



Title	A SWOT analysis of the hospital performance management system in Hong Kong
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Abstract of project entitled

**“A SWOT analysis of the hospital performance
management system in Hong Kong”**

Submitted by

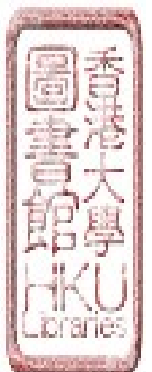
Dr Libby Ha Yun LEE

for the degree of Master of Public Health

at The University of Hong Kong

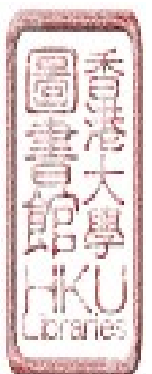
in August 2014

The existing financing model is not going to be sustainable for the ageing demographic in the future Hong Kong. In regards, Government suggested a voluntary and government-regulated health insurance scheme to provide more choices with better protection for those who are able and willing to pay for private healthcare services. However, performance of the Hong Kong health system is rarely discussed despite vast health expenditure has been spent. The objective of this project is to identify the strength, weakness, opportunities and threats of the hospital performance management system in Hong Kong.



The project involves a literature search for key success factors for performance management systems in healthcare. The SWOT analysis of the hospital performance management systems in Hong Kong are then analyzed with reference to the findings. *Findings:* Six success factors could be identified: position in the policy process and defined objectives, process of development, indicator validity, reliability, responsiveness and feedbacks. The public hospital system has partially incorporated these factors in its system but a structured performance monitoring and management system is lacking for the private sector.

The current Hong Kong hospital performance systems are not able to provide adequate information for the payers to make the appropriate choice. There is an urging needs to develop a robust and transparent performance management system in Hong Kong in order to support healthcare reform.



**A SWOT analysis of the hospital performance
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by

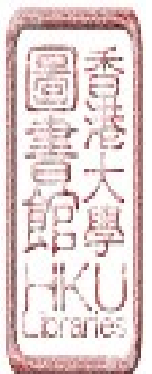
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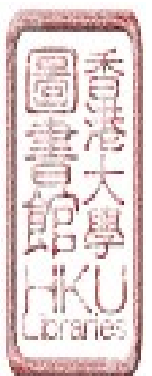
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A project submitted in partial fulfillment of the requirements for
the Degree of Master of Public Health
at The University of Hong Kong

August 2014



Dedicated
to
my husband Gilberto

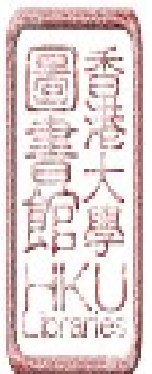


Declarations

I declare that this project represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualifications.

Signed

Dr Libby Ha Yun LEE



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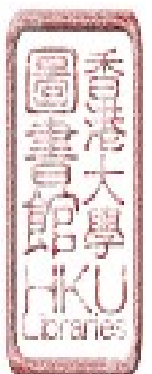
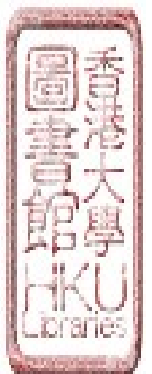
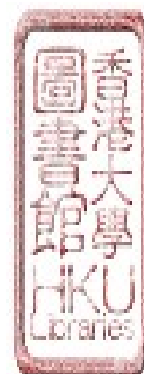


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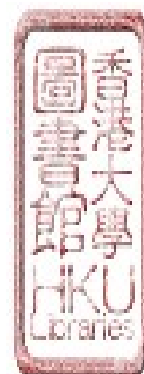
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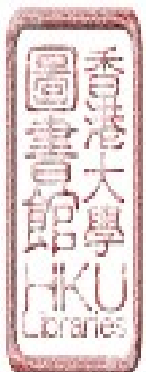


CHAPTER 1

Background

Like many countries, Hong Kong is facing the challenge of sustainable health systems for her ageing population. By 2031, one quarter of the Hong Kong population will be more than 65 years old (1). It is estimated that the risk of 65 years old patient requiring hospital admission is four times of that below 65 and the former's bed day requirement is nine times of the latter (1).

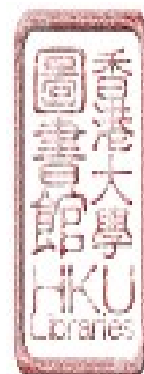
The city runs a dual track health system (public and private) spending about 5.1% of the gross domestic product on healthcare, which is about 17% of the total public expenditure (2). There are 42 public hospitals in the public sector, under the direct management and control of Hospital Authority; which is a statutory organization set up by the Hospital Authority Ordinance (Cap 113) in 1991. The public sector is heavily subvented by the Government, with a recurrent budget of around 45 billions dollar per year. It provides 90% of the inpatient bed-days and 20% of the outpatient attendances in Hong Kong (3). There are 12 private hospitals, regulated by the Department of Health (3) under the Hospitals, Nursing Homes and Maternity Homes Registration Ordinance (Cap. 165) which was enacted in 1937 with major amendments in 1966 (4). Slightly more than half of the total health expenditure is spent in the private sector, 69% of the share is through out-of-pocket payment (5). The existing financing model is not going to be sustainable for the ageing demographic in the future Hong Kong.



In view of this, the Government had consulted the public on healthcare service reforms and six possible supplementary healthcare financing options in 2008. Later in 2010, Government suggested the Health Protection Scheme, a voluntary and government-regulated health insurance scheme providing more choices with better protection for those who are able and willing to pay for private healthcare services.

The attention so far is drawn to the acceptability of using insurance scheme to support healthcare expenditure, from the perspectives of the insurance industry, patients and private healthcare providers. However, there is rarely any discussion on what we pay for. Performance of the Hong Kong health system is not under the spotlight, as it deserves. Healthcare reform would not achieve what it sets out for, if the health system performance assessment and management are not on the policy agenda.

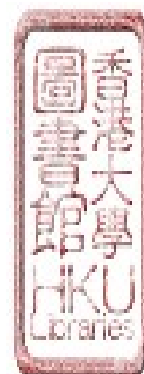
The performance management systems in the public and private hospitals are different. The public hospital system under Hospital Authority reports to the Food and Health Bureau and the Government released the performance report to the public via the annual Controller's Report. (6). Despite not a Government department; Hospital Authority is included in the yearly HK Government Service Excellence Index survey on public satisfaction by the Efficiency Unit (7). There is internal performance mechanism within Hospital Authority. Key performance indicators were developed since 2008 (8). Quarterly review of the data and reports to the Hospital Authority Board are conducted quarterly. In addition,



Hospital Authority performs regular patient satisfactory survey to collect patients' view on its service. The survey result is accessible by the public.

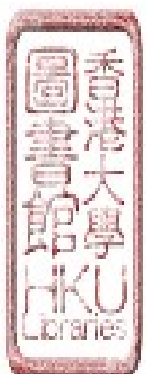
The Department of Health regulates all private hospitals and monitors them on accommodation, manpower and equipment. The Department of Health has promulgated a Code of Practice to the private hospitals since 2003 and updated in 2010. Though not a part of the Ordinance, it dictates the standards of good practice on quality management, management of staff and premises, protection of rights of patients and their right to know, risk management, reporting of sentinel events, the setting up of a system to deal with complaints, and standards on specific types of clinical and support services (9). Apart from the compliance to the Ordinance, fulfilling all the Controller's Report requirements is a pre-condition for registration and re-registration of private hospitals. The statutory requirements are monitored through field inspections; scrutiny of the institution activities and complaint statistics; number of advice and warning issued; and handling of complaints lodged by public against the institutions.

Hospital performance management with the use of performance indicators is widely adopted internationally. PIs are originated from the United State of America for alleviating the information asymmetry between the healthcare purchasers and providers. The latter would have knowledge about the performance of the hospital before they seek health services and make the decision. Performance indicators are later used by the conservative administration under Mrs Thatcher in 1990s with an aim to direct and control the internal market of the health system in the United Kingdom (10-13). Blair administration



modernized the health agenda from the internal market bureaucracy to performance-driven integrated care (14) in 1997. The performance monitoring then shifted from performance indicators to performance indicator framework. Performance indicators are indicators (15) reflecting whether the organization at stake achieves goals; which are determined either by or for the organization. Framework is in a broader sense of performance management, which includes a bundle of performance indicators, management system for improvement, and accountability of the institution (16-17).

