Health policy in emerging economies: innovations and challenges
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The International Policy Centre for Inclusive Growth (IPC-IG) is a partnership between the United Nations and the Government of Brazil to promote South–South learning on social policies. The Centre specialises in research-based policy recommendations to foster the reduction of poverty and inequality as well as promote inclusive growth. The IPC-IG is linked to the United Nations Development Programme (UNDP) in Brazil, the Ministry of Planning, Budget and Management of Brazil (MPOG) and the Institute for Applied Economic Research (Ipea) of the Government of Brazil.

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Over the last decade, the global health agenda has converged around proposals for the construction of policies and interventions towards greater equity. Despite the great diversity in their historical and institutional contexts, developing countries face similar health challenges, including inequity regarding access to services and to quality medicines, the prevention and control of communicable and non-communicable diseases, and the strengthening of capacities in scientific and technological development.

The recognition that universal access to health care and to medicines has an impact on poverty and social inclusion has led to the formulation and implementation of diverse interventions to improve the provision, access and quality of health services and products. This issue focuses on developing countries that have exhibited significant progress across various health indicators. However, shortcomings remain regarding not only the financing of public health and social assistance interventions but also the regulatory and coordination capacities of governments, with the aim of ensuring complete, universal access to services and medicines. Domestic and international aspects (especially regarding regulatory frameworks; property rights and procedures for structured purchases) can translate into gaps and a lack of capacity to develop medicines, vaccines and other medical technologies.

The globalisation of health issues demands a global response towards the production of multidisciplinary and collaborative knowledge, which can only occur as a result of quick mobilisation and cooperation among research institutions and multilateral agencies, both in the elaboration of biomedical solutions and the development of social research capable of generating evidence regarding the effectiveness of actions and the determinants of the challenges being tackled. These and other aspects are brought to light by this special issue of Policy in Focus, a collaboration between the International Policy Centre for Inclusive Growth (IPC-IG) and the Centre for Strategic Studies of the Oswaldo Cruz Foundation (Fiocruz).

This compilation of articles from leading experts in the field introduces readers to some of the many ways through which public health policies can substantially contribute to the reduction of poverty and inequality and the promotion of inclusive growth.

This issue is divided into four thematic blocks, arranged to guide the reader from an analysis of broader aspects towards more specific aspects of health systems and policies. The first block presents general aspects of health systems and policies. The second block introduces articles that analyse more specific challenges and policies, especially those geared towards containment measures for epidemics such as hepatitis B, HIV/AIDS, dengue, zika and chikungunya. The third block is a collection of articles discussing specific policies for more equitable access to medicines, dealing with price control regulations and how to work around the intellectual property rights of large pharmaceutical companies. Finally, the edition concludes with a block of articles evidencing the potential of the use of telemedicine initiatives across various health fields, from the training of new professionals to the performance of examinations and differential diagnoses, to improve the quality of health care in remote areas.

We hope this special edition can spark new debates about points of convergence between the promotion of health care, inclusive growth and development more broadly, and that the diversity of experiences presented by the articles can help to systematise the best practices and negative experiences arising from emerging health systems and models.

by Jeni Vaitsman and Pedro Lara de Arruda

Latin American pathways to achieve universal health coverage

Achieving universal health care coverage not only means fulfilling a fundamental social right, but it can also have a significant impact on the improvement of the distribution of income and on the construction of a more equitable and cohesive society.

The reforms carried out over the last decade and a half by Latin American countries concerning their health systems—which were sustained by an increase in health expenditure from 2.4 per cent of gross domestic product (GDP) at the end of the 1990s to 3.6 per cent in 2014—have contributed to greater coverage rates and equity in access (Atun et al. 2014; see Figure 1).

Strengthening the solidarity pillar of social protection systems has been key to providing health care coverage to populations without access to contributory social protection, such as informal workers and poor households, often in rural areas. Additionally, the past decade of sustained economic growth was accompanied by policies oriented towards the formalisation of employment, which led to the broadening of coverage through traditional social security systems. However, fragmentation and overlap of benefits and coverage persist and are made evident by the disparate quality of services for different population groups: health systems in the Latin American region are typically organised around public-sector services for the poor; social security services for formal workers and private services for those who can afford them (Titelman, Cetrángolo, and Acosta 2014).

Although progress towards universal health coverage has been made throughout the region, the characteristics of health systems in terms of investment effort, out-of-pocket expenditures of households, integration of the public health and social security systems, coverage of the population and health impact indicators are quite uneven, depending on the country (see Table 1). Many of these differences are related to the historical evolution of the welfare state, which in turn is influenced by economic, social, demographic and political variables within each national context.

Cuba and Brazil are exemplary in the region for guaranteeing free universal health care coverage, funded by general taxation. Cuba established the National Health Service in 1961, consolidating it over the 1970s, and Brazil created the Unified Health System, a result of the enactment of the 1988 Constitution. In Costa Rica, the social security fund has been the only provider of comprehensive health care for the entire population, including informal workers and poor families since the 1980s (Atun et al. 2014; Cecchini, Filgueira, and Robles 2014; Cotlear et al. 2014).

More recently, to strengthen the solidarity pillar, countries have followed a variety of approaches, including:

- adopting universal health benefit plans, establishing guarantees and prioritising certain diseases and services (as in Chile, Colombia, Uruguay);
- expanding health insurance to formerly excluded population categories, especially the poorest (Mexico, Peru); and

by Olga Lucia Acosta and Simone Cecchini

FIGURE 1: Latin America – affiliation with health care systems among workers aged 15 and older, by income decile, national total, 2002–2013 (percentages)*

Source: Economic Commission for Latin America (ECLAC 2015), based on special tabulations of data from household surveys conducted in the respective countries.

Note: * Weighted average of 13 countries.
Solidarity pillar of social protection systems has been key to providing health care coverage to populations without access to contributory social protection.

In Chile, the Explicit Health Guarantees programme was established in 2004 to provide a minimum level of coverage for all citizens as part of a universal insurance plan, with an emphasis on paediatric, obstetric and gynaecological conditions. In Argentina, where all citizens are entitled to services provided by hospitals and public health services, there are additional initiatives to prevent barriers to access that exist on the ground. The Nacer plan was established in 2004 to facilitate access to public health care for mothers and children, in 2012, it was turned into the expanded Sumar plan, covering women and men up to 64 years old. The federal Inclusiv-Salud programme covers elderly people and people with disabilities who are beneficiaries of non-contributory pensions.

In Peru, the Essential Health Insurance Plan (PEAS) was adopted in 2009 to provide a minimum level of coverage for all citizens according to their financial ability to pay. In Uruguay, with the Comprehensive Health Care Plan (PIAS) adopted in 2006, all individuals are entitled to the same health care plan, financed by a single pool of resources to which citizens contribute according to their financial ability to pay. Furthermore, in Mexico, the Seguro Popular programme was established in 2004 to provide health coverage for people with no access to the social security system.

Looking forward, the complex and uncertain economic scenario that Latin America is now confronting brings new challenges to its efforts to improve equity, universalise health coverage and achieve Sustainable Development Goals (SDGs) 3, to ‘ensure healthy lives and promote well-being for all at all ages’. However, it is important for the countries to retain the progress made in recent decades, while at the same time continuing to advance in areas where further gains can be made (ECLAC 2015).

Most countries need to continue increasing the financial resources flowing into the health sector and to improve solidarity-based schemes, while at the same time reducing out-of-pocket expenditures. This requires increased fiscal resources (Titelman, Cetrángolo, and Acosta 2014)—something that has happened over the last decade and a half (total tax revenue in Latin America increased from 17.2 per cent of GDP in 2000 to 21.7 per cent in 2014) but which is more difficult to accomplish during times of less favourable economic conditions.

Cuba and Brazil are exemplary in the region for guaranteeing free universal health coverage.

### Table 1: Latin America – indicators for health systems, latest available year

<table>
<thead>
<tr>
<th>Country</th>
<th>Public health expenditure (% of GDP)</th>
<th>Public health expenditure per capita (2010 USD)</th>
<th>Out-of-pocket health expenditure (% of total household expenditure)</th>
<th>Integration of public health system and social security</th>
<th>Population health coverage by sub-system</th>
<th>Maternal mortality ratio (deaths per 100,000 live births)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>3.8</td>
<td>5.0</td>
<td>349</td>
<td>535</td>
<td>5.0</td>
<td>Integrated</td>
</tr>
<tr>
<td>Brazil</td>
<td>3.7</td>
<td>5.2</td>
<td>327</td>
<td>622</td>
<td>5.0</td>
<td>Integrated</td>
</tr>
<tr>
<td>Chile</td>
<td>2.4</td>
<td>3.9</td>
<td>226</td>
<td>569</td>
<td>4.3</td>
<td>Integrated</td>
</tr>
<tr>
<td>Colombia</td>
<td>2.0</td>
<td>2.1</td>
<td>120</td>
<td>148</td>
<td>3.2</td>
<td>Integrated</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>4.7</td>
<td>6.5</td>
<td>263</td>
<td>560</td>
<td>2.1</td>
<td>Integrated</td>
</tr>
<tr>
<td>Cuba</td>
<td>5.1</td>
<td>10.4</td>
<td>159</td>
<td>650</td>
<td>...</td>
<td>Integrated</td>
</tr>
<tr>
<td>Honduras</td>
<td>1.8</td>
<td>3.4</td>
<td>30</td>
<td>70</td>
<td>11.2</td>
<td>Integrated</td>
</tr>
<tr>
<td>Mexico</td>
<td>2.0</td>
<td>2.7</td>
<td>156</td>
<td>251</td>
<td>4.7</td>
<td>Segmented</td>
</tr>
<tr>
<td>Peru</td>
<td>1.5</td>
<td>2.4</td>
<td>48</td>
<td>128</td>
<td>7.0</td>
<td>Segmented</td>
</tr>
<tr>
<td>Uruguay</td>
<td>2.4</td>
<td>3.4</td>
<td>69</td>
<td>146</td>
<td>...</td>
<td>Segmented</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2.0</td>
<td>2.6</td>
<td>39</td>
<td>195</td>
<td>3.1</td>
<td>Segmented</td>
</tr>
<tr>
<td>Latin America</td>
<td>2.4</td>
<td>3.6</td>
<td>131</td>
<td>292</td>
<td>4.7</td>
<td>...</td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration, based on ECLAC Social Panorama of Latin America 2013 and 2015; CEPALSTAT; Atun et al. (2014); Bermúdez-Madriz et al. (2011); Cotlear et al. (2014).

Notes: Simple average of 21 countries. 2 Simple average of 18 countries. 3 Data for Colombia only provide general government expenditure on health, adding social security expenditure on health. Colombian public health expenditure per capita was USD117 in 2000 and USD405 in 2013 (WHO Global Health Expenditure Database).
The health systems of the BRICS countries and their performance regarding the health-related MDGs

by Pedro Lara de Arruda¹ and Mary MacLennan²

Despite legal and political tendencies towards providing universal health care, in practice, the BRICS countries (Brazil, Russia, India, China, South Africa) face a number of structural bottlenecks that challenge the delivery of and access to these services. This is especially the case regarding the distribution of services within the countries, particularly in rural and less developed regions.

The following article provides a review of recent changes to the health systems of the BRICS countries and an account of recent progress against health-related Millennium Development Goal (MDG) indicators. It brings up select points but is not intended to be an exhaustive review of the literature nor a comprehensive description of each health system. As there are many aspects outside the health care system that affect health outcomes, we are careful not to imply causation but hope to convey some of the drivers of the various BRICS health care systems.

Health systems of the BRICS countries

South Africa has a two-tier health system that relies on public and private sectors. Since 1996, the public sector has provided primary care free at the point of use (i.e. no user fees required), though the network of health professionals and the overall funding of the system is insufficient to meet the demand. The country’s health care system faces a particularly challenging set-up due to the high capacity of most vulnerable populations (Centre d’Analysè Strategique 2012).

India, on the other hand, attempts to increase health care progressivity through its vast public–private partnerships. It compels service providers to create more flexible participation criteria with the aim of accommodating vulnerable groups and poor people. A flagship initiative in this regard is the Rashtriya Swasthya Bima Yojana (RSBY), a scheme funded by federal (75 per cent) and state (25 per cent) governments, under which households living below the national poverty line only need to contribute a small amount of money (just enough to cover registration costs). Coverage is provided by public and private companies through guidelines established by a public regulatory agency. Launched in 2008, the initiative aims to benefit 60 million households, and, in its first two years, 18 million households classified as living below the poverty line (about 50 million people) had been included in the programme (Krishnaswamy and Ruchinimala 2011). Although there have been recent efforts to coordinate existing policies and services, the Indian system is still based on several public schemes operationalised by private partners with scarce coordination, facing duplication and efficiency challenges (Centre d’Analysè Strategique 2012).

Since its 1988 Constitution, Brazil has relied on the Unified Health System (Sistema Único de Saúde— SUS), a federal structure that provides both basic and specialised health services free at the point of use, through a vast network of public hospitals and clinics fully funded by the State through taxes. However, there are areas where demand for these services is greater than the supply, mostly in rural/ sparsely populated and less developed municipalities (ISSA 2013). The Workers Party’s government was particularly committed to ameliorating the shortage of health care professionals in such areas through special programmes to attract Brazilian professionals (e.g. Programa de Valorização do Profissional da Atenção Básica—Pavob) as well as those from abroad (e.g. Programa Mais Médicos).

Russia’s health care system has relatively high indicators of coverage and quality of services compared to other BRICS countries. The country has a vast number of hospitals and clinics, both public and private. Since private hospitals charge user fees, health insurance is of utmost importance. The management and operation of health services devolves to federal units, although they are guided by a central government strategy. To mitigate user fees and barriers to access, the country has two separate health funding (funding) systems.

First, the Mandatory Health Insurance Fund covers basic health services and is subsidised by central government funds, covering about 98 per cent of the population. With their share of the national funds, local and regional governments are responsible for subcontracting private insurance packages to be chosen by the beneficiaries. Even though this set-up is meant to provide users with a variety of choices, often the subcontracting by local and regional governments is monopolistic or oligopolistic, and in such cases beneficiaries have to accept benefit packages ostensibly more limited than what could be achieved if actual competition existed among the various subcontracted insurers (Popovych et al. 2011).

Second, the Voluntary Health Insurance Fund covers relatively specialised health services and reaches only around 5 per cent of the population. In addition, there are private health insurance plans available, where risk pooling is smaller, but contributions and premiums can be suited more according to the needs and demands of consumers. It is worth noting that many of Russia’s health outcome indicators are comparable to some of the best-performing countries of the Organisation for Economic Co-operation and Development (OECD) (ibid.).

Other than expanding health insurance coverage to more specialised health care services, Russia’s main challenges include improving the cost-effectiveness of its services (which cost around 30 to 40 per cent more than in OECD countries with comparable health outcome indicators) and restructuring the network of mid-level health agents (ibid.).

Note 1: Some of the MDG data presented on the United Nations Statistics Division website have been adjusted by the specialised agencies responsible, to ensure international comparability, in compliance with their shared mandate to assure progress towards the MDGs at the regional and global levels.

Note 2: Data refer to the latest available year for each country. Data on Targets 4.1, 4.2, 4.3, 4.6.1 and both 6.9 (prevalence and death rates) are from 2013. Data on Target 6.6 are from 2012. Data on Target 6.6 are from 2011. Data on Target 6.8 for Brazil, India, China and South Africa are from, respectively, 2007, 2006, 2010 and 2008. Data on Target 5.2 for Brazil, Russia, India, China and South Africa are from, respectively, 2012, 2008, 2009, 2013 and 2009. All remaining data are from 2015.
In China, the supply of health care used to be provided by communes and state firms, but since the 1980s and a pro-market reorientation, the provision of these services has changed. Furthermore, in the past decades, the state restructured their supply. Currently, health care services are offered by central and local governments through rural and urban initiatives that have both contributory (e.g. the New Rural Cooperative Medical Scheme—NCMS—and the Urban Employee Basic Medical Insurance—UBEMI) and non-contributory streams (Resident-Based Basic Medical Insurance Scheme—UBRBM). In addition, central government funds are provided to subsidise user fees (Medical Financial Assistance Programme—MFA) (Meng and Tang 2010).

As a result, in 2008, about 87 per cent of the entire population of China was covered by a health care plan—68 per cent of whom were covered by NCMS, 15 per cent by UEBMI, and 4 per cent by UBRBM. Between 2005 and 2010, China increased the proportion of people covered by health insurance from 24 per cent to 94 per cent of its total population (around 16 million newly insured per month during this period) (Meng and Tang 2010).

Performance regarding some health-related MDG targets

Given the complexities and uniqueness of health contexts in each of the BRICS countries, there is no one-size-fits-all instrument that can adequately illustrate the health achievements and the health status of these countries.

