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

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Objective To describe geographical patterns of implementation of the Integrated Management of Childhood Illness (IMCI) strategy in three countries and to assess whether the strategy was implemented in areas with the most pressing child health needs.

Methods We conducted interviews with key informants at the national and district levels in Brazil, Peru and the United Republic of Tanzania, and an ecological study of factors associated with health worker training in IMCI. Exploratory factors included district population, distance from the capital, human development index, other socioeconomic indicators and baseline mortality rates in children younger than five years.

Findings In line with recommendations by WHO, early implementation districts were characterized by proximity to the capital and suitable training sites, presence of motivated health managers and a functioning health system. In the expansion phase, IMCI tended to be adopted by other districts with similar characteristics. In Brazil, uptake by poor and small municipalities and those further away from the state capital was significantly lower. In Peru, there was no association with distance from Lima, and a non-significant trend for IMCI adoption by small and poor departments. In the United Republic of Tanzania, the only statistically significant finding was a lower uptake by remote districts. Implementation was not associated with baseline mortality levels in any country studied.

Conclusion Whereas clear and reasonable guidelines are provided for selection of early use districts, no criteria for promoting IMCI expansion had been issued, and areas of greatest need were not prioritized. Equity analyses based on the geographical deployment of new programmes and strategies can contribute to assessing whether they are reaching those who need them most.

Introduction

There is ample literature on how the availability and quality of health care varies inversely in relation to an individual’s health needs, a principle that was convincingly stated by Julian Tudor Hart’s “inverse care law” in 1971. The sociological literature also suggests that new technologies or behaviours — including those related to health care — are initially adopted by a small group of innovators and later diffused to other social groups. Those with access to new health technologies are usually members of the upper social strata, who already have access to better care. Thus, it has been postulated that the health gap, at least temporarily, when effective new interventions are introduced.

In this paper we investigate a related issue at the geographical, rather than the individual level. We examined which factors were associated with the uptake, at district level, of a new strategy for improving the health of children. Our general hypothesis was that health interventions, programmes and strategies are often deployed without explicit attention to the question of which areas of the country are most likely to gain from their implementation.

The Integrated Management of Childhood Illness (IMCI) strategy was developed in the mid-1990s by WHO, the United Nations Children’s Fund (UNICEF) and their technical partners. IMCI was proposed as a strategy to unify the vertical child health programmes that were prevalent at that time, such as the Control of Diarrheal Diseases or Acute Respiratory Infections programmes. IMCI has three main components: improving the performance of health workers in first-level facilities through a training course addressing leading causes of infant and child mortality; ensuring health systems support for child health (including drug and vaccine supply, supervision and health information systems); and the strengthening of family practices needed to prevent disease, to stimulate appropriate utilization of health services, and to improve home

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The IMCI case management guidelines were designed to address major causes of child mortality — pneumonia, diarrhea, malaria, measles and malnutrition in countries with mortality rates in children younger than 5 years (U5MRs) of 40 per 1000 live births or greater.4,5

IMCI was introduced at the country level in 1996, and since then more than 100 countries have adopted the strategy.5 In each country, IMCI was designed to evolve over three phases, namely the introduction, early implementation and expansion phases.7 In the introductory phase, countries held orientation meetings, trained key decision-makers in IMCI, defined a management structure for preparing for IMCI planning and early implementation, and built government commitment to move forward with the IMCI strategy. In the early implementation phase, countries gained experience while implementing IMCI in limited geographical areas. They developed their national strategy and plan, adapted the IMCI guidelines to their national context, developed management and training capacity in a limited number of districts and started implementing and monitoring IMCI. The end of this phase was marked by a review meeting with the objective of synthesizing the experiences gained during early implementation and planning for expansion. In the expansion phase, countries were encouraged to increase both the range of IMCI interventions and IMCI coverage.8 In practice, the range of interventions was seldom expanded.

The WHO document entitled IMCI planning guide: gaining experience with the IMCI strategy in a country6 proposed a series of possible criteria for selecting two or three districts for early implementation in a country. The criteria included good physical access to central-level staff; committed staff at the district level; availability of a training site; availability of drugs; existence of referral care; and availability of funds to support IMCI, e.g., from a donor institution. Additional selection criteria were also proposed, including the districts having similar child-feeding practices and a common language, the need for diversity (for example, including periurban as well as rural districts) and the advantage of selecting districts that are already being targeted by external donors.

As the above list shows, selection criteria for early-use districts were mainly pragmatic and managerial. The purpose was to select a couple of demonstration districts with several facilitating factors (e.g., proximity, good staff, available funding and referral capabilities) where IMCI could be shown to work, with a view to later expansion to other districts.

