

# T D R I

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**PROMOTION OF  
ACTIVE AGING  
AND QUALITY OF LIFE  
IN OLD AGE AND  
PREPARATION FOR  
A COMPLETE AGED SOCIETY  
IN THAILAND**

**CURING THE "COST DISEASE"  
WITH INNOVATION**



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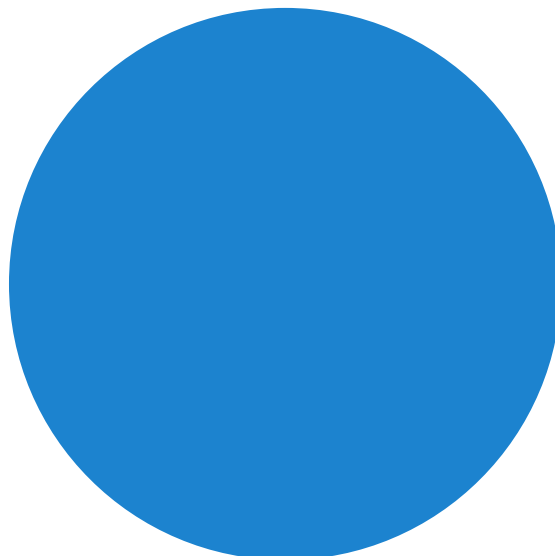
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*KANITP.*

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*The Thailand Development Research Institute Foundation was established in 1984 to conduct policy research and disseminate results to the public and private sectors. TDRI was conceived, created and registered as a non-profit, non-governmental foundation, and is recognized as such by the Royal Thai Government. The Institute does technical and policy analyses to support the formulation of policies with long-term implications for sustaining social and economic development.*

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# PROMOTION OF ACTIVE AGING AND QUALITY OF LIFE IN OLD AGE AND PREPARATION FOR A COMPLETE AGED SOCIETY IN THAILAND\*

*Srawooth Paitoonpong\*\**

## I. INTRODUCTION

Thailand became a complete aged society in 2023 when its population of 14 million older persons (aged 60 and older) accounted for 20 percent of the total population; the country is approaching becoming a super-aged society in the next 15 years when an estimated 21 million older persons will account for 30 percent of the total population.

Such a change in the population age structure has resulted in a smaller working-age population, higher dependency among older persons, and a greater demand for welfare and health services.

Indeed, Thailand has been preparing to become an aging society for some time. In preparation, it devised the First National Long-term Plan on the Elderly (1992-2001) and the Second

National Long-term Plan on the Elderly (2002-2021). The Second Plan contains five strategies: (a) preparing the people for quality aging; (b) promoting and developing the elderly; (c) providing social protection for the elderly; (d) using management to improve nationally integrated activities concerning the elderly; and (e) compiling, developing, and disseminating knowledge and data on the elderly in Thailand, as well as evaluating the achievement of the two Plans. Moreover, Thailand also promulgated the Act on the Elderly, B.E. 2546 (2003), and its revisions in B.E. 2553 (2010) and B.E. 2560 (2017). The Act, among others, defines the elderly, authorizes the establishment of the National Committee on the Elderly, and establishes the rights of the elderly.

According to a 2017 assessment of the Plans by the College of Population Studies in cooperation with the Department of Older Persons, the implementation of the Plans has not been successful. In particular, the first strategy on the preparation of the people for quality aging is the least successful (scoring 29/100), followed by the third strategy on social protection for the elderly (scoring 36/100), and the second strategy on the promotion and development of the elderly (scoring 47/100).

In essence, Thailand needs to strengthen its long-term plans for the elderly by promoting behavior changes in health, savings, lifestyle, and housing, including awareness of welfare and the fiscal burden of the public sector in the future so that people of working age can live well after retirement with happiness and good-quality living.

In response to the felt need for up-to-date policy research, this research program has been conducted with the financial support and technical guidance of the National Research Council of

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\* This article is based on the research report, in Thai, entitled "Promotion of Active Aging and Quality of Life in Old Age and Preparation for Complete Aged Society in Thailand," submitted to the National Research Council of Thailand in 2022.

\*\* Dr. Srawooth Paitoonpong, Senior Research Fellow, Human Resources Policy, TDRI, is Director of the Research Program.



Thailand. The objectives of the program are: (a) to prepare working-age people (aged 15 years and older) for happy aging and a good quality of life in old age; (b) to develop and promote older persons to live with their potential; and (c) to provide policy recommendations on the preparedness, promotion and development of active aging and quality of life in old age and in a fully aged society with the potential of older persons.

## II. CONCEPTUAL FRAMEWORK

The main analytical framework for the study program is derived from the United Nations Principles for Older Persons (December 16, 1991) and, particularly the Madrid International Plan of Action on Ageing (MIPAA).

Two international plans of action are of concern. The International Plan of Action on Ageing was adopted at the first World Assembly on Ageing in Vienna, held between July 26 and August 6, 1982. Twenty years later the Political Declaration and Madrid International Plan of Action on Ageing were adopted at the Second World Assembly on Ageing, Madrid, April 8-12, 2002. The MIPAA offers a bold new agenda for handling the issue of aging in the twenty-first century. It calls for changes in attitudes, policies and practices at all levels in all sectors so that the enormous potential of aging in the twenty-first century may be fulfilled. It is focused on three priority directions:

Priority 1: older persons and development;

Priority 2: advancing health and well-being into old age;

Priority 3: ensuring enabling and supportive environments.

**Table 1: MIPAA Priority directions and recommended issues**

Priority directions	Recommended issues
Priority direction 1: Older persons and development	Issue 1: Active participation in society and development
	Issue 2: Work and the aging labor force
	Issue 3: Rural development, migration, and urbanization
	Issue 4: Access to knowledge, education, and training
	Issue 5: Intergenerational solidarity
	Issue 6: Eradication of poverty
	Issue 7: Income security, social protection/social security, and poverty prevention
	Issue 8: Emergency situations
Priority direction 2: Advancing health and well-being into old age	Issue 1: Health promotion and well-being throughout life
	Issue 2: Universal and equal access to health-care services
	Issue 3: Older persons and HIV/AIDS
	Issue 4: Training of care providers and health professionals
	Issue 5: Mental health needs of older persons
	Issue 6: Older persons and disabilities
Priority direction 3: Ensuring enabling supportive environments	Issue 1: Housing and the living environment
	Issue 2: Care and support for caregivers
	Issue 3: Neglect, abuse, and violence
	Issue 4: Images of ageing

Source: United Nations 2002, *Political Declaration and Madrid International Plan of Action on Ageing, Second World Assembly on Ageing, Madrid, Spain, 8-12 April 2002.*

The recommendations for action organized according to the three priority directions identify important issues for each priority direction, as shown in Table 1.

### III. RESEARCH APPROACH

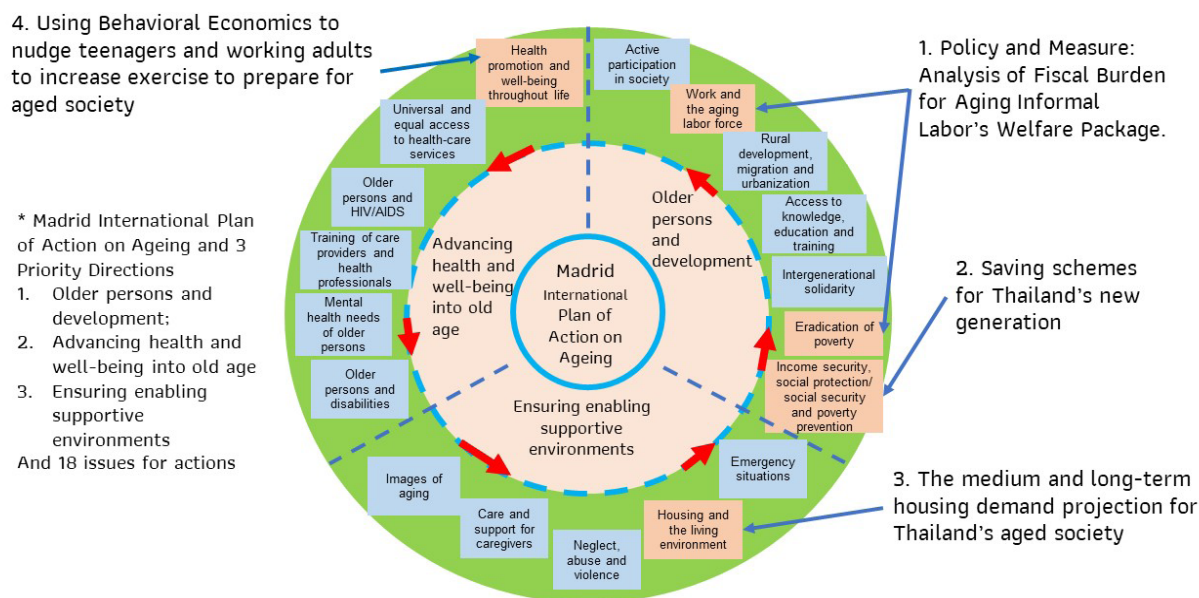
In order to achieve the program objectives, five issues of the MIPPA priority directions were selected for study: (a) health promotion and well-being throughout life; (b) housing and the living environment; (c) income security, social protection/social security, and poverty prevention; (d) eradication of poverty; and (e) work and the aging labor force. These issues are not mutually exclusive.

