

## Youth involvement in local pharmaceutical manufacturing in sub-Saharan Africa: barriers, recommendations, and public health implications

Oluwaseyi Muyiwa Egbewande<sup>1,2</sup>; Oladotun Erastus Okediji<sup>1</sup>, Yusuf Babatunde<sup>1,2</sup>

<sup>1</sup>Faculty of Pharmaceutical Sciences, University of Ilorin, Ilorin, Nigeria

<sup>2</sup>Alliance Against Antimicrobial Resistance, Ibadan, Nigeria

### Abstract

**Background:** In 2021, Africa imported 99% of its vaccines and 70% of its pharmaceuticals. As such, there has been a growing concern about and acknowledgement of the need for Africa to produce its own medicines. There are, however, only 375 pharmaceutical manufacturers in Africa, most of which are in North Africa, leaving a dearth in sub-Saharan Africa. Despite the youthful population of sub-Saharan Africa, with 33% of its population between the ages of 10 and 35, youth are not actively involved in pharmaceutical manufacturing. This commentary explores the barriers to and opportunities for youth inclusion in sub-Saharan Africa's local manufacturing of pharmaceutical products.

**Methods:** This commentary synthesises findings from existing literature and case studies of youth engagement in local pharmaceutical manufacturing. It also explores current regional policies relevant to youth involvement in the local manufacturing of pharmaceutical products in sub-Saharan Africa.

**Results:** Several barriers hinder the involvement of youth in local pharmaceutical manufacturing, including a lack of financial capacity among young persons, inadequate training and mentorship, and regulatory hurdles. In addition, policy frameworks from key stakeholders like the WHO rarely include plans for youth involvement in local manufacturing.

**Conclusion:** Youth participation in local manufacturing is important for the growth of the pharmaceutical industry in sub-Saharan Africa and for achieving local self-sufficiency in medicine and vaccines. Future policy revisions should explicitly prioritise youth inclusion in pharmaceutical manufacturing across the region, steps should be taken to promote industry-academia collaborations, and incubation hubs for youth-led pharmaceutical startups should be established. These efforts will enable the region to maximise its demographic advantage and achieve sustainable local pharmaceutical manufacturing.

**Keywords:** youth involvement, local pharmaceutical manufacturing, sub-Saharan Africa

### Introduction

Given the COVID-19 pandemic and recent outbreaks of diseases such as Ebola and Mpox, many sub-Saharan African countries have recognised and begun to address the need to boost their local pharmaceutical manufacturing capacities. Rwanda, for instance, has recently acquired the first mRNA technology vaccine manufacturing plants in Africa from the German biotechnology company BioNTech.<sup>1</sup> Local pharmaceutical manufacturing still suffers a great deal, however, as the region manufactures few of its medicines and relies heavily on imports. A 2021 report from the World Health Organisation (WHO) Regional Director revealed that African countries import 99% of their vaccines and 70% of their pharmaceuticals.<sup>2</sup> This limited production and huge dependency on imports for medicines and vaccines pose a risk to health security, affordability, and access to essential medicines in the region, especially during health crises.

The pharmaceutical industry in sub-Saharan Africa faces many challenges that have resulted in limited manufacturing capacities. In contrast to the more than 15,000 drug manufacturers reported in Asia, there are only 375 pharmaceutical manufacturing industries in Africa, and most are in the northern region.<sup>3</sup> The growing population of young people in the sub-Saharan Africa, however, presents a unique opportunity to revitalise the sector. With plans by the African Union to increase local manufacturing of vaccines in the African region to 60% by 2040,<sup>4</sup> and with 33% of sub-Saharan Africa's population between the ages of 10 and 24,<sup>5</sup> the involvement of youth in the local manufacturing of pharmaceutical products in sub-Saharan Africa should be encouraged.

