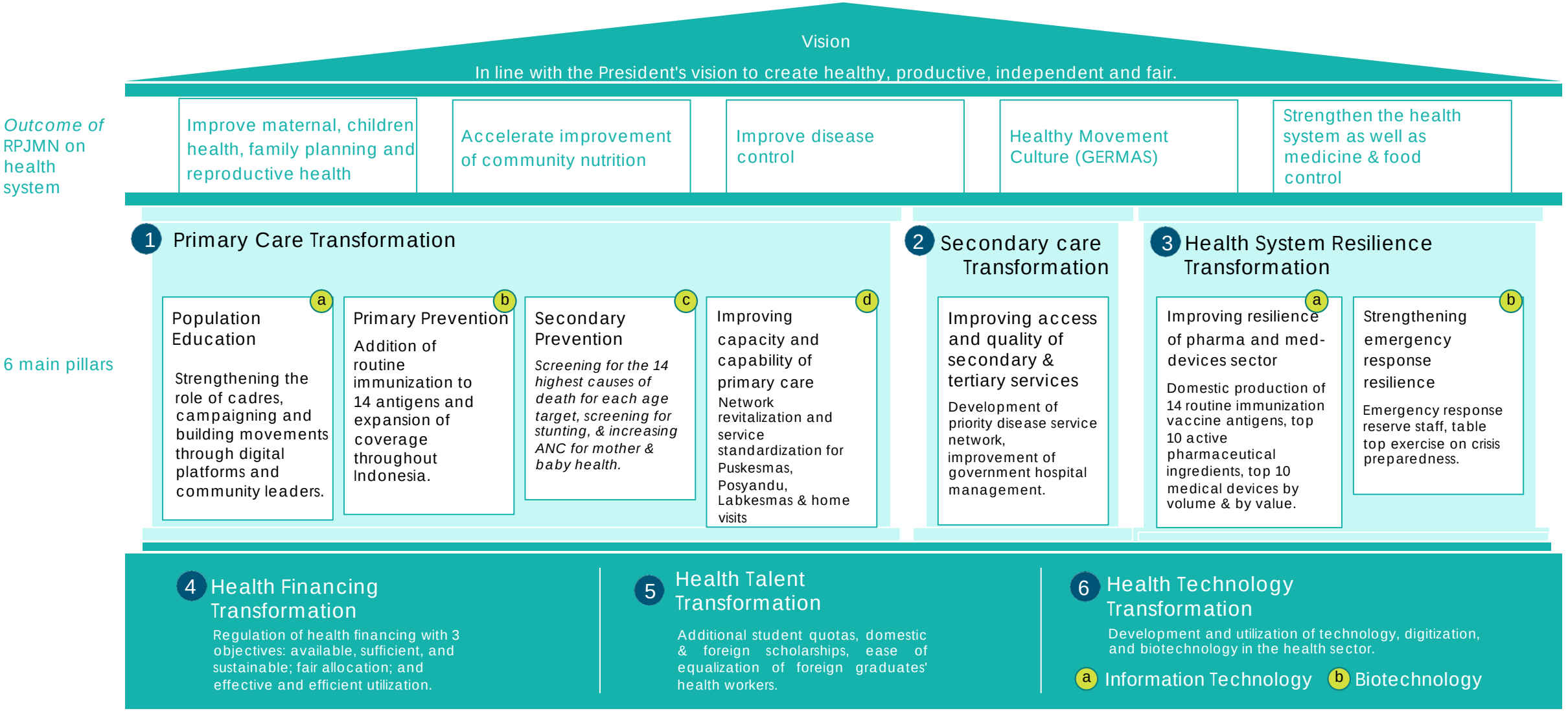
KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Indonesian Health System Transformation

Ministry of Health of the Republic of Indonesia

MoH is committed to implementing health system transformation

The 6 pillars of transformation supporting the Indonesian health system:



1

The lack of access to Primary Care

Revitalizing the structure and network of primary health services and public health laboratories

The levels of primary service facilities

Institution Level	Target Reach
Hospital	514 Regencies / Municipalities
Puskesmas	7,230 Districts
Puskesmas Pembantu	~85,000 Villages
Posyandu	~300,000 Hamlet / RT/RW
Home Visit	~273.5 Million population

Levels of health laboratories, referring to WHO standards

Level of laboratory	Number of Lab
5 NATIONAL LABORATORY National Lab of Prof. dr. Sri Oemiyati dan B2PVRP	2
4 REGIONAL LABORATORY BBTKL, BBLK, EKS BALAI LITBANGKES	13
3 PROVINCIAL LABORATORY	28
2 REGENCIES/MUNICIPALITIES LABORATORY	231
1 PUSKESMAS LABORATORY	10.374

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Structural revitalization accompanied by Standardization of Health Service Packages (1/2)

Targeted Health Problems	*Delivery Unit*		
	Puskesmas (Sub-regencies)	Puskesmas Pembantu (Village)	Posyandu Activities (Hamlet / Dusun / RT&RW)
Pregnancy, childbirth and postpartum	1. ANC (6x + ultrasound by doctor) 2. Class for pregnant women 3. Monitoring nutrition, intake, education, food supplement 4. Normal delivery and referral 5. Postpartum care service 6. Screening for female and children abuse 7. Dental and oral health services 8. Treatment	1. Antenatal care (K2, K3, K4, K6) 2. Class for pregnant women 3. Education and food supplement 4. Postpartum care service 5. Limited treatment	1. Class for pregnant women 2. Balanced nutrition education and food supplement
Babies and pre-School Children	1. MTBM (integrated neonatal management) neonatal visit, education, counseling 2. Class for under-five children mother 3. Management of baby with low birth weight (LBW) 4. Congenital hypothyroidism screening (CHS) sample collection and delivery 5. Monitoring of growth and development 6. Immunization 7. Providing vitamin A & deworming 8. Management of toddlers with nutritional problems 9. MTBS (Integrated Management of Childhood Illness) 10. Tuberculosis (TBC) screening 11. Thalassemia screening 12. Screening for female and children abuse 13. Dental and oral health services 14. Treatment	1. MTBM (integrated neonatal management) neonatal visit, education, counseling 2. Class for under-five children mother 3. Management of baby with low birth weight (LBW) 4. Monitoring of growth and development 5. Immunization 6. Providing vitamin A & deworming 7. Prevention, early detection, treatment, and referral for children with weight faltering, underweight, undernutrition, and stunting 8. MTBS (Integrated Management of Childhood Illness) 9. TBC screening 10. Limited treatment	1. Class for under-five children mother 2. Monitoring of growth and development 3. Immunization 4. Providing vitamin A & deworming 5. Prevention, early detection, treatment, and referral for children with weight faltering, underweight, undernutrition, and stunting 6. TBC screening
School Age and Adolescent	1. Communicable and non-communicable diseases screening 2. Immunization 3. PKPR (Socialization on Adolescent Health Service) 4. Facilitation of School's Health Clinic (UKS) activities 5. Screening for female and children abuse 6. Dental and oral health services 7. Treatment	1. Communicable and non-communicable diseases screening 2. Immunization 3. PKPR (Socialization on Adolescent Health Service) 4. Anemia prevention 5. Limited treatment	1. Adolescent health education 2. Anemia prevention

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Structural revitalization accompanied by Standardization of Health Service Packages (2/2)

Targeted Health Problems	*Delivery Unit*		
	Puskesmas (Sub-regencies)	Puskesmas Pembantu (Village)	Posyandu Activities (Hamlet / Dusun / RT&RW)
Productive age and Elderly	1. Obesity screening 2. Hypertension screening 3. DM screening 4. Stroke risk factors screening 5. Heart diseases risk factors screening 6. Cancer screening 7. COPD screening 8. TBC Screening 9. Vision screening 10. Fitness screening 11. Thalassemia screening 12. Screening for female abuse 13. Mental health screening 14. Pre-marital health check up 15. Screening for pregnancy 16. Family Planning Service 17. Screening for work-related diseases 18. Geriatric check-up 19. Dental and oral health services 20. Treatment	1. Obesity screening 2. Hypertension screening 3. DM screening 4. Cancer screening (breast cancer) 5. COPD screening 6. TBC Screening 7. Vision screening 8. Mental health screening 9. Screening for pregnancy 10. Family Planning Service 11. Geriatric check-up 12. Limited treatment	1. Obesity screening 2. Hypertension screening 3. DM screening 4. TBC Screening 5. Vision screening 6. Mental health screening 7. Screening for pregnancy 8. Family Planning Service 9. Geriatric check-up
Communicable Diseases Control	1. Prevention, early alert, response 2. Surveillance of environment quality		
Other Services	1. Laboratory 2. Pharmacy 3. Emergency 4. Inpatient	1. Laboratory with RDT	1. Laboratory with RDT

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Summary of service packages and examinations at each level of Public Health Laboratories

	Delivery Unit				
	Level 1 Puskesmas	Level 2 Regency/City	Level 3 Province	Level 4 Regional	Level 5 National
Infrastruktur Laboratorium	Non BSL	BSL 2	BSL 2	BSL 2	BSL 3, Biorepository Sistem, Galeri Diseminasi
Pemeriksaan dan Teknologi	1. RDT : 11 parameters (Infectious disease, pregnancy and blood type) 2. Microscopy: 7 parameters of infectious disease 3. Haematology Analyzer: 9 parameters 4. Blood Chemistry: 13 parameters 5. Urine Analyzer: 9 parameters 6. Environment: Physical parameters of water, air, larva inspection	1. RDT : 11 parameters (Infectious disease, pregnancy and blood type) 2. Microscopy: 7 parameters of infectious disease 3. Haematology Analyzer: 9 parameters 4. Blood Chemistry: 15 parameters 5. Urine Analyzer: 12 parameters 6. Culture : 5 parameters (bacteria) 7. Immunology (elisa): 4 parameters 8. Biomolecular: PCR examination (Covid-19 and 23 potentially outbreak diseases), Xpert TB, HBV DNA, VL HIV 9. Toxicology: 9 parameters 10. Environment: Physical parameters of water, air, inspection of larvae, catching mosquitoes. And mice. Microscope for vector identification and rat identification tool set. 11. Environmental Chemistry: 24 parameters 12. Environmental Microbiology: E.coli and Coliform 13. Liquid Waste Monitoring: 10 parameters 14. Vector and Reservoir 15. Food safety: Microbiology (6 parameters) and Chemistry (5 parameters)	1. Microscopy: 7 parameters of infectious disease 2. Haematology Analyzer: 17 parameters 3. Blood Chemistry: 16 parameters 4. Urine Analyzer: 12 parameters 5. Culture : 9 parameters (bacteria including aerosol bacteria) 6. Immunology (elisa): 8 parameters including SHK 7. Biomolecular: PCR examination (Covid-19 and 23 diseases with potential outbreaks), Xpert TB, HBV DNA, VL HIV, Rickettsia, anthrax, leptospira 8. Toxicology: 13 parameters 9. Environment: Physical parameters of water, air, larva inspection 10. Environmental Chemistry (AAS, Spectro, GCMS and UV vis) : 31 parameters 11. Environmental Microbiology: 7 parameters 12. Liquid Waste Monitoring: 10 parameters 13. Vector and Resrvoir: Detection of malaria in mosquitoes, detection of dengue virus in mosquitoes, detection of leptospirosis in rats 14. Food safety: Microbiology (6 parameters) and Chemistry (21 parameters) 15. Biomarkers: 9 parameters	16. Microscopy: 7 parameters of infectious disease 17. Haematology Analyzer: 17 parameters 18. Blood Chemistry: 26 parameters 19. Urine Analyzer: 12 parameters 20. Culture : 12 parameters (bacteria including aerosol bacteria, parasite) 21. Immunology (elisa): 23 parameters including SHK 22. Biomolecular: PCR examination (Covid-19 and 23 diseases with potential outbreaks), Xpert TB, HBV DNA, VL HIV, Rickettsia, anthrax, leptospira, zoonotic viruses (dengue, JE, hanta), batteries in reservoirs (rat leptospira 23. Toxicology: 13 parameters 24. Environment: Physical parameters of water, air, larva inspection 25. Environmental Chemistry (AAS, Spectro , ICP-MS, GCMS, UV vis) : 57 parameters 26. Soil: 41 parameters 27. Environmental Microbiology: 7 parameters 28. Liquid Waste Monitoring: 10 parameters 29. Vector and Reservoir: Detection of malaria in mosquitoes, detection of dengue virus in mosquitoes, detection of leptospirosis in rats 30. Food safety: Microbiology 31. (6 parameters) and Chemistry (21 parameters) 32. Biomarkers: 9 parameters 33. Sequencing and NGS	6. All level 4 Lab Tests 7. Cultures: viruses, parasites and all cultured bacteria, 8. Immunology (Elisa, Multiplex Elisa): human pathogen, zoonoses 9. Biomolecular: 10. PCR examination (Covid-19 and 23 diseases with potential outbreaks), Xpert TB, HBV DNA, VL HIV, 11. Rickettsia, anthrax, leptospira 12. Zoonotic disease laboratory examination 13. Specific capacities: neutralization tests for vaccine clinical trials, strain characterization; Post Marketing Validation Test for Covid-19 Reagents, HIV Reagents, Hep B, Hep C, Syphilis, Malaria; 14. Specific capacity: Insecticidal test 15. Advance Biomolecular: Sanger sequencing, NGS, High throughput NGS. 16. Toxicology: ICP-MS, ICP OES 17. Bioinformatic analysis

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3 main initiatives to strengthen diseases prevention

Routine Immunization:
from 11 to 14 types of antigen

BCG, DPT-Hib, Hep B, MMR/MR, Polio (OPV-IPV), TT/DT/td, JE, HPV, PCV, Rotavirus

Cervical cancer is a cancer that can be prevented by immunization with the Human Papillomavirus (HPV).

Pneumonia and diarrhea are 2 of the 5 highest causes of under-five mortality in Indonesia* that can be prevented by immunization (PCV and Rotavirus)

14 screenings
Priority Disease

Screening for the highest causes of death in each age target:

1. Congenital hypothyroidism
2. Thalassemia
3. Anemia
4. Stroke
5. Coronary heart disease (heart attack)
6. Hypertension
7. Chronic obstructive pulmonary disease
8. Tuberculosis
9. Lung cancer
10. Hepatitis
11. Diabetes
12. Breast cancer
13. Cervical cancer
14. Colon cancer

Improving maternal and child health

Monitoring children's growth and development at Posyandu with standardized anthropometric tools

Pregnancy check-up (ANC) from 4 times to 6 times, including 2 times USG examination by doctor in the 1st and 3rd trimesters

USG examination for Breast Cancer screening

Congenital heart diseases screening in Puskesmas with neonatal pulse oximetry

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National movement to increase service coverage and health promotion

Building 6 Movements to Prevent Stunting which are carried out with the community by partners, private sector, civil society organizations, universities, students, etc., to increase knowledge, service coverage and community empowerment

Nourishing Action

Target: Teenagers (Students of Middle School/equivalent and High School /equivalent)

Activities:

- Anemia screening during morning exercise
- Breakfast Together
- Consumption of iron Supplement

Gerakan Nasional AKSI BERGIZI

Healthy pregnant women

Target: Pregnant Woman

Activities:

- Pregnancy test
- Consumption of iron Supplement
- Consumption of additional food
- Pregnant class

Bumil Sehat

Active *Posyandu*

Target: Cadres, Toddlers, Mothers and Toddler Families

Activities:

- Purchase of anthropometric equipment for *Posyandu*
- Cadre Training
- Provision of additional food rich in animal protein (eating together)

posyandu

Jamboree Cadres

Target: Health Cadres

Activities:

- Jamboree cadres
- Skilled cadres' competition
- *Posyandu* competition

Jamboree 2023 Kader Posyandu

Prevent Stunting is Important

Target: all

Activities:

- Content Production
- Education across various platform: TV, Radio, Media Publishing, Social Media,
- Talk show, Seminar
- *Podcast, Storyline* Film
- Socialization

PROTEIN HEWANI Cegah Stunting HARI GIZI NASIONAL 2023

Animal Source Protein for Stunting Prevention

- Target : pregnant women, breastfeeding mothers, under-five children
- Activities : cooking class

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Strengthening cadres' (community health workers) competencies & skills

Posyandu Management	Infant and Under-Five Children	Pregnant Women, Breastfeeding Mothers	School Aged Children and Youth	Productive Aged and Elderly
Describe the Posyandu service package for the entire life cycle	Explaining the use of MCH Handbook – under-five children section	Explaining the use of MCH Handbook - pregnant women, postpartum mothers	Conduct counseling on Isi Piringku, physical activity and health checks	Germas counseling (Isi Piringku, physical activity and health check)
Recording and reporting	Conduct counseling on exclusive breastfeeding, complementary food of breast milk rich in animal protein according to age	Conduct counseling on Isi Piringku for pregnant women and breastfeeding mothers	Explain anemia prevention programs (iron supplement tablets and Haemoglobin screening for teenage girls)	Conduct counseling on most diseases (obesity, hypertension, stroke, cancer, COPD, TB, diarrhea, mental health, geriatrics)
Home visits	Weighing, measuring length/height and head circumference, upper arm	Explaining examination of pregnant women and postpartum mothers	Conduct counseling on the dangers of smoking and drugs and teenage pregnancy	Conducting early detection of the productive age of the elderly by measuring abdominal circumference, blood pressure (obesity, hypertension)
Communicating effectively	Explain the results of measurements of normal weight and height, less and its follow-up	Explains that pregnant women need to monitor their weight, arm circumference and blood pressure using the MCH Handbook curve		Conducting early detection of productive age and the elderly with questionnaires (COPD, tuberculosis, mental health, geriatrics and diabetes)
	Explains stimulation of development, vitamin A and deworming according to age	Explain the recommendations for taking iron supplement tablets every day during pregnancy		Conduct family planning counseling
	Explain complete routine immunization services and immunization-preventable diseases (Hepatitis, Diphtheria, Measles, Rubella, Diarrhea)	Explain monitoring of danger signs for pregnant women, postpartum mothers		
	Describe monitoring of danger signs in infants and under-five children			

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Levels of cadres based on 25 basic competencies/skills

start

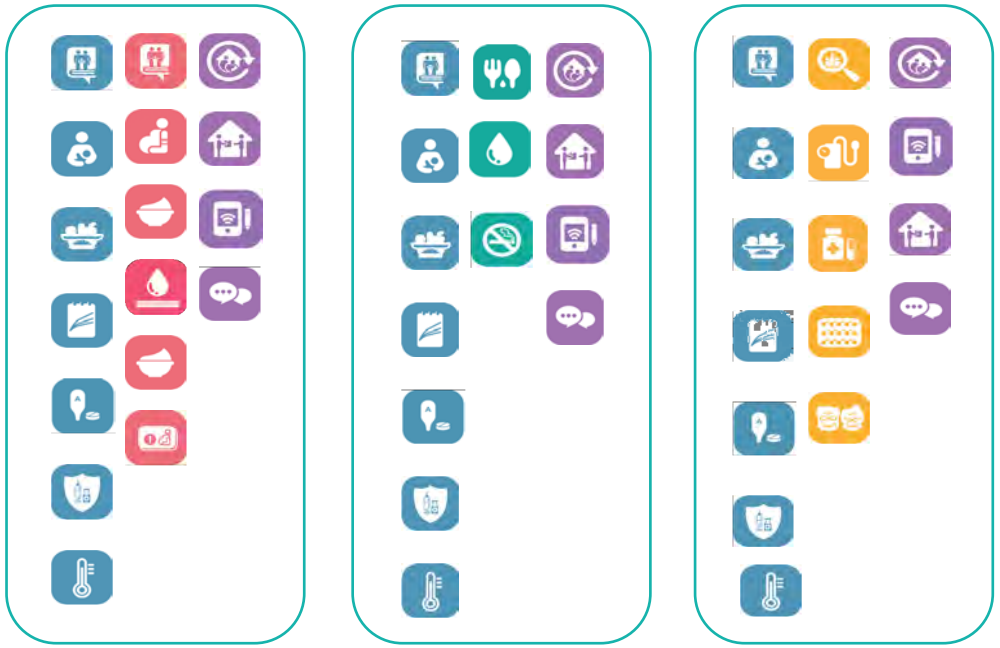
KADER PURWA OR KADER PURWA OR KADER PURWA

KADER MADYA OR KADER MADYA

KADER UTAMA

Purwa Cadre

1. Must master 2 basic competencies in Posyandu Management and Under-five Children health services.
2. Added with 1 other basic ability of choice (pregnant women, postpartum mothers, youth, or reproductive aged/elderly health services)



Madya Cadre

1. must master the 3 basic competencies of Posyandu Management, Under-five Children, and Pregnant Women and Postpartum Mothers health services.
2. Added with 1 other basic ability of choice (youth, or reproductive aged/elderly health services)

Utama Cadre

Must master all cadre competencies

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Working closely with the Ministry of Education and Culture, the MoH developed teaching Materials about health topics for Students

