Measuring Capacity to Care Using Nursing Data

Evelyn J.S. Hovenga and Cherrie Lowe

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About the authors

Evelyn J.S. Hovenga

Evelyn J.S. Hovenga brings global experience, strong scientific and professional leadership in Health and Nursing Informatics, she is widely published. Her experience and expertise covers many factors of health and nursing informatics, especially standards development pertaining to health terminology and electronic health records, including knowledge management, ontology and semantic interoperability. Evelyn undertook all her graduate studies whilst working full-time as a divorced mother of two daughters, and was awarded a doctorate in Health Administration from the University of New South Wales.

Her healthcare industry background began as a Nurse in paediatrics, obstetrics, general medical and surgical, organ imaging and ended as an operating room suite unit manager. This was followed by a new appointment as a Health Service Management (Workstudy) Consultant for the Victorian Government Health Commission, where her career progressed to her taking on the role of senior nursing advisor and researcher for a Ministerial enquiry into nursing in that State. Evelyn developed a nursing acuity system in response to a need to address major nursing industrial unrest over workload, nursing career structures and pay. This acuity system was in use by over 100 hospitals in three Australian States for close to fifteen years. It was outlawed in Victoria by the then Minister of Health, as the information made available to nurses was used by them to manage their workloads. He considered this to be in conflict with his new policy to reduce surgical waiting lists. Evelyn then worked privately as a consultant and undertook numerous additional patient acuity studies and nursing productivity reviews in Victoria and other Australian States.

Evelyn met up with her co-author, Cherrie Lowe when undertaking major research for the Private Hospitals Association in Victoria and Queensland, where Cherrie was a Director of Nursing of a private hospital. They recognised their shared vision and entrepreneurial mindsets while working together on this project. The research project's aim was to establish a nursing career structure.

Evelyn accepted an invitation from the Director of Nursing of the London Hospital, Maureen Scholes, who had established a Nursing Informatics working group for the International Medical Informatics Association, to represent Australian nurses internationally as a member of that working group. This provided her with an international network of other nursing

informatics researchers, with opportunities to collaborate with them. She was elected to Chair this group following her successful hosting of the International Nursing Informatics conference in Melbourne (NI'91). Profits made were used to establish the Health Informatics Society of Australia, of which Evelyn is a founding and lifelong member. She is a founding Fellow and life member of the Australasian College of Health Informatics, and the International Academy of Health Sciences Informatics. She was awarded fellowships by the Australian College and Nursing, the Australian Computer Society and the Australian College of Health Executives.

Evelyn again diverted from her career path by accepting a University appointment to develop post graduate programs in health informatics and administration, and to establish a research centre. Evelyn became a founding member of a newly established Health Informatics Standards Development Committee (IT/14) by Standards Australia. She has participated in many standards development activities as a volunteer for Standards Australia, ISO TC215 and HL7 Australia, and continues to work with the openEHR foundation at the University College of London. One of her Post Doctoral fellows, Dr Sebastian Garde established the first ontology based online clinical knowledge repository under her guidance. Evelyn was an external advisor for the EU funded NIGHTINGALE, TELENursing and ICNP development projects during the 1990s and has witnessed many new technical advances during her career. She retired as a full professor in 2007 and is continuing her work in her current positions.

Cherrie Lowe

Cherrie Lowe is a registered nurse, midwife, an innovator and business manager, who brings local, national and international health service executive management, research, software development and system implementation experiences. Her health industry experience includes past roles as a Nurse Educator, Quality Manager, Director of Nursing, Director of Clinical Services, hospital accreditation surveyor and medico-legal expert witness.

Her executive level industry experience began as a Director of Nursing for Mercy Health and Aged Care where she maintained an efficient nursing service and improved the hospital's profit margin by making use of her patient acuity system. Cherrie initiated the development of a hospital promotion campaign, which included a television video that significantly increased the hospital's bed occupancy. The success of this campaign achieved the Australian Council on Healthcare Standards (ACHS) National Quality Award for large hospitals.

As Director of Clinical Services for Ramsay Health Care Cherrie played a major role in managing the transition of a large Commonwealth funded veteran hospital to Australia's largest private teaching hospital. Here she developed a strong, efficient and dynamic nursing service and allied health team and assisted in the expansion of clinical services, including: Cardiac, Gynaecology and Neurosurgery. She again achieved the ACHS National Quality Award for large hospitals and the hospital was also awarded the Employer of the Year Award for large organizations in Brisbane. Cherrie was again responsible for generating a significant profit

margin for that organisation by maintaining a high level of efficiency in clinical services, an achievement made possible through the use of her patient acuity system.

