Biologics, and biosimilars, have the potential to significantly improve disease treatment, health outcomes, and quality of life for patients in low-and-middle income countries.

Biologic medicines are increasingly important for diagnosing, managing, treating and preventing all types of diseases. They will also be increasingly available in many countries, especially as older biologics come off patent and biosimilars are introduced. The WHO, in acknowledging that a "growing numbers of countries are building the necessary scientific expertise to facilitate development of solid, scientifically-based regulatory frameworks that promote access to biotherapeutic products that are affordable, safe, efficacious and of quality," also recommends "taking note of the relevant WHO quality standards that may be adapted to the national context and capacity." 1 It is very important that regulatory authorities, even in LMI countries, follow internationally benchmarked regulatory standards and gain expertise in the evaluation of original biologics, towards the development of standardized guidelines for evaluating biosimilars.

Countries choosing to participate in cross-border collaborations that allow them to pool resources and expertise have facilitated this. For example, several national regulatory authorities (NRAs) in Latin America have been working together through the Pan American Network on Drug Regulatory Harmonization initiative. Its purpose is to provide common regulatory guidelines 2 and establish good pharmacovigilance practices 3 together. The NRAs of Brazil (ANVISA) and Colombia (INVIMA) have also begun to release "Summary of Decision Documents" for approving or rejecting medicines in order to increase regulatory transparency. 4 In these countries in particular, close collaboration between regulatory authorities and other stakeholders is critical to help build a strong regulatory framework.
Cross-border collaboration can play a critical role in helping lower-resourced countries build a regulatory framework.

Current WHO biosimilar guidelines assume a certain level of regulatory expertise with biologics to verify the quality, safety, and efficacy of biosimilars on a case-by-case basis. For example, WHO recommends head-to-head comparative trials to ensure there are no clinically meaningful differences between biosimilars and their reference biologics. However, how these comparison trials are designed and the demonstration of equivalence will vary according to the biologic and the target diseases or conditions. Regulatory agencies, as well as health professionals and patients, have only recently begun to acquire working knowledge on biologics.

International collaborations between countries to combine regulatory capacity and expertise across countries may play an important role in overcoming these limitations.

For example, the International Pharmaceutical Regulators Forum (IPRF) recently proposed to use Public Assessment Summary Information for Biosimilar (PASIB), to create an open, common regulatory template for biosimilars among the member NRAs and promote exchange of regulatory experience in biosimilars. Brazil and Mexico actively participate in this initiative (Box 1). The members of the Association of Southeast Asian Nations (ASEAN) group have introduced the ASEAN Common Technical Dossier (ACTD) for the Registration of Pharmaceuticals for Human Use from the ASEAN, which has been used since 2005 to establish a common template and drive mutual regulatory recognition for submitting applications for new medicines among the member states (Box 2). Finally, the creation of the African Medicines Agency (AMA) could allow pooling of regulatory resources across different African countries. Establishing the AMA was first discussed in 2014. Its business plan as well as legal and institutional framework were subsequently announced in 2016 (Box 3).

**Sources**

It is important for regulators to engage with all relevant stakeholders, including drug manufacturers, clinicians and patients when developing pharmaceutical regulations. A transparent and consultative process builds a stronger regulatory framework and ultimately increases public confidence in the regulatory decisions that ensue.

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INTERNATIONAL COLLABORATION TO ENHANCE REGULATORY STANDARDS FOR BIOSIMILARS

The International Pharmaceutical Regulators Forum (IPRF) has recently proposed the use of PASB.11 This common template aims to promote cross-border standardization of biosimilar evaluation and knowledge sharing, among its member regulatory agencies with varying degrees of experience in biologics including biosimilars. If broadly implemented, it is anticipated to promote transparency and thus increase public trust in biosimilars.12

The current IPRF member organisations consist of the national regulatory authorities from the following countries: Australia, Brazil, Canada, European Union, Japan, Republic of Korea (South Korea), Mexico, Russia, Singapore, Switzerland, and the United States of America.13
Since 2005, ACTD has provided a common template for regulatory reviews and communication for new pharmaceutical registration applications in the Association of Southeast Asian Nations (ASEAN) member states. ACTD allows overview information for the quality, nonclinical, and clinical aspects of a new medicine to be presented in a common format. It allows common comparison of information for medicines not only within a single ASEAN member state, but also across the ASEAN member states. For the marketing authorisation applicants, it provides the convenience of preparing a single application for all ASEAN member states. By definition, ACTD also applies to all biologics, and biosimilars by extension. For example, the Thai biosimilars guideline requires using ACTD when submitting biosimilars applications. Similarly, the Singaporean biosimilars guideline requires using ACTD for submitting quality data. ASEAN member states include: Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

The African Medicines Agency is working on establishing the African Medicines Agency (AMA). Benchmarking EMA, AMA aims to consolidate existing bilateral agreements and other regulatory harmonisation efforts across the African states. Through regulatory harmonisation, AMA will seek to strengthen local manufacturers’ ability to produce high quality medicines and improve risk management for all medicines across the region. A detailed business plan, accompanied by legal and institutional plans, was released in early 2016. The recent meeting of the WHO Regional Committee for Africa in August 2016 also stressed the key strategic role of AMA in the coming future.