S Attitude & Skills T Theory / Knowledge E Extracurricular

Topic	Expected behavior/action	Pre-School (3-6 yo)	Elementary Phase A (Class 1-2)	Elementary Phase B (Class 3-4)	Elementary Phase C (Class 5-6)	Junior High Phase D (Class 7-9)	Senior High Phase E (Class 10)	Senior High Phase F (Class 11-12)
1	Consuming balanced diet	S	S, T	S, T	S, T*	S, T	S, T, E	S, T, E
2	Consuming iron supplement		T	T	T	S, T	S, T, E	S, T, E
3	Consuming vitamin A	S*						
4	Consuming hygienic beverages	S	S, T	S, T	S, T	S, T	S, T, E	S, T, E
5	Maintaining personal hygiene (Skin)	S	S	S*	S, T	S, T	S, T, E	S, T, E
6	Maintaining environmental cleanliness	S	S, T	S, T*	S, T	S, T	S, T, E	S, T, E
7	Correct handwashing with soap	S, T	S, T*	S, T	S, T*	S, T, E	S, T, E	S, T, E
8	Refrain from smoking	T	T	S, T	S, T, E	S, T, E	S, T, E	S, T, E
9	Refrain from alcohol consumption		T	T	S, T, E	S, T, E	S, T, E	S, T, E
10	Avoiding harassment and violence	S	S	S	S, T, E	S, T, E	S, T, E	S, T, E
11	Managing emotions (stress, depression).	S	S, T	S, T	S, T	S, T, E	S, T, E	S, T, E
12	Attending mental health counseling					S, T	S, T, E	S, T, E
13	Identifying and reporting sexual harassment	S, T	S, T	S, T	S, T	S, T, E	S, T, E	S, T, E
14	Engage in regular physical exercise/activity	S	S, T	S, T, E*	S, T, E	S, T, E	S, T, E	S, T, E
15	Awareness of traffic risks and accidents	S	S, T	S, T	S, T	S, T	S, T, E	S, T, E
16	Performing first aid	S	S, T	S, T	S	S, T, E	S, T, E	S, T, E
17	Receiving immunization	S	S, T*	S, T	S, T, E	S, T, E	S, T, E	S, T, E
18	Conduct regular monitoring of growth and development	S	S, T	S, T	S, T	S, T	S, T, E	S, T, E
19	Access regular health check-ups	S	S, T*	S, T	S, T	S, T	S, T, E	S, T, E
20	Understand medication compliance					T	S, T	E
21	Understand the leading causes of death in Indonesia and become an agent of change within the family a) Knowledge of cardiovascular, Diabetes Mellitus and tuberculosis diseases b) Importance of blood pressure, blood sugar, BMI/obesity, and tuberculosis screenings.	S, T	S, T*	S, T*	S, T, E*	S, T, E*	S, T, E	S, T, E
22	Disaster preparedness	S	S, T	S, T	S, T	S, T, E	S, T, E	S, T, E
	TOTAL	18	19	19	19	21	21	21

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19 Teaching Materials have been approved by the Ministry of Education and Culture

and uploaded on the Merdeka Teaching Platform

The Ministry of Health continues to strengthen primary health care services and access

1 Primary service integration kick off and pilot Launching

2 Fulfillment of USG for Puskesmas and Anthropometry for Posyandu

3 Complete basic immunization of babies and toddlers

4 *Active Case Finding (ACF) Tuberculosis in 25 districts/cities*

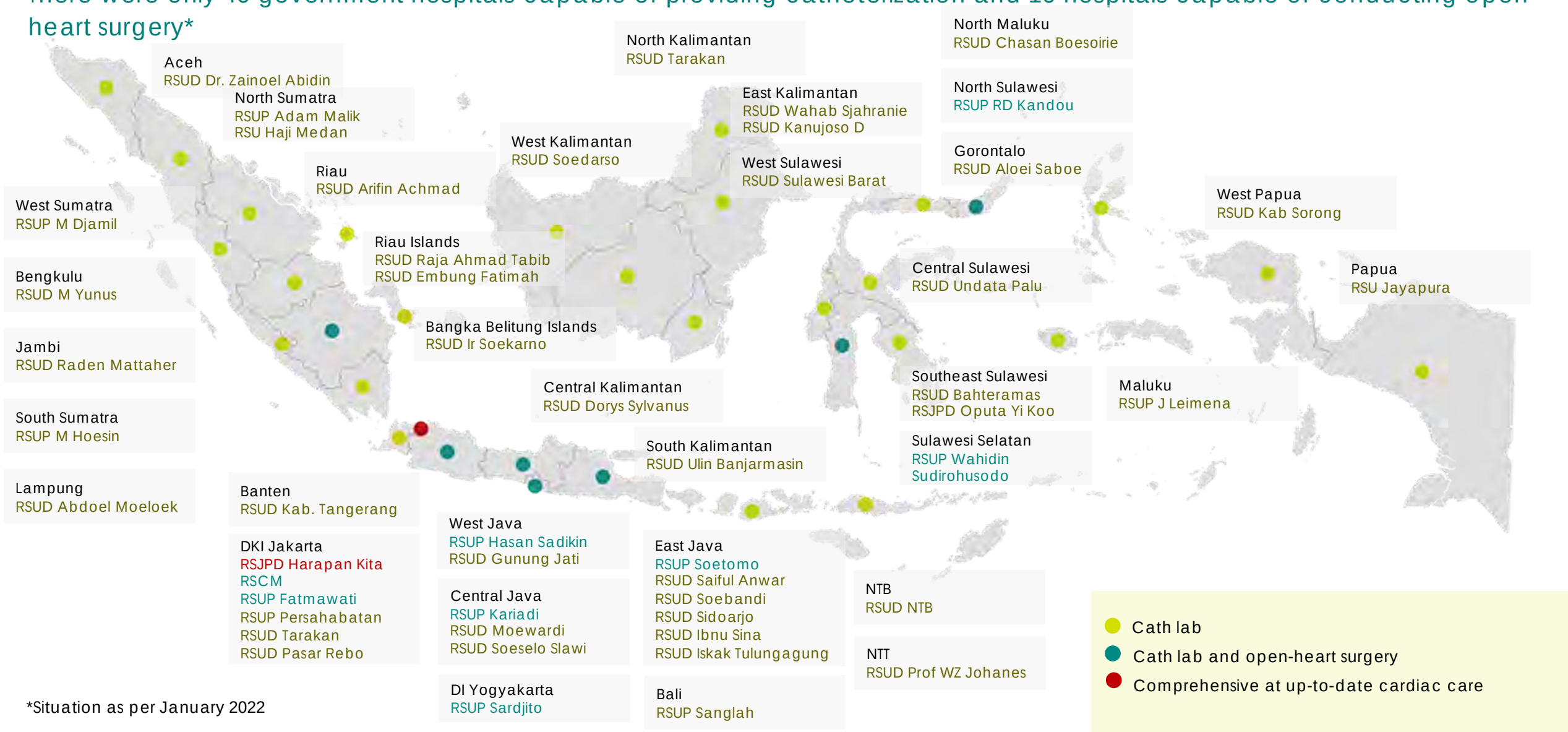
- 101.797 newborns (2.3%) were screened for Congenital Hypothyroidism (SHK)
- 71% pregnant women visited ANC for 6 times
- 75% toddlers are monitoring growth regularly at Posyandu.
- 6.032 (58.4%) Puskesmas have USG
- 5.628 Hb Meter have been distributed to the Puskesmas across 12 provinces
- 61.256 Posyandu have standardized anthropometries
- Rearrangement of ~15.073 laboratories at various level across provinces in Indonesia
- Around 6,420 schools (2,289,871 students) participated in the *#ActionBergizi* movement
- 143 Tier-2 Health Labs and 22 Tier-3 Health Labs have Bio-safety level 2 facilities.
- >90% of houses visited by Cadres in Region 9 Primary Health Services Integration pilot locus.
- 68,788 TB contacts screened Nov 2022-Feb 2023
- 300,379 infants and under-fives have received complete basic immunization, and 467,785 children have received new antigen immunization

2

Lack of secondary care capacity

Cardiac services based on competency levels were not evenly distributed in Indonesia

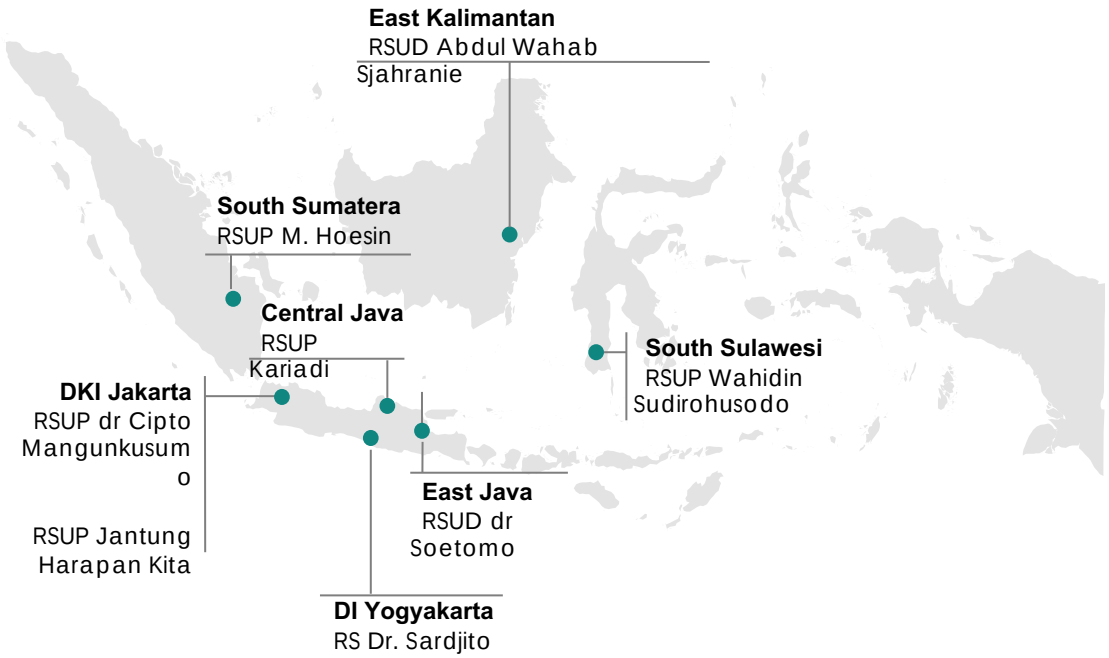
There were only 40 government hospitals capable of providing catheterization and 10 hospitals capable of conducting open-heart surgery*



*Situation as per January 2022

Currently, the lack of service centres results in long service lines

Distribution of hospitals with paediatric cardiac surgery*



*Situation as per January 2022 (source: Harapan Kita Hospital)

Example: Time spent waiting in the cardiac service queue

No	Hospital	Location	Waiting Time (# month)	Surgical Case (# patient)
1	Harapan Kita Hospital	Jakarta		
	• Observation		36	2727
	• Adult Vascular case		12	50
	• Complex pediatric case		9	133
	• Simple pediatric case		3	73
	• CABG for Adult		0-1	43
2	Cipto Mangukusumo	Jakarta	5-12	300
3	Sardjito Hospital	Yogyakarta	12	200
4	M Hoesin Hospital	South Sumatera	12	150
5	Hasan Sadikin Hospital	West Java	4-5	250
6	Kariadi Hospital	Central Java	4	250
7	Wahab Sjahranie Hospital	East Kalimantan	4-6	150

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There are still many regions without hospitals providing stroke services

Mapping of hospitals with stroke services in Indonesia

Source: *Pusat Otak Nasional* Hospital

Additionally, facilities and specialists for chemotherapy and radiotherapy remain insufficient

Distribution of Chemotherapy service

Chemotherapy services available

Chemotherapy services are not currently available.

Distribution of Radiotherapy service mapping

Radiotherapy services available

Radiotherapy services are not currently available.

Source: Perhompedin, IROS (January 2022)

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The referral network programme divides hospitals into three categories: Madya, Utama, and Paripurna, with each having distinctive competencies

	Madya Hospital	Utama Hospital	Paripurna Hospital
Heart Disease and Stroke	• Invasive diagnostics and non-surgical interventions, e.g. PCI and thrombectomy/coiling	• Open heart surgery and open neurosurgery/clipping	• Surgical services and advanced non-surgical cardiac and neurological interventions
cer	• Tumor surgery and chemotherapy	• Radiation therapy, advanced cancer surgery, and chemotherapy	• Comprehensive and up-to-date cancer therapy, e.g. microsurgery, proton therapy
ey	• Hemodialysis and CAPD • Adult urinary tract stone therapy with minimally invasive techniques • Screening and diagnosis of urological malignancies	• Hemodialysis with special techniques • Screen kidney transplant candidates • Urological malignancies treatment	• Kidney transplant • Surgeries for congenital abnormalities of the kidney
Maternal & Child Health	• Delivery care for fetal weight >1800 grams or gestational age >34 weeks • Simple surgery (eg: atresia ani) • Pregnancy services with obstetric problems	• Delivery care for fetal weight >1000 grams or gestational age >28 weeks • Complex pediatric surgery • Simple pediatric cardiac surgery • Pregnancy services with other medical disorders	• Delivery care for fetal weight <1000 grams or gestational age <28 weeks • Complex pediatric cardiac surgery • Pregnancy services with complex medical disorders

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Equitable distribution for these priority diseases is aimed to reach 100% of districts by 2027 through optimisation of the national referral network

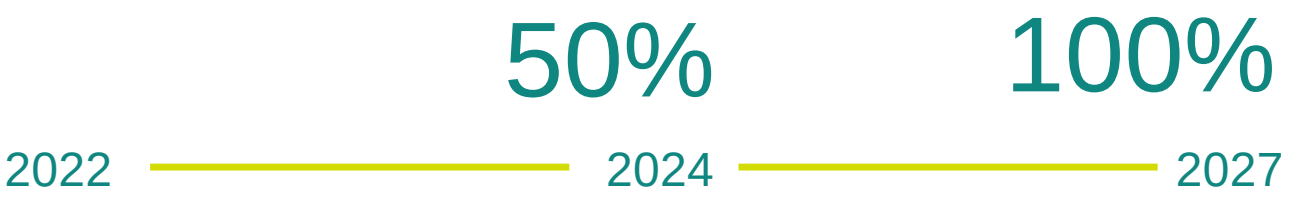
ILLUSTRATION

Acceleration of extending referral hospital service coverage, with the vision:

- 34 provinces have at least 1 Utama level Hospital
- 514 districts have at least 1 Madya level hospital*

Target

50% of districts will have at least one madya level hospital by 2025, and 100% by 2027.



*There are only 507 districts with a government hospital.

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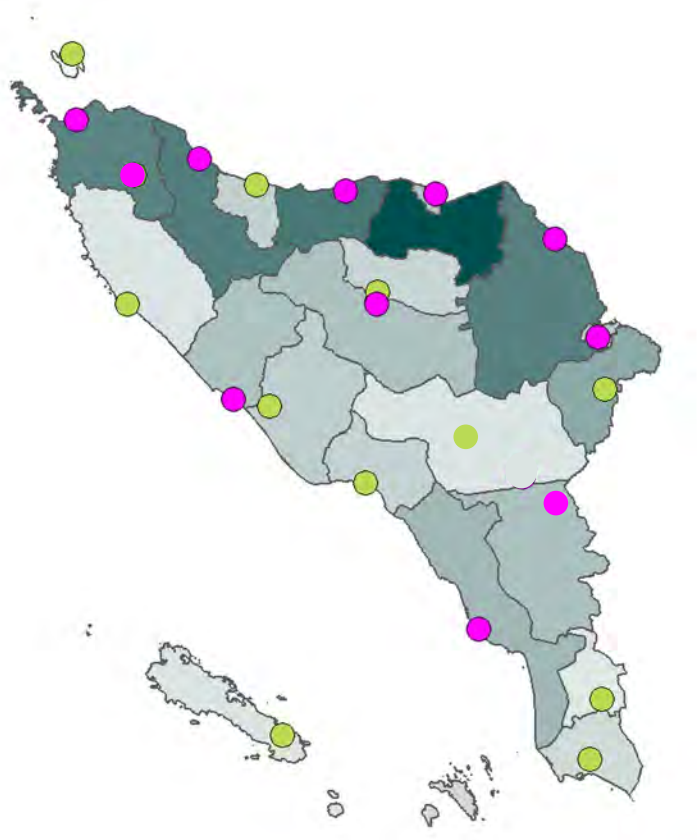
Example: Hospital network in Aceh

Stage 1 Stage 2



Haven't met Madya level
Madya
Utama
Paripurna

Current capabilities of Hospital (Stage 1)

	Type	Class	Cardiac	Stroke	Cancer	Kidney
RS Paripurna						
-	-	-				
RS Utama						
RSUD Zainoel Abidin	RS Provinsi	A	●	●	●	●
RS Madya						
RSUD Yulidin Away	Kab	B	○	●	○	○
RSUD Langsa	Kab	B	○	○	○	○
RSUD Dr. Fauziah Bireun	Kab	B	○	○	○	○
RSUD Meuraxa	Kab	B	○	○	○	○
RSUD Datu B Takengon	Kab	B	○	○	○	○
RSUD Cut Nyak Dhien	Kab	B	○	○	○	○
RSUD Cut Meutia	Kab	C	○	●	●	○
RSUD Tgk Chik Ditiro	Kab	C	○	○	○	○
RSUD HS Kutacane	Kab	C	○	○	○	○
RSUD dr Zubir Mahmud	Kab	C	○	○	○	○
	.					

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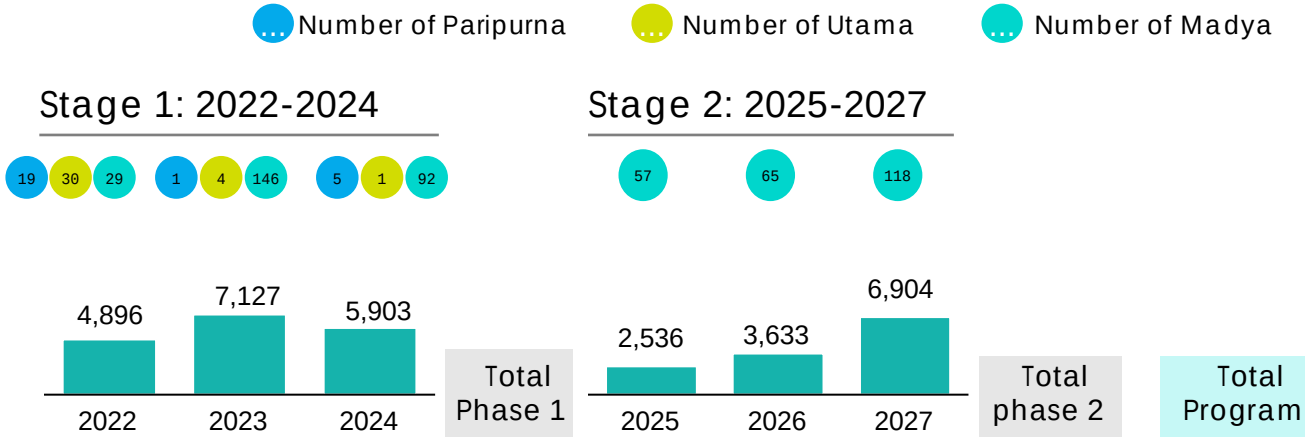
Total budget ~IDR 31Tn needed until 2027; 17,9Tn in phase 1 and 13,1Tn in phase 2

Needs of budget, in IDR billion



	2022	2023	2024	Total Phase 1	2025	2026	2027	Total phase 2	Total Program
Tools	4,431	6,610	5,312	16,355	2,370	3,303	6,222	11,895	28,250
Paripurna Hospital	1,105	-	255	1,360	-	-	-	-	1,360
Utama Hospital	2,443	402	159	3,004	-	-	-	-	3,004
Madya Hospital	883	6,208	4,899	11,990	2,370	3,303	6,222	11,895	23,886
-Cardiac, Stroke, Cancer	518	4,058	3,299	7,876	1,506	2,183	4,137	7,827	15,703
-Uro-nefrology	365	2,150	1,600	4,114		1,119	2,085	4,068	8,183
Infrastructure 1	465	517	590	1,572	166	330	682	1,179	2,751
Total	4,896	7,127	5,903	17,927	2,536	3,633	6,904	13,074	31,001

1. To finance the space/building (CT Scan, Cath Lab, MRI, OK) for class C and D, as well as finance the room for Linac for class A and B

Potential budget sources:

- 70% national economic recovery budget
- 30% fulfilled through:
  - Special Allocation Fund for Health Sector
  - Public service agencies
  - Local government budget
  - Loans/Partnerships (development bank)

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

The Ministry of Health assists in the provision of medical equipment based on the availability of specialist in cardiac, stroke, cancer, and kidney network hospitals

Paripurna Utama Madya

Level	Cardiac
1	Cath Lab*
2	Echocardiography
3	CT Scan 128*
4	Rotablator
5	IVUS + FFR
6	IABP
7	HLM
8	CABG surgery set
9	Pediatric Basic surgery set+ ToF
10	Set ECMO*
11	3D ablation
12	Pediatric TGA surgery set

Level	Stroke
1	Cath Lab*
2	CT Scan 64*
3	CT Scan 128*
4	MRI 1,5T*
5	Microscope Neurosurgery
6	Bor High Speed

Level	Cancer
1	Cytotoxic Drug Cabinet
2	Mammography
3	CT Scan 64*
4	CT Scan 128*
5	MRI 1,5T*
6	IHK Set
7	SPECT CT
8	CT Simulator
9	Linac
10	Brachytherapy
11	Flow Cytometer
13	Microscope surgery
14	PET Scan
12	Cyclotron

Level	Kidney (Uronephrology)
1	Endourology basic set
2	USG Doppler
3	Endourology pediatric set
4	C-Arm
5	ESWL
6	Laser Holmium
7	Endourology flexible set
9	Automated Peritoneal Dialysis
10	Operating Sets Kidney Transplantation

In 2022, the Indonesia Ministry of Health continued to advocate for all patients to have access to secondary care