Looking at some of the recent data for the indicators analysed for each BRICS country (Figures 1 and 2), it is easy to notice that Russia stands out for having the most positive figures related to nutrition and child, maternal and newborn health care. Russia has the worst indicators for nutritional, maternal and child outcomes, as well as access to antiretroviral medicines, and has the highest mortality rate in the world (Phillips 1999) provides comprehensive analysis of such problems featuring demographic survey data gathered during the Apartheid regime, whereas Bhorat and Kanbur (2005) illustrate the challenges inherent to the process of consolidation of new data-sets in the first post-Apartheid years. Also relevant is the Jennie Seekings article (2006) that discusses these data-related aspects while also drawing attention to the fact that comparisons of periods before and after the 1990s have to take into consideration the emergence of HIV/AIDS pandemics, which deteriorate life expectancy and death rates, and how such effects are particularly pronounced in South Africa (the country with the highest prevalence of the disease in the world, with rates over 1500 per cent higher than those of the other BRICS countries). For these reasons, we advise caution on the interpretation of South African nominal performance as illustrated in Table 1.

Concluding remarks

India and South Africa depend greatly on public-private partnerships, although they differ largely in that India has a more progressive set-up for ensuring access to health care. However, that country also has room to improve in terms of cost-

**TABLE 1: Progress of the BRICS countries regarding selected MDG health targets**

<table>
<thead>
<tr>
<th>Target 1.8: Halve the proportion of population below minimum level of dietary energy consumption</th>
<th>Target 1.9: Halve the proportion of population below minimum level of dietary energy consumption</th>
<th>Target 4.1: Reduce under-five mortality rate (per 1,000 live births) by two thirds</th>
<th>Target 4.2: Reduce infant mortality rate (per 1,000 live births) by two thirds</th>
<th>Target 4.3: Increase the proportion of one-year-old children immunised against measles by two thirds</th>
<th>Target 5.1: Reduce maternal mortality ratio (per 100,000 live births) by three quarters</th>
<th>Target 5.2: Reduce child mortality by three quarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Russia</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>India</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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</tr>
<tr>
<td>China</td>
<td>✔️</td>
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<tr>
<td>South Africa</td>
<td>✔️</td>
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<td>✔️</td>
<td>✔️</td>
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</tbody>
</table>

Source: Authors’ elaboration based on data from the United Nations Statistics Division.
effectiveness and coordination. Among the countries whose health policies are more dependent on the direct provision of the services by the State, Brazil stands out as the one that does not charge user fees, while China is developing subsidy funds and non-contributory streams to mitigate the coverage gaps of its contributory initiatives. Russia’s large formal labour market makes it somewhat easier to increase adherence to the mandatory, contributory basic health insurance, although the country still faces the challenge of expanding the coverage of the voluntary health insurance set up to mitigate the costs of more-specialised health care services. In terms of their performance regarding the MDG targets, there is a clear divide separating Russia, Brazil and China from India and South Africa. The first group has relatively better health indicators, including almost universal immunisation rates against measles, although they all face major challenges due to specific disease burdens, such as tuberculosis in Russia and HIV in Brazil. These diseases represent even more severe challenges in India and, especially, South Africa.

From our select group of indicators, it is evident that all of the BRICS countries should strive to provide their people with access to improved sanitation facilities, a major environmental factor related to preventable diseases. This is a particular challenge for India, whose coverage is still below 50 per cent of the population. Brazil and China achieved by far the most progress in relative terms during the 15-year period of the MDGs. The worsening scenarios related to diseases such as HIV and/or tuberculosis in Russia, India and South Africa deserve political attention. Specifically regarding HIV, the Brazilian trajectory may be of interest to India and, especially, South Africa, since Brazil performs well not only regarding the target related to reduction in prevalence but also the one related to the provision of universal access to antiretroviral medicines. Although this article discusses key elements of the health systems and MDG-related progress in the BRICS countries, any policy recommendation must be the result of more in-depth studies. This is because we have only considered health care systems in a somewhat isolated manner, and progress and setbacks in health are often related to many interconnected external factors such as disease burden—which in South Africa’s case is very high in terms of HIV/AIDS. •

Improving access and reducing health inequities in India, Brazil and South Africa: financing, human resources and private-sector strategies

by Venkat Raman,1 Gert van Zyl,2 Jeni Vattman,3 Lenoura Lobuto,4 José Mendes Ribiero5 and James W. Björkman6

Analysing the inequities in the health sector is a significant topic for researchers, development partners, social entrepreneurs, and governments across the globe. Cooperation among researchers in India, Brazil and South Africa was established in 2014 to study policies aimed at tackling three key issues that might improve access to health care and, as a consequence, equity, financing, human resources and public-private partnerships.

The three countries have tried to address these contributing to inequities, each in their own way. Evidence about the potential causes of inequity, and how equity might be enhanced, can provide valuable lessons for learning across the countries. Best practices and innovations in financing, human resource management and private-sector engagement (and related evidence-based policymaking) in each country.

Despite diverse social settings and differences in economic, demographic and health indicators, India, Brazil and South Africa share democratic political systems and an avowed commitment to achieving equitable access to affordable health care for all their citizens. Access to health services is a core determinant for equity in health, as it involves social, geographic, economic, organisational and individual characteristics—specifically, the organisation of service delivery, geographic availability, affordability and acceptability. Brazil has a constitutionally guaranteed universal (public) national health system as well as a strong private insurance subsystem. South Africa is moving away from its hospital-centred approach to one that emphasises primary care and ensures availability of funding at different levels of service delivery. India has adopted a pyramidal health system7 based on primary care but is struggling to improve the base of the pyramid (i.e. rural health service delivery and the referral system). Each country has severe inter-regional disparities, not only in health indicators but also in the availability of resources and governance; there are shortages and regional imbalances among categories of health professionals as well as inadequate regulation of the private sector.

The imbalanced distribution of resources between the public and private health sectors severely impacts the poorest and most vulnerable segments of society, thus accentuating the problems of access and inequity. In addition to difficulties in accessing general health services, particular groups such as elderly people, people with disabilities, women and children face other types of neglect in these countries.

Addressing the challenge of equity and access

Moving beyond principles of fairness, the growing recognition that access to good health services produces direct positive impacts on poverty and inclusiveness has stimulated the creation of policies geared towards the expansion of the provision of health interventions and services. Over the last decade, indicators related to infant mortality, infectious diseases, malnutrition, vaccination and longevity have improved in all three countries; however, their public systems continue to display deficiencies in coverage and capacity. Each country is striving to address the challenges of equity and access.

The Brazilian public health system is currently facing many such challenges, among which imbalances in health financing—due to fiscal constraints—and access at different levels of decentralisation. Another challenge relates to human resource shortages in a context of growing demand for public services. In the case of medical doctors, the shortage is exacerbated due to their high mobility across different private markets (selling their services to the public sector, participating in private health plans, having their own private practice etc.), which can decrease the attractiveness of working with the public sector. Concerning private health plans, the challenges are mostly regulatory.

India is addressing inequities in rural health services through the National Rural Health Mission (NRHM), a sub-mission of its National Health Mission initiative, with additional funding, contracting of human resources, private-sector collaboration and insurance schemes. However, the poor regulation of the private sector continues to be a major cause for concern.
South Africa’s health policy agenda is centred on revitalising the organisation of health services through human resource training, financing and insurance, and the strengthening of the district health system.

Central to any health system, human resources comprise the single largest expenditure in public health. Therefore, the efficiency of any health system is directly influenced by human resource management policies and practices. All three countries face shortages across different categories of health personnel and imbalances in their distribution over geographical regions as well as between the public and private sectors. The public sector often competes rather unsuccessfully with the private sector for health professionals: work conditions and comparatively low wages not only make public health services less attractive but can also cause absenteeism and moonlighting among doctors in the public sector. All of these factors aggravate the problem of deficient access to health services in public health facilities. The rapid expansion of private medical schools and the high cost of medical education often create a set of circumstances and incentives that can lead to doctors being unwilling to work in the public sector due to arduous service rules and low pay. The role of the private sector in a country’s health system can be assessed not only by the proportion of services it provides but also by comparing private health expenditure to total health expenditure. The private health sector in all three countries is a complex amalgamation of non-state service providers that range from unqualified practitioners to polyclinics, nursing homes and hospitals of varied sizes, diagnostic centres, pharmacies, blood banks etc. They differ in size, ownership and purpose, sources of funding, market segments, resources and technology deployed, tariffs and regulatory control. Private health expenditure in proportion to out-of-pocket expenditure is significantly higher in India than in Brazil and South Africa. In countries where the private sector dominates service delivery and where out-of-pocket expenditure is high, governments have sought to collaborate with the private sector (through public-private partnerships); however, these arrangements have their own set of associated complexities.

In Brazil, the upper and middle classes, as well as portions of the working class, pay for private health insurance and private service providers, which deliver services through public contracts. Municipalities manage and regulate service delivery according to such contracts, but the high cost and low quality of monitoring mechanisms remain a major weakness.

India’s private sector is responsible for the treatment of around 80 per cent of outpatients and more than 60 per cent of inpatients, but almost 80 per cent of costs for services are paid out of pocket, with significant inter-state and urban–rural variations. Estimates suggest that out-of-pocket medical costs drive nearly 6 per cent of India’s population (63 million people) below the poverty line each year (World Bank 2014). In addition to pro-market policies, low expenditures on public health and poor regulatory systems have stimulated the rapid growth of India’s private sector.

In South Africa, a small proportion of people use private medical insurance schemes, even though the private sector controls more than a quarter of total hospital beds. Private health expenditure accounts for around half of all health expenditures, but less than one fifth of the population uses the private sector for health services. Private insurance schemes constitute 44 per cent of total health funds but cater to only 16 per cent of the population. Around 16 per cent of the uninsured population consult with private general practitioners. There is also a large disparity among different racial groups in accessing private health care services: nearly 71 per cent of white South Africans, 47 per cent of Indians and only 10 per cent of black South Africans use the private sector.* Despite the low coverage of the private sector, it employs significantly more doctors, nurses, dentists and pharmacists.

The need for policy research
Socio-economic, demographic and health indicators concerning India, Brazil and South Africa are already well known. New studies, based on primary data and in-depth analysis, are crucial tools for understanding local features, problems and arrival at potential solutions. They should review the achievements and flaws of each health system and explore possible innovative solutions from each other’s experiences. Comparative analyses and documentation of best practices can then identify policy alternatives and options for reform.

Of course, one size does not fit all, and a number of responses may be feasible to address similar issues. Different schemes, programmes or policies might facilitate increased access to universal health services, and lessons may be learned on how service delivery systems help to address inequities in different contexts of gender, social group, income, age and geographical areas. ●


TABLE 1: Brazil, India and South Africa – selected indicators

<table>
<thead>
<tr>
<th>Demographic and development indicators</th>
<th>Brazil</th>
<th>India</th>
<th>S. Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (millions) in 2012 (**)</td>
<td>209</td>
<td>1266</td>
<td>52.3</td>
</tr>
<tr>
<td>GDP per capita (US$ at 2007 prices) (*)</td>
<td>32,526</td>
<td>3,777</td>
<td>12,722</td>
</tr>
<tr>
<td>Percentage of the population living on below USD 2.5 per day, 2002–2012 (**)</td>
<td>6.1</td>
<td>12.6</td>
<td>13.77</td>
</tr>
<tr>
<td>Income inequality (GINI index 2003–2012) (*)</td>
<td>0.55</td>
<td>0.54</td>
<td>0.63</td>
</tr>
<tr>
<td>Gender inequality index rank (**)</td>
<td>85</td>
<td>127</td>
<td>94</td>
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<table>
<thead>
<tr>
<th>Health financing and resources (input indicators)</th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Health expenditure, 2012 (percentage of GDP) (**)</td>
<td>9.3</td>
<td>4</td>
<td>8.8</td>
</tr>
<tr>
<td>Per capita health expenditure, 2012 (USD) (*)</td>
<td>1056</td>
<td>61</td>
<td>645</td>
</tr>
<tr>
<td>Public health expenditure (as a percentage of total health expenditure 2012) (**)</td>
<td>46.4</td>
<td>33.1</td>
<td>47.9</td>
</tr>
<tr>
<td>Private health expenditure (as a percentage total health expenditure 2013 (***))</td>
<td>54.3</td>
<td>69.5</td>
<td>52</td>
</tr>
<tr>
<td>Out-of-pocket health expenditure (as a percentage of total health expenditure 2012) (*)</td>
<td>31</td>
<td>57.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Private prepaid plans (as a percentage of private expenditure on health 2012) (**)</td>
<td>40.4</td>
<td>4.6</td>
<td>81.1</td>
</tr>
<tr>
<td>Physicians per 10,000 population, 2007–2012 (*)</td>
<td>18</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Hospital beds per 1000 population, 2007–2012 (**)</td>
<td>2.3</td>
<td>0.7</td>
<td>2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health outcome indicators</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Life expectancy at birth (years) 2013 (***)</td>
<td>73.9</td>
<td>66.4</td>
<td>65.9</td>
</tr>
<tr>
<td>Crude birth rate (per 1000 people) 2012 (*)</td>
<td>14</td>
<td>21</td>
<td>21</td>
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<tr>
<td>Crude death rate (per 1000 people) 2012 (**)</td>
<td>6</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Maternal-mortality rate (per 100,000 births) 2010 (**)</td>
<td>56</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>Infant mortality rate (per 1000 births) 2013 (*)</td>
<td>12</td>
<td>41</td>
<td>33</td>
</tr>
<tr>
<td>Under-five mortality rate (per 1000 births) 2013 (**)</td>
<td>14</td>
<td>53</td>
<td>44</td>
</tr>
</tbody>
</table>


Improving health and access to health care in South Africa and India

by Charli Swart, Kieke Olmos and Roathika Arul

Countries have addressed the challenge of safeguarding access to health care and improving their population’s health in different ways, ranging from social insurance to tax-financed health services or targeted schemes for different population groups. However, those policies have not always been beneficial to minority populations. In several cases, the health of ethnic, cultural and other minority groups has remained much worse than the majority of the population (Liao, Buy et al. 2009).

This article discusses the efforts of South Africa and India to achieve universal access to health care. It describes major social and economic inequities, and explores whether new health policies—both fiscal policy and health care—have resulted in enhanced access to health care services and improved the population’s health in these two nations.

Social differences and inequities—the problem

South Africa and India share the legacy of colonialism, heterogeneous populations and widening inequalities. In India, this heterogeneity extends to a bewildering spectrum of social, cultural and geographical diversity. Apart from the major racial groups defined under the apartheid regime, South Africa has many other racial and ethnic minorities. Both countries have witnessed economic growth over the last few decades, which, while ushering in multiple benefits, has also widened social and economic inequities. South Africa, with a Gini coefficient of 0.634 in 2011 (World Bank 2010), is one of the most unequal societies in the world. South Africa’s colonial and apartheid legacies of racial discrimination and segmentation are reflected in disparities in the overall health of the population and unequal access to health services (Coovadia et al. 2009). In 2012, life expectancy at birth among different groups of the population ranged from an average of 47.2 years for Black to 59.7 for Coloured (mixed-race), 65.8 for Indian/ Asian and 71 for White South Africans (van Rensburg 2012: 192).

The wealthier white minority accesses health care largely in the private sector—characterised by out-of-pocket payments or coverage by private health insurance (Ataguba and McIntyre 2012; Harris et al. 2011). The private health sector offers better services than the public sector, with a disproportionate share of resources—over 40 per cent of total health expenditure for only 16 per cent of the population. Private health insurance covers over 70 per cent of the white population, but only 10 per cent of black South Africans, 22 per cent of the mixed race (coloured) population and 47 per cent of Indian/Asian South Africans (Mayosi et al. 2012). Black South Africans have an unemployment rate five times higher than whites, they are more likely to be uneducated, and to lack access to safe drinking water and adequate housing (ibid.). Socio-economic status, racial or insurance status and urban/rural location are generally associated with access barriers to health care in South Africa (Harris et al. 2011).

The impact of India’s caste system on access to health care is reflected in divergent immunisation rates and access to safe child delivery, among other aspects. For example, only a third of the women living in urban slums have delivered their babies in clinics or hospitals, versus 93 per cent of women living outside those slums in the same region (Samveev et al. 2013). Discrimination is sometimes simply not implemented in areas where people belong to a certain caste or religious group. Minority and disadvantaged groups are often ill-informed of their rights and have little to no access to legal recourse (ibid.).

Access to health services

South Africa and India have extensive formal legal, political and constitutional safeguards to provide access to health care to all their people. South Africa’s Constitution of 1996 states that health care is a fundamental right for all South Africans. It lays the foundation for a “liberal and egalitarian healthcare system” (van Rensburg 2012: 127). Furthermore, improving health and access to health care are important goals of the African National Congress (ANC), the dominant political party since the country’s first democratic election in 1994.

The ANC government sought to actively address inequalities in different ways. It presented fewer than 40 health policies plans and programmes aimed at improving the population’s health and the health system (ibid.). Those policies consider primary health care (local clinics, community health centres and regional hospitals) crucial to ensure universal access to health. The National Development Plan (NDP) served as its long-term “socio-economic development roadmap” (SAPA 2013). The NDP chapter on health reform includes specific targets—for example, raising the average life expectancy from 52 to 70 years and reducing infant mortality to 20 deaths per 1,000 live births.

