

# **National Action Plan on Antimicrobial Resistance Indonesia**

**2017 - 2019**

Supported by :



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**Food and Agriculture  
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## Abbreviations and Acronyms

AGPs	Antimicrobial Growth Promoter
AMA	Antimicrobial agent
AMR	Antimicrobial Resistance
AMSP	Antimicrobial Stewardship Programme
AMU	Antimicrobial use
APIs	Active Pharmaceutical Ingredient
ARSADA	Association of Local Government Hospitals
ARSI	Association of Private Hospitals
ASCC	AMU Surveillance Coordination Committee
BBVet	Regional Veterinary Laboratory.
BPMSPH	National Quality Control Laboratory Certification for animal product
BPOM	Food and Drug Administration Agency
Bvet	Small regional veterinary laboratory or disease investigation vendor
DG PKH	Directorate General Livestock and Animal Health Services
DRA	Drug Regulatory Authority
EML	Essential Medicine List
EQAS	External Quality Assessment Scheme
ESBL	Extended Spectrum Beta Lactamase
FAO	Food and Agriculture Organization
GAP	Global Action Plan
GLASS	Global Antimicrobial Resistance Surveillance System
HAIs	Healthcare associated infections
IHR	International Health Regulation
IMSC	Inter-Ministerial Steering Committee
IPC	Infection Prevention and Control
KAP	Knowledge, Attitude and Practice
KARS	Komite Akreditasi Rumah Sakit (Hospital Accreditation Committee)
LIPI	Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Sciences)
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture
MoD	Ministry of Defence
MoF	Ministry of Fisheries
MoH	Ministry of Health
MoHiEd	Ministry of Higher Education
MoInfor	Ministry of Information
MoRT & HE	Ministry of Research, Technology and Higher Education
MRSA	Methicillin Resistant Staphylococcus aureus
MS	Member State
NAP	National Action Plan
NARCC	National Antimicrobial Resistance Coordination Committee
NA-DFC	National Agency of Drug and Food Control
NGO	Non-Governmental Organization
NRA	National Regulatory Authority

NRL	National Referral Laboratory
OIE	World Organisation for Animal Health
PERSI	Indonesian Hospital Association
STG	Standard Treatment Guideline
TWG	Technical Working Group
UNAIDS	United Nations Programme on HIV/AIDS
UNGA	United Nations General Assembly
WaSH	Water, Sanitation and Hygiene
WHA	World Health Assembly
WHO SEARO	World Health Organization Southeast Asia Regional Office



## Executive Summary

*“Global leaders must take a broad, coordinated approach to address root causes of Antimicrobial resistance across sectors, especially in human and animal health and agriculture.”*

*United Nations General Assembly meeting on AMR in New York, 21 Sep, 2016*

The issue of Antimicrobial resistance has become one of the most substantial health issues, prompting the World Health Assembly (WHA) to urge Member States to finalise tailor made national action plans by May 2017, aligning them with objectives of the Global Action Plan (GAP). These cover awareness, surveillance and research, hygiene infection prevention & control, optimal use of antimicrobial medicines and economic case for sustainable investment.

Indonesia, by virtue of its geographical terrain and complex interactions with diverse stakeholders, indicates a higher burden of AMR. Most of the country's data currently relies on local studies conducted by labs and universities. To get a more accurate estimate of the situation, one has to rely on results from the Regional Resistance Surveillance Programme. By undertaking such measure, Indonesia would acquire data to detect AMR trends at a national level.

In preparing the National Action Plan on Containment of Anti-Microbial Resistance, due consideration is given to and emphasis is put on the achievement of:

- *maintenance of effective treatment of infection and communicable diseases*
- *usage of quality assured drugs*
- *responsible use of medicine*
- *constant availability for use*

The process was commenced in December 2016, based upon a situational analysis commissioned by WHO in conjunction with the ARCC in May of that year, which provided an overall illustration on the situation of anti-microbial resistance, and the gaps in the country's capacity. Technical assistance was rendered by the WHO Indonesia Country Office, WHO- SEARO and independent consultants through a series of dialogues involving key stakeholders and other resource persons from the Ministry of Health. Ultimately a strategic plan has been produced which lays down strategic interventions and primary activities and their schedule.

The situation analysis revealed a high level of political commitment towards supporting AMR containment, duly reflected in policy endorsement, leadership

structures, human and animal health sectors and financial outlays made for Ministry of Health. Strategic plans and roadmaps to roll out existing regulations and guidelines were developed with focus on rational use of antibiotics in health care facilities and community. Several awareness campaigns were rolled in 2015-16. However, analysis revealed that although initial implementation was in place and had advanced in areas such as awareness and surveillance, these efforts were neither rooted in a comprehensive AMR control plan nor guided by multisectoral coordination with potential to aid the implementation process. What also emerged was that though AMR was perceived as an important and strategic area of public health, it was yet to catch the attention of the larger research and innovation community.

The GAP AMR strategies are based on five guiding principles that follow a whole-of-society engagement including a One Health approach that engages all sectors to preserve effectiveness of antimicrobial medicines through conservation and stewardship programmes.

Capability to treat infection require availability of effective, safe, and affordable antimicrobials, that are prescribed properly and accurately. To ensure treatment of serious infections with appropriate use of existing and new antimicrobial medicines, there should be surveillance, operational research, laboratories, human and animal health systems, competent regulatory capacities and professional education and training for human and animal health sectors.

Accordingly, the Indonesian NAP AMR has been developed with five strategic objectives:

1. Improve awareness and understanding of AMR through effective communication, education and training
2. Strengthen knowledge and evidence base through surveillance and research
3. Reduce incidence of infection with sanitation, hygiene and infection prevention
4. Optimise use of antimicrobial medicines in human and animal health
5. Develop economic case for sustainable investment and increase investment in new medicines, diagnostic tools, vaccines and other interventions

In line with the five strategic objectives above, the Indonesian NAP AMR are further elaborated into strategic objectives and interventions, each with a set of key activities with indicative list of M&E indicators and a detailed operational plan.

**Strategic objective 1** addresses raising awareness on AMR and promoting behavioural change through public communication programmes for practitioners and consumers in human health, animal health and agricultural sectors.

**Strategic objective 2** focuses on having evidence based surveillance to acquire AMR data. It identifies information gaps and lays out a national roadmap for an AMR surveillance system. Support is needed from quality assured national referral laboratories in human and animal health sectors and their network of surveillance laboratories. Additionally, a national early warning system needs to be established and operated.

**Strategic objective 3** looks at hygiene, infection prevention & control in the context of healthcare facilities with reference to containing AMR. It presents a ‘how to’ approach on improving hygiene (WaSH) and infection prevention control methods to reduce spread of infections in ambulatory human and animal care facilities, food production systems and local communities.

**Strategic objective 4** relates to optimising use of antimicrobial medicines to minimise precipitation of resistance in target microbes. A robust system for regulation and surveillance of use of antimicrobial agents for control of human and veterinary use of antimicrobial substances is suggested with formulation of a National AMR Containment and Use Policy with related regulatory frameworks, National Drug Policy, National Drug Regulatory Authority, essential medicines list and standard treatment guidelines for use of antimicrobial agents and evidence based guidelines for National Antimicrobial Stewardship Programme in human and animal health care, amongst others.

**Strategic objective 5** emphasises need for sustainable investments and increase in investments in new medicines, diagnostic tools, vaccines and others to reduce AMR use.

These strategic objectives along with detailed activities and proposed methodology of implementation form part of the Indonesia NAP on AMR. It will provide a useful baseline understanding of the local AMR situation, highlight gaps and available capacities, allowing Indonesia to fine tune it based on local realities and sensitivities. Simultaneously, Government of Indonesia will under the leadership of National Antimicrobial Resistance Coordination Committee (NARCC) and the thematic technical working groups will finalise the operational, budgetary and monitoring and evaluation plans before rolling out activities as laid down in this strategic plan.

## Background

### Setting the Context: From Global to National Action Plans

Antimicrobial resistance (AMR) has emerged as one of the biggest public health threats of the modern epoch. At the 68<sup>th</sup> World Health Assembly (WHA) in May 2015, a global action plan on AMR (GAP AMR) was adopted in response to the acknowledgement of this emerging crisis (1). The GAP AMR has been developed at the request of the Health Assembly in keeping with resolution WHA67.25 of May 2014, which was reflective of the global consensus that AMR is a major threat to human health.

The GAP AMR has advocated for the One Health approach to form the basis for the global response to AMR, especially in case of developing countries, which are expected to contribute to the increasing trends of antimicrobial agent (AMA) consumption and therefore, likely to be at a higher risk of emerging resistant microbes (2–4). The need for this was further stressed at the 2015 WHA through resolution WHA68.7.<sup>1</sup>

Consolidating the position of the GAP AMR, the global political will came together to further commit to the cause of containment of AMR at the United Nations General Assembly (UNGA) at the high level meeting on AMR on 21 September, 2016, in New York (5). At this meeting, global leaders committed to “taking a broad, coordinated approach to address the root causes of AMR across multiple sectors, especially in human health, animal health and agriculture” (5).

One of the overarching requirements outlined by the GAP AMR was that all Member States (MS) should develop their own, tailor made National Action Plans on AMR (NAP AMR) that is in line with the national condition of the respective member state. The process of framing a contextually-driven NAP AMR will provide a baseline understanding of the local AMR situation, along with highlighting gaps and available capacities. This will serve as valuable information, allowing different countries to customise their NAP AMR as per their local realities.

