

Commentary

Cite this article: Archer RA, Marshall AI, Sirison K, Witthayapipopsakul W, Sriakpokin P, Chotchoungchatchai S, Srisookwatana O, Teerawattananon Y, Tangcharoensathien V (2020). Prioritizing critical-care resources in response to COVID-19: lessons from the development of Thailand's Triage protocol. *International Journal of Technology Assessment in Health Care* **36**, 540–544. <https://doi.org/10.1017/S0266462320001890>

Received: 20 July 2020

Revised: 22 October 2020

Accepted: 26 October 2020

First published online: 18 November 2020


Key words:

COVID-19; Pandemic; Priority setting; Rationing; Critical-care resources

Author for correspondence:

Kanchanok Sirison,
E-mail: kanchanok.s@hitap.net

Prioritizing critical-care resources in response to COVID-19: lessons from the development of Thailand's Triage protocol

Rachel A. Archer¹, Anika I. Marshall², Kanchanok Sirison¹ ,
Woranan Witthayapipopsakul², Pisit Sriakpokin³,
Somtanuek Chotchoungchatchai², Orapan Srisookwatana³,
Yot Teerawattananon^{1,4} and Viroj Tangcharoensathien²

¹Health Intervention and Technology Assessment Program, Ministry of Public Health, Nonthaburi, Thailand; ²International Health Policy Program, Ministry of Public Health, Nonthaburi, Thailand; ³The National Health Commission Office, Nonthaburi, Thailand and ⁴Saw Swee Hock School of Public Health (SSHSPH), National University of Singapore, Singapore

Abstract

As COVID-19 ravages the world, many countries are faced with the grim reality of not having enough critical-care resources to go around. Knowing what could be in store, the Thai Ministry of Public Health called for the creation of an explicit protocol to determine how these resources are to be rationed in the situation of demand exceeding supply. This paper shares the experience of developing triage criteria and a mechanism for prioritizing intensive care unit resources in a middle-income country with the potential to be applied to other low- and middle-income countries (LMICs) faced with a similar (if not more of a) challenge when responding to the global pandemic. To the best of our knowledge, this locally developed guideline would be among the first of its kind from an LMIC setting. In summary, the experience from the Thai protocol development highlights three important lessons. First, stakeholder consultation and public engagement are crucial steps to ensure the protocol reflects the priorities of society and to maintain public trust in the health system. Second, all bodies and actions proposed in the protocol must not conflict with existing laws to ensure smooth implementation and adherence by professionals. Last, all components of the protocol must be compatible with the local context including medical culture, physician–patient relationship, and religious and societal norms.

Introduction

COVID-19 continues to wreak havoc on health systems around the globe. The number of confirmed cases surpassed ten million cases on 28 June 2020 and there are no signs of the pandemic slowing down soon. The World Health Organization estimates that 5 percent of COVID-19 cases become critical and require significant intensive care (1). A surge in COVID-19 cases can place an unprecedented strain on critical-care resources when having to simultaneously respond to the needs of many severely ill patients (2;3).

The pandemic has shown that even the most well-resourced health systems experience shortages of critical-care resources in the height of the outbreak. In Lombardy, Italy, for instance, there were not enough ventilators despite large efforts to increase supply (2). When demand far outstrips supply, rationing is simply unavoidable. The question, therefore, is not whether one should ration or not, rather how to ration in a fair and explicit manner or do so “in the heat of the moment” (4).

Recognizing the ability of COVID-19 to stretch health infrastructure to the limit, many countries, including Belgium, Germany, South Africa, the United Kingdom, and the United States (at city and state levels) (5–9), have been compelled to tackle tough decisions head-on and introduce triage protocols for allocating critical-care resources during this pandemic when critical-care capacity is exceeded. Thailand has been no different. This paper shares the experience of developing triage criteria and a mechanism for prioritizing intensive care unit (ICU) resources in a middle-income country with the potential to be applied to other low- and middle-income countries (LMICs) faced with a similar (if not more of a) challenge when responding to the global pandemic. To the best of our knowledge, this locally developed guideline would be among the first of its kind from an LMIC setting.