Recognizing the importance of performance indicators, the objective of this project is to identify the strength, weakness, opportunity and threat of the application of performance indicators in the hospital performance management systems in Hong Kong by comparing to the successful model identified through a literature search.



CHAPTER 2

Methodology

The project involves a literature search to identify previous reports / review on the key success factors for performance management systems in healthcare. Relevant literature will be searched via the PubMed database. Only articles published in the English language from 1994 onwards will be included. Development of performance indicators started more than 30 years ago. The adoption of performance indicators as part of a framework and the introduction of performance management system was in the early 1990s. Since the project focus is on management systems with the use of PIs, a 20-year time frame is applied to the search strategy.

The key words used are “performance indicator” and/or “hospital”. The initial search resulted in 3122 articles. A review of the relevant titles identified 45 articles. After perusal of the abstracts, 30 articles were selected. Consideration of full papers yielded 24 relevant articles and a further 22 were identified through bibliography. A total of 46 papers were reviewed (Figure 1). Papers describing the attributes of success or failure of performance management are considered to be relevant.

The hospital performance management systems in Hong Kong are then analyzed with reference to the key success factors identified.

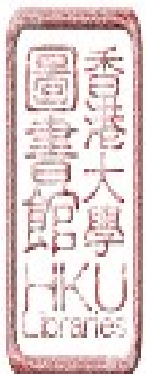
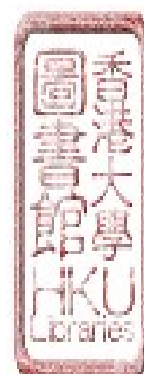
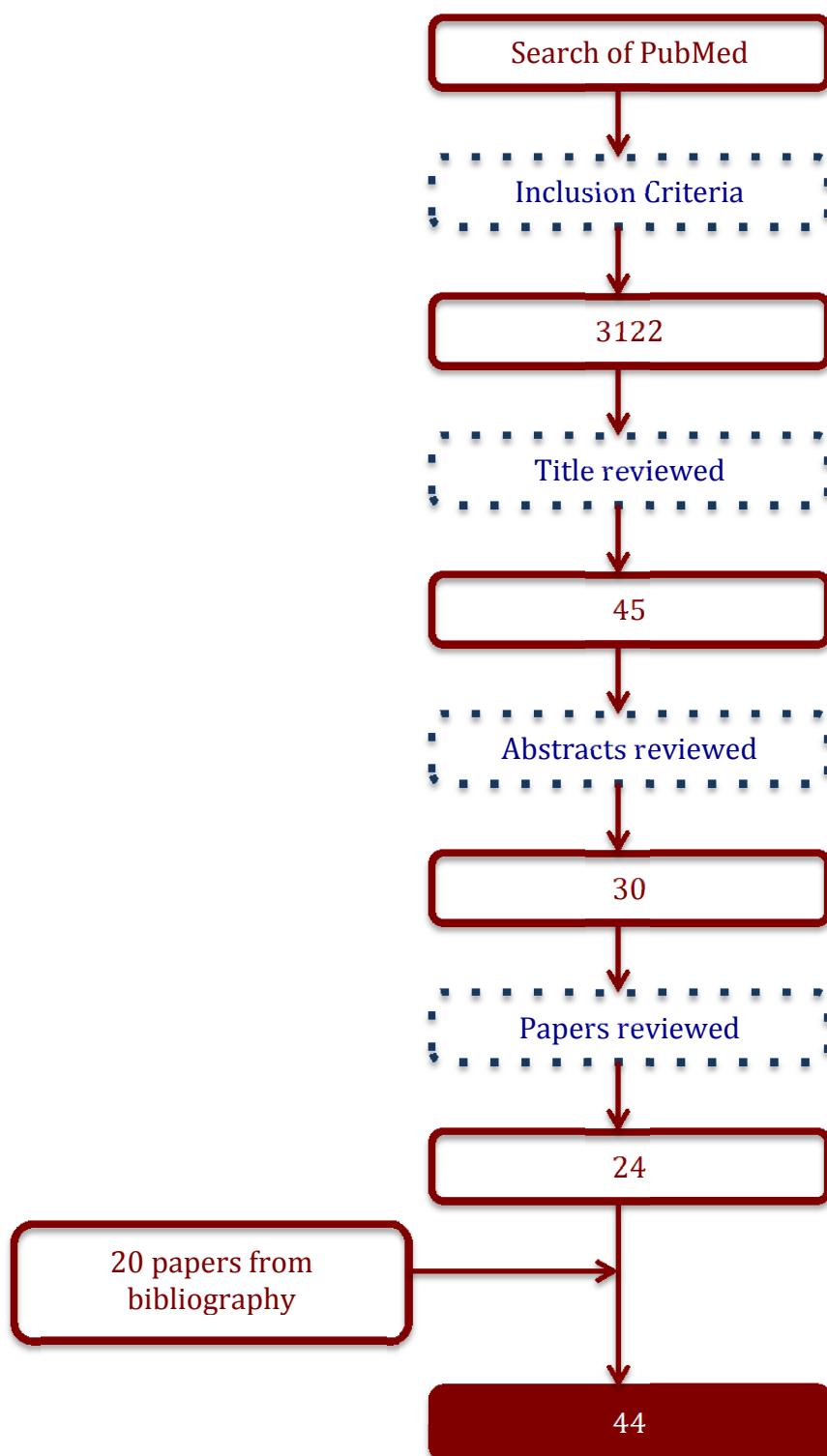


Figure 1 Approach to literature review



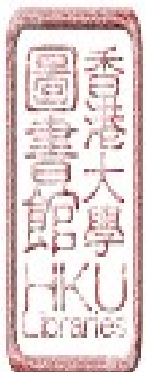
CHAPTER 3

Common Key Success Factors in Hospital Performance

Management System

3.1 Functions of PIs

A summary of the paper is found at the Appendix. Performance indicators are useful in measuring and improving performance in health outcomes and cost-effectiveness gains (18) when carefully adopted and used in a framework (13, 19). Performance indicators should not be treated as standard of care but a gatekeeper for poor performers (20). It is common to adopt two sets of performance indicators, one for external stakeholders and the other for internal use. The external indicators aim at demonstrating accountability while the internal ones for quality improvement (17, 21). The external indicators usually are outcome indicators; measuring the achieved outcome. Examples are hospital standardized mortality rate, bed occupancy rate, average length of stay and readmission rate (22). These indicators are more relevant to the consumers, purchasers or funders for decision-making on service purchase. The internal indicators are usually process indicators that provide useful information for the organization to improve their healthcare (23-25). They signify the gaps in the health service delivery process. Examples are surgical wound infection rate for a particular operation; average waiting time (22).



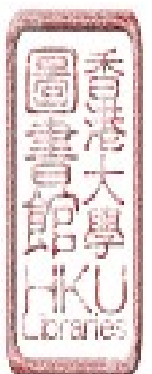
Upon extensive reading of the literatures, several lines of thought appeared to be shared by many authors. These concepts are summarized below as six key success factors (Table 1).

Table 1 Six Success Factors for Performance Management System

1) Position in the policy process and defined objectives
2) Process of development
3) Indicator validity
4) Indicator reliability
5) Indicator responsiveness
6) Feedback of results

3.2 Position in the policy process and defined objectives

The position of performance monitoring in the policy process and the objectives of using performance indicators should be clearly defined (26). Nowadays, the functions of performance indicators extend beyond performance measurement. Some use performance indicators as an information gathering hub to deliver policy relevant information for priority setting and policy evaluation (19, 27), and some consider them as a tool for hospital ranking (28, 29), an accountability report (27, 30-32), a driving force towards its missions (18), an instrument to guide the purchase of service (26), evidence-based planning (26, 33) and strategy formulation (27, 34-35). Therefore, countries or organizations have to develop their own performance indicators framework to best suit its

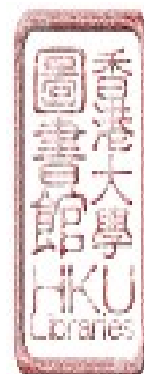


demography, epidemiology, health financing arrangements (26, 36), technical feasibility (22, 37), and organizational goals.