The five issues have been investigated by

conducting four interrelated studies: (a) Policy and Measure: Analysis of Fiscal Burden for Aging Informal Labor’s Welfare Package; (b) Saving Schemes for Thailand’s New Generation; (c) The Medium and Long-term Housing Demand Projection for Thailand’s Aged Society; and (d) Using Behavioral Economics to Nudge Teenagers and Working Adults to Increase Exercise to Prepare for an Aged Society (Figure 1).

The first study is aimed at strengthening the welfare of informal workers because more than half of workers in Thailand are in the informal sector and they lack welfare. The second study has been conducted because most Thai people do not prepare for retirement, especially in terms of saving.

**Figure 1: Program’s analytical framework based on Madrid International Plan of Action on Ageing**



The study thus examines options for preparations that need to be made for the retirement of Thai people. The third study has been conducted because it is anticipated that, on becoming an aging society, the housing sector will be developed unevenly and the value of houses is likely to deteriorate. The fourth study is aimed at searching for intervention to nudge Thai teenagers and the working-age population to increase their physical activities and exercises so that they will experience healthy aging.

The four constituent studies of the program were conducted by four study teams from TDRI. The general methodology employed by the four studies includes: reviews of the literature; collection of primary data through focus group discussions, interviews of samples, interviews of resource persons, and experiments; and collection of secondary data from official sources, in addition to analyses by developing and applying economic modeling

techniques, such as the Mixed Logit Model, an analytical modeling technique for studying people’s saving behavior based on data from a household expenditure survey, and experiments with 168 samples of youth and working-age people. The specific research methodology is provided in the reports of the constituent studies.

## IV. SUMMARY AND FINDINGS OF STUDY PROJECTS

### Study project 1: Policy and Measure: Analysis of Fiscal Burden for Aging Informal Labor’s Welfare Package

The study was conducted by Nuttanan Wichitaksorn and his team. The objectives of the study are: (a) to analyze the socio-economic and health conditions of households and their structural change resulting from the aging society problem; (b) to develop and analyze desired welfare packages,

behavior, and access to health-care rights, of informal workers advancing toward old age; (c) to assess and project the fiscal impact of desired welfare packages; and (d) to provide recommendations for Thailand's society.

This study uses both primary and secondary data. In the households' socio-economic and health analysis, we used secondary data from the Socio-economic Surveys (1998-2019) and the Health and Welfare Surveys (2005-2021) provided by the National Statistical Office of Thailand. The study uses the primary data collected from 500 informal workers nationwide and analyzes them based on a choice experiment through the Mixed Logit Model. The results from primary data analysis were applied to design the desired welfare packages for informal workers. In the fiscal impact assessment of the desired welfare packages, the study analyzes the future demographic change using a component method. The assessment is expected to be beneficial for public policy formulation and lessening the government's fiscal burden.

The results from the household analysis show that informal workers have limited savings. This will generate a vulnerability for them to have a good quality of life after retirement. In addition, their major concerns, when they become elderly, are insufficient savings for living, unsecured health welfare, and lack of care-givers. Hence, in the welfare package design, the study also proposes to have wider coverage than the base one. However, the additional welfare package can lead to higher government expenditure, so the government needs to wisely find a way to increase revenue, while being mindful of spending, to sustain their fiscal status.

## Study project 2: Saving schemes for Thailand's new generation

The study was conducted by Pontakorn Vorapamorn and his team. The objective of this study is to determine the required amount of savings for individuals earning the lowest minimum wage per day across varying circumstances, and to propose potential solutions for enhancing the current saving mechanisms.

The study calculates the amount of savings required for retirement by applying a modified Franco Modigliani "Life-cycle hypothesis" which proposes that individuals plan their consumption and savings decisions over their entire lifetime, while decisions about saving and consumption are also shaped by individuals' expectations about their future income. An equation was developed containing variables, such as income, start-saving age, retirement age, saving rate, expenses after retirement, inflation rate, return on investment, and life expectancy. Based on the proposed equation, the study assumes a baseline model for calculating the required amount of savings for individuals. The required amount of savings that individuals may need is calculated under different scenarios, based on their obligations toward their families. The baseline scenario assumes that the individual does not have any care-giving responsibilities toward children or the elderly. Table 2 shows the calculated baseline savings needed per month for individuals without care-giving responsibilities for children and elders. Savings needed for an individual of different background and savings targets are also calculated. For example, Table 3 shows alternative savings needed for an individual whose retirement savings target is 12,000 baht per month.



**Table 2: Baseline savings needed per month for individuals without care-giving responsibilities for children and the elderly**

Age to start saving (years)	Desired retirement age (years)			
	55	60	65	70
20	854 baht (10.5%)	635 baht (7.8%)	464 baht (5.7%)	326 baht (4.0%)
25	1,147 baht (14.1%)	838 baht (10.3%)	602 baht (7.4%)	415 baht (5.1%)
30	1,562 baht (19.2%)	1,115 baht (13.7%)	781 baht (9.6%)	529 baht (6.5%)
35	2,173 baht (26.7%)	1,489 baht (18.3%)	1,017 baht (12.5%)	675 baht (8.3%)
40	3,158 baht (38.8%)	2,035 baht (25.0%)	1,335 baht (16.4%)	863 baht (10.6%)

Source: Calculated by the author.

Note: The numbers inside parentheses refer to percentage of monthly income that needs to be saved per month.

**Table 3: Savings needed per month for individuals without care-giving responsibilities for children and elders for a retirement income of 12,000 baht per month**

Age to start saving (years)	Desired retirement age (years)			
	55	60	65	70
20	3,687 baht (45.3%)	2,751 baht (33.8%)	2,010 baht (24.7%)	1,400 baht (17.2%)
25	4,964 baht (61.0%)	3,638 baht (44.7%)	2,612 baht (32.1%)	1,798 baht (22.1%)
30	6,763 baht (83.1%)	4,818 baht (59.2%)	3,385 baht (41.6%)	2,295 baht (28.2%)
35	9,408 baht (115.6%)	6,437 baht (79.1%)	4,403 baht (54.1%)	2,922 baht (35.9%)
40	13,696 baht (168.3%)	8,813 baht (108.3%)	5,786 baht (71.1%)	3,735 baht (45.9%)

Source: Calculated by the author.

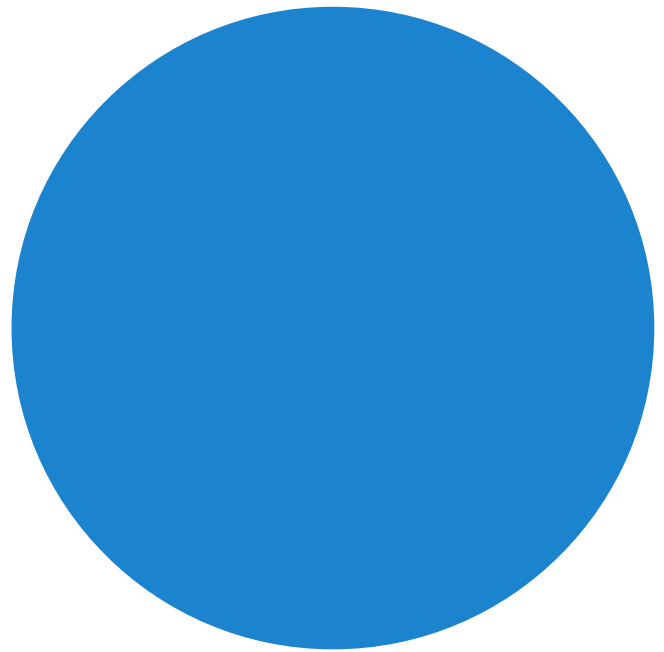
Note: The numbers inside parentheses refer to percentage of monthly income that needs to be saved per month.

The study finds that the new generation and the government have their own obligations to attain sustainable saving schemes. Nevertheless, individuals without care-giving responsibilities for children or elders, who retire at an appropriate age, have access to decent saving or investing options, and save regularly, can save enough for their retirement. Therefore, to reduce the government's financial burden and enhance the effectiveness of saving schemes, the government should encourage people to save for retirement and create a robust, risk-free investment platform.

The study provides three recommendations. First, the government needs to encourage people to save for retirement by providing financial literacy education. This should not only emphasize the importance of financial preparation for retirement, but also provide specific guidelines for saving. Second, to support individuals who cannot save enough money for retirement due to important obligations, such as those who have care-giving responsibilities for both children and elders, the government needs to provide support to help them save. Third, to enhance the effectiveness of saving schemes, the government needs to create an environment that enables individuals to save for retirement.

### **Study project 3: The medium and long-term housing demand projection for Thailand's aged society**

The study was conducted by Watcharin Tantisarn and his team. The objectives of the study are: (a) to study the trends of housing demand during the period 2021-2070 and the impacts of an aging society on the trends; (b) to study the costs



of different types of housing (renting/purchasing), patterns of housing costs, cost of bank loan in an aging society, long-term housing prices, opportunity cost of housing; and (c) to study housing policy for an aging society.

The study constructs an econometric model to assess housing demand using secondary data from the national Socio-Economic Survey (2019) and primary data from interviews with resource persons.

The findings of the study include the following.