The final section of the IMCI planning guide addresses the selection of districts for the expansion phase: “Factors to consider in assessing district capacity or readiness to support the IMCI strategy are: a well-functioning district management team, inclusion of IMCI activities in the district health plan, availability of local training faculty (for example in a training institution) and the presence of a nongovernmental organization or other donor that is ready to technically and financially support IMCI implementation in the district.”6 As for the early implementation phase, these criteria primarily represent predictors of successful implementation rather than indicators of need for IMCI, such as high mortality or prevalence of malnutrition.

In 1997, the multi-country evaluation of IMCI effectiveness, cost and impact (MCE-IMCI) was launched; it included in-depth studies in Bangladesh, Brazil, Peru, Uganda and the United Republic of Tanzania.9 The objectives of the evaluation incorporated an assessment of the potential effects of IMCI on inequalities in child health. This entailed a study of the geographical spread of IMCI within countries, to determine whether or not the programme was reaching the areas with the most pressing child health needs.

Of the five countries included in the evaluation, it was possible to obtain data on IMCI uptake at the district level in Brazil, Peru and the United Republic of Tanzania. This paper presents the results of this investigation.

Methods

In each country, two complementary approaches to data collection and analyses were used. Desk reviews and interviews with key informants were used to investigate the introduction, early implementation and expansion phases of IMCI with emphasis on which administrative units (e.g., districts, states, municipalities or departments, henceforth referred to as “districts”) were prioritized, and why.

The second approach included statistical analyses of district characteristics associated with IMCI implementation during the expansion phase. An ecological design (a type of analysis in which the study units are geographical areas) was used to compare the spatial distribution of IMCI implementation with potential explanatory variables, including sociodemographic factors, health infrastructure and pre-implementation child health and nutritional status.

The outcome variable was implementation of the case-management training component of IMCI. Because the other two components of IMCI were less strongly implemented in most countries,6 and are also more difficult to measure, training coverage indicators were used in these analyses. The actual indicators used varied from country to country depending on the nature of the data available. Table 1 summarizes the main characteristics of the design in each country.

An attempt was made to collect information on the same explanatory variables in each of the three countries, but the nature of data available varied from country to country. The information obtained included general characteristics of the district (population, distance from the capital or largest city and urbanization rate), socioeconomic variables (literacy, income and gross domestic product (GDP)), environmental variables (water supply) and U5MR. For each of the three countries, we also attempted to obtain information on the Human Development Index, a composite indicator of GDP per capita, education (weighted average of adult literacy rate and gross school enrolment ratio) and life expectancy at birth.10 Whenever possible, we used baseline values for all explanatory variables, that is, pre-IMCI implementation levels.

Details on the methods used in each country are presented below.

Brazil

In Brazil, the analyses were restricted to 443 municipalities with populations between 5000 and 50 000 inhabitants in three states in the north-east region of the country: Ceará, Paraíba and Pernambuco.11 These were leading states in IMCI implementation. Municipalities were restricted to those with this population range because the study involved fieldwork12 — which would be difficult in large cities — and because a greater impact was expected in smaller cities where IMCI coverage could be scaled up rapidly.
Table 1. Summary of study characteristics in the three sites

<table>
<thead>
<tr>
<th>Country</th>
<th>Study units</th>
<th>Population range of study units (approximate)</th>
<th>Outcome: Integrated Management of Childhood Illness (IMCI) implementation variable</th>
<th>Reference period for the outcome</th>
<th>Statistical method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>443 municipalities in three states in the north-east region</td>
<td>5000–50 000</td>
<td>Whether or not there were any IMCI-trained health workers in the municipality</td>
<td>1999–2002</td>
<td>$\chi^2$ test</td>
</tr>
<tr>
<td>Peru</td>
<td>All 24 departments in the country</td>
<td>80 000–7 000 000</td>
<td>Percentage of doctors and nurses working in government facilities who were trained in IMCI</td>
<td>1996–2000</td>
<td>Pearson correlation coefficient</td>
</tr>
<tr>
<td>United Republic of Tanzania</td>
<td>82 of 118 districts in the country, and all 21 regions of the country</td>
<td>300 000–2 500 000 (regions)</td>
<td>Ranked date of first IMCI training course in district; mean rank of all districts in each region</td>
<td>1995–2005</td>
<td>Spearman rank correlation coefficient</td>
</tr>
</tbody>
</table>

Based on data available at state level, municipalities were classified as to whether they had “strong IMCI” (training coverage over 50% in 2000 and over 60% in 2001 and 2002), “some IMCI” (at least one trained health worker in the period 2000–02), or “no IMCI.” If state-level data were not available, municipal departments of health were contacted by telephone to provide information on IMCI training. Only 23 municipalities were classified as having strong IMCI, 216 had some, and 204 none. Owing to the small number of municipalities with strong IMCI, the first two categories were merged and the outcome variable was dichotomous (any IMCI training versus no IMCI training).