For example, World Bank focuses on efficiency and thus adopts a comparable framework for describing the financial flows through the health system (37). Netherlands requesting more direct and control on the decentralized healthcare, especially in areas of accessibility and affordability (27), focuses on waiting time and cost. World Health Organization aims at steering countries to start looking at the performance of their health system and thus develop a generic framework on clinical effectiveness, efficiency, staff orientation, responsive governance, safety and patient centredness (38), that is easy for others to adopt. Canada noted a national-wide poor mental health service and the Federal Advisory Network on Mental health developed a core set of indicators on mental health service to drive quality improvement (39).

3.3 Process of development

It is observed that successful performance management system is driven by the administration or policy makers in the organization (22) with active participation of the healthcare providers and technical experts (19). Scottish National Health Service shared their experience of failure when there was no involvement of clinicians in the development of performance indicators (19). The clinicians did not cultivate a sense of ownership of the hospital performance and did not feel the urge to improve even the indicators reflecting a poor performance.



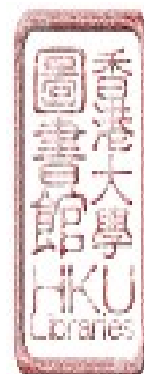
They rarely cited the indicators and had a lot of criticisms against their reliability and validity.

Literatures suggest engaging the providers in the developmental phase as well as the implementation of measurement, analysis and interpretation of data (11, 40, 41). A good understanding of the methodology, inherent under-spinning limitations and the historical and policy context behind are essential to avoid misconceptions and erroneous policy decisions (37). This extensive involvement of clinicians and providers contributes to a broader sense of ownership of the performance management system (17, 26, 42, 43) and a bigger driving force for continuous improvement.

3.4 Indicator selection

Number of PIs

The performance management system usually involves the use of a series of performance indicators. Although there are opposing opinions on the appropriate number of performance indicators used (37, 42), most gear towards using a diverse set. The number of indicators employed ranges from 200 to 2500 (11, 25, 42). The reasons against using a few indicators are the inability to reflect the overall performance of the institution by a few parameters (44, 45). Organizations tend to neglect those areas not being covered in the performance management (18) and put tremendous effort to improve those measured. Integrating various indicators to a framework is a more powerful measurement for



quality improvement and strategy formulation (46, 47). Some combine performance indicators of different perspectives (patient's and provider's) on the same problem into the framework and believe that would conclude in a more comprehensive view (27).

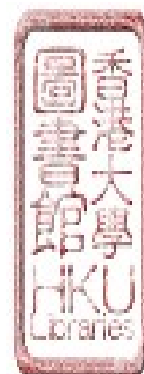
Validity

Validity of these indicators is the utmost important element for the success of performance management (20, 40, 48, 49, 44, 50). Validity of indicators depends on how they are developed (face validity), its capability of measuring what they are designed to measure (content validity) and its ability to predict results (criterion validity) (11, 25, 27, 37, 43, 51).

Face validity implies performance indicators to be developed by health system experts, academics and clinicians (17, 26, 27, 43) through a process of extensive consultation and review so as to ensure the medical soundness and relevance (13). This participatory approach will ensure their full understanding of the PIs and appreciation of its significance (11, 43, 51).

Content validity requires use of clearly defined data elements to ensure measuring what they are intended to measure with a maximized specificity and sensitivity (11, 37). It will moderate the inconsistency of data and reduce the possibility of "gaming" (11, 50).

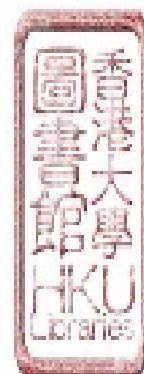
Criterion validity signifies the predictive ability of the indicators. performance indicators with ambiguity over causation to performance will be



perceived as useless and harmful, especially when it is linked to incentive to improvement of resources redistribution. The indicators are chosen on the basis of what should be measured but not could be measured (41). For example, hospital readmission rates could either reflect poor performance or unavoidable reasons like disease progression or social factors. In short, the performance indicators should be able to identify events that warrant review or attention (43) and predict the overall performance of the hospital (21, 45). They should be able to assist the organization to prioritize the area of improvement (51) and result in improvement.

Risk adjustment

When performance indicators are used for benchmarking or ranking, crude comparison of data across hospitals is not recommended. Risk adjustment to case-mix via diagnostic-related groups, illness severity indices or hospital characteristics is usually used (19, 23, 43). The risk-adjusted data would provide more objective performance assessment (19, 44). For example in Australia (43), the diagnoses are documented in the standard International Classification of Diseases, Tenth Revision and the outcome data were risk adjusted to facilitate fruitful benchmarking. For example, they have adjusted for age, sex, illness complications and comorbidities, assuming any residual differences in outcome reflected differences in quality of care received. Take the example of comorbidities relevant to cardiovascular diseases, they have included malignancy, diabetes with or without complications, dementia, hypertension, valvular diseases conduction disorder, renal disease etc.



3.5 Indicator reliability

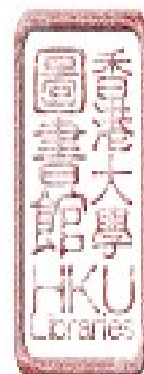
Indicators have to be reliable and reproducible (13, 19, 37, 43, 44, 50, 51, 52). It is a result of data collection capabilities, i.e. all participants report data in the same way (43). Performance indicators with low impact are usually being challenged by the way the data is collected (19). The common illustration is the unreliability of the administrative data for its incomplete and inconsistent coding (45, 53). Inaccuracy is usually resulted when the principle data source is relying on retrospective record review (43) or self-reporting (54). Gaming occurs when providers capture data in a way to favour their institution (41).

Vast resources are usually invested to improve the data quality by building the infrastructure of measurement and electronic data systems (12, 18, 49), training of staff (18, 20, 25, 36) and evaluating the reliability of data as well as plausibility of performance indicators (18, 32, 41, 55).

3.6 Indicator responsiveness

Usefulness of performance monitoring depends on how the information being used within the organization to improve performance (19, 29, 43, 56). Some suggested that the usefulness of performance indicators is its best validity test (55).

Reports of successful performance management have common features. They hold the organization accountable for their performance (18), integrate the Performance indicators framework into their management process and provide

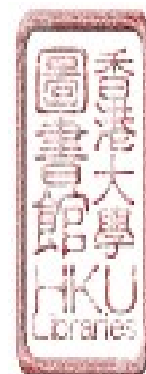


resources for improvement measures (29, 37). For example, Australia requires the health organizations to provide qualitative information on the actions taken as a result of the performance indicators monitoring together with the quantitative data of the indicators every 6 months (42). It is important to provide an organizational environment and incentive context to drive for good quality (18-19). Canadian uses a consortium, which includes Ministry of Health, Statistic Canada, professional bodies, Canadian Council for Health Services Accreditation to encourage collaboration among different entities and explicit changes (26). Australian emphasizes financial incentives and accountabilities.

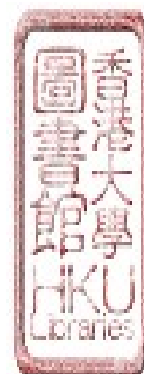
However the organization should avoid measurement fixation; that is, only focus on providing favourable figures than improving services. Take the example of the 5-minute waiting target in the emergency room of the National Health Service, which is originally designed to promote timely and effective triage in the Accident and Emergency Department. In order to produce a favourable score sheet, some organizations employ staff to meet the patients within 5 minutes for routine checking but not triaging them (55).

3.7 Feedback of results

Timely release of the performance report and feedback to providers at all levels of the organization is essential to improve performance (19, 20, 25, 29, 37, 42, 56). Data comparison with the aggregate and the peer comparative results are important to strive for change (42, 56).



However there are contrasting views on whether the result should be publicly disclosed. Some urge international benchmarking (49). Lied 1998 proposed a Hawthorne strategy using external observations of performance to increase internal commitment to performance improvement. This was thought to improve individual's sense of responsibility by linking his own effort to performance improvement and institution recognition (58). There are strong views against publishing the health outcomes to drive service improvement (24, 55). They argued that the disclosure would disrupt the trust in professionalism and ranking of hospitals did not quantify the potential gains (20, 29, 40, 60). The legitimacy of quality control through performance measurement is argued to be internal and policy maker or administrators will limit professional autonomy by tightening the control and accountability system.



