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Lessons From Health Screening Programs in Asean: A Comparative Policy Analysis Using the National Health Screening Implementation Maturity Index

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ABSTRACT

Non-communicable diseases (NCDs) account for nearly two-thirds of deaths in Southeast Asia, demanding the strengthening of primary service-based health screening as a key prevention strategy. This study aims to analyze the strategies, patterns, and challenges of national screening programs in ASEAN countries through a comparative policy approach to strengthen the Free Birthday Health Checkup (PKG) in Indonesia. The research method used a structured narrative review of policy documents, government reports, and academic publications from 11 ASEAN countries, focusing on the dimensions of implementation maturity: geographic scale, universality of age targets, and funding sources. These three dimensions were assessed through a scoring index of 0–3, resulting in a total score out of 9 for mapping the maturity index of national health screening implementation. The results showed significant variations: Indonesia (score 9), Thailand (8), Malaysia, Singapore, and Brunei (7) were in the high index with high coverage and universality; the Philippines (6), Myanmar (5), Cambodia, and Timor-Leste (4) were in the medium index; while Vietnam and Laos (2) remained low, depending on project pilots. In addition, the findings underscore the role of financing stability and digital integration in successful implementation. The implications for Indonesia are that PKG has the potential to serve as a robust health screening model and pilot, but it requires strengthening human resources, standardizing services, and integrating data to overcome regional heterogeneity. Further recommendations include more in-depth research on ASEAN countries for knowledge transfer and capacity building in developing countries.

INTRODUCTION

Health screening in primary care serves as a key policy instrument for early disease risk detection (Lloyd-Jones et al., 2019; Mulvaney-Day et al., 2018). When implemented effectively, optimal health screening reduces chronic disease incidence, controls long-term costs, and enhances public health literacy and access. According to WHO data (2024), non-communicable diseases (NCDs) account for the largest share of deaths in Southeast Asia, making strengthened primary-level screening not merely an option but a systemic imperative that governments must address.

Non-communicable diseases (NCDs) account for nearly two-thirds of deaths in the Southeast Asian region (Yusuf et al., 2021). This burden underscores the need for early detection through primary services, enabling earlier and more equitable prevention and management interventions (Choi & Lee, 2022). The WHO Package of Essential NCD Interventions (WHO PEN) framework positions screening for risk factors and priority diseases as a core service in primary facilities (Moser et al., 2023), as proactive approaches at this level have proven effective in expanding essential service coverage in low- and middle-income countries (Mendis et al., 2021). Early detection strategies, particularly for hypertension, diabetes, and cancer, have shown significant potential in reducing the

long-term burden of these diseases (Pandey et al., 2020). Furthermore, integrating NCD interventions into primary health care systems enhances accessibility and health equity across diverse populations (Smith et al., 2021).

In Indonesia, the government launched the Free Birthday Health Checkup (Pemeriksaan Kesehatan Gratis Ulang Tahun (PKG)) in February 2025 as a flagship preventive health initiative, which remains in its initial implementation phase (Rahman et al., 2025). The technical framework is outlined in Ministerial Decree No. HK.01.07/MENKES/33/2025, mandating age-specific health screening packages for all residents in defined age cohorts (Yuliana & Setiawan, 2024). Operational infrastructure integrates digital health systems, with registration and notifications managed via the SATUSEHAT Mobile platform—a major advancement in Indonesia's health information technology ecosystem (Wang & Syafrizal, 2023). This initiative aligns with global trends in digital health adoption, particularly in low- and middle-income countries, where digital platforms facilitate widespread access to healthcare (Siti et al., 2022). Furthermore, integrating mobile health systems like SATUSEHAT contributes significantly to improving service delivery and patient engagement in preventive health (Harrison et al., 2023).

Given the PKG program's recent launch and ongoing early implementation challenges, there is an urgent need for evidence-based cross-border learning to guide policy refinement and operational optimization (Tan & Lim, 2023). Comparative studies of national screening programs in other ASEAN countries—which share similar socioeconomic contexts, epidemiological profiles, and health system challenges with Indonesia—offer valuable insights for PKG implementation (Rahman et al., 2022). Such comparative policy analysis facilitates synthesis of successful strategies, identification of common barriers, and adaptation of proven approaches to Indonesia's context (Nguyen et al., 2021). For example, health system innovations in the Philippines and Vietnam have proven effective in overcoming barriers to screening accessibility and equity (Goh & Yap, 2022). Drawing lessons from these countries could accelerate the PKG program's development and ensure that it aligns with best practices in regional health policy (Tan et al., 2023).