During her years as a nurse executive, Cherrie managed her family, undertook her post graduate studies as an external student, was a surveyor for the Australian Health Care Council, developed, tested and made use of a patient acuity system, and undertook various consultancies. She partnered in business with a software developer and her system was fully computerized taking advantage of ongoing technical developments. Cherrie shared her research findings with other Directors of Nursing who then worked with her by facilitating ongoing research and development activities in their facilities. This research was presented at a world informatics conference in San Antonio in 1994. During the mid 1990s both Cherrie's and Evelyn's patient acuity systems were used by numerous Queensland hospitals. The Queensland Government funded a validation study enabling a comparison to be made between these two systems using the same patient populations which validated both systems, as the use of their systems provided comparable results.

The success of Cherrie's automated and highly interoperable TrendCare system enabled her to assume the CEO, researcher and developer role for Trend Care Systems Pty Ltd on a full-time basis. Her primary focus has always been to take on the many ensuing challenges to benefit the nursing and midwifery professions. In 1997 Cherrie received a Nursing Excellence award from the Royal College of Nursing for her contribution to nursing in Australia.

Developing and continuously improving the reliability of an evidence based patient acuity and workload management system for nursing and midwifery has been a challenging undertaking, and during the past 25 years Cherrie has had to overcome many barriers. These include (1) convincing nursing and midwifery leaders, colleges and unions that nursing services need to collect and present their own evidence of nursing demand in order for nursing services to be adequately resourced, (2) convincing health service senior executives, including CEO's, finance managers and chief information officers of the methodologies that are best suited to measuring nursing demand, and the value of nursing demand measurements for effective budget management and accurate costings of episodes of care, (3) Convincing nurses and midwives of the importance of collecting nursing and midwifery data, so that safe staffing and fair workloads can be a reality. These barriers have been overcome in some countries but are still ongoing in others.

Developing a viable small business, while trying to provide an affordable software product to health services that are financially stretched, has tested Cherrie's business skills. Transforming a small local business to an international business with a customer footprint across six countries in the health care environment is testament to her determination, commitment and sound business strategies.

Cherrie has won the AustCham Business Award in Singapore, the Australian national and state Microsoft eHealth iAwards for innovation in IT development and the Australian national ICT exporter of the Year Award.

Preface

The Need for a Better Understanding of Contributions Made by the Nursing and Midwifery Professions to the Health of any Nation.

This book seeks to meet the need for a better understanding of the many and varied very significant contributions made by the nurses and midwives within any country's health system. The nursing and midwifery workforce is three times as large as that of any other health professional group. It is viewed by many as the largest health cost burden rather than for being responsible for the most significant cost savings to the health industry by enabling many individuals to continue to contribute productively to the nation's overall economic status.

We are passionate advocates for the nursing, midwifery and informatics professions and have spent a lifetime endeavoring to make our profession more visible to decision makers. We have fought many battles and encountered many barriers. Despite the many solutions developed over the years, we continue to witness a very poor understanding of the nursing and midwifery human resources' needs relative to meeting health service demands. Nurses and midwives deserve to be provided with the capacity to care for our fellow human beings during their most intimate and often traumatic life events. That represents a highly valued investment for the population at large. Nurses and midwives, most of whom are women, continue to be compelled to fight and engage in industrial action to get a fair deal. This needs to change.

This book is addressed to a wide readership, including policy makers, health service executives, managers in healthcare settings, nurses and midwives, health IT, health information and ICT professional, researchers and educators. It is intended to contribute knowledge and provide an argument for why nursing and midwifery data need to be a focal point for identifying evidence of practice and facilitating health care service planning and resource management at all levels within any organization, region, nation and the global health ecosystem.

The book's content is based on extensive literary scoping reviews plus the authors' real life past and current local, national and international work and research experiences. The many complexities associated with nursing and midwifery work and their human resource management are decomposed. Many tried and tested solutions to address identified issues are provided together with detailed descriptions of the underpinning research and development activities we have undertaken. This includes some case studies from public and private sector,

acute, sub-acute and long term care healthcare organizations. Our findings have an unequalled large evidence base.

We provide detailed insights into the complexities associated with any health system to improve future decision making by using digital transformation. It is our desire to influence our readers so that they will be in a better position to negotiate, innovate and find suitable solutions to issues they encounter in the healthcare environment. We have identified numerous impacts of past high-level decisions made and associated lessons learned, so that those in highly influential positions will be able to improve their future decision making.