1 MOU signing with the Governor to provide networking assistance

2 Distribution of government aid to meet the needs of priority medical devices

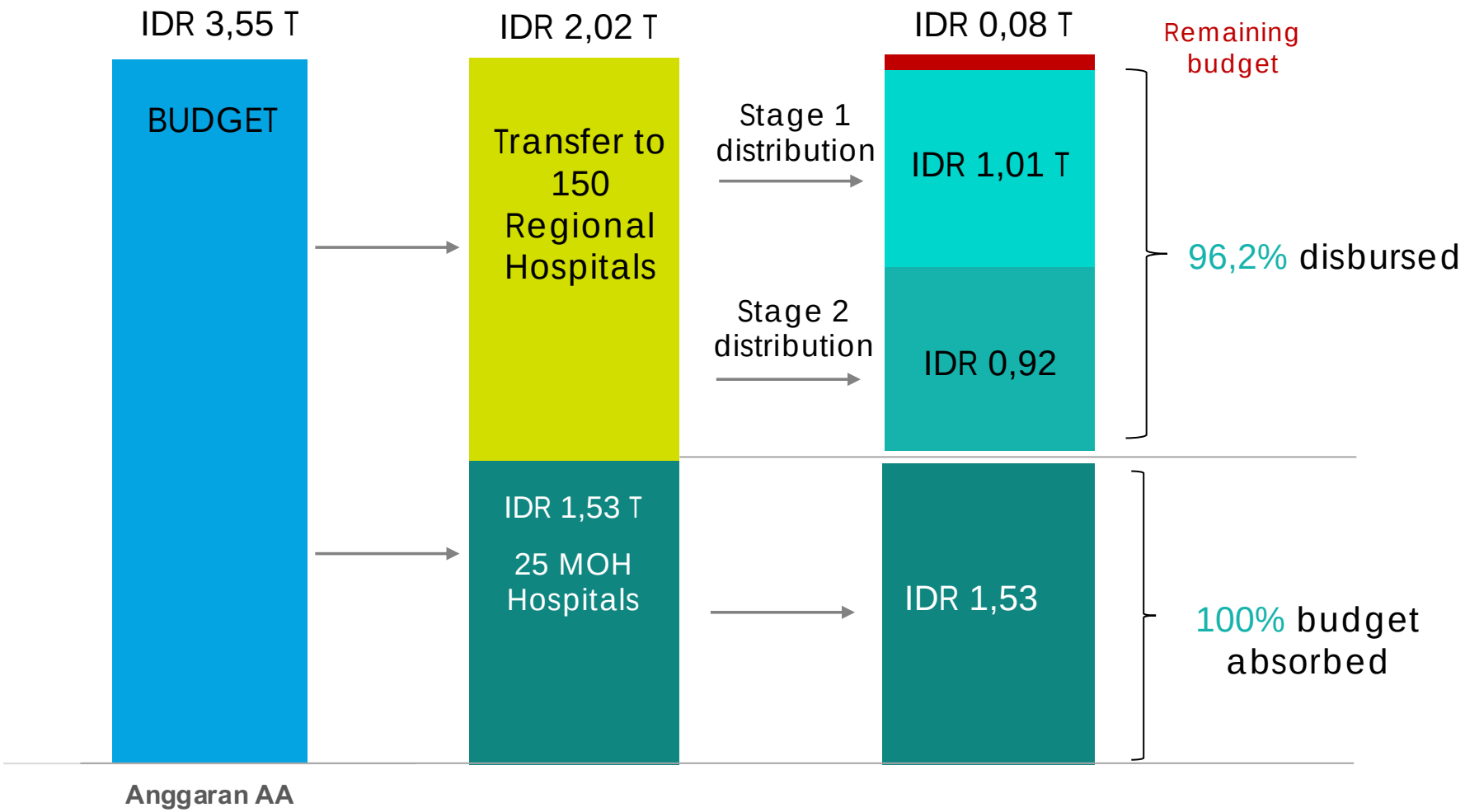
3 *Proctorship* for cardiac catheterization and open heart surgery*

4 The first open heart surgery operation in West Nusa Tenggara

- Government assistance funds distributed to 150 hospitals and 25 hospitals in 34 provinces to fulfill priority medical devices.
- Governors of ~24 provinces in Indonesia have signed an agreement with the Ministry of Health for the development of RSUD as a referral service network.
  - Cardiac : 24 provinces
  - Stroke: 13 provinces
  - Cancer: 12 provinces
  - Uronephrology : 7 provinces
- Proctorship* interventional and surgical actions are carried out to increase the capability of priority disease services:
  - Cardiac: 37 Hospitals
  - Strokes: 3 Hospitals

*Proctorship: The process of knowledge and skill transfer through assistance in the implementation of actions and disease management by a team of clinicians from the Pemmpu Hospital.

Referral network hospital medical devices are covered by national economic recovery budget



Government assistance transfer to 150 regional public hospitals have been distributed 96,2%

Government assistance to 25 vertical hospitals have been distributed 100%

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Types and quantities of medical devices financed by 2022 funds

Cardiac & Stroke		Cancer		Uronefrology		Maternal & Child	
Equipment	Qty	Equipment	Qty	Equipment	Qty	Equipment	Qty
Echocardiography	46	Mammography	59	Set endourology	50	Anesthesia Machine	101
CT-Scan	44	SPECT CT	8	ESWL	40	Patient Monitor	100
Cath lab	12	Flow Cytometer	8	C-Arm	28	Ventilator	33
Operating Room	12	IHK Set	7	USG Doppler	22	USG Fetomaternal	24
IABP	11	Bronchoscopy	7	Video Urodynamic	16	Baby Incubator	12
Rotablator	11	Brachytherapy	6	Laser Holmium	14	MALDI Tofs	11
IVUS-FFR	10	CUSA	3	Automated Peritoneal Dialysis Machine	11	Nitric Oxide	11
MRI	8	LINAC	2	PCNL	6	Laser Ablation	6
Neuro Microscope	8	PET-CT	2	URS	4	HFOV	4
Heart Lung Machine	6	CT Simulator	2	Tissue typing	3	HFOT	2
OCT	6					HFNC	2

Note:102 other medical devices

Progress of medical device fulfilment in Paripurna, Utama, and Madya Hospitals in Phase I (target 50% of districts)

IDR Billion

Province	Cancer		Cardiac		Stroke		Uronephrology		Overall
	Needs	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Achievement
Aceh	104	19%	169	18%	178	15%	136	18%	17%
North Sumatra	130	34%	388	2%	293	8%	337	5%	8%
West Sumatra	245	18%	228	5%	213	29%	212	20%	18%
Riau	144	3%	87	9%	82	31%	86	3%	10%
Jambi	98	5%	149	14%	104	0%	111	5%	7%
South Sumatra	124	25%	253	3%	208	32%	231	7%	15%
Bengkulu	101	5%	130	28%	69	1%	111	7%	12%
Lampung	93	7%	150	9%	139	38%	136	5%	15%
Bangka Belitung	23	50%	54	14%	84	0%	90	21%	15%
West Java	200	49%	285	14%	271	38%	317	21%	29%
Central Java	341	17%	321	9%	359	38%	384	17%	20%
DI Yogyakarta	176	1%	63	13%	98	2%	74	22%	7%
East Java	190	34%	240	6%	206	18%	392	15%	17%
Banten	26	50%	109	32%	100	65%	103	28%	39%
Bali	138	40%	114	12%	96	12%	103	21%	22%
West Nusa Tenggara	28	0%	140	17%	114	0%	124	10%	9%
East Nusa Tenggara	116	14%	261	1%	167	8%	242	1%	4%
West Kalimantan	71	0%	82	21%	57	0%	108	6%	7%

Progress of medical device fulfilment in Paripurna, Utama, and Madya Hospitals in Phase I (target 50% of districts)

IDR Billion

Province	Cancer		Cardiac		Stroke		Uronephrology		Overall
	Needs	Achievement	Needs	Achievement	Target	Achievement	Target	Achievement	Achievement
Central Kalimantan	89	0%	98	16%	119	10%	114	3%	7%
South Kalimantan	33	15%	137	2%	146	10%	112	13%	9%
East Kalimantan	165	0%	48	17%	41	0%	71	52%	14%
North Kalimantan	8	0%	37	0%	70	0%	51	0%	0%
North Sulawesi	117	20%	209	11%	190	27%	186	14%	18%
South Sulawesi	197	10%	280	5%	258	35%	256	19%	17%
Southeast Sulawesi	99	5%	199	0%	174	0%	197	14%	5%
Gorontalo	22	0%	62	0%	61	0%	74	0%	0%
West Sumatra	136	0%	50	0%	44	0%	48	24%	4%
Maluku	82	0%	114	18%	54	0%	84	6%	8%
North Maluku	20	15%	65	0%	82	19%	67	28%	15%
Papua	121	0%	301	11%	178	0%	249	3%	5%
West Papua	28	10%	145	0%	70	0%	125	0%	1%
Central Sulawesi	160	3%	153	8%	149	0%	146	2%	3%
Riau Islands	71	3%	79	19%	68	21%	74	38%	20%
DKI Jakarta	263	94%	306	62%	177	55%	254	46%	65%

3

Weak health system resilience

We still depend heavily on imports from developed countries and lack investment in technology research

90%

imported medicinal raw materials in 2019

88%

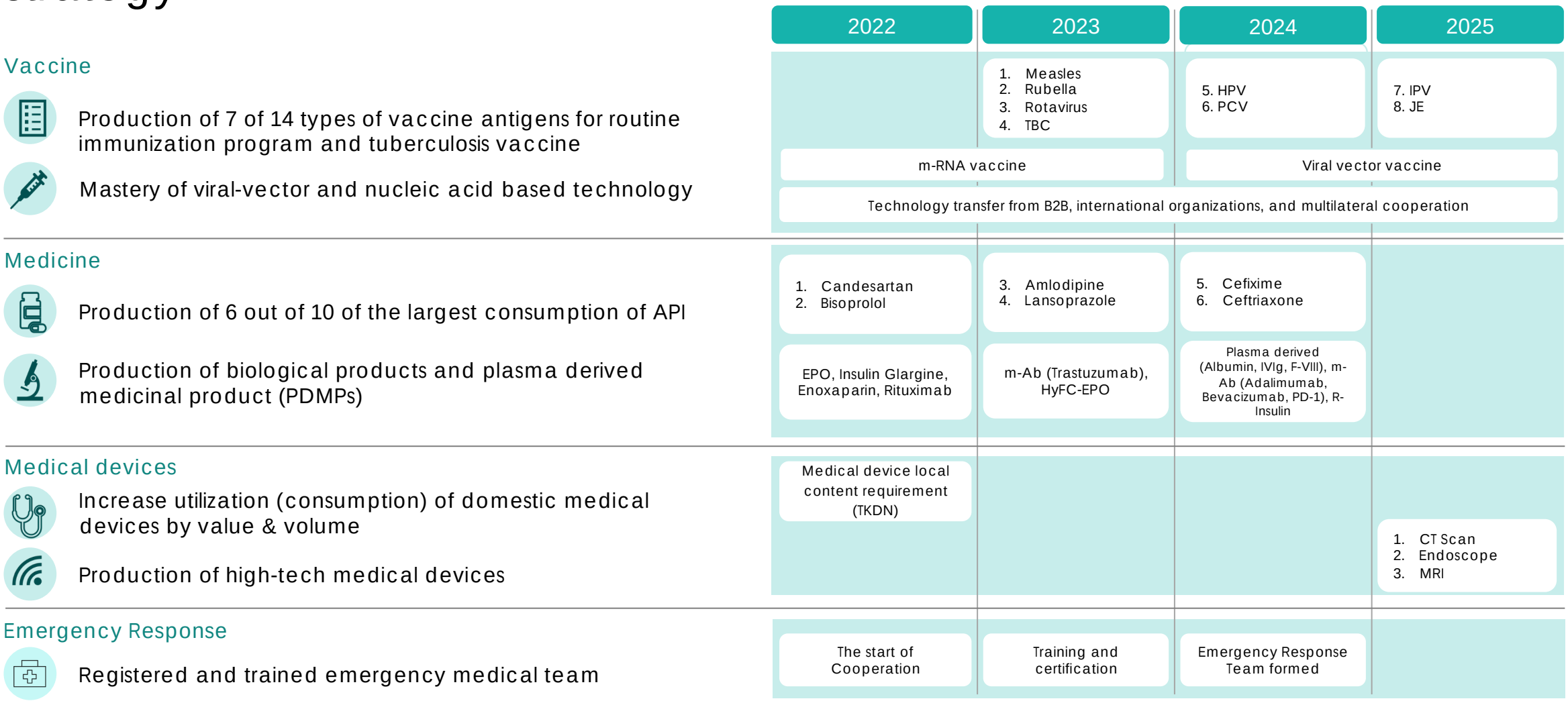
2019-2020 medical device transactions are imported

0,2%

2020 total GDP goes to research and development. This figure is low compared to the United States (2.8%) and Thailand (1%)

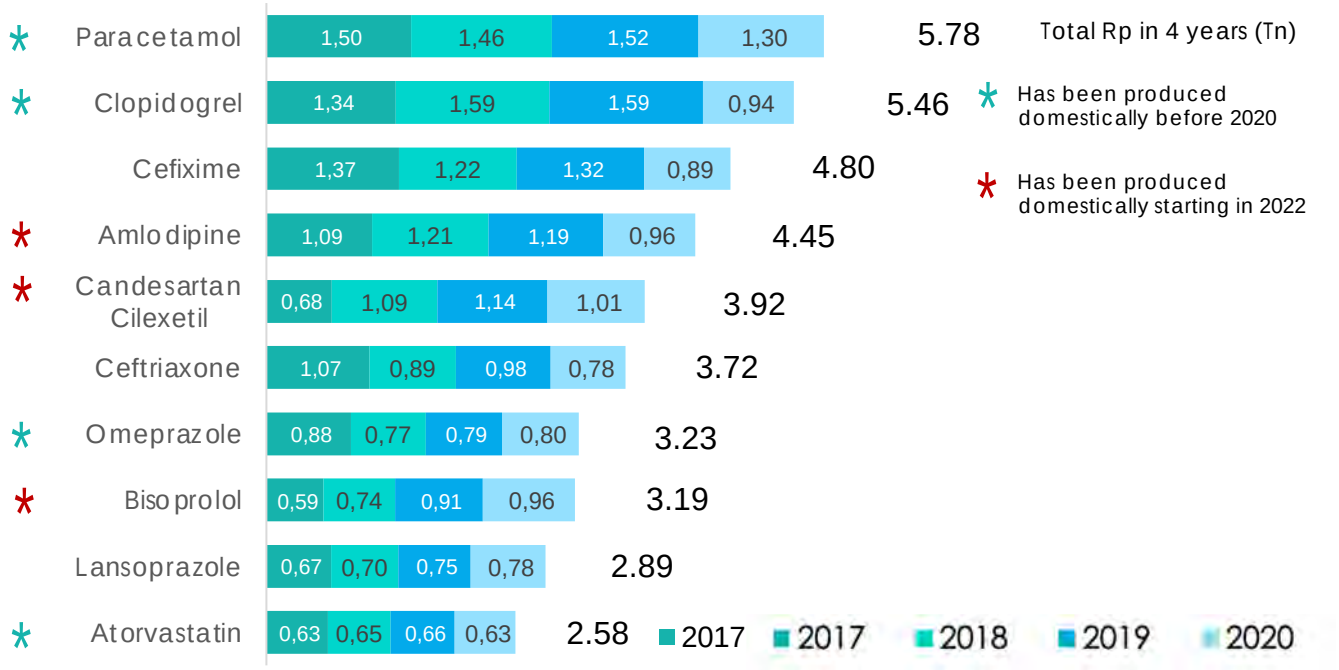
Source: [1] McKinsey 2020, [2] Kementerian Kesehatan 2021, [3] UNESCO 2021

Pharmaceutical & medical device resilience and emergency response strategy



Domestic production has been carried out in stages in the context of resilience in raw materials for medicines, vaccines, and medical devices

7 out of 10 of the largest consumption of API has been produced domestically



~70%

transactions for imported medical devices in 2021-2022* in the e-catalogue
*There has been a significant reduction in the use of imported medical devices compared to 2019-2020

Progress of the production of 14 types of vaccine antigens for routine immunization program

7 types of antigens that have been produced domestically

1. BCG
2. Diphtheria
3. Pertussis
4. Tetanus
5. Hepatitis
6. Influenza
7. Oral Polio Vaccine (OPV)

5 of the 7 (imported) types of antigens are already in the technology transfer stage for domestic production

1. Measles
2. Rubella
3. Inactivated Polio Vaccine (IPV)
4. Japanese Encephalitis (JE)
5. Human Papillomavirus (HPV) Vaccine
6. Pneumococcal Conjugate Vaccine (PCV)
7. Rotavirus

- No partners yet
- Technology transfer initiation
- Technology transfer process

Source: Ministry of Health 2022,

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

The government provides Change Source facilitation to increase the use of domestic Active Pharmaceutical Ingredient (API) on the 10 largest API consumption by value

No	API | TKDN	*Change Source*
1	Omeprazol ~53,33%	
2	Clopidogrel ~68,33%	
3	Atorvastatin ~67,94%	
4	Candesartan	
5	Amlodipine	
6	Bisoprolol	
7	Lansoprazol	
8	Paracetamol	
9	Ceftriaxone	
10	Cefixime	

The change source of 10 highest API consumption into domestic API will reduce imports by

↓19,75%

Description:

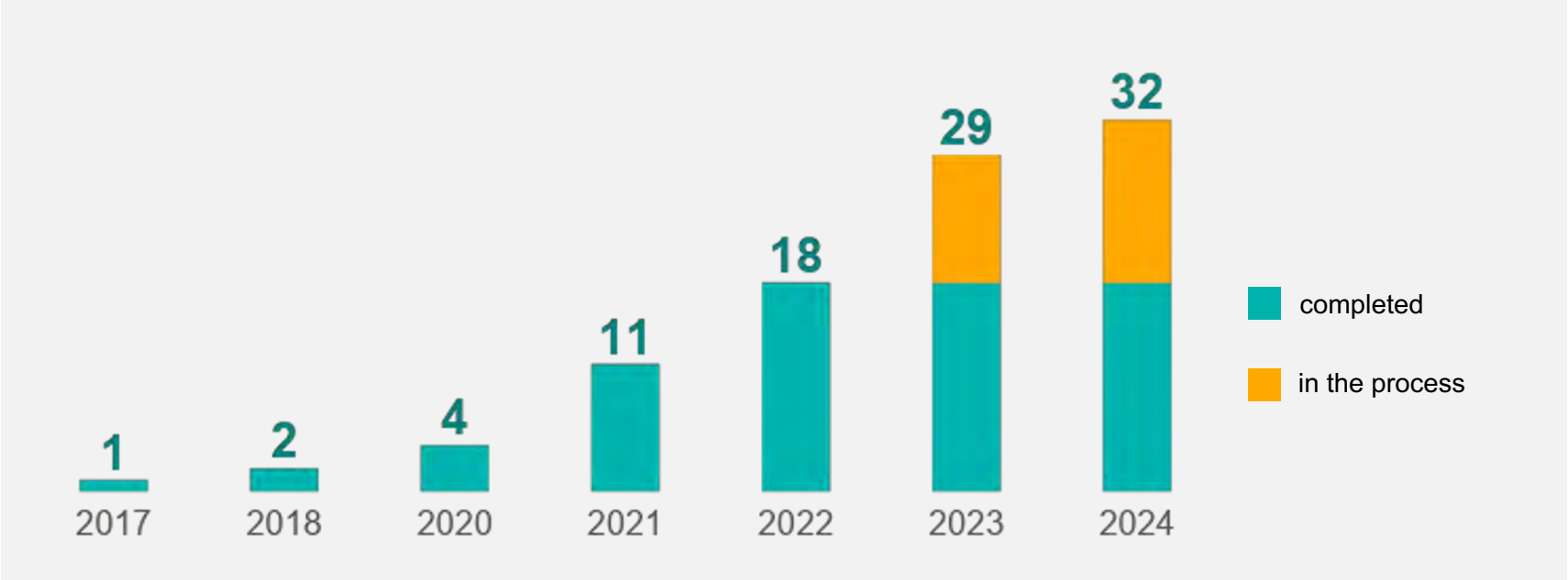
: Completed : In the process : Not yet started

Data update: Februari 2023

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

The number of API developed in Indonesia has significantly increased since 2017

Apart from the top 10 APIs consumed list, there are 22 other APIs that have been and are in the process of being developed



18 APIs have completed the development: Omeprazole, Pharmaceutical Salts, Simvastatin, Attapulgite, Efavirenz, Clopidogrel, Atorvastatin, Lamivudin, Remdesivir, Zidovudine, Tenofovir, Povidone Iodine, Candesartan, Amlodipine, Gefitinib, Imatinib, Rosuvastatin, Azithromycin.