(1) During the period 2021-2070, the demand for housing with a value of 1 million baht in 2022 will increase annually to 9.94 million baht in 2070. The growth rate of housing demand will be 6.6 percent within the next 10 years, but will decrease to 4.1 percent per year in 2070. The demand for renting housing with a value of 10,700 baht per month in 2022 will increase annually to 13,400 baht per month in 2070. The trend of renting housing will increase a little, but will decrease in the long run in

2070. The real estate market in Thailand is likely to have an imbalanced development trend similar to the situation of vacant houses because of poor location in some countries. The aging society will negatively affect housing demand so that it will decrease by about 0.6-1.3 percent per year.

(2) In the study of the patterns of housing costs, the study team classified households into 58 clusters according to age structure, the proportion of dependents in the household, source of income, structure of household expenditure, etc. It was found that some households have savings while some do not. The reasons why some do not have savings are because of high expenditures and low income. In comparing the costs of buying a house to renting a house, it was found that, instead of buying and owning a house, a household can save a lot of money by renting a house over the long term or using a bank loan (and paying long-term installments): 400,000-600,000 baht over 30 years in the case of renting and 500,000-700,000 baht in the case of a bank loan.

(3) The housing policy at the national level is stated in: (a) the Housing Development Strategy (2017-2036), which links important concepts and policies on housing at the national level with the international one; (b) the Constitution of the Kingdom of Thailand B.E. 2560, which stipulates that individuals have the right to travel and choose where to live by emphasizing development at all levels and all dimensions so that the people have a warm family life, income and housing; (c) the Twelfth National Economic and Social Development Plan (2017-2021): Strategy for Creating a Just Society and Reducing Inequality includes a guideline on developing housing for low-income families; and (d) Cabinet decision B.E. 2559 that approves a reverse

mortgage program or housing credit for the elderly.

At the international level, the main policy and measure on housing is based on the Sustainable Development Goals (SDGs), Goal 11 to: “Make cities and human settlements inclusive, safe, resilient, and sustainable.” The seven outcome targets include safe and affordable housing, affordable and sustainable transport systems, inclusive and sustainable urbanization, protection of the world’s cultural and natural heritage, reduction of the adverse effects of natural disasters, reduction of the environmental impacts of cities and provision of access to safe and inclusive green and public spaces. In addition, there is WHO Age-friendly Cities framework developed in the Global Age-friendly Cities Guide (2007) which proposed eight interconnected domains that can help to identify and address barriers to the well-being and participation of older people. The eight domains are: Community and health care; Transportation; Housing; Social participation; Outdoor spaces and buildings; Respect and social inclusion; Civic participation and employment; and Communication and information.

#### **Study project 4: Using Behavioral Economics to nudge teenagers and working adults to increase exercise to prepare for an aged society**

The study was conducted by Kannika Thampanichvong and her team. The main objectives of this project are to search for interventions to nudge Thai teenagers and working-aged populations to increase their physical activities and exercise so that they will enjoy healthy aging later in their lives. This project is aimed at proposing policy recommendations to the relevant public and private agencies, which they can use in conjunction with

their projects or campaigns to promote physical activities or exercise among teenagers and working-aged people.

The research methodology includes reviews of extant work, focus group meetings, interviews of resource persons, preparation for field experiments, construction of baseline questionnaires, recruitment of experiment volunteers, preparation of volunteers for field experiments, development of a dashboard for sending information and instruction to volunteers, conducting field experiments, constructing end-line questionnaire, analysis of the result of field experiment, preparation of the report of the study and recommendations, and conducting a policy forum to review the result of the study.

From the review of related literature, the focus group discussions with the representatives from teenagers and working-aged populations, and the consultation with experts, two interventions were selected, namely giving information about social norms, and setting goals for the physical activities, i.e., targets for step counts. This project uses the field experiment as the methodology to test the effectiveness of these two interventions. The duration of the experiment is 12 weeks, with weeks 1-2 being the control period with no intervention provided to the participants and weeks 3-12 being the treatment period. Participants were randomly assigned to two groups. Participants in the first treatment group received social norm information, i.e., average steps of other participants in the same group, during the treatment period (weeks 3-12), while participants in the second treatment group received information on their step count goal that they are encouraged to achieve each week during the treatment period.

Results from the analysis show that, on average, participants in both treatment groups increased their physical activities during the treatment period, i.e., during weeks 3-12, compared with the control period, i.e., weeks 1-2. To be specific, the average increase in the step counts for participants in the first treatment group is about 664 steps, while the average increase in the step counts for participants in the second treatment group is about 415 steps. Yet, the difference in the effectiveness of these two treatments is not statistically significant.

A key finding from this study is that the provision of information plays a crucial role in encouraging teenagers and working-aged populations to increase their physical activities. Therefore, in terms of policy recommendations, in designing the messages or campaigns to communicate with the target audience to encourage them to exercise or increase their physical activities, the relevant agencies can consider providing social norm information or setting goals for the exercise or physical activity for the target audience to achieve, such as the “National Steps Challenge,” “10,000 steps daily for healthy life,” or “30 minutes of exercise or physical activity per day.”

## **V. CONCLUSIONS AND POLICY RECOMMENDATIONS**

In conclusion, the program on Promotion of Active Aging and Quality of Life in Old Age and Preparation for a Complete Aged Society in Thailand, which receives financial support and technical guidance from the National Research Council of Thailand, has successfully accomplished its objectives in conducting policy research that can be useful for Thailand in facing the aging society.

The main analytical framework is derived from MIPAA, particularly its focus on three priority directions, as mentioned previously, as well as its recommended 18 important issues for each priority direction.

Based on the above findings, selected policy recommendations for the preparation, promotion and development of older persons in Thailand's aging society include the following:

(1) In order to add more choices of welfare packages, the relevant agencies, such as the Office of Social Security, the Ministry of Finance, and the National Health Security Office, should design and modify, through relevant funds, clear policies on old-age pensions for informal workers by their background and ability to pay.

(2) Improving risky health behavior of informal workers is an important factor in reducing pressure on the government's fiscal space and spending on health. Therefore, relevant agencies, such as the Office of Social Security and the National Health Security, should provide incentives for informal workers to improve their health behavior.

(3) To provide additional income for the new welfare packages, the government may increase VAT through the Political Earmarked Tax.

(4) With respect to saving schemes for Thailand's new generation, government agencies, such as the Bank of Thailand, the Ministry of Labour, the Office of Social Security, the Department of Older Persons, the Securities and Exchange Commission (SEC), and the Securities Exchange of Thailand (SET), should play a role in providing knowledge and information on savings, promoting income of people having saving limitations, and develop saving options to promote the saving efficiency of people.

(5) In the case of people who cannot save sufficiently because they must look after children and/or older persons, the Ministry of Finance and the Ministry of Social Development and Human Security should provide social assistance with appropriate criteria.

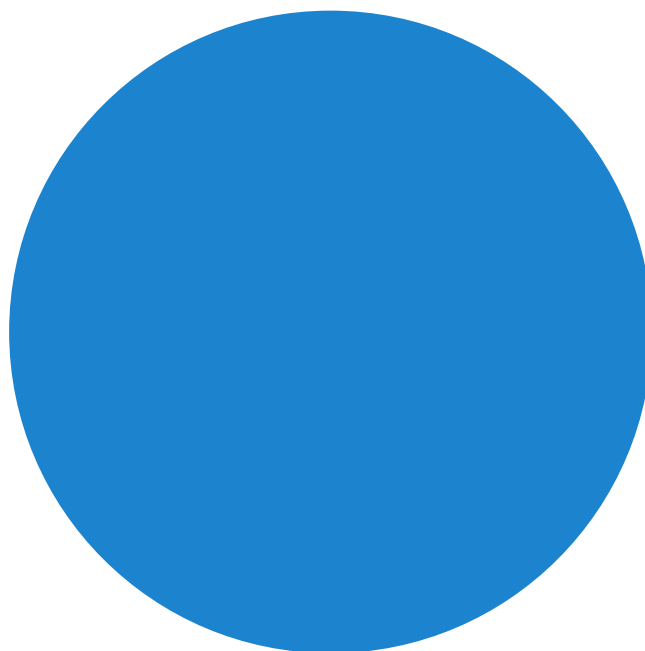
(6) Regarding housing to cope with the aging society, government agencies, such as the National Housing Authority and the Government Housing Bank, should build a new pattern of housing for the market in poor locations for leasing with no ownership. The lease would be only for a living purpose: the lessees would have the right to stay for a long time with their family but return the unit when they move out or die.

(7) Relevant government agencies, such as the National Housing Authority and the Government Housing Bank, should support the foreign ownership of housing in good locations to increase competition in the housing market. The ownership could be through leasing or buying in appropriate proportions.

(8) To nudge teenagers and working adults to increase their level of exercising to prepare for their own old age in this aging society, the provision of information would play a crucial role. Therefore, in designing messages or campaigns to communicate with the target audiences to encourage them to exercise or increase their physical activities, relevant information could be providing social norm information or setting goals for the exercise or physical activity for the target audiences.

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# CURING THE “COST DISEASE” WITH INNOVATION

Natcha Yongphiphatwong\*

*We all want to be healthy, but at what cost?*

Global healthcare spending (in real terms) has more than doubled over the past two decades, rising from US\$ 4.2 trillion in 2000 to US\$ 8.5 trillion in 2019.<sup>1</sup> The trend for per capita healthcare expenditure is similar.<sup>2</sup> Even against the backdrop of global adjusted net national income per capita increasing almost two-fold, healthcare has still become increasingly unaffordable.<sup>3</sup>

In this context, Thailand fares quite well compared with the rest of the world in terms of nearing Universal Health Coverage and protecting

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<sup>1</sup> World Health Organization, “Global expenditure on health: public spending on the rise?” accessed on October 3, 2023, <https://www.who.int/publications/i/item/9789240041219>.