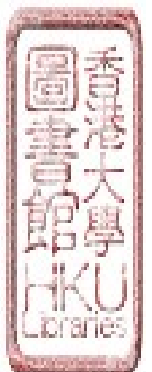
CHAPTER 4

Hong Kong Hospital Performance Management System - Where are we?

4.1 Hong Kong Health System

The heavily subvented health system in Hong Kong faces challenges of financial sustainability, especially in the landscape of an ageing population. The Hong Kong Government suggests the adoption of a voluntary health insurance scheme after a series of public consultation, as one of the healthcare financing strategies. This government-regulated insurance scheme provides more choices to the patients who can and are willing to pay for the private services. However along with this change of financing model, there is no mechanism to guarantee the quality of health services provided. The pricing of private service is not transparent or standardized. Patients or insurers are not given information on what they are paying for. This information asymmetry makes the impact of the scheme less reassuring. There is a need to improve the performance assessment and management mechanism in both the public and private sectors.

Hong Kong runs a dual track system. The public hospitals under Hospital Authority report to the Food and Health Bureau while the private hospitals are regulated by the Department of Health. The following discussions will focus on



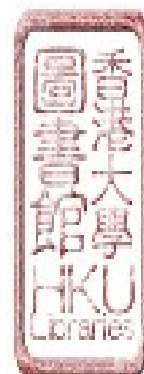
the existing performance management systems in the two sectors, with reference to the six success factors identified through the literature review.

4.2 Position in the policy process and the objectives of monitoring

The public hospital system is expected “to provide adequate, efficient and effective public hospital services of the highest standard recognized internationally within the resources available” (6) in four target areas, namely (i) acute and emergency care; (ii) low income and under-privileged groups; (iii) illnesses that entail high costs, advanced technology and multi-disciplinary professional team work; and (iv) training of healthcare professionals (59). HA is accountable for improving efficiency by development of appropriate management structure, systems and performance measures.

The external performance indicators are in line with the policy direction for HA and is able to provide some accountability reporting. In the yearly Controller’s Report signed off by the Permanent Secretary of the Food and Health Bureau (6), there are four key areas for monitoring: access to services, delivery of services mainly on the service capacity and activities, quality of services and cost of services. The Controller’s Report is submitted to the Legislative Council in every budgetary cycle.

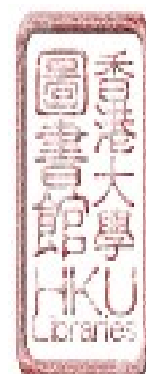
Hospital Authority, internally, uses key performance indicators in driving towards the organizational objectives and priorities (8). The main foci of key performance indicators are placed on efficiency and quality, which are not fully



linked to the organization's mission and strategies. The matching of KPIs and the strategic framework (Figure 3) is listed as below (1, 8).

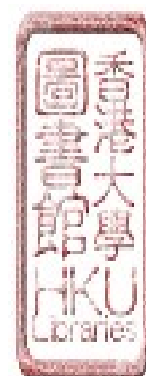
Table 2 Matching of Strategic Framework and KPIs in HA (1)

Strategy	Internal Indicators	External Indicators
Allay shortage and high turnover		Number of community nurses Number of psychiatric nurses Manpower
Better manage growing service demand		Number of hospital beds Number of geriatric places Number of psychiatric day places Bed occupancy rate
Ensure service quality and safety	<p>The waiting time for cataract surgeries, transurethral resection of prostate, diagnostic radiological investigations</p> <p>Access to general outpatient clinic episodic illness service</p> <p>Standardized admission rate for AED</p> <p>Rate of Methicillin-resistant Staphylococcus aureus (MRSA) bacteraemia</p> <p>% of acute stroke patients with CT/MRI brain within 12 hours of AED admission</p> <p>% of patients indicated for surgery on hip fracture with surgery performed \leq 2 days after</p>	<p>% of accident & emergency (AED) patients within target waiting time</p> <p>Median waiting time for first appointment at specialist clinics</p> <p>Average length of stay</p> <p>Number of hospital deaths</p> <p>Unplanned readmission rate</p>



	<p>admission through AED</p> <p>Waiting time for cancer patient to start radiotherapy</p> <p>Waiting time for colorectal / nasopharynx cancer patient receiving first definitive treatment</p> <p>% of diabetic patients with HbA1c <7%</p> <p>% of hypertensive patients treated in GOPC with BP < 140mHg</p> <p>% of end stage renal disease patient receiving hemodialysis</p> <p>% of acute myocardial infarction patients prescribed with statin at discharge</p>	
Enhance partnership with patients and community		Number of home visits
Enhance adequate resources for meeting service needs	Net asset value of medical equipment	
Enhance corporate governance		

Under the strategies of “enhance partnership with patients and community”, “enhance adequate resources for meeting service needs” and “enhance corporate governance”, the number of key performance indicators is



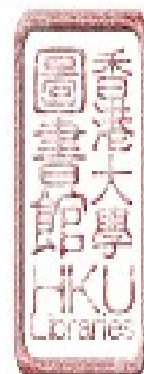
scarce if not any. Hospital Authority does not fully monitor the implementation of these strategies through the existing performance management system.

The objective of performance monitoring is very different for the private sectors. It is related to licensing of the hospitals. As a regulatory body, Department of Health issues license to the private hospitals only when they meet the standards required by the Hospitals, Nursing Homes and Maternity Homes Registration Ordinance (Cap. 165) and Code of Practice. However, these standards are not quantified as parameters or indicators for monitoring.

Department of Health reports two performance indicators in the Controller's Report. There are no publicly accessible reports on the performance of the private hospitals. Recognizing the lack of information concerning the performances of the private hospitals, the Food and Health Bureau commences a review on related Ordinances to strengthen the regulatory control of private hospitals and other private healthcare facilities, to enhance the safety, transparency and quality of private healthcare services and better protect consumer rights.

The current performance monitoring systems in both public and private health sectors do not fully cover their objectives and not align with the changing ecology of healthcare market.

4.3 Process of development of indicators



The performance indicators on the Controller’s Report are determined by the Government. Hospital Authority develops its own sets of internal indicators through an established structure and mechanism. There is active involvement of administrators, clinicians and technical experts in indicators design, measurement and selection. A mechanism of regular review of the plausibility of key performance indicators is also in place (8).

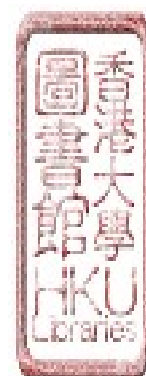
4.4 Indicators selection

Number of performance indicators

There are 144 performance indicators used in Hospital Authority and two in the Department of Health. The performance indicators used by Department of Health are “inspections of all licensed institutions registered under the Ordinance not less than once a year” and “the number of inspection of licensed institutions registered under the Ordinance”. They are the indicators measuring the performance of the Department of Health instead of that of private hospitals.

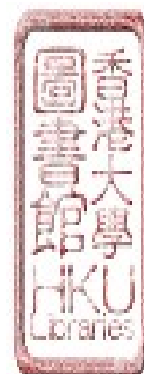
Validity

Hospital Authority has involved stakeholders at all levels for designing and measuring internal performance indicators. This extensive participatory approach ensures face validity. The content validity is reinforced by clearly defined performance indicators and data set. The definitions and methodology of measurement are published and regularly updated (8). The inclusion of



performance indicators for active monitoring is also reviewed annually. However there is no study on the predictive ability of the employed performance indicators. Researches on the usefulness, validity and reliability of the performance indicators in local settings are lacking. Some of the indicators do not measure what is intended to measure. For example, access block is a recent scandal of some hospitals in Hospital Authority. The percentage of patients to be seen within the target waiting time at the emergency room is the only indicator used to reflect the emergency room services. It does not reflect the long waiting time for admission after being seen by emergency physicians. Another example is the current biggest service gap in Hospital Authority cardiac service. Hospital Authority does not provide 24 hours service of primary percutaneous cardiac intervention; which is a standard treatment for acute coronary syndrome in most developed countries. However, the only indicator used for cardiac service is the prescription of statin in patients with acute myocardial infarction after discharge. It does not reflect the true quality of the cardiac service in the organization. The gap in predictability is because the determination of performance indicators depends on the availability of data rather than the need for performance improvement.