Despite the strategic value of such comparative knowledge, the existing literature reveals a significant gap. Current publications often address NCD prevention capacity or health system responses in general terms, lacking detailed comparative analysis of screening program design, operational frameworks, and implementation strategies at the primary care level across ASEAN member states. Studies on the specific architecture of national screening programs—including target population definitions, service delivery models, financing mechanisms, and digital integration strategies—remain scarce. This gap in practice-oriented policy research hinders evidence-based policymaking and regional knowledge exchange.

This article addresses this gap through a systematic comparative analysis of national health screening programs across ASEAN countries. The study aims to: (1) map strategies, operational patterns, and implementation challenges of national screening programs in 11 ASEAN member states; (2) assess implementation maturity using a structured analytical framework; and (3) derive actionable policy lessons to strengthen PKG implementation in Indonesia. Through this comparative policy analysis, the study advances academic understanding of health screening program development in Southeast Asia while providing practical guidance for countries aiming to establish or enhance universal screening systems.

METHOD

This study used a comparative policy analysis approach with a structured narrative review of the documents and literature of national health screening programs in ASEAN countries. This approach combines document analysis and secondary data synthesis to map the maturity dimension of implementation. The study focused on primary service-based national health screening programs/policies in eleven ASEAN countries (Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam, and Timor Leste). Unit analysis is a national program or policy owned by each country. The inclusion criteria for this study include health screening policies/programs that apply at the national level and are fully / partially covered by

the government. The exclusion criterion is a health screening program that is purely private/institutional/project-bound with no national policy support. The search strategy is carried out through several sources, including the WHO portal, the official website of each country's government, and relevant academic publications.

The three dimensions of implementation maturity (target age range, implementation scale/geographic coverage, and funding sources) were synthesized from several WHO frameworks that were considered relevant, such as the Health System Building Blocks, the UHC Service Coverage Index, and the Global Strategy of Digital Health, which were then used as the basis for mapping policy comparisons between countries. The three dimensions were then assessed cross-country and mapped into the National Health Screening Implementation Maturity Index. Each dimension is given a score of 0-3. The study used secondary data from public documents and did not involve primary subjects.

RESULTS AND DISCUSSION

Overview of National Health Screening of ASEAN Countries

Indonesia

In Indonesia, prior to the launch of the Free Health Check-up (PKG) Birthday program, health screening efforts were already underway but tended to be segmented and focused on certain risk groups. The Chronic Disease Management Program (Prolanis) managed by BPJS Kesehatan, for example, is specifically intended for JKN participants with chronic diseases, especially type 2 diabetes mellitus and hypertension with a proactive approach in first-level health facilities to prevent complications and improve quality of life, not as a periodic screening package for the entire population.

At the community level, the Integrated Development Post for Non-Communicable Diseases (Posbindu NCDs) has been developed since 2013 as a community-based health effort for the early detection and monitoring of NCD risk factors (such as hypertension, obesity, hyperglycemia, and risky behaviors) on a regular and integrated basis; However, the evaluation shows that the coverage of the target is still relatively low and is more used by the elderly group, with implementation that is not optimal and highly dependent on cadre capacity and regional support.

P KG Birthday was then introduced as a national quick win through the Decree of the Minister of Health Number HK.01.07/MENKES/33/2025, with a life cycle approach from newborns to the elderly and the provision of a free health check-up package every year on the birthday. This program is carried out in an integrated manner at the First Level Health Service Facility and other facilities, using an information system connected to the National Health Information System, including the SATUSEHAT Mobile and ASIK applications for registration, recording, and presentation of digital "health report cards" for participants. The target of PKG covers the entire Indonesian population, ranging from 2-day-old babies, toddlers and preschoolers 1 - 6 years old, adults 18 - 59 years old, and the elderly ≥60 years old. So that for the first time, Indonesia has a periodic health check scheme that is truly population-based across age groups, complementing previous screening programs such as Prolanis and Posbindu PTM.