Setting the Scene: COVID-19 in Thailand

The COVID-19 outbreak in Thailand remains an unpredictable and rapidly evolving situation. It would be all too naïve to proceed as though Thailand can be spared from a tsunami of

COVID-19 cases despite a downward trajectory since the second half of April 2020. A resurgence in neighboring countries, Singapore and Japan, signals a potential looming crisis. This necessitates plans to be put in place on how critical-care resources should be allocated if Thailand is met with a severe surge beyond the critical resource capacity (10).

As of 14 April 2020, 12,650 ventilators and 4,579 ICU beds have been reserved throughout the country of 67 million people (11). While Thailand has been working hard to expand ICU capacity, like other LMICs, the health budget is limited and mirroring the scale-up of other developed countries is not feasible. ICUs are costly and expansion is tricky given the major infrastructure modification required; for example, negative pressure rooms, oxygen pipeline systems, and more importantly an increase in qualified physicians, nurses, and technicians operating the medical devices who are already few and far between. It can, therefore, be questioned whether directing funds to ICU expansion, and therefore prioritizing 5 percent of severe COVID-19 patients, is the best weapon LMICs can use when going into battle with COVID-19 (12).

Development of the Thailand Prioritization Protocol

To date, in Thailand, there is no existing protocol or established mechanisms for developing protocols for the fair allocation of critical-care resources in a public health emergency. Therefore, the Thai Ministry of Public Health requested a prioritization plan for ICU beds, ventilators, and hemodialysis machines in preparation for the worst-case scenario, to be adopted in response to COVID-19 but also in future public health emergencies in Thailand. The protocol would be a last-resort measure and implemented only when demand exceeds supply after exhausting all avenues for resource mobilization (10). If there were to be an uneven distribution of critical COVID-19 cases, allocation of patients would occur at the regional/provincial level.

It is most inappropriate for a guideline of this nature to be created in a “closed room” (13) manner, ergo the development process involved: a review of existing country guidelines and international recommendations, interviews with healthcare workers to document the current triage practice, and stakeholder consultations to elicit expert opinions and civil society values. Amid the continually improving COVID-19 situation in Thailand since April, the rationing protocol has yet to be legally endorsed in view of the message that it would send to Thai citizens. Should a change in circumstance occur, whereby COVID-19 triggers a scarcity of critical-care resources, the protocol will be implemented. The protocol would then be uniformly applied across health facilities (both public and private) in Thailand for all patients being considered for critical care (4). It is impermissible for these allocation decisions to be made on the basis of ethnicity, race, nationality, gender, disability status, and religious belief (14). Furthermore, decisions would not discriminate between COVID-19 and non-COVID-19 patients (15).

Lessons from the Development of the Thailand Prioritization Protocol

Although the Thai protocol is context-specific and a reflection of societal values, there are several key learnings that can be highlighted from the Thai experience:

(1) Strong Stakeholder and Public Engagement

There is a strong history of explicit and transparent priority setting in Thailand for the implementation of universal health coverage which involves formal stakeholder consultations in policy development and multiple channels for disseminating decisions to the public (16). This has lent itself to public confidence in, and the legitimacy of, the decision-making process. It was crucial that the development of this protocol followed suit.

Twenty-one stakeholders were thoroughly consulted in two half-day workshops, including civil society organization representatives, medical professionals, ethicists, religious leaders, scholars, lawyers, medical anthropologists, policy makers, and media experts, all fully engaged in shaping the guideline. Such transparent and thorough consultation strengthens public trust in the health system process (4;10;14;15;17;18). The protocol is based on the general consensus of the stakeholders during the consultations.