The external performance indicators in Hospital Authority are not sensitive enough to distinguish the difference of performances between hospitals. Aggregates of all the 42 public hospitals are reported in the Controller's Report. Therefore performance of an individual hospital cannot be identified. It deviates from the Hawthorne strategy (19), and difficult to hold the hospital executives accountable for the performance of their hospital, or drive them for improvement.



Internal PIs are employed at hospital level, which provides information for the hospital to formulate improvement plans.

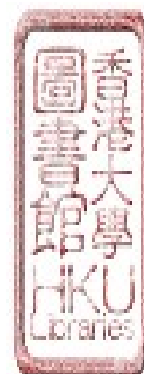
The performance indicators used by the Department of Health are predetermined by the Government and are clearly defined. They reflect the performance of Department of Health in terms of hospital inspection. They do not give any information on the performance of the private hospitals. There is no requirement for the private hospitals to submit performance indicators to the Department of Health or for the Department to report them in the Controller's Report.

Risk Adjustment

In both sectors, risk is not adjusted. More information could be provided to the hospital for service improvement if case-mix is adjusted. Fair and just resources allocation will only occur if the complexity of cases is taken into consideration.

4.5 Indicator reliability

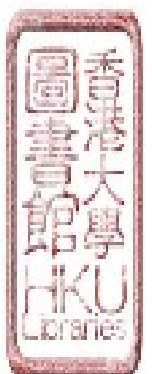
In Hospital Authority, all the data required for performance monitoring are automatically captured by the information system. The system is linked to the International Classification of Diseases, Ninth Revision coding. However, there is no regular study on the accuracy of data or coding.



Department of Health monitors the quality of hospital services by regular inspection instead of the use of performance indicators. Reliability of the inspection will require the adoption of a checklist to ensure all areas are inspected, as enacted by the Ordinance and guided by the Controller's Report. However, a recent audit report by the Audit Commission (60) found that a designated checklist was not used to guide the process of inspections. As a result, there were areas required inspection were not inspected.

4.6 Indicator responsiveness

Performance management is part of the management process in Hospital Authority. Quarterly management meeting between the hospital and the administration is held to discuss the performance gap and improvement strategies. However, the adoption of a broad-brush approach, being non-specialty specific and non-risk adjusted, makes meaningful interpretation of data challenging and framing the improvement strategies difficult. The limited predictive ability of the Performance indicators further compromises its usefulness in driving improvement. Hospital Authority does not provide incentives for improvement or punishment for poor performance. The management is supposed to be accountable for the poor performance but there is no perceived loss when the hospital performs badly. The link of performance monitoring to management is not strong.



The main incentive for the private hospitals to performance improvement is the licensing in their re-registration. However, the Department of Health does not always document the findings of their hospital inspection (1). Inspection reports are not commonly prepared. Warning or advisory letters on service irregularities are not routinely issued. It will be difficult for the private hospitals to learn their performance gaps when feedback is not provided. A limited responsiveness is expected in this context despite there is an incentive for service improvement.

4.7 Feedbacks of results

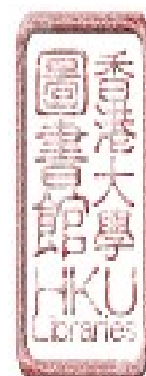
Controller's Report is released yearly and subject to open discussion in the Legislative Council. The Hospital Authority internal performance report is discussed quarterly with the cluster management committee and Board meetings.

The private hospitals do not always receive feedback from the Department of Health after inspection, which makes performance improvement difficult. Public has no access to the performance report of the private hospital.

4.8 SWOT Analysis of the Hospital Performance Management in Hong Kong

Strength

The structure and process of developing indicators is transparent and participatory in the public hospital system. The database structure and the information system are also available. These lay down a good foundation for



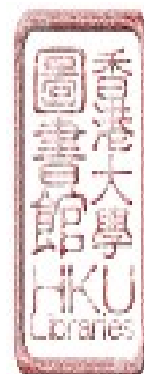
further developing performance indicators and thus enhancing the hospital performance management system.

Furthermore, there is a practice of open disclosure on the performance of the hospitals via the release of Controller's Report. It is well accepted by the internal and external stakeholders, at least in the public system, that the performance of the hospitals would be discussed in the Legislative Council and by the public annually.

Weakness

Performance indicators are expected to be aligned with the strategic goals of the health system and unfortunately the link of the indicators and the mission of hospitals are weak in both the public and private sectors. The indicators are thus not serving as the driving force for service quality improvement or achieving what the hospitals are set out for.

The lack of evidence of the validity and reliability of the indicators are another main weaknesses found. Involvement of academia in studying the usefulness, validity and reliability of the indicators are important to improve their predictability. Risk adjustment of the outcome data should be seriously explored. More specific indicators should be included to reflect the actual performance e.g. the percentage of emergency percutaneous cardiac catheterization done on eligible patients and the standardized mortality rate.



Furthermore, the approach of benching performance among hospitals (public and private) should be adopted so as to inform public for better choice on appropriate care. A collective data for the public hospitals is ambiguous for decision making on good quality of care.

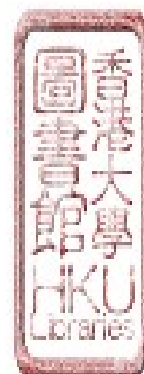
Last but not the least, there is a missing link between performance and incentives. Healthcare workers or hospitals are neither rewarded or hold accountable for good or bad outcome. A rewarding system down to the physician level, will empower them for a better quality of care.

Opportunity

Healthcare reform for sustainability has raised lots of public attention in the recent years. It becomes a healthcare agenda and changes are expected to upkeep the current health service. Performance indicator framework could serve as a tool to address this policy position.

One of the healthcare reform initiatives is the launching of the electronic health record system, which shares a similar data structure with the one using in the public system. It is anticipated that the e-health record system will improve the comprehensiveness of information of the public using health services in Hong Kong. This will facilitate monitoring and measuring same set of indicators for both the private and public hospitals, by improving the data reliability.

There has been always the impression that the public hospitals are taking care of sicker and older patients than the private sectors. It will be essential to

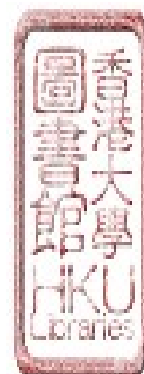


adjust the risk of the patients when benchmarking the hospitals' performance in Hong Kong. The experience of risk-adjusted casemix internal resources allocation in the public hospitals could provide clues in adopting a similar system in performance monitoring.

Threat

The major threat will be the engagement of private hospitals in the accountability and reporting of their performance. It would be a challenge for the Department of Health to change their monitoring system and execute their role among the private hospitals. It will depend on the political power of the Bureau in driving the insurance coverage in the healthcare reform. If there is not going to have an insurance coverage for health services, or the insurance industry is not mature to manage the purchaser-provider model, the bargaining power of the Department of Health to strive for a vast change in hospital performance monitoring will be demanding.

Another threat that should not be underestimated is the manpower shortfall in public hospitals. The perception of additional workload for performance monitoring and the subsequent quality improvement programmes are often seen as administrative tools without considering patients' benefits or staff's sentiments. This might aggregate the discontent of the working staff in the hospitals. A even more participatory approach for performance monitoring should be adopted to fully engage the staff.

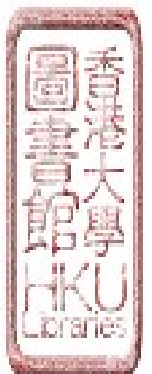


CHAPTER 5

The Way Forward

In the changing ecology of healthcare market, the current hospital performance systems, both in the public and private sectors, are not able to provide adequate information for the payers to make appropriate choice. Literature review identifies six key elements for successful performance indicators: position in the policy process and defined objectives, process of development, indicator validity, reliability, responsiveness and feedbacks. The comparison of the local context to the international experiences suggests enhancement of the performance management system is required.