The ANC announced National Health Insurance (NHI) as a means to reach its targets and reduce inequities in access to health (National Planning Commission 2011). The NHI is to become a population-wide health insurance, financed by contributions from all citizens and long-term residents. All patients can contract a public or private insurance plan for basic medical care (Longman 2015). However, the plan’s actual implementation has been slow. By 2016, pilot schemes had started in only 11 of the 52 districts, and concerns were raised about costs, administrative complexity, and the monopoly position of the existing (private) medical insurance schemes (WHO 2010, Surender 2016).

There has been fierce opposition against the NHI from political opposition parties and different stakeholders—including the private medical sector. When the state Competition Commission appointed the private auditing firm KPMG to investigate funding of the private health sector, Netcare, a major private medical company took the Competition Commission and KPMG to court, citing a conflict of interest (Hodgson and Heywood 2014). The High Court ruled in favour of the Competition Commission and decided the investigation could continue (Rugeje 2014). Other health plans and the majority of the physicians continued their opposition against the NHI, fearing excessive government control (Business Tech 2016, Surender 2016). Such opposition is not new or unique to South Africa; when the UK introduced its National Health Service in 1948, there was fierce opposition from the British Medical Association; likewise, the Australian Medical Association opposed Australia’s national health insurance in 1985 (Mooney 2011).

The Indian Constitution promises universal access to health care and other social services. The notion of health for all has figured in the Indian social policy agenda for decades, reappearing in the health debate over the last decade. The first post-colonial Indian government adopted a blueprint for a universal public health system, outlined in the 1946 Bhore Committee Report. This focused on the needs of vulnerable groups, especially women and children across all social strata. In the following decades, successive national health and development policies and government programmes, such as the Reproductive and Child Health Programme and the Integrated Child Development Service, emphasised the needs of disadvantaged groups such as Scheduled Castes (Dalits) and Scheduled Tribes (Ad欢喜).

India has undertaken major health-sector reforms since 2005, starting with the National Rural Health Mission (NRHM), now the National Health Mission (NHM). The NRHM aimed to improve maternal and child health and the quality and access to primary care, and to strengthen outreach services in rural and remote areas; it also included health insurance through the 2008 National Health Insurance Programme (Rashtriya Swasthya Bima Yojana—RSBY) for people living in poverty. The Maternal Security Scheme (Janani Suraksha Yojana—JSY) covers the costs of institutional delivery of up to two live births for INR500 for poor people, while RSBY covers inpatient care for up to INR30,000 annually per family (currently undergoing changes) (Mandal, Pushpdeep and Murhekar 2012; Powell-Jackson, Mazumdar, and Mills 2013; Thakur 2016). The NHM is undertaking further initiatives towards strengthening the health system and urban health. Even so, public health expenditure remained near 1 per cent of GDP, a very low level given the high ambitions for universal insurance coverage (World Bank 2010).

The result of interventions

Despite lofty ambitions, policy implementation in South Africa over the last decade has been modest (Gray, Vawda, and Jack 2013). The introduction of the NHI has been slow, eliciting speculation about its future (Archer 2014; Kardas-Nelson 2014), and the private medical sector has not relented in its resistance against it (Hodgson and Heywood 2014). Despite these challenges, there are no signs that the government has abandoned plans for the further development of the NHI, maintaining that it will help address inequalities in access to health care (Motosaolei 2014).

In India, multiple schemes run in parallel, targeting different social and economic population groups, yet they have not managed to solve the challenges of a crumbling health system. India has been taking significant steps in framing formal health policies to address the urgent needs of its health system, achieve universal health coverage and increase access to health for its most vulnerable populations, but there is a large gap between ambition and reality. Efforts are fragmented, however, with often centralised and implemented with short-term political goals in mind. Moreover, solving major health issues requires not only public health care but also investment in education, sanitation and the reduction of poverty, in addition to increasing awareness, education and knowledge and empowering vulnerable and marginalised sections of society (Thakur 2015).

Conclusion

South Africa and India have expressed high ambitions to realise universal access to health care as a strategy to improve overall population health. Both are aware of the need to pay special attention to the position of disadvantaged ethnic and cultural minorities. However, declaring intentions to implement universal social insurance or even passing legislation to that effect does not automatically mean that everybody has equal access to health care services. Also, concerns remain about financial protection and funding mechanisms tend to dominate the current global health policy agenda. For example,
Innovations in the financing and delivery of oral health care in Brazil

by Edvaldo Batista de Souza

Following the re-democratisation process that culminated in the enactment of a new Constitution in 1988, Brazil went through a series of policy changes to strengthen the public financing and delivery of health care. The health care delivery system (Systemo Único de Saúde—SUS) aims to provide universal and comprehensive health care. Brazil is, however, still far from achieving its goals.5 SUS has helped to improve access to oral care, particularly to primary and emergency services. It has ensured universal coverage of vaccination and prenatal care and free HIV/AIDS antiretroviral therapy (ART), among others. It also provides most high-cost medical services and complex procedures, such as transplants.

Primary care is organised around two co-existing models: the traditional model and the Family Health Strategy (Estratégia Saúde da Família—ESF). In the traditional model, a team of health care professionals comprising doctors (general practitioners, gynaecologists and paediatricians), nurses and assistant nurses provide health care according to individual demand. In an ESF, a team of health care professionals comprises doctors (general practitioners, gynaecologists and paediatricians), nurses and assistant nurses provide oral care and promote health and well-being. They work on the promotion of oral health to different population groups for the purpose of social policymaking and research.

To tackle these problems, the Brazilian government enacted a new programme, named Swasthya Bima Yojana (National Health Insurance). The programme aims to improve public access to dental care through the expansion of OHTs, the provision of specialised dental care through public service providers (specialised dental centres or Centros de Especialidades Odontológicos—CEO) and the expansion of fluoridated water supplies. Each OHT comprises at least one dentist and a dental assistant or a dental hygienist. They work on the promotion of oral health and the prevention of oral diseases, including oral cancer, and perform less complex dental procedures. They are also responsible for referring patients to CEOs and hospitals, if necessary, where they can receive more specialised dental care. The services provided by the OHTs are financed by the federal and municipal governments.

Alternatively, they might provide orthodontic appliances and dental implants. Another component of specialised dental care within the BS programme are the laboratories of dental prosthetics (LPDP), which are public or private providers contracted to produce dental prosthetics. Similar to primary dental care, the services provided by the CEOs and LPDPs are financed by the federal and municipal governments. The federal government also allocates funds to help build public facilities and to acquire the equipment and materials required for the provision of these services.

The fluoridation of water supplies started in Brazil in 1953. Currently, the federal government is promoting it through the BS programme by allocating financial resources for projects proposed by sub-national governments. Priority is given to jurisdictions that use it; however, only to those communities with developed water supply systems and that are able to ensure the quality of water actually manage to access these resources.

The BS programme is a health policy priority, and available data show improvements in access to dental care since its inception. Data from the National Household Sample Survey (PNAD) conducted by the Brazilian Institute of Geography and Statistics (IBGE) estimate that 38.8 per cent of the population visited a dentist in the 12 months prior to the survey in 2003 (IBGE 2005). For 2013, this figure was estimated to be 44.4 per cent (IBGE 2015). These estimates are consistent with the most recent surveys carried out by the Ministério da Saúde.

Table 1 shows that access to dental care, as measured by at least one visit to a dentist in the last 12 months prior to the survey, has improved for all age groups for which data are available and in all geographic regions of the country—except for adolescents in the Southeast region, where a minor decrease in the variable during the period under analysis was observed. It is worth noting that the North and

the current debate about ‘universal health insurance or universal coverage’ seems to pay little attention to how this principle actually translates into effective policies and programmes in the countries that struggle with issues of day-to-day fiscal and political realities.

South Africa and India have made progress in their health care systems and in the overall health of their populations. They have failed to deliver on the sweeping promises of improved health, better quality of life, and universal health care, however. In India, the very low level of public health funding signals that health care is the least important of the eyes of policymakers, and that does not seem likely to change soon. This means that in the foreseeable future, despite political promises of universal coverage, most Indians will continue to depend on private resources for health care. In South Africa, governments have committed far more financial resources, yet the legacy of apartheid and racial division remains a massive obstacle to equal access to health care. The focus on the main racial groups as a legacy of apartheid has also been a barrier to more targeted policies for other ethnic minority groups.

Moreover, reforms that seek to improve the health of the population require a much wider policy scope than simply access to health services. Such policies need to include population density, housing and access to clean water if they are to deliver on the promises of improving health and effective health care for the entire population.

Given the current dominance of the private health care and health insurance sectors in both countries, governments must involve the private sector—be it health insurance or health care providers—in its policymaking process. Shifting resources from one destination to another always entails political struggle. Raising taxes or introducing contributory universal social health insurance might be measures bound to face strong resistance from private business interests.

In both South Africa and India, the rhetoric around health care leans towards universal access to health care based loosely on social welfare ideologies.

Both countries are struggling to float the proverbial ‘socialist boat in a capitalist ocean’; both consider universal access to health care an important element of policy development, and both are dedicated to improving the health of their populations. For both nations, the major challenge is how to align their social policy rhetoric to their day-to-day political, social and fiscal realities.


Ataguba, J.E., and D. McIntyre. 2014. “Paying for and receiving benefits from health services in South Africa is the health system equitable?” Health Policy and Planning 29: 37–45.


Northeast regions had the highest increase in the percentage of the population visiting a dentist, contributing to reducing inequalities in access to oral health services among the different regions. The data also show improvements in oral health outcomes, as measured by the Decayed, Missing or Filled Teeth (DMFT) index.

CEOs are central to the specialised dental care provided by SUS. Some studies show that financial resources have been allocated to more deprived areas (Baldani, Almeida and Antunes, Junqueira et al. 2004) and that, in some localities, specialised dental care was not provided because of administrative discontinuity (Guerra 2009). However, for the implementation of new centres are not being met on schedule, and barriers to access remain even in localities favoured by the programme. Currently, there are more than 1,030 CEOs providing specialised dental care, but the National Health Plan 2012–2015 set a target of more than 1,900 by the end of 2015.

A case study for the state of Rio de Janeiro highlights some of the difficulties faced by SUS managers to implement the policy: a shortage of specialised dental care professionals, unreasonable cost and unmet expectations. The study undertaken in the city of Recife found that more than 50 per cent of respondents lack financial resources or do not prioritise access to dental care (Deitos 2009). However, for the state level has rarely taken part in the study undertaken in the city of Recife found that more than 50 per cent of respondents lack financial resources or do not prioritise access to dental care (Deitos 2009).

In November 2015, as a result of the dramatic increase in the number of cases worldwide, Brazil took a leading role in informing the global health community about the characteristics that are common to other arboviruses, in particular regarding vector control. It is a complex enigma for science and technology, given the lack of insight into biological interactions, etiopathogenesis, immune response, clinical-pathological manifestations, and the lack of diagnostic instruments and of preventive therapies for what is referred to as congenital microcephaly, both of which are related to the zika virus infection.

That does not mean the absence of registers in scientific literature about the zika virus. According to a brief record, the virus was isolated in rhesus monkeys (sentinels) in the Zika forest in Uganda in 1947. After its discovery, there were only a few reports of infection in humans in South Africa and Asia. Until the 2007 epidemic in the Yap Islands, only 14 cases were documented in the existing literature (Duffy, Chen, and Iskander 2007). According to a brief record, the virus was isolated in rhesus monkeys (sentinels) in the Zika forest in Uganda in 1947. After its discovery, there were only a few reports of infection in humans in South Africa and Asia. Until the 2007 epidemic in the Yap Islands, only 14 cases were documented in the existing literature (Duffy, Chen, and Iskander 2007).

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### TABLE 1: Brazil and regions – oral health and access to dental care by age, 2003 and 2010

<table>
<thead>
<tr>
<th>Variable</th>
<th>2003</th>
<th>2010</th>
</tr>
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<tr>
<td>Age group</td>
<td>12 y/o</td>
<td>15-19y/o</td>
</tr>
<tr>
<td>Brazil</td>
<td>48.55</td>
<td>37.84</td>
</tr>
<tr>
<td>North</td>
<td>42.27</td>
<td>31.49</td>
</tr>
<tr>
<td>Northeast</td>
<td>46.02</td>
<td>31.91</td>
</tr>
<tr>
<td>Southern</td>
<td>51.02</td>
<td>41.55</td>
</tr>
<tr>
<td>South</td>
<td>60.86</td>
<td>46.56</td>
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<tr>
<td>Mid-West</td>
<td>65.20</td>
<td>37.18</td>
</tr>
<tr>
<td>DMTF Index</td>
<td>2.79</td>
<td>6.17</td>
</tr>
<tr>
<td>North</td>
<td>3.11</td>
<td>6.14</td>
</tr>
<tr>
<td>South</td>
<td>3.25</td>
<td>5.94</td>
</tr>
<tr>
<td>Mid-West</td>
<td>3.21</td>
<td>5.77</td>
</tr>
<tr>
<td>Source: Author’s elaboration based on data from the Ministério da Saúde (2003, 2010)</td>
<td>65.20</td>
<td>37.18</td>
</tr>
</tbody>
</table>

The role of the Brazilian Unified Health System (SUS) and the contributions of the Fundo de Cruz Faria to the control of the zika virus

By Paulo Gedeão, Nívia Trindade Lima, Volcini Rangel and Rodrigo Stabeli1

In November 2015, as a result of the dramatic increase in the number of cases worldwide, Brazil took a leading role in informing the global health community about the characteristics that are common to other arboviruses, in particular regarding vector control. It is a complex enigma for science and technology, given the lack of insight into biological interactions, etiopathogenesis, immune response, clinical-pathological manifestations, and the lack of diagnostic instruments and of preventive therapies for what is referred to as congenital microcephaly, both of which are related to the zika virus infection.

That does not mean the absence of registers in scientific literature about the zika virus. According to a brief record, the virus was isolated in rhesus monkeys (sentinels) in the Zika forest in Uganda in 1947. After its discovery, there were only a few reports of infection in humans in South Africa and Asia. Until the 2007 epidemic in the Yap Islands, only 14 cases were documented in the existing literature (Duffy, Chen, and Iskander 2007). According to a brief record, the virus was isolated in rhesus monkeys (sentinels) in the Zika forest in Uganda in 1947. After its discovery, there were only a few reports of infection in humans in South Africa and Asia. Until the 2007 epidemic in the Yap Islands, only 14 cases were documented in the existing literature (Duffy, Chen, and Iskander 2007).
The effects of dengue could be significantly reduced through practical environmental initiatives. This process could not only help control the zika infection but also a series of other problems and threats.

**Photo:** Sumario (Volk/Agence Brasil. Baby with microcephaly during a physiotherapy session, 2015; [http://www siti b.jpg](http://www siti b.jpg)).
We need to face the broader questions that are central to Brazil’s health system in general, from its financing to the creation of its administrative models and the debates about technological models.

Brazil’s triple epidemic: dengue, chikungunya and zika; challenges to the provision of opportunities for science, technology and innovation

by Rivaldo Vendinha

At the end of 1985, Rio de Janeiro was surprised by a disease characterised by acute-onset fever and generalised pain. More recently, the epidemic from the Oswaldo Cruz Foundation (Fiocruz) identified the causing agent: the dengue virus, transmitted by the Aedes aegypti mosquito (Schultzmayr et al. 1986). Since then, dengue has become a common disease in the country, reported in all Brazilian states as well as in the Federal District. There has been an uninterrupted, 30-year-long period of dengue epidemics, during which 15 million cases of the disease have been reported nationwide.

Since October 2013, countries in Central America and the Caribbean have had to deal with chikungunya epidemics — another virus borne by the Aedes aegypti mosquito (Barreto et al. 2016). Brazil started being notified of an abnormal increase in the number of microcephaly cases in babies born during that period. In Brazil, the Information System on Liveborn Infants (Sistema de Informações sobre Nascidos Vivos — SINASC) is responsible for recording epidemiological information related to pregnancy, childbirth and congenital malformations, in addition to the socio-demographic characteristics of mothers. It recorded over 170 cases of microcephaly each year between 2000 and 2014 (Ministry of Health 2015).

Surprisingly, epidemiological investigations suggested the temporary association of these congenital alterations in newborn infants whose mothers were infected by the zika virus during the first few months of pregnancy. Subsequently, the viral genome was detected in the amniotic liquid of two pregnant women whose foetuses were diagnosed with microcephaly. The presence of the virus was also detected in blood and tissue samples of a newborn infant with these abnormalities. In Brazil, the circulation of chikungunya was verified in September 2014 (Rines et al. 2016), with thousands of people affected across the 17 states where it was identified.

Since the end of 2014, the country has had to deal with yet another disease, caused by the zika virus, of the same family and genus as the dengue virus, also borne by the Aedes aegypti mosquito (Dick, Kitchen and Hadlow 1952). The clinical manifestations of zika were considered benign, featuring a low fever (not always present), a rash all over the body, itching and joint pains (more prevalent in the hands, feet and ankles), sometimes accompanied by swelling, in addition to irritation in the eyes (Campos, Bandeira and Sardi 2015; Zanluca et al. 2015). In parallel, beginning in September 2015, health surveillance services in some states of the Northeast region of the country started being notified of an abnormal increase in the number of microcephaly cases in babies born during that period. In Brazil, the Information System on Liveborn Infants (Sistema de Informações sobre Nascidos Vivos — SINASC) is responsible for recording epidemiological information related to pregnancy, childbirth and congenital malformations, in addition to the socio-demographic characteristics of mothers. It recorded over 170 cases of microcephaly each year between 2000 and 2014 (Ministry of Health 2015).