14 APIs in development process until 2024:

- 2023: Bisoprolol, Sitagliptin, Entecavir, Dapagliflozin, Sugammadex, Ticagrelor, Tamsulosin, Telmisartan, Etoricoxib, Apixaban, Lansoprazole
- 2024: Ceftriaxone, Cefixime, Paracetamol end to end

Data update: Februari 2023

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Productive development of vaccine in Indonesia

The number of industries has increased significantly accompanied by mastery of vaccine technology which will continue to grow

PT Bio Farma

1 vaccine industry

PT Biotis

PT Etana

2 vaccine industries

PT Daewoong Infion

PT Jakarta Biopharmaceutical Industry (JBIO)

PT Kalbio Global Medika

PT Combiphar Donga Indonesia

4 vaccine industries (in the process)

~2021 | 2022 | 2023

Inactivated virus
Recombinant protein
Live attenuated

m-RNA (nucleic acid based)

Viral vector based

Description: In the process of mastering technology

m-RNA Factory Inauguration, 7 October 2022

Launching of Indovac vaccine, 13 October 2022 and Inavac vaccine

Local production of vaccine is encouraged to fulfill the need of Primary Care Transformation: expansion of vaccine types in routine immunization program

Routine immunization (program) vaccines:
from 11 to 14 types of vaccine

- BCG
- DPT-Hib
- Hep B
- Polio
- TT/DT/td

- HPV
- Rotavirus

- MMR/MR
- PCV
- JE

Description: Domestic products | Process of technology transfer | Import

Signing the MoU Technology Transfer for HPV vaccines

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

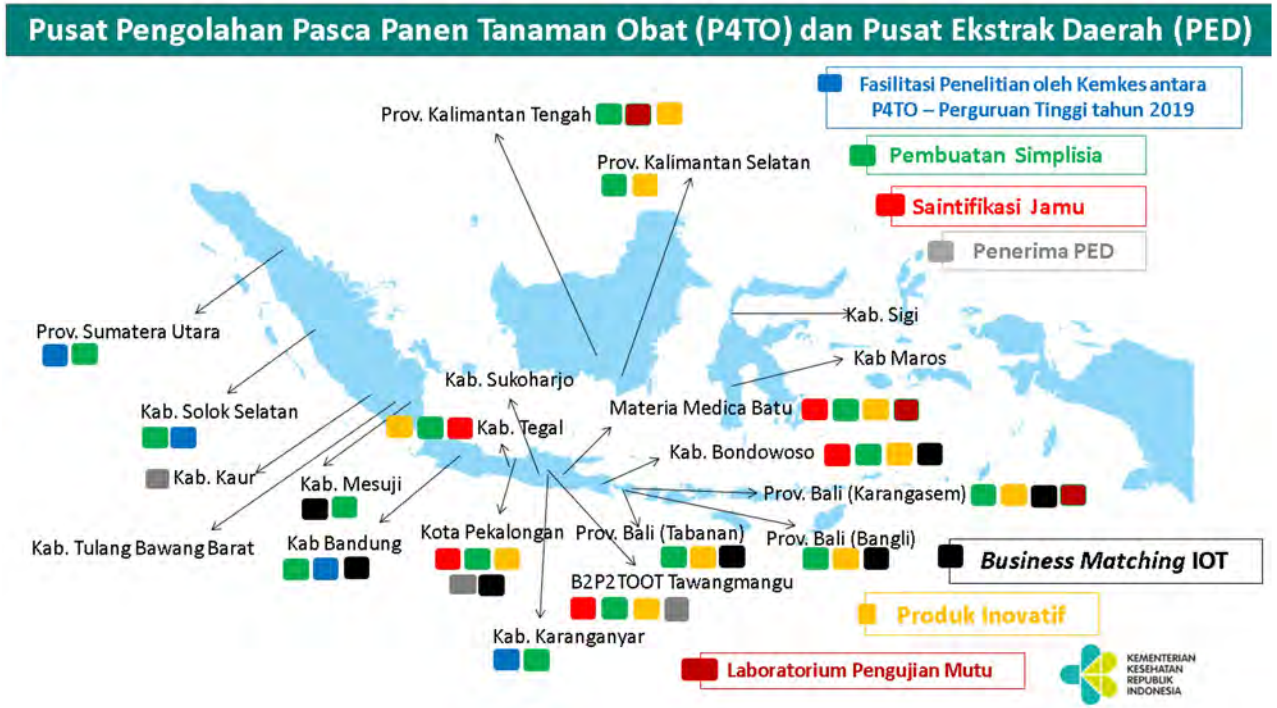
The development of phytopharmaca is also one of the strategies to achieve resilience

The Phytopharmaca Formulary has been published as a reference for the use of phytopharmaca in health care facilities

Phytopharmaca Formulary

Contains 5 therapeutic areas including antihypertensive, antidiabetic, gastric disorders, immunomodulator, hypoalbuminemia

To encourage the development of natural products, PED and P4TO facilitation is carried out



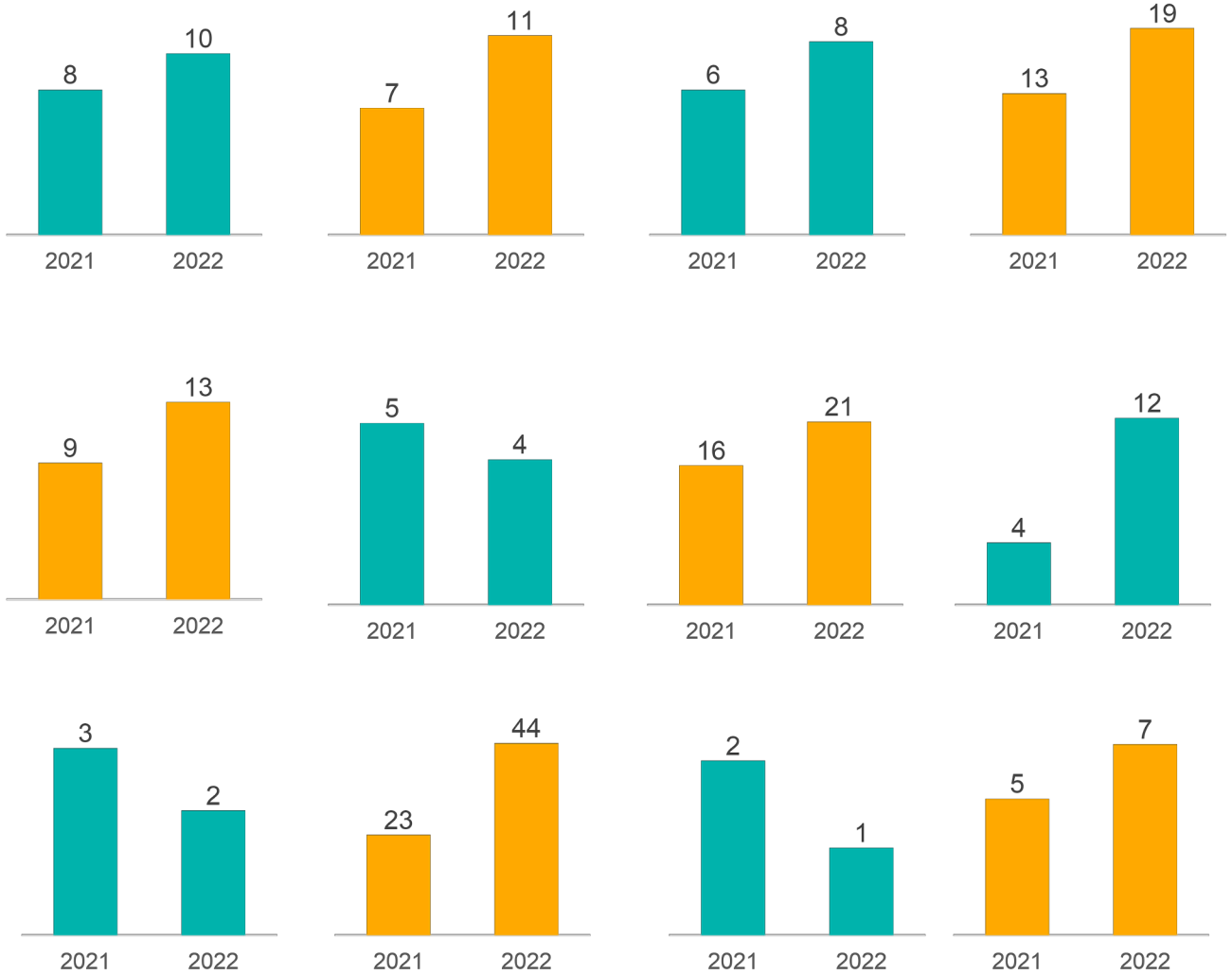
Until 2022 it has been given to 20 (twenty) P4TO recipient regions and a total of 3 (three) PED recipient regions

The showcase for Phytopharmaca and Standardized Herbal Medicines has been opened in the sectoral e-catalogue of the Ministry of Health and Provincial/District/City Health Offices can propose plans for Phytopharmaca needs in 2024 through e-Monev Medicines

Domestic production of diagnostic medical devices is in line with the needs of the Public Health Laboratories (Labkesmas) and priority diseases

Signing of MoU with Foundation for Innovative New Diagnostics
30 January 2023 (Documentation of Ministry of Health)

Data on the number of distribution permits for 12 Rapid Test Diagnostics (RDTs) needed for 'Labkesmas' and TB detection
Source: http://infoalkes.kemkes.go.id/, 31 December 2022



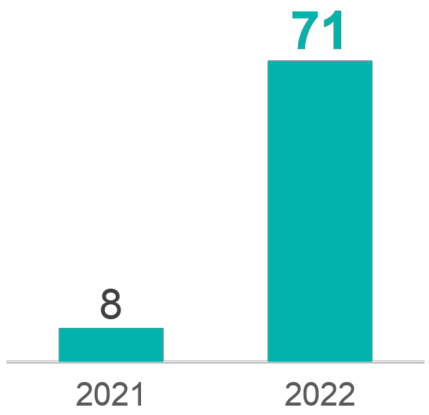
KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

The use of domestic* medical devices for the priority program has increased rapidly

Ultrasonography (USG)

Priority Programs:

- Decreased MMR and stunting by increasing the frequency of ANC to 6 times
- Breast cancer screening with ultrasound
- Screening for Congenital Heart Disease in Puskesmas with Neonatal Pulse Oximetry

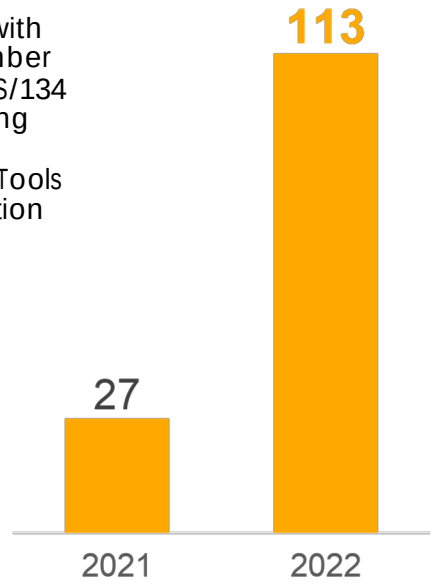


Anthropometry

Priority Programs:

Prevention of stunting through early detection of child development

In accordance with Kepmenkes Number HK.01.07/MENKES/1340/2022 concerning Standards for Anthropometric Tools and Early Detection of Child Development



*calculated based on market authorizations
Source: http://infoalkes.kemkes.go.id/, 31 Desember 2022

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

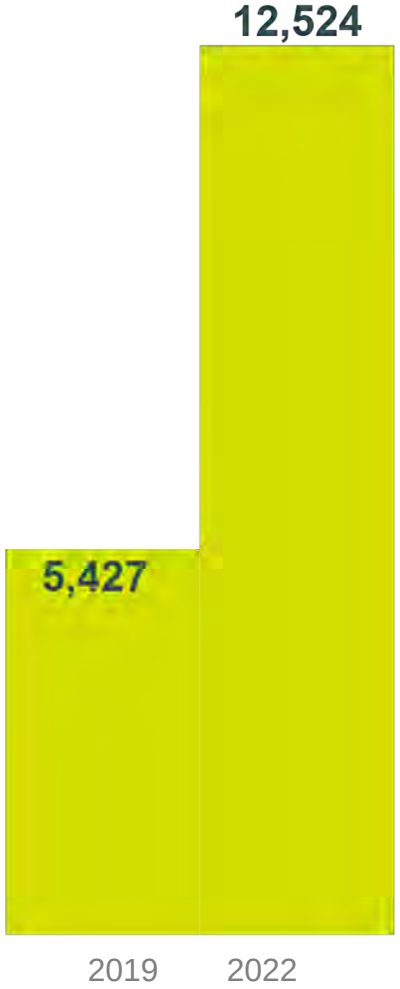
The support from the Government has had a significant impact on the increase of the production and use of domestic medical devices in the country

1 Presidential Instruction Number 2 of 2022

concerning the Acceleration of Increasing the Use of Domestic Products and Products of Micro, Small Enterprises, and Cooperatives in the Context of Succeeding in the Success of the Proud Made in Indonesia National Movement in the Implementation of Government Procurement of Goods/Services

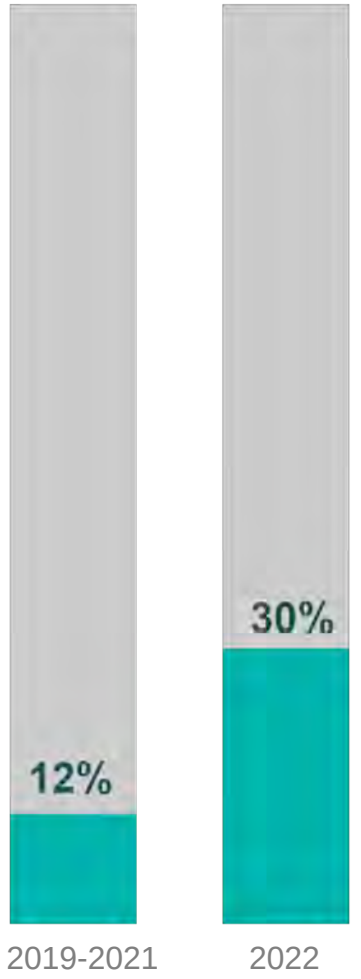
2 Decree of the Minister of Health Number HK.01.07/Menkes/1258/2022

concerning Substitution of Imported Medical Devices with Domestic Medical Devices in the Health Sectoral Electronic Catalogue



The number of domestic medical device permits/market authorizations (AKD) increased in 2022

2,3x times compared to 2019-2021



Domestic medical device transactions in the e-catalogue increased in 2022

2,5x compared to 2019-2021

Sourcer: Kemenkes, LKPP

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Health Reserve Workforce for preparedness for a health crisis

Reserve personnel come from active community participation, either directly or through institutions/organizations that can be activated at any time when a crisis occurs

Before the Health Crisis

Identification and registration of reserve personnel

Registration is carried out for people who are willing to become reserve staff according to identified needs.
(example: Scouts, Youth Red Cross, and students).

Backup power development

Guidance is provided to be able to equip reservists with the necessary skills when a health crisis occurs (e.g. providing basic life support, conducting triage).

During Health Crisis

Coordination and mobilization of reserve personnel when a health crisis occurs

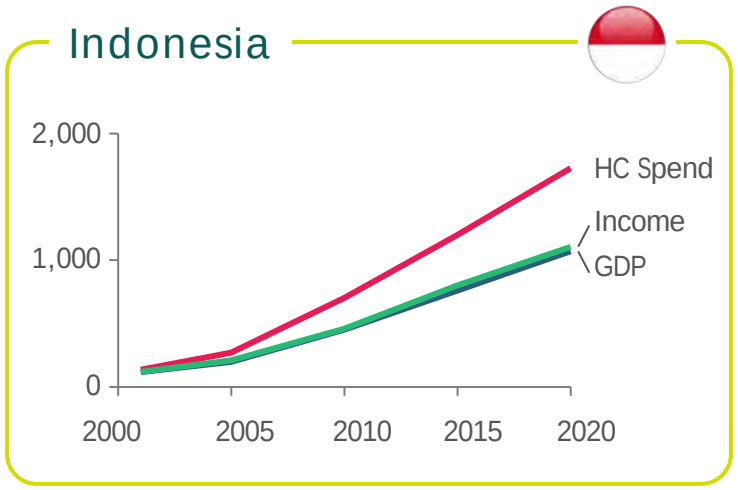
Coordination and mobilization at the regencies/municipalities, provincial and national scales must be carried out quickly when a health crisis occurs.

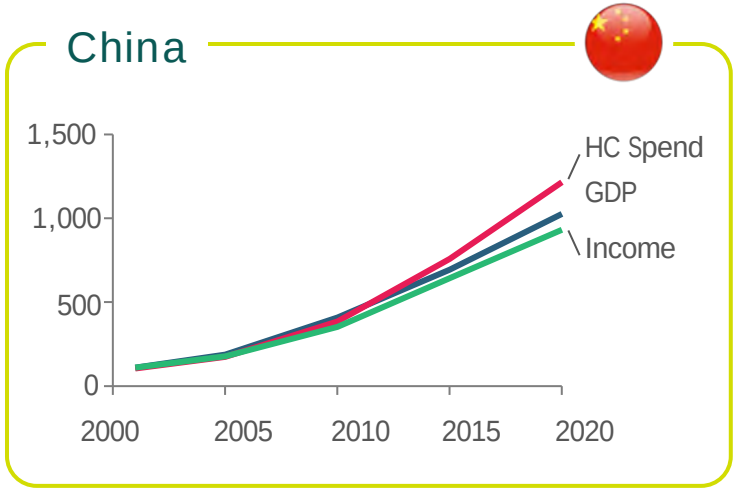
4

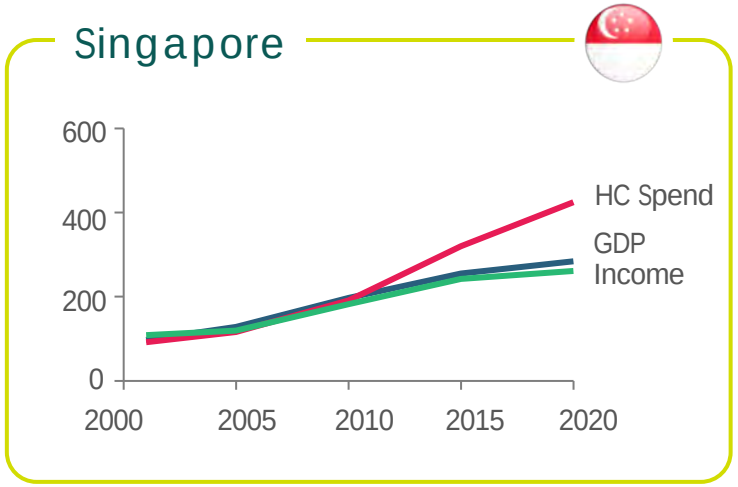
Health financing that has not been effective and efficient

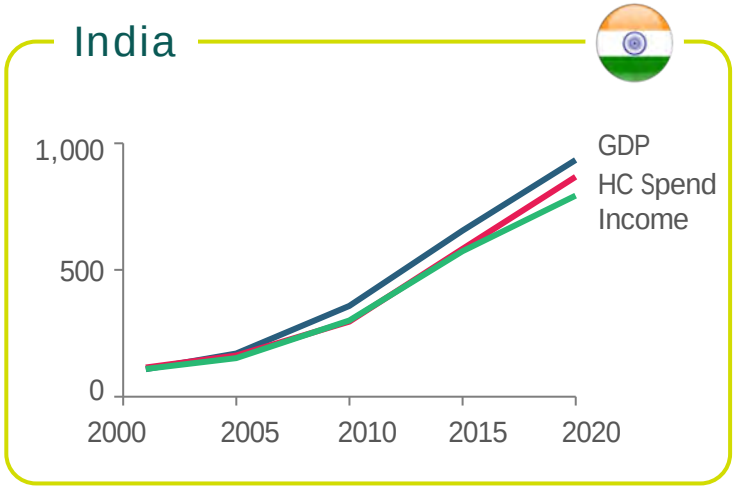
Health costs are higher than global economic growth

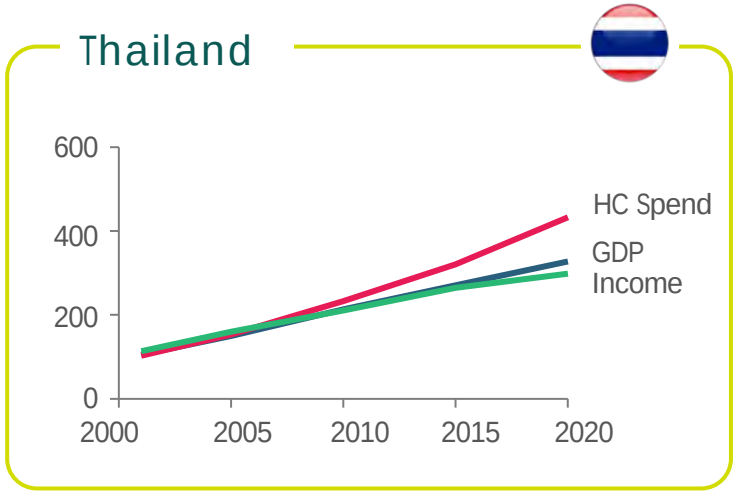
Indonesia's health spending has outpaced GDP growth

