

Equity and child-survival strategies

EK Mulholland,^a L Smith,^b I Carneiro,^b H Becher^c & D Lehmann^d

Abstract Recent advances in child survival have often been at the expense of increasing inequity. Successive interventions are applied to the same population sectors, while the same children in other sectors consistently miss out, leading to a trend towards increasing inequity in child survival. This is particularly important in the case of pneumonia, the leading cause of child death, which is closely linked to poverty and malnutrition, and for which effective community-based case management is more difficult to achieve than for other causes of child death.

The key strategies for the prevention of childhood pneumonia are case management, mainly through Integrated Management of Childhood Illness (IMCI), and immunization, particularly the newer vaccines against *Haemophilus influenzae* type b (Hib) and pneumococcus. There is a tendency to introduce both interventions into communities that already have access to basic health care and preventive services, thereby increasing the relative disadvantage experienced by those children without such access. Both strategies can be implemented in such a way as to decrease rather than increase inequity.

It is important to monitor equity when introducing child-survival interventions. Economic poverty, as measured by analyses based on wealth quintiles, is an important determinant of inequity in health outcomes but in some settings other factors may be of greater importance. Geography and ethnicity can both lead to failed access to health care, and therefore inequity in child survival. Poorly functioning health facilities are also of major importance. Countries need to be aware of the main determinants of inequity in their communities so that measures can be taken to ensure that IMCI, new vaccine implementation and other child-survival strategies are introduced in an equitable manner.

Bulletin of the World Health Organization 2008;86:399–407.

Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction

In human rights law, the term “equity” is used to represent equality with fairness. This is synonymous with the notion of distributive justice, or fair distribution of good things within a society, whether they be material possessions, access to health care, or simply survival. There is nothing that highlights the inequity of our world more starkly than child mortality, and we believe that pneumonia is the cause of childhood death that most strongly reflects this inequity. Between countries the differences in child mortality rates are enormous and well documented. For a child born today, the risk of death in the first 5 years of life in Japan is 6 per 1000, while in Afghanistan, Angola and Sierra Leone the risk is over 40 times as great.¹ This is considering survival only; the chances of a child fulfilling their cognitive and growth potential are similarly inequitable.

Within countries there is also gross inequity in child health and child survival, about which much less is known. In Africa it is common to find mothers who have lost more than half of their children. These high-risk families are representatives of high-risk communities or high-risk strata within communities. To address the problem of inequity in child survival we must understand who these groups are and why they are at particularly high risk.

Modern health interventions have been the dominant factor in recent reductions in child mortality rates in the developing world. Health services, initially curative and later preventative, have generally originated in the cities and towns and moved out to rural areas, often very slowly. In the pre-20th century era this was appropriate, as the cities had higher child mortality rates in all parts of the world. However, during the 20th century the cities became healthier places to live in with improved

food supplies, water and sanitation, and health services. Consequently, in the latter part of the 20th century, as health services were rolled out into developing countries, they inevitably reached the urban areas first, often not extending beyond these areas into the more deprived rural areas. Consequently, since modern health facilities have been available, they have contributed to the growing gulf in health between urban areas and remote, rural areas in developing countries. As has been emphasized by Tugwell et al.,² the reduced effectiveness of interventions delivered to the most disadvantaged children only serves to increase the survival gap and inequity between high- and low-risk groups within a community.

Dahlgren and Whitehead³ propose a system for evaluating the equity of health services which is relevant for both developed and developing countries. The Affordability Ladder Programme (ALPS) framework assesses the

^a Department of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, England.

^b Department of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, England.

^c Department of Tropical Hygiene and Public Health, University of Heidelberg, Heidelberg, Germany.

^d Telethon Institute for Child Health Research, Centre for Child Health Research, University of Western Australia, West Perth, Australia.

Correspondence to EK Mulholland (e-mail: kim.mulholland@lshtm.ac.uk).

doi:10.2471/BLT.07.044545

(Submitted: 13 December 2007 – Revised version received: 30 March 2008 – Accepted: 1 April 2008)

equity of access to health care from the user or “demand” perspective, in contrast to the more common approach of focusing on the provider or “supply” side in this field. There are several stages in accessing effective health care (no care, informal care, formal care, and higher quality of care) each of which is influenced by the external policy environment and each of which can have potential negative health and social consequences. The ALPS framework can assist in the identification of potential barriers to accessing health care and suggest approaches to overcoming them.

“Demand” is determined by perceptions of need and recognition of the presence of serious illness. In the case of pneumonia, respiratory distress associated with rapid breathing or indrawing of the lower chest wall, often associated with difficulty feeding, indicates serious illness. Recognition of this will be determined by the mother’s education level, cultural perceptions of the cause of illness and exposure to public health messages on the subject. Having determined that a child is ill, the family must then decide what to do. In some settings, the process is obstructed by the mother’s inability to make decisions about care-seeking. For many poor families, the absence of an accessible health system means that the only options are no care or informal care that is usually inadequate. The result is a significant increase in the risk of death for the child, highest in the very young (Fig. 1).⁴ In some cases, informal care may be adequate to prevent death, as almost any of the common broad-spectrum antibiotics can be effective but they must be given in appropriate doses for at least 3 days.⁵ In many areas these can be purchased in local pharmacies. If the family decides to seek health care, there are invariably costs involved. These involve direct costs for transport, user fees at the health facility, drugs and medical supplies, and lodging for family members. In addition, there will usually be substantial indirect costs, due to lost earnings or lost time working on the family’s farm. Both direct and indirect costs will be much greater for families living in remote areas.

