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Human Resources and Facilities for Radiotherapy Service Requirements in Indonesia: A Prediction Model over a Ten-year Period

Introduction
Indonesia, while implementing the universal health coverage (UHC), is concurrently facing the growing burden of cancer. The Basic Health Research shows the increasing cancer prevalence up to 28% in the 5-year period from 2013 to 2018. Unfortunately, more than 70% cancer patients are diagnosed at latter stage, resulting in higher financial burden and low survival rates. Of all the total cancer patients, approximately 50% of them will need radiotherapy as part of the cancer management. A sufficient number of healthcare facilities and human resources for health (HRH) is needed to deliver a comprehensive radiotherapy service to achieve a successful UHC and to support cancer control planning in addressing these issues. However, the shortage of healthcare workforce and facilities for radiotherapy service still become a major threat in Indonesia. The available facilities and HRH still do not meet the population need and the international benchmark. Moreover, there is no formal guideline available to date regarding the forecasting of facilities and HRH-related oncology, especially in the radiotherapy field. We, therefore, modelled the healthcare facilities needed and translated it into year-by-year health workforce in requirements for radiotherapy service to ensure an effective cancer control planning in Indonesia.

Methodology
A Two-stage Markov state-transition model was developed. First, the model was used to estimate the number of healthcare facilities needed for radiotherapy service in Indonesia. Second, the projected healthcare facilities were translated into the radiotherapy workforce requirements using the national and international standard staffing. The one-year cycle length with a 10year-time horizon were used in the model. As the model was based on an annual planning cycle, which was a discrete-time process, the typical Markov model features such as discounting and half-cycles correction was not applied in this model. The base HRH requirements were further adjusted based on the ratio of HRH density. We also calculated the cost (salaries) implications of the projected radiotherapy staff requirements. Considering the uncertainty around the estimation result, sensitivity analysis was also conducted.

Results
The forecast is expected to show the need to expand the number and/or capacity of healthcare facilities to enable the comprehensive radiotherapy service for effective cancer control in Indonesia. The radiotherapy workforce shortage is predicted, resulting in a gap between the available and the requirement of healthcare workforce in radiotherapy field in Indonesia. This result will be a good comparison of the estimated model and calculation available from the IROS national roadmap.

Conclusion
Indonesia needs to expand the number of healthcare facilities and takes into account the serious shortage of radiotherapy workforce. Addressing these issues may require a substantial increase in government spending on HRH. While long-term commitment to comprehensively address the HRH challenges is pursued, the immediate steps such as recruiting staff, improving HRH productivity and ensuring the equitable distribution of the existing HRH might need to be taken.

Country or Int. Organization

Indonesia

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