<sup>2</sup> World Bank Open Data, “Current health expenditure per capita (current US\$),” accessed on October 3, 2023, [https://data.worldbank.org/indicator/SH.XPD.CHEX.PC.CD?end=2019&most\\_recent\\_value\\_desc=true&start=2000&view=chart&year=2019](https://data.worldbank.org/indicator/SH.XPD.CHEX.PC.CD?end=2019&most_recent_value_desc=true&start=2000&view=chart&year=2019).

<sup>3</sup> World Bank Open Data, “Adjusted net national income per capita (current US\$),” accessed on October 3, 2023, <https://data.worldbank.org/indicator/NY.ADJ.NNTY.PC.CD>.

its citizens from catastrophic health spending.<sup>4</sup> However, this achievement is contingent upon a substantial allocation of up to 13 percent of the total government budget to healthcare, surpassing the level of all other ASEAN countries except Singapore, which also dedicates a similar proportion of its budget to healthcare as Thailand.<sup>5</sup> Reducing the cost of healthcare can help the government afford to provide greater coverage and alleviate the burden on out-of-pocket payers.

This article posits that one way to reduce the cost of healthcare is through innovation. The empirical foundation for this argument is derived from a comprehensive literature review and a series of case studies conducted between October 2022 and October 2023. These case studies encompass a range of healthcare initiatives in Thailand, including the Princess Sirindhorn IT Foundation Craniofacial Centre, dental implants domestically developed by the Dental Innovation Foundation Under Royal Patronage and the Center of Excellence for Dental Implantology at Chiang Mai University, Thai Reach, Telemedicine at Srinagarind Hospital in Khon Kaen, and the Protheses Foundation of Her Royal Highness the Princess Mother. Several of the in-depth interviews were conducted on-site and thus provided an enriched opportunity for the research team to ask context-based questions. Furthermore, the team also interviewed stakeholders, such as patients, where available.

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<sup>4</sup> World Health Organization, “Tracking Universal Health Coverage: 2021 Global Monitoring Report,” accessed on October 3, 2023, <https://www.who.int/publications/i/item/9789240040618>.

<sup>5</sup> World Bank Open Data, “Domestic general government health expenditure (% of general government expenditure),” accessed on October 3, 2023, [https://data.worldbank.org/indicator/SH.XPD.GHED.GE.ZS?end=2019&name\\_desc=false&start=2000&view=chart&year=2019](https://data.worldbank.org/indicator/SH.XPD.GHED.GE.ZS?end=2019&name_desc=false&start=2000&view=chart&year=2019).



The article's structure is organized into four coherent sections. Section I provides an overview of the mechanisms underlying the rising costs of healthcare. Next, Section II discusses how innovations can reduce the cost of healthcare, while Section III explicates the strategies for achieving cost-reducing health innovations in the Thai context. Finally, Section IV provides the conclusion to the argument.

## I. THE PLAGUE OF PRICES: RISING COSTS OF HEALTHCARE AND HOW TO STOP IT

In *The Cost Disease*, William J. Baumol (2012) explains how market mechanisms can push healthcare into becoming expensive relative to other goods and services.<sup>6</sup> Inflation is measured by the changes in the average spending of a household based on a basket of goods. In this basket of goods, there are some items which are cheaper and some items which are pricier than the average. Baumol argues that the cheaper items in the basket tend to consist of capital-intensive goods whose unit costs are lowered by industrialization whereas the more expensive counterparts, such as healthcare services, tend to be labor-intensive in their production. This is because wages tend to increase with inflation, even if labor productivity has not caught up.

To clarify, low labor productivity relative to wages does not imply that medical professionals are slacking off. A survey of more than 8,000 medical professionals suggested that a staggering 60 percent of doctors work more than 80 hours per week while

a further 30 percent are toiling over 100 hours per week.<sup>7</sup> This figure far exceeds the Medical Council of Thailand's 80-hour recommended limit.<sup>8</sup> To retain doctors within the public hospital ecosystem, the Ministry of Public Health has increased compensation for medical professionals, albeit only slightly.<sup>9</sup>

Healthcare delivery consists of both labor-intensive elements – surgery, for instance – and capital-intensive elements, such as medical devices. These two are often combined within one service: when a patient pays for a bone implant surgery, he or she pays not only for the labor-intensive surgical procedure, but also the implant itself.

Given the two-part price structure, lowering the cost of either part would contribute to lowering the overall cost of the service. One strategy might be to improve labor productivity. If surgeons can operate in less time, they will be able to service more people per day, so the labor cost for the surgery would go down. As an example, by planning with 3D-printed surgical guides and bone models, the Princess Sirindhorn IT Foundation Craniofacial Center was able to speed up surgery while improving

<sup>6</sup> William J. Baumol and De Ferranti David M., 2012, *The Cost Disease Why Computers Get Cheaper and Health Care Doesn't*, New Haven: Yale University Press.

<sup>7</sup> Hfocus.org, "Doctors request 'physician working hour' rights to be established as a legal regulation to address the problem of excessive working hours over the past several decades (in Thai)," accessed on October 3, 2023, <https://www.hfocus.org/content/2022/06/25393>.

<sup>8</sup> Hfocus.org, "The Medical Council of Thailand has announced regulations specifying that physicians should not work more than 40 hours per week, instead encouraging to doctors to enhance their skills. Why? (in Thai)," accessed on October 3, 2023, <https://www.hfocus.org/content/2022/06/25337>.

<sup>9</sup> Thai PBS, "New compensation rates have been introduced for 'Doctors-Nurses-Staff' working in specialized outpatient clinics after hours (in Thai)," accessed on October 3, 2023, <https://www.thaipbs.or.th/news/content/329154>.

patient outcomes.<sup>10</sup> Another strategy may be to reduce the cost of such implants. Illustratively, domestic production of implants by Meticuly Co., Ltd., a spin-out of Chulalongkorn University, brought prices down from the hundreds of thousands of baht needed for imported equivalents to the tens of thousands range.<sup>11, 12</sup>

As the bone implant case demonstrates, innovation can provide a cure to the “cost disease.” The remainder of this article will elaborate on the mechanisms behind cost reduction through innovation in healthcare and provide policy recommendations to facilitate its occurrence.

## II. INNOVATION AS A SOLUTION

Having delineated the logic behind the rising costs of healthcare, this section of the article unpacks the argument that innovation can help reduce the cost of healthcare into two propositions. Each proposition is addressed in detail, using case studies to capitalize on the observations made.

### A. Innovation can make medical devices cheaper and hence more accessible

Product innovation can lead to lower-priced medical devices. In Thailand, the Dental Innovation Foundation Under Royal Patronage as well as the

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<sup>10</sup> Watcharaporn Sitthikamtiub, 2022, *The operations of the Princess Sirindhorn IT Foundation Craniofacial Center*, personal communication, October 18.

<sup>11</sup> *The Momentum*, 2018, June 19, “Assoc. Prof. Boonrat Lohwongwatana develops personalized bone implants, hoping to widen access to all Thai people (in Thai),” <https://themomentum.co/boonrat-lohwongwatana-meticuly/>.

<sup>12</sup> 3D-printed personalized prosthesis/bone plate, accessed on October 3, 2023, <https://innovation.bb.go.th/item/03/0303/03030017>.



**Table 1: Dental implant price comparison**

Brand	Brand origin	International standards	Price (baht)
NOVEM	Thailand	ISO13485; CE Mark	25,000-35,000
PRK	Thailand	ISO13485	28,000
Osstem	South Korea	ISO13485; CE Mark	29,000
Hiossen	South Korea	ISO13485; CE Mark	55,000
Dentium	South Korea	ISO13485; CE Mark	35,000 - 45,000
Astra Tech	Sweden	ISO13485; CE Mark	65,000
Straumann	Switzerland	ISO13485; CE Mark	60,000 - 75,000

Source: Thailand Development Research Institute (TDRI), June 2023, “Final report: Reducing health inequality by increasing access to medical devices and digital health platforms (in Thai).”

Center of Excellence for Dental Implantology at Chiang Mai University successfully developed dental implants which are domestically producible.<sup>13, 14</sup> While similarly meeting internationally recognized standards, such as the CE mark,<sup>15</sup> Thai dental implants are significantly cheaper than their global counterparts (Table 1).

The innovation of dental implants in Thailand has helped people access dental care at a lower cost by providing cheaper alternatives.

<sup>13</sup> Dental Innovation Foundation Under Royal Patronage, “Research and Development of Dental Implants (in Thai),” accessed on October 3, 2023, [https://dent-in-found.org/web2023/public/research\\_detail/30](https://dent-in-found.org/web2023/public/research_detail/30).

<sup>14</sup> Peter A Reichart, 2017, January 1, “Clinical results of implant treatment in a Center of Excellence for Implantology Clinic: A retrospective clinical study,” CMU Intellectual Repository, <http://cmuir.cmu.ac.th/handle/6653943832/67233>.

<sup>15</sup> The acronym CE stands for “Conformité Européene.” It is the European Union’s (EU) mandatory conformity marking for regulating the goods sold within the European Economic Area since 1985. The marking represents a manufacturer’s declaration that products comply with the EU’s New Approach Directives.