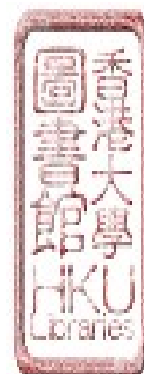
There are rooms for improvement in the performance management system in the public hospitals. They include better alignment of the performance indicators to the organizational strategies by incorporating corporate risks management and strategic directions in the formulation of indicators. Predictive ability of the indicators through researches should be enhanced. Collaboration with academic bodies on studying the reliability and validity of indicators will improve their usefulness. Risk adjustment model, by correcting age, sex and comorbidity, should be adopted. It would not only improve the reliability of the indicators, through the engagement of stakeholders, it would also augment the face validity. More specific performance indicators should be included.



Indicators like the percentage of category I patient attending accident and emergency department to be seen within 1 hour does not reflect the challenges of access block the public hospitals are facing. The time from the decision to admit to that of admission should be measured instead. Last but not the least, introduction of incentive system at the clinicians or departments should be considered to empower frontline clinicians driving for performance improvement.

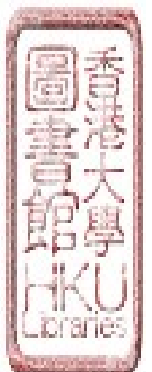
The performance management system in private hospitals is under-developed. The quality is controlled by regular hospital inspection by the Department of Health but not through the use of performance indicators. There is no designated checklist for inspection and the result is not communicated to the hospital. The performance report is not available to the public.

In order to support the healthcare reform, there is an urging needs to develop a robust and transparent performance management system in Hong Kong. The society has the right to know what they are paying for. It will be essential to seize the opportunity of this political wave of healthcare reform to reinforce the hospital performance monitoring in Hong Kong. With the implementation of electronic health record, a comprehensive database would be available for measurement as a territory-wide initiative. Furthermore, risk-adjusted model should be explored for performance monitoring, with the support of research on usefulness, predictability and reliability of performance indicators.

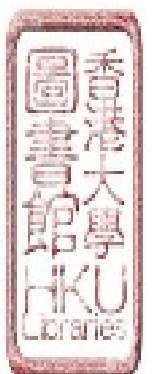


Appendix 1 Summary of the literature review

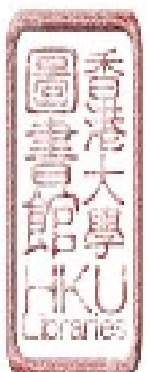
Arthur, Year	Summary of the success factors for performance management
Bowen, 2008 (11)	<ul style="list-style-type: none">• Validity, reliability, sensitivity and specificity of performance indicators• Full engagement of clinicians are essential• Understand the limitation of performance indicators• Existing data might not indicate what the organization wants to measure• Meaning and calculation of performance indicators have to be transparent
Veillard, 2010 (13)	<ul style="list-style-type: none">• Use of performance indicators are associated with improvement of clinical and financial outcomes, especially when they are strategy-based• Hold those receiving resources accountable for results• performance indicators have to be important, relevant, reliable and valid• Incentives should be linked to the performance management• The result should be disclosed to the public
Weir, 2009 (17)	<ul style="list-style-type: none">• An inclusive and participatory approach should be used for defining and creating performance indicators



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- Kerr, 2007 (18)
- Resources need to be provided to develop the infrastructure for performance monitoring
 - Using a few numbers of performance indicators for measurement will create a biased view of the overall performance of the organization
 - Incentives should be linked to the performance management
-
- Mannion, 2001 (19)
- Causes of failure of performance indicators include poor quality of data, inconsistent coding, no engagement of clinicians, little incentives provided, and no training of clinicians on performance indicators
-
- Fisher, 2001 (20)
- Performance indicators act as gatekeeping for poor performance but not a standard of care
-
- McLoughlin, 2001 (21)
- Essential elements are information infrastructure, paucity of accurate and accessible clinical data, accountability and the mechanism for linking the result to improvement measures
-
- Busse, 2009 (23)
- Important to have consistent dataset e.g. linking to diagnosis-related group
-



Evans, 2001 (24)	<ul style="list-style-type: none"> • Outcomes performance indicators are more relevant to quality improvement. While process indicators cannot guarantee the desired impact
Davis, 1998 (25)	<ul style="list-style-type: none"> • Publishing the results of performance measures and health outcome is counterproductive as it will compromise the public trust in professionalism
Tashobya, 2015 (26)	<ul style="list-style-type: none"> • There should be an inclusive development process • Concrete purpose for monitoring is present • The performance indicators framework is related to the prevailing policy and organizational set-up • It is embedded in the health systems • Environment for change should be provided
Berg, 2014 (27)	<ul style="list-style-type: none"> • Resources receiver should be hold accountable • Performance indicators are related to strategic decision making • Data is reliable • Combining multiple perspectives on the same issue • International benchmarking • Continuous exchange between researchers and policy makers
Chiu, 2007 (28)	<ul style="list-style-type: none"> • Active participation of stakeholders is essential



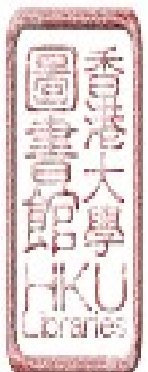
	<ul style="list-style-type: none"> • Ensure good understanding and correct interpretation of data • Incentives should be linked to the performance management
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Gibberd, 2004 (29)	<ul style="list-style-type: none"> • Ranking of hospitals does not quantify the potential gains • Process indicators quantify potential gains, thus encouraging action • Resources should be provided for improvement measures
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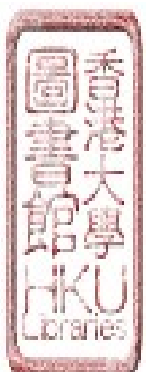
Berg, 2005 (30)	<ul style="list-style-type: none"> • PIs can improve transparency, accountability and quality in healthcare • External performance indicators is the accountability report while internal performance indicators drive service improvement • Performance indicators are valid and risk adjusted • Clear defined data will prevent gaming • Incentive is provided for the improvement
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Friedman, 2003 (31)	<ul style="list-style-type: none"> • Performance indicators are useful when linked to the strategy
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Stewart , 2001 (32)	<ul style="list-style-type: none"> • Purpose of performance monitoring should be defined. It is found to be useful when it is in line with strategy
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	<ul style="list-style-type: none"> • The development of should take into consideration of whether the customers' expectation is met
Lotfi, 2014 (33)	<ul style="list-style-type: none"> • Performance indicators should be lined to future planning and have an impact on resources allocation
Devitt, 2005 (34)	<ul style="list-style-type: none"> • Effective performance management should link the performance monitoring to the strategy planning
Yap, 2005 (35)	<ul style="list-style-type: none"> • Important to link the organizational strategies with performance data to netter manage their health systems
Anderson, 2009 (36)	<ul style="list-style-type: none"> • Barriers to the effective uses of performance indicators are: Performance indicators selection driven by accountability rather than public health requirement, poor data quality, inadequate infrastructure and human resources, minimal information to the communities
Forde, 2013 (37)	<ul style="list-style-type: none"> • Key success factors are the legitimacy of the coordinating center for the development of performance indicators, indicators validity, feasibility of data collection, availability of technical support for data correspondences • Controversial issues include the number and diversity of performance indicators used, the aggregation vs granularity of data, flexibility vs consistency



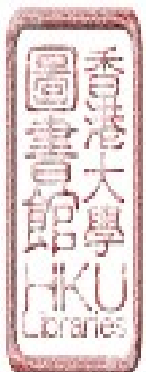
performance indicators definition and inclusion criteria

- Veillard, 2005 (38)
- WHO's performance indicators are studied. It is important to select a core and a tailored set of performance indicators with detailed operational definitions, understand the trade-offs between performance indicators and assist the providers in mastering the results for service improvement

- McEwan, 2002 (39)
- Important to identify the objective of performance indicators before designing the monitoring framework

- Forster, 2012 (40)
- Performance indicators should be chosen on the basis of what should be measured instead of what can be measured
 - Essential to build the performance management infrastructure
 - Investment in researches to study the plausibility of performance indicators

- Collopy, 2000 (41)
- It is essential to have formal provider involvement with performance indicators development.
 - Clinicians receive 6 monthly feedback of aggregate and peer comparative results
 - A core set of performance indicators is used instead of a



diverse set

Booth, 1997 (42)

- The integrity of performance indicators depends on the validity, responsiveness, predictive ability and reliability
- Gaming occurs when there is reliance on retrospective record review as the principal data source

Scott, 2003 (43)

- It is common to use administrative data for performance monitoring. However significant risk adjusted systematic variation was found. Data validation is essential if administrative data is employed for performance measures.