The current situation is extremely concerning. The congenital zika epidemic might turn into a real health tragedy (Brito 2015), causing suffering on the level of the HIV/AIDS pandemic. The epidemic is occurring in the Northeast region, concentrating over 80 per cent of the suspected microcephaly cases (COES 2016), it possibly already starting to affect other states in the country, and, due to the infection affecting pregnant women, an increase in the number of infants with congenital malformations is expected. From September 2015 to the end of March 2016 there had been 907 recorded cases of microcephaly, with 4,293 others being investigated throughout the country.

The recent zika epidemic has spawned a new agenda for overcoming barriers to science, technology and innovation in the country (Barreto et al. 2016). Brazil urgently needs to invest in projects that help understand the dynamics of the transmission of this virus, as well as the mechanisms through which congenital malformations happen. It is important to reduce new cases of microcephaly by limiting the spread of the zika virus. A basic issue that may come up in discussions is the trend of microcephaly cases (COES 2016), which has possibly already passed after the end of 2015 (Costa et al. 2016). The confirmation of the zika virus as a cause of these abnormalities is mandatory. In newborns represents an unprecedented find in global scientific research.

Both climatic as well as social conditions in Brazil are conducive to the proliferation of the vector mosquito for these viruses. The country features high temperatures and frequent rains, in addition to suffering from severe deficiencies in the collection of solid urban waste and irregular supply of water for domestic use; this intermittent supply fosters inadequate storage and can lead to new Aedes aegypti breeding grounds, favouring the occurrence of dengue, zika and chikungunya. In addition, historical urban violence, especially during the pacification period and with outbreaks of medium-sized and large cities, hinders the access of agents who work to control these mosquitoes.


Filippis, Allison Fabri, Eliane S.M. Araujo, Rivaldo Venâncio1, F.C. Vasconcelos, Mauro Teixeira, Paulo Buss, Rodrigo Stabeli, Naomar Almeida-Filho, Pedro Barreto, Mauricio L., Manoel Barral-Netto, and Sardi 2015; Zanluca et al. 2015). In Brazil, the circulation of chikungunya was verified in September 2014 (Rines et al. 2016), with thousands of people affected across the 17 states where it was identified. Since the end of 2014, the country has had to deal with yet another disease, caused by the zika virus, of the same family and genus as the dengue virus, also borne by Aedes aegypti (Dick, Kitchen and Hadlow 1952). The clinical manifestations of zika were considered benign, featuring a low fever (not always present), a rash all over the body, itching and joint pains (more prevalent in the hands, feet and ankles), sometimes accompanied by swelling, in addition to irritation in the eyes (Campos, Bandeira and Sardi 2015; Zanluca et al. 2015). In parallel, beginning in September 2015, health surveillance services in some states of the Northeast region of the country started being notified of an abnormal increase in the number of microcephaly cases in babies born during that period. In Brazil, the Information System on Liveborn Infants (Sistema de Informações sobre Nascidos Vivos — SINASC) is responsible for recording epidemiological information related to pregnancy, childbirth and congenital malformations, in addition to the socio-demographic characteristics of mothers. It recorded over 170 cases of microcephaly each year between 2000 and 2014 (Ministry of Health 2015).

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Some underlying results have been attributed to the mosquito control model adopted over the last three decades in Brazil. One of them relates to the activities aiming to reduce the number of potential Aedes aegypti breeding grounds, having been performed without the active participation of society. After the 1986 epidemic in Rio de Janeiro, a ‘real army’ of vector control agents was established. With each new epidemic, this ‘army’ gains greater visibility in the media, and, as a consequence, the hopes for solving the problem are placed squarely on its shoulders.

Media campaigns are generally geared towards fighting an ‘enemy’, the Aedes aegypti mosquito. In practice, this fight was restricted to the use of two tools: chemical products to combat the spread of the mosquito, and also for the elimination of adult mosquitoes; and removal and mechanical destruction of objects that might collect water and, therefore, become potential breeding grounds for the Aedes aegypti. The use of insecticides for the elimination of adult mosquitoes is performed through the dispersion of ultra-low volume (ULV) products.

This idea, spread during national mobilisation campaigns, contributed to reinforcing the belief that once the mosquito had been eliminated, the problem would be completely solved. Furthermore, and even worse, this led to the population believing that the use of these chemical products was the only viable way to eliminate the mosquitoes. Questions related to basic sanitation conditions, including the collection of urban waste and the regular supply of drinking water for domestic use, have not been dealt with. Likewise, this approach also encouraged the passivity of a significant portion of the population. Often they wait for mosquito control agents to visit their homes and remove objects that might inadequately collect water. This model of social mobilisation has not stimulated reflection about how Brazilian citizens have been taking care of their environment.

It is not possible to control the Aedes aegypti mosquito only with the currently available tools, unless some significant, innovative technological development emerges. A good example of innovative technology is the possibility of using the Wolbachia bacteria to render female Aedes aegypti mosquitoes unable to transmit viruses. Research on this technology being developed by Fiocruz in partnership with colleagues from Monash University is part of the ‘Eliminating Dengue: Our Challenge’ programme. The incorporation of this new technological innovation must be understood as a complementary tool to Aedes aegypti control activities, and does not exclude the need for the implementation of the aforementioned structural measures, such as the improvement of environmental sanitation.

Among the demands that arose from this new epidemiological scenario due to the Zika virus, one requires absolute priority: the immediate distribution of diagnostic kits, which are easily performed and accessible to the majority of the Brazilian population. All other actions geared towards adaptation to changes will only be successful if they are not adequate mothers and babies exposed to the viruses, depend on the existence and availability of trustworthy laboratory diagnostic. Brazil urgently needs to improve its performance in this area. The Ministry of Health and the institutions related to it, such as Fiocruz, are actively seeking national and international partnerships to overcome the lack of such products in the country.

Another demand resulting from this health emergency is to develop a vaccine against the Zika virus. Naturally, obtaining a vaccine is not sufficient; it must be safe, easily deployed, long lasting, efficacious and accessible for use on a sufficiently large scale. The Zika virus was ‘forgotten’ for the five decades between 1947, when it was first isolated in Uganda, and 2007, when it caused an epidemic in Yap, Micronesia. This ‘fifteenth’ period of the virus means that it was not thoroughly studied—a fact that is easily verified by the scarcity of scientific articles published in indexed journals between 1947 and December 2015: a little over 200 articles in almost 70 years.

The reluctance to admit the magnitude of the current triple epidemic—dengue, Zika and chikungunya—may delay the debate about the reorganisation of the current health care model in Brazil even further. It is necessary to establish an outpatient care network for pregnant women suspected of being infected with the Zika virus and, afterwards, for the full-time care of the mother–infant dyad. This outpatient network would be responsible for patient care by doctors of various specialties, such as neonatology, neuropaediatrics, ophthalmology and otorhino-laryngology; likewise, other equally indispensable professionals for the health care of infants and their mothers, such as psychologists, physiotherapists, phonoaudiologists and occupational therapists, among others, would be guaranteed a role to play. Another equally important aspect of effective care for children exposed to the Zika virus, and which can be performed through this outpatient network, is the performance of the necessary laboratory examinations and imaging, all of this without requiring hospitalisation.

Currently, this kind of patient care is provided mainly by the hospital network, which has less flexibility to adapt to the new demands imposed by the epidemic. Because it requires strong networks and efficient admittance of patients. An outpatient network would allow administrators to create, for example, a third service shift, something that would be impossible in the traditional hospital network.

The aforementioned challenges represent only part of a complex chain of requirements imposed by this international health crisis. Now is the time for action, because omission from this point onwards might be directly responsible for permanently compromising the cognitive capacities of an entire generation of children.


1. Oswaldo Cruz Foundation (Fiocruz).

Both climatic as well as social conditions in Brazil are conducive to the proliferation of the vector mosquito for these viruses.
Substantial medical progress during the 20th century allowed the opportunity to substantially reduce mortality and improve the quality and expectancy of life in most of the world. Despite such crucial improvements, the HIV epidemic that emerged towards the end of that century generated not only a strong response from health providers and scientists but also an unprecedented mobilisation of affected communities globally. This has helped generate international mechanisms that, over time, led to innovative collaborations, which may have irreversibly altered the dynamics of symbolic power between scientific institutions, medical practitioners, ‘patients’ and affected communities in general.

The HIV epidemic had characteristics that made it transcend the medical realm: it remained lethal until the discovery of combination antiretroviral treatment in 1996 (WHO 2010); however, it disproportionately affected people who were socially excluded: non-heterosexuals, sex workers, people who use drugs, poor people and migrants. Despite many governments’ initial resistance to address the HIV issue, community mobilisation led to a strong, participatory global response that has radically transformed the profile of HIV infection over the past three decades.

This is the context underlying the policy response to HIV in Peru. There, HIV has also exhibited the same regional (Latin American) pattern of a mostly urban epidemic, concentrated on men and transgender women who have sex with men (MSM/TGW), with HIV prevalence over 10 per cent among MSM and 20 per cent among TGW in key cities (while below 0.5 per cent in the general population) (Bastos et al. 2008). Since its inception, the epidemic has been the target of multi-layered stigma, based on the fear of a lethal disease associated with sexual non-conformity and poverty, resulting from sensationalist misinformation. Arguably, the evolving HIV response has been both a factor and a reflection of important cultural changes concerning sexuality and human rights; likewise, increasing community participation is both a determinant and a consequence of new spaces for intersectoral articulation promoted internationally and facilitated by actors in the health sector (Caceres, Cueto and Palomino 2008). Local recognition of the need for such spaces echoes an international consensus supported by Joint United Nations Programme on AIDS (UNAIDS) co-sponsors and key funders (e.g. the Global Fund), regionally adopted by peer HIV programmes in the Horizontal Technical Cooperation Group (Grupo de Cooperacion Técnica Horizontal—GCHT), a long-standing regional mechanism that also includes regional community networks.

**Key phases of the HIV response in Peru**

The HIV epidemic in Peru has demonstrated significant changes over time concerning prevalence, incidence, morbidity and mortality. Some of them—particularly in the early stages—may reflect unchecked dissemination of the virus through sexual networks and changes in the pool of susceptibles. Many others, however, reflect changes in HIV-related policy, which was influenced by:

- an evolving understanding of HIV in the health sector;
- the international context, including the changing policy frameworks, evolving technologies, and funding opportunities; and
- the formation of a relatively well-positioned civil society constituency that demanded that the State take concrete responsibility (Caceres and Mendoza 2009).

Table 1 identifies key phases in the Peruvian HIV response, including conditions and the main characteristics and the resulting epidemiological profile. These phases are based on the perception of the global HIV epidemic as of 2016. As shown in Table 1, the national response to HIV may be generally described in five phases, conditioned, for the most part, by international events that have favoured its evolution towards more complex or comprehensive structures:

- **Phase I**: In fact, a non-response phase, through which international consensus was still being reached regarding the appropriate ways to respond.
- **Phase II**: An early response phase, which allowed for some initial strategies regarding blood safety, HIV testing guidelines and initial steps in prevention, mostly at the level of the Ministry of Health.
- **Phase III**: A first phase of strong, yet sectoral, legal and country-level programmatic development. It focused on prevention, with an emphasis on ‘core groups’ (a term used at that time, following modelling work on epidemics of sexually transmitted infections—STIs), and defining prevention as focused on (individual) risk, meaning STI control (a tendency observed in the 1990s), condom promotion and the development of new guidelines for HIV testing and counselling (Cueto 2001).
- **Phase IV**: Adopted the United Nations General Assembly Special Session (UNGASS)–promoted multilateralisation of HIV responses, often mediated through the Country Coordination Mechanisms (CCMs) required by the Global Fund to submit funding applications; locally it brought about a revolution—the provision (mandated by law) of antiretroviral therapy (ART) to all those in need (as defined by clinical/laboratory criteria) that have changed over time. Not surprisingly, this has led to significantly reduced morbidity and mortality rates, with no major improvement in prevention. (Social) vulnerability and human rights were part of the focus.
- **Finally**, the ongoing phase V reflects changes resulting from a decline in global HIV funding that has especially affected Latin America; but also a growing consensus about the need to accelerate the control of HIV by increasing the proportion of people diagnosed, treated and virally suppressed by 2020. To this end, the State is taking on a higher proportion of programmatic costs, and international guidelines concerning when to treat, and what strategies to use for prevention, are in the process of being adopted globally.

**A country balance**

An attempt to indicate a balance of the national response to the epidemic, including policies and programmes at the government level, as well as community activities (including outreach work), suggests that the country has managed to incorporate increasing levels of complexity into policies and programmes, and to reach national coverage (although several concerns regarding access among rural populations have been raised). It has also focused on key populations (with more inclusive approaches over time), although the levels of stigma against MSM and TGW were still high in some cases that insufficient linkage to care among some newly HIV-positive is explained by self-exclusion, based on negative experiences in the past. Indeed, discrimination based on sexual non-conformity has been traditionally pervasive in all TGW populations (although several exceptions are observed that as much as in other countries, the establishment of HIV care programmes has forced health systems and societies at large to face sexual and gender diversity in previously unseen ways.

Despite the progress that has been achieved, improvements need to go beyond HIV-related services and include policies for the comprehensive care of communities. The approval of government-funded HIV treatment in 2004 was an extraordinary achievement, but it showed that the country, with consistently positive economic indicators, was able to increase its health investment (Caceres et al. 2010) and should continue to do so with prevention activities.

The multilevel governance of the HIV response (through COMUNASA, a Global Fund–mandated CCM) (Collins 2006) deserves further analysis, beyond the scope of this article. Such an analysis might begin by tackling at least two dimensions:

- The way the CCM defined itself—and how it was further delimited by the Ministry of Health, in its mandate for inclusiveness and its role in the development and approval of proposals, as well as
despite the progress that has been achieved, improvements need to go beyond HIV-related services and include policies for the comprehensive care of communities.

National Nursing and Midwifery Legislation in Countries of Southeast Asia with High HIV Burdens

by Niña Kausumawati Ellison,1 Andrea Verani2 and Carey McCarthy3

The need for a legislative review
HIV/AIDS remains a serious global health issue, as evidenced by its contribution to the global burden of disease and by global commitments to expand access to prevention and treatment services. The World Health Organization (WHO) South-East Asia Region is second only to the African Region in the number of people living with HIV and the number of AIDS-related deaths (WHO 2016). However, the Member States of the Region have committed to expand access to antiretroviral treatment (ART) and eradicate new HIV infections.

To provide universal access to prevention, care and treatment, national health care systems need sufficient competent human resources. In this context, competence means that health workers, particularly nurses, who comprise the majority of professional health workers in the countries reviewed, have and use the requisite knowledge and skills to fulfill their defined roles.

In all five countries included in this review (India, Indonesia, Myanmar, Nepal and Thailand), there are more nurses than physicians, suggesting that nurses are probably providing a larger proportion of health care services—especially in Indonesia and Thailand, which have the highest densities of nurses and lowest densities of physicians in the Region. The importance of nurse-initiated and -managed ART education, policy, regulation and practice for scaling up HIV treatment in east, central and southern Africa has already been discussed in the literature (Zuber et al. 2014). Additional research suggests that, to provide ART to 1,000 patients, between one and two physicians and between two and seven nurses are required (Klang et al. 2006). However, in the WHO South-East Asia Region, there is a severe shortage of physicians and nurses (the latter averaging fewer than 2 per 1,000 patients). The distribution of these professionals within countries is skewed toward urban areas, and many nurses and midwives lack the clinical skills to adequately respond to health care demands.

Legislation can establish mandates, authorise the issue of regulations and allocate resources to address deficiencies in the numbers of health workers, their distribution and clinical capacity. In many low- and middle-income countries, nurses are in greater supply than physicians, and a growing body of evidence suggests that the quality of nurse-led ART initiation and management services is not inferior to that provided by physicians (Sanne et al. 2016). These studies have noted the importance of high-quality training and supervision to ensure quality of care, and professional regulation can facilitate both.

Traditionally, the purpose of professional regulation has been to set standards (such as pre-service and continuing education requirements, and scopes of practice) that ensure the competence of practicing health workers, such as nurses and midwives. In countries around the world, health professionals are regulated through national or sub-national legislation (such as a nursing act) that establishes a regulatory body or council and authorises it to issue regulations pertaining to education and practice. Common functions of nursing and midwifery councils include accreditation of training institutions, registration and licensing of qualified nurses and midwives, implementation of continuing education requirements, delineation of scopes of practice, and enforcement of professional codes of conduct. More recently, nursing and midwifery acts have been drafted to ensure that nurses and midwives are able to provide the public with safe, high-quality care. Legislation on health professionals varies from country to country, and international non-governmental organisations such as the International Council of Nurses (ICN) and the International Confederation of Midwives (ICM) have issued global standards for nursing and midwifery legislation and regulation. The ICM Model Nursing Act outlines 21 standard elements (seven structural and fourteen functional) that are encouraged for inclusion in national nursing acts (Wallace 2007). Thus, international guidelines can be used as a benchmark to evaluate the content of national nursing acts. Furthermore, the WHO urges countries to regularly review and strengthen their legislation governing health professionals and to ensure that nurses and midwives make an optimum contribution to the community, which need not be limited to the delivery of health care services. For example, to promote community outreach, they may be called on to supervise other nurses, midwives and community health workers.

