, especially primary health care. However, some countries, despite very high HIV/AIDS prevalence, have succeeded in improving health outcomes. Malawi is one notable example with a disease prevalence of 14% and a very low GNI of \$170 per person. Although, some reduction in life expectancy has occurred in the presence of the HIV/AIDS epidemic (figure 3), it is less than might be expected compared with other countries. Malawi is one of only two African countries in the top 30 countries with child mortality reduction (table 1). Rwanda is another country that is doing much better than expected on the basis of HIV/AIDS prevalence and GNI, and despite major civil disturbance in the past (figure 3). Mozambique, Eritrea, and Haiti are also doing well. Of note, several southern African countries including Lesotho, Swaziland, and Botswana, with very high HIV/AIDS prevalence were excluded from our analyses due to their small populations.

The third group includes countries with specific adult mortality challenges despite low child mortality rates, notably some former Soviet countries that have had a reduction in adult, particularly male, life expectancy. In Russia, Tajikistan, and Kazakhstan, life-expectancy rates are low (figure 2) despite low child mortality rates, and are affected by excess adult mortality rates, particularly for men; alcohol, tuberculosis, violence, and suicide, and chronic diseases are important contributory factors. Importantly, primary health care in the Soviet Union was strong, and achieved high coverage but was neglected with the breakup of the Soviet Union. Key public-health markers, such as immunisation coverage, have decreased

and health investment has mainly been in cities. Consistent commitment is needed to ensure that primary health care reaches the whole population.

The fourth group includes countries with governance challenges and marked societal inequity—eg, Zimbabwe, Nigeria, and Cameroon—available resources for health are not spent effectively (figure 3). In Nigeria, even child immunisation coverage remains very low, with DPT3 coverage at 54%, which is much lower than the African average of 72%. Yet for the richest families in Nigeria, full intensive care of any sort is available. Progress in improvement of life expectancy, and reduction of child and maternal mortality has been extremely slow despite a strong primary health-care national champion in the former minister of health, Olikoye Ransome-Kuti, and the availability of an appropriate cadre of workers—community health extension workers—initiated more than two decades ago. Effective primary health care requires reliable decentralised management and accountability to the community served, both of which are a challenge in Nigeria because of the sheer size of the country with 774 districts, independence of each state from federal policy, and pervasive corruption at all levels of the public system, including the health system. In Transparency International's corruption index, Nigeria had been ranked as the most corrupt nation for several years but in 2007 it ranked 147 among 179, which is perhaps a sign of hope.¹⁵

30 low-income countries with the most progress

We selected the top 30 low-income countries with the greatest average yearly reduction in mortality among children under the age of 5 years (1990–2006) as a marker of progress for primary health care (table 1). Together these 30 countries account for 2.6 billion people, more than 40% of the world's population but only 1.43 million deaths of children less than 5 years of age, about 15% of the worldwide total (table 1). The first 15 countries in the list are predominantly in southeast Asia, north Africa, and Latin America, with the exceptions of Nepal and Sri Lanka. Sub-Saharan Africa is represented only by Eritrea and Malawi. Although all these countries have shown progress in reduction of child deaths, not all are officially on track for MDG 4. Some African countries with recent progress in reduction of mortality in children less than 5 years of age, such as Tanzania,¹⁶ still have a low average yearly rate of reduction during the 16 years from 1990 to 2006 and so are not in the top 30 list of countries. Although the 30 countries have substantially reduced mortality rates for children aged less than 5 years, several (notably Malawi and Nepal) still have very high estimated maternal mortality ratios, and for many countries the neonatal mortality rate has not decreased as quickly as that for children less than 5 years of age. A wide variation in coverage of primary health-care services exists even among the 30 countries that are making progress (table 2; for more detail see webtable 2). Almost all these countries