Data for 2000, derived from the National Demographic Census, were available on the following indicators, unless otherwise stated:

- Human development index: calculated by the United Nations Development Programme office in Brazil;14
- Per capita monthly income: average household per capita monthly income (in Brazilian reais);
- Literacy rate: percentage of individuals aged 15 years or more who were literate;
- Population: number of inhabitants;
- Distance from the state capital in kilometres: distance by road between the seat of the municipality and the centre of the state capital;
- Urbanization (%): percentage of individuals living in urban areas;
- Water supply (%): percentage of households with piped water inside the house;
- U5MR (per thousand), based on indirect mortality estimates made available by the United Nations Development Programme.14 These estimates refer to the mid-1990s.

**Peru**

The ecological analyses combined information from the 34 health districts with data from the 24 departments (political divisions) of Peru, covering the period from 1996 to 2000. Indicators related to coverage of IMCI training were collected by the research team which visited all health districts.15,16 These data were reviewed for consistency and checked against information available at the Ministry of Health and at the United Nations Children’s Fund (UNICEF) and Pan American Health Organization (PAHO) country offices.15,16 Information from the 34 health districts was aggregated into 24 departments to match the geographical basis of information on explanatory variables.

Because all health districts had started training of health workers, it was not possible to categorize IMCI implementation as a yes/no variable, as was done in Brazil. The outcome variable therefore was the percentage of doctors and nurses employed by the Ministry of Health in each department, who were trained on the clinical IMCI course, between 1996 and 2000.

The following explanatory variables were obtained from official sources and from the 1996 and 2000 Demographic and Health Surveys17,18 and are defined as for Brazil, unless otherwise stated:

- Human development index, 2000;17
- Per capita gross departmental product (US$), 1996;19
- Literacy rate (%);
- Population (number of inhabitants);
- Distance from the national capital (Lima) in kilometres;
- Urbanization (%);
- Water supply (%): percentage of households with piped water inside the house, 1996;17
- Indirect U5MR estimate, ca 1995.18

Because of the small number of departments, we used a non-parametric approach (Kruskal–Wallis test) to assess the associations between quartiles of the explanatory variables and training coverage. Pearson correlation coefficients were also calculated.

**United Republic of Tanzania**

The United Republic of Tanzania was a global leader in IMCI implementation and the first district-level training course took place in November 1996; by April 2004 half of all districts had started IMCI training, and when the present data were collected in mid 2005, only 14 (17%) districts had yet to start training.

The data available in the United Republic of Tanzania were more limited than for Brazil or Peru. There were 118 districts in the country, of which 82 (69%) had complete information on child mortality, literacy and IMCI implementation date. Other indicators were available only for the 21 regions, each including two to six districts and having populations that ranged from approximately 300 000 to 2.5 million.

Because data on coverage of IMCI training by district were not available, the variable representing IMCI uptake was the date of the first training course in each district. This was obtained through a review of records, and interviews with the national IMCI team that included
staff from the Ministry of Health and the WHO country office. Districts were then ordered according to the date of the first training course. The first district to start training was given the rank of “1,” and the analyses were based on these ranks. For regional-level analyses, the outcome was the median rank, in terms of the date of the first training course, of all districts belonging to each region. All analyses were repeated using mean instead of median ranks and the results were virtually unchanged.

The following explanatory variables were available at district level, based on the 2002 census, unless otherwise stated:

- literacy rate: percentage of the population aged 5 years or more who can read and write in at least one language;
- total population;
- distance from the largest city (Dar es Salaam) in kilometres, estimated using a geographical information database (MapInfo Professional version 7.8);
- U5MR: deaths in children younger than 5 years per 1000 live births, estimated from the 2002 census using indirect methods; the estimate is for the 5-year period from 1995–99.

All variables available at the district level were also available at the regional level. In addition, the following variables were available only at the regional level:

- human development index;
- average annual contribution to the national GDP, expressed as a percentage of the regional over the national GDP. As regions varied in population size, the ratio of this percentage to the percentage of the national population living in the region was calculated, and this variable is referred to as the “GDP/population ratio”;
- per capita income in Tanzanian shillings;
- urbanization: percentage urban population;
- water supply: percentage of the population with safe water.

Because the outcome was a ranked variable, we used Spearman rank correlation coefficients in the analyses. Analyses were repeated using Pearson correlation and the results were virtually unchanged.

Results
For each country, we provide a brief history of IMCI implementation, followed by the statistical analyses of factors associated with its uptake.

