

**Carlos AG Gadelha et al.**

## **The Health Economic–Industrial Complex approach, Brazil**

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# **A health economic and industrial complex that facilitates production and innovation for universal health access, Brazil**

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### **Abstract**

**Problem** The coronavirus disease 2019 (COVID-19) pandemic has highlighted global disparities in accessing essential health products, demonstrating the critical need for low- and middle-income countries to develop local production and innovation capabilities.

**Approach** The Health Economic–Industrial Complex approach changed the values that guided innovation and industrial policies in Brazil. The approach directed health production and innovation to universal access; the health ministry led a whole-of-government approach; and public procurement was strategically applied to stimulate productive public and private investments. The institutional, technological and productive capacities built up by the Health Economic–Industrial Complex allowed the country to quickly establish local COVID-19 vaccines production and guarantee access for the population.

**Local setting** Brazil has a universal health system that guarantees access to health for its 215 million population.

**Relevant changes** Public policies and actions, based on the Health Economic–Industrial Complex, guided investment projects in line with health demands, strengthened local producers and increased autonomy in the production of health products in areas of greater technological dependence. During the COVID-19 pandemic, the country was able to rapidly scale-up of local vaccine production. By August 2021, Brazil had produced of 74.8% (151 463 502/202 437 516) of the vaccine doses used in the country.

**Lessons learnt** The Brazilian example shows that low- and middle-income countries can build systemic development policies that increase their capability to produce and innovate in concert with universal health systems. This increased capacity can guarantee access to health products and supplies that are critical during global health emergencies.

## Introduction

During the coronavirus disease 2019 (COVID-19) pandemic, global disparities in production and innovation capacities resulted in the lack of access to essential health products and services, such as COVID-19 vaccines, revealing and reinforcing global health inequities.<sup>1</sup> Despite the global initiatives created to tackle these disparities, national interests hindered effective international cooperation.<sup>2</sup> This fallout underscored the importance of local production and innovation capacities for essential health products and services in low- and middle-income countries, especially during global health emergencies.<sup>3</sup> Hence, governments in low- and middle-income countries need to create policies that stimulate local production and innovation to meet the health needs of its populations.<sup>4</sup>

Since 2008, the Brazilian government has developed public policies for health products and services based on the Health Economic–Industrial Complex, an approach that integrates production of health products, innovation and access to health care. The adoption of this approach encompassed institutional and policy changes aimed at strengthening the state's capacity to coordinate and implement industrial and science, technology and innovation policies. These policies have boosted local production and innovation capacities towards health needs of the population.<sup>5</sup>

This article outlines how, over the past decades, public policies based on the Health Economic–Industrial Complex approach enabled the Brazilian government to quickly establish local production of COVID-19 vaccines, thereby ensuring access for the population.

## Local setting

Brazil, a large upper middle-income country, has a universal health system that guarantees access to health care for its 215 million population.<sup>6</sup> Established in the 1988 Constitution of Brazil, the health system is based on the principle of health as a citizen's right and a duty of the state. The national immunization programme, created in 1973 and strengthened the universal health system, has led to high vaccination coverage, especially considering the country's large territory.<sup>7</sup> A key aspect in the success of the programme has been its ability to link vaccine accessibility with the development of national production capacities of vaccines.<sup>8</sup>

## Approach

Access to health is conditioned by access to the goods and services needed to fulfil the citizen's right to health. Therefore, the expansion of the health systems without a national strategy for health production and innovation tends to reinforce countries' economic and technological dependence, further hindering access to health.<sup>1,5</sup>

In the context of this conclusion, the Health Economic–Industrial Complex approach, developed in the early 2000s in the *Fundação Oswaldo Cruz* (Fiocruz), probed how universal access to health could be achieved in a middle-income country with a welfare state still in formation.<sup>5</sup> Initially, the work focused on vulnerabilities within the universal health system, particularly the increasing trade deficits on health goods linked to the expansion of access to health care. The demand for these health goods served as a foundation to build an economy for health for all. This work depended on a complex political economy that integrates the epidemiological setting, health system organization, strengthening of national capacities within science, technology, innovation and production, as well as geopolitics and international trade in health.<sup>1,5</sup>