| | Countries and territories* | Total population in thousands (2006) | Average yearly reduction in mortality (1990–2006) | Mortality rate for children <5 years† (2006) | Number of deaths for children <5 years (2006) | Estimated maternal mortality ratio (2005)‡ |
|----|----------------------------|--------------------------------------|---|--|---|--|
| 1 | Thailand | 634 44 | 8.5% | 8 | 7 000 | 110 |
| 2 | Vietnam | 86 206 | 7.1% | 17 | 28 000 | 150 |
| 3 | Peru | 27 589 | 7.1% | 25 | 15 000 | 240 |
| 4 | Brazil | 189 323 | 6.5% | 20 | 74 000 | 110 |
| 5 | Indonesia | 228 864 | 6.2% | 34 | 151 000 | 410 |
| 6 | Syria | 19 408 | 6.2% | 14 | 7 000 | 130 |
| 7 | Egypt | 74 166 | 6.0% | 35 | 64 000 | 130 |
| 8 | Sri Lanka | 19 207 | 5.6% | 13 | 4 000 | 58 |
| 9 | Nepal | 27 641 | 5.5% | 59 | 47 000 | 830 |
| 10 | Morocco | 30 853 | 5.5% | 37 | 23 000 | 240 |
| 11 | El Salvador | 6 762 | 5.5% | 25 | 4 000 | 170 |
| 12 | Ecuador | 13 202 | 5.4% | 24 | 7 000 | 210 |
| 13 | Tunisia | 10 215 | 5.1% | 23 | 4 000 | 100 |
| 14 | Dominican Republic | 9 615 | 5.0% | 29 | 7 000 | 150 |
| 15 | Laos | 5 759 | 4.9% | 75 | 12 000 | 660 |
| 16 | Bangladesh | 155 991 | 4.8% | 69 | 277 000 | 570 |
| 17 | Honduras | 6 969 | 4.8% | 27 | 5 000 | 280 |
| 18 | Iran | 70 270 | 4.7% | 34 | 48 000 | 140 |
| 19 | Bolivia | 9 354 | 4.5% | 61 | 16 000 | 290 |
| 20 | Kazakhstan | 15 314 | 4.5% | 29 | 8 000 | 140 |
| 21 | Eritrea | 4 692 | 4.3% | 74 | 14 000 | 450 |
| 22 | Guatemala | 13 029 | 4.3% | 41 | 18 000 | 290 |
| 23 | Philippines | 86 264 | 4.1% | 32 | 73 000 | 230 |
| 24 | Turkmenistan | 4 899 | 4.1% | 51 | 6 000 | 130 |
| 25 | Haiti | 9 446 | 4.0% | 80 | 22 000 | 670 |
| 26 | Nicaragua | 5 532 | 4.0% | 36 | 5 000 | 170 |
| 27 | Paraguay | 6 016 | 3.9% | 22 | 3 000 | 150 |
| 28 | China | 1 320 864 | 3.9% | 24 | 415 000 | 45 |
| 29 | Cuba | 11 267 | 3.9% | 7 | 1 000 | 45 |
| 30 | Malawi | 13 571 | 3.8% | 120 | 68 000 | 1 100 |
| | Total | 2 545 732 | | | 1 433 000 | |

Countries are ranked according to progress for Millennium Development Goal 4. *Countries with Gross National Income greater than US\$5000 per person and less than 100 000 births per year were excluded. †Per 1000. ‡Per 100 000.

Table 1: 30 low-income countries with the highest average yearly rate of reduction in mortality among children less than 5 years of age (1990–2006)

have high immunisation coverage, with a median coverage of 91% (range 53–99%) for DPT3, with only Haiti at 53% having low coverage. Contraceptive (modern method) use differs from other indicators in that the target is not 100% coverage but the median coverage of 62% is much higher than that (ie, 29%) for the 68 priority countries in Countdown.³ However, Haiti, Nepal, Laos, and the African countries included still have low contraceptive coverage of less than 50%. The median skilled birth attendant coverage for these well-achieving countries at 75% is much greater than that for the Countdown³ countries (53%) but this marker has the most variation (ranging from 19% to 100%). The coverage

See Online for webtable 2

rates for Nepal, Bangladesh, and Laos are all still very low, about 20%.

In terms of intersectoral markers, access to clean drinking water ranged from a median of 67% in the countries with selective primary health care to a median of 92% in those with comprehensive primary health care, but almost all the countries showed ongoing urban or rural inequity for this indicator (table 2). The countries with comprehensive primary health care almost had gender

equity for education. In countries with selective primary health care, female literacy is a median of 78% of male literacy, but this value is greater than the average of 68% (female literacy as a percentage of male literacy) for the least developed countries. Many Latin American countries with comprehensive primary health care have high levels of social-sector spending compared with defence.⁵