Brazil
The IMCI introduction phase started with a meeting held in Brasilia in March 1996. There was a broad consultative process involving staff from the Ministry of Health, representatives from governmental and nongovernmental institutions, the Brazilian Society of Pediatrics, public universities, and state and municipal health departments. Generic IMCI materials were adapted and training materials were prepared.

The first training course took place in June 1997. At that time, the estimated infant mortality rate (IMR) in

### Table 2. Brazil: percentage of municipalities with Integrated Management of Childhood Illness (IMCI) according to quartiles of geographical, socio-economic and environmental variables, and to baseline mortality levels

<table>
<thead>
<tr>
<th>Variables (quartiles)</th>
<th>Number</th>
<th>Municipalities with IMCI (%)</th>
<th>P-level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human development index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 0.64</td>
<td>106</td>
<td>59.4</td>
<td>0.01*</td>
</tr>
<tr>
<td>0.61–0.64</td>
<td>114</td>
<td>57.9</td>
<td></td>
</tr>
<tr>
<td>0.58–0.60</td>
<td>110</td>
<td>56.4</td>
<td></td>
</tr>
<tr>
<td>&lt; 0.58</td>
<td>113</td>
<td>42.5</td>
<td></td>
</tr>
<tr>
<td>Per capita income (Brazilian reais)</td>
<td></td>
<td></td>
<td>0.02**</td>
</tr>
<tr>
<td>&gt; 91</td>
<td>111</td>
<td>66.7</td>
<td></td>
</tr>
<tr>
<td>78–91</td>
<td>111</td>
<td>52.2</td>
<td></td>
</tr>
<tr>
<td>67–77</td>
<td>111</td>
<td>46.8</td>
<td></td>
</tr>
<tr>
<td>&lt; 67</td>
<td>110</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Literacy rate (%)</td>
<td></td>
<td></td>
<td>0.59**</td>
</tr>
<tr>
<td>&gt; 64</td>
<td>112</td>
<td>52.7</td>
<td></td>
</tr>
<tr>
<td>61–64</td>
<td>110</td>
<td>59.5</td>
<td></td>
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<tr>
<td>56–60</td>
<td>111</td>
<td>50.9</td>
<td></td>
</tr>
<tr>
<td>&lt; 56</td>
<td>110</td>
<td>52.7</td>
<td></td>
</tr>
<tr>
<td>Population (inhabitants)</td>
<td></td>
<td></td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>25 001–50 000</td>
<td>106</td>
<td>70.7</td>
<td></td>
</tr>
<tr>
<td>15 001–25 000</td>
<td>111</td>
<td>62.2</td>
<td></td>
</tr>
<tr>
<td>10 001–15 000</td>
<td>111</td>
<td>52.2</td>
<td></td>
</tr>
<tr>
<td>5 000–10 000</td>
<td>109</td>
<td>31.2</td>
<td></td>
</tr>
<tr>
<td>Distance from the state capital (km)</td>
<td></td>
<td></td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>&gt; 318</td>
<td>110</td>
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<td></td>
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<tr>
<td>195–318</td>
<td>111</td>
<td>52.2</td>
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<tr>
<td>95–194</td>
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<td>69.4</td>
<td></td>
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<tr>
<td>&lt; 95</td>
<td>111</td>
<td>60.4</td>
<td></td>
</tr>
<tr>
<td>Urbanization (%)</td>
<td></td>
<td></td>
<td>0.46**</td>
</tr>
<tr>
<td>&gt; 62</td>
<td>111</td>
<td>58.6</td>
<td></td>
</tr>
<tr>
<td>48–62</td>
<td>110</td>
<td>60.4</td>
<td></td>
</tr>
<tr>
<td>38–47</td>
<td>111</td>
<td>50.9</td>
<td></td>
</tr>
<tr>
<td>&lt; 38</td>
<td>111</td>
<td>45.9</td>
<td></td>
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<tr>
<td>Water supply (%)</td>
<td></td>
<td></td>
<td>0.14**</td>
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<tr>
<td>&gt;46</td>
<td>110</td>
<td>58.2</td>
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<tr>
<td>36–46</td>
<td>112</td>
<td>58.0</td>
<td></td>
</tr>
<tr>
<td>26–35</td>
<td>110</td>
<td>44.5</td>
<td></td>
</tr>
<tr>
<td>&lt;26</td>
<td>111</td>
<td>54.9</td>
<td></td>
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<tr>
<td>U5MR (per 1 000)</td>
<td></td>
<td></td>
<td>0.17**</td>
</tr>
<tr>
<td>&gt;93</td>
<td>112</td>
<td>49.1</td>
<td></td>
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<tr>
<td>77–93</td>
<td>105</td>
<td>49.5</td>
<td></td>
</tr>
<tr>
<td>64–76</td>
<td>116</td>
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<td></td>
</tr>
<tr>
<td>&lt;64</td>
<td>110</td>
<td>54.5</td>
<td></td>
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</tbody>
</table>