By adapting the concept to practices in the real world, the theory of the complex evolved into a solid public policy approach. In 2008, the Health Economic–Industrial Complex was incorporated as a reference to guide the formulation of comprehensive and articulated industrial and science, technology and innovation policies of the health ministry. Up to 2015, several policies stemming from Health Economic–Industrial Complex were introduced, such as the List of Strategic Products, which signalled the needs of the universal health system to the multiple actors and institutions involved in the process of innovation and production in health. This list was periodically defined by the Executive Group of the Health Economic-Industrial Complex, which was an inter-ministerial governance group led by the health ministry, with the participation of public and private entities and civil society. The executive group became the locus for the institutional coordination of Health Economic–Industrial Complex policies, linking with the different actors and institutions related to the innovation and production in health, including regulation and financing institutions. Therefore, the executive group legitimized the construction of a whole-of-government approach guided by national challenges and social missions.<sup>9,10</sup>

Another key initiative was the strategic use of the state's purchasing power, to subordinate industrial and science, technology and innovation policies to meet the demands of the universal health system.<sup>5</sup> The most consistent and innovative example of the complex's actions are the public–private partnerships for domestic production of

health goods to meet health needs. The health ministry guarantees that partnerships gain access to the public market, provided there is a transfer of technology for the product in question. The market share and duration of access, which ranges from 5 to 10 years, depends on the technological complexity of the product being transferred to the local public partner institutions from the private sector. The products eligible for the partnerships were determined by the List of Strategic Products.

## Relevant changes

The public policies and actions, based on the Health Economic–Industrial Complex, guided investment projects in line with health demands, strengthening local producers, public and private, and increasing autonomy in the production of health products in areas of greater technological dependence.<sup>10</sup> The accumulation of technological capabilities of public producers was fundamental for the institutions to rapidly incorporate COVID-19 vaccine production technologies in a global context of asymmetric dispute of vaccine distribution.<sup>11</sup>

The institutional, technological and productive capacities built up by previous Health Economic–Industrial Complex public policies, enabled the rapid scale-up of local production capacity of COVID-19 vaccines. Even in the context of the asymmetric global vaccine distribution, by the end of August 2021, Brazil reached a slightly higher coverage of at least one dose of COVID vaccine (63.2%) than the average for high-income countries (62.8%). This achievement can be attributed to the local production of 74.8% (151 463 502/202 437 516) of the vaccine doses (Fig. 1). At that time, only 1.7% of the population in low-income countries, 23.1% in lower-middle-income countries and 61.0% in upper-middle-income countries had received at least one dose of the vaccine (Fig. 2).

## Lessons learnt

The Brazilian example demonstrates that low- and middle-income countries can create systemic development policies that increase their capacity to produce and innovate health products and services aligned with a universal health system needs. To achieve this, governments must broaden the health policy scope to coordinate innovation and production strategies in the health sector. This broadness can be applied in a local, regional and global context (Box 1).

Overcoming the political and institutional division between socio-environmental, industrial and science, technology and innovation and economic policies is imperative to achieve health for all. The policies created based on the Health Economic–Industrial

Complex approaches serve as important examples of public policy that integrated economic, science, innovation and technology dimensions with social needs. The COVID-19 response highlighted the link between institutional, scientific and productive capabilities with the capacity to ensure access to health products and services amid global competition.

The fourth industrial revolution, marked by new technologies in digitalization, automation and connectivity, along with climate change<sup>14</sup> and rising social inequalities, is transforming social needs and introducing new challenges.<sup>10</sup> Therefore, public policies and international cooperation should pursue an integrated sustainable development vision that includes the ecological and digital transition of health systems. Industrial and science, technology and innovation policies are essential and structural for developing preparedness for sanitary emergencies, including those associated with climate change.

The main challenges regarding the implementation of public policies based on the Health Economic–Industrial Complex approach are maintaining institutional stability to manage technological risks, protecting investments in health production and innovation and ensuring an industrial and science, technology and innovation strategy able to link innovation with production capabilities.

The recent launch of the National Strategy for the Health Economic–Industrial Complex in Brazil, within a mission-oriented industrial and innovation policy framework, updates and strengthens this approach. The national strategy incorporates lessons learnt during this public policy process and aligns national efforts with global health challenges, including those efforts associated with the digital and ecological transition. Now more than ever, effective international cooperation is essential to overcome asymmetries that constrain the global health agenda. Brazil can contribute to raise the urgency of integrating innovation, production and health access in the global health agenda by sharing the possibilities of this concrete public policy experience in global and regional forums.