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<sup>1</sup> Recognizing that the main impact of antimicrobial resistance is on human health, but that both the contributing factors and the consequences, including economic and others, go beyond health, and that there is a need for a coherent, comprehensive and integrated approach at global, regional and national levels, in a “One Health” approach and beyond, involving different actors and sectors such as human and veterinary medicine, agriculture, finance, environment and consumers.

## Situation Analysis and Assessment

Indonesia ranks fourth in terms of total population in the world, with an estimated population of 258 million. In addition, the nation comprises of thousands of islands, therefore representing a complex geographic terrain as well. Given these settings, it is expected that the problem of AMR would emerge because of complex interactions between multisectoral drivers. However, as has been indicated in a previous report by the Dutch Embassy, very little data is available about the AMR situation in Indonesia (6). Data related to AMR in Indonesia is based on studies conducted by laboratories or universities with means and there is no nationally networked laboratory set up which can provide nationally representative data.

Prevalence of tetracycline resistant *Streptococcus pneumoniae* was put at 46% in Jakarta in 2001 (7). Later studies, in 2010, from Semarang province puts cotrimoxazole resistance in *Streptococcus pneumoniae* at 45% and penicillin non-susceptibility rates at around 24% (8). *E coli* isolates from hospital discharged patients also showed remarkably high rates of resistance to ampicillin (73%), cotrimoxazole (56%) and ciprofloxacin (22%) (9).

Results from the Regional Resistance Surveillance Programme, conducted in 12 Asia-Pacific countries, indicate that Indonesia's burden of AMR could be higher than anticipated through local studies. Although based on a limited number of samples, there are indications that Indonesia has the highest rates of ESBL positive *E. coli* (71%) and *Klebsiella* (64%) in the Asia Pacific nations under surveillance over a quarter of the samples were also positive for MRSA (28%), indicating the fact that there could be an even larger problem of undiagnosed carriers (10). These findings are in agreement with the surveys from 2005 which indicated ESBL bearing *E. coli* (20%) and *Klebsiella* (28%) to be more prevalent in Indonesia than in other countries of the region (11). Worrying trends are emerging with respect to imipenem resistance in *Enterobacteriaceae* and Indonesia (6%) tops the Asian countries in this respect (12).

The situation analysis process comprised of guided discussions between the National AMR Control Committee members, Ministry of Health and Ministry of Agriculture (Directorate General of Livestock and Animal Health), and WHO team. The situation analysis looked at how well developed the AMR programme was in terms of the established governance, policy and systems. The study was focused on a broad system analysis by assessing quality of policies and documents.

The indicators in situation analysis protocol were grouped into seven focus areas:

1. National AMR Action Plan in line with GAP-AMR
2. National AMR surveillance system

3. Antimicrobial Stewardship and Surveillance of antimicrobial use
4. Infection Prevention Control in healthcare settings
5. Awareness raising; 6. Research & innovation
7. One-Health engagement. These focus areas were consistent with the five strategic objectives of the WHO GAP-AMR

Each of the focus areas was composed of a list of sub-focus areas. Each sub-focus area was graded on five levels to show the incremental extent of AMP programme implementation. These five levels of phases are stated as follows (13):

Phase 1: Phase of exploration and adoption

Phase 2: Phase of programme installation

Phase 3: Phase of initial implementation

Phase 4: Phase of full operation

Phase 5: Phase of sustainable operation

A thematic situation analysis was conducted based on the phases in which each of the indicators were placed in. The phases reflect phases of the installation and implementation of the AMR containment programme in terms of governance, policy and system. Phases 1 and 2 – relates to policy development and planning but not implementation; Phases 3 to 5 are related to different levels of implementation including Initial implementation; phase of full operation; and phase of sustainable operation. These phases are the strengths of the system. Sustainable operation is considered best practice and defined here as an operation that incorporate an M&E system.

The following graphic demonstrates the status of implementation of AMR containment programme in Indonesia. Green colour indicates complete implementation, yellow indicates partial implementation and red implies no implementation.

Figure 1: Status of implementation of AMR containment programme/initiatives in Indonesia, by phase of implementation

Focus area	Strategic activity	Exploration and Adoption	Programme Installation	Initial Implementation	Full Operation	Sustainable Operation
Developing or strengthening the NAP	NAP AMR developed in alignment with GAP AMR					
AMR Awareness raising	Awareness campaigns for the public					
	Education and training strategies for professionals					
AMR surveillance	National AMR surveillance in humans					
	National laboratory network strengthening					
Rational use of antimicrobials and surveillance of antimicrobial use and sale	A national AMR containment policy for control of human use of antimicrobials; AMR stewardship in the community					
	National Regulatory Authority (NRA) or Drug Regulatory Authority (DRA)					
	Surveillance of antimicrobial use and sales in humans in the community					
Infection Prevention and Control and AMR stewardship programme in healthcare settings	AMR stewardship programmes in healthcare settings					
	Infection Prevention and Control programme in healthcare settings					
	National Hospital Acquired Infection and related AMR surveillance					
Research and Innovation	Research funding; National Policy to promote and foster innovation					
One Health Engagement	A national AMR containment policy and regulatory framework or control of animal use and their registration for use					
	National surveillance of AMR and the use and sale of antimicrobials at national levels in the veterinary sector					
	Infection Prevention and Control programme in the animal sector					
	AMR awareness generation and education in the animal sector					

The situation analysis revealed a need for high level political commitment supporting AMR containment as was reflected in policy endorsement, leadership structures being developed in human and animal health sectors and the financial outlays (US\$ 2 million) for MoH. Strategic plans and roadmaps to roll out existing regulations and guidelines have been developed by both MoH and MoA with focus on rational use of antibiotics in both health care facilities and community. Several awareness campaigns have been rolled between 2015 and 2016 for general public and select professional groups. Heightened political commitment to AMR as a priority issue is also reflected in several pilot initiatives related to different aspects of AMR containment. These include surveillance networks in university and other settings for AMSP.

While the initial implementation is in place and has advanced in some key areas such as awareness and surveillance, these efforts are not rooted in a comprehensive AMR control plan and are not guided by multisectoral coordination that can further aid the implementation process. Coordination mechanisms have been established in individual sectors and are yet to coordinate between themselves. Apart from pilot efforts, surveillance of AMR and AMU, especially in the animal health and related sectors are yet to be developed into organised efforts. Limited laboratory capacity in veterinary sectors and to a large extent in human health sectors is a major impediment. While sanitation, infection prevention and hygiene, including vaccination, is recognised as an important public health intervention in the human health sector, the animal health and food production sectors are yet to make adequate progress with the exception of aquaculture, which due to its export orientation is relatively more advanced. AMR as an important and strategic area is yet to catch the attention of the larger research and innovation community in Indonesia.



# National Action Plan on AMR (2017-2019)

## Goal, Objectives and Guiding Principles

The goal of the GAP AMR is: “to ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them.”

To achieve this, the GAP-AMR has laid down five strategic objectives which form the basis for developing public health response to AMR globally. These strategic objectives are:

**Objective 1:** Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.

**Objective 2:** Strengthen the knowledge and evidence base through surveillance and research.

**Objective 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures.

**Objective 4:** Optimize the use of antimicrobial medicines in human and animal health.

**Objective 5:** Develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

Additionally, the NAP AMR is expected to reflect the five principles based on which the GAP AMR strategies have been enunciated. These include:

**(1) Whole-of-society engagement including a One Health approach**

Antimicrobial resistance will affect everybody, regardless of where they live, their health, economic circumstances, lifestyle or behaviour. It will affect sectors beyond human health, such as animal health, agriculture, food security and economic development. Therefore, everybody – in all sectors and disciplines – should be engaged in the implementation of the action plan.

**(2) Prevention first.** Prevention of infection can reduce mortality, morbidity and increase cost effectiveness. Infection prevention may be implemented

in sectors, even where resources are limited. Implementation of infection prevention and containment measures can slow the development and restrict the spread of infections that are caused by antibiotic resistance.

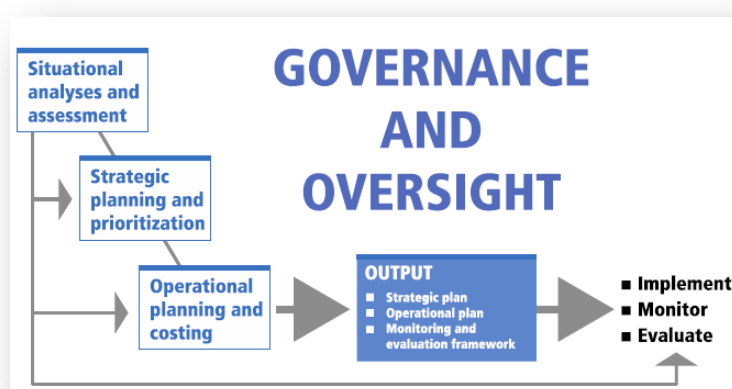
- (3) Access.** The ability to treat infections requires affordable access to effective and safe use of antimicrobial medicines and the rendering of the appropriate and accurate diagnosis. Effective implementation of national and global action plans to address antimicrobial resistance depends on access, health facilities, health care professionals, veterinarians, preventive technologies, diagnostic tools including those which are “point of care”, and also on knowledge, education and information.
- (4) Sustainability.** All countries should have a national action plan on antimicrobial resistance that includes an assessment of resource needs. The implementation of these plans will require long-term investment, for instance in surveillance, operational research, laboratories, human and animal health systems, competent regulatory capacities, and professional education and training, in both the human and animal health sectors. Political commitment and international collaboration are needed to promote the technical and financial investment necessary for effective development and implementation of national action plans.
- (5) Incremental targets for implementation.** Member States are at very different stages in terms of developing and implementing national plans to combat antimicrobial resistance. To enable all countries to make the most progress towards implementing the global action plan on antimicrobial resistance, flexibility will be built into the monitoring and reporting arrangements in order to allow each country to determine the priority actions that it needs to take in order to attain each of the five strategic objectives.