* χ² test for linear trend in proportions.
** χ² test for heterogeneity. 
USMR, mortality rate in children younger than 5 years.
Brazil was 34 per 1000. IMCI training was initially targeted at four of the country’s 27 states: Ceará, Pernambuco and Sergipe, in the north-east region (estimated IMRs in 1997 of 45, 54 and 49, respectively), and Pará state in the Amazon region (IMR, 32). Therefore, three of the four states where IMCI was initially implemented had a higher IMR than the national rate. These states were known for having strong vertical child health programmes, including Control of Diarrhoeal Diseases and Acute Respiratory Infections. Interviews with key informants confirmed that the presence of a strong health team at the state level was a prerequisite for inclusion in the early implementation phase.

Training courses were rapidly expanded to other states in the country, including those in the south and south-east where IMRs were below 20 per 1000. Nevertheless, training coverage in most states has remained very low. A detailed discussion of IMCI implementation is available elsewhere.

The analysis presented in Table 2 covers 443 municipalities in three states leading in IMCI implementation in the north-east region (Ceará, Paraíba and Pernambuco). IMCI was less likely to be implemented in municipalities with low scores on the Human Development Index, low per capita income, small populations, and that were far from the state’s capital. Indicators of literacy, urbanization, water supply and baseline U5MR were not associated with IMCI implementation.

### Peru

Peru was one of the first countries in the Americas to introduce IMCI, starting in 1996. Six districts were identified for the early implementation phase. Junín, Pasco and Huanuco were chosen because of high IMRs and high rates of acute respiratory infections, diarrhoeal diseases, malaria and malnutrition in children younger than 5 years. An additional criterion was that they were not being covered by other major health projects in progress at that time, such as the Proyecto Salud y Nutrición Basica and Proyecto 2000. The first of these projects was run by the Ministry of Health in collaboration with the World Bank, to modernize the health sector with the aim of improving quality of care and coverage of primary-level health services with a focus on maternal and child health and nutrition. The second project — Proyecto 2000 — was implemented by the Ministry of Health and USAID with the objective of improving the health and nutritional status of pre-school children and women of reproductive age through the promotion of utilization of maternal and perinatal health services, home care and healthy community practices.

The other three early-implementation districts — Ferreñafe in Lambayeque Department, Caylloma in Arequipa Department and Callao — were proposed by the staff in charge of the Programa de Salud Básica para Todos (PSBT). This Ministry of Health programme, which aimed at improving access to

<table>
<thead>
<tr>
<th>Variables (quartiles)</th>
<th>Number of departments</th>
<th>Mean training coverage</th>
<th>P-levela</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human development index</td>
<td>&gt; 0.66</td>
<td>6</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>0.59–0.66</td>
<td>6</td>
<td>26.7</td>
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<td></td>
<td>0.51–0.58</td>
<td>6</td>
<td>24.2</td>
</tr>
<tr>
<td></td>
<td>&lt; 0.51</td>
<td>6</td>
<td>20.6</td>
</tr>
<tr>
<td>Per capita gross departmental product (US dollars)</td>
<td>&gt; 1759</td>
<td>6</td>
<td>20.4</td>
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<td></td>
<td>1102–1759</td>
<td>6</td>
<td>9.0</td>
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<td></td>
<td>707–1101</td>
<td>6</td>
<td>23.4</td>
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<td></td>
<td>&lt; 706</td>
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<td>26.9</td>
</tr>
<tr>
<td>Literacy rate (%)</td>
<td>&gt; 95</td>
<td>6</td>
<td>20.7</td>
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<td>92–95</td>
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<td>21.4</td>
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<td></td>
<td>82–91</td>
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<td>16.7</td>
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<tr>
<td></td>
<td>&lt; 82</td>
<td>6</td>
<td>21.0</td>
</tr>
<tr>
<td>Population (inhabitants)</td>
<td>&gt; 1 148 000</td>
<td>6</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>696 000–1 148 000</td>
<td>6</td>
<td>22.1</td>
</tr>
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<td>&lt; 384 000</td>
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<td>Distance from the state capital (km)</td>
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<td>9.8</td>
</tr>
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<td></td>
<td>850–1109</td>
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<td>422–849</td>
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<td>&lt; 422</td>
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<td>Urbanization (%)</td>
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<td>60–81</td>
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<td>27.8</td>
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<tr>
<td></td>
<td>41–59</td>
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<td>18.3</td>
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<td></td>
<td>&lt; 41</td>
<td>6</td>
<td>19.8</td>
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<tr>
<td>Water supply (%)</td>
<td>&gt; 63</td>
<td>5</td>
<td>13.1</td>
</tr>
<tr>
<td></td>
<td>56–63</td>
<td>7</td>
<td>23.2</td>
</tr>
<tr>
<td></td>
<td>42–55</td>
<td>6</td>
<td>12.4</td>
</tr>
<tr>
<td></td>
<td>&lt; 42</td>
<td>6</td>
<td>29.5</td>
</tr>
<tr>
<td>U5MRb (per 1000)</td>
<td>&gt; 93</td>
<td>6</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>81–93</td>
<td>6</td>
<td>20.7</td>
</tr>
<tr>
<td></td>
<td>59–80</td>
<td>6</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>&lt; 59</td>
<td>6</td>
<td>17.7</td>
</tr>
</tbody>
</table>