The COVID-19 pandemic has made it clear that an agenda integrating health production, innovation and access is vital for preparedness against current and future public health challenges. To improve autonomy and ensure universal access to health, the Brazilian government has included the Health Economic–Industrial Complex as a strategic axis in Brazil's technological and industrial development policy. Additionally, the World Health Organization Council on the Economics of Health for All recognized this complex as a successful example of a mission-oriented policy to guarantee health for all.<sup>9</sup>

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## Competing interests:

None declared.

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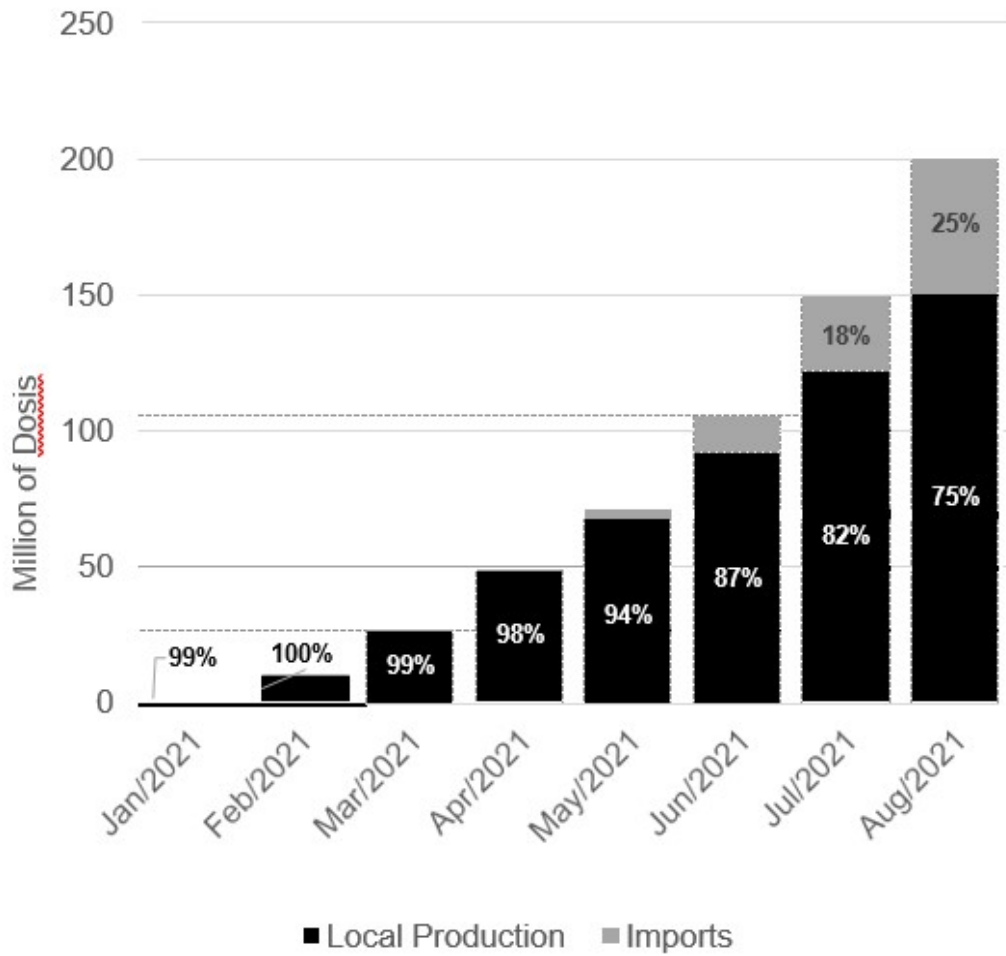
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#### **Box 1. Summary of main lessons learnt**

- The existence of production, innovation and institutional capacities is essential to ensure universal access to health and to tackle global health challenges
- Broadening the scope of health policies will help to coordinate innovation and production strategies in health and develop emergency preparedness
- The Health Economic–Industrial Complex is a concrete example of how to develop industrial and science, technology and innovation policies that promote universal access to health care