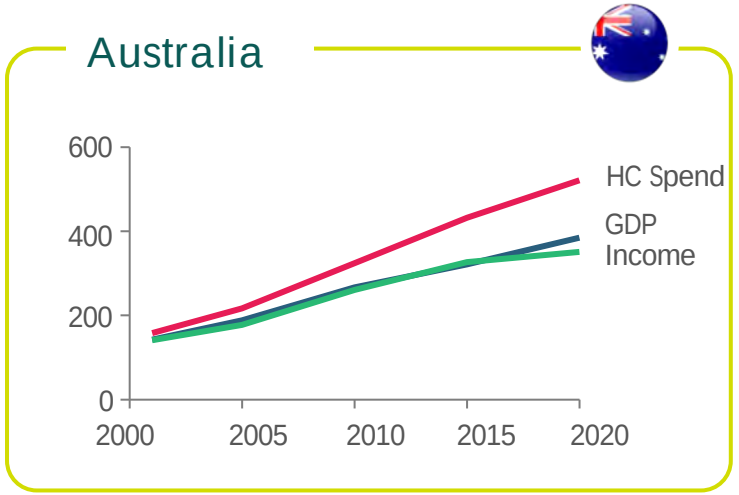










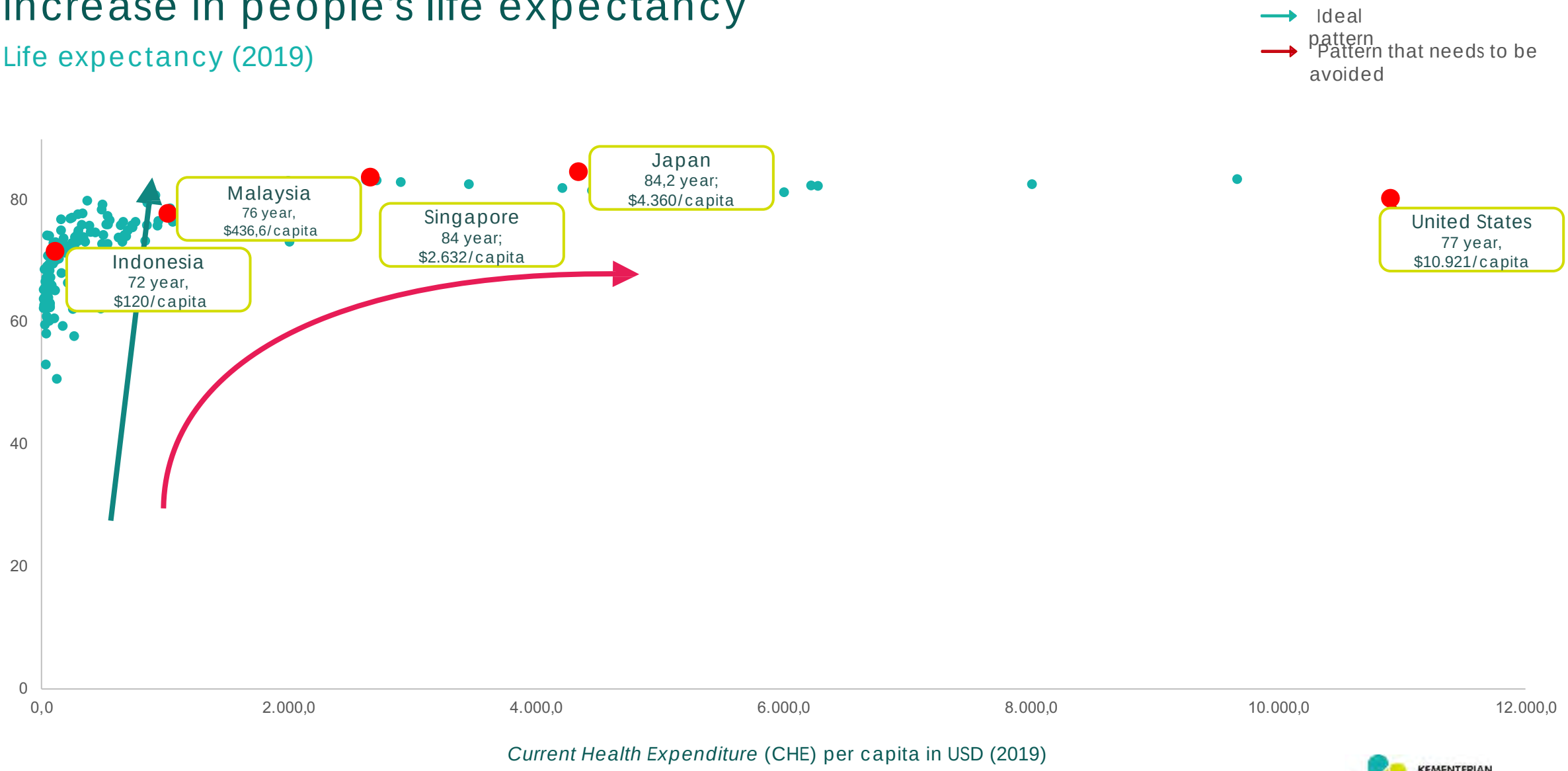


Notes: Index 100 at 1995, based on local currencies; Income = Personal Disposable Income

Source: WHO; EIU (Feb 2021); BCG analysis

Additional spending on health does not always guarantee an increase in people's life expectancy

Life expectancy (2019)



Sumber: WHO, Bank Dunia

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Transformation of health financing to ensure financing sufficient, fair, effective and efficient

1 *National Health Account* (NHA)

- Accelerating the production of NHA from T-2 to T-1 so that it can be used for sharpening health financing planning and interventions

2 *Health Technology Assessment* (HTA)

- Increase HTA implementation to ensure evidence-based quality and cost control for more effective and efficient health services

3 *Annual Review Tariff*

- Annual review of hospital and health center service rates in the National Health Insurance (JKN) to maintain the quality of service to JKN participants

4 Consolidation of Health Payment

- Consolidation of central and regional government health financing, JKN and the private sector for a stronger and more effective synergy of health financing sources in achieving health development goals

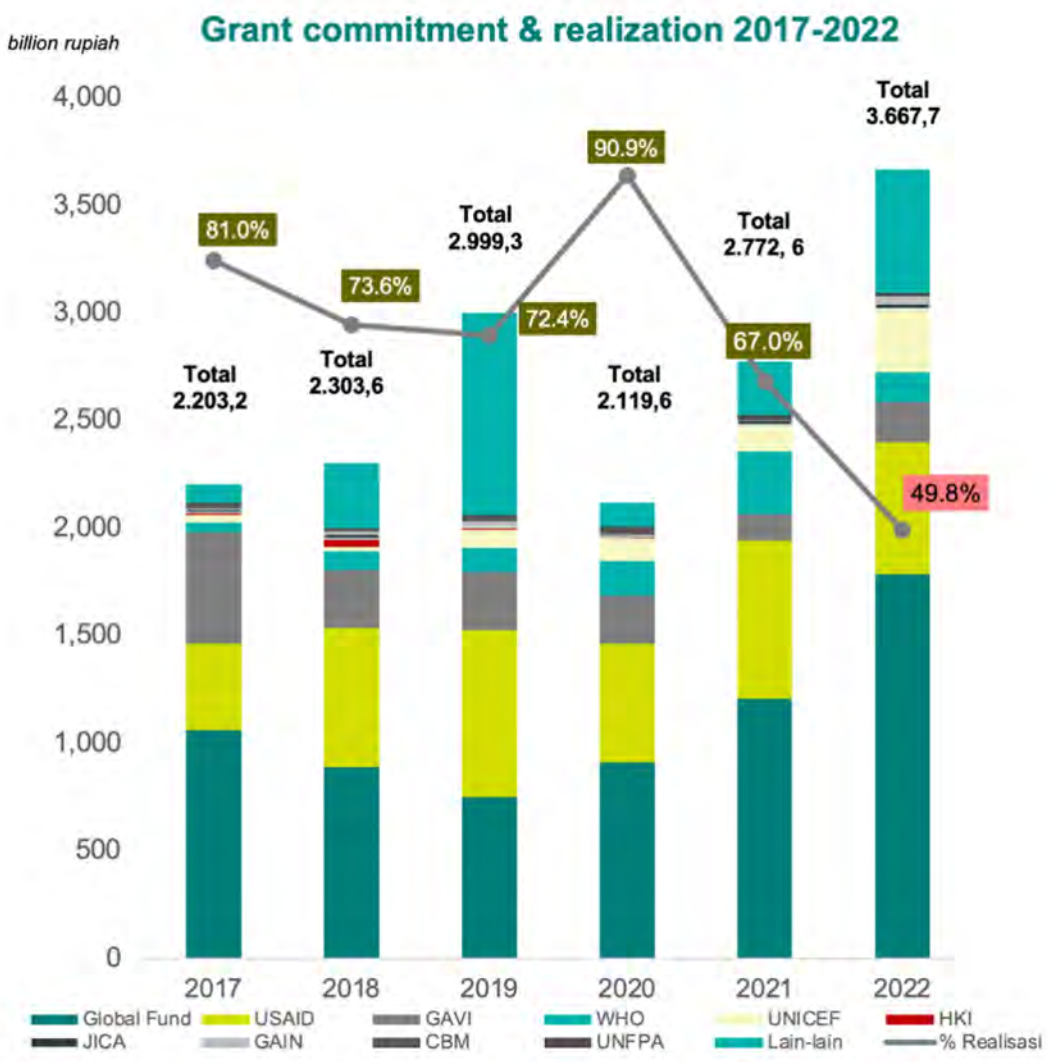
Development of Foreign Loans: Project Loan

The 2019-2024 project loan from the World Bank and IsDB is worth IDR 5.5 trillion

WB: Project I-sphere

Year	Donor	Description
2019	WB	Construction of the Continued Building of the UPT Vertical Ambon Hospital
2020	WB	Construction of RS Kupang, Procurement of Facilities, Infrastructure, and Alkes of the Ambon Vertical UPT Hospital
2021	WB	Continued Development of RS Kupang and Development of RS Papua
	IsDB	*Detailed Engineering Design, Management Supervision Consultant, Procurement of Alkes*
2022	WB	Continued construction of the RS Kupang, Construction of the RS Papual, Construction of the Dr. J. Leimena Hospital Bunker
	IsDB	IC Contract: Management, Procurement, Civil Engineering, HSS, Referral HS, Data Analyst, Senior Admin Construction services procurement process
2023	WB	Procurement of Lynac at RSUP Dr. J. Leimena, Procurement of advanced medical equipment and infrastructure at Kupang Hospital, construction of the Papua General Hospital
	IsDB	Construction of the KIA building in 6 hospitals
2024	WB	Continued construction of the UPT Vertical Papua Hospital, Procurement of Medical Devices and Fulfillment of Facilities and Infrastructure
	IsDB	Procurement of Facilities, Infrastructure, and MCH Medical Devices

Ministry of Health grant partner/donor support



"The unutilized grant commitment must be optimized in its utilization in 2023"

- Grant Allocations for the Global Fund 2021-2023 : USD329,4 Million
- Realisation 2022 : USD 89,2 Million
- Committed 2022 : USD 65 Million
- Remain : USD175 Million

Billion rupiah

No	Mitra/ Donor	2022	2023	2024	Desc.
1	Global Fund	1.785,1	1.118,9	N/A	Commitment completed 2023
2	USAID	613,7	87,9	51,6	Commitment 2021-2025: IDR 3,750 billion
3	UNICEF	294,6	288,0	3,2	Initial commitment 2021-2025: IDR 474 billion, annual work plan
4	GAVI	188,5	194,9	N/A	Annual commitment
5	WHO	135,9	68,5	N/A	2 year commitment ends in 2023, will be updated in 2023
6	WB-DFAT	104	94	N/A	*Trust fund-loan response until 2023*
7	GAIN	34,4	11,3	15	Commitment 2022-2025
8	JICA	25,3	16	N/A	Commitment ends in 2023, amendment until 2024
9	UNFPA	13,0	5,5	5,5	Commitment 2022-2025: IDR 139.4 billion
10	ADB	14,7	10,8	N/A	Commitment ends in 2023
11	Lain-Lain	458,5	88,7	23,5	among others: UNDP, DFAT-AIHSP, Government of Japan, Fleming Fund, Government of the United Arab Emirates (PEA), USTDA, Nutrition International, Thinkwell, CHAI, FHF, The Union, MSF, CDC
	Total	3.667,7	1.984,5	98,8	

- there will be 23 grant partners/donors in 2023
- The commitment values for 2023 and 2024 are the values identified by the Work Unit
- The commitment value for that year has not been identified by the Work Unit

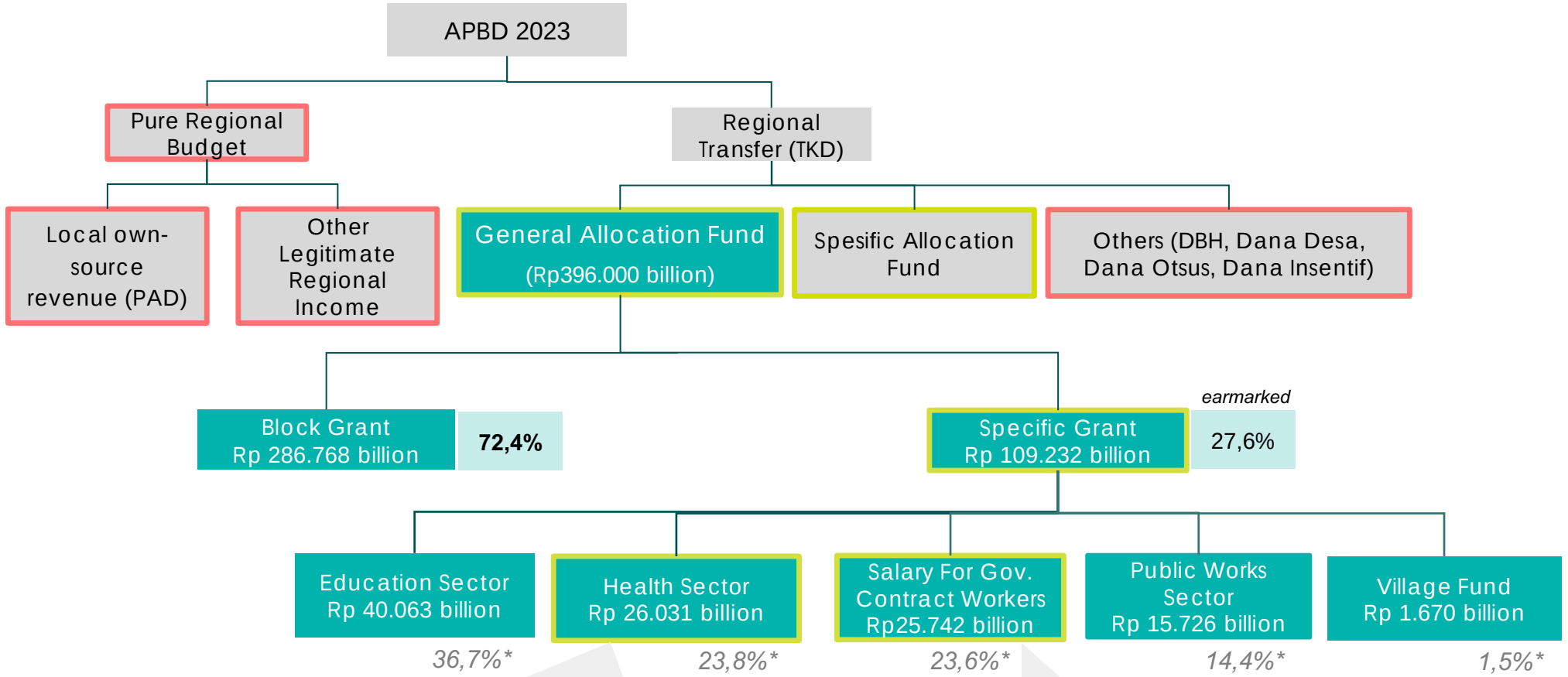
Project loan: 3 active status and 3 is in the process

	Lenders – Program Name		Withdrawal Plan until 2028 (US$ Million)						Periode	Description		Progres
			2023	2024	2025	2026	2027	Total				
Program Loan												
1.	WB	*Indonesia Supporting Primary Health Care Reform* (I-SPHERE)	29,9	54,0	-	-	-	83,9	Efektif: 2019 Closing: 2024	Pilar 2	Strengthening referral services through the construction of a vertical UPT hospital in the eastern region	Active
2.	IsDB	*National Referral Hospitals & Vertical Technical Units* (6in1 KIA)	77,8	107,2	8,2	-	-	193,2	Efektif: 2021 Closing: 2025	Pilar 2	Strengthening MCH Services in • RS Kanker Dharmais, • RSUP Hasan Sadikin, • RSUP Sardjito • RSUP Persahabatan, • RSUP Ngoerah, • RSUP Wahidin Husodo	Active
3	IsDB	*National Referral Hospital on Oncology Center*	1,4	44,0	106,9	38,1	13,0	203,4	Efektif: 2023 Closing: 2027	Pilar 2	Oncology Center in: • RSUP Adam Malik • RSUP Moh. Hoesin • RSUP Kandou • RSUP Soeradji Tirtonegoro • RS Surabaya • RS Makassar	Active
4	WB, AIIB, IsDB	*Strengthening Indonesia's Health care Referral Network* (SIHREN)	-	1.009,0	240,0	268,0	464,0	1.981,0	Plan: *2024*-2027	Pilar 1	Provision of medical devices for the KJSU referral service network	Process Green Book
5	WB, AIIB, AIIB	*Strengthening Of Primary Healthcare in Indonesia* (SOPHI)	-	632,0	476,0	318,0	161,0	1.587,0	Plan: *2024*-2027	Pilar 2	Provision of health center and posyandu health equipment	Process Green Book
6	WB, AIIB, ADB	*Indonesian - Public Laboratory System Strengthening* (InPULS)	-	160,0	429,0	-	-	589,0	Plan: *2024*-2025	Pilar 1 Pilar 3	Provision of Tier 2-5 Labkesmas medical devices	Process Green Book
		Total Loan	109,1	2.006,2	1.260,1	624,1	638,0	4.637,5				

- ❑ The total value of the I-SPHERE project is US$ 179.4 million and US$ 95.5 million has been allocated (until 2022)
- ❑ The total value of the 6in1 KIA project is US$ 125.7 million and US$ 47.9 million has been allocated until (until 2022)

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

The Specific DAU Grant for the Health Sector in 2023 is one of the sources of Regional Government Health funding with a total value of IDR 26.0 trillion



It has been aligned for the health sector

Potentially can be harmonized its use use for the health sector

* Proportion from DAU specific grant

Source: Ministry of Finance, December 2022

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

5

Healthcare workers are still lacking and uneven

Physician : Population ratio in Indonesia is 0.47 per 1,000 population, still far below the world average (1.76 per 1,000 population)

Physicians (per 1,000 people)
per 1,000 people

Country or region	1960	2019	Absolute Change	Relative Change
Cuba	0.95	8.42	+7.47	+790%
Italy	4.67	8.01	+3.34	+72%
Monaco	2.40	7.51	+5.11	+213%
Georgia	3.20	7.08	+3.88	+121%
China	1.07	1.98	+0.91	+85%
World	1.29	1.75	+0.45	+35%
Philippines	0.15	0.60	+0.45	+311%
Namibia	0.23	0.59	+0.36	+156%
Tonga	0.38	0.54	+0.17	+44%
Yemen	0.02	0.53	+0.50	+2,183%
Indonesia	0.02	0.47	+0.44	+2,115%
Bhutan	0.13	0.46	+0.34	+268%
Jamaica	0.39	0.45	+0.07	+18%

World's ranking

147 of 205 countries

ASEAN ranking

8 of 10 countries

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Increasing the student quota per lecturer (1:3 to 1:5) and increasing the number of lecturers (2x) can accelerate the fulfillment of specialist needs by up to 3-4x

xx Top 3 shortage of specialists

Program Speciality	Lack of human resources for 20221 national needs	Quota in FK		Compliance term, years	
		As of August 2022	New (1:5, 2x lecturer)	Now	New (1:5, 2x lecturer)
Cardiovascular	1.282	180	601	11	5
Neurology	617	149	498	7	4
Obstetrics Gynecology	3.941[2]	234	782	36	8
Pediatrics	3.662	259	865	26	8
Internal medicine	2.581	280	935	23	6
Surgery	2.378	245	818	17	6
Anesthesia and Intensive Care	2.476	199	665	24	7
Radiology	838	117	391	13	5
Clinical Pathology	977	109	364	18	6

1 based on the target ratio of Bappenas and Permenkes 56/2014; for all basic, middle, primary and plenary stratification hospitals
2 deficiency of 0.13/1,000 Women of Reproductive Age (Directorate of Planning)

Notes:

1. Taking into account the growth rate of Indonesia's population, it averages 1.3% per year or around 13% per 10 years *BPS 2016-2022
2. Taking into account graduate attrition of 1.5%, the number of graduates practicing and the number of graduates filling vacancies *Data on STR and SISDMK-Fasyankes
3. Fulfillment begins after the initial 3-4 years of implementation of the *long specialist education scheme

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Especially in cardiac services, it is necessary to focus on fulfilling interventional specialists, Cardiologist/Cardiovascular Consultant-Internist, Cardiothoracic-Consultant Anaesthetist and Cardiology Consultant-Pediatrician/Pediatric Cardiologist.

