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Panel on Health Services

Subcommittee on Health Protection Scheme

Background brief prepared by the Legislative Council Secretariat for the meeting on 11 March 2015

Commissioned study on projecting demand and supply for healthcare professionals

Purpose

This paper summarizes the concerns of members of the Subcommittee on Health Protection Scheme ("the Subcommittee") on the study on projecting demand and supply for healthcare professionals being conducted by The University of Hong Kong ("HKU") for the purpose of the Administration's strategic review on healthcare manpower planning and professional development ("the strategic review").

Background

2. The issue of healthcare manpower planning was featured in the two-stage public consultation conducted by the Government in 2008 and 2010 respectively to take forward the healthcare reform[1]. The outcome of the two public consultation exercises revealed that the community considered that there was a need to formulate a healthcare manpower plan to support the sustainable development of the healthcare system. Many respondents indicated that the

[1] On 13 March 2008, the Government put forth a package of healthcare service reforms and six possible supplementary healthcare financing options in the First Stage Healthcare Reform Consultation Document entitled "Your Health Your Life" ("the First Stage Public Consultation"). Based on the outcome of the First Stage Public Consultation, the Government published the Healthcare Reform Second Stage Public Consultation Document entitled "My Health My Choice" on 6 October 2010, in which a voluntary and government-regulated private health insurance scheme, Health Protection Scheme, was proposed for public consultation. Members of the public have expressed support for the introduction of the Scheme.

success of the proposed Health Protection Scheme ("HPS")[2] hinged on having an adequate supply of healthcare manpower. As part of its efforts to take forward HPS, the Administration established the Steering Committee on Strategic Review on Healthcare Manpower Planning and Professional Development ("the Steering Committee")[3] in January 2012. The Steering Committee, which is chaired by the Secretary for Food and Health, is tasked to formulate recommendations on, among others, how to cope with anticipated demand for healthcare manpower in the 13 healthcare disciplines that are subject to statutory regulation, viz. medical practitioners, dentists, dental hygienists, nurses, midwives, Chinese medicine practitioners, pharmacists, chiropractors, medical laboratory technologists, occupational therapists, optometrists, radiographers and physiotherapists. To assist the Steering Committee in making informed recommendations, HKU was commissioned to conduct a comprehensive manpower projection for the healthcare professions under study.

Deliberations of the Subcommittee

3. Issues relating to the commissioned study on projecting demand and supply for healthcare professionals were discussed at four Subcommittee meetings between March 2013 and September 2014. The deliberations and concerns of members are summarized in the following paragraphs.

The medical manpower projection model

4. Members noted that HKU had developed a generic forecasting model, which comprised a demand model and a supply model, for projecting the medical manpower up to 2041 ("the generic model"). Concern was raised as to whether the generic model would take into account local circumstances such as the challenges arising from an ageing population, and could be adopted to adjust for the impact of externalities such as an increase in inpatient beds arising from known and planned private hospital developments in the next few years.

5. According to the Administration and HKU, there was no universal model for estimating healthcare manpower whether in the literature or among the jurisdictions surveyed. The more common approaches adopted included

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[2] As HPS is intended as a supplementary financing arrangement, the Administration renames the scheme as Voluntary Health Insurance Scheme in the consultation document published on 15 December 2014 to better reflect its objectives and nature.

[3] The Steering Committee is supported by a Coordinating Committee, which is chaired by the Permanent Secretary for Food and Health (Health) and comprises six Steering Committee representatives from non-healthcare background as non-official members (who in turn convene six consultative sub-groups, viz. Medical Sub-group, Dental Sub-group, Nursing and Midwifery Sub-group, Traditional Chinese Medicine Practitioners Sub-group, Pharmacists Sub-group and Other Healthcare Professionals Sub-group), in carrying out its work.

workforce-population ratios[4], demand/utilization-based or need-based models[5] and supply models. Developed to suit the local circumstances and adopting the methodology of curve-fitting of historical sample, the generic model would use historical inpatient and outpatient utilization data from the public and private healthcare sectors and the population projections of the Census and Statistics Department to project the healthcare service utilization of age-, sex-specific population groups. Support vector machine[6] would then be used to project the required number of doctors, which would be sector-specific (i.e. for the public and private sectors) and separated by clinical settings (i.e. inpatient and outpatient services). The projected demand would be compared with the projected supply and the difference so derived would be quantified in the gap analysis to see if any surplus or shortage of medical manpower existed. The generic model was so designed such that it could be adopted to adjust for the impact of externalities, such as an increase in public and/or private inpatient beds over and above endogenous historical growth and an increase in demand for private services in view of the impending implementation of HPS.

6. Given that a key assumption of the generic model was that the manpower projection followed the historical trend in the data, question was raised as to the reason why historical utilization volume of a relatively short span of time (i.e. from 2005 to 2011) was used for projecting service utilization in the public healthcare sector. Concern was also raised as to whether the generic model would take into account the fluctuation in healthcare service utilization.

7. The Administration advised that using more recent service utilization data in the modeling would help to project more accurately the demand for doctors in the coming years brought about by an increase in public healthcare service utilization due to an ageing population. In addition, data of earlier years could not reflect changes in the service delivery models of the Hospital Authority ("HA") (e.g. the introduction of the grade of Health Care Assistant to relieve nurses of simple care duties). The reason why data from 2005 but not 2004 onwards was used for the projection was that the data of 2004 might be unduly influenced by the outbreak of Severe Acute Respiratory Syndrome in 2003. Given that the commissioned study commenced in 2012, data up to 2011 was used for making the initial projections. The projections could be updated when

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[4] According to the Administration, by way of benchmarking, manpower requirements were estimated on the basis of healthcare worker-to-population ratios and current healthcare services.