## NAP Development Process

The development of NAP followed the guidelines enshrined in WHO's "Antimicrobial resistance: A manual for developing national action plans" (World Health Organization 2016a). The approach was structured around the five strategic objectives and five principles which are embodied by the GAP AMR (World Health Organization 2015).

The five strategic objectives of the GAP AMR are further elaborated into 12 specific objectives and 12 key strategic interventions. Each of these interventions were broken down into key activities. To evaluate the key activities in the implementation of the strategic interventions, indicators were defined by duly taking into account the budget allotted for the respective activities.

The NAP thus consists of the Situation Analysis and Assessment, a Strategic Plan, an Operational Plan as described in the WHO guidance manual and a Sample template (14,15).



The Situation Analysis by WHO focused on how well developed the AMR programme is in terms of policy and system formed for identifying gaps and strategic priorities. It was further supported by literature review including grey literature provided by country level stakeholders.

Based on the extent of implementation, each of the strategic interventions was graded on an incremental scale consisting of five phases adapted from the Indicator Standards Assessment Tool developed by UNAIDS (13). The first phase - that of exploration and adoption indicates that the process of designing an AMR containment programme has been initiated. Once implementation of the interventions has commenced, systems progress to the second phase, that of programme installation. The third phase, of intervention initiation, is one of the most challenging phases for programmes in developing countries. Once the early implementation barrier is overcome and the programme is scaled up, the fourth stage – full operation – is achieved. Once the programme starts to function at the highest grade of operational efficiency, the fifth and final stage - that of sustainable operation, is attained.

Findings from the Situation Analysis helped situate the current state of NAP in the country along the incremental scale. To enable the MS to make the most progress towards implementing NAP, GAP principle of “Incremental targets for implementation” was followed with the ultimate aim of achieving phase 5 of sustained operations. Flexibility was built into the planning process including monitoring and reporting arrangements, in order to allow the country to determine priority actions that it needs to take in order to attain the five strategic objectives and implement actions in a step-wise manner that meets both local needs and global priorities.

NAP development involved the stakeholders and professionals whose work relate to containment of antimicrobial resistance. Further expansion into a detailed operational plan by sub activities and validation was done by country team and stakeholders. Technical support was provided by WHO Country office, WHO SEARO, FAO and FAO and WHO Consultants.

# Country Response for Indonesia

## Governance and multi-sectoral coordination

A national multi-sectoral governance mechanism is the pivot around which AMR-related activities can be effectively coordinated in all the relevant sectors. This will ensure a systematic and comprehensive approach. However, the scope should be broad enough to address all five strategic objectives of the global action plan, prioritising activities in a step-wise approach.

The governance mechanism for Indonesia will comprise of a High Level Inter-Ministerial Steering Committee, a National ARCC with ARCCs of respective ministries, multi-sectoral Technical Working Groups who will address the strategic objectives of GAP, specialised Coordination Committees and Task Forces commissioned by TWGs. Each of these will be formed and will function as per the following criteria.

**High Level Inter-Ministerial Steering Committee (IMSC):** The IMSC will provide the necessary political commitment and support for national AM containment efforts in Indonesia and to the international global health community. Given the ultimate goal of AMR containment efforts that are geared to improve human health outcomes, the IMSC will be formed under the coordination of MoH.

### Proposed Composition of IMSC

<b>Chief agencies</b>	<b>1. Coordinating Minister of Human Development and Culture Human Research Development MoH, Drug and Food Supervisory Agency (BPOM), Ministry of Research and Technology and Higher Education, Ministry of Education)</b> <b>2. Coordinating Minister for Politics, Law and Security Ministry of Defence, and Ministry of Communication and Information</b>
<b>Chairman</b>	Ministry of Health
<b>Vice Chairman</b>	1. Minister of Defence 2. Minister of Agriculture 3. Minister of Foreign Affairs
<b>Secretary</b>	MoH Secretary General

<b>Members</b>	<ol style="list-style-type: none"> <li>1. DG of Pharmaceuticals and Health Equipment, MoH</li> <li>2. DG of Health Services, MoH</li> <li>3. Head of National Institute of Health Research and Development, MoH</li> <li>4. DG Livestock and Veterinary, MoA</li> <li>5. DG of Research and Development Strengthening, Ministry of Research, Technology and Higher Education</li> <li>6. DG of Defence Capacity, Ministry of Defence</li> <li>7. DG of Aquaculture, Ministry of Marine and Fisheries</li> <li>8. DG for Budget, Ministry of Finance</li> <li>9. Deputy Of Therapeutic Products And Narcotics, Psychotropic And Addictive Substance Control, National Agency of Drug and Food Control ( NA-DFC)</li> <li>10. Deputy for Bio Sciences , LIPI</li> </ol>
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## **National ARCC (NARCC)**

The NARCC will be the implementation agency for NAP AMR and will draw its powers and mandate from Presidential Decree while IMSC will provide strategic vision to AMR control efforts. The NARCC will provide the platform for programme planning and implementation through a supporting structure comprising of technical working groups for individual strategic objectives.

The NARCC comprises of experts from different ministries with adequate representation of non-governmental agencies, cooperatives, civil society representatives, media, international agencies (WHO/FAO/OIE). By way of its multi-sectoral composition, it will ensure adequate integration of AMR containment efforts into the existing health system, public health and disease-specific programmes, animal health and production food sector and other environmental initiatives.

The NARCC will be chaired by practitioners and its Secretariat will be located in the Ministry of Health. Its membership will be drawn from the:

- Ministry of Health and National Drugs and Food Supervisory Agency (BPOM)
- Ministry of Agriculture
- Ministry of Research Technology and Higher Education +LIPI
- Ministry of Marine Affair and Fisheries
- Ministry of Defence

## **Roles and responsibilities of NARCC**

Detailed and specific roles and responsibilities of the NARCC have been mentioned in the Strategic Plan. Broadly, it will be responsible for:

- Monitoring and evaluation on implementation of different strategic interventions and activities of NAP AMR.
- Reporting implementation status to IMSC, national agencies and international partners.
- Constitute technical working groups and commission task forces whose mandate include providing technical input for programme support and NARCC decision-making.
- Facilitate collaborations with national and international agencies and essential organizations, especially in the field of surveillance and innovations.
- Advocate for prevention and containment of AMR.

## **Appointing a National Focal Point**

NARCC will be the national AMR focal point responsible for coordinating AMR activities and tasks in the health, animal, aquaculture, food production and environment sectors. The responsibilities of NFP will be to:

- Build sustained partnerships and work nationally and internationally on containment of AMR.
- Identify stakeholders and facilitate formation of an inclusive NARCC.
- Lead and coordinate drafting of a national action plan for containment of AMR.
- Facilitate and oversee implementation, M&E of the plan through the NARCC.
- Ensure regular data collection and information sharing by instituting effective communication and coordination among all stakeholders, the members of NARCC and their constituencies, sectors and disciplines.
- Coordinate national activities for establishment of AMR surveillance systems.
- Report on prevalence of and trends in AMR to the global AMR surveillance system (GLASS).

## **Forming Technical Working Groups**

Technical working group (TWG) will form an integral part of the governance mechanism in Indonesia. These will be multi-sectoral in composition and will report to the national ARCC. They will be formed a priori and will be mandated with specific tasks such as providing technical input, conducting situational analyses, drafting

NAPs, planning and budgeting, commissioning specialised task forces and overseeing implementation of strategic interventions and corresponding key activities under the five strategic objectives.

The proposed thematic TWGs that will be formed include:

1. Education and Awareness
2. Surveillance and Research
3. Infection Prevention and Control
4. Optimizing Antimicrobial Use
5. Innovation and Investment

Each of the TWGs will be responsible for programme planning and budgeting referring to NAP on AMR while focusing on One Health and for coordinating between the different agencies and secretariats. They will assume charge for monitoring and evaluation and based on their interactions and review mechanisms come up with a set of workable recommendations.

The 5 TWGs will be mandated by the National ARCC and will report to their Chairpersons and to the National Focal Point of the National ARCC. The organisational structure, composition, locus of coordination centre and general job description are listed below. Specific jobs of individual TWGs have been detailed in action Plan document.