The purpose of this article is to analyse nursing acts in countries of the WHO South-East Asia Region and to suggest areas that could be further examined to strengthen the nursing profession and its critical role in addressing HIV specifically, and primary health care more broadly. Countries were selected for inclusion in this review according to a 2010 global report on HIV-related disability-adjusted life years (DALYs), a common measure used to quantify disease burden (Doblado et al. 2013). Five countries in the Region account for more than 99 per cent of its HIV burden: India, Indonesia, Myanmar, Nepal and Thailand. The current nursing and midwifery legislation from these five countries was obtained by searching the online legislative archives of the ICN, the International Labour Organization (ILO) and national regulatory bodies and governments, from May to October 2013.
The overview of the current legislation and recommendations

National pieces of legislation or acts in India, Thailand, Myanmar and Nepal each incorporated over 70 per cent of the 21 elements recommended by the ICN, Indonesia was the only country in the region without a national nursing and midwifery act. Since their enactment, all acts have been amended, albeit not recently (between 14 and 20 years ago). This suggests that countries may benefit from reviewing their national nursing acts to take into consideration current health care needs and global guidelines. Revisions to nursing and midwifery acts, or permissive interpretation of existing legal and regulatory scopes of practice, could expand the workforce for health services such as ART. This is particularly relevant, as nurses greatly outnumber professionals in the countries profiled, as well as globally.

While functional regulatory elements relating to registration and pre-service education were well represented in all countries, many of the acts required continuing education after initial registration. Continuing education or continuing professional development should enable nurses and midwives to update their knowledge and skills to keep up with the rapid evolution of medical research, science and technology. Continuing education and professional development are necessary to ensure that health workers sustainably provide high-quality health care services.

Only two acts (those of Thailand and Myanmar) included a general scope of practice, which elaborated on the breadth of educational definitions provided. However, none of the acts included a detailed, task-oriented scope of practice for nurses or midwives, making it difficult to interpret how the terms in general scope of practice, such as ‘diagnosis’, ‘treatment’ and ‘management’ might relate to specific tasks, such as diagnosing HIV and initiating ART. How general or how specific a scope of practice should be is not a question this article seeks to answer, as strong arguments could be made for both approaches. General scopes of practice can provide greater flexibility for health professionals to respond to changing needs with new technologies and skills, whereas specific scopes of practice can provide greater protection for, and direction to, health professionals, as authorised tasks are explicitly delineated in writing. In the absence of specific scopes of practice, the ways in which Thailand’s and Myanmar’s general scopes of practice are interpreted and implemented may well make a significant difference to the involvement of nurses and midwives in HIV service delivery. General scopes of practice could be made more specific, to provide further guidance to providers and their employers about what nurses and midwives are authorised to undertake. Specific scopes of practice could include HIV-related tasks, such as nurse-initiated and -managed ART, as recommended by the WHO to include prescriptive authority for nurses. Scopes of practice could be reformulated through legislative amendment, or by issuing rules or regulations.

Comparing nursing acts in countries of the WHO South-East Asia Region with the ICN Model Nursing Act. Continuing education was the only element not included in any act. Given the importance of continuing education to the quality of practice in HIV care and other areas, this is a problematic finding; however, our research did not assess whether continuing education is required through means other than the acts (such as regulations). Requirements for continuing education can help health workers to maintain and improve on the training received prior to entry into services, thus facilitating high-quality patient care.

Furthermore, none of the acts included a scope of practice specifically linking HIV-related tasks. Without explicit and specific directions concerning which tasks a nurse or midwife may undertake within their scope of practice, some of them may hesitate to practise to their full scope, for fear of exceeding it. However, general language in scopes of practice may potentially be interpreted by domestic authorities to include such tasks, without necessarily listing each one. Thus, the lack of specific scopes of practice is actually a barrier to task-sharing of HIV services. Countries considering reform to their existing nursing and midwifery acts may benefit from comparing their legislation with those of other similarly situated countries and with global standards. Such a review may assist countries in the WHO South-East Asia Region to better delineate and improve their nursing and midwifery legislation and regulations as part of efforts to strengthen their national health systems, and increase coverage of HIV and other primary health care services.

The role of nurses and midwives in HIV/AIDS care is paramount in South-East Asia and elsewhere. This is due to the greater density of nurses and midwives compared with physicians, and to their placement at the front lines of health care, often in facilities lacking physicians. In short, nurses and midwives are critical to HIV/AIDS care. Therefore, those interested in improving the sustainability of the scale-up for HIV services may benefit from a greater understanding of the manner in which nursing and midwifery are regulated, be it through continuing education, scopes of practice or other relevant requirements for training, registration and licensing.

In conclusion, the national nursing acts of India, Thailand, Myanmar and Nepal were all fairly comprehensive, containing 15–20 elements of the 21 elements in the ICN Model Nursing Act. Continuing education was the only element not included in any act. Given the importance of continuing education to the quality of practice in HIV care and other areas, this is a problematic finding; however, our research did not assess whether continuing education is required through means other than the acts (such as regulations). Requirements for continuing education can help health workers to maintain and improve on the training received prior to entry into services, thus facilitating high-quality patient care.
Eradication of the hepatitis C virus in low- and middle-income countries: between treatment advances and structural bottlenecks

by Francisco I. Bastos, Lydia Boudarène, Roberto Pereira Niqui and Peter Vickerman

With the advent of a new generation of highly efficacious, short-duration direct acting antivirals (DAAs) for the hepatitis C virus (HCV), relevant stakeholders and policymakers, including the World Health Organization (WHO), have started discussing the medium- to long-term prospects of curbing and possibly eradicating HCV. Although exciting, the challenge remains considerable, given the huge number of people infected by HCV worldwide, estimated at 130-150 million people (WHO 2015a).

Approximately one quarter of HCV infection cases undergo spontaneous viral clearance after the first six months. The remaining cases may progress to chronic HCV disease (Baker et al. 2013). In the absence of appropriate treatment, over three decades, 41 per cent of these patients might develop progressive liver fibrosis and cirrhosis, and 1–3 per cent might progress to liver cancer (Hajarizadeh et al. 2013) and, ultimately, death when the possibility of a cure is lacking any assistance outside the health systems. Such categories may overlap, since patients might develop progressive liver disease (Hajarizadeh et al. 2013). Remaining cases may progress to chronic hepatitis C virus (HCV) disease (Hajarizadeh et al. 2013). Eradication of the hepatitis C virus claimed about 500,000 lives in 2010: 16,000 resulting from acute hepatitis, 195,700 due to liver cancer, and 287,400 resulting from cirrhosis secondary to the hepatitis C infection (Lozano et al. 2012).

HCV is a single-stranded ribonucleic acid (RNA) blood-borne virus, transmitted predominantly through unsterile medical equipment and supplies, transfusion of unscreened blood/blood products, and unsafe injection practices (WHO 2015a). HCV is highly mutable, and 11 different strains with different sub-types have been described so far, making the design of an efficient vaccine a great challenge. Genotype 1 is responsible for 46 per cent of all infections worldwide, prevalent in North and Latin America, Europe and Australasia (Gower et al. 2014). Genotype 3 distribution corresponds to 22 per cent of total global infections, predominantly in Asia. Genotype 2 accounts for 13 per cent, and Genotype 4 for 13 per cent, predominantly in North Africa and the Middle East (ibid.). Unlike interferon treatments, which present a different prognosis depending on genotype, the new DAAs are effective for a wide range of genotypes, with fewer side effects.

In the context of low- and middle-income countries, several bottlenecks may pose formidable challenges for scaling up treatment to eradicate HCV. For the sake of conciseness, we have divided these bottlenecks into three broad categories:

- difficulties associated with transforming findings from clinical trials into real-life condition outcomes;
- high treatment and screening costs (and tight/shrinking budgets); and
- pockets of very high prevalence of the diseases, usually among disenfranchised and vulnerable populations.

Such categories may overlap, since disenfranchised populations are usually uninsured, unemployered and/or homeless, therefore lacking any assistance outside inclusive government programmes. The difficulties facing the transition of findings from randomised clinical trials (RCTs) into concrete outcomes in real-life conditions have been discussed by several authors (e.g. Victoria et al. 2004). Such difficulties are universal, since RCTs are—by their very nature—artificial, in the sense that their’recontrollability’ is secondary to strict rules imposed to eligibility and follow-up. The overall health conditions of potential recruits tend to be better than those prevailing in the general population, especially among those from deprived segments. Purposeful biases are an essential component of such protocols, such as those relative to age (usually to the detriment of children, youth and seniors) and gender—for example, women of reproductive age tend to be excluded from protocols or must be thoroughly screened for the consistent use of contraception. Strict follow-up rules tend to function as a disincentive for people with complicated working schedules, unstable housing and/or a lack of family/social support.

Difficulties are context-specific and tend to be more pronounced and difficult to mitigate in settings where health systems and/or services are affected by structural deficits such as: scarcity or demotivation of the workforce; scarcity of clean water and/or electric power; less than optimal enforcement of biosecurity procedures and proper disposal of hazardous materials; and, in a broader sense, less than optimal health coverage, monitoring, long waiting times and inefficient transportation.

Countries of all income levels (exactly obvious differences) have been challenged by the high cost of such new medicines, which may cost as much as an additional US$6 billion over the next five years in the USA (Chhatwal et al. 2015). Even the best-funded health systems, such as the UK National Health System (NHS), have been struggling to fully incorporate a comprehensive portfolio of DAAs (NHS 2014). The innovative concept of ‘minimum target prices’ (MTP), has been explored by the International literature, and a recent analysis published by van de Ven et al. (2015) has estimated costs at US$171–360 per person without genotyping or US$261–450 per person with genotyping. These costs preclude the adoption of such therapeutic regimens by very low-income countries. Some of them have a per capita health budget far below both global market prices and MTP. In the absence of substantial help from international donors, it is very unlikely that such treatments could be offered. International donors have paved the way for the current increased access to antiretrovirals for HIV/AIDS. A similar commitment will be required to curb HCV.

A second dimension is to translate the concept of MTP into a practical and affordable alternative in different contexts—i.e. making these theoretical lowest prices a benchmark for actual procurement prices. This requires the sustained commitment of national governments with the full adoption of large-scale treatment programmes, which cannot operate in a vacuum but must necessarily incorporate large-scale programmes on detection, testing and counselling, and agile referral between outreach programmes, teams and health services. It also calls for the provision of decentralised treatment, not involving doctors (especially costly specialists) but, rather, nurses and harm reduction staff, and simplified testing regimens (Lobo et al. 2015). Finally, the concrete adoption of MTP calls for a comprehensive partnership between governments, international institutions, organisations and private companies. Available alternatives comprise a whole gamut of policies and initiatives that are not mutually exclusive, such as negotiating substantial discounts, the implementation of revolving funds—such as those adopted by institutions such as the Pan American Health Organization (PAHO), the Revolving Fund on Vaccines Procurement (PHD 2016) and/or the domestic production of generic medicines. The third and final category comprises the need to reach and enrol hard-to-reach populations and to implement culturally sensitive programmes targeting key populations. These populations vary to some extent in different contexts but usually include people who inject drugs—an umbrella category that requires interventions tailored to the needs of people who inject different substances (Tavitian-Exley et al. 2015). These groups drive the HCV epidemic in many developed settings and are a crucial transmission group with high prevalence in all settings (De Angelis 2009; Nelson et al. 2011). Although treatment compliance and re-infection are a common concern among people who inject drugs (Aspinall et al. 2013), it is likely that the treatment of this group could be highly cost-effective prevention strategy (Martin et al. 2013). Other key populations are those among whom increased vulnerability is associated with the failings of the health services themselves and/or community contamination—for example, tattooing personnel, barbers or dentists who do not comply with the consensus guidelines regarding the sterilisation of tools and materials.

Inefficient and poorly supervised services may impose additional harm and burdens on people who are already struggling with debilitating medical conditions, such as patients with renal failure undergoing haemodialysis (Su et al. 2013) and haemophiliacs (Canares et al. 2015), as well as others who receive frequent blood transfusions or are intermittently exposed to contaminated blood or blood products.

Ironically, the full implementation of some of the most advanced and costly therapies might be hampered by the failings and basic deficiencies of health systems and services. Conversely, the simple structure of several services and health systems could be boosted by carefully designed policies, which benefit from their simplicity to scale-up testing, counselling and access to treatment with simpler diagnostic tools and less specialist monitoring.

Despite these bottlenecks, more or less relevant depending on individual country contexts, rising global awareness regarding the hepatitis C epidemic and access to DAAs is encouraging. Multiple global initiatives and coalitions play a synergistic role to work towards the end of the epidemic. The WHO has recently included DAAs in its Model Lists of Essential Medicines (WHO 2015b). The World Health Assembly has reaffirmed the importance of the improvement of prevention, diagnosis and treatment of hepatitis, as well as access to quality and affordable medicines, while considering the need for greater flexibility in the application of property legislation for the production of generic drugs. Global hepatitis C coalition groups play an important advocacy role.
The political will and drug negotiation agreements are key factors towards eradicating the HCV epidemic.

In low- and middle-income countries, fielding such a large budget is challenging, even in countries with high-income status, such as Australia and Portugal (despite the fiscal crisis affecting the latter), have recently decided to invest AUD1 billion towards eradicating the HCV epidemic. Portugal, with 230,000 infected people (Mitruka et al. 2015), is initiating its eradication programme in 2015. Its HCV elimination programme in 2015, as recently decided by the Ministry of Public Health and Social Solidarity, is hailed as a sentinel event used for the evaluation and improvement of the health care system worldwide.

Policy in Focus

The Brazilian health system ensures access to medical treatment for all patients diagnosed with chronic hepatitis C. New drugs (Daclatasvir, Sofosbuvir and Ledipasvir) have been delivered to patients since the end of 2015, starting with those who have not benefited from previous treatment. Warning campaigns have helped to expand diagnosis, especially among people who undergo surgeries, blood transfusions or transplants before 1993 (ibid.).

The purchase of generic drugs, as recently decided by the Ministry of Public Health and Social Solidarity, is viewed as a sentinel event used for the evaluation and improvement of the health care system worldwide. The Ministry of Public Health and Social Solidarity announced the purchase of generic drugs, as recently decided by the Ministry of Public Health and Social Solidarity, is viewed as a sentinel event used for the evaluation and improvement of the health care system worldwide.

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Challenges facing access to medicines under the expansion of international trade

by Maria Auxiliadora Oliveira and Gabriela Costa Chaves

The year 2015 was marked by a series of events that characterise an ambitious agenda for the health sector. On the one hand, in September 2015, the United Nations (UN) General Assembly established an action plan for 2030 featuring 17 Sustainable Development Goals (SDGs), among which is Goal 3: “Ensure healthy lives and promote well-being for all at all ages”. New high-cost medicines for the treatment of cancer and hepatitis are now part of the World Health Organization (WHO) model list for essential medicines (Experts in Chronic Myeloid Leukemia 2013; Ban-ki-moon, UN Secretary-General, has convened a High-Level Panel on Access to Medicines. On the other hand, 2015 marked the 20-year anniversary of the World Trade Organization (WTO) and multinational agreements such as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

Ending the AIDS, tuberculosis, malaria and tropical disease epidemics, as well as fighting viral hepatitis and other communicable diseases by 2030, is one of the objectives of this agenda. The continuous intake of new medicines, and other epidemics depend on access to medicines, many of which are launched at prohibitively high prices. Another goal of SDG 3 is to reduce premature mortality due to non-communicable chronic diseases by a third, through prevention and treatment.

In this context, the objective of the aforementioned UN Panel is to identify proposals that minimise the “incoherence between the justifiable rights of inventors, international human rights law, trade rules and public health in the context of health technologies” (UN Secretary-General’s High-Level Panel on Access to Medicines. 2016).

All of these events occur at a time when life-saving medicines are being marketed at prices that can surpass USD100,000 per treatment, threatening the sustainability of the health systems of developing and even developed countries (Experts in Chronic Myeloid Leukemia 2013; Londeix 2014; PAHO 2015, Boasley 2013).

This article presents an overview of the trajectory of medicines in the international health agenda and their linkages with the agenda of intellectual property rights and international trade over the past 20 years, focusing on the challenges of meeting the ambitious health-related SDGs.

Access to medicines—international commitments

Since the 1970s, when the theme entered the WHO agenda (WHA28.66), the regular provision of medicines to people in need has been considered one of the key components of health systems and services, occupying a crucial space in international health, commerce, development, human rights and diplomacy agendas. Essential medicines are one of the pillars of health care established in 1978 by the Declaration of Alma-Ata (PAHO 2015).