Thus, we would expect children living in otherwise similar economic circumstances in more remote settings to be even less likely to access

care, leading to increased likelihood of pneumonia death. This is likely to be the dominant factor in settings where many children live far from health facilities. Where health services are more readily available, but costs are mainly comprised of user fees and drug costs, we would expect economic wealth, or more specifically the ability to raise cash at short notice, to be a more dominant factor. In some settings, care-seeking may be profoundly affected by ethnic differences in perceptions of the cause of disease and the likely cure.⁶ This may be compounded by the relative exclusion of some ethnic groups from routine health services.

It follows that the risk of pneumonia death will be greatest in younger children, those living in more remote areas, those whose families do not have access to ready cash, and those whose mothers have not been able to access public health messages. Yet when public health officials approach a community with a new intervention to prevent childhood pneumonia, these are the groups most likely to miss out.

Children with the highest risk of pneumonia should be the first recipients of new interventions. If this is not the case then the “inverse equity hypothesis” described by Victora et al. may be observed, whereby reductions in overall mortality rates mask increasing inequities as the least vulnerable initially enjoy the greatest access to interventions and subsequent gains in health improvement.⁷ This may be seen as the public health equivalent of the “inverse care law,” described by Tudor Hart in 1971, which states that “the availability of good medical care tends to vary inversely with the need for it in the population served”.⁸ This paper will discuss these issues in relation to pneumonia death and propose approaches to avoid increasing inequity as global efforts to control pneumonia mortality gather pace.

Economic deprivation and pneumonia death

Most of the work that has been undertaken in the field of equity over the past decade has been based on analyses of communities by wealth quintiles, focusing on wealth inequality as the main source of inequity in either risk of disease, access to health interventions or mortality. Studies rarely attempt to investigate all three components.

The pathway from economic poverty to death due to pneumonia or another childhood disease is logical and not in dispute. It involves under-nutrition, poor living conditions, and a lack of resources for transportation to a health facility, user fees and additional costs. Socioeconomic status is also strongly related to maternal education level, which impacts on the risk of disease through child-rearing practices such as breastfeeding, and the likelihood of appropriate care-seeking.⁹ The role of malnutrition as a risk factor for pneumonia death has been demonstrated robustly in numerous studies.^{10,11} Elements of the household environment associated with poverty, especially crowding and indoor air pollution, are also important risk factors for pneumonia.^{12,13}

While effective treatment of pneumonia at the community level is feasible, it is more complex and demanding than treatment of other major childhood diseases. Specific training is needed to identify which children with acute respiratory infections need antibiotics for likely pneumonia, or referral for severe pneumonia. Training is also needed to guide effective treatment, in contrast to diarrhoea and malaria, which can be managed effectively in poor households based on the recognition of key symptoms. For these reasons we would expect poor economic status to be an important determinant of pneumonia mortality in children and this is borne out by the evidence. Within-country studies show that low economic status is associated with increased rates of infant and child mortality.^{14–17} However, in such studies, there are examples of settings where the risk gradient is rather less than expected.¹⁸ It may be that such settings represent more equitable societies but it is more likely that, in those societies, inequity is better defined by factors other than wealth quintiles.

While there is little doubt that, globally, poverty is a major determinant of inequity, the complete picture is more complex with economic factors being dominant in some communities and geographic or ethnographic factors being dominant in others. In addition, the relative importance of the different determinants may change over time.¹⁹ We would predict that in settings with more challenging geographic conditions, where much of the population

live far from a health facility, economic factors would be less important than geography. This appears to be the case in Ethiopia where wealth quintiles do not correlate with child mortality risk, whereas urban/rural residence does.²⁰

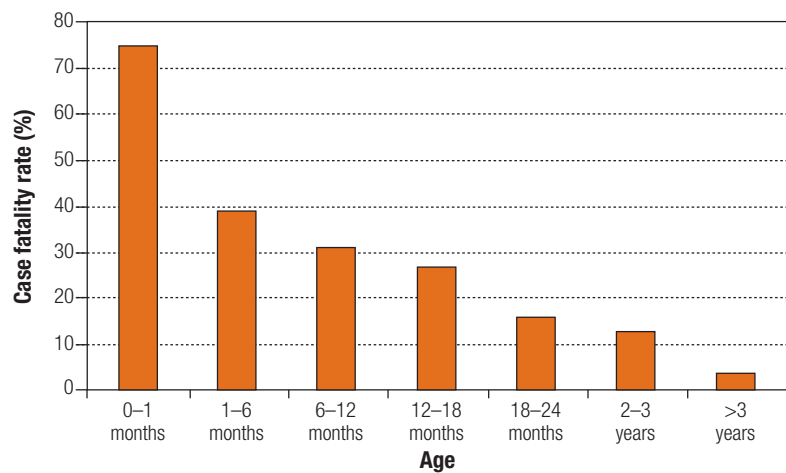
Geography and pneumonia death

There is considerable evidence that the risk of child death is affected by where one lives. This is usually assessed using the relative risk of mortality between urban and rural areas. Recent data from the United Nations Children's Fund (UNICEF) show that, in a survey of 63 developing countries, rural communities suffer 52% higher child mortality rates than urban communities, a differential that is similar to that between the richest 40% and the remainder of the population.²¹ For mortality from pneumonia, we would expect this to be a continuous relationship, with mortality risk increasing with remoteness, up to the point where there is effectively no access to health services. Beyond that point, mortality can be expected to remain at a similar, high level, reflecting the incidence of pneumonia and the untreated case fatality rate (Fig. 1).