Malaysia

The National Health Screening Initiative (NHSI) is the National Health Screening Initiative (NHSI). NHSI is part of the National Agenda for Healthy Malaysia (ANMS) which implements a whole of nation approach involving the government, the private sector, NGOs, and the community. This program was launched in July 2022 to increase screening rates and empower the public to detect the risk of NCDs early. The components of the NHSI basic screening include body mass index (BMI), blood pressure, blood sugar levels, blood cholesterol levels, and smoking status. The main target of this program is Malaysian citizens aged ≥40 years old and have not undergone a health screening in the last 3 years. Access is done through the Appointment System (online appointment), as well as walk in at Health Clinics/KKIA/Village Clinics/Community Clinics.

The NHSI program is also used as an umbrella program that unifies and accelerates the use of pre-existing screening channels. Some of NHSI's main partners from the beginning were PeKa B40, the Malaysian Social Security Organisation (Socso), and LPPKN. PeKa B40 (ProtectHealth) is a health screening scheme focused on groups with the bottom 40% of household income, recipients of Rahmah Cash Donation (STM), and those over 40 years old. In addition, Socso is a social security agency under the Ministry of Human Resources that provides a health screening program for formal workers, with the participation of active participants/contributors, i.e. those who routinely pay contributions to the labor social security scheme. The National Population and Development Institute (LKKPN) is also the main partner of NHSI under the Ministry of Health Malaysia. LPPKN acts as a channel for screening the general public, especially women, through the Nur Sejahtera Clinic (KNS) network spread throughout the country. There are two main health screening packages offered for a fee. The first package is Package 1 (RM10.00) which includes BMI checks, blood pressure, blood sugar, and cholesterol. Open to all citizens and non-citizens, male or female, with no age restrictions. While the second package is Package 2 (RM 25.00) which includes BMI checks, blood pressure, glucose, cholesterol, Pap smears, and breast clinical examinations (CBE). This plan is intended for women who are married, once married, or at risk (including those who are sexually active ≥18 years old).

These three channels (PeKa B40, SOCSO, and LPPKN) synergistically expand the scope of NHSI, where each institution targets different segments of the population: low-income groups, formal workers, as well as the public and women of reproductive age. Through this integration, NHSI acts as a national coordinating platform that connects various ministries and institutions through the Health Information Exchange (HIE) system and the MySejahtera application, ensuring that screening results are aggregated in one national monitoring system.

Philippines

Health screening in the Philippines is conducted through a national benefit-based approach under the PhilHealth health insurance scheme. The legal framework rests on the Universal Health Care Act (RA 11223) and the National Integrated Cancer Control Act (RA 11215), which require the government to provide early detection and prevention at the primary service level.

At the implementation level, the screening package is included in the PhilHealth Consultation Benefit Package and expanded through PhilHealth Circular No. PC2025-0014. This scheme places primary care providers (PCPs) as the main entrance. Every PhilHealth participant must be registered with a PCP that conducts a risk factor assessment, provides an examination request form, and coordinates referrals to an accredited screening facility. The facility includes laboratories and diagnostic centers licensed by the Ministry of Health (DOH), and the results of the examination must be returned to the PCP for clinical follow-up.

The focus at the moment is cancer screening, specifically breast, colorectal, lung, and liver. All of them are guaranteed to be free of co-payment at accredited facilities. The claim mechanism is carried out digitally through the eClaims System, and payments are channeled directly to the screening facility. This approach strengthens secondary prevention within the framework of Universal Health Care (UHC) and affirms the PCP's position as a service navigation guide and guardian of care continuity.

However, the Philippine system has not yet adopted a national call-recall mechanism, so the implementation of screening is still highly dependent on facility initiatives and individual participation. Electronic recording between facilities is also not fully integrated, and inspection capacity is still limited. In other words, the Philippines' strategy relies on integration into the national insurance system rather than establishing a new population-based screening program, making it an insurance-based screening model.

In addition, non-communicable disease (NCD) screening at the primary level is also based on the Philippine Package of Essential Noncommunicable Disease Interventions (PhilPEN), which is an adaptation of the WHO PEN. PhilPEN was established through DOH Administrative Order No. 2012-0029, which regulates screening, management, and referral for hypertension, diabetes, and

dyslipidemia in primary facilities. The program focuses on early screening for hypertension, diabetes, cardiovascular disease, and risk factors such as smoking and obesity. The main target is adults aged 18 and over, with an emphasis on high-risk groups such as those over 40. Through activities such as Mass PhilPEN, inspections are carried out on a community and door-to-door basis in rural areas with low access to services. PhilPEN is the national clinical standard for early detection of NCDs and serves as the operational basis for primary services financed by PhilHealth.