Three groups of countries with varying patterns of primary health-care coverage can be identified (table 2):

| | Selective primary health care (skilled attendance <50%) | Primary health care in transition between selective and comprehensive (skilled attendance 50–80%) | Comprehensive primary health care (skilled attendance >80%) |
|---|--|---|---|
| Countries | Nepal, Laos, Bangladesh, Guatemala, Eritrea, Haiti | Peru, Indonesia, Syria, Egypt, Morocco, Ecuador, Honduras, Bolivia, Philippines, Nicaragua, Malawi | Thailand, Turkey, Vietnam, Brazil, Sri Lanka, El Salvador, Tunisia, Dominican Republic, Iran, Kazakhstan, Turkmenistan, China, Cuba |
| Demographic status | | | |
| Total population (in thousands)* | 1839 996 | 489 178 | 216 558 |
| Estimated adult (≥15 years) HIV/AIDS prevalence rate | 0.9 | 0.25 | 0.35 |
| Economic status | | | |
| GNI per person (US\$) | 480 | 1375 | 2690 |
| Population living on <\$1 a day | 27% | 15% | 10% |
| Maternal outcomes | | | |
| Maternal mortality ratio | 365 | 150 | 67 |
| Total fertility rate in 1970 | 6.2 | 6.5 | 6.3 |
| Total fertility rate in 2005 | 3.6 | 3.1 | 2.2 |
| Child outcomes | | | |
| Mortality rate for children <5 years in 1970 | 229 | 172 | 127 |
| Mortality rate for children <5 years in 2005 | 72 | 35 | 23 |
| Mortality rate for children <5 years MDG 4 target for 2015 | 49 | 26 | 19 |
| Average yearly rate of reduction to MDG 4 recorded in 1990–2006 | 4.6% | 5.4% | 5.3% |
| Average yearly rate of reduction to MDG 4 needed by 2007–15 | 4.1% | 2.6% | 2.5% |
| Number of child deaths in 2005* | 390 000 | 423 000 | 620 000 |
| Selective primary health-care coverage markers | | | |
| Immunisation of 1-year-old children with DPT3 | 84% | 88% | 98% |
| Contraceptive prevalence | 38% | 61% | 72% |
| Health system and equity markers | | | |
| Skilled attendant at delivery | 23% | 67% | 96% |
| Skilled attendant at delivery (poorest people) | 7% | 36% | 93% |
| Skilled attendant at delivery (least poor people) | 68% | 95% | 99% |
| Intersectoral markers | | | |
| Total population using improved drinking water sources | 67% | 85% | 90% |
| Urban population using improved drinking water sources | 81% | 95% | 97% |
| Rural population using improved drinking water sources | 65% | 69% | 78% |
| Adult literacy† | 79% | 88% | 96% |
| Routine EPI vaccines financed by government | 14% | 98% | 100% |
| Governance for health marker | | | |
| Central government expenditure allocated to health | 7% | 7% | 6% |
| Central government expenditure allocated to education | 17% | 15% | 10% |
| Proportion of central government expenditure allocated to defence | 10% | 7% | 6% |
| Overseas development assistance per person | \$35.40 | \$17.80 | \$7.90 |

Data are median values, unless otherwise indicated. GNI=Gross National Income. MDG=Millennium Development Goal. DPT3=diphtheria, pertussis, and tetanus. EPI=expanded programme on immunisation. All data are the most recent available and most refer to around the year 2005. See webtable 2 for detailed sources and years. *Not median value. †For women as a percentage of male literacy.

Table 2: Summary of the 30 low-income countries with the highest average yearly rate of reduction in mortality for children less than 5 years of age (1990–2006)

selective (with high immunisation, assessed by DPT3 coverage) but with low comprehensive care coverage (skilled birth attendance <50%); primary health care in transition between selective and comprehensive (assessed by skilled birth attendance of 50–80%); and comprehensive primary health care (assessed by skilled birth attendance >80%) with varying levels of inequity in the provision of skilled birth attendance. These three groups provide a framework for assessment of the progress of primary health-care systems with time. A detailed analysis within the 30 low-income countries would be immensely valuable for understanding the broad patterns and possible mechanisms of progress. In this paper, we focus on the present coverage patterns and general long-term shifts in public-health policy for some of these 30 countries, selecting examples from each of the three groups.

Selective primary health care

For countries that started with selective primary health care, selective child survival interventions were often the entry point and formed the focus of the first child survival revolution epitomised by growth monitoring, oral rehydration, breastfeeding, and immunisation.¹ For six countries (Nepal, Laos, Bangladesh, Guatemala, Eritrea, and Haiti) the median GNI per person is only \$480 and about a quarter of the population live on less than \$1 a day (table 2). These countries are among the world's poorest, and for many instability is an additional challenge, yet progress has been made in reduction of mortality in children less than 5 years of age and total fertility rates, although maternal mortality ratio remains high. A key point to note is that these countries identified some highly effective, achievable interventions and strategies¹⁷ and have consistently followed through on these to attain high coverage even for the poor. The high immunisation rates in these countries (except Haiti) might provide an opportunity to further increase contraceptive prevalence if postnatal family planning could be integrated with the 6 week immunisation visit. Skilled birth attendance remains low and for most of these countries has changed little in the past decade, indicating a mix of constraints from absence of midwives and access issues to cultural taboos against leaving home around the time of birth. This increase in skilled attendance is the next frontier for progress in these countries and might require innovation to achieve supply (eg, accelerated midwifery training) and demand (eg, conditional cash transfers for facility births and transport subsidies) as achieved by some of the countries further up in the list of 30 countries.