## **Organization Structure of TWG**

Chairman, Secretary, Member

Secretariat (Location):

1. Education and Awareness: Ministry of Agriculture
2. Surveillance and Research: MoD
3. Infection Prevention and Control: MoH
4. Optimizing Antimicrobial Use: MoH
5. Innovation and Investment: MoRT and HE

## **Membership of TWG**

TWG 1: Education and Awareness

1. ARCC from 5 Ministries
2. Ministry of Education
3. Ministry of Information and Communication



4. NGO

#### TWG 2: Surveillance and Research

1. ARCC from 5 Ministries
2. Academic stakeholders
3. NGO

#### TWG 3: IPC

1. ARCC from 5 Ministries
2. KARS

#### TWG 4: Optimizing AMU

1. ARCC from 5 Ministries
2. Professional associations
3. Hospital Associations: PERSI, ARSI, ARSADA
4. KARS

#### TWG 5: Innovation and Investment

1. ARCC from 5 Ministries
2. Academic stakeholders
3. Business: Biofarma, Kimia Farma, Indofarma

### **Constituting Specialised Task Forces**

Specialised task forces will be commissioned by the TWGs for delivering on specific tasks in the respective strategic areas. They will work under the technical guidance and supervision of respective TWGs and will comprise of experts. The Task forces will be tasked with functions such as evaluation of existing policies, frameworks, interventions and guidelines and the development of guidelines and standards. They will be envisioned for the implementation of the Indonesian National Action Plan as mentioned in the Strategic Plan document.

# Strategic Plan

The strategic plan for Indonesia's NAP AMR is based on implementation of five strategic objectives, each of which has its specific objectives and strategic interventions. Each of the strategic interventions is further elaborated into key activities.

The five strategic objectives are as follows:

## 1. Raising Awareness and Understanding

Aim:

- 1.1. Establish an evidence-based public communications programme on a national scale for improving awareness of AMR amongst the general public and professionals.

Improve knowledge of AMR and related topics in professionals through professional education and training deployed at the national scale.

## 2. Surveillance of AMR

Aim:

- 2.1. Set up a national surveillance system for antimicrobial resistance.
- 2.2. Establish a national multicentre surveillance system for early detection of resistance and monitoring at the national level.
- 2.3. Build laboratory capacity under the supervision of a National Referral Laboratory (NRL) to ensure high-quality microbiological data to support surveillance activities.

## 3. Hygiene, Infection Prevention and Control

Aim:

- 3.1. To establish a national infection prevention and control programme through full implementation and compliance with the IPC guidelines within healthcare settings, animal husbandry systems and fisheries and the food chain.
- 3.2. Decrease Hospital Acquired Infection (HAI).
- 3.3. Limit the development and spread of AMR within the community.

#### 4. Optimize use of Antimicrobial Medicines

Aim:

- 4.1. Establish a national policy and manual on the use of antimicrobials in humans and animals.
- 4.2. Strengthen the enforcement of regulations on antimicrobial post-marketing surveillance.
- 4.3. Establish mechanisms to monitor antimicrobial usage on a national scale.

#### 5. Build investments in new medicines, diagnostic tools, and vaccines

Aim:

- 5.1. To promote sustainable investment in new medicines, diagnostic tools, vaccines and other interventions by engaging the public private sectors.

## Strategic objective 1: RISING AWARENESS AND UNDERSTANDING ON AMR

The GAP AMR has identified the need to raise awareness of AMR and promote behavioural change through public communication programmes. The scope of this strategic objective includes human health, animal health, agriculture, husbandry, fisheries, and other related sectors. The GAP AMR has also focused on making AMR a core component of education, professional training, certification, continuing education, and development in the human health, animal health, agriculture, husbandry, fisheries, and other related sectors. This approach is expected to foster proper understanding and awareness amongst professionals.

The Situation Analysis revealed although awareness campaigns had been carried out, these were on a limited scale for general public and few professional groups. It also pointed towards specific education and training strategies for professionals that had been developed but was yet to be formalised as a government regulation.

By 2019, Indonesia's Strategic Plan will be well equipped to carry out nationwide evidence based awareness campaigns with regular M&E. This will ensure a more robust system of review and ongoing improvement. The aim is also to revise undergraduate, postgraduate curricula and Continuous Professional Development courses that will initially be implemented on a limited scale but with regular audits.

### **Objective 1.1: To establish an evidence-based public communications programme on a national scale for improving awareness of AMR amongst the general public and professionals**

*Strategic intervention 1.1 Establish an evidence-based public communication programme to raise awareness of the general public and professionals on antimicrobial resistance*

#### **KEY ACTIVITIES**

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2017	The MOH, MoA, MoD and MoEnv (or agencies identified by them) to conduct KAP Studies on a national scale on AMR, IPC, and the relationship between the environmental and the impacts of AMU and AMR health of humans, animals and environment) to assess awareness levels and gaps in knowledge in general public, including farmers, cattle raisers, and the environment, in order to assess awareness levels and gaps in knowledge among the general public including farmers and
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	school children.
2017-19	<p>Evidence based communication campaigns using evidence generated will be designed with accurate and relevant messages targeting the general public and media with support from ministries in charge of HRD, education and Information dissemination. Additionally, it is expected that awareness on AMU and AMR can be inserted into primary and secondary school curriculum.</p> <p>Awareness material on IPC and biosecurity measures for professional groups: para-veterinarians and veterinarians, paramedical staff, pharmacy technician and healthcare staff.</p> <p>Ongoing awareness activities of MoF will be enhanced through campaigns.</p>
2017-18	MOH, MOA and other relevant ministries will identify pilot sites to implement communication campaign for antibiotic awareness improvement followed monitoring and evaluation.
2019	Pilot campaigns will be evaluated in 2018. This will be followed by nationwide scale up and scale out of awareness campaigns in 2019 with regular monitoring, evaluation and refresher trainings and awareness campaigns.

### ***Responsible Agency***

MoH, ministries responsible for matters relating to agriculture, animals, fisheries, environment, forestry, primary education, secondary education, and higher education

### ***Partners and Stakeholders***

MoH, ministries responsible for matters relating to agriculture, animals, fisheries, environment, forestry, primary education, secondary education, and higher education, domestic affairs, communication and information, marine affairs and fisheries, coordinating ministry for human development, culture, human resources (teachers, volunteers, researchers), UN bodies, professional groups, media

### ***Key Indicators***

- Awareness levels by target groups
- Evidence based communication campaigns tailored for specific target groups
- Reports on the impact of communication programme
- Enhanced understanding on AMR and IPC

- Attitude and behaviour change (HH: reduced purchase of non-prescription antibiotics)

## **Objective 1.2: Improve knowledge of AMR and related topics in professionals through professional education and training deployed at the national scale**

*Strategic intervention 1.2 Include AMR and prudent use of antimicrobials, as well as the containment and prevention of infection as a core component of professional education, training, certification and development for health care providers and veterinarians*

### **KEY ACTIVITIES**

Under the overall supervision of TWG (Awareness) and technical guidance of Ministry of Education:

2017-2018	The MOH, MOA, Ministry of Defence, MoF and Ministry of Environment (or agencies identified by them) will conduct KAP Studies on a national scale on AMR, hygiene & IPC, as well as relationship between human-animal-environment and the impacts related to AMR. The study aims to assess awareness levels and gaps in knowledge in professionals, ministry officials, and policymakers.
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2017-2018	The MOH, MOA, Ministry of Defence and Ministry of Environment (or agencies identified by them) will conduct KAP Studies on a national scale on AMR, hygiene & IPC, as well as relationship between human-animal-environment and the impacts related to AMR. The study aims to assess awareness levels and gaps in knowledge in professionals (veterinarians, physicians, pharmacists, environmental health specialists, agriculture/production experts, ministry officials of relevant departments and policymakers).
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2017-18	Revision will be undertaken for professional development courses by respective councils/universities (human and animal health, the food industry and agriculture). Roll out of courses will be done on a limited scale along with concurrent regular audits followed by nationwide scale up.
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2019	AMR and related topics will be incorporated in undergraduate and
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postgraduate curricula in human and animal health, the food industry, agriculture, fisheries, and environmental health. Limited scale testing of revised curriculum along with regular audit of courses will be conducted before planning a nationwide scale up in next phase of NAP.

### ***Responsible Agency***

Working group (for mapping & advocacy), university association, ministry responsible for primary, secondary, and higher education, health and accreditation bodies.

### ***Partners and Stakeholders***

- Ministry responsible for matters relating to primary, secondary, and higher education, professional organizations, related personnel.

### ***Key Indicators***

- Awareness levels by professional groups
- Number of revised curricula for target professional groups
- Audit reports of professional courses
- AMR incorporated into curriculum of primary schools, secondary schools, and universities, with continuing professional development.

## Strategic objective 2: SURVEILLANCE OF AMR

The GAP AMR identifies the need to establish evidence based surveillance for AMR in the nation and identifies the following critical information/evidence gaps:

- Epidemiological data on resistant organisms
- Understanding how resistance develops and spreads
- The ability to rapidly characterise the emergent resistant organisms
- Understanding social sciences, behavioural and other research needed for holistic fulfilment of all five strategic objectives
- Treatment and prevention of infections, especially in the low resource settings
- Basic and translational research to support the development of new treatments, diagnostic tools, vaccines and other interventions
- Alternatives to non-therapeutic uses of antimicrobial agents in the context of agriculture, aquaculture and their use in crop protection
- Research on the impact of the interventions on AMR (including economic research)

The situation analysis revealed that the national AMR surveillance in humans is still in policy formulation and planning phase with several pilot initiatives in human health, animal health and aquaculture sectors. Similarly, the process of setting up a network of quality assured laboratories has also started.