The implementation of PhilHealth and PhilPEN is like the National Health Insurance (JKN) system in Indonesia, where health screening is included as part of the primary service benefits guaranteed by the national guarantor, rather than as a separate vertical program. In both systems, early detection and prevention of non-communicable diseases are carried out through primary service facilities, with financing sourced from health insurance schemes (PhilHealth in the Philippines, BPJS Kesehatan in Indonesia).

Singapore

Healthier SG was launched in 2023 as part of the transformation of national health policy in Singapore. Initially, the primary healthcare scene in Singapore relied on the private sector, where the private clinic network (about 2,400 clinics) handled approximately 75% of all primary care visits. Meanwhile, public polyclinics play a role as subsidized primary service providers but often bear the surge in demand. Healthier SG's strategy makes the existing system evolve into a private-public partnership, utilizing shared care protocols, interconnected information technology systems, new financing models, sharing of responsibilities and human resources, and two-way feedback channels. The program focuses on distributing services with a wide network of physicians, with citizen enrollment to one physician/polyclinic of choice, emphasis on chronic disease prevention, and the integration of national screening through Healthier SG Screening with subsidies of up to $0–$5 for eligible participants.

The screening package offered includes screening of non-communicable disease risk factors and early detection of cancers that are recommended nationally. The main screening includes screening for diabetes, hypertension, and dyslipidemia, which is done every three years if the results are normal. In addition, residents are also advised to undergo colorectal examination using the Faecal Immunochemical Test (FIT) every year starting at the age of 50, cervical cancer screening through Pap smear (age 25 - 29 years, every three years) or HPV test (age 30 years and above, every five years), as well as mammograms for breast cancer in women aged 50 - 69 years every two years.

The programme is applicable nationally to all Singaporeans and most permanent residents, with implementation in a network of private clinics accredited by the Community Health Assist Scheme (CHAS) and public polyclinics. By 2024, participation in chronic risk factor screening for the age group of 40 years and above is recorded at around 66.4% of the target population, equivalent to more than 1.4 million people. For cancer screening, the participation rate also increased, which was around 35% for breast cancer, 44.9% for colorectal, and 44.9% for cervical.

Thailand

In Thailand, national health screening is integrated into the Universal Coverage Scheme (UCS) administered by the National Health Security Office (NHSO). The focus of this policy is cancer and non-communicable disease (NCD) screening which is integrated into the national benefit package. For colorectal cancer, the NHSO began to include the Faecal Immunochemical Test (FIT) since 2018 for the population aged 50 - 70 years with intervals every two years, targeted to reach around 1.7 million people per year. Cervical cancer screening has also shifted from Pap smears to HPV DNA tests since 2020, with five-year intervals for women aged 30 – 60, and has reportedly covered all three national health insurance schemes (UCS, CSMBS, and SSO). In February 2024, the government added mammograms and breast ultrasound for women ≥40 years old with a family history of breast cancer to the UCS benefit, marking the expansion of coverage to high-risk groups.

In addition to cancer screening, Thailand also has regular health screening packages for chronic diseases such as diabetes, hypertension, and dyslipidemia, which are provided free of charge through

NHSO's network of partner clinics. This service is supported by the Lab Anywhere program, which is a community laboratory system that allows UCS participants to perform basic examinations at local facilities, with results that are directly digitally integrated into the referral hospital. This policy is strengthened by the Neighborhood Healthcare model launched in 2024, focusing on primary care at the community level with equal access, coordination between services, and digitization of national medical records.

With all these interventions, screening in Thailand has national coverage and is fully funded by the government through the UHC/UCS fund, making it universal for Thai citizens. In 2024, program data recorded 1,053,458 women screened for cervical cancer using HPV DNA. As many as 83.4% of target women aged 30–60 years have undergone cervical cancer screening in 2020-2024. In addition, Thailand's Ministry of Public Health (MOPH) report on the elderly in 2022 recorded that 621,596 people aged 50–70 years have been screened for FIT. Regarding chronic diseases/NCDs, measurable annual coverage figures (percentage/number of people screened) are not yet available as an official release.