This guidance is sensitive to the core and clear communication to the general public is vital. Once the protocol has been finalized, it will be published online to enable open access to this information. A platform will be established for public feedback as has been seen in other country guidelines to enable a two-way communication stream. This feedback may lead to subsequent revisions of the protocol. While the ins and outs must be explained thoroughly, efforts will also be made to educate society on the rationale guiding the protocol to help minimize public anxiety. This communication can elucidate the “social value” of patients being withheld the ventilator as “giving new life to others” similar to organ donation.

(2) Criteria for Prioritization

There are a multitude of ethical principles that can form the basis of rationing decisions aptly summarized in Emmanuel et al. (4). The Thai protocol is underpinned by the notion of utilitarianism which can be defined as maximizing the greater good. In normal circumstances, health workers observe four basic ethical principles in patient care: (i) maximum patient benefit (beneficence); (ii) do not expose the patient to any additional harm (nonmaleficence); (iii) respect for autonomy; and (iv) justice. However, in a scenario of scarce medical resources brought about by a public health emergency in Thailand, consensus was reached in the stakeholder consultation meetings that there is a need to prioritize “maximizing total benefits for the society” over “the good of the individual patient.” Deciding how to ration access to critical care brings with it grueling ethical dilemmas; for instance, a utilitarian model of triage can compromise egalitarian principles and vice versa (19). This complexity necessitates a transparent and inclusive protocol development process that ensures ethical allocation decisions are grounded in societal values as well as expert input.

In the context of maximizing benefits related to healthcare, numerous approaches can be used. Saving the greatest number of lives governs the Thai protocol and patients with the highest chance of survival will gain and retain access to critical care. This is in line with several recommendations arising from the medical ethics literature that in the context of finite resources, patient prioritization should be rooted in maximizing medical outcomes (4;14;15). The concept of fairness needs to be at the forefront of these decisions, but it would be wrong to mistake fairness as treating all persons identically. “Fairness requires that when there are differences in treatment, those differences should be based on appropriate differences between groups of people”

(20) and in this instance, clinical prognosis is a suitable outcome measure for distinctions.

This guideline upholds that patients should be assessed for critical-care suitability upon and during admission using measurable and objective criteria for clinical prognosis that is based on short-term (<1 year) survival prospect. Practitioners are recommended to utilize at least two of the following tools being applied in the same sequence when evaluating patients: (i) Charlson Comorbidity Index, (ii) Sequential Organ Failure Assessment, (iii) Frailty Assessment such as Clinical Frailty Scale, and (iv) Cognitive Impairment Assessment. These four tools have been applied widely in the Thailand clinical setting and the literature shows a strong mortality prediction for each (21–26). There should then be a relative comparison of candidates' scores for prioritization rather than employing a cutoff score to ensure practicality and efficient use of resources. It was further recommended that patients are regularly reassessed every 48 hours to monitor the relevant clinical changes and ensure the system does not favor incumbents occupying ICU facilities.

A second-order criterion of the “number of life-years saved” was proposed in the stakeholder consultation as a tiebreaker for the aforementioned clinical prognosis criteria. However, this was rejected for being problematic for various reasons. Representatives from religious groups maintained that both life and death are unpredictable, and there was a widespread concern that the number of life-years saved disadvantages the elderly. For example, a healthy 88-year-old man with no comorbidities would have a negative number of life-year saved of -14.772 years (e.g., Thailand's life expectancy at birth is 73.2 years in men in 2018) (27). In addition, the male population has lower life expectancy at birth than the female population, thus creating further disparities across the sexes. Discussions suggested that the inclusion of this criterion would contradict the principle of nondiscrimination based on age and sex.

“Social utility” was put forward as a third-order criterion but was similarly discarded by stakeholders. This criterion is controversial but would entail giving priority to those who play an instrumental role in the pandemic response, for instance, a physician who can, in turn, save others. A number of texts maintain that this can be ethically justified in public health emergencies (14;15). However, the social utility criterion was opposed in the stakeholder meetings because of its subjectivity. Social worth was argued to hold a different meaning to every individual; for some, this could be derived from a person being the family breadwinner or caregiver, and others may take the view that everyone has an equal worth independent of social function. This criterion was regarded as too socially divisive to be incorporated, even in the form of a tiebreaker.