Mapping the needs and supply of human resources for adult and pediatric cardiac services

Types of Human Resources	Standard			Needs			Deficiency calculation				Quota/ year	Fulfillment estimation
	M	U	P	M (267)	U (34)	P (18)	M	U	P	Total		
CARDIAC[2]												
Cardiologist	1	3	8	267	102	120	102	20	13	135	180	1 year
Cardiovascular Consultant-Internist											10	
Cardiothoracic Surgeon		2	4		68	60		49	29	78	20	4 years
Pediatric – Congenital Consultant-Cardiothoracic Surgeon			1			16			8	8	4	2 years
Interventional Cardiologist	1	3	6	267	102	90	242	54	34	330	60	5 years
Interventional Cardiovascular Consultant-Internist											2	
Pediatric and Congenital Heart Diseases Consultant Cardiologist		1	2		34	32		27	6	33	10	**3** years
Cardiology Consultant-Pediatrician												
Cardiothoracic-Consultant Anaesthetist		1	6		34	90		26	60	86	24	4 years
Intensive Care Consultant-Anaesthetist		2	6		68	90		40	38	78	54	2 years
Pnet certified Pediatrician	1			514			482			482	480	**1 year**
Echo Fellow Pediatrician		1	1		34	16		34	16	50	16	3 years
Interventional Echo Fellow Pediatrician		1	1		34	16		34	16	50	16	3 years

Not applicable No fellowship yet xx Shortage xx Fulfillment >2 years

Based on the needs of Madya, Utama, and Paripurna Hospitals stage 1 : The number of cardiac Paripurna hospitals = 15 hospitals; 3 Total stroke Paripurna Hospital = 16 hospitals

Conclusion and follow up

The four specialists with the biggest deficiencies are:

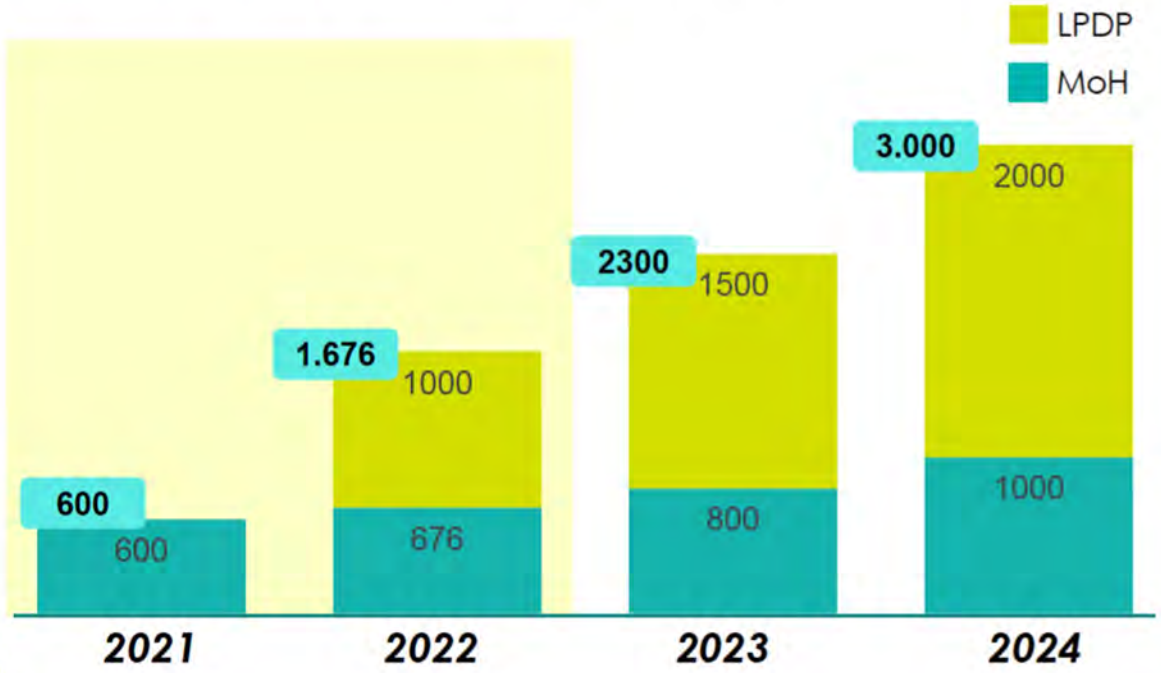
- Interventional Cardiologist/Cardiovascular Consultant-Internist
- Cardiothoracic Surgeon
- Cardiothoracic-Consultant Anaesthetist
- Cardiology Consultant-Pediatrician / Congenital Heart Disease and Pediatric Cardiologist

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

Ministry of Health improves the quality of health professionals through Scholarship and Training

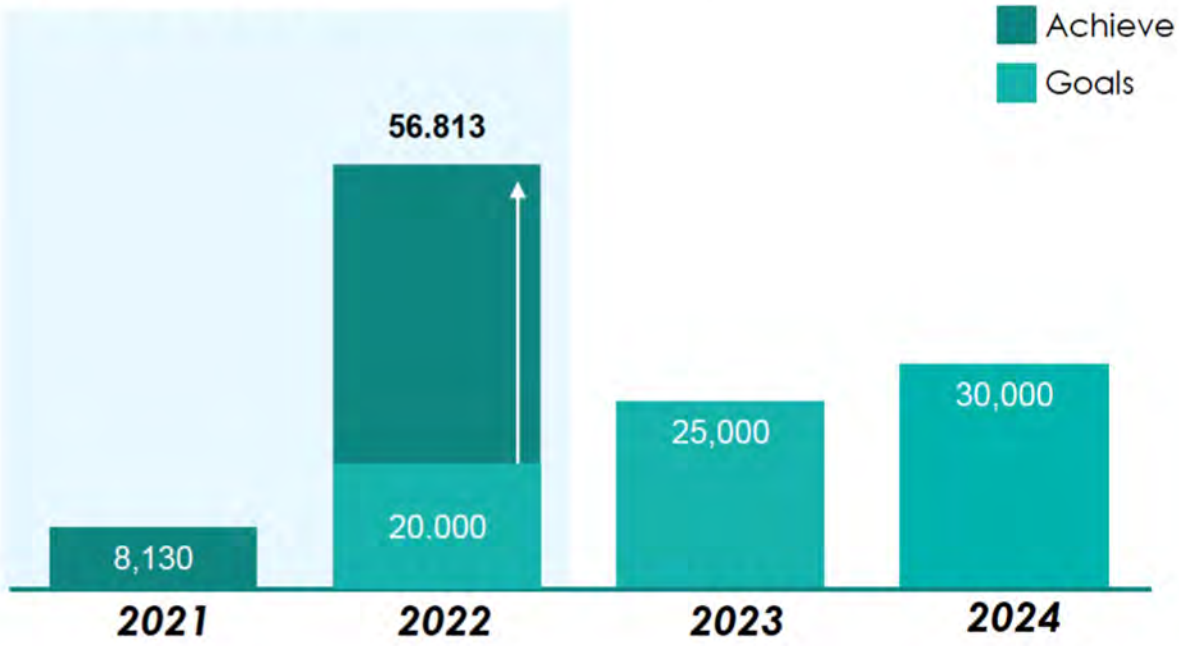
Scholarship *(domestic and overseas)*

Specialists, Sub-Specialist, and Fellowship



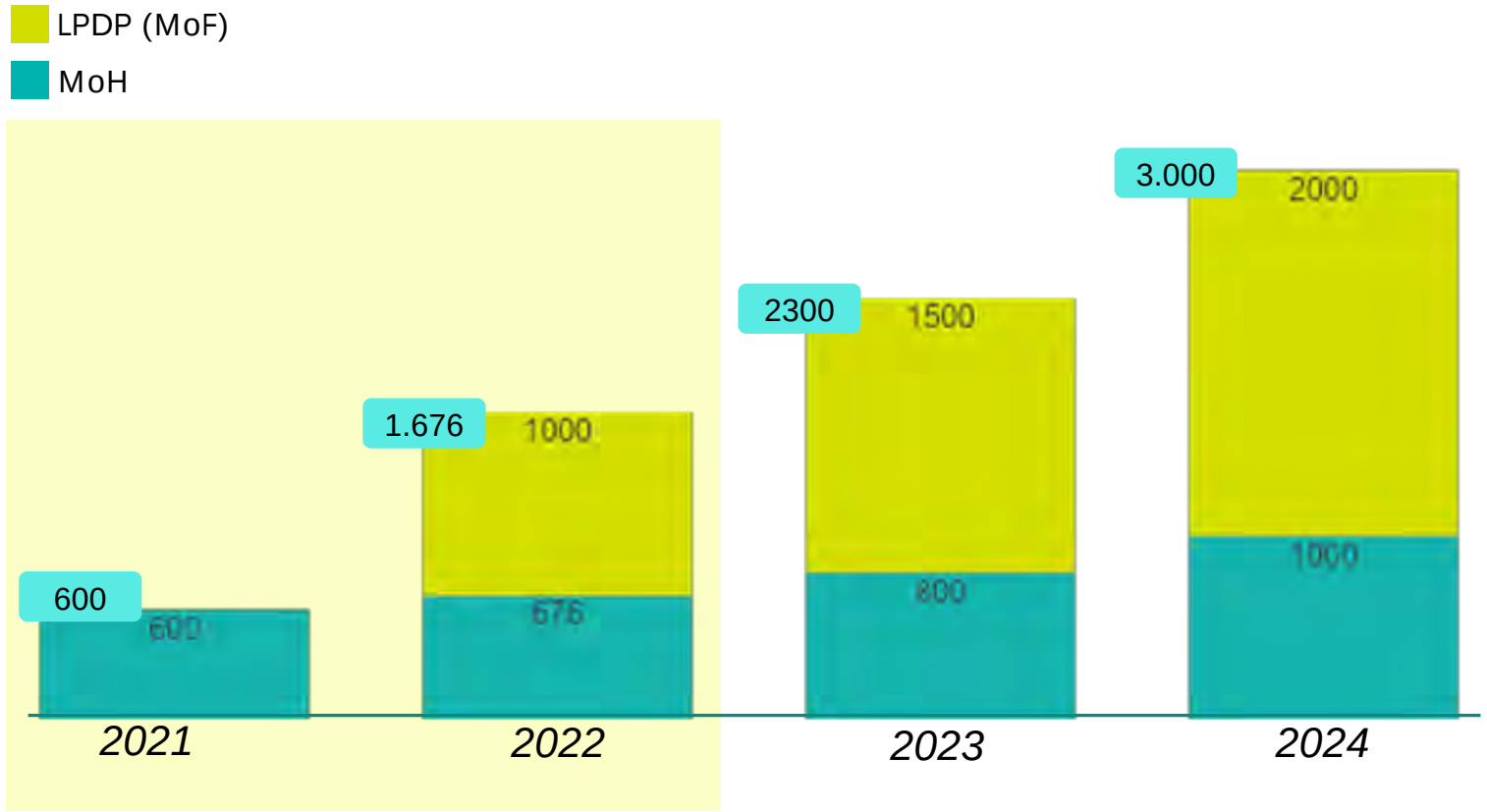
Training

Improving the competence of health professional in treating
9 Priority Diseases



- Increasing the number of health scholarships > joint collaboration between MoH and LPDP (MoF)
- Applies not only to medical workers but also to other health professionals to access excellent education

The Ministry of Health has prepared ~2,500 Education Scholarships for health workers



Agreement
LPDP x Ministry of Health

- Implementation of joint recruitment for specialist doctor scholarships - subspecialists
- Facilitating health worker fellowships (domestic and overseas) according to the priority service needs of the Ministry of Health
- Utilization of post-education specialist medical graduates

Ease of Adaptation Process

Specialist Doctor for Indonesian Citizens Graduated Overseas

Criteria	Before (Perkonsil 41/2016)	Perkonsil 97/2021 Permenkes 14/2022
1 Organizer verification and assessment	3 institutions • KKI (file verification) • Collegium (Equivalence assessment and placement test) • University (adapted admission)	Centralized in the Joint Committee
2 Verification & assessment	• Variative • Waiting time at university > 2 years	Uniform, transparent and Monitored in the *website*
3 Registration System	Manual	*Web-based apps* (clear and transparent flow)
4 STR (Registration Certificate)	STR adaptation in educational institutions only	STR adaptation + 1 Copy of STR in year-2 (according to year-1 evaluation result)
5 Adaptation Placement	Educational institution	Hospitals
6 Incentive	None	Providing incentives from the Ministry of Health
7 Adaptation Cost	Pay to the University	Not paying

Other countries apply college-based specialty education
Meanwhile, Indonesia only applies university-based

Benchmark cross-country residencies

	Selection candidate	Resident salary	Curriculum	Title specialist	Registration/ Practice license
Indonesia *University-based*	*University*	None	Kolegium *(College)*	*University*	•Council (registration) •District health office (license)
Australia *College-based*	Hospitals	Hospitals	*College*	*College*	National database (AHPRA[1])
USA *College-based*	Centralized (NRMP1)	Hospitals	Accreditation agency (ACGME[1])	Medical board	State agencies
Malaysia *University-based*	Centralized (State University Central System)	None	Council (MMC[1])	*University*	Council (MMC[1])
College-based	Centralized (Ministry of Health)	MoH	Council (MMC[1])	*College* (*Royal Colleges*)	Council (MMC[1])
Japan *College-based*	Hospitals	Hospitals	Professional association	Professional association	MoH, Employment and Welfare
Netherlands *College-based*	Hospitals	MoH, Employment and Welfare	*College* (CGS[1])	*College* (CGS[1])	National database (RGS[1])
England *College-based*	Centralized (deanery)	Hospital (from NHS1)	Council (GMC[1])	Council (GMC[1])	Council (GMC[1])

1. Australian Health Practitioner Regulation Agency; NRMP: National Resident Matching Program; ACGME: Accreditation Council for Graduate Medical Education; MMC: Malaysia Medical Council; CGS: *College Geneeskundige Specialismen* (College of Medical Specialty); RGS: *Registratiecommissie Geneeskundig Specialisten* (Registration Committee for Medical Specialists); GMC: General Medical Council

Sources: news searches, expert interviews

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

The disparity of specialist doctors still occurs in all regions in Indonesia

Availability

51.949 Specialist Doctors

Target Ratio 0,28:1000[1]

59% of specialists located on Java Island

~30.000

Shortage of Doctor Sp

21

Organizers of specialist study programs, from 92 medical schools

~2.700

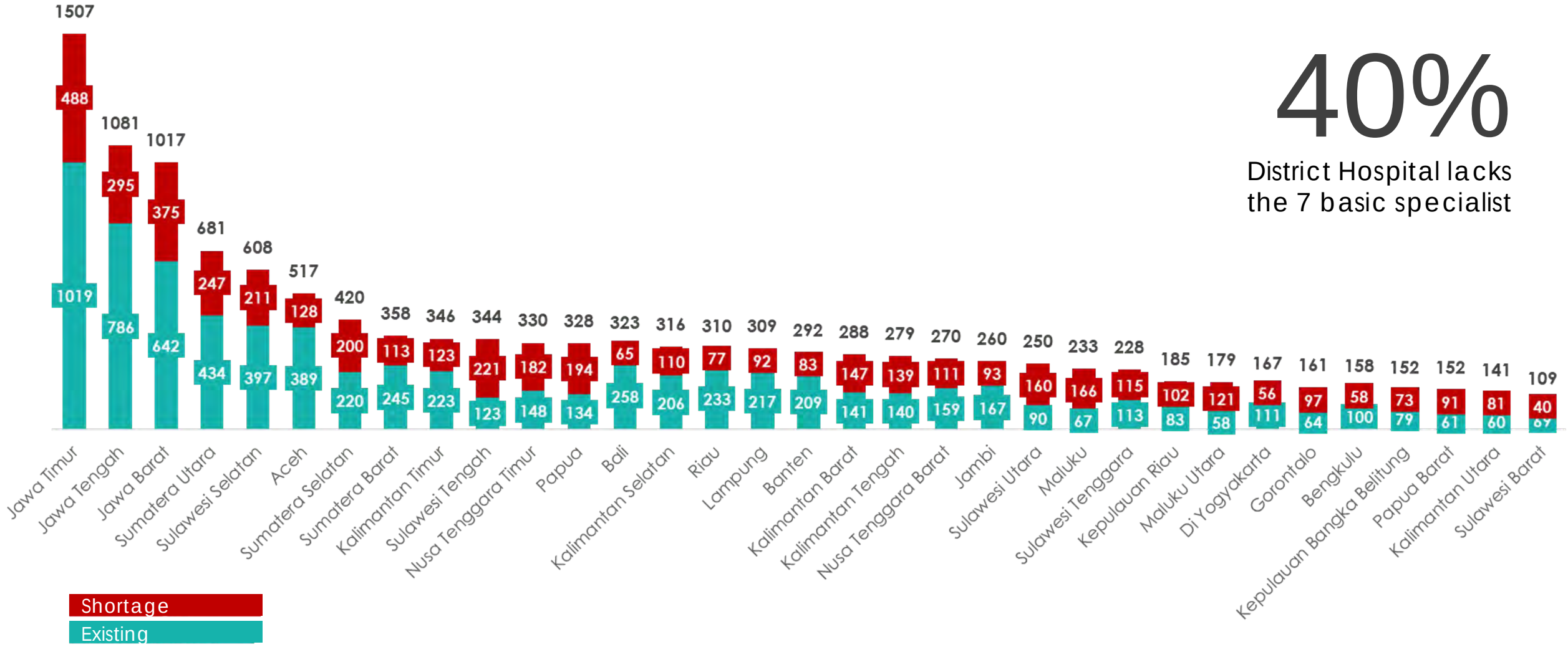
Specialist Graduate / year

>10 tahun

Specialist fulfillment time

[1] Needs projection 2025: Bappenas (National Development Planning Board)

The 7 Basic Types of Specialist Doctors[1] in hospitals are still incomplete and uneven



40%

District Hospital lacks the 7 basic specialist

[1] Sp.A, Sp.OG, Sp.B, Sp.PD, Sp.An, Sp.Rad, dan Sp.PK
[2] SISDMK, March 2023

~30 Provinces in Indonesia lack specialist doctors, impacting the distribution of health services

No	Specialties	Target Ratio/ 1000 population	Provinces based on target ratio	Provinces < target	3 Provinces lacking the most	3 Provinces beyond target ratio
1	Cardiovascular	0,01	**5** / 15 %	29	Papua, Maluku Utara, Sulbar	**Jakarta**, Yogyakarta, Bali
2	Pediatric	0,024	**3** / 9 %	31	Lampung, Sulbar, **NTT**	**Jakarta**, Bali, Yogyakarta
3	Internal medicine	0,03	**6** / 17 %	28	Maluku, NTB, **NTT**	**Jakarta**, Gorontalo, Yogyakarta
4	OBGYN	0,02	**11** / 32 %	23	**NTT**, NTB, Sulbar	**Jakarta,** Bali, Gorontalo
5	General surgery	0,02	**6** / 17 %	28	NTB, Sultra, **NTT**	**Jakarta,** Bali, Yogyakarta
6	Anesthesiology	0,02	**4** / 12 %	30	NTB, **NTT**, Sulbar	**Jakarta,** Gorontalo, Bali
7	Clinical pathology	0,01	**7** / 21 %	27	Sulbar, Kalbar, Sumsel	**Jakarta,** Gorontalo, Yogyakarta
8	Neurology	0,01	**7** / 21 %	27	Papua, Sulbar, **NTT**	Yogyakarta, **Jakarta**, Bali
9	Neurosurgery	0,0022	**5** / 15 %	29	Maluku Utara, Papua Barat, Sulbar	**Jakarta**, Yogyakarta, Gorontalo
10	Orthopedic & traumathology	0,01	**3** / 9 %	31	Papua, Sulbar, **NTT**	**Jakarta**, Bali, Yogyakarta
11	Cardiothoracic surgery	0,002	**1** / 3 %	33	Sulbar, Sulteng, Sultra	**Jakarta**
12	Pulmonology	0,0013	**1** / 3 %	33	**NTT**, Sulbar, Papua barat	**Jakarta**
13	Radiology	0,02	**1** / 3 %	33	Maluku utara, NTB, Maluku	**Jakarta**
14	**Anatomic Pathology**	**0,01**	**0 / 0 %**	**34**	**Papua, Sultra, Sulbar**	**-**

KEMENTERIAN KESEHATAN REPUBLIK INDONESIA

By placing Teaching Hospitals as the main organizer for Specialist Medical Education, we can expedite the availability of Specialist Doctors.

Recruitment based on the shortage of Specialist Doctors in districts/cities.

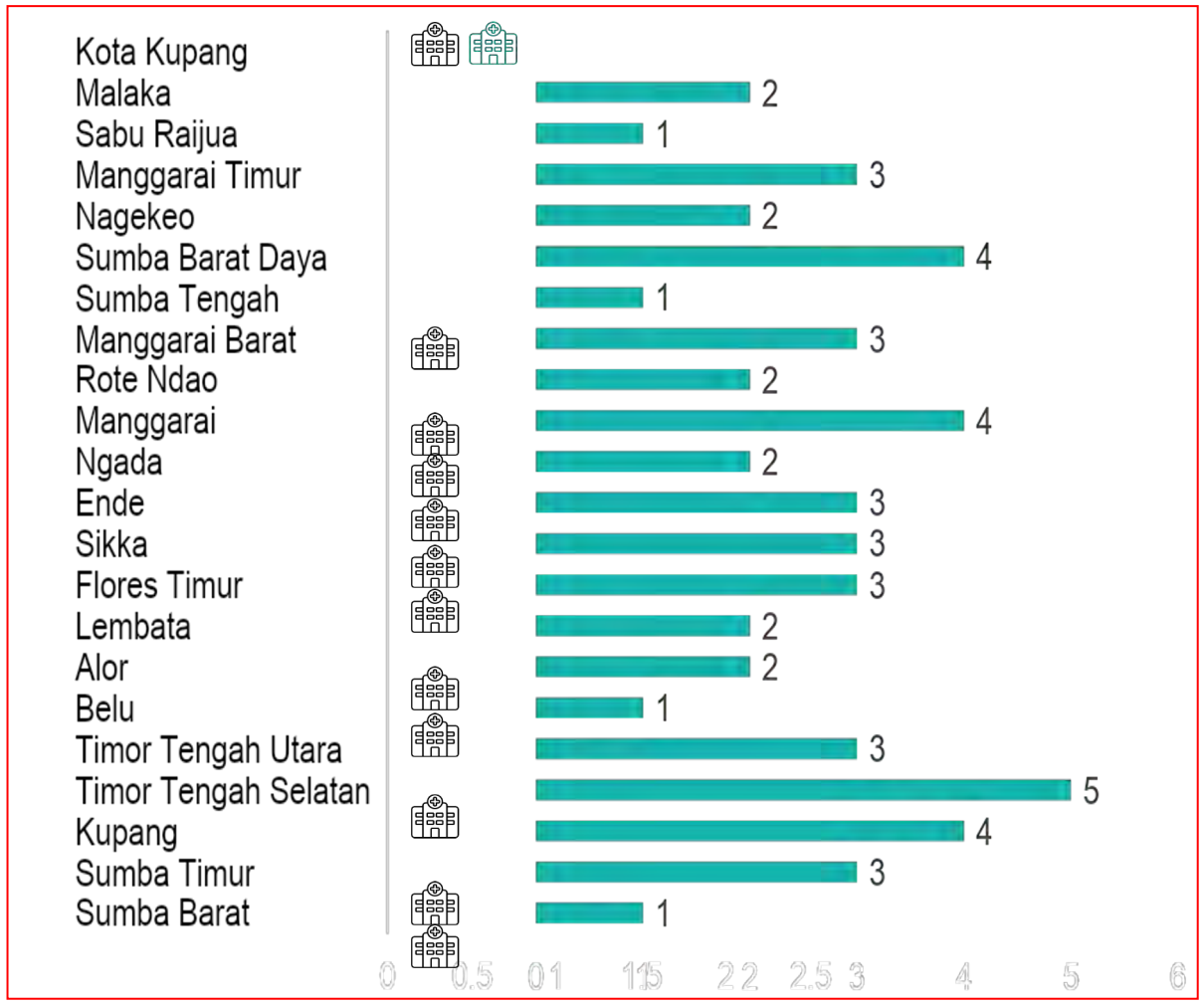
The Teaching Hospital is working in partnership with medical colleges and universities to coordinate the program's implementation.