Bangladesh, which previously had high mortality, is an example of a country where high coverage of a selective range of interventions has reduced mortality substantially. Large community-based non-governmental organisations, notably BRAC, have succeeded in teaching people about oral rehydration throughout the whole country so that diarrhoea is no longer the leading cause of child death.^{18,19}

Other selective interventions, such as immunisation, vitamin-A supplementation, family planning, and short-course tuberculosis directly observed treatment are delivered by community workers at high coverage, in many cases through large community-based non-governmental organisations with the support and encouragement of the government. However, comprehensive health-system coverage has not increased to the same extent, although paradoxically there have still been major reductions in maternal mortality ratio despite low skilled birth attendance.²⁰

Eritrea has focused on a few key interventions such as immunisation and has used community-change agents to deliver these interventions. This approach has been linked to consistent and impressive reductions in child mortality during 20 years despite war and harsh socioeconomic conditions. In Eritrea, improved comprehensive primary health care, as assessed by skilled birth attendance, is still low. Indeed, even contraceptive use is very low (8%). Maternal mortality ratio remains at 450 per 100 000 according to the latest UN estimates.⁶

Haiti, despite severe breakdown in governance, has achieved substantial child mortality reduction largely through the efforts of a network of non-governmental organisations working at the community level to deliver a selective range of services, in most cases bypassing ineffective government facilities. A high level of external assistance has made fairly high coverage possible, often through non-governmental and faith-based organisations. The non-governmental organisation sector applies some essential features of primary health care, including focus on priority conditions, use of community workers, strong preventive services, and simplified case management protocols.

Nepal has focused on selected interventions, and used these to build up a strong district-based network of services with community health workers in villages, supervised by extension workers in health posts, who are in turn affiliated to district hospitals. Community-case management of pneumonia is provided by community health workers,²¹ and the government is presently working with partners to test the addition of neonatal sepsis case management.

Primary health care in transition between selective and comprehensive

Egypt and Malawi are examples of countries that started with a focused approach to the delivery of a few interventions but have subsequently moved towards the delivery of a wide range of interventions, working towards a comprehensive health system. *The Lancet* Mexico Series coined the phrase “diagonal approach” to describe this progress with time.²²

In Egypt, maternal, newborn, and child health was prioritised, starting in the 1980s after Alma-Ata. The initial focus was on a selective child health and family planning package; immunisation, vitamin-A supple-

mentation, oral rehydration solution use, and contraceptive use are at high coverage now. Egypt has made progress in scaling up skilled birth attendance, now reaching about three-quarters of the population, but has a major equity gap with only 31% of the poorest quintile accessing skilled care compared with 94% of the richest quintile. Of 68 countries identified in Countdown, Egypt is one of only two where postnatal care within 2 days of

birth is received by more than 25% of the population.³ Disparity reduction, with efforts to reach the poor, is a top priority and will need continued support from community-level workers.

Malawi is one of few African countries with a national cadre of extension workers, sustained since the 1980s. The use of health surveillance assistants, mainly men, helps to explain how Malawi with a critical human resources crisis

Panel 1: Thailand's progress in primary health care and maternal, newborn, and child health

Background and approach taken

In the early 1970s, Thailand prioritised primary health care based on the following principles:

1 *Involvement of the community, bringing care close to families*

Community volunteers play an important part, promoting behaviour change and providing selected maternal, newborn, and child health, nutrition services, and promoting immunisation. The country still has more than 800 000 health volunteers for primary health care. Thailand was one of the first countries to offer injectable contraceptives at community level, contributing to a high level of contraceptive prevalence even by the 1980s. Community women's groups were part of the health and development process, and later involved in microfinance schemes. During the 1990s, bolstered by a stronger economy, universal clean water and sanitation were achieved.