The Strategic Plan outlined below draws up a roadmap for developing a nationwide AMR surveillance system and operationalising it by 2019. By the same year it is also expected that a national system has been established for early detection of resistance in priority pathogen.

By the subsequent years, Indonesia also aims to report resistance profiles of priority pathogens. These efforts is expected to be supported by quality assured national referral laboratories in human and animal health sectors

Aim:

- 2.1 Set up a surveillance system for antimicrobial resistance.
- 2.2 Establish a national multicentre surveillance system for early detection of resistance and monitoring at the national level.
- 2.3 Build laboratory capacity under the supervision of a National Referral Laboratory (NRL) to ensure high-quality microbiological data to support surveillance activities.



## Objective 2.1: Set up a national surveillance system for antimicrobial resistance

### *Strategic intervention 2.1 Establish a national coordination structure for surveillance of AMR*

#### KEY ACTIVITIES

2017	Establishment of <b>TWG surveillance and research as the</b> National Surveillance Coordination Centre (NSCC), followed by definition of its mandates and terms of reference.
2018	<p>The NSCC will develop guidelines for AMR Surveillance and prudent use of antimicrobials including guidelines for national data management (indicators, analysis plan, response plan), incorporating the critical components as outlined in global guidance documents (WHO sample templates, GLASS implementation guide, AGISAR technical recommendations, OIE, Codex, etc).</p> <p>The NSCC will identify priority pathogens, sample types, and antimicrobial sensitivity patterns in humans and animals, based on the country's AMR situation</p> <p>NSCC will develop an AMR surveillance plan in humans, animals, food and aquaculture (sample selection, number of samples, sample processing, logistics).</p> <p>NSCC will assess and inventory resources of every center for antibiotic surveillance and antimicrobial resistance</p> <p>NSCC will train surveillance staff and clinical staff in AMR surveillance and lab techniques according to GLASS standards</p> <p>NSCC will develop an integrated human and animal IT platform for AMR surveillance reporting</p>
2018	<p>NSCC will implement a national AMR surveillance programme that is representative of the country situation but with limited number of operational sites. Regular data of AMR along with resistance profiles of priority pathogens for human, animal, food and aquaculture will be made available to NSCC.</p> <p>Antibiotic resistant organisms in representative environments (hospitals, animal production units, slaughterhouses, pharmaceutical manufacturing units etc.) and selected organisms in water and soil, with varying degrees of exposure to antibiotics will be mapped</p> <p>Data will be reported, exchanged and queried through the integrated</p>

AMR surveillance IT platform	
2018	.The NSCC will establish formal linkages between national AMR surveillance programme and UHC (Universal Health Coverage) within the NHI (National Health Institutes) to inform revision of guidelines, essential medicines list etc. Linkages will also be established with WHO GLASS by NSCC.
2019	.A formal assessment of National AMR surveillance will be conducted followed by recommendations of nationwide scale up

### ***Responsible Agency***

- Agencies responsible for matters relating to human health (MoH; DG Pharmaceuticals; DG Health Care; Hospitals, labs (private and public) and primary health care centres; DG of DC, NIHRD, Drug and Food Supervisory Agency, and Data and Information Centre, etc.)
- Agencies responsible for matters relating to animal health (MoA; DG Veterinary Public Health; DG Animal Health; DG Livestock and Animal Health Services; Professional organisations; BBVet and Bvet (animal) (Keswan) and BPMSPH (product), BBPMSOH (animal medicine), etc.)
- Ministry of Fisheries (DG of Aquaculture)

### ***Key Indicators***

- Presence of NSCC with NFP
- AMR surveillance standards and guidelines incorporating GLASS standards and other intergovernmental standards
- Formulation of list of priority pathogens, specimens, pathogen-antimicrobial combinations and sensitivity
- Number of AMR surveillance sites fulfilling requirements of programme
- Data reports from surveillance sites
- Timeliness and completeness of surveillance reports
- Assessment reports of performance of National AMR surveillance programme

**Objective 2.2: Build laboratory capacity under the leadership of a National Referral Laboratory (NRL) to produce high-quality microbiological data for patient and food-safety management and support surveillance activities.**

*Strategic intervention 2.2 Establish a quality assured national laboratory surveillance network*

## **KEY ACTIVITIES**

Under the overall technical guidance of TWG (Surveillance):

2017	<p>The MoH and MoA will identify National Reference Laboratories for their respective sectors. The NRLs are tasked with confirming and characterising specific pathogens, organising quality assurance and participating in external quality assurance schemes (EQAS). The NRLs will coordinate a national network of surveillance laboratories to monitor AMR in human clinical, animal and food samples. Further, environmental surveillance for AMR will be carried out as per 2.1.</p> <p>The NRLs will identify laboratories to implement surveillance and establish standard operating procedures (SoPs) consisting of methods to collect, store and transport samples/specimens, isolate pathogenic bacteria, identify and test sensitivity to antibiotics.</p> <p>The NRLs will develop and share AMR surveillance standards and guidelines, including SoPs, incorporating other intergovernmental standards (OIE/WHO GLASS and AGISAR/Codex) with surveillance laboratories.</p>
2018	<p>NRLs will train healthcare personnel, veterinarians, veterinary paramedics, laboratory analysts, and other personnel involved in surveillance measures according to international standards</p> <p>In support of the national AMR surveillance network, the designation of healthcare and veterinary laboratories will be adjusted to the established surveillance sites.</p>
2019	<p>TWG (Surveillance) will conduct a formal assessment of National laboratory surveillance network followed by recommendations for a nationwide scale up.</p> <p>NRLs will expand the national surveillance laboratory network (involving the Ministry of Marine Affairs and Fisheries and other relevant ministries), and subsequently establish regional and</p>

### ***Responsible Agency***

#### Human Health:

- MoH; DG Pharmaceuticals; DG Healthcare; DG of DC, NIHRD and Data and Information Centre)
- State or private microbiology laboratories
- Drug and Food Supervisory Agency (BPOM)

#### Animal Health:

- MoA, to include DG of Animal Health and Veterinary Public Health
- Ministry of Marine Affairs and Fisheries (DG of Aquaculture)
- BBPMSOH (Center for Quality Testing and Certification of Animal Medicine)
- BPMSPH (Center for Quality Testing and Certification of Animal Products)
- Veterinary Center

### ***Key Indicators***

1. National Reference Laboratories (NRLs) that have expertise in methods for confirming and characterizing specific pathogens, organizing quality assurance and participates in an external quality assurance scheme (EQAS)
2. Number of quality assured laboratories supporting AMR surveillance sites
3. AMR surveillance standards and guidelines incorporating GLASS standards
4. Surveillance staff, clinical staff, and laboratory personnel trained in AMR surveillance and lab techniques according to GLASS standards
5. National AMR testing external quality assurance system
6. Performance reports of NRLs and national laboratory network

**Objective 2.3: Develop a multicentre surveillance system on the national scale to provide early warning of emerging resistance and monitoring of secular trends at national and sub-national levels.**

*Strategic intervention 2.3 Establish a systematic, standardized process to collect, assess and share data, maps and trends on AMR hazards, develop communication and dissemination systems to ensure coordination and information exchange and initiate responses to warning triggers*

**KEY ACTIVITIES**

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2017-18 The NSCC coordinates with surveillance units in the field of agriculture, human and animal health, drug control, and environmental health to assess AMR hazard and risk, and communicate their respective roles and responsibilities

The NSCC will frame guidelines and national standards for systematic collection, sharing, and assessment of AMR hazard events framed in keeping with international standards (IHR/WHO/OIE/FAO); includes surveillance manual, investigation/response guidelines, case management guidelines and lab guidelines.

The NSCC formulates a list and definitions of priority events (priority pathogens, specimens, and pathogen-antimicrobial combinations) in keeping with country AMR situation

The NSCC coordinates surveys to establish baseline estimates and trends of AMR to determine and establish thresholds for alerts and action systems

2019 The NSCC establishes a data and information unit to store AMR information that can be utilized by government agencies, the general public and international community as appropriate in future  
Data transmission on AMR alerts will start flowing from initial phase AMR surveillance sites established pursuant to 2.1. Processing of information will be initiated in real time or close to real time. This will be followed by a comprehensive analysis on AMU in the human and veterinary sector (and fisheries) and its linkage with the resistance profiles reported in animals and humans by the laboratory based AMR surveillance programme

## ***Responsible Agency***

### Human Health:

- MoH; DG Pharmaceuticals; DG Healthcare; DG of DC, NIHRD and Data and Information Centre)
- State or private microbiology laboratories
- Drug and Food Supervisory Agency (BPOM)

### Animal Health:

- MoA, to include DG of Animal Health and Veterinary Public Health
- Ministry of Marine Affairs and Fisheries (DG of Aquaculture)
- BBPMSOH (Center for Quality Testing and Certification of Animal Medicine)
- BPMSPH (Center for Quality Testing and Certification of Animal Products)
- Veterinary Center

## ***Key Indicators***

1. Protocols for interagency communication
2. National standards and guidelines for data collection, information sharing, AMR risk or hazard assessment; investigation and response in accordance with international standards (IHR/WHO/OIE/FAO)
3. List of priority AMR risk triggers
4. Baseline estimates of trends and thresholds for alerts and action systems
5. Multi sectoral Rapid response teams trained response to AMR events
6. Central database of AMR pathogens and their risk information
7. Timeliness and completeness of surveillance reports
8. Assessment reports of performance of national AMR risk Early Warning System

### Strategic objective 3: HYGIENE, INFECTION PREVENTION AND CONTROL

Infection prevention and control, especially in the context of hospitals, is an extremely important aspect of a strategic plan to contain AMR. This is essentially because a clinical setting represents an ecosystem of high antimicrobial usage. Within this ecosystem, exist patients, who may be immunologically impaired. These patients not only represent the population that is vulnerable to serious, life-threatening infections, at the same time, they promote the emergence of resistance.