### The Case for Youth Inclusion in Local Manufacturing in sub-Saharan Africa

Africa is home to the youngest population in the world, with more than 50% of people in sub-Saharan Africa under the age of 30.<sup>6</sup> This demographic advantage, if properly maximised, could strengthen important sectors such as pharmaceutical manufacturing. Young people are well-positioned to gain the necessary skills and contribute meaningfully in local manufacturing. Evidence from several youth-led pharmaceutical innovations across Africa and other Low- and

### Corresponding Author:

Oladotun Erastus Okediji

Email: [eradot2015@gmail.com](mailto:eradot2015@gmail.com)

middle-income countries (LMICs), such as the Generic Aadhaar (India) and Advantage Health Africa (Nigeria), demonstrates the practicality of youth innovation.<sup>7,8</sup>

Barriers such as an outdated education system, limited mentorship, and few opportunities in the industry have, however, prevented the full involvement of young people in this space. So while such involvement could be of great value, issues of how to increase the inclusion of young people in local pharmaceutical manufacturing need to be addressed.

### **Barriers to Youth Engagement in Local Pharmaceutical Manufacturing**

According to the Director General of the Africa Centres for Disease Control and Prevention (CDC), between 9,000 and 14,000 full-time workers will be needed in Africa's vaccine manufacturing sector by 2040.<sup>5</sup> This number presents an opportunity to engage youth in the local manufacturing of pharmaceutical products. But despite several plans for self-sufficiency and local pharmaceutical production, barriers remain to the involvement of young people.

#### ***Education, Training, and Career Entry Barriers***

The existing educational systems in sub-Saharan Africa misalign with the competencies needed for meaningful engagement in local pharmaceutical manufacturing. In Nigeria, for example, the pharmacy curriculum offers limited support for practical, industry-relevant training.<sup>9</sup> Allowing young people to specialise at an earlier stage would enable them to acquire the pertinent knowledge, making them effective contributors to the local manufacturing sector. Industry leaders could also partner with educational institutions, as seen with the Bioeconomy Hub in Rwanda, which aims to equip young people with advanced training resources and skills in biotechnology and pharmaceutical manufacturing.<sup>10</sup> And emphasizing local manufacturing could stimulate interest among students.

According to a study from the Association of the British Pharmaceutical Industry (ABPI), young people in the UK are increasingly choosing pharmaceutical careers because of good earnings and work-life balance.<sup>11</sup> More youth in Africa will explore pharmaceutical manufacturing if they find it rewarding and appealing rather than costly and complex.<sup>12</sup>

It is also important for industry leaders to create more mentorship and internship opportunities for young people. Prioritising the recruitment of young persons into local pharmaceutical manufacturing companies in sub-Saharan Africa and giving them leadership positions could inspire other young persons to become interested in the sector.<sup>12</sup>

#### ***Economic and Structural Barriers***

High taxes, poor infrastructure, and unfavourable policies lead pharmaceutical manufacturers to prefer importing rather than producing locally.<sup>13</sup> Policymakers and key stakeholders must

create an environment that encourages local pharmaceutical manufacturing — an environment that includes strong political commitment and investment in human capital.<sup>14</sup>

Governments can also improve and encourage local pharmaceutical manufacturing by creating policies that favour the procurement of locally manufactured products.<sup>15</sup> In Nigeria, for example, the National Agency for Food and Drug Administration and Control (NAFDAC) operates with a ceiling list,<sup>16</sup> currently comprised of 36 active ingredients of pharmaceutical products which can be manufactured in the country. This list exists to prevent the importation of certain medications that are or could be produced locally. Use of such a list can encourage more people, especially young people, to invest in local pharmaceutical manufacturing, as they are assured of a market for their products.

#### ***Cost and Infrastructure Challenges***

Most of both the equipment and the active pharmaceutical ingredients (APIs) needed to manufacture pharmaceutical products in Africa are imported.<sup>12</sup> As such, the relatively high cost of production compared to the cost of importation is a major barrier to youth involvement in the local manufacturing of pharmaceutical products in sub-Saharan Africa.<sup>16</sup> Given the high cost of manufacturing APIs in Africa, importing most products from countries like China and India is a cheaper option.<sup>12,17</sup>