2 *Investment in building an effective district health system*

In the 1980s, government policy supported development of the District Health System. By the 1990s, each district, typically with a population of 50 000, was served by a district hospital of 30–120 beds operated by a team of qualified health professionals, linked to subdistrict health centres serving a population of 5000 and staffed by three to four paramedics and providing better geographical access to services especially for the rural poor. To help address the human resource gap, mandatory rural service was instituted in 1971.²⁶ All nursing, medical, dental, and pharmacist graduates had to serve at least 3 years in the rural district hospitals. In view of limited human resource production, the Ministry of Public Health trained nurses and other paramedics. To maximise cost-effective use of drugs, the government has promoted an essential drug list using generic drugs and promoted the manufacture of drugs in the country, notably for HIV/AIDs.

3 *Attention to protecting the poor from unaffordable health costs*

In 1975 the poorest families were exempted from payments for health services, and this exemption was increased with time to include the elderly and those with disabilities, whereas maternal, newborn, and child health care and immunisation were provided free of charge from the 1970s. Low-income families who were not poor enough to be exempted could join the voluntary public subsidised insurance scheme. Public sector employees have health costs covered, and since 1991 private sector contributions to the Social Health Insurance scheme have been mandatory. The EQUITAP project, indicated that Sri Lanka and Thailand had the lowest out of pocket expenditures for health care amongst the Asian countries evaluated.²⁷ Since the universal coverage policy was introduced in 2001, the overall incidence of unaffordable expenditure has been reduced to a very low level.²⁸

4 *Increased use of data for decision making in public health*

Use of data for public health decision making has been an important ingredient. Detection of increases in HIV/AIDS prevalence in the 1980s prompted effective responses such as condom promotion, and scale-up of prevention of mother-to-child transmission strategies. National HIV prevalence remains low (1.4%).

Results

Since Millennium Development Goal baseline year 1990, Thailand has demonstrated the highest average yearly reduction in mortality for children younger than 5 years (8.5% per year) and has substantially reduced its maternal mortality ratio (now at 110 per 100 000), and is on track for Millennium Development Goals 4 (child survival) and 5 (maternal health) (table 2). The total fertility rate is also low. Very high coverage of immunisation and skilled birth attendance was achieved in the 1990s with low inequity.⁶

Sustainability and status now

With steady progress in reducing the maternal mortality ratio and mortality among children younger than 5 years, more focus on newborn mortality reduction, which now accounts for 50% of deaths in children less than 5 years of age is required. HIV/AIDS prevention and treatment are at high coverage even for poorer communities. Major challenges ahead for primary health care include demographic and rapid epidemiological transition towards chronic disease. Although the Asian economic boom of the 1980s contributed to Thailand's primary health-care success, much of the foundation was laid through consistent progress when the country still had a very low per person income.

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<http://www.equitap.org>

(only four national paediatricians in the whole country and more than half of midwifery posts vacant) has maintained and even increased coverage of some key interventions, and had substantial reductions in mortality among children less than 5 years of age. Indeed the health surveillance assistants provide antiretroviral drugs for HIV/AIDS and short-course directly observed treatment for tuberculosis,²³ and are in the process of adding further maternal, newborn, and child health tasks, notably postnatal home visits. These community workers are all affiliated to fixed health facilities, staffed by nurses, from which referral to district hospitals is made easy. 40% of health facilities are managed by faith-based organisations and non-governmental organisations, working closely with government to assure a uniform set of essential services and quality. As a result, skilled birth attendance coverage is now almost 60%, one of the highest in sub-Saharan Africa though inequity still remains high (table 2), and caesarean coverage has increased largely through the use of non-physician clinicians.²⁴ However, according to UN estimates, the maternal mortality ratio is still very high at 1100 per 100 000 (table 1).⁶ Malawi has received a high level of overseas development aid of \$42 per person, which might have contributed to progress. Distribution through health-sector planning linked to the essential health plan might have increased effectiveness of this aid. Other important components for progress have been the national Essential Health Package, with strong government leadership and buy in by donors and non-governmental organisations. Strong managerial skills at district level and improvement of drug supplies also play a part.

Indonesia has built a primary health-care infrastructure progressively in the past 30 years, initially establishing a health centre in every county in which village volunteers are trained to supervise village activities (posyandus). These volunteers focused on nutrition, child illness, family planning, and, later, immunisation. After achievement of a high level of contraceptive use and immunisation coverage, they initiated a mass effort to provide a fully trained midwife for every village, substantially increasing the access to skilled delivery assistance sustained by private practice of these midwives.²⁵ The poorest, however, are still left behind the better off with only 21% versus 89% skilled delivery assistance. Meanwhile, the posyandus have become increasingly neglected and some primary health-care coverage is decreasing. As systems develop high-level services, attention is still needed to maintain the services near to the community.