On the other hand, better hygiene (WaSH) and Infection prevention control represent methods to cut down on the spread of infections in ambulatory human and animal care facilities, in food production systems (including aquaculture) and in the community in general. Vaccination in humans and animals and biosecurity in food production systems are specific interventions that if implemented effectively, can result in better health outcomes and reduced risk of emergence of AMR.

The Situation Analysis of measures related to hygiene, infection prevention and control in human, animal and related sectors shows that initial efforts have been initiated in human health sector alone in the field of infection prevention and control methods and AMR stewardship programme in healthcare settings. Limited scale efforts have also been made in HAI surveillance.

The Strategic Plan as outlined below aims to roll out a comprehensive multi-sectoral national IPC programme on a limited scale in healthcare facilities in THE public and private sector and in selected food chains (farms, slaughterhouses, food processors, aquaculture etc.). Similarly, HAI surveillance will be implemented in few public and private healthcare facilities. In community settings, formal campaigns for sanitation and hygiene including biosecurity and animal husbandry practices, food handling practices and vaccination on a small scale in animal and food production sites. Human vaccination is a well-developed programme that will be further consolidated and strengthened.

**Objective 3.1: To establish a national infection prevention and control programme through full implementation and compliance with the IPC guidelines within healthcare settings, animal husbandry systems and fisheries and the food chain**

*Strategic intervention 3.1 Create a formal organizational structure to ensure proper development and use of infection prevention and control policies and strategies in health care settings, animal rearing facilities and in fisheries*

**KEY ACTIVITIES**

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2017	The TWG (IPC) will commission a multi-sectoral task force that will evaluate existing IPC guidelines and develop a national IPC policy, mandating the creating of a National IPC Programme in healthcare facilities, animal health care facilities, and food production systems.
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2017	<p>The multi-sectoral taskforce on IPC will develop IPC guidelines with implementation and M&amp;E plans covering infection prevention and control in all health care settings (hospital and ambulatory) in human sector including linking it with hospital accreditation system; IPC/biosecurity in animal health facilities, vaccination, and biosecurity in the farm to fork chain in line with international standards set out by OIE/FAO in animal and food production sectors.</p> <p>The taskforce, in collaboration with WHO, FAO, OIE and NCC will identify target groups to be trained in IPC from different sectors (human health, animal health, food production/agriculture, environment) and within the community (policy makers, programme managers, healthcare personnel, veterinary personnel, farmers, cattle raisers general public).</p>
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2017-18	<p>MoH and MoA will coordinate capacity building for IPC and biosecurity teams in the various sectors.</p> <p>MoH and MoA, in collaboration with MoRT&amp;HE, will review existing curricula of professional courses with respect to content on IPC and with support from WHO/FAO/OIE, develop training modules for incorporation into professional courses</p>
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2019	The ministries responsible for matters relating to human health, animal health and fisheries will roll out IPC programme on a limited scale, with dedicated, trained teams in place in some healthcare facilities (hospital type A and B), husbandries, farms, fish farms, and all units involved in food supply (slaughterhouses, food processors, aquaculture etc.).
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TWG (IPC) will conduct a formal assessment of National IPC Programme followed by recommendations of nationwide scale up in all human and animal healthcare facilities across the nation and across all food production systems (sectors 1, 2 and 3)

### ***Responsible Agency***

- MoH: DG of Pharmaceuticals; DG Health Care
- MoRTHE:DG of HiEd
- Ministry of Civil Service
- MoA
- MoFishery
- MoTrade
- Local government and private sector

### ***Key Indicators***

- Evidence based IPC guidelines
- Healthcare workers and staff trained in IPC procedures and guidelines
- Number of institutions with IPC programme
- Revision of curricula of target professional groups
- Number of institutions with audit reports
- Performance reports of national IPC program

## **Objective 3.2: Decrease Hospital Acquired Infection (HAI) and associated AMR through facility based HAI surveillance programme (Human Health)**

*Strategic intervention 3.2 Implement a healthcare facility-based HAI surveillance system along with related AMR surveillance (human health).*

## **KEY ACTIVITIES**

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2017	The TWG (IPC) will commission a multi-sectoral task force that will develop guidelines for HAI surveillance (objectives, standardized case definitions, methods of detecting infections/procedures/exposures and exposed populations, process for analysis of data, evaluation of data quality, reporting/communication lines at local level and from local to national facilities, quality assured microbiology capacity including a designated national reference laboratory, training programme, financial outlays). Existing HAI surveillance guidelines of MoH will be reviewed for suitably incorporating them into the revised guidelines including the list of priority pathogen available from university hospitals that have ongoing limited HAI surveillance
2018	NCC for AMR surveillance will implement on pilot scale a HAI surveillance in few public and private healthcare facilities. HAI surveillance data will be reported centrally from these public and private healthcare facilities through the 'Online System" developed by MoH.
2019	NCC will carry out a formal assessment of HAI surveillance pilot. Data from HAI surveillance network will be integrated into National AMR surveillance network. Integrated analysis of surveillance data will form the basis for monitoring and response frameworks, including the identification of priority triggers (priority pathogens or pathogen-drug resistance combination) that will be established by NCC. HAI surveillance will be implemented on a national wide scale covering national, provincial and district level hospitals in public and sentinel private hospitals/chains of hospitals

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### ***Responsible Agency***

MoH, Provincial and District/City Health Offices

### ***Key Indicators***

1. National HAI surveillance standards and guidelines
2. Number of HAI surveillance sites
3. Performance reports of national HAI surveillance programme

**Objective 3.3: To limit the development and spread of AMR outside health settings through sanitation campaign and training on a national scale and monitoring and evaluation of these campaigns**

### *Strategic intervention 3.3 Promote sanitation and hygiene by social mobilization and behavioural change activities*

#### **KEY ACTIVITIES**

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2017 The TWG (IPC), in collaboration with TWG (Awareness), will establish a joint evaluation collaboration forum. Participatory Hygiene and Sanitation Transformation (Joint effort of MoA and MoH) has been operational in 17 provinces since 2016. The collaboration forum will review and evaluate these campaigns, generate new evidence wherever necessary and modify guidelines suitably to address issue of sanitation and hygiene including biosecurity and animal husbandry practices, food handling practices and vaccination in humans and animals

#### **Under the overall technical supervision of TWG (IPC):**

2018 MoH and MoA will implement formal campaigns for sanitation and hygiene including biosecurity and animal husbandry practices, food handling practices and vaccination on a small scale in animal and food production sites.  
MoA will establish immunization programmes for preventable infections. Animal vaccination campaigns will be rolled out on limited scale with a plan for phased nationwide scale up developed; MoH will evaluate existing vaccination programme for their effectiveness and coverage

2018-19 MoH and MoA will include sanitation and hygiene including food handling practices in the core curricula for specific major groups such as pharmacist, nurse, culinary institutions. MoE will incorporate sanitation and hygiene related content in secondary and undergraduate education for school children

2019 MoH and MoA will carry out monitoring and concurrent evaluation of campaigns on sanitation and hygiene including biosecurity and animal husbandry practices and food handling practices to inform nationwide scale up

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#### ***Responsible Agency***

Ministries responsible for matters relating to health, agriculture, education.

### ***Key Indicators***

1. Campaign for sanitation and hygiene in a number of sectors
2. Number of revised curricula for primary schools, secondary schools, and higher education covering sanitation and hygiene
3. Vaccination coverage rates

## **Strategic Objective 4: OPTIMIZE USE OF ANTIMICROBIAL MEDICINES**

Use of antimicrobials in any form, even when rational and prudent, can precipitate resistance in target microbes. High antibiotic use may reflect over-prescription, easy access through no prescription sales, and more recently sales via the Internet which are widespread in many countries.

The situation analysis reveals that Indonesia has made some progress in this arena. The National AMR containment policy for control of human use of antimicrobials and an AMR stewardship programme in the country have been articulated. However, when it comes to surveillance of antimicrobial use and sales in the community, the systems are yet to be developed, except for some pilot institutional initiatives. Animal health sector, however, lags on all of the above fronts.

Indonesia will establish a robust system for regulation and surveillance of use of antimicrobial agents for control of human and veterinary use of antimicrobial substances. Some of the measures that may be taken include:

- 1) National AMR Containment and Use Policy and related regulatory frameworks,
- 2) National Drug Policy,
- 3) Coordination by Drug Regulatory Authority,
- 4) Essential medicines list and standard treatment guidelines with special reference to use of antimicrobial agents,
- 5) Evidence based guidelines for National Antimicrobial Stewardship Programme in human and animal health care, ambulatory and community settings as well as aquaculture, and
- 6) AMU monitoring programme in humans and food animals including, residues testing in food products.