[5] According to the Administration, demand/utilization-based models projected healthcare service need based on service utilization data, under the assumption that healthcare workload remained constant over time, and that population growth directly led to increased workload. The need-based models allowed for estimates of a population's healthcare need by considering changes in population health status and efficacy of healthcare services while adjusting for population size and characteristics including age, sex, household income, risk behavior, and self-perceived health.

[6] According to HKU, support vector machine (i.e. neural network analysis) was a supervised learning method that analyzed data and recognized data patterns in the historical data. As such, this artificial intelligence predicted for each given variable the corresponding outcome. As compared with linear and exponential regression models, it had the flexibility to evolve an optimal structure according to historical data.

more up-to-date data became available. According to HKU, sensitivity analysis was used to compute the projection by omitting a portion of historical data where the omitted data was regarded as unreliable. All projection trials converged to a locus when historical data was reliable.

8. There was a view that given the rising public expectations for longer consultation time for public outpatient services, the factor of consultation time per patient should be included as a parameter for the medical manpower demand model for converting the healthcare demand/utilization to public sector doctor full time equivalent. HKU advised that under the generic model, an increase in outpatient consultation time per patient would represent a decrease in manpower supply of doctors in the planning horizon.

9. Members were concerned that the impact brought about by the retirement of an experienced doctor could not be offset by the addition of a fresh medical graduate to the total doctor pool under the medical manpower supply model. According to the Administration, the estimated number of local medical graduates in each of the coming academic years up to 2018 would be based on the actual number of students currently in different years of study in University Grants Committee funded medical undergraduate programmes. The supply model assumed that there would be an addition of 420 local medical graduates per year from 2019 to 2041, and a constant annual inflow of 60 non-local graduates to the registration pool.

10. As regards whether the generic model would take into consideration the distribution of medical manpower resource between the public and private healthcare sector, as well as the elasticity of medical manpower supply in the private market, HKU advised that these factors would be taken into account in the medical manpower projection if needed be.

<u>The manpower projection model for other healthcare professions</u>

11. Members noted that the generic model would be suitably adapted to cater for utilization parameters peculiar to individual professions in forecasting the manpower demand and supply situation of the other healthcare disciplines under study. There was a suggestion that the parameters for projecting the demand for nurses and allied healthcare professionals should include the utilization of care services provided in the welfare setting, such as those provided at the residential care homes for the elderly and people with disabilities and day care centres for the elderly, and those under the home care services schemes for frail elders and programmes for autistic persons. According to the Administration, the Social Welfare Department would be invited to provide profession-specific service utilization data in the welfare setting for the purpose of making projections for nurses, occupational therapists and physiotherapists.

12. On the question of whether the common international standard on nursing manpower ratio (i.e. one nurse to six patients) would be adopted for projecting the manpower requirements for nurses, the Administration advised that there was no universally applicable set of international standard on nurse to patient ratios. Given that healthcare systems of different countries varied, adjustments for differences in care setting were important for such models to be relevant.

Healthcare manpower planning

13. Noting that the manpower projections for the healthcare professions under the study would be up to 2041, there was a suggestion that the projection period should be extended for 25 more years to take into account the likely factor that the proportion of elderly people in the population and their healthcare demands might decline after the peak period. An adjustment mechanism should also be put in place to address the deviation between the projected and the actual demand for individual healthcare professionals, if any, in the planning horizon.

14. The Administration advised that while the commissioned study sought to estimate the demand and supply of healthcare professionals for the disciplines under study with an initial planning horizon of up to 2041, it would assess the accuracy of the projected healthcare manpower demand from time to time, say, every one to two year(s). Where necessary, adjustments would be made to address the differences between the projected and the actual demand.

15. Question was raised as to how the manpower projection for doctors could help to avoid the situation which occurred in early 2000s whereby medical graduates could not undergo training in HA due to a downward adjustment in the Government subvention to HA during economic downturn, and hence, a decrease in HA's budget for the recruitment of new resident trainees. The Administration advised that while an economic downturn might affect healthcare demand and manpower needs during a certain period of time, the medium to long-term manpower requirements brought about by factors such as an ageing population and changes in the delivery models of healthcare would remain unchanged. Hence, the generic model would shed light on the need to maintain a stable supply of medical graduates to HA notwithstanding economic cycles. This would avoid over-reaction during economic downturn which might prove short-sighted at a later day.

Timetable for the strategic review

16. Members noted that the initial plan of the Administration was to conclude the strategic review in 2013. Given the complexity of the task and the longer than expected time required for data collection, members were advised in November 2013 that HKU anticipated that the manpower demand and supply projections for doctors, nurses (including midwives) and dentists, and that for

the other healthcare professions under study were expected to be available in early 2014 and towards the latter half of 2014 respectively.

Recent developments

17. At the meeting of the Panel on Health Services on 19 January 2015 to receive a briefing from the Secretary for Food and Health on the 2015 Policy Address in relation to health matters, members noted that the latest plan of the Administration was to complete the strategic review in 2015.

18. The Administration will brief the Subcommittee on the manpower projection for doctors, nurses (including midwives) and dentists at the meeting on 11 March 2015.

Relevant papers

19. A list of the relevant papers on the Legislative Council website is in the **Appendix**.

Council Business Division 2
Legislative Council Secretariat
6 March 2015

Appendix

Relevant papers on commissioned study on projecting demand and supply for healthcare professionals

Committee	Date of meeting	Paper
Subcommittee on Health Protection Scheme	4.3.2013 (Items I and II)	Agenda Minutes
	11.11.2013 (Item III)	Agenda Minutes
	15.4.2014 (Item II)	Agenda Minutes CB(2)2260/13-14(01)
	12.9.2014 (Item I)	Agenda Minutes

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