Comprehensive primary health care

We identified 14 of 30 countries with comprehensive primary health care based on coverage of skilled attendance above 80%. Thailand, which has had the highest average reduction in mortality for children younger than 5 years of 8.5% per year for 1990–2006, started with a comprehensive primary health-care

approach, and has made progress in addressing inequity (panel 1). Thailand prioritised maternal, newborn, and child health even before Alma-Ata, and beginning with community workers was able to increase coverage for immunisation and family planning interventions, and nutrition promotion. The government then invested in district health systems, which provided a foundation for transition to comprehensive coverage of maternal, newborn, and child health care and increased to cover all other essential services, and safeguarded the poor with national coverage of pro-poor health insurance. Innovative approaches to human resource production, the application of a national essential drug list, and national production of generic drugs also helped to strengthen the system with time.

Cuba is an instructive example of a country that had to make a crisis response to health after the 1959 revolution, not only for ideological reasons, since health was declared a human right for all citizens, but also for practical reasons since 3000 doctors left the country and a heavy dependence on imported medical supplies from the USA was no longer an option. Within a very short time new medical schools were established and a 2 year nursing course was started. In the meantime, while human resources for health were being replenished, the government ran mass immunisation campaigns, reaching high coverage, leading to elimination of polio, measles, and rubella before most other countries in the region. Health surveillance was rigorous, and maternal and child deaths were reported to the highest levels of government. In the 1980s, integrated polyclinics were established in all communities, enduring intensive continuity of care. For example, in the first year after birth, a mother and baby in Cuba receive 15 home visits from their local family doctor, focused on preventive care in the family context.²⁹ Cuba's mortality rate for children younger than 5 years is less than that for the USA.⁵

The barefoot doctors of China were once the most famous examples of primary health care, and probably the most influential example at the time of Alma-Ata.¹⁸ They were present in almost all communities, integrated traditional and modern care, were paid for by communes or work brigades, and had effective referral connections through county and province to the highest specialty centres in the country. However, with the end of the communes, the barefoot doctors had to rely on fees for service, leading to extensive overmedication, neglect of preventive services, and rapid collapse of the system. The country has largely succeeded in establishing a comprehensive health system along traditional lines with hospitals and clinics. High coverage has been achieved for urban populations but inequity is still high with big gaps in health outcomes between urban and rural areas, and the possibility of catastrophic health expenditure and further impoverishment are real problems for the poor.³⁰ Would the urban to rural and

rich to poor gaps be reduced if the barefoot doctors were still in practice and working within the new system, perhaps with gradual upgrading?

Progress in other countries

Although Mexico has a GNI per person of \$7870 and hence was excluded from the countries assessed (figure 1), many important lessons about primary health care and health sector progress can be learned from it.³¹ The early focus was on the standard selective child survival package with emphasis on growth monitoring, oral rehydration, breastfeeding, and immunisation; elimination of polio, diphtheria, and measles; and substantial reductions in diarrhoea mortality rates. Nutritional status of children improved greatly. The range of interventions increased with time, bridging clinics and homes, and then complex systems were strengthened, while the poor were protected through social health insurance.²² Leadership and consistency in policy making, along with investments in institutions and human resources strengthening, were among the reasons identified for progress.

Some large countries are notable by their absence from the list of 30 low-income countries with the most progress for child mortality. India has huge challenges but success within some of its states—notably Kerala and Tamil Nadu—provide important examples of primary health-care success⁴ in populations larger than many African nations. These states are characterised not only by high coverage of services but also by a stronger level of accountability of government workers to communities than in many of the areas that do worse. Pakistan is an example of a country with large-scale primary health-care programmes and multipurpose community health workers where effects on mortality and life expectancy are not discernable. This discrepancy might indicate poor programme quality, inadequate links with an effective health system,³² or complexity in measurement of programmatic effect.

Pathways to progress for primary health care

Our analysis of 30 countries, selected on the basis of child mortality reduction, offers many lessons for the pathways to scale for maternal, newborn, and child health, and for primary health care generally. Many of the same principles apply to the care of chronic disease, HIV/AIDS, and tuberculosis, particularly with a selective start to build and then extend the system. Even for countries with very low income and a quarter of population living on less than \$1 a day, reduction of mortality is possible by provision of prioritised highly effective services at high coverage. However, further gains, especially for conditions that are dependent on curative case management or complex care (such as obstetric services), depend on progression to comprehensive primary health care with a reliable referral system linking to functioning facilities. Among these 30 countries, Vietnam has achieved the comprehensive primary health-care level with a GNI per person of less than \$1000 compared with most of the

countries in the progressing group that have a GNI per person \$1000 or more; Malawi is a notable exception with a GNI per person of \$170. Panel 2 summarises characteristics we noted in many of the successful country examples. These attributes were present in many well-achieving countries and absent in many of the underachieving countries; however, statistical comparisons are not available for most of these characteristics.

