CMC PLATFORM BEST PRACTICES

Summary Report

The Coalition for Epidemic Preparedness Innovation's (CEPI) 100-day mission represents one of the most ambitious and consequential targets in pandemic preparedness, requiring vaccine developers to overcome substantial CMC challenges as soon as a pandemic or outbreak threat emerges. Building on lessons from COVID-19, CEPI assessed the vaccine development pathways to identify principles and enablers that could help shorten timelines from approximately one year to 100 days. Achieving this will require compressed and parallel CMC activities while maintaining vaccine quality, safety, and efficacy. The use of prior knowledge through established platform technologies is therefore a key enabler.

CEPI's Regulatory CMC established the CMC Platform Best Practices initiative in 2022 in collaboration with global CMC and regulatory experts from industry, academia and the Developing Countries Vaccine Manufacturers Network (DCVMN), the International Federation of Pharmaceutical Manufacturers and Associations (IFPMA), and Vaccines Europe (VE) within the European Federation of Pharmaceutical Industries and Associations (EFPIA). The initiative strengthens pandemic preparedness by establishing regulatory framework documents that can accelerate the execution of critical CMC activities — comparability studies and manufacturing process validation — during future public health emergencies.

The set of documents built under this collaborative project (also called “CMC Platform Best Practices”) provides a strategy-oriented CMC framework with approaches to efficiently assess comparability and to perform manufacturing process validation for newly developed vaccines which pertain to a platform technology. While the primary intent is to support responses to public health emergencies such as pandemics and epidemics, these principles can also be applied to other situations, such as addressing an unmet medical need by leveraging prior knowledge from platform technologies.

The documents focus on four vaccine platforms: mRNA, viral vector, subunit protein, and inactivated virus. The documents are organized into three parts and comprise seven documents, as shown in Figure 1 and summarized below:

- Part A: Overview
- Part B: Comparability documents that provide illustrative examples for each of the four platform technologies
- Part C: A process validation best-practices guide that draws on prior knowledge, without providing platform-specific guidance for the four technologies.

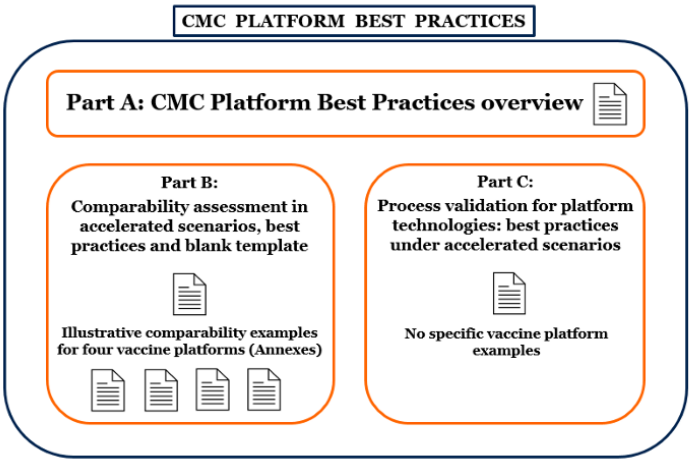

Figure 1 Layout of CMC Platform Best Practices

These best practices documents were finalized after review by a broad group of regulatory agencies and organizations worldwide, gathered via the Accumulus Synergy Inc. submission platform — an early pilot under CEPI's Regulatory Preparedness Framework supporting coordinated regulatory engagement and harmonization.

References

1) 100 Days Mission to respond to future pandemics threats, June 2021.

2) Saville M, Cramer J, Downham M, Hacker A, Lurie N, Van der Veken L, Whelan M, Hatchett R. Delivering pandemic vaccines in 100 days – what will it take? N Engl J Med 2022; 387:e3

3) McGoldrick M, Gastineau T, Wilkinson D, Campa C, De Clercq N, Mallia-Milanes A, et al. How to accelerate the supply of vaccines to all populations worldwide? Part I: Initial industry lessons learned and practical overarching proposals leveraging the COVID-19 situation. Vaccine. 2022;40(9):1215–1222

4) The ICMRA-Industry Virtual Workshop Report on enabling Manufacturing Capacity in the COVID-19 Pandemic, July 2021.

Regulatory review and engagement

The following regulatory agencies participated in the review and feedback using the Accumulus Synergy Inc. submission platform:

- 19 NRAs: Argentina; Australia; Brazil; Canada; Egypt; El Salvador; Ghana; India; Indonesia; Japan; Malaysia; Mexico; Senegal; Singapore; South Africa; South Korea; United Kingdom; United States; Zimbabwe
- 2 Organizations: AVAREF (regulatory network) and European Vaccine Hub (R&D and Pandemic Preparedness consortium)
- EMA: CMC Platform Best Practices was presented to EMA subject matter experts through EMA Emergency Task Force (ETF) advisory and support body

Acknowledgment

This work is a result of exceptional collaboration of a highly effective team collaboration between CEPI, vaccine industry, academia and organizations. They are recognized here for their dedication and contribution in developing these framework documents.

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- CEPI – CMC: Vishal Sonje, June Kim
- Industry: Astra Zeneca, Biological E, Bio Farma, BioVac, Biomanguinhos (Fiocruz), CanSino Bio, CureVac, GSK, Instituto Butantan, Institut Pasteur de Dakar, J&J, MSD, Quantoom, Sanofi, Seqirus, Sinergium Biotech, Touchlight, Walvax.
- Academia: Dr. Harris Makatsoris – Sustainable Manufacturing Systems, Department of Engineering, King's College London; Dr. Maria Papathanasiou – Process Systems Engineering, Department of Chemical Engineering, Imperial College London.
- Organizations: DCVMN – Developing Countries Vaccine Manufacturers Network; IFPMA – The International Federation of Pharmaceutical Manufacturers and Associations; EFPIA – Vaccines Europe (VE) within the European Federation of Pharmaceutical Industries and Associations.