Thailand's protocol opts to use clinical outcome, in favor of health maximization as the only criterion. In the event of two patients having exact assessment scores, the third and fourth additional tools of clinical prognosis will be used. Acknowledging differing local challenges, facilities have a degree of flexibility on which of the above tools to utilize, but they must apply the chosen tools consistently across cases. Stakeholders concurred that “first-come, first-served” or randomization should not be used as both are at odds with the health maximization principle.

Absolute withdrawal of life support is not recommended by this protocol. When stepping down from ICU support, all patients are bound to receive palliative care based on the assessment of the patient's individual health (see Figure 1). In Thailand, a palliative care team has been set up in almost all hospitals, and this team can automatically come into task when providing care to the patient including setting up an advanced care plan. It is an imperative that physicians uphold their moral duty to provide the best possible palliative care to alleviate pain and suffering (17).

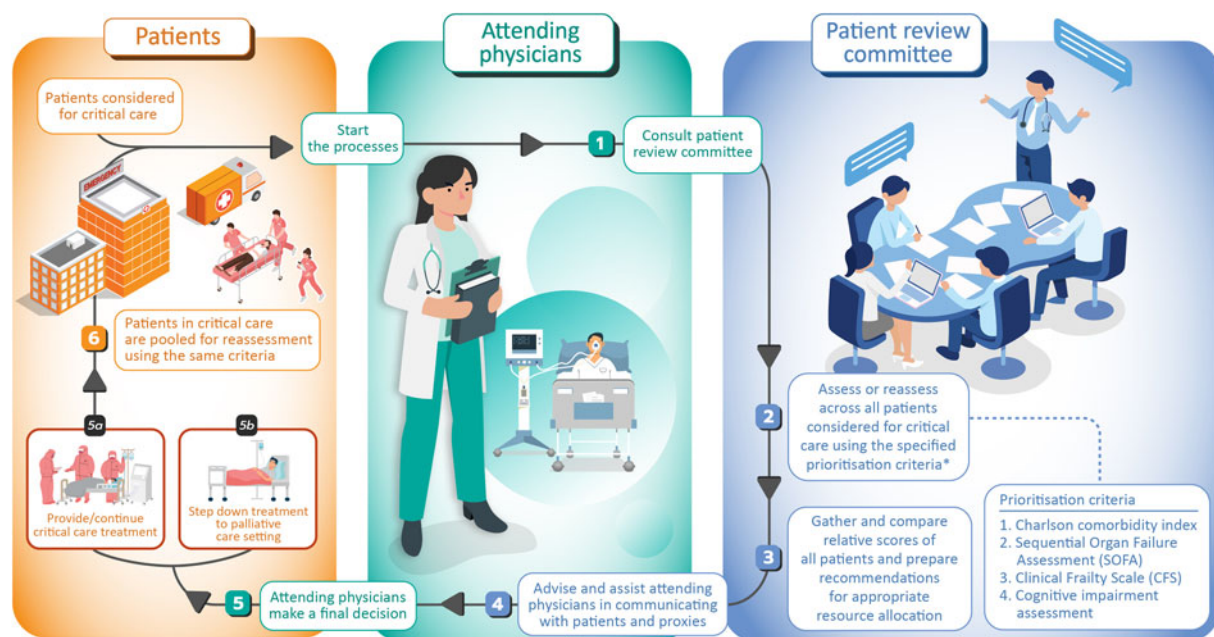


Figure 1. Flowchart of the sequential decision-making steps from 1 to 6. The hospital should use at least two of the following tools to assess patients: (1) Charlson Comorbidity Index, (2) Sequential Organ Failure Assessment (SOFA), (3) Frailty Assessment such as Clinical Frailty Scale (CFS), and (4) Cognitive Impairment Assessment. Each hospital must apply tools consistently across cases. When the first two tools give an equal score, use the third and fourth tool for additional assessment.