Jha, 2005 (44)

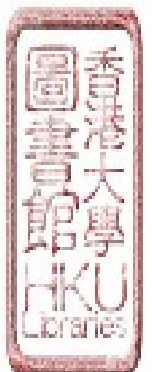
- When performance indicators are used for hospital benchmarking or ranking, a diverse set of indicators should be used cover the great variation of performance among hospitals of similar characteristics.

Gordon, 1998 (45)

- Performance indicators framework in the form of a balance scorecard is a powerful tool for enabling complex decision making by hospital management

Shahin, 2007(46)

- Goals should be set before selection of performance indicators
- Within the diverse set of performance indicators, prioritization of performance indicators is required to



maximize gains

Barker, 2012 (47)

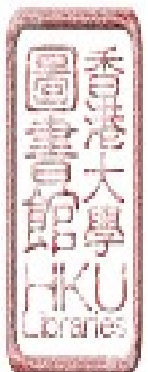
- Use of indicators with poor validity has the consequence of potentially incorrectly classifying hospitals as poor performers.
- Administrative data is not suitable for fair performance monitoring
- Other measures like better systems of audit, checklists should be incorporated into the performance management system

Groene, 2008 (48)

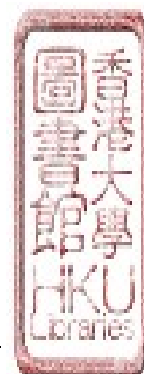
- After evaluating the pilot implementation of the World Health Organization performance assessment tool, it is recommended to seed funding and technical support for data collection, standardize and improve indicators, increase use of routine data, provide timely feedback to stakeholders with a stronger focus on international benchmarking and support data interpretation.

Turpin, 1995 (49)

- Important features of performance indicators are described: reliability, validity, and active engagement of stakeholders in development, implementation and interpretation of indicators.
- Performance indicators should be relevant and able to identify opportunities for improvement



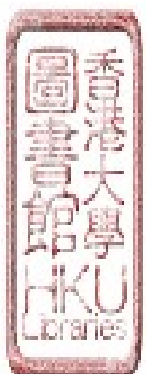
	<ul style="list-style-type: none"> • The organization has to build up systems to translate the measures into improvement action and disseminate the performance results
Anema, 2013 (50)	<ul style="list-style-type: none"> • Data quality is important. There are heterogenic ways of data collection and conditional data infrastructure. This will affect the reliability of the performance indicators. • Data accuracy and precision is particularly essential in self-report based performance indicator system
Glance, 2006 (51)	<ul style="list-style-type: none"> • Use of administrative data without standardization and validation lead to mis-identification of hospital quality outliers.
Scott, 2006 (52)	<ul style="list-style-type: none"> • It is an investigation report of reliability of self-reported standardized performance indicators • Regular study to confirm the reliability of data and plausibility of performance indicators is essential for a meaningful performance management system
Mannion, 2012 (53)	<ul style="list-style-type: none"> • A review of dysfunctional consequences resulted from performance measurement • The causes for failure of performance management included poor measurement, misplaced incentives, breach of trust, gaming and politicization of performance systems



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- Persaud, 2006 (54)
- Most systems reflect accountability aspect but are devoid of clear mechanisms for translating feedback from measures into strategies for action
 - When design performance indicators, first to decide what is important instead of the indicators that reflect this
 - Process indicators are linked to identifiable activities and thus changing the work process will result in service improvement

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- Kazandjian, 1995 (55)
- Performance indicators should be developed with the consideration of technical feasibility and conceptual validity
 - Robust mechanism and infrastructure are important for performance indicators development

-
- Lied, 1998 (56)
- Open disclosure of performance results is the Hawthorne strategy to improve service. It uses external observations of performance to increase internal commitment to improvement.
 - It is thought to increase individual responsibility and perceived connection to the organizational performance
 - The sense of accountability is maintained by the institutional recognition

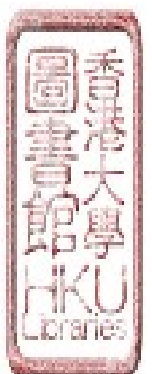


Tu, 2009 (57)

- A randomized trial to study the impact on quality improvement of a public release of performance result. The study did not show any significant difference in the quality improvement in hospitals with public release of performance results

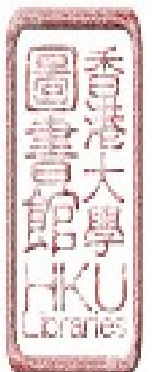
Davis, 2012 (58)

- A study to show the correlation of sets of standardized performance result to the hospital ranking. Little correlation could be found. A multiple or composite indicator models was suggested in order to provide a more holistic and rounded account of performance
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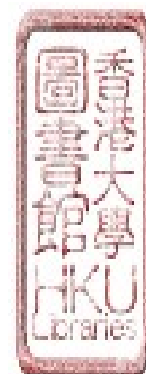


Bibliography

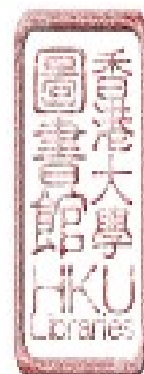
1. Strategic Plan 2012-17. Hospital Authority 2012.
2. Budget Speech 2014-15, HKSAR.
http://www.budget.gov.hk/2014/eng/pdf/e_appendices_b.pdf (last searched on 28 July 2014)
3. Hong Kong: Facts, Public Health. Department of Health 2013.
4. Annual Report. The Department of Health 2009 – 10.
http://www.dh.gov.hk/english/pub_rec/pub_rec_ar/pdf/0910/ADR_2009_10_full.pdf (last searched on 28 July 2014)
5. Hong Kong's Domestic Health Account, Food and Health Bureau.
http://www.fhb.gov.hk/statistics/download/dha/en/dha_summary_report_0910.pdf (last searched on 28 July 2014)
6. Head 140 – Government Secretariat: Food and Health Bureau (Health Branch), The HKSAR, 2014.
7. Hong Kong Government Service Excellence Index 2013, Report for Hospital Authority. Efficiency Unit, the HKSAR, 2013.
8. Guidebook on Key Performance Indicators (Clinical Services). Hospital Authority 2014.
9. Issues relating to the Development and Operation of Private Hospitals, Legco Paper, 2012. The Food and Health Bureau, HKSAR.
<http://www.legco.gov.hk/yr12-13/english/panels/hs/papers/hs1218cb2-334-1-e.pdf> (last searched on 28 July 2014)
10. Carter N. Performance Indicators: “Backseat Driving” or “Hands Off” control? Policy and Politics 17;1989:131-8.



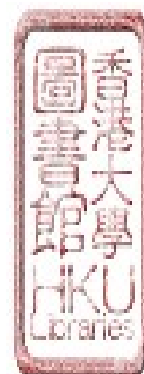
11. Bowen S, Kreindler A. Indicator madness: a cautionary reflection on the use of indicators in healthcare. *Healthcare policy* 2008; 3:41-48.
12. Thomson R, Taber S, Lally J, Kazandjian V. UK Quality Indicator Project and the UK independent healthcare sector: a new development. *Int J for Qual in HC* 2004;16:51-6.
13. Veillard J, Huynh T. Making health system performance measurement useful to policy makers: aligning strategies, measurement and local health system accountability in Ontario. *Health Policy* 2010; 5: 49- 65
14. Arah O, Klazina N, Delinoij D, Ten Asbroek A, Custers T. Conceptual frameworks for health systems performance: a quest for effectiveness, quality, and improvement. *Int J for Qual in Healthcare* 2003;15:377-398.
15. Carter N, Klein R, Day P. How organization measure success: the use of performance indicators in Government; 1992.
16. Conn J. Leading Indicator – Program in Maryland has analyzed hospital quality for 20 years. *Modern Healthcare* 2005;15:38–9.
17. Weir E, d’Entremont N, Stalker S, Kurji K, Robinson V. Applying the balanced scorecard to local public health performance measurements deliberations and decisions. *BMC public Health* 2009;9:127. http://www.biomedcentral.com/1472-2458/9/127_(last searched on 28 July 2014)
18. Kerr E, Fleming B. Making performance indicators work: experiences of US Veterans health administration. *BMJ*. 2007;335:971-3.
19. Mannion R, Goddard M. Impact of published clinical outcomes data: case study in NHS hospital trusts. *BMJ*. 2001;323:260-3.