Moreover, a spillover effect of this product is its disruptive force on existing price structures. The commercialisation of Thai dental implants put competitive pressure on foreign competitors, incentivising them to lower their margins. Hence, even those who are not users of Thai dental implants still benefit from their existence.

Another instance where product innovation led to a cost-reduction of a medical device is the localization of prosthetic legs by the Protheses Foundation of Her Royal Highness the Princess Mother. Since its inception in 1992, the Foundation has been actively engaged in the production and provision of free prosthetic legs.<sup>16</sup>

The Foundation’s research team innovated and designed prosthetic leg models to be more appropriate for Thai people. One notable adaptation involved the modification of the foot component, making it flatter and better suited for indoor barefoot

<sup>16</sup> Protheses Foundation of Her Royal Highness the Princess Mother, “Origin (in Thai),” accessed on October 3, 2023, <https://www.prothesesfoundation.or.th/th/history.php>.

usage. Conventional prosthetic leg models, originating predominantly from Western designs, are typically optimized for users wearing shoes.<sup>17</sup> The design adaptation makes the prosthetic more appropriate for use under Thai cultural norms. Another signature prosthetic model is the “farmer prosthetic,” which switches the humanoid foot in typical designs to a rounded rubber block. This design change improves the functionality for usage in agriculture, where a humanoid foot would experience too much friction in the mud, become stuck, and fall off (Figure 1).<sup>18</sup>

**Figure 1: Farmer prosthetic**



Source: SlidePlayer, “Metal Technology and Materials for Prosthetic Legs – PPT Download (in Thai),” accessed on October 3, 2023, <https://slideplayer.in.th/slide/2998033/>.

Furthermore, and crucially, the foundation changed the material used to make their prosthetics to plastic, which helps improve wearability in humid climates and has the added benefit of costing only a

tenth of existing designs, thus making the technology more accessible.<sup>19, 20</sup> Although affordability has come partially at the sacrifice of glamour, the novel functional adjustments made to traditional prosthetics by the Foundation confirm that cost-reducing innovation is indeed possible in the Thai context.

Critics may argue that the new product’s lower prices were only attainable because it was in a similar quality range as existing alternatives. Indeed, part of the rising costs of healthcare has been due to technological improvements. After all, people are always willing to pay a little more for better technology, and these incremental innovation premiums accumulate over time. How might we resolve this conundrum?

Building scalable solutions is important. Smaller profit margins can make economic sense if the volume is sufficiently large, and the product can achieve economies of scale. This is part of the motivation behind the 2015 launch of the Thai Innovation List – a list of innovative products developed in Thailand that are favored by the government procurement system.<sup>21</sup> The rationale for this policy being showing Favor to domestically produced innovation will help them scale up and enable their manufacturers to innovate further. After all, a better product at a lower price is bound to be desired.

In addition to considering scalability, it is critical to recognize that significantly lower costs

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<sup>19</sup> *Ibid.*

<sup>20</sup> SlidePlayer, “Metal Technology and Materials for Prosthetic Legs – PPT Download (in Thai),” accessed on October 3, 2023, <https://slideplayer.in.th/slide/2998033/>.

<sup>21</sup> “Cabinet delegates the compilation of the Thai Innovation List on September 22, 2015 (in Thai),” September 23, 2015.

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<sup>17</sup> Panpanich, Virat, *The operations of the Prostheses Foundation of HRH the Princess Mother*, personal communication, October 20, 2022.

<sup>18</sup> *Ibid.*

need not come at the expense of the user's experience. Thai Reach developed its 3D printed prosthetics based on the open-source designs made by the international volunteer network e-nable. Utilizing open-source technology, the manufacturer can save on research and development (R&D) costs. Moreover, the arms are made of plastic, unlike traditional designs which feature a metal core. This choice of material lowered the raw material cost of producing a prosthetic arm by 70 times while making the final product relatively lightweight, making it more comfortable for the user to wear the device over an extended period.<sup>22</sup> Furthermore, they also offer customizability. The user can tailor anything from adjusting the color to designing it to mimic famous superhero gear. The collaborative customization process between the maker and the user gives the user a sense of ownership of the hand and a sense of agency over their lives.<sup>23</sup> Thai Reach's activities demonstrate that low prices and high quality are a false dichotomy.

## B. Innovation can improve labor productivity in healthcare

Lowering the unit cost of capital has been a common exercise for mankind since the dawn of industrialization. Yet, boosting labor productivity appears to be a much grander challenge, for it is constrained by human physiological and psychological capacity. This assumption of human limitation underpins Baumol's argument in Section I. Illustratively, a nurse can get only so efficient with

making injections, or a surgeon can operate only with so much added efficiency.

The human body has its limits, but by incorporating technology into labor-intensive procedures, it is possible to overcome the barriers instilled by human limits and leapfrog labor productivity. This is achievable both via product and process innovation.

Product innovation can help improve labor productivity – measured in terms of the number of patients attended per medical staff in a given period. Innovative products, such as the aforementioned case of surgical guides, can make the surgeon more efficient by lowering the time needed for measuring parts during surgery: surgeons may face human limitations in how quickly they can measure but technology can be designed to help them overcome this limitation.

Process innovation can also improve labor productivity. Process innovation refers to changes to the techniques, equipment, or software used in a process to improve the outcome in some way. One prominent example of process innovation is the adoption of digital tools for data analytics in hospital management. Data analytics can help increase allocative efficiency for health workers. Machine-learning algorithms are used to predict surgery times to optimize operation room allocations.<sup>24</sup> Moreover, Green, Savin and Savva's (2013) study demonstrates that algorithms can be used to optimize the allocation of nurses.<sup>25</sup> Ensuring human resources are allocated in

<sup>22</sup> Thai Reach OPDC, YouTube (Thai Reach, 2022), <https://www.youtube.com/watch?v=slrIdAGEqQ0>.

<sup>23</sup> Pariyasoot Intasuwan and James Quilty, *The operations of Thai Reach*, personal communication, April 19, 2023.

<sup>24</sup> "How Digital Transformation Can Improve Hospitals' Operational Decisions," *Harvard Business Review*, January 18, 2022, <https://hbr.org/2022/01/how-digital-transformation-can-improve-hospitals-operational-decisions>.

<sup>25</sup> Linda V. Green, Sergei Savin, and Nicos Savva, 2013, "Nursevendor Problem': Personnel Staffing in the Presence of Endogenous Absenteeism," *Management Science*, vol. 59, no. 10: 2237–2256, <https://doi.org/10.1287/mnsc.2013.1713>.

settings where they can work can improve overall labor productivity.

Besides improving allocative efficiency, digital technologies can also help improve the technical efficiency of medical staff. In a review of 14 studies assessing the impact of Decision Support Systems (DSS) on physicians, Muhiyaddin et al. (2020) found that DSS led to benefits, such as improved efficiency, greater confidence in decision-making, and a reduced number of laboratory and medical imaging tests ordered.<sup>26</sup> In the same vein, Adler-Milstein and Bates (2010) noted that well-implemented DSS can improve performance indicated by multiple metrics.<sup>27</sup> Nevertheless, the usage of DSS may also carry shortcomings, such as poorer physician-patient connection.<sup>28</sup> In addition to DSS, Adler-Milstein and Huckman (2013) found, by using fixed effect models, that the use of Electronic Health Records (EHR) was also associated with increased productivity for physicians.<sup>29</sup>

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<sup>26</sup> Raghad Muhiyaddin et al., n.d., "The Impact of Clinical Decision Support Systems (CDSS) on Physicians: A Scoping Review," *The Importance of Health Informatics in Public Health during a Pandemic, Studies in Health Technology and Informatics*, 272: 470–473, <https://doi.org/10.3233/SHTI200597>.

<sup>27</sup> Julia Adler-Milstein and David W. Bates, 2010, "Paperless Healthcare: Progress and Challenges of an IT-Enabled Healthcare System," *Business Horizons*, vol. 53, no. 2: 119–130, <https://doi.org/10.1016/j.bushor.2009.10.004>.

<sup>28</sup> Raghad Muhiyaddin et al., n.d., "The Impact of Clinical Decision Support Systems (CDSS) on Physicians: A Scoping Review," *The Importance of Health Informatics in Public Health during a Pandemic, Studies in Health Technology and Informatics*, 272: 470–473, <https://doi.org/10.3233/SHTI200597>.

<sup>29</sup> Julia Adler-Milstein and Robert S. Huckman, 2013, "The Impact of Electronic Health Record Use on Physician Productivity," *The American Journal of Managed Care, Health Information Technology*, vol. 19, no. SP 10 (November 25): 345–352, <https://www.ajmc.com/view/the-impact-of-electronic-health-record-use-on-physician-productivity>.