(3) The Need to Align with Local Legislation

There is a wealth of literature recommending that bedside clinicians should not be tasked with deciding who gets access to life-saving care as it can be mentally debilitating (4;15;17). However, medical decision making must act in accordance with the legal framework (10) and, unlike other western countries, the Thai law requires attending physicians to make appropriate treatment decisions for their patients (28). Thus, the protocol recommends facilities establish a “Patient-Review Committee” to advise the attending physician and help alleviate the stress placed on their shoulders (see Figure 1) (4). The committee should consist of five persons, appointed by the hospital director, to avoid a split vote. This may consist of a senior ICU nurse, a specialist physician, a palliative care practitioner, social workers, or a prominent and highly respected figure in the community (e.g., a religious leader, a spiritual leader, a teacher, or a village elder). The hospital director would select the community figure based on the respect they receive from the community and their ability to represent the community interest. If there are multiple figures that meet this criterion, the director may consult with other committee members on the most appropriate individual for this position. The committee can support the attending physician to accurately and sensitively communicate difficult decisions to patients and relatives (17). While Triage or Ethics Committee is a commonly used terminology, this wording was not deemed appropriate for the Thai setting. A “Patient-Review Committee” was proposed to reflect the committee’s function.

(4) Appeal Mechanism: To Develop or Not Develop?

A neglected aspect of triage planning in a disaster scenario relates to discussions on whether to include an appeal mechanism (29). After outlining the advantages and disadvantages of appeal mechanisms in the stakeholder consultation meetings, there was a general consensus not to develop an appeal mechanism as part of this protocol. It was argued that this could unnecessarily delay the process and hamper the effective implementation of the mechanism during the pandemic. As an alternative, the Thai protocol suggests that effective communication skills by attending physicians, to regularly inform clinical progress and prompt step-down services, will help build trust and reduce the likelihood of appeals. Moreover, the protocol recommends that data and decisions are to be properly documented in a patient registry and then regularly reviewed in batches by a third party. The third party can be an individual within the hospital that is not directly connected to the patient or an external practitioner from outside the hospital, for example, a provincial public health doctor. Patient registries would then be inspected and evaluated by the central authority at the national level. In the absence of an appeal mechanism, this review process can serve to ensure that allocation decisions are transparent and made fairly.

Conclusion

While it is hoped that a situation will not arise in which demand for critical-care resources outstrips supply during the COVID-19 outbreak in Thailand, the global pandemic has plainly shown that Thailand can never be prepared enough. Thailand’s prioritization protocol is guided by health maximization, in favor of clinical outcome as the only criterion, to enable a fair allocation of ICU beds, ventilators, and hemodialysis machines should scarcity arise. Although the protocol is limited in that it has yet to be

implemented, the guideline development process provides useful lessons for other countries grappling with similar challenges.

Rationing conjures up negative connotations, so clear communication to the public is a crucial step for the acceptance of the protocol. The public needs to be made aware that the protocol is a last resort and does not replace surge-response efforts to expand ICU resource capacity. That being said, ICU scale-up may not always be the most practical option in resource-constrained settings. Rationing has existed in health system management long before COVID-19 and will continue after the pandemic, especially in LMICs. Therefore, the development of explicit and fair priority-setting mechanisms should not be placed on the back burner in nonpandemic times.

Declarations

Ethics Approval and Consent to Participate

The identities of both the key informants and participants involved in the consultations were kept confidential. Ethics Approval was granted by the Institute for the Development of Human Research Protections (Reference: IHRP2020054). The authors confirm that all procedures contributing to this work comply with the ethical standards of the institutional guides for human research protection.