Regular access to medicines is one of the essential conditions for the realisation of the basic human right to health. The worsening of acute or chronic diseases, the appearance and dissemination of infectious illnesses, the avoidable suffering of great masses of the population, the loss of quality of life, the increase in mortality and health system expenditures, as well as the deepening of social inequities are some of the consequences of the lack of regular access to medicines.

At the health service level, access to medicines depends on certain factors such as availability, geographic accessibility, affordability, acceptability and quality (Boasley 2015). From a political perspective, it is necessary that government representatives and leaders have the political will to bring about related international commitments. This goes beyond the technical availability of medicines, and it is necessary to invest in strengthening health systems and achieving affordability to ensure the sustainable financing of medicines policy.

Trade agreements and access to medicines

In the 1990s, the expansion of the HIV epidemic across developing countries coincided with the implementation of the WTO TRIPS agreement. At that time, a variety of effective medicines to treat the infection and control the epidemic already existed. However, over 90 per cent of people living with HIV in those countries did not receive treatment, leading to thousands of early deaths. This reality drove the emergence of a broad international movement to improve access to medicines, which questioned the prevalence of intellectual property rights established by the TRIPS agreement over the human right to life of people affected by diseases for which effective treatments already existed.

Significant efforts over the last two decades, involving governments, big drug companies, and the UN, made a rapid response to the epidemic possible, leading to—in early 2013—13.6 million people living with HIV having access to antiretroviral therapy (ART) and 7.6 million deaths being avoided due to access to such medication (Bigdeli et al. 2013).

Despite these advances, Millennium Development Goal (MDG) target 6.B—to achieve, by 2015, universal access to treatment for HIV/AIDS for all those who need it—was only partially met (United Nations 2016). One of the persisting problems is the high prices of ARV medicines, often under a monopoly due to patent protection. The TRIPS agreement was enacted in January 1995 and led to concerns due to its implications for local production and access to medicines (Velasquez and Boulet 1999). This is because, unlike the previous international system established by the Paris Convention of 1884, the TRIPS agreement determines that all WTO member countries must grant patents for products and processes across all technological areas, including the pharmaceutical sector.

At the time, the vast majority of developing countries did not grant patents for pharmacological products, as they had the right to choose technological areas to be excluded from patentability. The TRIPS agreement created a new international system of intellectual property, globalising the patent rules—considered a flaw by those who defended a stricter protectionist system. Patents provide the holder exclusive rights in the commercialisation of the invention for the duration of the patent’s term, which in the case of medicines allows patent holding companies to charge high prices (’t Hoen 2009).

In the context of initial efforts to ensure access to ARV therapy, the negative effects of TRIPS were felt as early as the end of the 1990s, representing one of the first high-cost products to be adopted by health systems in developing countries, raising questions related to their sustainability. Patent protection for a period of at least 20 years confers to the patent holder the power of monopoly, allowing it to set high prices and temporarily excluding third parties from commercialising generic alternatives to these medications.

One possible way for governments and civil society to deal with the high prices of medicines under a monopoly is the adoption of the TRIPS agreement safeguards for the protection of public health (Chaves and Oliveira 2007). Such safeguards ensure the availability of generic medicines, which can be cheaper and prevent the abuse of patent rights and the granting of secondary patents, while promoting scientific and technological advancement. Among the main safeguards are the transition period for adopting the grant of patents in the pharmaceutical sector, parallel importing (based on the international exhaustion of rights), compulsory licensing,3 experimental use and the Bolar exception,4 restrictive interpretation of patentability requirements, and patent opposition.

Despite the defence and incorporation of these safeguards, their use has been quite limited. Over the last decade, developing countries have adopted compulsory licensing in specific cases such as AIDS and cancer medicines, but pressures against its use have crippled more widespread and systematic adoption.

“The TRIPS agreement was never enough”: free trade agreements and the mega trade deal

Susan Sell (2010) argues that the TRIPS agreement met up to 95 per cent of the demands of those who advocated a stricter patent system. However, in parallel and after the TRIPS agreement negotiation process, they sought to reach the remaining 5 per cent through the inclusion of so-called TRIPS-plus provisions in regional and bilateral free trade agreements signed between the USA or European Union countries with developing countries. These provisions include mechanisms that restrict or even make unavailable the use of safeguards related to the protection of health. Studies have estimated the impact of TRIPS- plus provisions in the pharmaceutical market and in expenditures with medicines in Latin American countries (Colombia, Ecuador, Peru, Costa Rica and the Dominican Republic) (Gamba, Buenaventura, and Bernate 2010; Gamba 2006; Gamba, Corona, and Bernate 2009). In October 2015, negotiations came to a close on the so-called Trans-Pacific Partnership (TPP), comprising 12 countries (USA, Japan, Australia, Brunei, Canada, Chile, Malaysia, New Zealand, Peru, Singapore and Vietnam), which represent 40 per cent of the global economy (Baker 2016). Defined by specialists as a “mega trade deal” (Drahos 2015), this trade agreement is seen as a deepening and an increase of the monopoly related to patents for medicines. In addition to the provision of the so-called TRIPS-plus measures, which might nullify TRIPS flexibility and restrict the space for the adoption of policies for the protection of public health, the agreement also features a chapter (Chapter 9) on investor-State disputes, under which companies can challenge government decisions that affect their intellectual property investments in private supranational courts that override national courts (Baker 2016). The threat or use of these measures can restrict the policy space for countries to promote medicine price reduction through competition.

Ensuring access to new medicines compromises the sustainability of

"Regular access to medicines is one of the essential conditions for the realisation of the basic human right to health."

Colombian policies on generic and biotechnological medicines

Colombia is moving faster than other Latin American countries towards universal health care coverage. Nearly 97 per cent of its citizens have access to health insurance. Furthermore, income does not determine the health benefits package (HBP) whatever, and out-of-pocket expenses are the lowest in the region (Arreola-Oñez and Wong 2013). The country has the widest-reaching immunisation plan in the Americas, including all the latest recombinant vaccines. Over the past four years, the HBP has grown more than those in other countries, and coverage goes beyond the recommendations of the latest update of the World Health Organization (WHO) Essential Medicines List, including biotherapeutics (BTs) for cancer, diabetes and rheumatoid arthritis (MINSALUD 2011; Hoen 2016).

BTs are drugs that harness living cells to make or modify protein products to combat diseases. They are often expensive medicines used for non-communicable diseases and some infectious diseases. Many patents for BTs have been expired. Expanding generic versions of those products, known in some countries as ‘biosimilars’, is an efficient way to guard the sustainability of health care systems and protect them from the technological and financial pressure produced by BTs.

Expanding the Essential Medicines List, including BTs, however, poses a huge financial challenge for the Colombian government, because new medicines represent a significant proportion of overall public expenditure on health care. To manage this burden, in 2012, the HBP has grown more than those in other countries, and coverage goes beyond the recommendations of the latest update of the World Health Organization (WHO) Essential Medicines List, including biotherapeutics (BTs) for cancer, diabetes and rheumatoid arthritis (MINSALUD 2011; Hoen 2016).

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The core of Colombian regulation managed to achieve what the Colombian government has high quality standards. This is precisely while still demanding compliance with a deliberate strategy to facilitate competitors have to obtain authorisation from India, South Korea and Europe present information regarding the quality, and financial pressure regulation experience.

Promoting generic versions of those products, known in some countries as ‘biosimilars’, is an efficient way to guard the sustainability of health care systems and protect them from the technological and financial pressure produced by BTs.

Colombia’s proposal was coherent with its previous decisions on generic medicines. It has promoted generic medicines since 1963 (Pichon-Riviere et al. 2015), and in 1990 introduced a fast track for market authorisation of generic medicines through Decree 709, which was aligned with the Hatch-Waxman Act, established some years before in the USA.

Nevertheless, the ACP is not the same pathway used for traditional generic medicines. It requires its own essential tests, which are more extensive and specific than those required for a classical generic medicine. The ACP only applies to known BTs, characterised well enough and possessing a widely available breadth of information and global evidence about its use, quality and efficacy. The global regulation tendencies of BTs do not stray too far from the Colombian approach.

Colombia’s strategy to take the regulatory proposal forward While at local and global levels BT patent holders promoted controversy, the Colombian government established a strategy to discuss and successfully negotiate the contents of Decree 1782. This strategy was based on widespread transparency (to publish all comments sent from every stakeholder) and on a diplomatic agenda with the strong support of the Union of South American Nations (UNASUR). In addition, the media, Congress, various experts and physicians were involved in the communication plan.

The diplomatic agenda included an internal paper that identified international regulatory tendencies that supported the Colombian stance. The paper was used across all government levels and its use, quality and efficacy. The global regulation tendencies of BTs do not stray too far from the Colombian approach.

Price controls by the State are insufficient, as demonstrated by the Colombian price regulation experience.

In addition, it requires that the impurity profile and the nature of excipients of the biosimilar itself do not give rise to concern.”

This document illustrates how after ten years of experience with biosimilars in Europe, researchers and experts have come to realise the challenges related to clinical comparability exercises required of biosimilars by the EMA. Schellekens and Moors (2010) analysed the biosimilars dose/s approved by the EMA and concluded that only one—Piramal—had fulfilled all the required clinical comparability conditions. They concluded that all biosimilars in Europe have produced similarly positive outcomes compared with the reference.

As the simplified approach proposed by the EMA agrees to waive clinical confirming testing, the Colombian ACP also allows a waiver for confirmatory clinical testing if physicochemical characteristics, biological activity and potency are similar between the reference product and its bioequivalent.
the discretion of the Food and Drug Administration (FDA), a Federal law of the US Federal Government.

Since February 2012, the FDA has released two guidelines: regarding marketing authorisations of biologics to public consultation, including, similar to the Colombian decree, the option to waive clinical and preclinical tests in some circumstances. Grabovski et al. (2014) present the cases of Omnitrope and Enoxaparine, where the FDA had approved two BTs through abbreviated New Drug Application, using the classic generic application.

4. Regarding the relationship between the Colombian regulation and WHA Resolution WHA67.21: Acknowledging the delicate context in which to issue pre-competitive BT regulations, Colombia, Argentina, and other UNASUR member states presented a resolution to the WHA that was sponsored by many countries. In May 2014 Resolution WHA67.21 was released, regarding “Access to biopharmaceutical products including similar biotherapeutic products and ensuring their quality, safety and efficacy”. The resolution included language similar to the Colombian regulation and a written letter that requested the WHO Director-General: “to convene a Global Expert Consultation on Biological Standardization to update the 2009 guidelines, taking into account the technological advances for the characterization of biopharmaceutical products and considering national regulatory needs and capacities and to report on the update to the Executive Board.” This resolution was key for the final stage of the negotiation process according to Decrete 1782 in Colombia.

5. Regarding the relationship between the Colombian regulation and tendencies in Latin America: Over the last five years, Latin-American countries have seen some well-called emerging economies, such as Brazil, Colombia, Ecuador, Chile, Mexico, Peru and Argentina—have established their own abbreviated regulatory schemes. In general, they follow the EMA and WHO guidelines, adapted to local political, economic and historic contexts.

These regulations allow for clinical tests to be reduced or waived, with some restrictions and specific requirements, in the same vein as discussions about generic medicines 20 years ago.

Conclusion
Ongoing scientific advances and the deepening knowledge of therapeutic proteins can support regulations to overcome the clinical comparability test paradigms and to introduce public health objectives to sanitary regulations. The goal of universal coverage, without compromising the quality of BTs, requires the promotion of competences.

The Colombian ACP has adopted and globalized a traditional tendency to take advantage of technical and scientific advances to assure the quality of BTs, while at the same time reducing the costs related to unnecessary clinical testing.

Colombian Decrete 1782 applies the same set of considerations and circumstances as European and US regulations for waiving clinical experiments of some well-known therapeutic proteins to fast-track their market entry; however, it is innovative in that it presents the ACP explicitly to send a clear public health message.


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A strategic roadmap for telehealth in the community of Portuguese-speaking countries

By Luis Velez Lopez, Paula Ferreira, Luz Any Mesina, Augusto Paulo Silva, Felis Rosenberg, Luz Eulidia Fanasse, Paula Rossa, Regina Ungere and Francisco Campoo

The health agenda within the Community of Portuguese-Speaking Countries (Comunidade dos Países de Língua Portuguesa—CPLP) was strengthened in 2008 with the creation of the Strategic Plan for Cooperation in Health (PECs/CPLP) that was signed in May 2009 by all CPLP Ministers of Health. This plan outlined seven strategic areas and 21 development projects with an emphasis on the training of human resources and institutional development for strengthening health systems.

Following up on the Third Meeting of Ministers of Health of the CPLP in Maputo, Mozambique, in February 2014, during which Ministers of Health affirmed their commitment to promote the use of new technologies to ensure universal health coverage and to reduce preventable and avoidable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. For more information, see <http://unesdoc.unesco.org/images/0013/001395/139578e.pdf>. Accessed 28 May 2016.

The development of a strategic roadmap for telehealth is a tool of new technologies to promote distance education and collaborative research and to ensure universal access to health care in line with the priorities of the PECs/CPLP. The proposal was presented, discussed and approved at the Technical Meeting of PECs/CPLP 2009–2016 at the CPLP Executive Secretariat in Lisbon on 2 March 2016. All the topics approved in the meeting, including telehealth, will make up a Resolution to be signed by all nine CPLP member countries.

Telehealth is defined as “the use of information and communication technologies (ICTs)—more specifically, telemedicine—to support, complement or substitute the relationship between human health care at a sustainable cost, the authors propose an analysis of the potential use of telehealth, an assessment of existing mechanisms for cooperation and new recommendations for the nine Portuguese-speaking countries (Portugal, Brazil, Mozambique, Angola, Cape Verde, Guinea-Bissau, Equatorial Guinea, East Timor, and São Tomé and Príncipe).

These recommendations serve as a medium- and long-term strategic roadmap for CPLP countries to develop their own national strategies for the appropriate use of information and communication technologies (ICTs)—more specifically, the use of telehealth—and collaboration among CPLP member countries.

Most CPLP members already have extensive experience in the use of ICTs for telemedicine, e-health and digital health, especially in distance learning, which can transform and consolidate the mechanisms for cooperative and collaborative networking, effectively improving the public health systems of these countries from a global health perspective.

Summary of experiences of telehealth in CPLP member countries

In 2013 the Ministry of Health of Angola started a project to take the first steps into telehealth via a collaboration with international partners (the Geneva University Hospitals (HUG), Switzerland, and the Institute of Tropical Hygiene and Medicine, Universidade Nova de Lisboa (HUI/UNL), Portugal).

The first telehealth steps in Cape Verde started in 1999, after the signing of an agreement between the Apoestado Neto Hospital in Cidade da Praia, Cabo Verde, and the University Hospital of Coimbra, Portugal; telehealth covered gynaecology and obstetrics. The Cardiology Department followed in 2009. In 2012, Cape Verde implemented a crucial strategic shift by connecting central hospitals to regional and health districts, across all islands.

Research on the impacts on the referral network and evacuations demonstrates its relevance to the more distant populations, increasing overall health system efficiency (Lapão and Correia 2015). More recently, in 2014 Cape Verde started its national telemedicine program (Azevedo 2014), having inaugurated the National Telemedicine Centre in the Apoestado Neto Hospital on 23 July 2015. This new

Network of National Health Institutes (Rede de Institutos Nacionais de Saúde Pública—RINSP) and the International Network for the Education of Health Technicians (Rede de Educação de Técnicos em Saúde—RETS).

The more developed experiences of Brazil and Portugal are based on consistent experiences of Angola, Cape Verde, Mozambique, and São Tomé and Príncipe, serve as the basis to promote the use of telehealth in the Portuguese language, which can transform and consolidate the mechanisms for collaborative and telehealth research and related to collaborative discussion. However, this potential is far from fully realised, and many opportunities for cooperation may still be leveraged. Distant rural areas can benefit enormously from these services.

The development of a strategic roadmap for telehealth is a tool of new technologies to promote distance education and collaborative research and to ensure universal access to health care in line with the priorities of the PECs/CPLP. The proposal was presented, discussed and approved at the Technical Meeting of PECs/CPLP 2009–2016 at the CPLP Executive Secretariat in Lisbon on 2 March 2016. All the topics approved in the meeting, including telehealth, will make up a Resolution to be signed by all nine CPLP member countries.

Establish network cooperation mechanisms among CPLP member countries;

Consider important aspects of telehealth in public health, health surveillance, disease localization, in the fields of health promotion and prevention, health emergencies, multicentric trials etc.; and

Strengthen the means of networking among member countries of CPLP Health and their various networks, particularly those

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programme fully extends the telemedicine service to all islands and works on a daily basis, whenever necessary (to deal with clinical evacuations).

The Pan-African e-Network is present in Guinea-Bissau, São Tomé and Príncipe, Cape Verde and Mozambique, among 42 other countries of the African continent. Throughout this process, the Indian government and the African Union carry out the training of African health professionals and provide telehealth services for specialty consultations (Wamala and Augustine 2013; Yusif and Jeiffrey 2014). Language barriers must be pointed out; 14 of the 27 Brazilian states in the region find content in English difficult to understand. This problem presents an opportunity for Portuguese-language training programmes.