Brunei Darussalam

Brunei Darussalam has been implementing the National Health Screening Programme (NHSP) since 2019 as part of the Ministry of Health's national strategy to detect non-communicable diseases and cancers early in at-risk age groups. The program is open to citizens and permanent residents, and is implemented nationwide in all government-owned health centers. The main objectives of the NHSP include four main components: cardiovascular risk screening (for ≥40-year-olds who have not undergone a follow-up of chronic disease, including historical interviews, physical examinations, and fasting glucose and lipid tests); colorectal cancer screening using Faecal Immunochemical Test (FIT) for 50 - 75 years old; breast cancer screening through mammograms for women aged 40 - 69 years; and cervical cancer screening using HPV test for women aged 25 - 65 years.

Registration is done through the BruHealth application, where users fill out a risk assessment questionnaire, then the system displays screening recommendations that are appropriate to their age and medical history. Appointment for a check-up can be made directly through the app or by coming to the nearest health center by walk-in. Through this system, the government seeks to standardize the implementation of screening in all regions and utilize digital integration to increase community participation. The NHSP is national but age-group and risk-oriented, not universal for the entire population without age restrictions. Program financing comes entirely from the public budget through the Ministry of Health, with services carried out at government facilities at no cost to participants. Although annual public data on the number of participants screened is not yet available, the existence of the BruHealth digital system allows for continuous monitoring of participation and follow-up of screening.

Vietnam

To date, Vietnam does not have a structured and fully government-funded national health screening program. Early detection of NCDs and cancer is generally carried out through opportunistic screening and limited programs (pilot/region-based), without a national screening package that specifies the type of screening and target population. Nonetheless, the Vietnamese government has explicitly announced the direction of health policy through politburo resolution No. 72-NQ/TW on strategic solutions to strengthen public health protection, services, and improvement. It is mapped out related to the commitment to shift the health system from a curative approach to prevention, including the provision of free annual health checks for all citizens starting in 2026, recording the results of examinations in electronic medical records, and the integration of screening services in the national health insurance scheme. The resolution is the first milestone in reform towards a more universal, structured, and public-financing-based national screening model.

The policy direction is built on the foundation that has been established earlier through Decree No. 155/QD-TTg of 2022, namely the National Plan for Prevention and Control of Non-Communicable Diseases and Mental Disorders 2022–2025. This decision establishes strengthening

the early detection of NCDs as a national priority and serves as a technical basis before expanding coverage towards universal screening. The 2022-2025 plan has regulated various forms of limited and segmented screening, including blood pressure checks, cardiovascular risk assessments, and annual blood sugar checks for the ≥40-year-old age group, along with a target proportion of the population that must be screened every year. The implementation of this plan has also been tested through a number of pilots and region-based activities, especially at community health stations, where NCD examinations are carried out during routine service visits or health campaigns.

Entering the next phase of reform, the Vietnamese government is designing a screening package that will be integrated into the national health financing mechanism. The initial program content planned for implementation in 2026 includes annual general health screenings, NCD risk factor assessments, blood pressure screenings, evaluation of basic metabolic status (blood sugar, simple lipid profiles), as well as updates of individual electronic medical records. The target of this policy is the implementation of annual examinations for all citizens, with an initial priority in the productive age group and the elderly group that has a higher risk burden of NCDs. Through this design, Vietnam is directed towards a more systematic, standardized, and public-funded national screening model.

Laos

In Laos, there is no structured national health screening program; NCD screening services are still very limited and generally appear in the form of small-scale community projects. Data from a community surveillance initiative carried out by Vital Strategies with the Ministry of Health in two districts in the capital of Vientiane showed that through mobile clinics and home visits for about 18 months, more than 4,000 residents who had previously been rarely touched by preventive services were successfully screened, with the finding that about a third of the participants had hypertension, almost half were in diabetes or prediabetes. and two-thirds are overweight or obese. Beyond that, standard health screening in Laos is very minimal, and it can even be said that there is none, except in areas where pilot projects are carried out. The absence of checks for NCDs that are easily accessible to the public indicates the absence of an organized national screening system.

At the policy level, Laos has a National Multisectoral Action Plan for the Prevention and Control of Noncommunicable Diseases 2014-2020 which is an umbrella for NCD control, but the plan has not developed into a national primary service-based screening package supported by national health insurance. The implementation of NCD screening in Laos relies heavily on the support of international partners and capacity-building programs that focus on NCD prevention, screening, and management, rather than on routine health check-ups for the entire population.