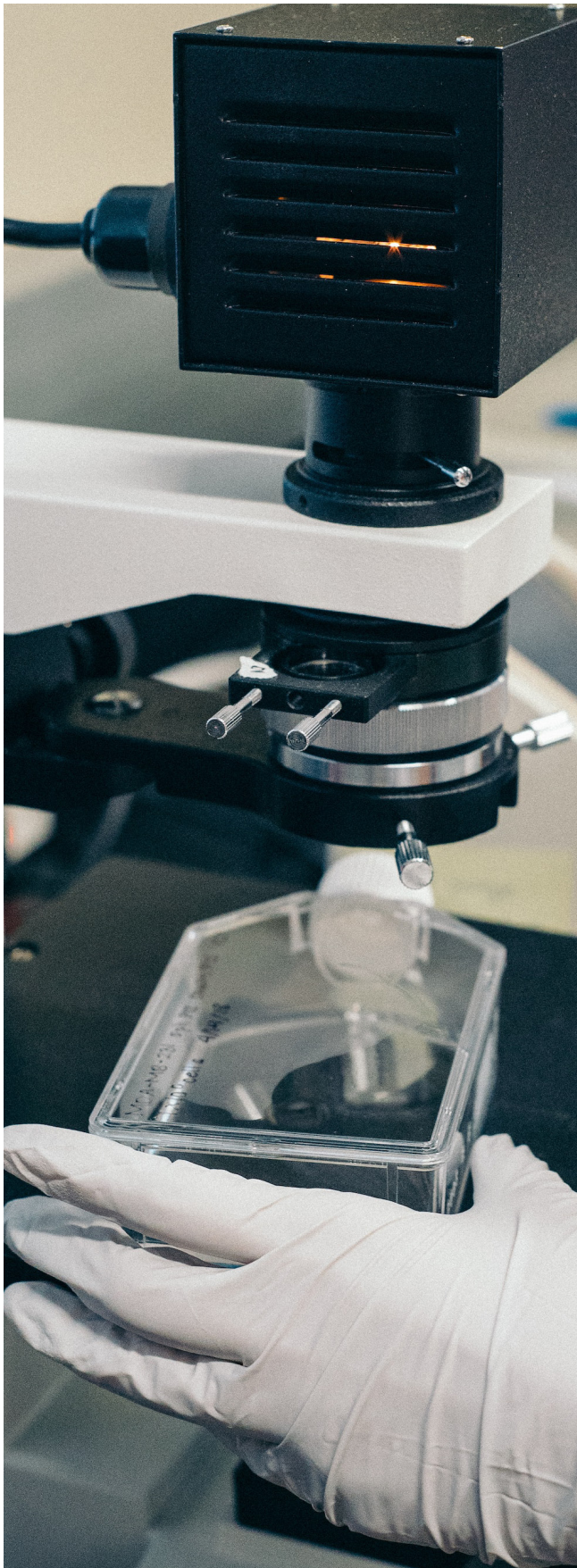
Process innovation can, but need not, involve ground-breaking medical technology; it may simply be the adoption of already existing tools in healthcare. Doctors at Srinagarind Hospital in Khon Kaen, for instance, are now using such generic applications as LINE and Facebook Messenger to conduct telemedical consultations, thereby reducing the turnaround time between patients.<sup>30</sup> The adoption of this practice is expected to result in a significant increase in efficiency, ranging from 40 percent to 60 percent.<sup>31</sup> Moreover, patients who are already in a stable condition can receive follow-ups without the need to travel to the hospital, saving both transportation costs and time-related opportunity costs – a commonly cited barrier to accessing healthcare.<sup>32</sup> Furthermore, patients at Srinagarind Hospital can register themselves into the hospital system using a dedicated application instead of having to join the queue at the registration desk. Overall, Srinagarind Hospital successfully reduced crowding by 30–40 percent by redesigning its OPD system. Importantly, the technology

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<sup>30</sup> *The use of such technologies for medical purposes is controversial. On the one hand, it poses cybersecurity concerns. On the other, it enables the most access to medical care by patients, since these are user interfaces that they are familiar interacting with; some patients are elderly and less adept with learning to use new platforms, such as the telemedicine applications developed by the government. The outcome of this debate is not essential to the argument furthered in this article, for the key message is merely that process innovations can simply be on-boarding already existing products or technologies to improve processes.*

<sup>31</sup> Somsak Tiamkao, 2023, *The operations of the telemedicine program at Srinagarind Hospital*, personal communication, April 19.

<sup>32</sup> National Statistical Office, Ministry of Digital Economy and Society, September 26, 2021, "The 2021 Health and Welfare Survey."



involved here is not complicated. The transition to paperless has already started in many hospitals and, as this case demonstrates, is a change that is worth accelerating.

Using innovation to improve labor productivity would kill two birds with one stone. Increased labor productivity leads to a decrease in healthcare costs, and as a corollary, improved labor productivity can help alleviate the burdens on the currently overworked medical professionals.

### **C. What it takes to innovate our way out of the cost disease**

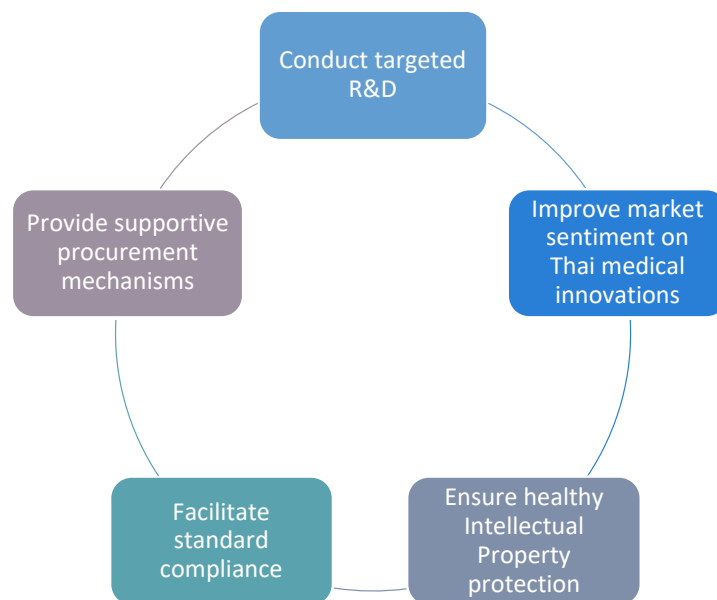
Thus far, this article has illustrated the potential impact of innovation in reducing healthcare expenses. However, bringing innovations to the market is not an easy task to accomplish. The success of an innovation depends on its success in multiple stages, from invention to market. Therefore, ecosystem-wide measures should be implemented to facilitate innovation. This section of the article aims to give actionable recommendations on what needs to be done to enable cost-reducing innovations to arise in Thailand. The subsequent paragraphs outline five strategies for fostering innovation (Figure 2).

#### **First, conduct targeted R&D**

R&D efforts should be demand-driven. Choosing to develop a technology that may be too niche to scale may threaten the market viability of a product. Oftentimes researchers prefer to base projects on their area of expertise rather than demand, leading to fascinating yet non-scalable innovations.

To ensure demand-driven solutions, R&D investments should set marketability as a key criterion for funding a project. Marketability can

Figure 2: Strategies to facilitate cost-reducing innovation in healthcare



be demonstrated based on a feasibility study that considers the burden of disease data, for example. Hefty investments should also take Early Health Technology Assessments (Early HTAs) into consideration.

Expanding on the prior suggestion, Early HTAs can help gauge the marketability of a product from the initial stages of R&D. They are “early” in contrast to traditional Health Technology Assessments (HTAs) as typical HTAs are used to evaluate finished pre-market products rather than products at the early stages of development. Early HTA encompasses “all methods used to inform industry and other stakeholders about the potential value of new medical products in development, including methods to quantify and manage uncertainty,” such as but not limited to:<sup>33</sup>

1) Headroom analysis – used for determining the maximum reimbursable price of a product via current willingness-to-pay thresholds;

2) Early-stage health economic modelling – for instance using the Markov model;

3) Stakeholder preference elicitation and Multi-Criteria Decision Analysis (MCDA) – to assist resource allocation decisions across a portfolio of technologies based on their elicited future values.

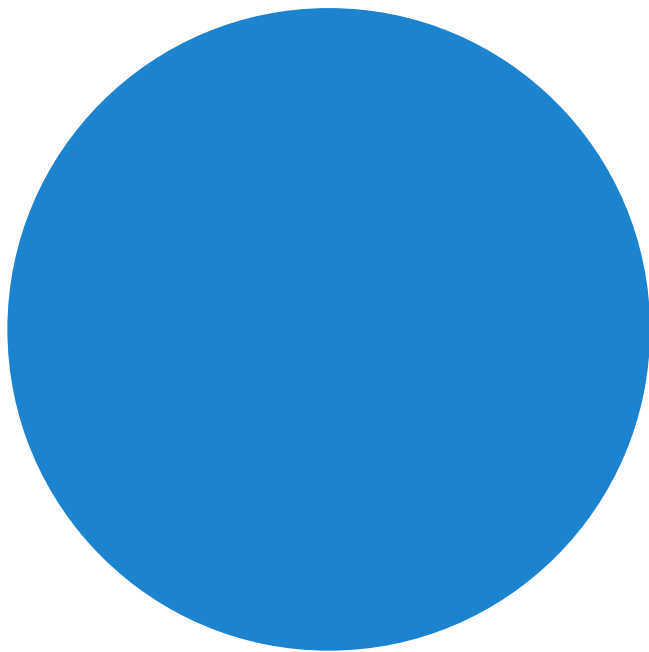
Early HTAs have been applied to guide the development of various health innovations – continuous blood pressure measurement devices, computed tomography imaging devices, and vascular closure devices, to name a few.<sup>34, 35</sup> The approach was also used to manage the COVID-19 pandemic in Thailand, in particular, to identify

<sup>33</sup> Maarten J. IJzerman et al., 2017, “Emerging Use of Early Health Technology Assessment in Medical Product Development: A Scoping Review of the Literature,” *PharmacoEconomics*, vol. 35, no. 7: 727–740, <https://doi.org/10.1007/s40273-017-0509-1>.