Mozambique is currently developing its strategy for information and telehealth systems. The Brazilian National Research and Education Network (Rede Nacional de Ensino e Pesquisa—RNP) has a cooperation agreement with the Mozambican National Research and Education Network (MoRENET) under the Ministry of Science & Technology, that seeks to promote new advanced services and telehealth programmes. Portugal is still focusing on capacity-building of personnel for advanced network infrastructure.

The Health for All programme is a specialised care and telehealth project from São Tomé and Príncipe, which since 2012 has been effectively improving health indicators through the use of a telehealth platform, to enable missions of medical specialties such as radiology, psychiatry, paediatrics, pathology, general surgery, cardiology, imaging and ophthalmology. This project is supported by the Camões Mission, Institute for Cooperation and Education Network (RNP), Brazil.


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2. Brazilian National Research and Education Network (RNP), Brazil.
3. Oswaldo Cruz Foundation, Brazil.
4. See: <www.rute.mp.br>.
Development of telehealth services in Latin America: the current situation

by Alaneer de Fátima dos Santos,1 Mônica Penna de Abreu,1 Maria do Carmo Barros de Melo,2 Cláudio de Souza,2 Luis Aran Mesina1 and Humberto José Alves1

Public health systems struggle to provide care to the needs of populations (Clark and Goodwin 2010). In this context, telehealth initiatives can play a significant role in reducing barriers to access and improving the quality of diagnosis. The development of telehealth activities in Latin America, despite advances in recent years, still faces many challenges.

The use of telehealth services is uneven worldwide. According to the World Health Organization (WHO), in less developed countries where the available structure is limited, it has been lower than what is possible. Activities that have already been implemented feature sub-standard use or frequency of use. Whereas more developed countries have geared services towards diagnosis and control, developing countries face challenges related to connecting basic services to higher levels of the health system (WHO 2013).

The challenge of incorporating telehealth resources is significant. Some Latin American countries feature nationwide telehealth programmes, relying to some degree on open forums to strengthen processes. These forums, in addition to the ones comprising Ministries of Health and universities from different countries, include various entities for cooperation in the region, such as the Economic Commission for Latin America and the Caribbean (ECLAC), the Pan-American Health Organization (PAHO), the Inter-American Development Bank (IDB), and the Latin American and the Caribbean Economic System (SELA). The article presents an overview of telehealth in Latin America and constructs a timeline for its development.

Methodology

Following a literature review conducted regarding telehealth in Latin America, using data since 1985, a data collection instrument was developed, targeted at telehealth managers of the Ministries of Health of all Latin American countries, covering the National Telehealth Projects (NTPs); their objectives and characteristics. The Telehealth Centre of the Medical School of the Federal University of Minas Gerais developed a distance education course for 407 managers of Ministries of Health and major universities. The participants presented essays validating the data collected in their respective countries. Next, a timeline of telehealth was built, and the data were systemised, allowing for an overview of the development of NTPs in Latin America. For the purposes of this article, countries of South America and Central America (including Cuba, Haiti and the Dominican Republic) and Mexico were considered to belong to Latin America.

Results and discussion

Table 1 displays the main telehealth initiatives in Latin America since 1968, highlighting NTP milestones. Considering their characteristics, it is possible to identify three clear stages in the development of telehealth in Latin America.

The initial stage was based on an exchange of experiences between Latin American countries and the USA. During this period—from the 1970s up to the 2000s—the experiences of Mexico, Panama, and Costa Rica stand out.

It has been observed that Mexico was the first country in Latin America to introduce telehealth resources. In 1995 it launched the first NTP in the region, focused on providing distance teleconsultation services. Continuing to innovate, in 2009 it started using standards in the medical information technology (IT) field. The Mexican NTP remains a model for the region as a whole (Gertrudis 2010).

Since 1986 Argentina has been connecting its hospital units with an important development in medical IT. By the end of the 1990s there were 2,000 interconnected health institutions performing teleconsultations. In 2000 Argentina launched its NTP, however, it was not possible to fully implement the project (Oliverio 2010; Riccur 2011).

In 1996 Costa Rica launched its telemedicine project in primary care. The project was ambitious from the start; however, it happened to be discontinued over time (Ortega 2011).

In 2002, in a partnership between the Ministry of Health and the University of Arizona, Panama launched an NTP in radiology and pathology which covered rural areas and penitenciaries (Vega 2010).

In the early stages of the development of telehealth in Latin America, the initiatives were isolated and fragmented, mainly influenced by the USA. However, a new stage began in 2003, when local telehealth initiatives became connected to the development of telehealth in European countries, with the aim of using resources for projects to exchange experiences between Europe and Latin America and demonstrate their results. The Alliance for the Information Society (eLIS) and EURIDICIAL, programmes, established by the European Union and Latin American countries, now have an impact on telehealth in Latin America. Demonstration projects carried out in various Latin American countries contribute towards strengthening capacities in telehealth.

Primary care now plays an important role in telehealth, and there are already some continuous forums—still restricted to few countries—for the exchange of experiences between Latin America and Europe (EURIDICIAL 2008).

As a result, many countries took their first steps towards NTPs: Ecuador launched its NTP in 2006 (Lopes et al. 2010), and Brazil and Colombia did the same in 2007 (Galegos 2014). These were important experiences, usually focusing on providing teleconsultation, connecting primary care to distant experts. Colombia also deploys telehealth resources across semi-intensive care.

In 2007 the Brazilian telehealth project (Campos et al. 2009) became a milestone of telehealth development in Latin America, comprising many different initiatives the Laboratory of Excellence and Innovation in Latin America, the Telemedicine University Network (Rede Universitaria de Telemedicina—RUTE), the Latin American Journal of Telehealth and the establishment of the Pan-American Telehealth Network (Santos et al. 2009).

With these positive Brazilian experiences, the development of telehealth was boosted among Latin American countries, establishing a new period of development for these initiatives and enabling the necessary conditions for actions by multilateral organisations, which began to incorporate telehealth into their action planning. The issue of primary care, perceived as an important organisational strategy, is now significantly integrated into the development of telehealth.

There has been a steady increase in attempts by cooperation organisations to institutionalise telehealth, starting in 2009 with a committee set up by SELA (SELA 2014). In 2009 the IDB designed the project ‘Regional development protocols of public policies for telehealth in Latin America’, providing a set of integrated telehealth activities for countries of the region (IDB 2012). ECLAC contributed to reflection and analysis towards the formulation of policies, establishing the ‘eSalud’ adviser group in 2010—a forum for the development of the information society in Latin America and the Caribbean. PAHO took an important step in 2011 with the approval of the eHealth Action Plan (PAHO 2011).

Both ECLAC and PAHO reinforce the guideline regarding the focus on the development of telehealth based on primary care. After 2010 many countries in Latin America started developing NTPs or building conditions to enable their eventual development: El Salvador (Marroquín 2013), Peru (Correa 2011), Venezuela (Sanchez 2012) and Bolivia (Ministério de Saúde Bolivia 2014). Peru approved a technical standard for telehealth in 2008, and in 2015 the regulatory framework was established.

Table 1: Telehealth milestones in Latin America

<table>
<thead>
<tr>
<th>Stage</th>
<th>Country</th>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAGE 1</td>
<td>Panama</td>
<td>1968</td>
<td>Launch of NTP</td>
</tr>
<tr>
<td></td>
<td>Cuba</td>
<td>1968</td>
<td>Transmission of ultrasound image in the Hermanos Ameijeiras Hospital</td>
</tr>
<tr>
<td></td>
<td>Argentina</td>
<td>1986</td>
<td>Tele-Ophthalmology</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>1998</td>
<td>Launch of NTP</td>
</tr>
<tr>
<td></td>
<td>Chile</td>
<td>2000</td>
<td>First country in Latin America to introduce telemedicine in primary care</td>
</tr>
<tr>
<td></td>
<td>Colombia</td>
<td>2001</td>
<td>Creation of the Latin American Telemedicine and Telehealth Iberoamerican Association</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>2003</td>
<td>Introduction of tele-Ophthalmology</td>
</tr>
<tr>
<td></td>
<td>Peru</td>
<td>2007</td>
<td>Launch of NTP</td>
</tr>
<tr>
<td></td>
<td>El Salvador</td>
<td>2010</td>
<td>Launch of NTP</td>
</tr>
<tr>
<td></td>
<td>PAHO</td>
<td>2011</td>
<td>Telehealth Action Plan</td>
</tr>
</tbody>
</table>

| Table 1: Telehealth milestones in Latin America | Stage | Country | Year | Event |
|-------|--------|------|-------|
| STAGE 2 | Cuba | 2013 | Launch of NTP |
| | Boliva | 2014 | Launch of NTP |
| | Peru | 2015 | Launch of NTP |

| TABLE 1: Telehealth milestones in Latin America | Stage | Country | Year | Event |
|-------|--------|------|-------|
| STAGE 3 | Cuba | 2014 | Launch of NTP |
| | Boliva | 2015 | Launch of NTP |

| Table 1: Telehealth milestones in Latin America | Stage | Country | Year | Event |
|-------|--------|------|-------|
| STAGE 4 | Cuba | 2016 | Launch of NTP |
| | Boliva | 2017 | Launch of NTP |

| Table 1: Telehealth milestones in Latin America | Stage | Country | Year | Event |
|-------|--------|------|-------|
| STAGE 5 | Cuba | 2018 | Launch of NTP |
| | Boliva | 2019 | Launch of NTP |

| Table 1: Telehealth milestones in Latin America | Stage | Country | Year | Event |
|-------|--------|------|-------|
| STAGE 6 | Cuba | 2019 | Launch of NTP |
| | Boliva | 2020 | Launch of NTP |

| Table 1: Telehealth milestones in Latin America | Stage | Country | Year | Event |
|-------|--------|------|-------|
| STAGE 7 | Cuba | 2020 | Launch of NTP |
| | Boliva | 2021 | Launch of NTP |

| Table 1: Telehealth milestones in Latin America | Stage | Country | Year | Event |
|-------|--------|------|-------|
| STAGE 8 | Cuba | 2021 | Launch of NTP |
| | Boliva | 2022 | Launch of NTP |
In 2013 Bolivia implemented the Bolivia Telehealth Project. There is currently a more accelerated process of NTP qualification, boosted by PAHO, ECLAC and the IDB, with the participation of the countries that already have telehealth projects in place, such as Brazil, Mexico, Colombia and Ecuador. Publications on telehealth initiatives in Latin America are being produced; discussion forums are being implemented, qualification processes involving governments and Latin American universities are being developed, in addition to the establishment of a Latin American Committee for Best Practices in Telehealth, involving the main countries and organisations in Latin America. However, some countries still do not have a functioning NTP. Argentina, Uruguay, Paraguay, Dominican Republic, Honduras, Nicaragua, Chile, Cuba and Haiti. A predominance of teleconsultation and distance courses is observed, linking primary care to other levels of health care. In addition, more complex telehealth activities are being developed: tele-radiology, tele-cardiography, tele-urology and semi-intensive care.

In the last stage, it was observed that the theme of telehealth became appropriated by Latin America’s own dynamics, particularly after the start of the NTP in Brazil. Several organisations are now converging efforts to help develop telehealth as a tool to improve health.

**TABLE 2: NTPs in Latin American countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Start year</th>
<th>General objective</th>
<th>Main features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>1995</td>
<td>To contribute to universal health care through a telehealth national system that favours access, quality and efficiency</td>
<td>Teleconsultation—primary care, telemedicine in primary care centres or tele-medicine in prisons</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1994</td>
<td>To provide health care coverage to the population, improving access to high-quality, specialist medical care</td>
<td>Teleconsultation—primary care centres or tele-medicine in prisons</td>
</tr>
<tr>
<td>Panama</td>
<td>2002</td>
<td>To increase the coverage and quality of health services, including in remote areas</td>
<td>Telemedicine services in primary care; telepathology.</td>
</tr>
<tr>
<td>Brazil</td>
<td>2007</td>
<td>To integrate family health teams with the reference university or centres or services; To improve the quality of primary care</td>
<td>Teleconsultation during primary care; Teleconsultation—primary care units; Telereferencing; Distance learning; ECG and retinography; Telemedicine in semi-intensive care; Tele-ECG and tele-x-ray</td>
</tr>
<tr>
<td>Colombia</td>
<td>2007</td>
<td>To improve the health conditions in remote areas and in conditions of social vulnerability</td>
<td>Teleconsultation—primary care units; Webconferences; Distance learning; ECG and retinography</td>
</tr>
<tr>
<td>Ecuador</td>
<td>2009</td>
<td>To strengthen the health care model through a network of reference and counter-reference from primary care</td>
<td>Teleconsultation—primary care; Webconferences; Distance learning</td>
</tr>
<tr>
<td>Peru</td>
<td>2010</td>
<td>To develop, implement and spread a telehealth system to improve health services</td>
<td>Teleconsultation—primary care</td>
</tr>
<tr>
<td>El Salvador</td>
<td>2011</td>
<td>To implement health training and consulting projects for family health teams</td>
<td>Teleconsultation—primary care teams and specialists; Webconferences; Distance learning</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2012</td>
<td>To increase medical assistance coverage in remote rural areas by implementing a telemedicine system or a medical consultation system assisted by the Simón Bolívar satellite</td>
<td>Telehealth—primary care; Telemedicine in primary care in rural areas (including in remote areas); Telehealth in primary care and hospitals with digital x-ray</td>
</tr>
<tr>
<td>Guatemala</td>
<td>2012</td>
<td>To implement a telehealth project involving teleconsultations in primary care, tele-cardiology and tele-x-ray activities</td>
<td>Telehealth centres equipped with: general examination camera, vital signs monitor, electrocardiogram, ultrasound probe, digital otoscope and basic medical mobile cart, among others</td>
</tr>
<tr>
<td>Bolivia</td>
<td>2014</td>
<td>To democratise specialist medical care, reducing the incidence of diseases and health costs, training doctors and providing an adequate, fast response to health emergencies</td>
<td>Telehealth initiatives focused on: PAHO, ECLAC, IDB and SELA began to create e-health boards, with telehealth occupying an important part of their agenda. Table 2 details the NTPs within specific country contexts.</td>
</tr>
</tbody>
</table>

**Conclusion**

Despite the discontinuation of some projects (particularly in Argentina and Costa Rica), there are consolidated telehealth activities taking place in several countries (Mexico, Brazil, Colombia, Panama and Paraguay) and new projects being developed nationally (El Salvador, Peru, Venezuela, Bolivia and Guatemala). Most of these programmes focus on the relationship between primary levels of care and other levels of complexity, by performing teleconsultations and various educational activities. Forums for exchanging experiences, developing policies and identifying best practices are under way, driven by PAHO, ECLAC, the IDB and the countries that already have a significant degree of development in telehealth. Though much has occurred in regard to the development of telehealth services in Latin America, there still remains much more to do. This article, among other studies, can hopefully contribute to the further development of such services in Latin America moving forward.

In 2013 Bolivia implemented the Bolivia Telehealth Project.

**References**


Photo: Universidad Tecnica Particular de Loja. Medical appointment using the InHealth system, Ecuador, 2007 <https://go.gl/0g4Z6v>.

PHO, ECLAC, IDB and SELA began to create e-health boards, with telehealth occupying an important part of their agenda. Table 2 details the NTPs within specific country contexts.

**Conclusions**

Despite the discontinuation of some projects (particularly in Argentina and Costa Rica), there are consolidated telehealth activities taking place in several countries (Mexico, Brazil, Colombia and Panama) and new projects being developed nationally (El Salvador, Peru, Venezuela, Bolivia and Guatemala). Most of these programmes focus on the relationship between primary levels of care and other levels of complexity, by performing teleconsultations and various educational activities. Forums for exchanging experiences, developing policies and identifying best practices are under way, driven by PAHO, ECLAC, the IDB and the countries that already have a significant degree of development in telehealth. Though much has occurred in regard to the development of telehealth services in Latin America, there still remains much more to do. This article, among other studies, can hopefully contribute to the further development of such services in Latin America moving forward.

Photo: PUCPR. Telehealth laboratory at a university in Paraná, Brazil, 2014.

“Telehealth initiatives can play a significant role in reducing barriers to access and improving the quality of diagnosis.”

Photo: Universidad Tecnica Particular de Loja. Medical appointment using the InHealth system, Ecuador, 2007 <https://go.gl/0g4Z6v>.
A Brazilian policy for telehealth focused on scientific network support to healthcare, research and education

by Brazilian National Research and Education Network (Rede Nacional de Ensino e Pesquisa—RNP)

National Research and Education Networks (NRENs) worldwide are expanding capacities and bridging federal authorities in the fields of science, technology, innovation, education, assistance and health to discuss, finance and work together and comprise an academic telehealth community. The World Health Organization (WHO) promotes universal health coverage as a goal for equitable access to health services without driving people into poverty. The National Telehealth Programme from the Brazilian Ministry of Health focuses its policy on primary health care but also on the NRENs, using information and communication technologies to perform health care to people in remote areas of the country and to those who need health services most. In this article, we present some salient features of the Brazilian NRENs that include both training of students and professionals, as well as the remote, online provision of services and diagnosis.