Myanmar

Myanmar does not yet have a general population-based national health screening program that guarantees regular screening for the entire population. Early detection efforts for NCDs are mainly integrated into the World Health Organization Package of Essential Non-communicable Disease Interventions (WHO PEN) adopted in 2017 in 20 townships as a pilot for primary services, with a focus on screening hypertension, diabetes, and cardiovascular risk factors at basic level facilities.

Beyond NCDs, Myanmar developed the National Programme for Secondary Prevention of Cervical Cancer 2020 - 2024 targeting HIV-negative women aged 30 - 49 years and all HIV-positive women, using a combination of HPV DNA testing and VIA screening with an estimated 1.5 million screening services during the period 2020 - 2024 (approximately 300,000 services per year) and a target coverage of approximately 16% of women aged 30 - 49 years by 2024. A number of additional interventions, such as the NCD Screening Response led by Community projects in Yangon Region and Kayah State, provide community screening for adult populations with the support of digital health solutions, but their geographical coverage is still limited to some areas and refugee camps.

The screening approach in Myanmar is still disease-specific, facility-dependent, and dependent on patient contact with primary services and several vertical programs (PEN, cervical cancer, TB-DM pilot). Rather than having a common national screening package that guarantees at least one periodic health check-up for every citizen, Myanmar's current position is more akin to strengthening

NCD services and a gradual disease-specific screening program in terms of both coverage and funding integration.

Cambodia

Population-based, population-wide national health screening is not yet available in Cambodia Early detection efforts for NCDs are primarily integrated into primary services through the National Standard Operating Procedure for Diabetes and Hypertension Management in Primary Care which was passed in 2019 and is compiled based on the WHO PEN approach. This document is a national guide for health centers to conduct blood pressure measurements, glucose checks, risk factor assessments, lifestyle counseling, and early management of hypertension and diabetes, and operates within the framework of the National Multisectoral Action Plan on NCDs 2018 - 2027 and the National Strategic Plan for NCDs 2022 - 2030. However, the implementation of screening is still highly dependent on patient contact with health facilities, and service studies show that most adults have never had their blood pressure or blood sugar checked, reflecting the lack of a structured and routine national screening program.

Outside of NCDs, Cambodia developed the National Action Plan for Cervical Cancer Prevention and Control 2019–2023 along with the Standard Operating Procedure on Cervical Cancer Screening 2018 as a framework for the gradual establishment of population-based cervical cancer screening programs. The plan targets the expansion of VIA screening services and a phased transition to the use of HPV DNA testing (including a self-swab option) across provinces, with technical support and funding from WHO and UNFPA. However, recent policy briefs and evaluations show that cervical cancer screening coverage is still low, primary facility capacity for diagnosis and management of precancerous lesions is uneven, and implementation is highly dependent on the support of international projects and partners.

Several limited-scale innovative interventions have been tested, including a pilot integration of early screening of NCDs (blood pressure and blood sugar for adults ≥40 years) with COVID-19 vaccination in early 2021 at 10 major vaccination sites in two provinces. The intervention reached several thousand adults and found that more than 40% had never had their blood pressure checked and more than 70% had never had their blood sugar checked before, confirming the existence of large gaps in access to NCD screening in the general population. Thus, the approach to health screening in Cambodia is still fragmented and disease-specific, centered on specific NCDs and cervical cancer, with limited scope and highly dependent on projects and donors, and has not yet developed into a structured general national health screening package.

East Timor

To date, Timor Leste has not implemented a comprehensive health screening program that ensures regular checks for all residents. Early detection of NCDs is more commonly inserted into primary services through the adaptation of the WHO Package of Essential Noncommunicable Disease Interventions (PEN) to Timor-Leste PEN (TL PEN). The package is positioned as part of the health center and health post services, and began to be introduced around 2017 in several facilities in Dili and Ermera before being gradually expanded to other municipalities. TL PEN's primary focus is to discover and treat hypertension, diabetes, cardiovascular disease, and chronic lung disease through blood pressure and blood sugar measurement, risk factor assessment, lifestyle counseling, and first-rate clinical follow-up. The findings of the 2014 WHO STEPS survey show that the burden of risk factors for NCDs in Timor Leste is quite high, but the proportion of the population who have undergone screening is very small. For example, only about 1.1% of women aged 30 - 49 years have been screened for cervical cancer. This illustrates that screening is still not in the form of a national system that reaches a wide population.