a Kruskal–Wallis test.

b U5MR, mortality rate in children younger than 5 years.
health services and quality of health care, provided, at least initially, most of the funding for IMCI implementation. The PSBT officers chose Cerreñafe and Cailloma because these were the poorest areas in their respective departments. Callao, one of the most advanced departments in terms of integrated health care and located just outside Lima, was chosen because it provided the opportunity for close follow-up of IMCI implementation. By mid-1997, a high-level decision at the Ministry of Health led to the incorporation of six additional districts (Andahuaylas, Ayacucho, Ica, Puno, Tacna and Ucayali), chosen because they were priority areas for Proyecto 2000. Of the 12 areas chosen for initial IMCI implementation, five (Apurimac, Ayacucho, Pasco, Puno and Ucayali) had IMRs above the national average of 58.3 per 1000 live births, whereas seven had mortality rates below the national average.

By late 1996, 53 national facilitators had been trained in IMCI. As early as 1997, the Ministry of Health declared its commitment to expanding the strategy to all 34 health districts, but the rate of training of health workers fell well short of achieving this target. The rate of training peaked in 1999, and fell thereafter. Details of IMCI implementation at district level in this period have been published elsewhere.

Table 3 and Table 4 show the results of the quantitative analyses. There were no significant associations between coverage of training and any of the indicators under study. Coverage tended to be somewhat lower in departments with higher values of the Human Development Index, larger populations and poorer water supply.

**United Republic of Tanzania**

A detailed account of IMCI implementation in the United Republic of Tanzania is available elsewhere. The introductory phase started with a planning meeting in November 1995, at which the first IMCI national plan of action was prepared and seven “early use” districts were identified. These districts were intended to start IMCI implementation, five (Apurimac, Ayacucho, Pasco, Puno and Ucayali) had IMRs above the national average of 58.3 per 1000 live births, whereas seven had mortality rates below the national average.

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The early implementation phase started in October 1996 and involved activities at the central level, including training of trainers who were then deployed in the seven early-use districts. In June 1998, there was a desk review of initial implementation, and the expansion phase was launched. This involved the appointment of a full-time National IMCI Coordinator and stepwise expansion of IMCI training to all facilities within the initial districts, to new districts within the same region and to new districts in other regions. The expansion phase also incorporated implementation of the other two IMCI components: strengthening of health systems and improving family and community practices.

Interviews with key informants at the national level suggest that implementation depended largely on the attitude of the individual district health management team, and rather less on the availability of a donor, and was unlikely to be associated with the level of socioeconomic development.

This view is supported by the data shown in Table 5. Owing to lack of data, fewer variables are available at the district than at the regional level. The only significant correlation was the earlier introduction of IMCI in districts that were close to Dar es Salaam. None of the other correlations, including that with baseline U5MR, were statistically significant.

**Discussion**

The strong inverse association between the geographical availability of health resources and measures of population need for health care is well recognized. Much less is known, however, about how new health programmes are spread out on a geographical basis, or about the factors associated with their uptake at district level.

The present analyses have certain limitations. Detailed information on IMCI implementation, and particularly on coverage of training for health workers, was very difficult to obtain. In Brazil and Peru, this required repeated contacts with, and sometimes visits to, numerous administrative units, because there was no up-to-date central registry of training coverage. In the United Republic of Tanzania, it was only possible to obtain information on the date of the first training course in each district — admittedly a poor proxy for training coverage.

The countries for these analyses were selected from the five (Bangladesh, Brazil, Peru, Uganda and the United Republic of Tanzania) included in a multi-country evaluation. However, in Bangladesh, IMCI was being implemented only in one pilot district and in Uganda, data on IMCI introduction or
Antenatal and delivery care, immunizations and many other child survival interventions are inequitably distributed within low- and middle-income countries. Vaccination initiatives have recently incorporated the “reach every district” approach to achieve universal coverage and thereby reduce inequities; countries are being encouraged to focus first on low-coverage districts, which will often be the poorest. The need to match delivery of child survival interventions with population health needs in a geographical area is also reflected in the programme management guidelines for child survival, which WHO is currently developing.