There are several studies relating geographical access to use of health facilities. As one would expect, members of communities that are more distant use the facilities less than those that are nearer, but this may not always translate into increased risk of mortality.^{22,23} It is possible that the more remote communities would only use the services for severe, life-threatening cases. However, the few data that are available on this issue indicate that in Africa, and probably in many settings in Asia and elsewhere in the developing world, distance from a health facility is an important independent determinant of child mortality.^{22,24}

Results of a study on access to health care and mortality conducted within the Asaro Valley demographic surveillance site (DSS) in Papua New Guinea demonstrated a significant increase in all-cause mortality in children aged less than 5 years with increasing distance from the province's referral hospital as shown by stratification of the study population according to urban, peri-urban and increasingly remote rural areas (Table 1).²⁵ This same

Fig. 1. Case fatality rate for childhood pneumonia by age in the pre-antibiotic era, New York, 1926–33⁴



pattern was evident for infant pneumonia deaths, although interestingly the pattern was not seen for children over the age of 1 year. This probably indicates that older children will not deteriorate as rapidly as young infants, allowing their parents more time to get appropriate treatment. Utilization of the hospital for treatment of the terminal illness decreased with increasing distance from the hospital. To some extent, this was compensated for by greater use of the local aid post in the most remote areas. However, the more common response was no treatment at all,²⁶ which may indicate issues with the quality of services provided by the rural aid posts, compounded by the long distance to the hospital.

The impact of distance from a health facility on child mortality is particularly acute in settings where a substantial proportion of the population lives in areas with either very difficult or no access to reasonable care. Sadly this includes much of sub-Saharan Africa as well as countries like Papua New Guinea. In such circumstances it can be expected that most children who develop pneumonia have no access to antibiotics, the essential component of effective treatment. Strategies to improve access to effective pneumonia treatment for children living in remote areas include training health workers at remote health posts or community health workers to recognize and treat the common childhood illnesses such as pneumonia, diarrhoea and malaria. It is not clear how many small health posts function well in this role.

Separating the impacts of geography and poverty will always be difficult since those living in rural areas are generally (although not always) poorer than their counterparts living in urban areas who are closer to markets and other income-generating activities.

However, this argument cannot be used to fully explain the differences in health-care utilization and mortality shown by the Papua New Guinea data, since the effects of distance continued to be seen between two rural areas which had different levels of remoteness but were similar in socioeconomic characteristics. These data suggest a direct relationship between geographical access to a health facility and mortality, which is what one would expect in a setting where all of the population are similarly poor.

The importance of ethnicity

Another important determinant of inequity is ethnicity. Historically, dramatic differences in child survival between ethnic groups have been attributed to child-rearing practices, particularly nutrition. For example, in 19th century Canada and the United States of America, mortality rates among infants of Jewish families were less than one-third of the rates in children from families of French origin probably due to differing child-rearing and nutrition practices.²⁷ Some families may fail to access care for their sick child because of their ethnic group as they may perceive, rightly or wrongly, that they will not be treated well in the hospital.²⁸

Table 1. **Child mortality and treatment seeking during terminal illness by place of residence in the Asaro Valley, Papua New Guinea, 1980–1989**²⁶

Indicator	Urban (Goroka town)	Peri- urban	Rural (Lowa census division)	Rural (Asaro census division)
Median distance to GBH (km)	1	6	13	30
Nearest health facility	GBH	Aid post	Aid post	Aid post
All-cause mortality rate (per 1000 person-years)^a				
< 1 year	32.7 (13)	48.5 (10)	47.2 (17)	94.0 (72)
1–4 years	8.7 (13)	3.0 (2)	8.7 (11)	11.1 (34)
ALRI mortality rate (per 1000 person-years)^a				
< 1 year	12.6 (5)	14.6 (3)	25.0 (9)	33.9 (27)
1–4 years	2.0 (3)	1.5 (1)	2.4 (3)	3.0 (9)
Treatment sought for children < 1 year who died^b				
None	1 (8)	2 (20)	3 (18)	21 (29)
GBH outpatient	1 (8)	1 (10)	2 (12)	1 (1)
GBH inpatient	11 (85)	7 (70)	11 (65)	26 (36)
Health centre/aid post	0	0	1 (6)	24 (33)
Place of death for children < 1 year^b				
Home	4 (31)	5 (50)	8 (47)	49 (68)
GBH inpatient	9 (69)	5 (50)	9 (53)	16 (22)
Health centre/aid post	0	0	0	6 (8)

ALRI, acute lower respiratory infection; GBH, Goroka Base Hospital.

^a Values presented in parentheses are the actual number of deaths.

^b Values presented in parentheses are percentages.

They may use the hospital as a last resort, presenting only when the child is *in extremis*, too late for effective treatment. Furthermore, members of minority ethnic groups may have atypical views of the causation of disease which can also contribute to delayed access to care.²⁹ Ethnicity may affect risk of death because of differential exposure to environmental factors such as indoor air pollution.

Studies from different parts of Africa have shown that child mortality risk differs between ethnic groups.^{30,31} A study from the Nouna demographic surveillance site in Burkina Faso highlights the extraordinary variability in risk of child mortality, even between villages in the same district. In that study one village had an under-5 mortality risk of 39%, compared with a mean under-5 mortality risk of 16% among the other 38 villages in the study³² (Fig. 2). This high mortality rate is of a similar magnitude to what was described in west Africa in the period before modern health care was introduced.³³ When the study was undertaken, the investigators were unable to explain the high mortality rate using the standard variables collected as part of the routine demographic surveillance,

such as fertility, family size, age of the mother at child's birth.²² However, further studies within the DSS have provided more insight into the high mortality in this particular village. The village is inhabited almost exclusively by an ethnically distinct tribe which experiences higher than average mortality in other settings. In addition, the village experiences less favourable living conditions, such as worse water supply, and is more remote, located further from health facilities. The excess mortality in this village is due to pneumonia and diarrhoeal diseases, often in combination with malnutrition. The extent to which the higher mortality is attributable to economic poverty or poor child-rearing and care-seeking practices is unclear. Indeed, in this particular village, ethnic differences, and related social and lifestyle factors, may be the most important determinants of inequity in child survival.