Acknowledgments. The authors would like to express their gratitude to Maneechotirat Santi for providing administrative support during this project. We gratefully acknowledge the National Health Commission Office (NHCO) that kindly hosted the stakeholder consultation meetings. This research was funded by the National Research Council of Thailand. The Health Intervention and Technology Assessment Program (HITAP) is funded by the Thailand Research Fund under a grant for Senior Research Scholar (grant number RTA5980011). The HITAP’s International Unit is supported by the International Decision Support Initiative (iDSI) to provide technical assistance on health intervention and technology assessment to governments in low- and middle-income countries. iDSI is funded by the Bill & Melinda Gates Foundation (grant number OPP1202541), the United Kingdom’s Department for International Development, and the Rockefeller Foundation.

Conflicts of Interest. The authors declare that they have no competing interests.

References

1. **World Health Organization (WHO).** COVID-19 strategy update: 14 April 2020; 2020 [cited 2020 Apr 16]; Available from: https://www.who.int/docs/default-source/coronaviruse/covid-strategy-update-14april2020.pdf?sfvrsn=29da3ba0_19.
2. **Rosenbaum L.** Facing Covid-19 in Italy—ethics, logistics, and therapeutics on the epidemic’s front line. *N Engl J Med.* 2020;382:1873–5.
3. **Christian MD, Sprung CL, King MA, Ditcher JR, Kisson N, Devereaux AV, et al.** Triage: care of the critically ill and injured during pandemics and disasters: CHEST consensus statement. *Chest.* 2014;146:e61S–74S.
4. **Emanuel EJ, Persad G, Upshur R, Thome B, Parker M, Glickman A, et al.** Fair allocation of scarce medical resources in the time of Covid-19. *N Engl J Med.* 2020;382:2049–55.
5. **Ethical principles concerning proportionality of critical care during the 2020 COVID-19 pandemic in Belgium.** Belgian Society of Intensive Care Medicine. [cited 2020 Mar 18]; Available from: http://www.siz.be/wpcontent/uploads/COVID-19-ethical_final_c.pdf.
6. **Entscheidungen über die Zuteilung von Ressourcen in der Notfall- und der Intensivmedizin im Kontext der COVID-19 Pandemie - Klinisch-ethische Empfehlungen, DIVI.** [cited 2020 Mar 25]; Available from: <https://www.divi.de/empfehlungen/publikationen/covid-19/1540-covid-19-ethik-empfehlung-v2/file>.