Poor infrastructure could be another factor discouraging youth from exploring the local manufacturing of pharmaceutical products. In DR Congo and Nigeria, for example, local manufacturers of pharmaceutical products are hindered by the cost of utility and transportation.<sup>12,13</sup> And in Nigeria, the lack of a functioning petrochemical industry forces pharmaceutical industries to rely on imports.<sup>18</sup>

#### ***Addressing Youth Participation Barriers***

Addressing the barriers that limit the participation of young people in pharmaceutical manufacturing in sub-Saharan Africa is important for promoting their active involvement in the sector. Efforts should be made, for instance, to address the high cost of pharmaceutical product production in the region. This could be achieved by subsidising the raw materials and equipment used in manufacturing and by creating tax incentives for young people.<sup>19</sup> Governments in the region must also invest in infrastructure; for young people to be actively involved in pharmaceutical manufacturing, transportation networks must be improved and energy and power supply challenges addressed. Doing so would lower the cost of operation and increase the efficiency and productivity of the manufacturing process.<sup>14,20</sup> And international collaborations and partnerships with institutions and manufacturing companies in countries such as India and China could provide young people with the necessary knowledge, skills, and resources to establish sustainable local pharmaceutical manufacturing capacities. Capacity-building

initiatives — specifically those related to research and innovation technology — can also engage young people. Apprenticeship programs, such as skill acquisition boot camps focused on manufacturing, development, and innovation, should be developed.

All of these efforts could lead to pharmaceutical industries and manufacturers focused on local manufacturing, and to informed stakeholders and policymakers who will implement policies favourable to local pharmaceutical manufacturing in sub-Saharan Africa.

### Current Gaps in Policy Frameworks

Policy frameworks are important for increasing the inclusion of young people in the local manufacturing of pharmaceutical products in Africa. The recent WHO framework for strengthening the local manufacturing of medicines, vaccines, and other health technologies in the African region (2025–2035) is one such framework.<sup>21</sup> But while it recognises the need for a skilled workforce to support local manufacturing, it fails to explicitly address youth inclusion or participation.<sup>21</sup> It includes no clearly defined strategies for engaging young people or supporting youth-led initiatives in this sector, and does not mention terms such as “youth,” “young professionals,” or “early-career scientists.” This signifies a missed opportunity to intentionally harness the region’s youthful population for strengthening and sustaining local pharmaceutical manufacturing in sub-Saharan Africa.

### Recommendations for Youth Inclusion in the WHO framework

The inclusion of youth in the WHO framework would increase momentum for the inclusion of youth in local manufacturing. As such, recommendations for future revisions to address the current gaps include:

- Identifying a focus on youth as a priority for workforce development and capacity-building initiatives.
- Providing explicit and actionable strategies and guidelines to facilitate the inclusion and participation of youth in pharmaceutical manufacturing.
- Making provisions for mechanisms to track and evaluate youth participation in local pharmaceutical manufacturing in the region.

Implementing these recommendations will increase the involvement of sub-Saharan Africa’s young population in the local manufacturing of pharmaceutical products, and help achieve the region’s target of increasing local manufacturing of vaccines to 60% by 2040.<sup>4</sup>

### The Role of Technological and Digital Innovation in Promoting Youth Engagement in Pharmaceutical Manufacturing

Technological and digital innovations also present significant opportunities to engage youth in local pharmaceutical manufacturing. Emerging technologies such as artificial

intelligence (AI) and 3D printing have the potential to significantly strengthen pharmaceutical capacity in the region.<sup>22, 23</sup> These innovations can support more efficient drug development, improve supply chain management, and enable cost-effective local production of medicines and medical devices,<sup>22, 23</sup> making the industry more accessible and efficient for young entrepreneurs and professionals. The use of AI to analyze biological data, for example, can help researchers identify disease targets and predict drug interactions,<sup>22</sup> streamlining drug discovery by reducing the costs and time of development. And 3D printing technology can also reduce the cost of local manufacturing, important for promoting increased youth engagement.<sup>24</sup> Training in AI and 3D printing for local youth will empower them to take on the local manufacturing of pharmaceutical products in sub-Saharan Africa.<sup>23</sup>

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