The importance of health-care quality

Compounding the other factors is the impact of dysfunctional health services, which create communities that appear

to have adequate health services, but fail to derive the health benefit from them.³⁴ Many small hospitals in the developing world have unacceptably high case-fatality rates for childhood pneumonia, often as high as 15–20%. Most of these deaths are avoidable with adequate care.

Understanding the effect of dysfunctional health facilities on overall pneumonia mortality is extremely difficult. If risk of death could be mapped for an entire country, mortality in the catchment area of a dysfunctional health facility would probably appear as a dark area, perhaps with mortality as high as that seen in areas with no health facilities. Since such data are never available, it is important for countries to develop systems to monitor the quality of child health care in district hospitals on a continuous basis. WHO has developed tools for this and strategies for the improvement of poorly performing hospitals.^{35,36}

Access to a poorly functioning facility may be equivalent to no access or, in some cases, worse than no access at all. In such cases, everything might appear to go as it should. When a child develops pneumonia, the signs of pneu-

monia are recognized by his educated mother and he is taken promptly to a health facility. However, at the facility he receives either no treatment or inappropriate treatment and subsequently dies.³⁷ Under such circumstances, the presence of a poor health facility may have prevented a family from accessing a better service, which may have averted the child's death. Tragically, these families may have done everything right in the care of their sick child, only to be failed by the health services. Such scenarios may be avoided either by educating the mothers to recognize incompetent health staff and inappropriate treatment, or by improving the quality of the health services. Neither are easy options, but this issue must be addressed.

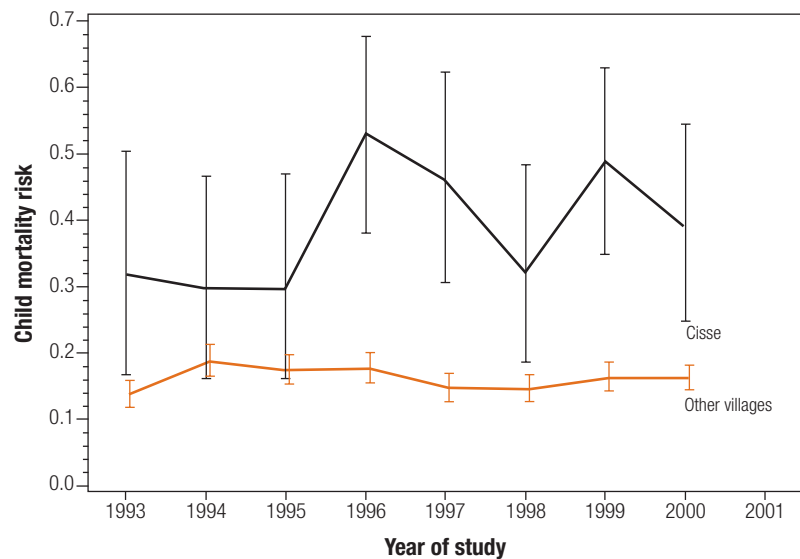
The impact of existing child-survival strategies on equity

In general, child-survival strategies have been implemented without consideration of equity, with the resultant clustering of interventions at the level of the child.³⁸ The approach has generally been to first reach the children who can be most easily reached. Sadly, the children who are easiest to reach are those whose risk of mortality is lowest, the basis of Victora et al.'s "inverse equity hypothesis".⁷ As a result, children at greatest risk are the least likely to receive the interventions. Moreover, those children who receive one intervention are those most likely to receive the next.³⁸

In the developing world, the two child-survival strategies with the potential to have a significant impact on pneumonia mortality are: (1) standardized case management within the Integrated Management of Childhood Illness (IMCI); and (2) immunization, with *Haemophilus influenzae* type b (Hib) conjugate vaccine now in wide use and pneumococcal conjugate vaccines due to be implemented in the first African countries in 2008.

IMCI is an integrated package of case management strategies designed to lead to effective management of the common causes of child death, including pneumonia. It has been designed (and to a large extent implemented) by WHO over the past 15 years and is now

Fig. 2. Child mortality risk for Cisse village compared with other villages in the Nouna demographic and surveillance site, Burkina Faso, by year of study



a pillar of child-survival strategies in most developing countries of the world. Because of its nature, IMCI requires a functioning primary health-care system for effective implementation. WHO guidelines specifically direct countries to implement IMCI first in settings with good health-care structures and access to referral care.³⁹ This is likely to increase inequity in child health outcomes. A study of the experiences of selected countries with IMCI found that in Brazil it was implemented mainly in better developed, higher income areas closer to the state capital, whereas these trends were not seen in Peru where the government chose to implement IMCI in the highest mortality areas first.⁴⁰ The consideration of issues of equity influenced the way IMCI was implemented in Peru, with the result that it served to reduce inequity, in contrast to Brazil.

To improve the equity dimension of IMCI at the global level it will be important to emphasize equity issues at the time of implementation to avoid contributing to existing inequity in the community. Choosing the districts with greatest need, rather than those that are easiest to reach, is important. However, the effectiveness of IMCI is dependent on effective and accessible referral level care, which is not possible in many countries for large sectors of the population. IMCI planners must avoid the temptation to exclude or delay introduction into the most difficult districts. Instead, the absence of

a health infrastructure in a difficult area should encourage the development of community-based approaches, more suitable for such settings.