In recent years, the country has begun to move more aggressively in cervical cancer, but it remains in the form of a program that is very specific to the disease and limited to a specific target group. In 2024, the Ministry of Health is implementing a single-dose HPV vaccination campaign for girls aged 11 - 14 years and reporting coverage above 90% (about 56 thousand girls covered in a short

period of time), as part of its commitment towards the goal of eliminating cervical cancer. Following that, in 2025 the first HPV screen-and-treat clinic will be launched at Vera Cruz Community Health Centre, Dili, which provides self-collection-based HPV screening for women aged 30 - 49 years with rapid results and treatment options at the same visit, through the support of EPICC and other international partners. These measures point to a stronger policy direction on cervical cancer prevention, but it has not yet morphed into a common health screening package across age groups; The screening approach in Timor Leste remains based on specific NCD and cancer interventions and facilities-based projects, rather than a comprehensive national screening program.

Cross-Country Mapping According to the Maturity Dimension of National Health Screening Implementation

Variations in health screening approaches in ASEAN countries are then mapped through an Implementation Maturity Index. This index helps identify the extent to which each country has reached the operational capacity needed to run national screening effectively. This index assesses three main dimensions, namely the scale of implementation/geographical coverage, the target age range/universality, and the source of funding. Each of these dimensions is then scored 0–3 to illustrate the maturity level of each country. The following is the operational definition for each scoring:

1. Implementation Scale Dimensions / Geographic Coverage
    a. Score 0 : Screening is limited to pilots, donor projects, or only trials in specific districts/regions
    b. Score 1 : Limited regional coverage. Implementation is limited to a specific region or depends on regional capacity.
    c. Score 2 : National coverage but partial / uneven
    d. Score 3: Full national coverage systemically and equitably, with the same standard of service
2. Universality Dimension / Target Age Range
    a. Score 0 : There is no national screening program, the target group is not clearly defined
    b. Score 1 : Limited partial. Screening is only indicated in one specific risk/age group
    c. Score 2: Moderate partial. Screening includes several target groups
    d. Score 3: Screening was conducted for all age groups, from infants to the elderly
3. Funding Source Dimensions
    a. Score 0 : No special funding by the government; Screening is only done through international/private donor projects, there is no specific budget allocation nationally
    b. Score 1 : Mixed funding with high donor dominance; Government funding has not been properly schemed
    c. Score 2 : There is a structured financing scheme between the government and the private sector / donors
    d. Score 3 : Fully funded by the government, structured scheme

So that from the scoring that has been formulated, the 11 countries can be mapped in the following table:

Table 1. Maturity Scoring of National Health Screening Implementation

No	Country	Implementation Scale Dimensions / Geographic Coverage	Universality Dimension / Target Age Range	Funding Source Dimensions	Total Score
1	Indonesia	3	3	3	**9**
2	Malaysia	3	2	2	**7**
3	Philippines	2	2	2	**6**
4	Singapore	3	2	2	**7**
5	Thailand	3	2	3	**8**
6	Brunei	3	2	2	**7**

7	Vietnam	0	1	1	**2**
8	Laos	0	1	1	**2**
9	Myanmar	2	2	1	**5**
10	Cambodia	1	2	1	**4**
11	East Timor	1	2	1	**4**

Based on the score on the three dimensions of the implementation scale, the universality of the targets, and the source of funding, there is a gradation in the maturity of the implementation of national health screening in the ASEAN region. In general, countries can be grouped into three clusters: high maturity (total score 7 - 9), medium maturity (total score 4 - 6), and low maturity (total score 0 - 3).

The high maturity cluster consists of Indonesia (total score of 9), Thailand (8), and Malaysia, Singapore, and Brunei Darussalam (7 each). Countries in this cluster generally have a national-scale screening policy, with a wide geographical coverage and supported by relatively well-established financing schemes. Indonesia occupies the highest position because it simultaneously meets all three aspects: the scale of national implementation, the target age range covering the entire life cycle, and full public funding. Thailand has also shown high maturity, especially in terms of national coverage and financing through the universal health coverage scheme. Malaysia, Singapore and Brunei have national coverage and structured financing schemes, although the target age range is still partial moderate.