**Objective 4.1: Establish a national AMR containment policy, Antimicrobial Stewardship Programmes (AMSP) and Standard Treatment Guidelines (STG) at a national scale for prudent use of antimicrobials**

*Strategic intervention 4.1 Create a national AMR containment policy for control of use of antimicrobials in humans and animals, and establish a comprehensive evidence-based formal antimicrobial stewardship programmes at the national level*

**KEY ACTIVITIES**

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**The TWG (AMU) will commission a task force to develop a National AMR Containment and Use Policy and related regulatory frameworks. Within this policy framework, the task force will:**

2017-2018      Propose a formal organisational structure responsible for implementation of the National AMR containment policy.  
Formulate regulatory framework for control of human and veterinary use of antimicrobial substances, including but not limited to the phasing out of Antimicrobial Growth Promoters (AGPs) and establishment of system for certification of farm products free from antibiotic residue.  
Update and prepare and encourage implementation of guidelines on the use of antibiotics as a National Policy in support of AMR containment and rational use of antibiotics.

2018      Develop an essential antibiotics based on Indonesian situation of current levels of AMR, availability, supply chains, financial outlays and international guidelines and standard treatment guidelines in human medicine, veterinary medicine and aquaculture (including antimicrobial growth promoters; AGPs). In addition, national guidelines for antibiotic use will be considered when developing essential medicines list and National Formulary.  
STGs and clinical guidelines will be developed by the taskforce for training, supervision and supporting critical decision-making in antimicrobial use practices, both in human and veterinary healthcare and fisheries, under the leadership of respective sectoral councils/universities  
Conduct baseline surveys to assess the extent, barriers and enablers of

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### AMSP at institutional levels

Develop comprehensive, evidence based guidelines for National AMSP for addressing the core areas (leadership commitment; accountability; drug expertise; actions to support optimal antimicrobial use; monitoring antimicrobial prescribing, use and resistance; reporting information to staff; education for clinicians) in human and animal health care, ambulatory and community settings as well as aquaculture. Existing guidelines practiced in learning and referral hospitals will be reviewed and suitably incorporated into the comprehensive guidelines. Existing hospital accreditation code (KARS, JCI) will be modified to qualifying criteria for AMSP.

### Under the overall supervision of TWG (AMU)

2018-19 Formulate policies and regulations on AMU in humans, animals, and fish, along with strict sanctions.

The ARCCs of respective ministries will implement AMR policy for control of human and veterinary use of antimicrobial substances, including the phasing out of Antimicrobial Growth Promoters (AGPs). Limited scale implementation of the national AMSP in human and animal health care and ambulatory facilities and aquaculture will be done in existing University network. This will be followed by nationwide implementation.

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### ***Responsible Agency***

- MoH (DG of Farmalikes, DG of Yankes, ARCC), MoA, MoFisheries, Ministry of Defense, Ministry of Finance, KARS, Drug and Therapeutic Committee

### ***Resources***

- Staff
- Expertise (ID specialist, Clinical Microbiologist, Clinical Pharmacologist, Clinical Pharmacist)
- Finance: related ministries, local government (Provincial MoH), hospital
- Baseline data
- Further specify the volume of required resources and budget.

### ***Key Indicators***

1. Evidence based national standard treatment guidelines

2. National Essential medicines list
3. Regulatory framework for control of human use of AMAs
4. Comprehensive, evidence based National AMSP guidelines for health care and community settings addressing the core areas
5. Performance reports of National AMSP

**Objective 4.2: Regulate post-marketing quality of drugs under the coordination by NRA/DRA to ensure access to safe and quality antibiotics**

*Strategic intervention 4.2 strengthening the coordination by National Regulatory Agency (NRA) or Drug Regulatory Agency (DRA) which can enforce quality standards of antimicrobial drugs (veterinary, human, and aquaculture)*

**KEY ACTIVITIES**

2017 **TWG (AMU) will formulate a National Drug Policy with special reference to AMAs and AMR. The Policy will be applicable to human and animal health and aquaculture and will be made available in the public domain**

**Under the overall supervision of TWG (AMU):**

2017 MOH will establish a coordination by Drug Regulatory Authority (DRA) including drug import, manufacture, quality, distribution, market authorization, advertising, and inspection. This coordination will cover drugs used in human health, animal health and aquaculture. The coordination by DRA will develop regulations and quality checklists for AMAs, APIs and its distribution. The coordination by DRA will establish a system for the drug quality control, including tracking and reporting.

2018-19 Within the regulatory frameworks, the MoH, MoA and MoF will establish an institutional network, at national and provincial level, with the capacity for quality control of antimicrobial agents or APIs on the market.

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2017-19 ARCC will commission independent periodic surveys to estimate the extent of non-prescription sales of antibiotics and APIs and the drivers for the same and evaluate the effectiveness of regulations done and corrective measures undertaken

2018-19 Nationwide gradually implementation of drug regulatory system in human health, animal health, and aquaculture, will be possible beyond 2019

### ***Responsible Agency***

- MoH (DG Farmalkes, DG Yankes, ARCC), NADFC, MoA, MoFisheries, Ministry of Defense, MoF

### ***Resources***

- Staff
- Expertise
- Finance: MoH, Local Government (Provincial MoH), Hospital.
- Baseline data.
- Further specify the volume of required resources and budget.

### ***Key Indicators***

1. Regulations for rational use of antimicrobials
2. Coordination by DRA including drugs which are used in human health, animal health, and aquaculture
3. Coordination system by DRA for drug quality control, including tracking and reporting
4. National Antimicrobial Use Policy
5. Drug regulatory including drug import, manufacture, quality, distribution, market authorization, advertising, and inspection.
6. Number of drug quality monitoring sites; estimates of non-prescription sales of AMAs and APIs

**Objective 4.3: Establish mechanisms to monitor antimicrobial usage on a national scale to inform interventions to reduce overuse and promote prudent use of antimicrobial substances**



*Strategic intervention 4.3 Monitoring antimicrobial use (AMU) and sales in humans, animals and fisheries; monitor trends of residues of antimicrobials in food chains to inform interventions to promote prudent use of antimicrobials*

## KEY ACTIVITIES

2017	NCC will establish a TWG on AMU Surveillance with appropriate mandate, TORs and Focal Point (FP) that links with NCC
2018	<p>The ASCC will review policies on AMU and monitor their impact on AMR. ASCC will design an AMU monitoring programme in humans and food animals including, residues testing in food products (guidelines and standards for surveillance design, data type, reporting formats, reporting sites, sources of antimicrobial usage/sales data, list of indicators - defined daily doses or DDD, duration of therapy or DOT, sales quantity per kg of slaughtered animal, etc.)</p> <p>ASCC will also develop guidelines to implement residue testing including data sharing. Existing national AMR and AMU surveillance and surveillance system of MoA for residue testing and Isikhnas (National Livestock Health Information System) for fowls will be reviewed for their suitability by ASCC and incorporated in the revised surveillance system.</p>
2019	<p>MoH, MoA and MoF will implement AMU surveillance and residue testing. Healthcare facilities, including in ambulatory and community settings (human and animal pharmacies etc.) and in (parts of) animal husbandry chains (e.g. farm level) will be recruited on a limited scale. For residue testing, surveillance sites will be identified under MoA programme will be recruited. AMU surveillance and residue testing will be scaled up to national level by 2019. Data for the use of antimicrobial substances and sales data in humans, animals and fisheries on national scale will be available by 2019 and published in public domain.</p> <p>The ASCC will analyse AMU data in linkage with the resistance profiles reported by the laboratory based AMR surveillance programme. Actionable recommendations will be made to modify existing local STGs</p>

## Responsible Agency

MoH (DG Farmalkes, DG Yankes, ARCC), KARS, Local Government (Provincial MoH), MoA, MoF, Ministry of Defence, Hospital

***Key Indicators***

1. AMU surveillance and monitoring system
2. AMU data at the national level
3. Actionable recommendations on modifying AMU to contain AMR

## Strategic Objective 5: INCREASE INVESTMENTS IN NEW MEDICINES, DIAGNOSTIC TOOLS, VACCINES AND OTHER INTERVENTIONS TO REDUCE ANTIMICROBIAL USE

The GAP AMR posits that the economic case should reflect the need for capacity building and training in low resource settings, while developing evidence based interventions to reduce infections and combat AMR. The 2001 strategy for AMR containment could not achieve its goals; one of the reasons cited for the same is that there were economic assessments, which evaluated the cost of doing nothing versus the cost/benefits of action at the present.

The Situational Analysis indicates that a strategic research policy focusing on research funding, including the national policy, which has been the mandate for the global NAP is in the process of being finalised.

The Strategic Plan lays down a roadmap for establishing a strategic research agenda, with systematically prioritised research areas and knowledge gaps related to AMR that will feed into a national policy for research and innovation. By 2019, multi-stakeholder platform and research consortia will be established that will generate evidence on and compare cost effectiveness of AMR control strategies. The strategic plan also envisions collaborations with national and international agencies, for implementation of strategic research agenda.