Immunization is the most effective child-survival intervention to date. At present, almost all routine immunizations are delivered through existing health services. In a study of countries that had undertaken at least two Demographic and Health Surveys during the 1980s and 1990s and shown an overall improvement in child survival, eight of 14 countries showed a widening gap in child mortality between the richest and poorest wealth quintiles.⁴¹ In most of the countries, immunization and other child-survival interventions are delivered disproportionately to the richest quintile, while the poorest groups are the last to have access to new health initiatives. The same principles also apply to the implementation of Hib vaccine, the first vaccine shown to prevent childhood bacterial pneumonia. The first decade of its use, from 1990–2000, saw Hib vaccine implemented in the parts of the world with the lowest pneumonia rates.⁴² Since 2000, the poorest countries of the world have had access to Hib vaccine with the assistance of the GAVI Alliance, but the vaccine has only been implemented with routine vaccination, with the exception of an emergency setting in Pakistan where a campaign was used to implement Hib vaccination. In sub-Saharan Africa, 34% of children fail to receive the third

dose of diphtheria–tetanus–pertussis (DTP3),⁴³ which is when they would also receive their final dose of Hib vaccine. This may affect equity in health outcomes by two mechanisms. Those children who do not receive DTP3 may also be at higher risk for other reasons and are now not as well protected against Hib disease. In addition, Hib vaccine has been shown to exert a substantial herd immunity effect, protecting unvaccinated children. However this effect, which depends on the impact of the vaccine on nasopharyngeal carriage, is best seen when children are fully vaccinated; so, if poorly vaccinated children live together in the same areas, Hib may continue to circulate in those communities.

Pneumococcal vaccines have also been shown to exert a herd effect,⁴⁴ and this has strengthened the argument that these vaccines actually reduce inequity. Whether or not this proves to be the case with the implementation of pneumococcal vaccines in the developing world, will be an important determinant of their overall impact on equity in child health and child survival. Clearly, the herd effect is a major means by which vaccines can reduce inequity.

The global immunization community is aware of the potential of new vaccines to add to inequity in child survival. The new WHO/UNICEF immunization strategy⁴⁵ outlines a range of ways to address inequity in immunization coverage, such as the Reaching Every District strategy, which aims to ensure that outreach services are sent to the most remote districts at least four times each year. A challenge facing immunization planners will be to devise appropriate regimens to ensure that new vaccines, particularly Hib and pneumococcal vaccines, are used effectively under such conditions.

Monitoring the equity dimension of child-survival interventions

Given the evidence that child-survival interventions can increase inequity,^{38,46,47} it is appropriate for the

implementation of child-survival interventions to be accompanied by indicators of their impact on equity. At present, the working group responsible for monitoring progress in child survival with respect to Millennium Development Goal 4 has only one indicator of equity – the percentage of children receiving six or more child-survival interventions in both the richest and poorest quintiles.¹ While this gives an indication of the distribution of interventions, it fails to acknowledge that in different settings there may be determinants of inequity other than economic poverty that are more important, particularly in Africa.

There is a fundamental philosophical dilemma that must be faced by all health planners in developing countries. Coverage is less than 100% for any intervention. In most settings, immunization coverage of 90% would be considered excellent. In such circumstances and with limited resources, health planners are frequently placed in a situation where they must choose between reaching the remaining 10%, often at great cost, or implementing another intervention, such as a new vaccine, knowing that the same 90% will be reached and the remaining 10% will still receive nothing. The total benefits for the community may be much greater with this latter approach, but it will be at the cost of growing inequity. This is a central and unresolved dilemma in health planning.

Monitoring inequity requires identification of the children who are at highest risk of dying. In many countries, wealth quintiles will adequately describe which children are at highest and lowest risk. However, in other countries ethnicity or geography may be of equal or greater importance. National health surveys should seek to define which parameter is the most sensitive by looking at the household-level determinants of access that drive inequities in child mortality. Inclusion of indicators of the three key parameters of inequity – poverty, geography and ethnicity – will enable a simple analysis to define the relative importance of these. Then, for any new in-

tervention, the appropriately designed implementation can be assessed against the most important of these parameters, ensuring that children at greatest risk are preferentially covered, rather than systematically excluded.

Expensive new interventions like pneumococcal conjugate vaccine may require a more active pro-equity approach. Recognition that those most likely to die of pneumococcal disease are those least likely to access routine immunization and basic health care should drive health planners to consider alternative approaches to the use of the pneumococcal conjugate vaccine and other expensive vaccines, such as limiting their use to outreach programmes in remote areas. Selective use of expensive vaccines for the poorest children has been tried before in Peru, where the Hib vaccine was initially introduced only for the lower socioeconomic classes.⁴⁸ With a growing menu of vaccines to choose from, it may be time to revisit this concept.⁴⁰

Conclusion

Pneumonia remains the leading cause of child mortality in the world. Risk of pneumonia is largely driven by factors associated with malnutrition, poverty and poor home environment. In general, it is the poor who suffer from these problems and who are in greatest need of interventions to prevent childhood pneumonia. The same factors plus poor access to basic health care are associated with risk of death from pneumonia. Difficulties in accessing basic health care may be associated with poverty, geographical isolation or ethnic issues. Countries seeking to improve child survival in line with the achievement of Millennium Development Goal 4 should deliver interventions and monitor their impact with careful reference to those particular factors that are responsible for inequity in child survival in their community. ■

Competing interests: None declared.

Résumé

Équité et stratégies en faveur de la survie des enfants

Les récents progrès dans la survie des enfants ont souvent été obtenus au prix d'une inéquité grandissante. Des interventions successives ont été appliquées aux mêmes secteurs démographiques sans jamais bénéficier à certains enfants d'autres secteurs et ont généré une tendance de plus en plus forte à l'inéquité dans la survie des enfants. Ce phénomène est particulièrement notable dans le cas de la pneumonie, principale cause de mortalité de l'enfant et fortement liée à la pauvreté et à la malnutrition, pour laquelle une prise en charge communautaire des cas est plus difficile à obtenir que pour d'autres causes de mortalité infanto-juvénile.