Graduates fill the gaps in the area with a permanent recruitment mechanism by the local government

Implementation of the Program based on the shortage of Specialist Doctors in areas in need

Simulation: Mapping of Needs

Cardiovascular Specialist and Availability of Referral Hospital in East Nusa Tenggara (NTT)



Utama (Primary)

Madya (Medium)

Cardiovascular Referral Hospital is the potential to be the main organizer of the Specialist Education Program for Cardiac and Vascular Programs.

Heart service referral hospitals in 12 districts/cities are the initial stage of implementing hospital-based education in NTT.

Regional commitment to post-study utilization for graduates in the regions is urgently needed.

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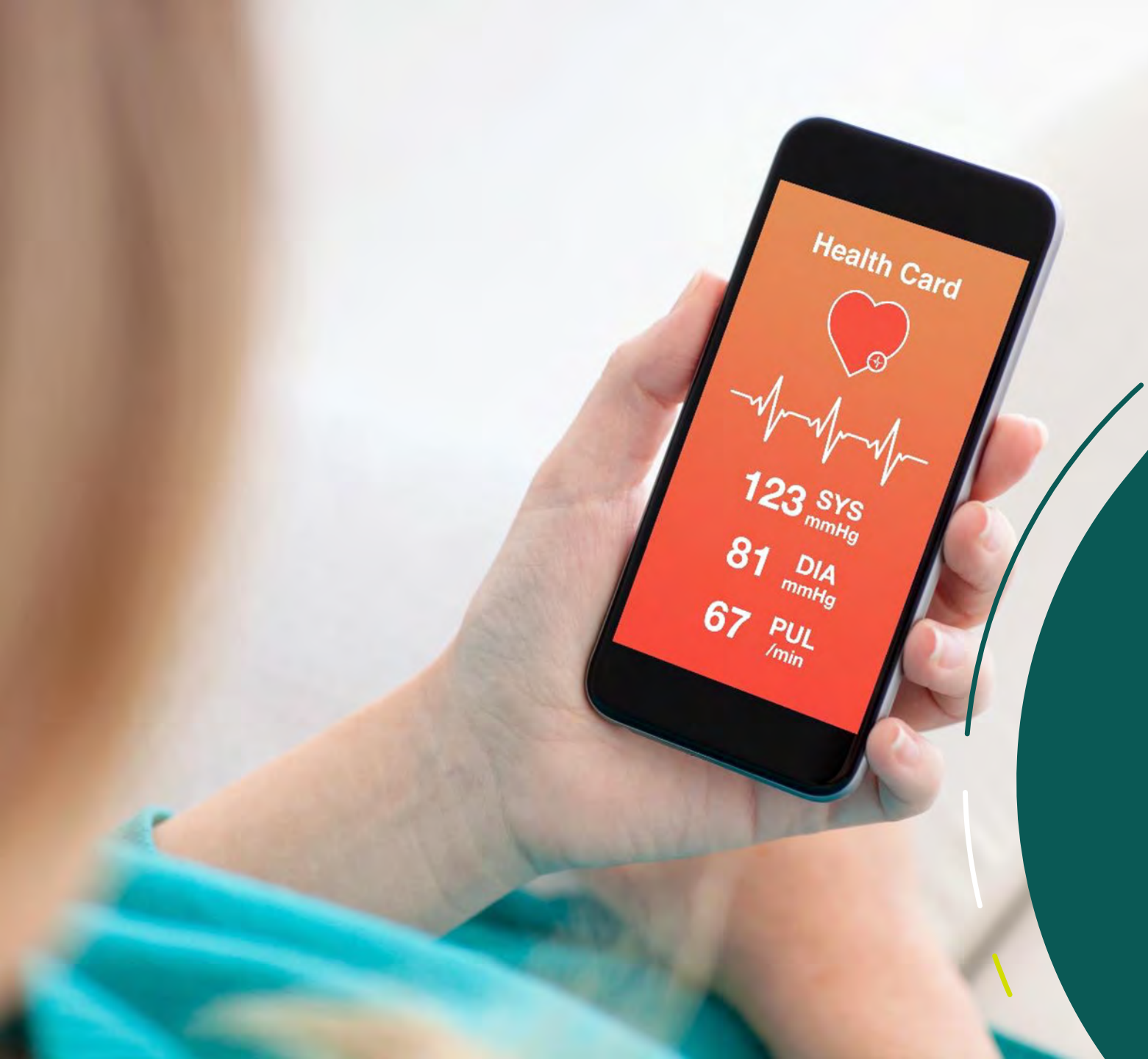
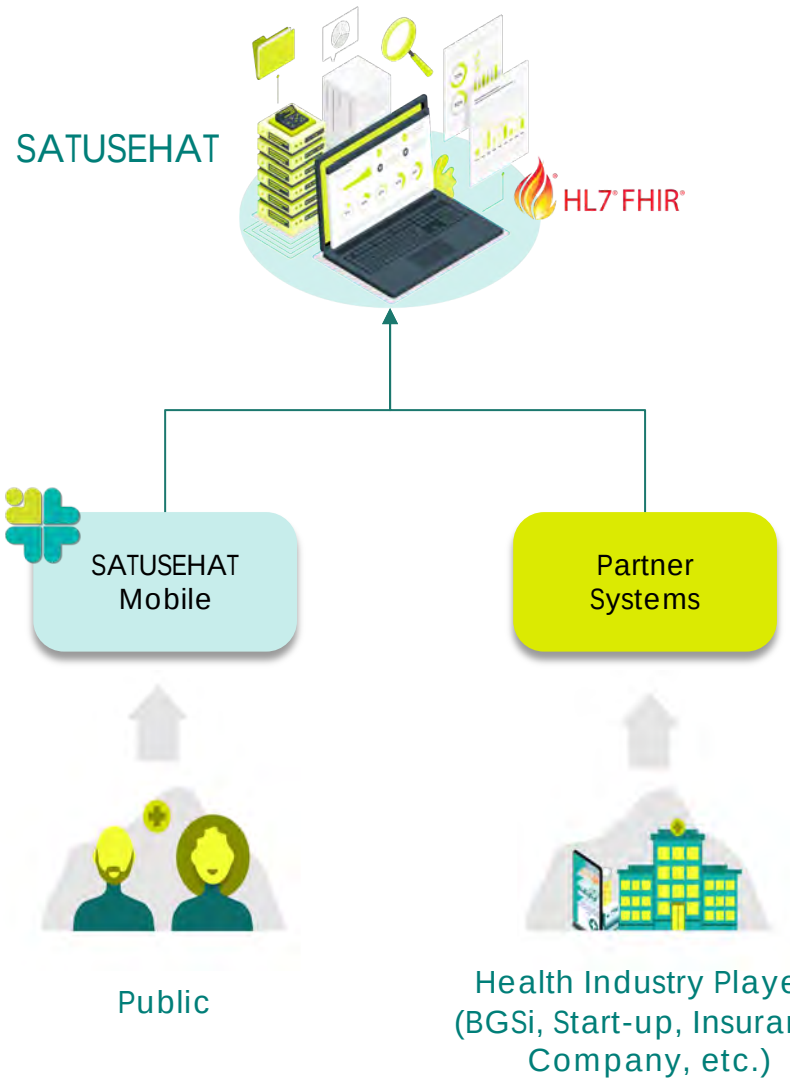


6

The lack of integration of data and health technology, and biotechnology innovation

Integration and Standardization Platform: SATUSEHAT

Big Data in Health for Integrated Health Services



10k+ Public Health Centers (Puskesmas)

11k+ Clinics

~3k Hospitals

5k+ GP & Dentist Clinics

1400 Laboratories

30k+ Pharmacies

IHS **ensure data interoperability of the entire ecosystem of healthcare industry** so it can be used more widely for the better outcome

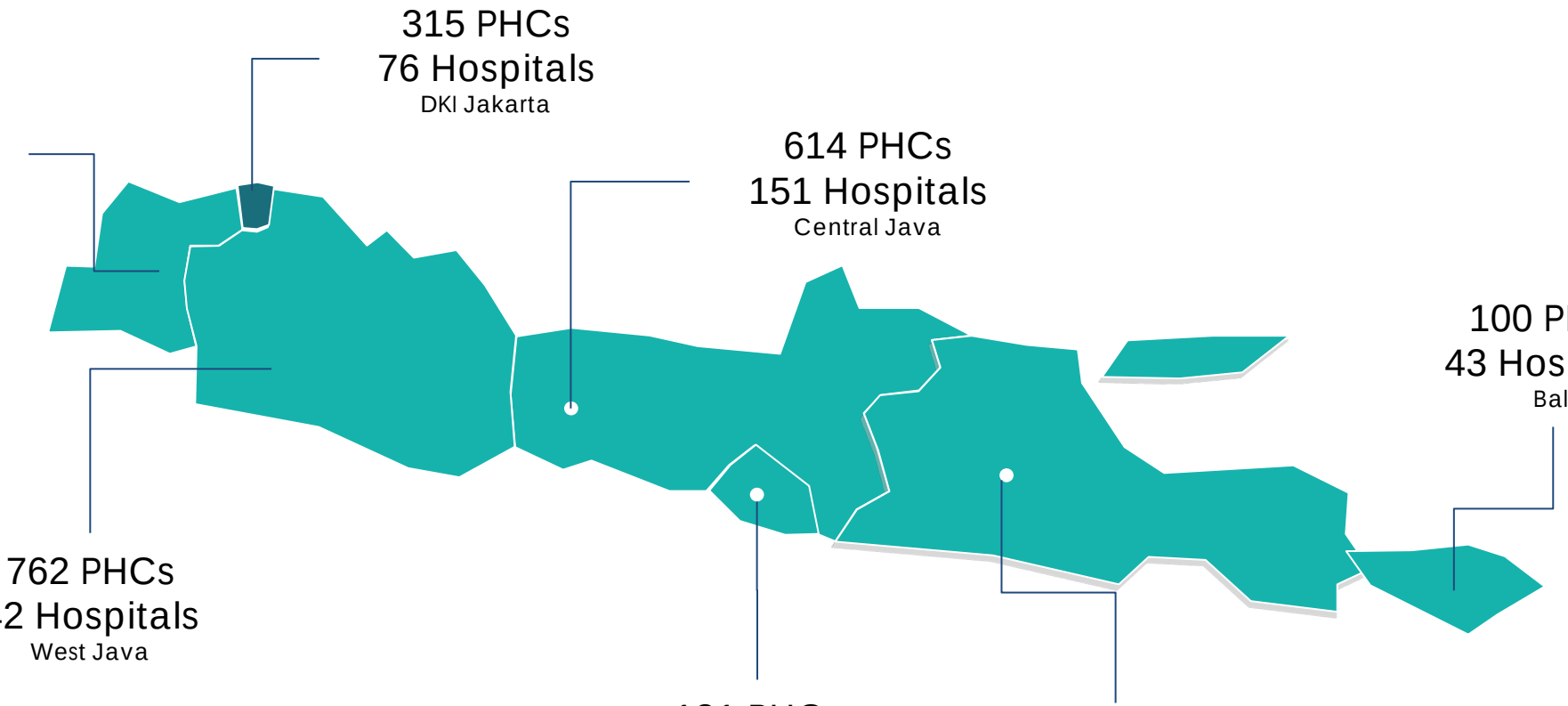
Provide standardized specifications and mechanisms for business processes, data, technical and security

41
Hospitals
Alpha Testing

31
Health Companies
Beta Testing

Systems in 2,893 (77.04%) health centers and 370 (31%) hospitals in Java-Bali are ready to be integrated* into SATUSEHAT

>11,000 health facilities are ready to be integrated into SATUSEHAT throughout Indonesia



PHCs = Public Health Centers

***Integration at sandbox stage**

Transforming PeduliLindungi into SATUSEHAT Mobile

a super health app that aims to continue to be useful to community and persist as the most widely used application in Indonesia.

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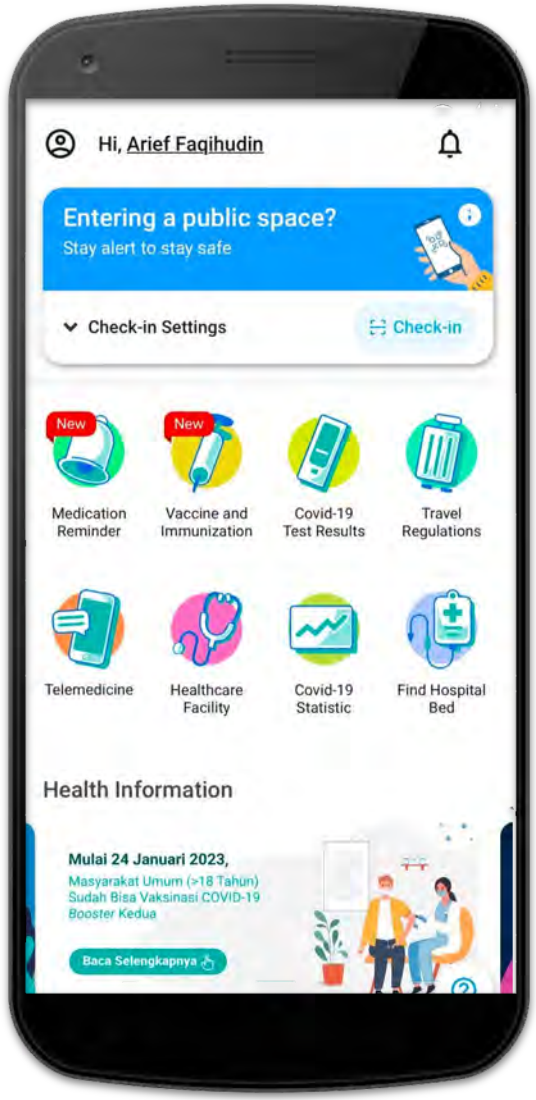
PeduliLindungi

Application of individual health services related to COVID-19 and proven in handling COVID-19

> 105 Mio
Total of users

8 Mio
Average daily users during the peak of COVID-19

1. Digital Tracing
2. COVID-19 Testing
3. Self-Isolated Telemedicine
4. Integrated Vaccination System



SATUSEHAT Mobile

Developed as a Personal Health Service application for the community for broader functions.

1. Medical Record
2. Health Promotion
3. Medication Profile
4. Health Diary
5. Hospital Bed Availability
6. Early Warning System
7. Tracing & Testing
8. Integrated Telemedicine
9. Personalized Health Education

Data Challenges and Health Systems

Petabytes of health data are generated every day

270 million Indonesians have medical data in paper and digital form

More than 60,000 health facilities produce health data both paper and digital

There are 400+ health applications belonging to the Central and local governments

Health data from IOT-based medical devices are not integrated and scattered

1. Health data is not standardized and not integrated
2. Some of the same data is collected by different systems/applications
3. Interoperability and integration of national health data is difficult
4. Burden on health workers in conducting reports
5. Health policy is not yet data based

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Health Biotechnology

Revolutionary scientific projects over time

Key findings and inventions that changed the world drastically

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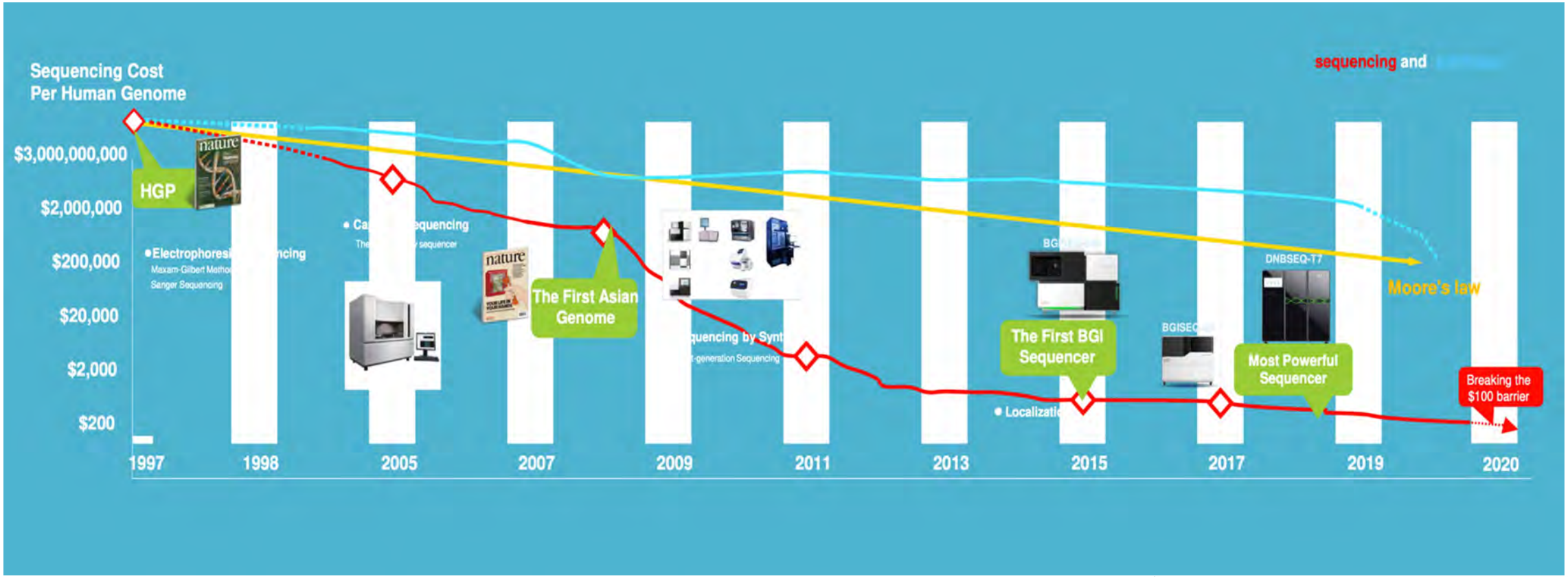
Atoms

Bits/Binary Code

Next Generation Biotechnology

Recent technology allowing rapid progress in biomedical and genomic sciences

Genomic sequencing per genome is more affordable and efficient

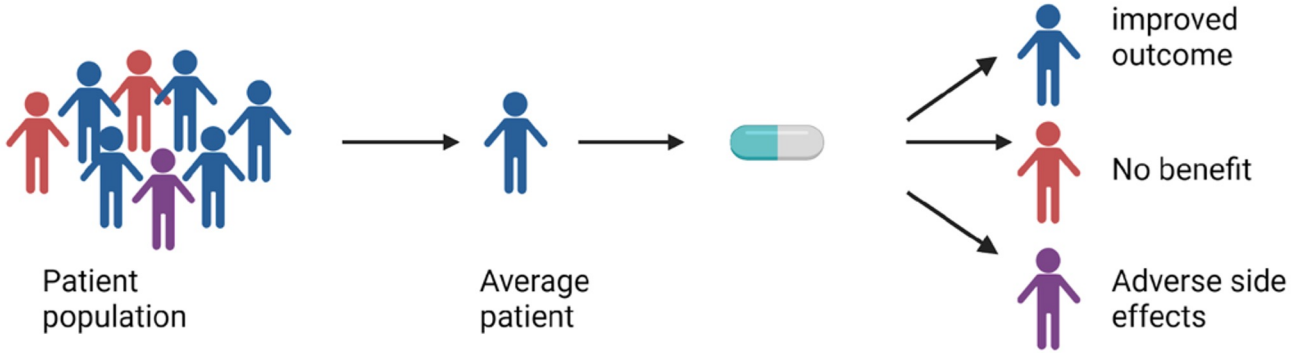


Not only a reduction in price, sequencing is now also available at the palm of your hand

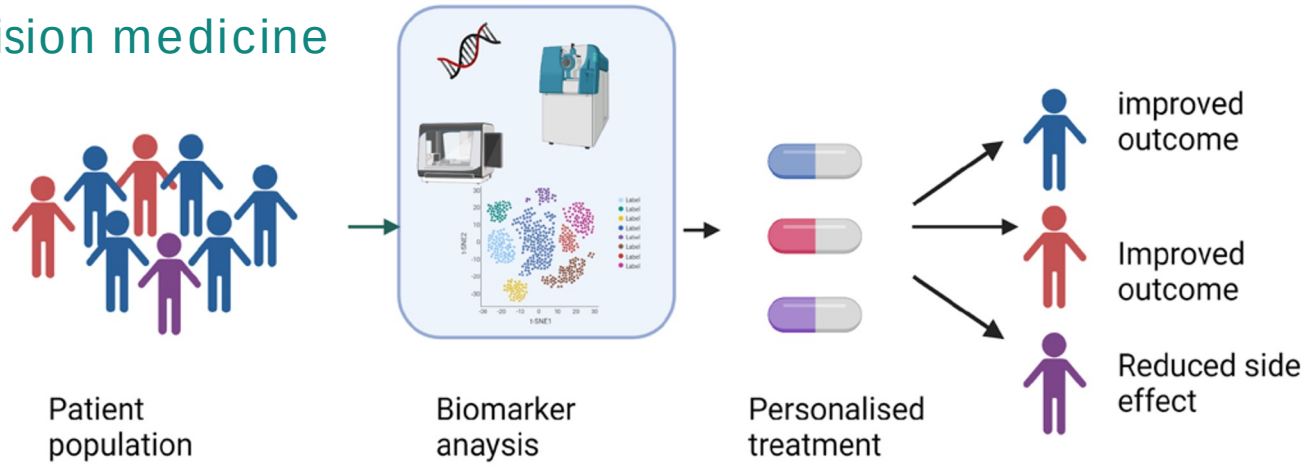
Source: BGI, ONT

The application of biotechnology in the development of precision medicine that is suitable for each individual