<sup>34</sup> *Ibid.*

<sup>35</sup> Katarzyna Markiewicz et al., 2016, “Commercial Viability of Medical Devices Using Headroom and Return on Investment Calculation,” *Technological Forecasting and Social Change*, 112: 338–346, <https://doi.org/10.1016/j.techfore.2016.07.041>.





which vaccines to select among the hundreds concurrently under development and the 10 approved for emergency use, given their costs and life-years saved.<sup>36</sup> A Target Product Profile (TPP) was drawn, considering questions related to desired characteristics, populations to prioritize given limited access, economic value when jointly used with social distancing measures, and the target price (Table 2). Establishing a TPP helps clarify market demands so producers can aim for desired efficacy and price thresholds.

Encouraging researchers, funding units, and agenda-setters to engage in Early HTAs can lead to more efficient management of valuable R&D investments, both in terms of physical and human capital. In Thailand, the Health Intervention and Technology Assessment Program (HITAP) has

<sup>36</sup> HITAP, n.d., “Policy Brief: Issue 105: Early HTA - A tool to identify cost-effective COVID-19 vaccines (in Thai).”

been the chief advocate of Early HTAs, especially following its successful implementation in handling the COVID-19 crisis. In June 2023, the HITAP Foundation also partnered with the National University of Singapore’s Saw Swee Hock School of Public Health to establish Medical Innovation Development and Assessment Support (MIDAS), an agency which specializes in conducting Early HTAs.<sup>37</sup>

### **Second, provide supportive procurement mechanisms**

Incremental innovations may be able to supply solutions for niche ailments with a low burden of disease but are unlikely to be marketable in markets related to common illnesses since they tend to be highly competitive and dominated by large incumbent firms with strong R&D capabilities. Yet, it is in these large markets where cost-saving innovations have the greatest potential for impact.

Since the medical device industry in Thailand is still an infant industry compared with its global counterparts, the government should, therefore, provide supportive procurement mechanisms to back rising innovative firms and boost their competitiveness. Furthermore, besides ensuring healthcare access, the government also has an interest in developing the medical technology industry. Illustrating this point, medical technology development is explicitly mentioned in the

<sup>37</sup> *TheCoverage.info*, “HITAP partners with Singaporean university and signs an MOU in conjunction with ‘TSRI-TCELS-NHSO’ to conduct frontier Early HTA research, increasing the chance of success for innovation development (in Thai),” accessed October 3, 2023, <https://www.thecoverage.info/news/content/5038>.

**Table 2: Target product profile by outcome type**

Economic value	Outcome type	Level (%)	Duration (hrs)	Target population	Social distancing
High	Infection prevention	90	1	Working age (20-39 years)	Yes
		70			
		50	0.5		No
Low	Reduction of severe symptoms	90	1	Seniors (60 years and older)	Yes
		70			
		50	0.5		No

*Remark: Highlighted cells indicate the combination associated with the greatest economic value for each outcome category. Source: HITAP, n.d., “Policy Brief: Issue 105: Early HTA - A tool to identify cost-effective COVID-19 vaccines (in Thai).”*

government’s Thailand 4.0 strategy.<sup>38</sup> Supporting the development of low-cost domestically produced health technologies can simultaneously contribute to progress on both government agendas.

There has already been some progress on the government’s side on this front, for instance, the aforementioned Thai Innovation List scheme. That scheme gives priority to Thai innovations in the public procurement process, in the hope of leveraging the government’s tremendous purchasing power to support them. Unfortunately, however, the Thai Innovation List scheme has experienced only limited success. Only 22 of 46 medical device products on the Thai Innovation List were purchased via the scheme between 2017 and 2020.<sup>39</sup>

As a previous TDRI report highlighted, part of the issue lies in product-market mismatch.<sup>40</sup> This reflects a significant limitation of the Thai Innovation List scheme, namely its supply-driven nature.

Government agencies, such as the Ministry of Public Health or the National Health Security Office (NHSO), may use forward procurement as a tool to further bolster efforts to support market-led medical innovations. Forward procurement is an early market engagement tool whereby the government “offers to buy solutions that meet [its] needs once they are available at a price commensurate with their benefits.”<sup>41</sup> Countries such as Australia and the

<sup>38</sup> The Excise Department, n.d., “What is Thailand 4.0? (in Thai).”

<sup>39</sup> Thailand Development Research Institute (TDRI), April 2022, “Final Report: Government Procurement for Innovation via the Thai Innovation List (in Thai),”

<sup>40</sup> *Ibid.*

<sup>41</sup> Department for Business, Innovation & Skills, November 2011, “Delivering Best Value through Innovation; Forward Commitment Procurement; Practical Pathways to Buying Innovative Solutions,” [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/32446/11-1054-forward-commitment-procurement-buying-innovative-solutions.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/32446/11-1054-forward-commitment-procurement-buying-innovative-solutions.pdf).



United Kingdom have used this mechanism in their public procurement practices (Box).<sup>42</sup> Through credibly articulating demand, forward procurement not only incentivizes but also enables demand-driven development by breaking the stalemate between innovation and demand.

### **Third, facilitate standard compliance**

As mentioned previously, standard compliance is key to innovation adoption, especially in the healthcare sector. This is for a good reason: medical professionals should put patient safety first and foremost. Products that do not meet industry standards are therefore seldom endorsed by buyers. Without proving that the product complies with international standards, it is very difficult to scale.

Current measures to facilitate standard compliance for medical devices in Thailand have been led chiefly by the Innovation and Technology Assistance Program (ITAP). ITAP was established under NSTDA to connect technological service providers with technology users, with the ultimate goal of building technological and innovative capabilities for small and medium-sized enterprises (SMEs). ITAP's program supporting the testing and standard compliance of medical devices is open to SMEs with at least 51 percent of shareholders having Thai nationality.<sup>43</sup> Since there are resource limitations, companies whose products are relevant to the government's Bio-Circular-Green Economic

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<sup>42</sup> *Ibid.*

<sup>43</sup> *Innovation and Technology Assistance Program (ITAP) for Thai industries (in Thai)*, "Innovation and Technology Assistance Program (in Thai)," accessed on October 3, 2023, <https://itap.nstda.or.th/th/#who>.

**Box: Forward procurement scheme by the South Australian government**

The South Australian (SA) government’s forward procurement initiative requires public authorities to announce, via Procurement Services SA, any intentions to undertake a procurement valued at A\$ 55,000 or more within the coming 24-month period. Suppliers are also notified of contracts due for expiry and/or renewal within this period. The requirement also extends to the healthcare sector (Table).

**Table: Examples of planned biomedical equipment procurements**

Procurement name	Description	Expected market release date	Expected award date	Date current contract expires
SA Health biomedical equipment panel	Establishment of a panel of suppliers of ‘Biomedical Technology’ goods across eight individual equipment categories to cover statewide requirement for capital equipment with associated services and proprietary consumables	Open	Ongoing	Not applicable
Ambulance base vehicles for SA Ambulance Service	Supply of ambulance vehicle base for SA Ambulance to replace the ageing fleet over the next three years (FY21-22 to FY23-24)	Q4 2020	Q2 2021	Q2 2021
FDG procurement	Procurement of radiopharmaceuticals for Royal Adelaide Hospital / Flinders Medical Centre PET sites for SA Medical Imaging	Q4 2020	Q2 2021	Q2 2021
Peritoneal dialysis	Supply of peritoneal dialysis equipment, fluids, consumables and related Services	Q4 2020	Q3 2021	Q3 2021
Urine sediment analyzer	Automated urine sediment analyzer(s), related goods and services	Q4 2020	Q2 2021	Not applicable
Pressure relieving devices	Supply of pressure relieving devices to SA Health	Q2 2021	Q3 2022	Q4 2020

Source: Adapted from SA Health, Government of South Australia, November 2020, Procurement governance policy – procurement services SA, accessed on October 3, 2023, <https://www.procurement.sa.gov.au/documents/Procurement-Governance-Policy.pdf>; “SA Health Forward Procurement Plan.”

Model (BCG) are prioritized.<sup>44</sup> Upon participating in the program, companies will receive the following:<sup>45</sup>

1) Product testing necessary for the approval of devices by the Thai Food and Drug Administration (Or-Yor), providing a 50 percent subsidy of up to 400,000 baht;

2) Advice from experts on medical device regulatory compliance;

3) Information regarding other relevant government support programs.

While ITAP's efforts are commendable, there are still some challenges associated with this consulting service. First, the service pertains to Thai FDA approval of products, which is a necessary but not sufficient condition for the product to be sold. Doctors tend to prefer medical devices that comply not only with local standards but also with globally recognized standards, such as the European Union's CE mark.<sup>46</sup> Thus, ensuring Thai FDA compliance may not be sufficient to bring product to market. Nevertheless, this issue poses less of a concern as the Thai FDA harmonizes its regulations with the ASEAN Medical Device Directive. Since the ASEAN Medical Device Directive shares many similarities with the Medical Device Directive of the EU, there will foreseeably be fewer gaps between conforming with the Thai FDA's requirements and

the EU Medical Device Regulation in the future.<sup>47</sup>

Second, the program is available only to those with a finished product waiting to enter the market.<sup>48</sup> However, ensuring compliance is a complicated, detailed process. For instance, the United States government requires design history files to be submitted for Class III (high-risk) medical devices to be approved.<sup>49</sup> These are documents explaining important design choices and the rationale behind any design-related changes through each iteration. Therefore, merely providing advice in the later stages of a product may be insufficient for high-risk products.