Pour prévenir la pneumonie chez l'enfant, les principales stratégies sont la prise en charge des cas, principalement par le biais de la Prise en charge intégrée des maladies de l'enfance (PCIME), et la vaccination, notamment par les nouveaux vaccins contre *Haemophilus influenzae* type b (Hib) et *pneumococcus*. Il existe une tendance à introduire l'une et l'autre interventions dans des communautés ayant déjà accès aux soins de santé de

base et à des services de prévention, d'où un désavantage relatif accru pour les enfants sans accès à ces prestations. Il est pourtant possible de mettre en œuvre ces deux stratégies de façon à diminuer plutôt qu'à augmenter l'inéquité.

Il importe de surveiller l'aspect équité lorsqu'on introduit des interventions en faveur de la survie des enfants. La pauvreté économique, telle que mesurée par des analyses reposant sur les quintiles de richesse, est un déterminant important de l'inéquité dans les événements sanitaires, mais dans certains pays, d'autres facteurs peuvent revêtir une importance plus grande encore. Les conditions géographiques et l'appartenance ethnique peuvent aussi empêcher d'accéder aux soins et donc conduire à des inéquités dans la survie des enfants. Le mauvais fonctionnement des établissements de soins joue aussi un rôle majeur. Les pays doivent connaître les principaux déterminants de l'inéquité dans leurs communautés de manière à pouvoir prendre des mesures pour garantir une introduction équitable de la PCIME, des nouveaux vaccins et d'autres stratégies en faveur de la survie des enfants.

Resumen

Equidad y estrategias para la supervivencia infantil

Los recientes progresos en materia de supervivencia infantil se han conseguido a menudo a expensas de un aumento de la inequidad. Las sucesivas intervenciones se centran en los mismos sectores de la población, mientras en otros sectores los niños son ignorados sistemáticamente, lo que se refleja en una tendencia al aumento de la inequidad en lo referente a la supervivencia infantil. Esa tendencia es harto patente en el caso de la neumonía, que constituye la principal causa de mortalidad en la niñez, está estrechamente asociada a la pobreza y la malnutrición, y plantea más dificultades que cualquier otra causa de mortalidad en la niñez para lograr un manejo de casos comunitario eficaz.

Las estrategias clave para la prevención de la neumonía en la niñez son el manejo de casos, principalmente mediante la Atención Integrada a las Enfermedades Prevalentes de la Infancia (AIEPI), y la inmunización, en particular con las nuevas vacunas contra *Haemophilus influenzae* tipo b (Hib) y contra el neumococo. Se tiende a emprender ambas intervenciones en comunidades que ya tienen acceso a los servicios de atención

básica y preventiva, lo que acentúa la desventaja relativa que padecen los niños que carecen de ese acceso. Sin embargo, ambas estrategias pueden aplicarse de manera que reduzcan la inequidad, en lugar de aumentarla.

Es importante vigilar la equidad cuando se llevan a cabo intervenciones de fomento de la supervivencia infantil. La pobreza económica, determinada mediante análisis basados en los quintiles de riqueza, es un determinante importante de la inequidad en los resultados sanitarios, pero en algunos entornos hay otros factores que pueden ser más relevantes. La geografía y el grupo étnico pueden ambos entorpecer el acceso a la atención de salud, y favorecer por consiguiente la inequidad en materia de supervivencia infantil. El mal funcionamiento de los centros de salud es también un factor de gran importancia. Los países deben saber cuáles son los principales factores determinantes de la inequidad en sus comunidades a fin de poder adoptar medidas que garanticen que la aplicación de la AIEPI, de la inmunización con nuevas vacunas y de otras estrategias de supervivencia infantil se realice de forma equitativa.

ملخص

العدل والإنصاف واستراتيجيات بقاء الأطفال على قيد الحياة

الأطفال في تدبير حالاته، والذي يتم أساساً من خلال استراتيجية التدبير المتكامل لصحة الطفل، والتمنيع، ولاسيما باللقاحات الجديدة المضادة للمستدمية النزفية من النمط ب وللمكورات الرئوية. وهناك اتجاه للقيام بكل التدخّلات في المجتمعات التي يُتاح لها بالفعل الحصول على خدمات الرعاية الصحية الأساسية والخدمات الوقائية، مما يزيد من الحرمان النسبي الذي يعاني منه هؤلاء الأطفال الذين لا يُتاح لهم الحصول على هذه الخدمات. ويمكن تنفيذ كلا الاستراتيجيتين بطريقة تقلل من مظاهر الجور لأن تزيدها.

ومن المهم رصد العدل والإنصاف عند القيام بالتدخلات الرامية إلى

إن التقدّم الذي أحرز مؤخراً في مجال بقاء الأطفال على قيد الحياة كان يقابله في الغالب زيادة في مظاهر الجور. فالتدخلات المتتالية تطبّق على نفس القطاعات السكانية، في حين يتم إغفال نفس الأطفال في القطاعات الأخرى، مما يؤوّل إلى مزيد من مظاهر الجور في بقاء الأطفال على قيد الحياة. وتبرز أهمية ذلك بشكل خاص في حالة الالتهاب الرئوي، الذي يُعدّ المُسبب الرئيسي لوفيات الأطفال، والذي يرتبط ارتباطاً وثيقاً بالفقر وسوء التغذية، والذي أيضاً يصعب التدبير المجتمعي الفعّال لحالاته بالمقارنة مع المسببات الأخرى لوفيات الأطفال.

وتتمثّل الاستراتيجيات الرئيسية للوقاية من الالتهاب الرئوي لدى

المرفاق الصحية في أداء وظائفها عامل رئيسي هام. وينبغي للبلدان أن تكون على دراية بالمحددات الرئيسية لمظاهر الجور في مجتمعاتها، بحيث يمكن اتخاذ التدابير اللازمة لضمان العدل والإنصاف في تنفيذ استراتيجيات التدبير المتكامل لصحة الطفل، واستراتيجية إعطاء اللقاحات الجديدة، وغيرهما من استراتيجيات بقاء الأطفال على قيد الحياة.

