Country Needs and availability of resources for strengthening healthcare biotechnology facilities

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The first case in 17 November 2019 (Hubei, China), outbreak in December 2019 (Wuhan, China). January 2020, The first Sars-Cov-2 Genome was reported from Wuhan, China.

March 2020, The first case of Covid 19 in Indonesia was announced. Indonesia issued presidential decree (No. 18 Th. 2020), to accelerates the development of national Covid 19 vaccine (VMP – Vaksin Merah Putih).

On June 13, 2020, Sinovac announced positive preliminary results of the phase I/II clinical trial. January 2021, Indonesia began the COVID-19 vaccination program with the first vaccination by the President of the Republic of Indonesia, Joko Widodo.

VMP started the first clinical trial on 9 February 2022.

Problems:
1) Human Resources (Skill, Experience)
2) Infrastructures
3) Collaboration
7 CONSORTIUM TEAM OF VMP DEVELOPMENT

**Viral Vector**
Vektor viral seperti adenovirus manusia atau simpanse membawa DNA SARS-CoV-2 DNA ke dalam sel inang.
Contoh:
- Oxford/Astra Zeneca
- Johnson & Johnson
- Sputnik V

**DNA/mRNA**
Vaksin genetik membawa gen patogen (DNA/messenger RNA) ke dalam sel inang.
Contoh:
- Pfizer/BioNTech (mRNA)
- Moderna (mRNA)
- Inovio (DNA)

**Virus-Like Particle**
Vaksin berbasis nanopartikel: DNA/protein patogen ditempelkan pada partikel nano (misal dalam bentuk virus-like particle).
Contoh:
- Novavax (mengandung protein Spike SARS_CoV-2)

**Rekombinan Protein**
Keseluruhan protein/fragmen protein dari patogen digunakan untuk membuat vaksin, umumnya spike protein SARS-CoV-2.
Contoh:
- Flinders University/Vaxine

**Inactivated Virus**
Vaksin dari virus yang dimatikan/di-inaktivasi.
Contoh:
- Coronavac (Sinovac)
- Sinopharm

**Pendekatan vaksin yang lebih baru**
- ITB
- UI + PT Etama
- UI + PT Etama

**Pendekatan tradisional**
- PRBM Eijkman + PT Biofarma
- PR Bioteknologi LIPI + PT Biofarma
- UNPAD + PT Biofarma
- ITB
- UGM

**Constrains/Problems:**
1) Human Resources (Skill, Experience)
2) Infrastructures
3) Collaboration
Indonesia Established Research Infrastructures to Accelerates Research and Innovation in Health & Biotechnology since 2020 (But, this effort is not enough...)}
RBRCH will work based on sharing facilities, infrastructure, and funding. As well as sharing on the benefit generated from those activities.

This collaboration framework will enable all parties to reach shared goals of strengthening all parties national health resilience through transfer knowledge, transfer technology, collaboration research works, and infrastructures development.*