Fig. 1. **Vaccination rollout by vaccine origin, Brazil, 2021**

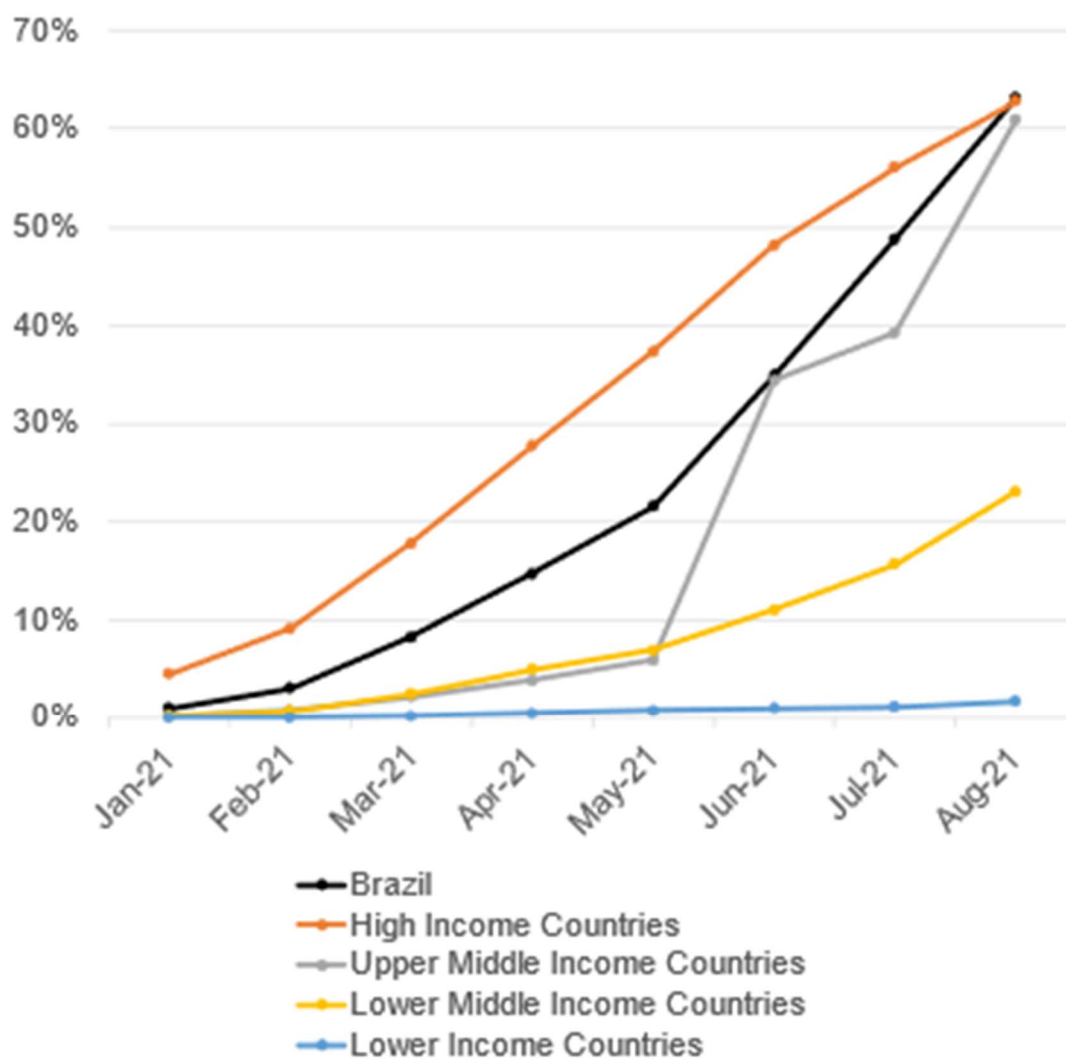


Source: Own elaboration based on "Ministry of Health - Vacinômetro COVID-19"

Data source: Brazilian health ministry.<sup>12</sup>



Fig. 2. **Shar of population with at least one dose of COVID-19 vaccine, 2021**



COVID-19: coronavirus disease 2019.

Data source: Mathieu et al.<sup>13</sup>