بقاء الأطفال على قيد الحياة. ويُعد الفقر الاقتصادي، والمُقاس بالتحليلات القائمة على الشرائح الخُمسية للثروة، محددًا هامًا لمظاهر الجور في الحاصلات الصحية، ولكن قد تكون هنالك عوامل أخرى أكثر أهمية في مواقع أخرى. وقد تؤدي العوامل الجغرافية والعرقية إلى فشل الحصول على الرعاية الصحية، ومن ثمَّ إلى مظاهر الجور في بقاء الأطفال على قيد الحياة. كما أن ضعف

References

1. *Tracking progress in child survival: the 2005 report*. New York, NY: UNICEF; 2005.
2. Tugwell P, de Savigny D, Hawker G, Robinson V. Applying clinical epidemiological methods to health equity: the equity effectiveness loop. *BMJ* 2006;332:358-61. PMID:16470062 doi:10.1136/bmj.332.7537.358
3. Dahlgren G, Whitehead M. A framework for assessing health systems from the public's perspective: the ALPS approach. *Int J Health Serv* 2007;37:363-78. PMID:17665729 doi:10.2190/U814-6X80-N787-807J
4. Kohn JL, Weiner SB. Pneumonia in children: a survey of one thousand cases with attempted follow-up. *Am J Dis Child* 1936;51:1095-1100.
5. Qazi S. Short-course therapy for community-acquired pneumonia in paediatric patients. *Drugs* 2005;65:1179-92. PMID:15916446 doi:10.2165/00003495-200565090-00001
6. Gove S, Pelto GH. Focused ethnographic studies in the WHO programme for the control of acute respiratory infections. *Med Anthropol* 1994;15:409-24. PMID:8041238
7. Victora CG, Vaughan JP, Barros FC, Silva AC, Tomasi E. Explaining trends in inequities: evidence from Brazilian child health studies. *Lancet* 2000;356:1093-8. PMID:11009159 doi:10.1016/S0140-6736(00)02741-0
8. Hart JT. The inverse care law. *Lancet* 1971;1:405-12. PMID:4100731
9. Bicego GT, Boerma JT. Maternal education and child survival: a comparative study of survey data from 17 countries. *Soc Sci Med* 1993;36:1207-27. PMID:8511650 doi:10.1016/0277-9536(93)90241-U
10. Tupasi TE, Mangubat NV, Sunico ME, Magdangal DM, Navarro EE, Leonor ZA, et al. Malnutrition and acute respiratory tract infections in Filipino children. *Rev Infect Dis* 1990;12 Suppl 8:S1047-54. PMID:2270404
11. Vathanophas K, Sangchai R, Raktham S, Pariyanonda A, Thangsuwan J, Bunyaratabhandu P, et al. A community-based study of acute respiratory tract infection in Thai children. *Rev Infect Dis* 1990;12 Suppl 8:S957-65. PMID:2270418
12. Cardoso MR, Cousens SN, de Goes Siqueira LF, Alves FM, D'Angelo LA. Crowding: risk factor or protective factor for lower respiratory disease in young children? *BMC Public Health* 2004;4:19. PMID:15176983 doi:10.1186/1471-2458-4-19
13. Smith KR, Samet JM, Romieu I, Bruce N. Indoor air pollution in developing countries and acute lower respiratory infections in children. *Thorax* 2000;55:518-32. PMID:10817802 doi:10.1136/thorax.55.6.518
14. Wagstaff A. Socioeconomic inequalities in child mortality: comparisons across nine developing countries. *Bull World Health Organ* 2000;78:19-29. PMID:10686730
15. Moser KA, Leon DA, Gwatkin DR. How does progress towards the child mortality millennium development goal affect inequalities between the poorest and least poor? Analysis of Demographic and Health Survey data. *BMJ* 2005;331:1180-2. PMID:16284209 doi:10.1136/bmj.331.7659.1180
16. Fenn B, Kirkwood BR, Popatia Z, Bradley DJ. Inequities in neonatal survival interventions: evidence from national surveys. *Arch Dis Child Fetal Neonatal Ed* 2007;92:F361-6. PMID:17379739 doi:10.1136/adc.2006.104836
17. Gwatkin DR, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A. *Socio-economic differences in health, nutrition and population within developing countries: an overview*. Washington, DC: World Bank; 2007.
18. Houweling TA, Kunst AE, Moser K, Mackenbach JP. Rising under-5 mortality in Africa: who bears the brunt? *Trop Med Int Health* 2006;11:1218-27. PMID:16903885 doi:10.1111/j.1365-3156.2006.01676.x
19. Houweling TA, Kunst AE, Borsboom G, Mackenbach JP. Mortality inequalities in times of economic growth: time trends in socioeconomic and regional inequalities in under 5 mortality in Indonesia, 1982-1997. *J Epidemiol Community Health* 2006;60:62-8. PMID:16361456 doi:10.1136/jech.2005.036079
20. *Ethiopia demographic and health survey 2005*. Addis Ababa: Central Statistical Agency; 2005.
21. Child deaths fall below 10 million for first time. Press release. New York, NY: UNICEF; 2007. Available from: http://www.unicef.org/media/media_40855.html [accessed on 2 April 2008].
22. Becher H, Kynast-Wolf G, Sie A, Ndugwa R, Ramroth H, Kouyate B, et al. Patterns of malaria: cause-specific and all-cause mortality in a malaria-endemic area of west Africa. *Am J Trop Med Hyg* 2008;78:106-13. PMID:18187792
23. Stock R. Distance and the utilization of health facilities in rural Nigeria. *Soc Sci Med* 1983;17:563-70. PMID:6879255 doi:10.1016/0277-9536(83)90298-8
24. Al-Kabir A. *Effects of community factors on infant and child mortality in rural Bangladesh* [Report No. 56]. Voorburg: International Statistical Institute; 1984.
25. Kakazo M, Lehmann D, Coakley K, Gratten H, Saleu G, Taime J, et al. Mortality rates and the utilization of health services during terminal illness in the Asaro Valley, Eastern Highlands Province, Papua New Guinea. *P N G Med J* 1999;42:13-26. PMID:11061003
26. Coakley K, Lehmann D, Smith D, Riley I, Howard P, Gratten H, et al. *The Asaro Valley Surveillance Unit of the Papua New Guinea Institute of Medical Research: methodology, demography and mortality*. Goroka: PNGIMR; 1993.
27. Alter G. Infant and child mortality in the United States and Canada. In: Bideau A, Desjardins B, Brignoli H, eds. *Infant and child mortality in the past*. Oxford: Oxford University Press; 1997. p. 100.
28. Stoneman J, Taylor SJ. Improving access to medicines in urban, regional and rural Aboriginal communities – is expansion of section 100 the answer? *Rural Remote Health* 2007;7:738. PMID:17590140
29. Choe MK, Retherford RD, Gubhaju BB, Thapa S. Ethnic differentials in early childhood mortality in Nepal. *J Biosoc Sci* 1989;21:223-33. PMID:2722918
30. Brockerhoff M, Hewett P. Inequality of child mortality among ethnic groups in sub-Saharan Africa. *Bull World Health Organ* 2000;78:30-41. PMID:10686731
31. Macassa G, Ghilgaber G, Bernhardt E, Burstrom B. Inequalities in under-five mortality in Mozambique: differentials by region of residence and ethnic affiliation of the mother. *East Afr Med J* 2006;83:259-66. PMID:16866220
32. Sankoh OA, Ye Y, Sauerborn R, Muller O, Becher H. Clustering of childhood mortality in rural Burkina Faso. *Int J Epidemiol* 2001;30:485-92. PMID:11416070 doi:10.1093/ije/30.3.485
33. Billewicz WZ, McGregor IA. The demography of two West African (Gambian) villages, 1951-75. *J Biosoc Sci* 1981;13:219-40. PMID:7287780
34. Ruger JP, Kim HJ. Global health inequalities: an international comparison. *J Epidemiol Community Health* 2006;60:928-36. PMID:17053281 doi:10.1136/jech.2005.041954
35. Duke T, Campbell H, Ayieko P, Opiyo N, English M, Kelly J, et al. Accessing and understanding the evidence. *Bull World Health Organ* 2006;84:922. PMID:17242822 doi:10.2471/BLT.06.037515
36. Duke T, Kelly J, Weber M, English M, Campbell H. Hospital care for children in developing countries: clinical guidelines and the need for evidence. *J Trop Pediatr* 2006;52:1-2. PMID:16415297 doi:10.1093/tropej/fmk006
37. Sodemann M, Jakobsen MS, Molbak K, Alvarenga IC Jr, Aaby P. High mortality despite good care-seeking behaviour: a community study of childhood deaths in Guinea-Bissau. *Bull World Health Organ* 1997;75:205-12. PMID:9277007
38. Victora CG, Fenn B, Bryce J, Kirkwood BR. Co-coverage of preventive interventions and implications for child-survival strategies: evidence from national surveys. *Lancet* 2005;366:1460-6. PMID:16243091 doi:10.1016/S0140-6736(05)67599-X
39. *IMCI planning guide: gaining experience with the IMCI strategy in a country*. Geneva: WHO/UNICEF; 1999.