In spite of the lack of specific recommendations regarding equity, in both Brazil and Peru — but not in the United Republic of Tanzania — national-level IMCI planners partially addressed equity concerns when selecting early-use districts. In Brazil, three of the four states initially selected were in the area of the country with the highest mortality rate; however, the two states with the highest mortality rates, Alagoas and Maranhão, were not included. In Peru, as described above, there was also an attempt at targeting health districts with high death rates.

The statistical analyses presented in Tables 2–5 go beyond the early-use districts, to reveal which administrative units were most likely to take up IMCI during the expansion phase. In Brazil, these are not the same types of geographical units (states) as were included in the early phase, but represent the spread to municipalities within three states. Because decentralization is an ongoing process in the three countries under study, districts or municipalities were reasonably independent in their adoption of new strategies such as IMCI, and the influence of the national- (or in Brazil, state-) level administration was relatively limited.

Unfortunately, it was not possible to obtain comparable data on all explanatory factors under study. In Brazil, IMCI was less likely to be implemented by poor and small municipalities, and by those that were distant from the state capital. The association with population size in Brazil may be, at least in part, artefactual: larger cities have more health workers and there is thus a greater chance that at least one of them would have been trained in IMCI. Key informants mentioned that small and remote municipalities were less likely to have qualified workers because most training took place in the capital, and because these municipalities were not willing to release one of their few health workers (sometimes the only one) for the extended period necessary for the training. Other informants also mentioned that IMCI-trained health workers were more likely to get jobs in larger and wealthier municipalities; it was even mentioned that some mayors were unwilling to allow their workers to be trained because this would lead to their eventual departure.

### Table 5. Spearman correlation coefficients (rho) between ranked dates of Integrated Management of Childhood Illness (IMCI) introduction and explanatory variables (ca 2000)

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Regional level analyses ( (n=21)^a )</th>
<th>District level analyses ( (n=82)^b )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rho ( P )</td>
<td>rho ( P )</td>
</tr>
<tr>
<td>Human development index</td>
<td>(-0.021) (0.93)</td>
<td>(-) () () ()</td>
</tr>
<tr>
<td>GDP/population ratio</td>
<td>(0.120) (0.61)</td>
<td>(-) () () ()</td>
</tr>
<tr>
<td>Per capita income</td>
<td>(0.249) (0.29)</td>
<td>(-) () () ()</td>
</tr>
<tr>
<td>Urbanization (%)</td>
<td>(-0.114) (0.63)</td>
<td>(-) () () ()</td>
</tr>
<tr>
<td>Water supply (%)</td>
<td>(-0.168) (0.48)</td>
<td>(-) () () ()</td>
</tr>
<tr>
<td>Literacy rate (%)</td>
<td>(0.011) (0.97)</td>
<td>(-0.034) (0.77)</td>
</tr>
<tr>
<td>Population (inhabitants)</td>
<td>(-0.261) (0.25)</td>
<td>(-0.149) (0.20)</td>
</tr>
<tr>
<td>Distance from Dar es Salaam (km)</td>
<td>(0.271) (0.25)</td>
<td>(0.244) (0.03)</td>
</tr>
<tr>
<td>USMR* (per thousand)</td>
<td>(-0.007) (0.97)</td>
<td>(-0.112) (0.32)</td>
</tr>
</tbody>
</table>

*a Data for 82 districts and 21 regions of the United Republic of Tanzania. Positive coefficients indicate that IMCI tended to be introduced later in areas with higher values of the explanatory variable.
*b Data not available.
** Data were missing for up to six districts for one or more variables.
*** Data were missing for up to one region for one or more variables.
**** USMR, mortality rate in children younger than 5 years.
Les interventions sanitaires sont-elles mises en œuvre là où elles sont le plus nécessaires ? Application à l'échelle du district de la Prise en charge intégrée des maladies de l'enfant au Brésil, au Pérou et en République unie de Tanzanie

Objectif Décrire comment se répartit géographiquement l'application de la Prise en charge intégrée des maladies de l'enfant (IMCI) dans trois pays et déterminer si cette stratégie est mise en œuvre dans les zones où les besoins des enfants sont les plus pressants.