Although economic growth and good governance are helpful, what is achievable despite the challenges is remarkable. We are encouraged by this country analysis in that at least half the 30 countries have one or more major constraints. Many have very low income—in the selective primary health-care group, a quarter of families live on \$1 a day or less and the median GNI per person is \$480. Malawi has very high HIV/AIDS prevalence (14%), and Haiti has moderate HIV/AIDS prevalence (4%). Haiti, Bolivia, Nepal, Sri Lanka, and other countries have had major civil unrest. Bangladesh ranks 162 among 179 countries in Transparency International's corruption index.¹⁵ Key strategies in these countries are an agreed national essential health package with defined priorities with links to the not-for-profit sector, non-governmental organisations, and other service providers in the system.

The three stages of primary health care identified here (selective, in transition between selective and comprehensive, and comprehensive) fit with other analyses of phased health-system development.⁸ However, not every country needs to pass through these stages. In some cases—notably in the oil-rich countries of the Middle East—a big jump in health-care provision by building hospitals and hiring staff was possible without first going through the process of building up a system in poor and hard-to-serve communities with restricted resources.

For most of the countries in the selective primary health-care group, health extension workers or community health workers have contributed to the achievement of high coverage of the selected interventions. 10–20 years ago, many countries in the comprehensive group were very dependent on such workers, but have now moved towards facility-based services. In Indonesia, thousands of community midwives (*bidan desa*) have been trained to ease the transition towards skilled care.^{25,33} The experience of Sri Lanka is instructive, in that improvement of rural health centres staffed by competent midwives reduced the need for beds in urban referral hospitals with large cost savings,³⁴ and reduced family opportunity costs with care being near to home.

Progression towards a comprehensive system can occur while massive inequities in coverage remain. In 11 of 21 countries (including Indonesia) with suitable data, skilled attendance coverage is twice as high in the richest compared with the poorest quintiles. In Vietnam, with high overall skilled delivery coverage (88%), and 100% for the richest quintile; coverage in the poorest quintile is still less than 60%. Remarkably, Thailand does not have

any notable inequity in skilled attendance, with apparently 100% of the poorest individuals accessing care (webtable 2). Panel 1 highlights some of the strategies that could have led to this achievement, including pro-poor financing and insurance schemes.

Although the technical health elements of primary health care are increasingly well established,¹⁷ many systems have not worked adequately or at all due to poorly developed management systems, unaccountable and unresponsive staff, chronic underfunding, and absence of attention and investment.³⁵ As shown by Thailand and Nepal, but true of many of the 30 countries, one key to success is a strong district health system, able to use data for appropriate action.³⁵

Good governance is linked to progress for health and development. Although the proportion of government spending allocated to health is low (median of 7% [range 1–23%]) for the 30 countries, social-services expenditure, for example on education, is high and that for defence is low (webtable 2). Some underachieving countries allocate up to a third of government spending to defence.³⁶ The Alma-Ata Declaration recognised the interconnectedness of social, environmental, educational, and economic factors with health.¹ Microcredit to small groups of women in Bangladesh has been proven to enhance child survival and nutrition, perhaps even more than the health services have.^{37,38} Clean and adequate water supplies were central to the health revolution in China in the 1960s,¹⁸ Indonesia in the 1980s, and Bangladesh in the 1990s, yet they remain underdeveloped in many of the poorest areas of countries

with high mortality¹⁹ and in the rural areas of these 30 countries (webtable 2). Environmental factors, such as poor urban housing quality, low occupational safety, and deforestation, with effects on water and agriculture, certainly contribute to ill health.³⁹ However, they are difficult to measure at the national level, and hence the quantification of their contributions is a challenge.

In terms of overseas development assistance per person, a clear inverse association is noted for the three groups of countries; those with comprehensive health systems in place receive a median of \$7.9 (IQR 1.33–22.09) per person; those in the middle group receive \$17.8 (11.03–62.36) per person; and the countries still with selective primary health care, receive \$35.4 (15.43–54.52) per person. At least overseas development assistance seems to be allocated so as to redress intercountry disparity.⁴⁰

Further assessment and analysis

We believe our analysis of overachieving and underachieving countries has drawn attention to factors that help or hinder national progress for primary health care and indeed for health outcomes. However, many questions remain unanswered. Perhaps some of these questions cannot be addressed successfully through quantitative, multicountry statistical analyses of progress with time. Such analyses are associated with several difficulties, including measurement error (or important factors not measured at all) compounded by the strong correlations between many of the factors of interest,