EK Mulholland et al.

40. Victora CG, Huicho L, Amaral JJ, Armstrong-Schellenberg J, Manzi F, Mason E, et al. Are health interventions implemented where they are most needed? District uptake of the integrated management of childhood illness strategy in Brazil, Peru and the United Republic of Tanzania. *Bull World Health Organ* 2006;84:792-801. PMID:17128359 doi:10.2471/BLT.06.030502
41. Minujin A, Delamonica E. *Socio-economic inequalities in mortality and health in the developing world*. Demographic Research 2004; Special Collection 2: Article 13:329-54.
42. Peltola H. Worldwide Haemophilus influenzae type b disease at the beginning of the 21st century: global analysis of the disease burden 25 years after the use of the polysaccharide vaccine and a decade after the advent of conjugates. *Clin Microbiol Rev* 2000;13:302-17. PMID:10756001 doi:10.1128/CMR.13.2.302-317.2000
43. Mocca P. *The state of the world's children 2007: women and children: the double dividend of gender equality*. New York, NY: UNICEF; 2006.
44. O'Brien KL, Dagan R. The potential indirect effect of conjugate pneumococcal vaccines. *Vaccine* 2003;21:1815-25. PMID:12706665 doi:10.1016/S0264-410X(02)00807-1
45. *Global immunization vision and strategy 2006-2015*. Geneva: WHO/UNICEF; 2005.
46. Bishai D, Kumar KCS, Waters H, Koenig M, Katz J, Khatry SK, et al. The impact of vitamin A supplementation on mortality inequalities among children in Nepal. *Health Policy Plan* 2005;20:60-6. PMID:15689431 doi:10.1093/heapol/czi007
47. Razzaque A, Streatfield PK, Gwatkin DR. Does health intervention improve socioeconomic inequalities of neonatal, infant and child mortality? Evidence from Matlab, Bangladesh. *Int J Equity Health* 2007;6:4. PMID:17547776 doi:10.1186/1475-9276-6-4
48. *Introduction of Haemophilus influenzae type b vaccine in the Americas*. Washington DC: Pan American Health Organization. Available from: http://www.paho.org/English/HVP/HVI/hvp_hib_text.htm [accessed on 3 April 2008].