7. **The South African Medical Association (SAMA), SARS-CoV-2 (COVID-19) guidance for managing ethical issues.** [cited 2020 Apr 7]; Available from: http://www.surgeon.co.za/wp-content/uploads/2020/04/SAMA_GDL_COVID-19-Ethics_2020-7-Apr.pdf.
8. **COVID-19 rapid guideline: critical care in adults, NICE guideline.** [cited 2020 Mar 20]; Available from: <https://www.nice.org.uk/guidance/ng159/resources/covid19-rapid-guideline-critical-care-in-adultspdf-66141848681413>.
9. **University of Pittsburgh, Department of Critical Care Medicine, Allocation of critical care resources during a public health emergency.** [cited 2020 Mar 23]; Available from: https://ccm.pitt.edu/sites/default/files/UnivPittsburgh_ModelHospitalResourcePolicy.pdf.
10. **Maves RC, Downar J, Dichter JR, Hick JL, Devereaux A, Geiling JA, et al.** Triage of scarce critical care resources in COVID-19 an implementation guide for regional allocation: an expert panel report of the task force for mass critical care and the American college of chest physicians. *Chest*. 2020;**S0012-3692**:30691–7.
11. **Ministry of Public Health.** *Beds and Critical Resource Management for Covid-19 Preparation: Bangkok and Other Provinces (15th April 2020)*. Bangkok: Department of Health; 2020.
12. **Hopman J, Allegranzi B, Mehtar S.** Managing COVID-19 in low- and middle-income countries. *JAMA*. 2020;**323**:1549–50. doi:10.1001/jama.2020.4169.
13. **Yamin AE, Norheim OF.** 3 Human Rights Imperatives for Rationing Care in the Time of Coronavirus. *Petrie-Flom Blog* [Internet] 2020 Mar 27 – [cited 2020 Apr 27]; Available from: <https://blog.petrieflom.law.harvard.edu/2020/03/27/rationing-health-care-coronavirus-human-rights/>.
14. **World Health Organization [Internet].** Ethics and COVID-19: resource allocation and priority-setting. 2020. Global Health Ethics [cited 2020 Apr 28]; Available from: <https://www.who.int/ethics/publications/ethics-and-covid-19-resource-allocation-and-priority-setting/en/>.
15. **White DB, Lo B.** A framework for rationing ventilators and critical care beds during the COVID-19 pandemic. *JAMA*. 2020;**323**:1773–4.
16. **Teerawattananon Y, Tantivess S, Yothasamut J, Kingkaew P, Kakanang C.** Historical development of health technology assessment in Thailand. *Int J Technol Assess Health Care*. 2009;**25**:241–52.
17. **Truog RD, Mitchell C, Daley GQ.** The toughest triage—allocating ventilators in a pandemic. *N Engl J Med*. 2020;**382**:1973–5.
18. **Daugherty Biddison E, Faden RR, Gwon HS, Mareiniss D, Regenber AC, Schoch-Spana M, et al.** Too many patients...A framework to guide statewide allocation of scarce mechanical ventilation during disasters. *Chest*. 2019;**155**:848–54.
19. **Reid L.** Triage of critical care resources in COVID-19: a stronger role for justice. *J Med Ethics*. 2020;**46**:526–30.
20. **Gandhi R, Patel A.** What if two COVID-19 victims need ventilators and just one is available?" [Internet]. Scientific American. 2020 Mar 17 – [cited 2020 Apr 7]; Available from: <https://blogs.scientificamerican.com/observations/what-if-two-covid-19-victims-need-ventilators-and-just-one-is-available/>.
21. **Bannay A, Chaignot C, Blotière PO, Basson M, Weill A, Ricordeau P, et al.** The best use of the Charlson Comorbidity Index with electronic health care database to predict mortality. *Med Care*. 2016;**54**:188–94.
22. **Raith EP, Udy AA, Bailey M, McGloughlin S, MacIsaac C, Bellomo R, et al.** Prognostic accuracy of the SOFA score, SIRS criteria, and qSOFA score for in-hospital mortality among adults with suspected infection admitted to the intensive care unit. *JAMA*. 2017;**317**:290–300.
23. **Kojima G.** Frailty defined by FRAIL scale as a predictor of mortality: a systematic review and meta-analysis. *J Am Med Dir Assoc*. 2018;**19**:480–3.
24. **Hao Q, Zhou L, Dong B, Yang M, Dong B, Weil Y.** The role of frailty in predicting mortality and readmission in older adults in acute care wards: a prospective study. *Sci Rep*. 2019;**9**:1207.
25. **Gale CR, Martyn CN, Cooper C.** Cognitive impairment and mortality in a cohort of elderly people. *BMJ*. 1996;**312**:608–11.
26. **An J, Li H, Tang Z, Zheng D, Guo J, Liu Y, et al.** Cognitive impairment and risk of all-cause and cardiovascular disease mortality over 20-year follow-up: results from the BLSA. *J Am Heart Assoc*. 2018;**7**:e008252.
27. **World Bank [Internet].** Life expectancy at birth, total (years)—Thailand; 2018 [cited 2020 Apr 25]; Available from: <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=TH&view=chart>.
28. **Teerawattananon Y, Tangcharoensathien V, Tantivess S, Mills A.** Health sector regulation in Thailand: recent progress and the future agenda. *Health Policy*. 2003;**63**:323–38.
29. **Patrone D, Resnik D.** Pandemic ventilator rationing and appeals processes. *Health Care Anal*. 2011;**19**:165–79.