Panel 2: Composite lessons learned from countries that are progressing

- A**ccountable leadership, consistent national policy progress with time. For example, development of an integrated national health plan including primary health care and maternal, newborn, and child health with identified human resources and defined strategies to reach underserved populations. Consistency in major health policies, even when political parties change. Social development and good governance are strongly linked with progress towards a comprehensive health system. Consistent investment in health and the social sector, both government and donors, is important. For very low-income countries, donor aid, especially if linked to national plans or effective large-scale non-governmental organisation partners, is a key ingredient.
- B**uilding coverage of care and comprehensive health systems with time. Although a single right way does not exist, key factors in these countries include prioritisation of high-effect interventions to start with, integrated service delivery and building on each programme, moving from selective primary health care to an effective continuum of care in a comprehensive health system. Increase in human resources and skill levels with time and a willingness to innovate, including delegation to community and extension workers, and short training courses (eg, accelerated midwifery training) followed by in-service upgrading of skills. Attention to essential drugs and appropriate technology for health, development of local generics when feasible.
- C**ommunity and family empowerment, involving the community both in health promotion and demand for care, with community cadres and extension workers for provision of curative care when appropriate. Especially in countries with restricted access to facility care or human resources for health crisis, community and family empowerment is a critical foundation for progress of both selective (eg, immunisation and family planning) and curative care (eg, case management of pneumonia).
- D**istrict-level focus, with data to set priorities for funding at district level and track results, identifying and redressing disparities. Creation of functional links at district level with private providers and non-governmental organisations so that referral distance is minimised for families, and services meet the same standards and have similar costs.
- E**quity priority, removing financial barriers for the poorest families, particularly for skilled attendance at birth, and protection against unaffordable health costs. Systematic use of data to identify inadequately served populations and find solutions to reach all families with essential primary health care and maternal, newborn, and child health care.

particularly the dominance of GNI. The possibility is that causal effects can be bidirectional—eg, to what extent does the strong association between total fertility rate and mortality for children younger than 5 years indicate reduced fertility leading to reduced mortality, and to what extent does this association suggest reduced mortality leading to reduced fertility? Many associated questions—eg, about aid effectiveness—require additional data and other analyses.

The landscape for assessment of global health and nutrition has changed greatly in the past 5 years with multiple new initiatives. The International Health Partnership, Global Campaign for the Health MDGs, Catalytic Initiative, and Global Alliance for Vaccines and Immunisation all promote support for health interventions that are central to primary health care. Advances in the control of HIV/AIDS, tuberculosis, and malaria are being made with support from worldwide initiatives,⁴¹ and again primary health care can and should be central to delivery of these preventive and therapeutic services. Much remains to be learned from these accelerated programmes, and systematic assessment is essential to ensure their effectiveness and sustainability. A common assessment framework for the health MDGs will benefit all stakeholders;⁴² use of common assessment approaches and core indicators, service provision, coverage, quality, cost, and health effect, will provide the best opportunities to improve our understanding of what is needed to build effective, sustainable primary health-care systems.

Health for all in every country—where will we be in 10 years?

30 years after Alma-Ata, many countries still have a high burden of disease with infections, such as high infection, malnutrition, and maternal and child health challenges, but also emerging chronic diseases, and high injury rates. Primary health care offers solutions and approaches to address these burdens but the increasing complexity threatens to overburden the health system. Our analyses indicate that most countries have made progress in increasing life expectancy; countries making most progress often have associated reductions in child mortality. With more than half of 30 low-income countries having major constraints to progress—ie, extreme poverty, political instability, conflict, or HIV/AIDS—this analysis offers hope that even in the most challenging circumstances progress can be made not just in service provision but also in saving lives. Some of these countries have done a remarkable job of delivering selective primary health-care services, subsequently adding more comprehensive, curative and facility-based interventions. The 14 countries identified furthest along the path towards a comprehensive and equitable health system have all benefited from strong, consistent government commitment to health. With the exception of Sri Lanka, all have had relative political stability during the past 15 years although several underwent

major political change in the two decades before that (eg, Vietnam, Iran, Kazakhstan, and Turkmenistan). By 2018 and the fortieth anniversary of the Alma-Ata Declaration will there be more countries with strong primary health care and progress towards “health for all”? Further analyses have the potential to yield important information. However, such information is only useful if it leads to investment and action to increase coverage and equity of services; to empower communities to make healthy choices.

Conflict of interest statement

We declare that we have no conflict of interest.

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