Brazilian national telehealth initiatives

There are three major Brazilian telehealth initiatives: the Brazilian Telehealth Programme, the SUS Open University (UNA-SUS) and the Telemedicine University Network. Up until now, little administrative data on such initiatives have been made publicly available. Nevertheless, for this article, the coordinators and stakeholders of this project have prepared some specific information with the aim of expressing the quality of the service and basic care of the Unified Health System (Systema Único de Saúde—SUS) and to promote tele-assistance and tele-education along with the SUS Open University (UNA-SUS), facilitating the access of patients to health care services and professionals, as well as encouraging their training. Telehealth and telemedicine centres in faculties and teaching hospitals are equipped with cutting-edge equipment. Over 200,000 participants have already registered for courses administered by UNA-SUS, in collaboration with teaching hospitals and faculties.

Currently, telehealth services are provided by the National Telehealth Programme in 14 of Brazil’s 27 states, engaging 30,000 professionals from the Family Health Programme (Programa Saúde da Família) and the National Research and Education Network (RNP), who perform remote diagnostics in the following specialties:

- cardiology (electrocardiogram (EKG), Holter and map);
- ophthalmology (retinography);
- pulmonology (spirometry, polysonomography);
- radiology;
- neurology (encephalography; and)
- dermatology.

Data from 2008 to September 2015 indicate that the Brazilian Telehealth Programme counted on 46 reference care units across the country. So far, the initiative its projects from more than 5,000 teleconsultations and over 7,000 spirometry exams. Additionally, it has produced 11 apps for medical decision-making support (Universidade Federal do Rio Sul 2016).

In the state of Rio de Janeiro the tele-education initiative has provided training for 48,974 health professionals, including upper- and middle-level professionals. Since 2015 its tele-education initiative offers a remote Master’s Degree qualification in telemedicine and telehealth, which includes Portuguese-speaking students from different parts of Brazil and abroad (Universidade do Estado do Rio de Janeiro 2016). Since 2008, Amazons has seen the initiative grow to provide over 247 remote tele-ECGs to 61 municipalities in the state.

Finally, the programme currently assists 290 of the 294 municipalities in the state of Santa Catarina, with the largest concentration of care units per municipality—1,294, or over four per

- Deborah Rivero, Dr. (Brazilian National Research and Education Network, Brasilia, Brazil)

Photos: Malovà Gobernador. Centre of operations at the Culiacán General Hospital, Sinaloa, Mexico, 2013

1. Medical School of the Federal University of Minas Gerais, Minas Gerais, Brazil.
2. Telemedicine University Network (RUTE), Rio de Janeiro, Brazil.
3. Telehealth can be defined as the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications.
4. The project was discontinued for audio-checking of the computer equipment. When the audit was completed, there had been a change of government.
5. The government did not continue in subsequent administrations.

Telehealth projects initiated under the Brazilian Telehealth Programme are becoming fully institutionalised services, made available to society as part of the public health service through partnerships with state health departments.

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Advanced networking for the scientific health community RUTE was launched in 2006, and by December 2015 its network covered 120 telemedicine units in medical schools and teaching hospitals across all Brazilian states. Its network comprises 57 Special Interest Groups (SIGs) dedicated to specific health areas, which hold an average of two to three scientific videoconference sessions per day, engaging 380 different health institutions (Messina et al. 2015).

Such results are the outcome of a carefully designed operational routine that starts by developing organisational and technological infrastructure. This is coordinated at national and local levels through advisory committees and SIGs. They are responsible for implementing and certifying telehealth centres as well as overseeing their maintenance and efficient communication. Institutions willing to participate in RUTE have to submit practical examples of the specific projects and proposals they intend to promote to the Network’s coordination, and they must provide physical installations and staff to certify the project under RUTE. Once certified, participating institutions are free to propose, create and coordinate SIGs operating under RUTE’s infrastructure. Each RUTE member participates in at least three SIGs, in addition to compulsory participation in the Technical Operation SIG.

Lopes (2013) studied the contribution of RUTE to the development of new health care practices. The study assessed five aspects of RUTE:

- education: health care education;
- assistance: remote collaborative assistance and care practices;
- Research and development: multi-centre research, development, innovation, and research on telemedicine itself;
- management: university hospital management; and
- social: social impact.

As illustrated in Figure 1, this study revealed that the operational units were mainly focused on using RUTE for education, followed by health care provision and then research. The results indicate that the network has instigated and stimulated the development of new digital health practices in university hospitals, especially regarding education and research.

Assessing the impact of collaborative scientific networks using SIGs Currently, 57 SIGs collaborate in areas such as radiology, nursing, cardiology, psychiatry, ophthalmology, child and adolescent health care, paediatric radiology, neurology, dentistry and others, yielding 625,500 video and 125 web conference sessions per year—all of them recorded and available online for consultation.

To assess the intensity of participation and overall activity of the RUTE units, an online survey conducted between April and July 2014 considered the levels of participation of RUTE units, weighting them according to the nature of the participation—whether they participate in SIGs coordinated by other groups or whether they coordinate SIGs themselves (Brito et al. 2015). The study also allows for the identification of linkages between units, as expressed by participation in SIGs coordinated by other units, and vice versa.

This exercise, combined with the tabulation of similar data from an earlier stage (2007), allows for a comparison that illustrates both the quantitative differences, as represented by the mushrooming of units from 2007 to 2014, and the qualitative differences, as represented by newcomers that managed to be as relevant as institutions that had been participating in the project since the beginning.

Even though a full description of the findings of that study goes beyond the purpose of this article, it is nevertheless worth mentioning that UNIFESP, UERJ, RUTE National Coordination, UFSC, UFPE, UFBA, INCA and ISCMPA are the most collaborative units in the RUTE system.

An interesting initiative that takes place under the scope of the RUTE network is that of providing remote, online synchronous preceptorship for students in multi-professional health areas. This was coordinated by Brazil’s Ministry of Education. Between September and December 2015, students undertook two hours of videoconference activities per week over a period of 12 weeks. An assessment revealed that around 45 videoconference rooms were used during that time, involving 617 participants and comprising 7,282 registered attendances over the course’s three-month duration, resulting in cost savings to the order of USD3.5 million. An updated programme is scheduled to start in March 2016.

International collaboration has also evolved as a result of the integration of the Brazilian telehealth initiatives. Eighteen Latin American countries have evaluated their national initiatives (IAO 2016). Moreover, telemedicine was included in the BRICS Science Workplan in October 2015 (BRICS 2015) and the technical meeting of the Comunidade dos Países de Língua Portuguesa (CPLP) in March 2016 also included telemedicine in its resolution (CPLP 2016).

Conclusions Telemedicine in Brazil has evolved enormously to a point of participation in both quantitative and qualitative terms. This is probably due to the national initiatives. Pre-existing and newly developed telemedicine and operational protocols for remote learning and provision of services set by the RNP and the National Telehealth Programme played a crucial enabling role. For a vast and heterogeneous territory such as that of Brazil, remote health initiatives are very likely to gain more and more relevance as facilitators of the constitutional right to universal health care.

The RNP is the result of an inter-ministerial effort... aiming at promoting the innovative use of advanced networks in Brazil as a means of cooperation for health care and other areas.

Science and Technology, Culture, Health and Defence), aiming at promoting the innovative use of advanced networks in Brazil as a means of cooperation for health care and other areas, through an advanced national information and communications technology (ICT) infrastructure. In addition to providing connectivity, the RNP allows for the interaction between people and resources far from developed urban centres, enabling the deployment of new network applications and protocols, leading to great benefits for the public in areas such as research, education and health care. Altogether, the RNP brings together around 4 million users. It is one of the top 10 highest-capacity academic networks in the world, operating through 30 Multi-Gigabit links and connecting 300 campuses (more than 900 institutions and around 27,500 research groups) with speeds of at least 1Gbps (RNP 2016).

The most demanding area of the RNP, after education, is the scientific health community. Since 2006, faculties alongside university and teaching hospitals have been integrated in the Telemedicine University Network (Rede Universitária de Telemedicina—RUTE), which provides them with an advanced ICT infrastructure that is used in most Brazilian telehealth programmes.

FIGURE 1: Evolution of digital health practices before and after the implementation of RUTE

Source: Lopes (2013).


The telehealth network of Minas Gerais: a large Brazilian public telehealth service improving access to specialised health care

For a vast and heterogeneous territory such as that of Brazil, remote health initiatives are very likely to gain more and more relevance as facilitators of the constitutional right to universal health care.

by Milena Sarania Marcella,† Maria Beatriz Alkmim,‡ Thiago Adriano de Deus Queiroz Santos,§ and Antonio Ribeno,†‡

Brazil's Constitution established the public health system (Sistema Único de Saúde— SUS) in 1988, ensuring health as a right of all citizens and the government responsibility (Brazil 1988). Primary health care (PHC) provides basic services to the population via multidisciplinary health teams, in a decentralised manner, across all Brazilian cities (Mackino and Harris 2015).

Despite the improvement in health indicators, major problems remain, such as difficulty in accessing health services, poor PHC problem-solving capacity, a shortage of qualified human resources and a high turnover of PHC professionals, especially in remote cities. Brazil’s economic, social and political discrepancies, associated with the concentration of financial, human and health services in large urban centres, have led to precarious access to specialised services in small and remote towns. In Minas Gerais, the fourth largest state in Brazil (586,528 km²), the second most populous and the third largest state economy, access to health care is no different from the rest of the country. There are around 21 million people living in the state, distributed over its 853 towns, 70 per cent of which have fewer than 14,000 inhabitants (IBGE 2016). In Minas Gerais, nearly 50 per cent of all doctors are concentrated in the metropolitan region of the state capital, Belo Horizonte (Conselho Regional de Medicina 2013).

Implementation and expansion of telehealth in Minas Gerais

Given this scenario, telehealth services slowly began to be introduced into the public health service in the early 2000s in an attempt to strengthen PHC and improve the population’s access to good-quality specialised services. The Telehealth Network of Minas Gerais (TNMG) was created in 2005, with the support of the state government. It is a partnership between seven public universities, with the aim of providing services and conducting research in the field of telehealth. The network operates in accordance with national, state and municipal policies, and is funded by the federal and state governments, as well as by research funding agencies (Alkmim, Figueira, Marcolino et al. 2012).

Given the high prevalence of cardiovascular diseases and the limited number of cardiologists in small and remote towns, the first network project was the implementation of telecardiology (Minas Telecardio) in 82 towns with less than 10,500 inhabitants, located in the poorest regions of the state. The project proved to be cost-effective (Andrade et al. 2011), increased the satisfaction of health professionals (Maia, de Sousa, Marcolino et al. 2016) and was eventually rolled out as a state-wide programme, with successive expansions (see Figure 1). It currently serves 750 towns in Minas Gerais.

Telediagnostics

The remote diagnostics service is an important part of the TNMG. The tele-electrocardiogram (tele-ECG) is the most important examination (see Figure 2).

Prior to the implementation of this service, many patients in small towns had to travel to other cities to have an ECG (Andrade et al. 2011; Ribeiro, Alkimim, Cardoso et al. 2016). Now a health care provider performs the examination at the remote location and sends it via the TNMG website (<http://www.teleausa.hc.ufmg.br>) to the central analysis centre for analysis by experts on duty.

The system used to conduct such diagnoses is simple, easy to navigate, lightweight, capable of working with various Internet connection speeds and thus suitable to local infrastructure conditions. It meets established standards and rules of interoperability, security and confidentiality.

With the success of this service, the TNMG developed the ability to perform remote analyses of other examinations, such as Holter ambulatory blood pressure monitoring (ABPM), ophthalmoscopy and retinography, which is an important tool for monitoring diabetic patients. Ensuring diabetic patients’ access to periodic fundus examinations by on-site ophthalmologists remains a challenge in Minas Gerais. This examination can prevent diabetic retinopathy, a major maculopapular complication of diabetes mellitus revealed in 50 per cent of diabetic individuals during their lifetime; it represents a leading cause of irreversible blindness.

The TNMG implemented fundus photography in two different remote referral clinics for diabetic patients, which are remotely examined by specialists.

From the start of the service until January 2016, 2.5 million ECGs, 1,024 Holter exams, and 212 ABPM reports were performed, and 744 patients underwent a retinography examination. Currently, the TNMG is developing a tele-echocardiography service.

Teleconsultation

Since 2007, a teleconsultation system was incorporated into the service to offer multidisciplinary support to health care practitioners in remote towns in the state. Primary care practitioners can thus perform their clinical activities with the support of TNMG specialists on duty. The specialist, who first answers the teleconsultation can seek the help of a subspecialist if he or she deems it necessary. Currently, there are professionals on duty in the areas of internal medicine/family and community medicine, paediatrics, dermatology, gynaecology-obstetrics, nursing, dentistry, physiotherapy, psychology, nutrition, pharmacy and speech therapy. Such professionals respond to teleconsultations in less than 12 hours, while the subspecialists do so in less than 48 hours.

From the very inception of the system until January 2016, 73,698

References

For a comprehensive list of references, see the original document.
Teleconsultations were performed. Nurses and physicians requested the majority of teleconsultations: 51 per cent and 37 per cent of the total, respectively. The most frequently requested specialty was dermatology (17 per cent), followed by obstetrics/gynaecology (9.2 per cent), nursing (6.3 per cent), internal medicine (5.4 per cent) and cardiology (4.6 per cent). Forty per cent of all teleconsultations were submitted outside working hours, demonstrating the importance of the service to primary care professionals.

At the end of each teleconsultation, the health care professional answers providing reminders, alerts and assistance to the diagnostics and treatment plans. These applications are currently being tested in action to verify the impact on clinical practice, and other applications are under development (support in caring for elderly patients at risk of falling, patients referred for palliative care and anticoagulation).

Clinical quality control
To ensure the quality of decentralised clinical services, a quality control centre was established. It implements standard protocols, provides an auditing system for examinations and teleconsultations and promotes clinical research.

Decision support systems
The TNMG has worked on developing innovative solutions to provide remote support to health professionals, to improve the quality of health care and reduce the feeling of professional isolation. A computerised decision support systems (CDSS) were developed for acute coronary syndrome, hypertension, diabetes and stroke. These applications comprise providing reminders, alerts and assistance to the diagnostics and treatment plans. These applications are currently being tested in action to verify the impact on clinical practice, and other applications are under development (support in caring for elderly patients at risk of falling, patients referred for palliative care and anticoagulation).

Myocardial infarction system of care
The TNMG implemented a myocardial infarction system of care in the north of the state. Using software developed in-house, a tablet-based electrocardiogram apparatus was installed in the ambulances of the region’s emergency services, the practice of pre-hospital thrombolysis was implemented, and all health professionals involved in the care of myocardial infarction patients were trained accordingly. Preliminary results have shown that this project increased the access of myocardial infarction patients to early diagnosis and established treatment, with a trend of mortality reduction. This project will be expanded in 2016 across the entire state, with a large potential impact.

Economic indicators
Since 2012, the TNMG has had a contract with the state government of Minas Gerais as a service provider for telehealth, therefore serving as an example of a sustainable service. It has proven to be cost-effective: a recent cost–benefit analysis of the project showed that for each dollar invested, 5.8 are saved as a result of reducing patient referrals (Marcolino, Figueira, Santos et al. 2016).

Concluding remarks
The TNMG provides telehealth services through simple, low-cost and easily-implemented activities performed with a high standard of quality. Its main aim is to support remote health professionals and improve the population’s access to specialised care, reducing geographical barriers and qualifying referrals to secondary and tertiary levels of health care. Thus, it contributes towards achieving the basic tenets of Brazil’s public health system: universality, equity and integrity.

The experience of the TNMG may be an example of a sustainable and effective service that could be reproduced in other regions of the country, as well as in other middle-income countries. The success of this initiative would depend on several aspects, such as the commitment of policymakers and health professionals from remote locations, the integration of telehealth into the routine of the regular health services and the continuous monitoring of the quality of the service. Another very important issue is the need for adequate reimbursement for activities and to update the technologies in use, to follow the very rapid change in the field of information and communication. Following these principles, telehealth might become a very powerful tool in supporting health policies that aim to facilitate access to health care, and contributing to the reduction of the inequities of contemporary societies.


Reforms that seek to improve the health of the population require a much wider policy scope than simply access to health services. Such policies need to include education, sanitation, housing and access to clean water if they are to deliver on the promises of improving health and effective health care for the entire population.

Charl Swart, Kieke Okma and Radhika Arora

Strengthening the solidarity pillar of social protection systems has been key to providing health care coverage to populations without access to contributory social protection.

Olga Lucía Acosta and Simone Cecchini

Central to any health system, human resources comprise the single largest expenditure in public health. Therefore, the efficiency of any health system is directly influenced by human resource management policies and practices.

Venkat Raman, Gert van Zyl, Jeni Vaitsman, Lenaura Lobato, José Mendes Ribeiro and James W. Björkman

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