### **Objective 5.1: To promote sustainable investment in new medicines, diagnostic tools, vaccines and other interventions by developing a strategic research agenda and national research policy**

*Strategic intervention 5.1 Generate cost effectiveness and benefit evidence for reducing AMU & AMR; develop a national strategic research agenda*

#### **KEY ACTIVITIES**

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2017	The TWG (Innovation and Investment) will commission a task force to assess the (cost-)effectiveness and feasibility of existing interventions to reduce the need for antimicrobial use in health care settings, animal husbandry systems and fisheries
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**Under the overall supervision of TWG (Innovation and Investment) and TWG (Surveillance) and in collaboration with Ministry of Research, Technology and Higher Education:**

2017-18 The ARCCs (MoH and MoA) will create an inventory of relevant networks, initiatives, institutions and experts involved in AMR research in the country/region. The ARCCS will assess existing research, capacities, future plans and funding sources for research and innovations through a landscape analysis.

ARCCs will develop a Strategic research agenda, with systematically prioritised research areas and knowledge gaps related to research and innovation in the field of AMR, and resource needs listed (in terms of human resources, materials and funding).

2017-18 TWG (Innovation and Investment) will develop a national policy for research and innovation in AMU practices and AMR, including research into alternatives for AMU practices

2018-19 TWG (Innovation and Investment) will establish a multi-stakeholder platform to guide AMR research and innovation. Three priority thematic research platforms will be: Animal health and economics, Human health and economics and Human and animal interface including environmental prevention and control. The research platforms will develop research consortia, and establish collaboration with national and international agencies, for implementation of strategic research agenda. Priority research on cost effectiveness and feasibility of interventions to reduce AMU and assessment of barriers and drivers for uptake of prudent antimicrobial use practices will be undertaken to immediately inform strategic interventions in other strategic objectives such as prioritization of interventions that could reduce the need for antimicrobial use in several settings.

***Responsible Agency***

MoH (NIHRD, DG Yankes, DG Farmalkes), MoA, MoF, Ministry of Research, Technology and Higher Education, relevant professional associations

***Key Indicators***

1. Research network and collaborations
2. Multi-stakeholder research initiative National Research Policy on AMAs and AMR Research

3. Strategic research agenda, with prioritised research areas, and resource needs in the field of AMAs and AMR

## Way forward

The National Strategic Plan for prevention and control of AMR in Indonesia has been prepared by stakeholders from different ministries in Indonesia. The Plan is a comprehensive document that describes the country's vision of AMR prevention and control, providing valuable insights from the Situation Analysis and a host of interviews, guided discussions and participative dialogue with multi-stakeholders. NAP AMR of Indonesia provides a constructive opportunity for the government to fine tune it based on their local realities and sensitivities. Accordingly, it presents an affirmative statement of goals, objectives and strategic interventions that will be deployed to achieve the objectives set out clearly in the document.

Following submission of the final report to the World Health Assembly, the Government of Indonesia will continue with its deliberations and planning process under the leadership of NARCC. Next, the NARCC through its constituent TWGs will draw up a detailed operational plan in addition to its budget and monitoring and evaluation plan for successful implementation of the activities. Most of these activities will be implemented by the key actors as outlined in strategic plan that covers the period 2017-19.

The successful implementation of the NAP AMR will serve as an example to other countries in the region, some of whom are still in the process of estimating their AMR burden. Most significantly, this NAP will bring together all the critical players from the public health domain creating greater responsibility, ownership and transparency. Working closely with a more sensitized and aware population, the country will bring down its levels of AMR and going forward institutionalize mechanisms to arrest its spread.

## References

1. World Health Organization. Global action plan on antimicrobial resistance. Geneva; 2015.
2. Van Boeckel TP, Brower C, Gilbert M, Grenfell BT, Levin SA, Robinson TP, et al. Global trends in antimicrobial use in food animals. *Proc Natl Acad Sci*. 2015;112(18):5649–54.
3. Van Boeckel TP, Gandra S, Ashok A, Caudron Q, Grenfell BT, Levin SA, et al. Global antibiotic consumption 2000 to 2010: An analysis of national pharmaceutical sales data. *Lancet Infect Dis*. 2014;14(8):742–50.
4. Center for Disease Dynamics Economics and Policy, Global Antibiotic Resistance Partnership. The State of the World's Antibiotics, 2015. Washington DC; 2015.
5. World Health Organization. United Nations high-level meeting on antimicrobial resistance. Antimicrobial Resistance. World Health Organization; 2016. p. 3.
6. Claassen I, Wagenaar JA, Schreijer A. 2015 Identification Mission on Antimicrobial. Jakarta; 2015.
7. Lestari ES, Severin JA. Antimicrobial Resistance in Indonesia: Prevalence, determinants and genetic basis. Erasmus University, Rotterdam; 2009.
8. Farida H, Severin JA, Gasem MH, Keuter M, Wahyono H, van den Broek P, et al. Nasopharyngeal Carriage of *Streptococcus pneumoniae* in Pneumonia-Prone Age Groups in Semarang, Java Island, Indonesia. Chabalgoity JA, editor. *PLoS One*. 2014 Jan;9(1):e87431.
9. Severin JA, Mertaniasih NM, Kuntaman K, Lestari ES, Purwanta M, Lemmens-Den Toom N, et al. Molecular characterization of extended-spectrum beta-lactamases in clinical *Escherichia coli* and *Klebsiella pneumoniae* isolates from Surabaya, Indonesia. *J Antimicrob Chemother*. 2010 Mar;65(3):465–9.
10. Mendes RE, Mendoza M, Banga Singh KK, Castanheira M, Bell JM, Turnidge JD, et al. Regional Resistance Surveillance Programme Results for 12 Asia-Pacific Nations (2011). *Antimicrob Agents Chemother*. 2013 Nov;57(11):5721–6.
11. Lestari ES, Severin JA, Filius PMG, Kuntaman K, Duerink DO, Hadi U, et al. Antimicrobial resistance among commensal isolates of *Escherichia coli* and *Staphylococcus aureus* in the Indonesian population inside and outside hospitals. *Eur J Clin Microbiol Infect Dis*. 2007 Nov;27(1):45–51.
12. Xu Y, Gu B, Huang M, Liu H, Xu T, Xia W, et al. Epidemiology of carbapenem resistant *Enterobacteriaceae* (CRE) during 2000-2012 in Asia. *J Thorac Dis*. 2015 Mar;7(3):376–85.

13. Monitoring and Evaluation Research Group. Indicator Standards: Operational Guidelines for Selecting Indicators for the HIV Response. Geneva; 2010.
14. World Health Organization. Antimicrobial Resistance: A manual for developing national action plans. 2016.
15. World Health Organization. Template for a national action plan on antimicrobial resistance. 2016.

## Annex: Interpretation of phase of AMR prevention and control programme implementation

Phase of Programme Implementation	What it means
Phase 1 Phase of Exploration and Adoption	<p>There are no programs implemented in a systematic manner in order to conduct AMR prevention and control in the country. However, the process of designing a programme has been initiated, and depending on the progress made (as seen through the indicators), it may be that one or more of the following activities are being undertaken:</p> <ul style="list-style-type: none"> <li>- Identification of needs, options and resources</li> <li>- Identification of potential barriers to implementation (funding, human resources, system responsiveness, etc.)</li> <li>- Investing in systems to augment their readiness to deploy the programme and overcome the identified barriers in implementation</li> <li>- Identifying structures (both in policy making and implementation frameworks) to aid in the implementation of the programme.</li> </ul> <p>As the nation gets closer to the end of Phase 1, it is on the verge of implementing (at any scale, even a pilot project) an AMR surveillance programme.</p>
Phase 2 Phase of Programme Installation	<p><b>The decision to implement a programme</b> has been made and the initial set of activities have been undertaken in order to launch the programme. These may include:</p> <ul style="list-style-type: none"> <li>- Capacity building</li> <li>- Resource allocation</li> <li>- Establishment of data transmission, security, and sharing protocols</li> <li>- Development of process indicators, standard operation protocols and other guidelines to be adhered to by institutions participating in the programme</li> </ul> <p>In course of the second phase, there is more emphasis on development of infrastructure, and allocation of resources in order to implement a programme in a defined context and then</p>



	scale it up to the national context in the subsequent phases.
Phase 3  Phase of Initial Implementation	<p>This is probably the most challenging phase in the stages of early <b>implementation</b> of any programme within the context of developing nations. In this phase, there is a need to initiate a change or an intervention, which may have patchy uptake or maybe avoided altogether.</p> <ul style="list-style-type: none"> <li>- In course of this phase, a functional model of the programme is identified</li> <li>- All protocols, SOPs, etc. undergo a real world challenge</li> </ul> <p>This is a very crucial phase and most programs are likely to find it difficult to come out of this phase.</p>
Phase 4  Phase of Full Operation	<p>This is the process of <b>scaling up a successful model</b> of the programme that may have been trialled in the previous phase.</p> <ul style="list-style-type: none"> <li>- The programme is part of accepted practice</li> <li>- There is a nation-wide (or a large scale) adoption of the programme</li> <li>- The programme is functional by generating outputs and outcomes on a regular basis (seek proof of evidence)</li> </ul>
Phase 5  Phase of Sustainable Operation	<p>This is the highest grade of <b>operational efficiency of the programme</b> and indicates that the programme can have long-term survival.</p> <ul style="list-style-type: none"> <li>- The programme is resilient to changes in funding volume, partner agency support, etc. external factors which were essential for installation and initial implementation of the programme.</li> <li>- Through a functional M&amp;E mechanism, there is systematic improvement of capacity, especially in human resources and system capacity, to enable the programme to function without extensive need to invest in continued capacity building.</li> </ul>