Today's medicine

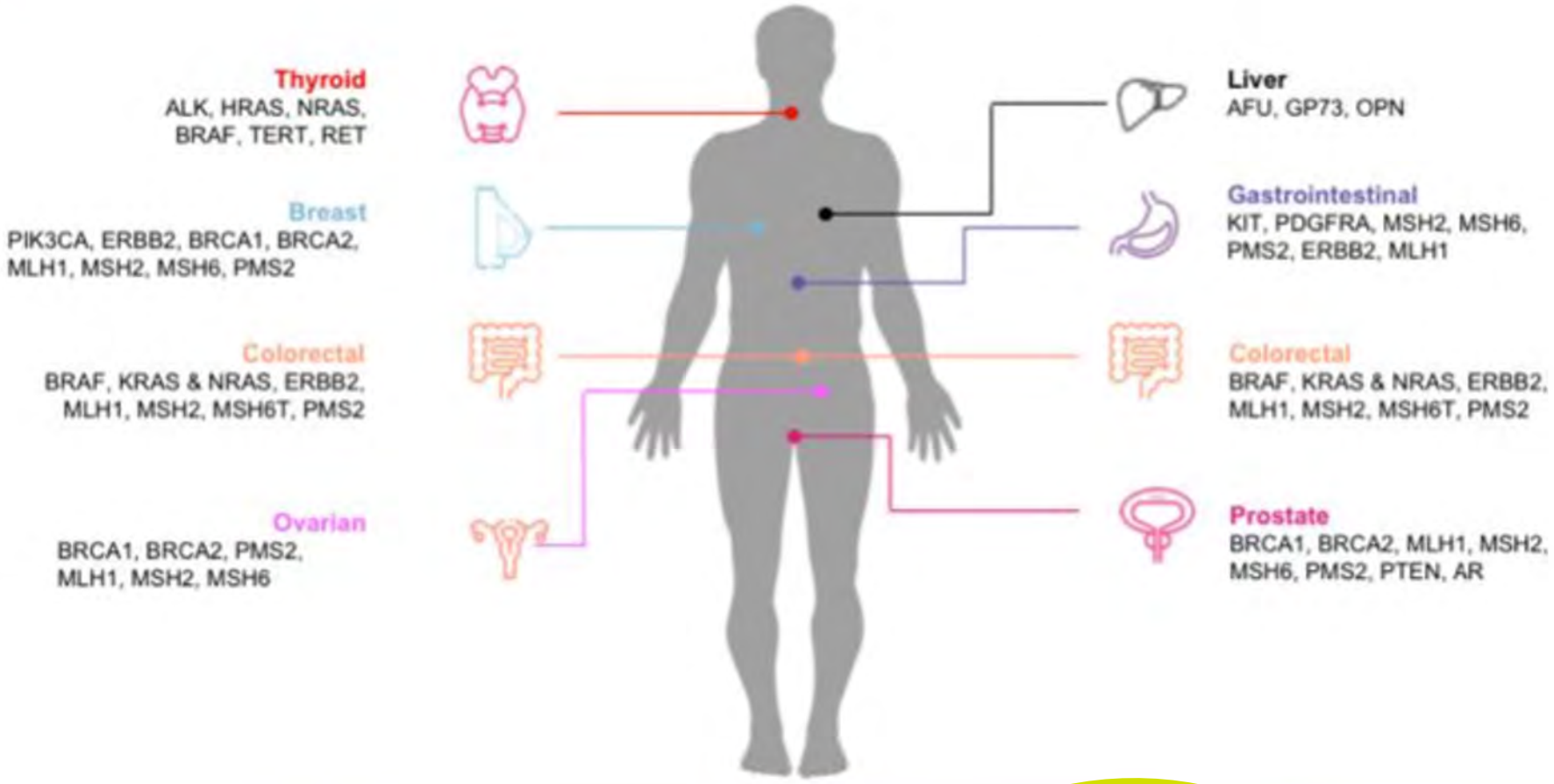


Precision medicine



Genomic sequence enables disease screening based on gene biomarker

Burden of Cancer in Indonesia



Source : Illumina

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Application of genomic data in health status screening

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Obesity

Obesity is a condition where excess body fat has accumulated. You may become obese if you take in excess calories without burning them and they accumulate as fat in your body. Obesity is the main cause of a variety of chronic diseases.

Analysis results — 6 genetic variations analyzed

Your obesity status is **Good**.

If you have the genetic variation, the risk of obesity tends to increase.

Heritability — The genetic factor's contribution rate to obesity is 40 to 70% (based on Koreans).

Useful information

The most accurate way to evaluate obesity is using the amount of body fat. Since it is difficult to measure the amount of body fat accurately, BMI or waist circumference is generally used to evaluate obesity.

It is important to set an achievable weight loss goal, around 5 to 10% of the initial body weight. It is advisable to lose weight slowly, around 0.5 to 1.0 kg per week.

Causes and symptoms

Over 90% of obesity is caused by eating habits or life habits. Some endocrine diseases or drugs can lead to obesity as well.

Obesity causes fatty liver, gallstones, degenerative osteoarthritis, sleep apnea, and various adult diseases such as hypertension, diabetes, and hyperlipidemia. It is also known to increase the risk of cancer.

Proposed lifestyle for you

Genetically, the risk of obesity is low. In addition to genetic factors, environmental factors such as overeating, stress, and lack of exercise can increase the risk of obesity. Check whether you have any eating habits or life habits that increase the risk of obesity.

Recommended ingredients — Hydroxy Citric Acid, conjugated linoleic acids, complex extract of seaweed, etc., and green tea extract

The results are irrelevant to disease diagnosis. You must consult your physician for diagnosis and treatment decision.

My genetic analysis results

Test items	Genes	affected allele	Non-affected allele	My genotype	Genotype frequency*		Race**
Obesity	FTO[1]	C	T	TT	CT:25% CC:5%	TT:70%	AS (EU) AM OS ME AF
	MC4R[1]	C	T	TT	CT:31% CC:3%	TT:66%	AS (EU) AM OS ME AF
	BDNF[1]	C	A	CC	AA:25% CA:48%	CC:27%	AS (EU) AM OS ME AF
	SEC16B	C	T	TT	CT:23% CC:3%	TT:74%	AS (EU) AM OS ME AF
	NEGR1	C	T	CC	TT:0% CT:13%	CC:87%	AS (EU) AM OS ME AF
	ADCY9	T	C	CC	TC:39% TT:11%	CC:50%	AS (EU) AM OS ME AF
Body fat percentage	FTO[2]	A	T	TT	AT:26% AA:3%	TT:71%	(AS) (EU) (AM) OS ME AF
	MC4R[2]	C	T	TT	CT:31% CC:3%	TT:66%	(AS) (EU) (AM) OS ME AF
Body Mass Index (BMI)	FTO[3]	A	T	TT	AT:26% AA:4%	TT:70%	AS (EU) AM OS ME AF
	MC4R[1]	C	T	TT	CT:31% CC:3%	TT:66%	AS (EU) AM OS ME AF
	BDNF[2]	C	T	CC	TT:25% CT:48%	CC:27%	(AS) (EU) AM OS ME AF
	GNPDA2	G	A	GA	AA:48% GG:9%	GA:43%	(AS) (EU) AM OS ME AF
	MTCH2	T	C	CC	TC:36% TT:10%	CC:54%	(AS) (EU) AM OS ME AF

* This shows the percentage of people who have the same genotype as yours. Ex.) Let's say your genotype is TT and the genotype frequency of TT is 25%. This means that 25 out of 100 people have the same genotype as yours.

** It refers to the group (race) in which the gene marker associated with the test item was studied. (AS: Asia, EU: Europe, AM: America, OS: Oceania, ME: Middle East, AF: Africa)

Ministry of Health is spearheading an initiative to leapfrog Indonesia into health biotechnology and precision medicine

Biomedical and Genome Science Initiative (BGSi)

- **National Health Biobank**
- We aim for **100K+** Human Genome Sequences*
- High-throughput Next Generation Sequencers
- **4** Integrated Platforms (Biobank, Registry, Bioinformatics, LIMS)

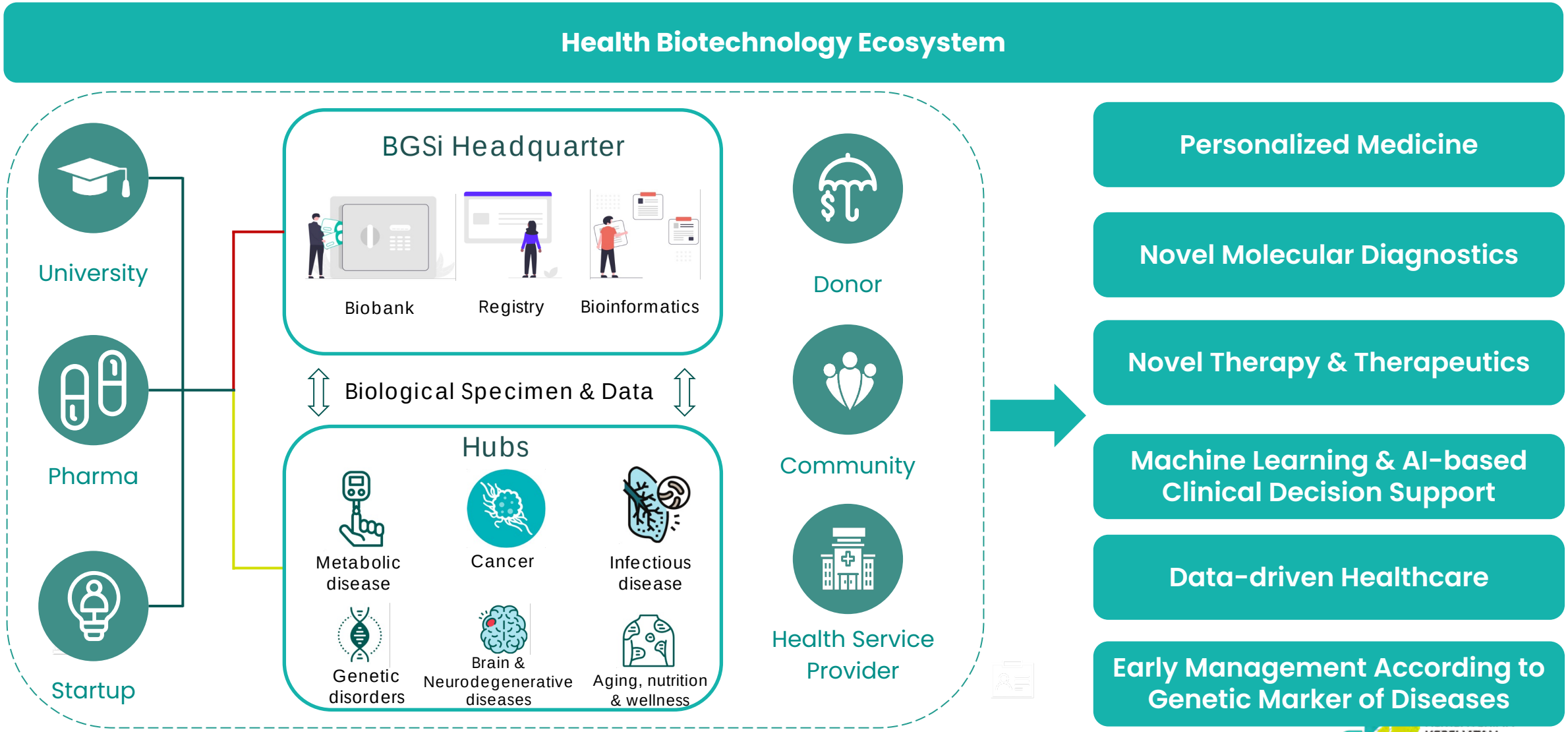
Value to the industry :

- Linking patients' medical, demography and genomic data
- Providing genome reference for Indonesia's population
- Sample collections in Biobank with well-annotated data and analysis

*10K Human Genome Sequences in the first 2-year implementation

BGSi as a catalyst for multi-stakeholders collaboration

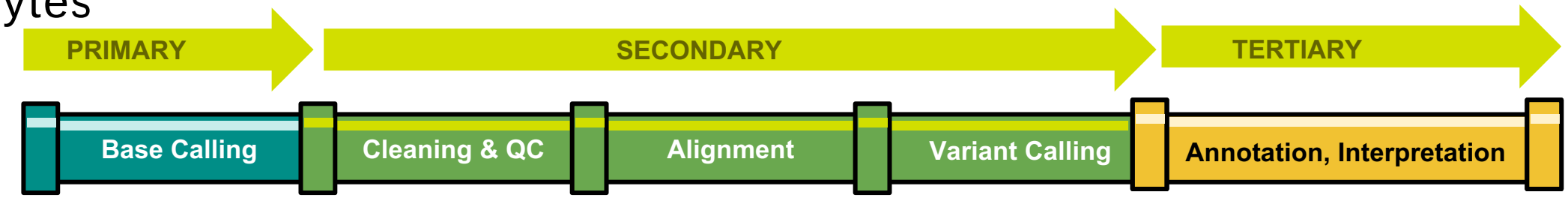
An investment opportunities for various products development



Proposal review, evaluation, agreement, project management

R&D collaboration

BGSi also provides secure data storage with a capacity of more than 11 petabytes



Input-Output	**Light/Signal**	**Raw Reads**	**Clean Reads**	**Aligned Reads**	**Variants**
File Format	BCL/FS/ FAST5 ~120GB	FASTQ ~120GB	FASTQ ~120GB	SAM/ BAM ~120GB	VCF/ BCF ~1-5 GB

ATGCAT
ATCCAT
ACGCAT

Annotated Variant, Assembly, Phylogenetic Tree

VCF/ BCF | FASTA/ FS | NEX/ WICK

BGSi	**primary analysis tools**	• **20 minutes/WGS (120 GB dataset)** • Standard workflows • Test validation workflow • System evaluation and hardware evaluation and optimization	• **tertiary analysis** • Tertiary tool curation, development, dan integrasi
BGSi Hubs	Upload targeted gene raw data & information instrument	• Pipeline for target gene sequences	• tertiary analysis • **Interpretation of genomic information from** WGS, gene, and clinical data

Biotechnology ecosystem to support the growth of startups in Indonesia

Several top startups in Indonesia and the multi million dollar market cap

NalaGenetics Personalized Drugs, Vitamins, and Screening	**Genetics Indonesia** Genetic-based health service
Nusantics Microbiome research and technology to everyday life	**Asaren** Integrates phenotype and genotyping data to build a better health.
tanyaDNA NIPT & DNA test	**PathGen** Affordable molecular diagnostics for everyone

Source : crunchbase.com

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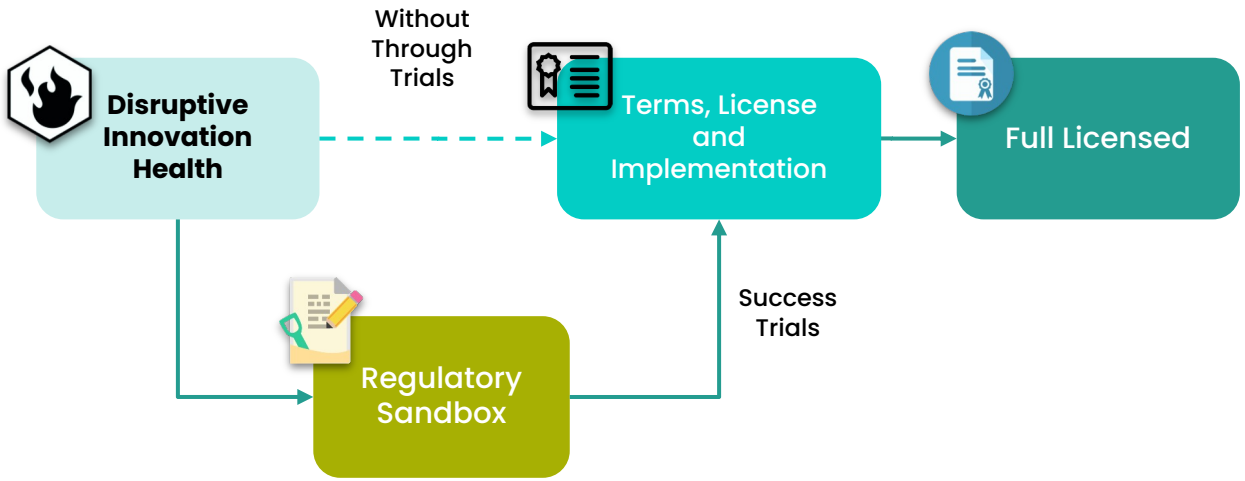
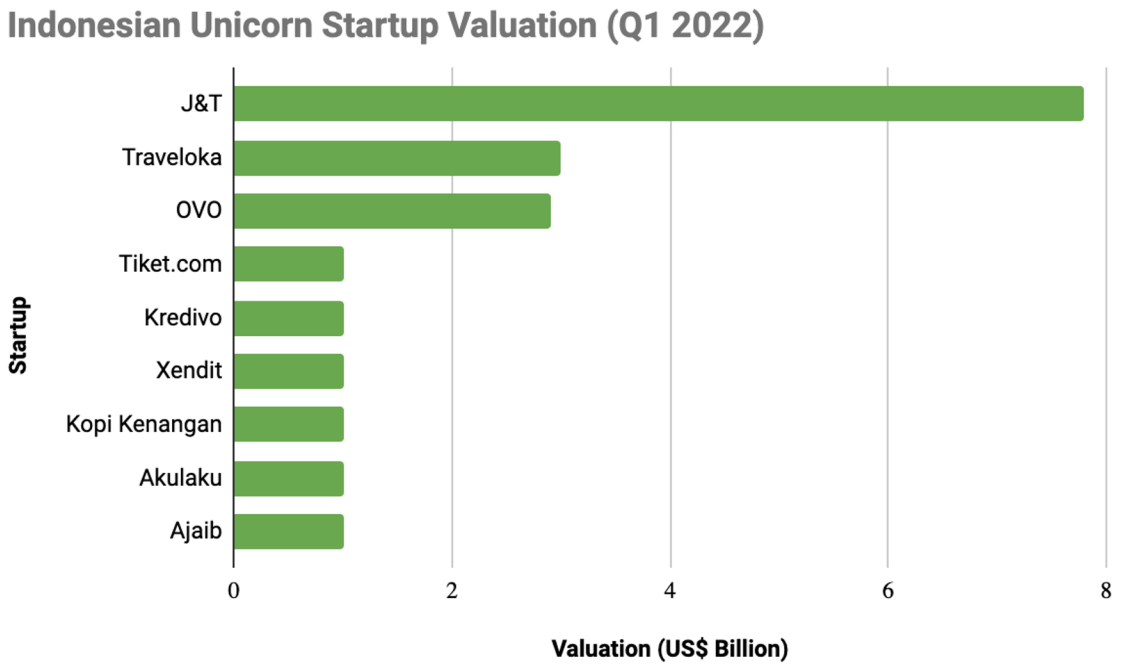
Health Innovation Regulatory Sandbox

Ensuring Good Governance along with Agile Health Innovation



Health Innovation Regulatory Sandbox can be a space where **innovations in the biotech sector** can pilot innovations or new business models in an environment that safe and monitored by regulators.

The implementation of the Regulatory Sandbox will also **encourage user growth** to increase the value of each innovation.



Recently, 5 fintech startups now have unicorn status, regulated and supervised by OJK (Otoritas Jasa Keuangan) through the Regulatory Sandbox program.

Source : Katadata, 2022

Once again, we call for action

Our mission is to close the gap of Indonesia's biotechnology ecosystem and speed up domestic innovation

Biotechnology

~$ 20mn

target of 50k human genome sequence by 2025

cutting-edge technology support, expanding capacity beyond genomics

IT and bioinformatics development

Access to logistics to support transport of samples

Health Technology

digital talent resource to accelerate the health transformation

implementation partner for digitizing 60K health facilities

implementation partner for standardizing and integrating the health big data

more investment on healthtech startup

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Several countries already have regulations governing genomics and biobanking services regulated separately in several laws and regulations

Point	England	USA	China	Singapore	German
Data					
Consent	**Arranged** Data Protection Act (DP Act) 2018	**Arranged** Privacy Act 1974	**Arranged** Personal Information Protection (PIP) Law 2021 and Human Genetics (HGR) Regulation 2018	**Arranged** PDP Act 2012 and HBR Act 2015	**Arranged** GDPR and Genetic Diagnostic Act 2010 (GenDG)
Storage, data usage and sharing	**Arranged** DP Act 2018	**Arranged** Privacy Act 1974	**Arranged** PIP Law 2021 and HGR Regulation 2018	**Arranged** PDP Act 2012	**Arranged** GDPR and GenDG
Data Ownership	**Arranged** DP Act 2018	**Arranged** Privacy Act 1974	**Arranged** PIP Law 2021	**Arranged** PDP Act 2012	**Arranged** GDPR and GenDG
Commercialization	**Permitted (with specific rules)** Health and Social Care Act 2012 and DP Act 2018	**Permitted (with specific rules)** Health Insurance Portability and Accountability (HIPAA) Act	**Permitted (with specific rules)** PIP Law 2021 and Cybersecurity Law 2016	**Prohibited** Human Biomedical Research Act 2015 (direct-to-customer tidak diatur)	**Permitted (with specific rules)** GDPR and GenDG
Genomic testing service					
Discrimination	**Prohibited** Equality Act 2010	**Prohibited** Genetic Information Nondiscrimination Act 2008	**No specific regulations**	**Prohibited** Moratorium on Genetic Testing and Insurance	**Prohibited** GenDG
Committee	**Not arranged**	**Not arranged**	**Not arranged**	**Arranged** Healthcare Services Act 2020	**Arranged** GenDG
Facility	**Not arranged**	**Not arranged**	**Arranged** HGR Regulation 2018	**Arranged** Healthcare Services Act 2020	**Arranged** GenDG
Biobank	**Arranged Generally** Health and Social Care Act 2012 and DP Act 2018	**Arranged Generally** National Biomedical Research Act	**Arranged in a few regulations**	**Arranged Generally** Human Biomedical Research Act 2015	**Arranged in a few regulations**

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> **Investment** in the Health Technology and Biotechnology sector does not serve only **prospects** from a **business** perspective, but also strengthens **Indonesia health resilience** and add value to **healthcare**

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