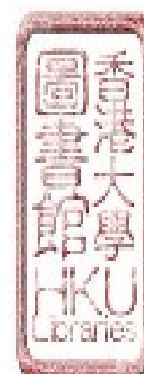
20. Fisher C, Fiorilli MG. Commentary: applying hospital quality indicators to clinical practice. *Am J Med Qual*. 2001;16:58-60.
21. McLoughlin V, Leatherman S, Fletcher M, Owen J. Improving performance using indicators. Recent experiences in the United States, the United Kingdom, and Australia. *Int J Qual in healthcare* 2001;13:455–462.
22. Donabedian A. Evaluating the quality of medical care. *Milbank Q* 2005;83:691–729.
23. Busse R, Nimptsch U, Mansky T. Measuring, monitoring and managing quality in Germany's Hospitals. *Health Affairs* 2009; 28:294-304.
24. Evans D, Edejer T, Lauer J, Frenk J, Murray C. Measuring quality: from the system to the provider. *Int J Qual Healthcare* 2001; 13:439-446
25. Davies H, Lampel J. Trust in performance indicators? *Qual in Health care* 1998; 7:159-162.
26. Tashobya CK, Campos da Silverira V, Ssenooba F, Nabyonga-Orem J, Macq J, Criel B. Health systems performance assessment in low-income countries: learning form international experiences. *Global Health* 2014; 10:5. <http://www.globalizationandhealth.com/content/10/1/5>_(last searched on 28 July 2014)
27. Van den Berg M, Kringos D, Marks L, Klazinga N. The Dutch health care performance report: seven years of healthcare performance assessment in the Netherlands. *Health Research Policy and System*. 2014; 12:1 <http://www.health-policy-systems.com/content/12/1/1>_(last searched on 28 July 2014)



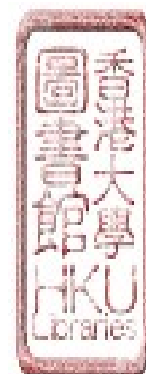
28. Chiu WT, Yang CM, Lin HW, Chu TB. Development and implementation of a nationwide health care quality indicator system in Taiwan. *Int J Qual Health Care.* 2007;19:21-8.
29. Gibberd R, Hancock S, Howley P, Richards K. Using indicators to quantify the potential to improve the quality of health care. *Int J Qual Health Care.* 2004;16 Suppl 1:i37-43.
30. Berg M, Meijerink Y, Gras M, Goossensen A, Schellekens W, Haeck J, Kallewaard M, Kingma H. Feasibility first: developing public performance indicators on patient safety and clinical effectiveness for Dutch hospitals. *Health Policy.* 2005;75:59-73.
31. Friedman N, Kokia E, Shemer J. Health value added: Linkung strategy, performance and measurement in healthcare organization. *IMAJ* 2003; 5: 3 – 8.
32. Stewart L, Lockamy A. Improving competitiveness through performance measurement systems. *Healthcare Fin Mgt* 2001; 55: 46-50
33. Lotif F, Kalhor R, Bastani P, Shaarbafchi Zadeh N, Eslamian M, Dehghai MR, Kiaee MZ. Various indicators for the assessment of hospitals' performance stats: difference and similarities. *Iran Red Crescent Med J* 2014;16:e12950
34. Devitt R, Klassen W, Martalog J. Strategic Management System in a healthcare setting – moving from strategy to results. *Healthcare Quarterly.* 2005;8:58–65.
35. Yap C, Siu E, Baker GR, Brown AD. A comparison of systemwide and hospital-specific performance measurement tools. *J Healthc Manag.* 2005;50:251-62.



36. Anderson M, Smylie J. Health systems performance measurement systems in Canada: how well do they perform in first nations, inuit and metis contexts? *Pimatisiwin*. 2009;7:99-115.
37. Forde I, Morgan D, Klazinga N. Resolving the challenges in the international comparison of health systems: the must do's and the trade offs. *Health Policy* 2013;112:4-8.
38. Veillard J, Champagne F, Klazinga N, Kazandjian V, Arah OA, Guisset AL. A performance assessment framework for hospitals: the WHO regional office for Europe PATH project. *Int J Qual Health Care* 2005;17:487-496.
39. McEwan K, Goldner E. Keeping mental health reform on course: selecting indicators of mental health performance. *Can J Comm* 2002: 21:5-15
40. Forster A, van Walraven C. The use of quality indicators to promote accountability in health care: the good, the bad and the ugly. *Open Med* 2012;6:75-9.
41. Collopy B. Clinical indicators in accreditation: an effective stimulus to improve patient care. *Int J Qual Health Care*. 2000;12:211-6.
42. Booth J, Collopy B. A national clinical indicator data base: issues of reliability and validity. *Aus Health Rev* 1997; 4:84-94.
43. Scott I, Youlden D, Coory M. Are diagnosis specific outcome indicators based on administrative data useful in assessing quality of hospital care? *Qual Saf Health Care*. 2004;13:32-9.
44. Jha A, Li Z, Orav J, Epstein A. Care in US hospitals – the hospital quality alliance program. *NEJM* 2005;355:265-274.



45. Gordon D, Carter M, Kunov H, Dolan A, Chapman F. A strategic information system to facilitate the use of performance indicators in hospitals. *Health Serv Manage Res.* 1998;11:80-91.
46. Shahin A, Mahood M. Prioritization of key performance indicators. *IJPPM* 2006; 56: 3. <http://www.emeraldinsight.com/1741-0401.htm> (last searched on 28 July 2014)
47. Barker A, Mengersen K, Morton A. What is the value of hospital mortality indicators, and are there ways to do better? *Aust Health Rev.* 2012;36:374-7.
48. Groene O, Klazinga N, Kazandjian V, Lombrail P, Bartels P. The World Health Organization Performance Assessment Tool for Quality Improvement in Hospitals (PATH): an analysis of the pilot implementation in 37 hospitals. *Int J Qual Health Care.* 2008;20:155-61.
49. Turpin R, Darcy L, Koss R, McMahill C, Meyne K, Morton D, Rodriguez J, Schmaltz S, Schyve P, Smith P. A model to assess the usefulness of performance indicators. *Int J Qual Health Care.* 1996;8:321-9.
50. Anema H, Kievit J, Fischer C, Steyerberg E, Klazinga N. Influences of hospital information systems, indicator data collection and computation on reported Dutch hospital performance indicator scores. *BMC Health Serv Res.* 2013, 13:212.
51. Glance L, Dick A, Osler T, Mukamel D. Accuracy of hospital report cards based on administrative data. *Health Serv Res.* 2006;41:1413-37.
52. Williams S, Watt A, Schmaltz S, Koss R, Loeb J. Assessing the reliability of standardized performance indicators. *Int J Qual Health Care.* 2006;18:246-55.



53. Mannion R, Braithwaite J. Unintended consequences of performance measurement in healthcare: 20 salutary lessons from the English National Health Service. *Int Med J* 2012; 42:569-74
54. Persaud D, Nestman L. The utilization of systematic outcome mapping to improve performance management in health care. *Health Serv Manage Res.* 2006;19:264-76.
55. Kazandjian V, Wood P, Lawthers J. Balancing science and practice in indicator development. *Int Qual Health Care* 1995;7:39-46.
56. Lied T, Kazandjian V. A Hawthorne Strategy: Implications for Performance Measurement and Improvement. *Clinical Performance and Quality Health Care* 1998;6:201-4.
57. Tu J, Donovan L, Lee D, Wang J, Austin P, Alter D, Ko D. Effectiveness of public report cards for improving the quality of cardiac care: the EFFECT study: a randomized trial. *JAMA.* 2009;302:2330-7.
58. Davis P, Milne B, Parker K, Hider P, Lay-Yee R, Cumming J, Graham P. Efficiency, effectiveness, equity (E3). Evaluating hospital performance in three dimensions. *Health Policy.* 2013;112:19-27.
59. *Building a Health Tomorrow*, 2005. The Food and Health Bureau, HKSAR.
60. *Regulatory control of private hospitals.* Audit Commission 2012.
http://www.aud.gov.hk/pdf_e/e59ch03.pdf (last searched on 28 July 2014)