Finally, the consulting service is provided as a program of ITAP, which has other areas of focus besides medical technology; this program structure could threaten the long-term provision of the service.

To improve ITAP's consulting services on medical devices, one may look to the example of the Singaporean Health Sciences Authority (HSA).<sup>50</sup> The Singaporean HSA provides two types of consulting services – one for products in the development phase and the other for products in the pre-submission phase (Table 3). The developmental phase consultation ensures medical device developers

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<sup>44</sup> Natcha Yongphiphatwong, *Personal communication with Khun Rungnapa (ITAP Coordinator) on September 20, 2023.*

<sup>45</sup> *Innovation and Technology Assistance Program (ITAP) for Thai industries, "Program for medical device standards compliance (in Thai)," accessed on October 3, 2023, <https://itap.nstda.or.th/th/project-experience/11/medicaldevice/>.*

<sup>46</sup> Porawee Dolsook and Ananya Nakkliang, *Interview with TÜV SÜD (Thailand) on March 22, 2023.*

<sup>47</sup> *Ibid.*

<sup>48</sup> Natcha Yongphiphatwong, *Personal communication with Khun Rungnapa (ITAP Coordinator), on September 20, 2023.*

<sup>49</sup> National Archives, *Code of Federal Regulations, "§ 820.30 Design Controls," access on September 29, 2023, <https://www.ecfr.gov/current/title-21/chapter-I/subchapter-H/part-820/subpart-C/section-820.30>.*

<sup>50</sup> TDRI, June 2023, *"Final Report: Reducing health inequality by increasing access to medical devices and digital health platforms (in Thai)."*

**Table 3: Consultation services provided by the Singaporean Health Sciences Authority**

<b>Consultation Category</b>	<b>Development Consultation</b>	<b>Pre-submission Consultation</b>
Scope	To seek regulatory advice during development, which may include: <ul style="list-style-type: none"> <li>• Device claims</li> <li>• Safety/performance studies, e.g. sterility and biocompatibility</li> <li>• Risk management</li> <li>• Clinical trials</li> </ul>	To seek feedback on how complete and appropriate the device dossier is
Target stakeholders	Medical device developers, researchers	Stakeholders submitting medical devices for local registration
Stage of Medical Device Lifecycle	During device development ideation	Before registration application submission
Number of products to be discussed (per consultation)	A single device or a group of devices to be used together as a system	Limited to one single product registration application
Duration (per consultation)	Up to 2 hours	Up to 1 hour

Source: HSA, “Consultation Schemes,” accessed on October 3, 2023, <https://www.hsa.gov.sg/medical-devices/consultation-schemes>.

are finding compliant solutions to their research problems, thereby avoiding wasting time and resources on non-compliant designs. The pre-submission consultation is based on a single product to be submitted for HSA approval. Providing both services helps put researchers on track to developing compliant medical devices from the outset.

Concurrent with product development, innovators should ensure that their products comply with industry standards. Beyond that, however, medical device standards are very particular and require that part suppliers also comply with industry standards, so working solely with the

manufacturers in the scheme may be insufficient to ensure they meet the requirements. The whole supply chain needs to be compliant.

**Fourth, ensure healthy Intellectual Property protection**

Healthy Intellectual Property (IP) protection can facilitate healthy market competition and provide room for growth for novel innovations. Most organizations are pressured to innovate by competition in the market. However, sometimes the healthcare market is not facing as much competition as it should. The average number of patents that the top 12 best-selling drugs in the United

States has is 70; there is supposed to be one patent per drug.<sup>51</sup> Many pharmaceutical companies use “patent walling” as a tactic to disincentivize competing firms from conducting research in that field, hence barring competition. Competition policy must be actively implemented in the realm of healthcare to prevent such cases from occurring.

To clarify, IP protection is important. IP protection underpins the existence of spinouts – one of the routes for innovation to go from lab to market. Without adequate IP protection, universities will not be supporting spinouts as they cannot make a return based on the IP they own. What is wrong is the abuse of IP protection mechanisms, not IP protection per se. Therefore, the judicial system should work to ensure that any patent protections that are currently in place are sensible and prevent further over-patenting acts.

### **Finally, improve market sentiment on Thai health innovations**

One of the significant obstacles encountered by Thai medical device manufacturers is users’ familiarity with existing technology. First, there are usually high switching costs to medical technologies. Oftentimes medical personnel will have to undergo extensive training to be able to use a certain device. Second, interview data suggest that users are doubtful about medical technologies of Thai origin. The nature of the industry, combined with the prejudices users may have toward Thai-owned

medical technology, has meant Thai medical devices struggle to gain significant market share.

The aforementioned Thai Innovation List scheme can help alleviate this problem by lowering the barriers to market entry for Thai medical innovations. The scheme’s facilitation of wider use of Thai medical devices can help dissolve prejudice and stimulate more evidence-based opinions on the products.

In addition to the Thai Innovation List scheme, the government can also encourage medical professionals to try using Thai medical devices by making them available to medical schools. Having new doctors trained on using Thai medical devices eliminates the cost of switching, which is associated with re-training when they enter the job market. Gaining familiarity with Thai-made medical devices during their education can also boost confidence in using them.<sup>52</sup>

On the whole, improving public sentiment about Thai-made technologies remains a key challenge to be triumphed. Overcoming this barrier can unleash greater potential for low-cost medical innovations to arise.

### **D. Concluding remarks: what it takes to innovate our way out of the cost disease**

In conclusion, the rising costs of healthcare can be tamed by innovating lower-cost medical devices and engaging in process innovation by incorporating new technologies into healthcare practices.

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<sup>51</sup> Ashoka, 2020, “An Entrepreneur’s Quest to Fix Drug Patents and Save Lives,” *Forbes*, May 26, <https://www.forbes.com/sites/ashoka/2020/05/26/an-entrepreneurs-quest-to-fix-drug-patents-and-save-lives/?sh=7a75d85e7308>.

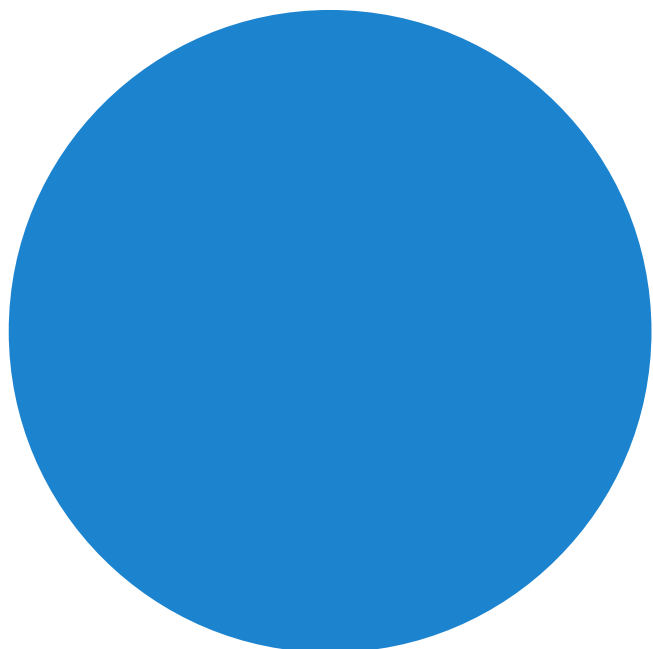
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<sup>52</sup> TDRI, April 2022, “Final Report: Government Procurement for Innovation via the Thai Innovation List (in Thai).”

To foster cost-effective healthcare innovations, the government needs to establish a robust innovation ecosystem by supporting focused R&D throughout its lifecycle, providing supportive procurement mechanisms, streamlining compliance with standards, safeguarding intellectual property, and enhancing market confidence in Thai healthcare innovations.

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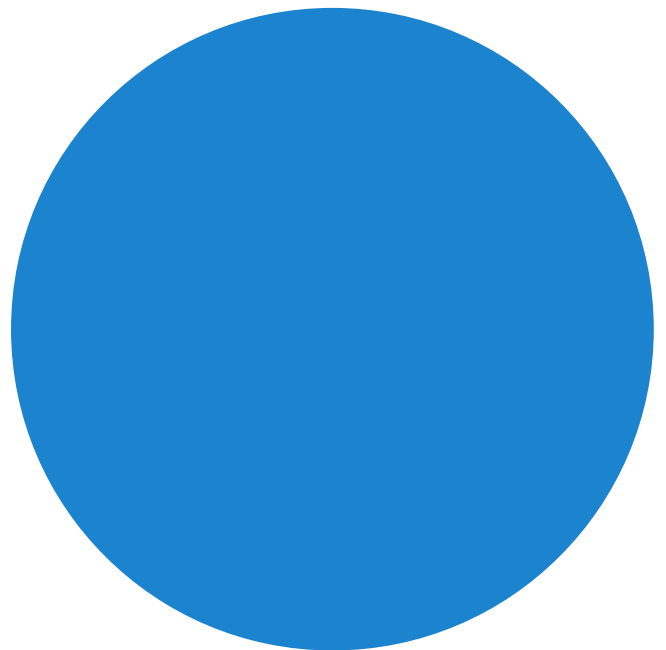
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