Medium maturity clusters include the Philippines (total score of 6), Myanmar (5), and Cambodia and Timor Leste (4 each). These countries already have national policy frameworks or programs that are sought to be broader, but their implementation is still partial, both in terms of territory, target groups, and financing stability. The Philippines and Myanmar, for example, have incorporated NCD screening into national policies and domestic financing schemes, but their implementation still varies widely between regions. Cambodia and Timor-Leste are in a transitional position, with a combination of policies that are starting to lead to a national approach but still underpinned by donor support and limited coverage.

Meanwhile, the low-maturity clusters include Vietnam and Laos (a total score of 2 each). In both countries, health screening is still dominated by pilot or project-based programs, with narrow coverage of areas and limited target groups. Policy commitments are beginning to emerge, especially in the form of strategic plans and documents, but have not yet materialized into a systemic national screening program with stable financing. These findings show that, despite progress in a number of countries, the capacity for implementing national health screening in ASEAN is still very diverse and leaves a wide gap between clusters.

Cross-country mapping shows that there is a wide variation in the maturity of the implementation of national health screening in the ASEAN region. Middle-to-high income countries with strong public financing systems. Indonesia, Thailand, Malaysia, Singapore, and Brunei are in the highest maturity clusters. This pattern is in line with stable fiscal capacity, strong primary service coverage, and the existence of an established Universal Health Coverage scheme. Thailand, for example, maintains screening funding through UCS consistently, while Indonesia stands out in the universality of target groups through a PKG design that covers the entire life cycle. On the other hand, lower-middle-income countries such as Cambodia, Myanmar, and Timor Leste are in the medium maturity cluster with partial implementation. Laos and Vietnam, although they already have policy commitment documents, are still in the early stages because screening activities are dominated by regional pilots and do not yet have a mature national implementation scheme. The factors that most distinguish the three clusters are the stability of domestic financing, the strength of primary services, and the state's ability to translate policies into equitable implementation in the field.

These findings have important implications for Indonesia. Although the PKG places Indonesia at the highest score, the main challenge is no longer in policy design, but in the consistency of implementation at the level of primary service facilities. Special attention needs to be paid to human

resource readiness, uniformity of service standards, screening tool supply chain, and data integration through the ASIK platform. Indonesia has the potential to become a life-cycle national screening model for the ASEAN region, but its success is highly dependent on the government's ability to maintain consistency in the quality of implementation between regions. With its wide geographical scope and regional capacity heterogeneity, PKG requires a continuous implementation phase to prevent quality gaps in the field.

The three-dimensional scoring approach in this study provides several analytical benefits. First, scoring facilitates cross-country comparisons in a standardized format, so that health system variations can be mapped more objectively. Second, it provides a concise overview of the relative position of each country, as well as what gaps contribute most to the low maturity of implementation. Third, scoring schemes allow policymakers to identify priority areas, such as funding, geographic coverage, or universality of goals, that need to be strengthened to encourage increased national screening capacity.

However, this study has some limitations. This analysis refers only to publicly available policy documents, government reports, and national publications, so it does not capture the dynamics of actual implementation on the ground or the perspectives of policy actors. In addition, variations in the depth of documentation between countries lead to the possibility of under-scoring in countries with limited public information. The scoring approach also cannot capture all the complexities of governance, infrastructure readiness, and variation in service quality, so the results need to be understood as an indication of relative position, not an absolute assessment. Nevertheless, this framework still makes an important contribution in understanding the maturity of the implementation of national health screening in the ASEAN region and areas for improvement that need to be prioritized.

CONCLUSION

This study reveals significant variation in national health screening implementation maturity across ASEAN countries, with Implementation Maturity Index scores ranging from 2 to 9; Indonesia leads the high-maturity cluster (alongside Thailand, Malaysia, Singapore, and Brunei Darussalam), supported by national coverage, a cross-life-cycle approach, and full public funding via the Free Birthday Health Checkup (PKG) program, followed by medium-maturity nations like the Philippines, Myanmar, Cambodia, and Timor Leste, and low-maturity Vietnam and Laos. Despite Indonesia's advanced policy design, challenges persist in primary care service quality consistency, health workforce readiness and distribution, logistics supply chain stability, and digital health system integration. The index serves as a diagnostic tool for policymakers to benchmark positions, prioritize improvements in design and adaptive strategies, and guide primary service-based, life-cycle screening programs region-wide. Limitations stem from reliance on secondary data and simplistic scoring, inadequately capturing service quality, equity, and financial protection. Future research should integrate primary data from actual implementations, alongside patient and healthcare worker perspectives, to refine the index comprehensively.

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