Méthodes Nous avons mené des entretiens avec des informateurs clés aux niveaux du pays et du district, au Brésil, au Pérou et en République unie de Tanzanie, ainsi qu'une étude écologique des facteurs intervenant dans la formation à l'IMCI des agents de santé. Parmi ces facteurs, figuraient la population du district, la distance par rapport à la capitale, l’indice de développement humain et d’autres indicateurs socioéconomiques, ainsi que les taux de mortalité de référence chez les enfants de moins de cinq ans.

Résultats Conformément aux recommandations de l’OMS, les districts ayant bénéficié précoce de la mise en œuvre de l’IMCI présentaient les caractéristiques suivantes : proximité avec la capitale, disponibilité de sites de formation appropriés, présence de cadres sanitaires motivés et d’un système de santé opérationnel. Dans la phase d’expansion, l’IMCI a été préférentiellement adoptée par des districts présentant des caractéristiques similaires. Au Brésil, sa mise en œuvre par les municipalités pauvres ou de faible importance et par celles situées à plus grande distance de la capitale de l’État était nettement plus limitée. Au Pérou, aucune association entre la distance à Lima et le taux de mise en œuvre n’a été constatée et une tendance non significative à l’adoption de l’IMCI par des services de faible importance et disposant de ressources limitées a été relevée. Pour la République unie de Tanzanie, le seul résultat statistiquement significatif était une moindre mise en œuvre dans les districts isolés. On n’a relevé d’association entre la mise en œuvre de cette stratégie et les taux de mortalité de référence dans aucun des pays étudiés.

Conclusion Si des directives claires et raisonnables ont été fournies pour la sélection des districts devant bénéficier parmi les premiers de l’IMCI, aucun critère pour guider l’élargissement de cette stratégie n’a été publié et aucun classement par priorité des zones où s’expriment les plus grands besoins n’a été établi. Des analyses sur le plan de l’équité du déploiement géographique des stratégies et programmes récents pourraient aider à déterminer si ces interventions atteignent ceux qui en ont le plus besoin.
Resumen
¿Se implementan las intervenciones sanitarias donde más se necesitan? Implantación distrital de la estrategia de Atención Integrada a las Enfermedades Prevalentes de la Infancia en el Brasil, el Perú y la República Unida de Tanzania

Objetivo: Describir la distribución geográfica de la implementación de la estrategia de Atención Integrada a las Enfermedades Prevalentes de la Infancia (AIEPI) en tres países y evaluar si dicha estrategia se aplicaba en las zonas donde más acucianes eran las necesidades de salud infantil.

Métodos: Realizamos entrevistas con informantes clave a nivel nacional y distrital en el Brasil, el Perú y la República Unida de Tanzania, así como un estudio ecológico de los factores asociados a la formación de los trabajadores sanitarios en materia de AIEPI. Entre los factores explicativos figuraban la población del distrito, la distancia hasta la capital, el índice de desarrollo humano, otros indicadores socioeconómicos y las tasas de mortalidad basales de los menores de cinco años.

Resultados: En consonancia con las recomendaciones de la OMS, los distritos de implementación temprana se caracterizaban por que estaban cerca de la capital y disponían de centros de formación idóneos, de administradores sanitarios motivados y de un sistema de salud operativo. En la fase de expansión, la AIEPI solía ser adoptada por otros distritos de características similares. En el Brasil, la implantación en los municipios más pobres y pequeños y en los más alejados de la capital del Estado fue significativamente menor. En el Perú no se observó ninguna relación con la distancia a Lima, y la tendencia de adopción de la AIEPI por los departamentos pequeños y pobres no era significativa. En la República Unida de Tanzania, el único dato estadísticamente relevante fue la menor implantación en los distritos alejados. La implementación no se asoció a niveles de mortalidad basal en ninguno de los países estudiados.

Conclusión: Si bien se facilitan directrices claras y razonables para la selección de los distritos de implementación temprana, no se suministraron criterios para promover la expansión de la AIEPI, y no se priorizaron las áreas más necesitadas. Los análisis de la equidad basados en el despliegue geográfico de nuevos programas y estrategias pueden ser una ayuda para evaluar si se está llegando o no a quienes más necesitan los servicios.

 precisa el lugar de implementación de la estrategia de Atención Integrada a las Enfermedades Prevalentes de la Infancia. En el Brasil, el Perú y la República Unida de Tanzania, las áreas de mayor necesidad de salud infantil tuvieron la estrategia de Atención Integrada a las Enfermedades Prevalentes de la Infancia (AIEPI) implementada en la mayor parte del territorio. En el Perú, sin embargo, la implementación distrital no fue igualmente distribuida, siendo menor en los distritos más alejados de la capital. En la República Unida de Tanzania, la implementación distrital fue significativamente menor en los distritos más alejados de la capital. Encontrar un balance que permita la implementación equitativa de la AIEPI es una tarea pendiente.

Referencias