Attaining the capacity to care requires the inclusion of nursing data and the effective use of routine operational data collected at any point of care. Readers are exposed to evidence provided from numerous systematic reviews and real-world case studies from multiple countries to provide them with new knowledge. Our analysis of the many issues identified has shown a need for improvements in clinical data management, digital transformation implementation strategies, greater collaboration and a stronger focus on working effectively using multidisciplinary teams, and to make use of small teams for direct care delivery in the acute sector.

We have provided evidence based solutions for the adoption of safe nurse staffing principles and optimum use of operational data enabling the implementation of health service delivery strategies that will result in improved patient and organizational outcomes. Our recommended solutions provide organizational transparency enabling every health worker to view information that enables them to effectively contribute as a team member to achieve optimal patient and organizational outcomes. Readers can learn to make better use of informatics to collect, share, link and process data collected at the source for the purpose of providing real time information to decision makers at every level of the organization, enabling optimum use of available human and other resources required to meet health service demands at any point in time and place.

Organization of the book

The first two chapters provide context and a big picture view by describing current dynamic health care environments and explaining the concept of the capacity to care. This is presented within the context of any national health system's framework and its primary building blocks that determine goals and outcomes. Our focus is on achieving efficient operational processes in order to optimize our capacity to care. This requires us to examine and decompose input, process and output factors together with the metadata needs for measuring operational efficiency and effectiveness.

The next four chapters provide an overview of current data use to determine nursing workloads and analyses four different nurse staffing methodologies. This reveals significant

variations and limitations leading to the need to identify the multitude of variables known to influence service demand and to develop an agreed standard nursing metadata set that is well suited to maximizing desired outcomes from any digital transformation. This is followed by an analysis of nursing work measurement methods and an assessment of their construct validity and use for benchmarking. As nurses and midwives constitute the largest group of health professionals delivering care it is important to consider how best to match not only numbers but also skills, knowledge and competencies within this workforce with service demands. This analysis identifies the many difficulties encountered in our attempts to make this happen.

Whilst acknowledging the global shortages of nurses and midwives, we provide suggestions for the re-engineering of clinical service delivery methods by implementing the appropriate use of non-nursing support staff. This section ends with an examination of nursing/midwifery professional models of care, including care plans and organizational models that focus on work allocation and distribution. Possible linkages between nursing documentation, electronic care plans and electronic patient records are explored to identify how best to improve data collection and data use efficiencies whilst supporting the effectiveness of services delivered.

After achieving a better understanding of how to measure service demand, there is a need to explore how to manage human resources to meet these demands in a manner that enables the provision of quality care, facilitates the best possible use of the available skill mix at any time in any location and be cost effective. Rostering staff to cover a 24 hour service is challenging. Detailed instructions for roster development and re-engineering are provided. This is followed by an examination of workforce planning to ensure the supply continues to meet service demand needs over time. We again found many shortcomings in current practice. We provide suggestions for meeting future service demands.

Throughout the book we identify numerous data collection, data use, information and communication flow limitations. These are best resolved by making better use of available digital technologies. Despite an extensive body of work associated with health (medical, clinical and nursing) informatics, we were able to identify only relatively small pockets of success. We understood the need for system connectivity many years ago and have been working as participants in multidisciplinary teams to ensure that interoperability schema adopted were able to accurately meet functional needs. Chapter 9 explains the need to understand the relationships between data characteristics and attributes, and how these are technically processed whilst retaining meaning and accuracy.

Health care is global. Clinical trials and medical advances are shared globally. There is a need to consider how healthcare providers are best able to share, link, aggregate and compare data, to attain reliable and accurate big data sources and facilitate data analytics to benefit global health. Doing so ensures that local needs are met in a timely and sustainable manner. Key technical

features required to optimize the results of local and national digital transformation strategies, including system connectivity, interoperability, health data exchanges and secondary data use are provided.

The chapter that follows focuses on how best to manage local digital transformations in a manner that ensures the nursing data are incorporated and able to be used to suit multiple purposes. Considerable detail is provided about how to overcome change management barriers and how to go about designing new work processes. This includes a generic example of a nursing acuity system implementation process. This chapter ends with guidelines for a system implementation evaluation and the provision of an evaluation framework. This leads in to methods of measuring the quality of services provided and the need for adopting meaningful measurements, trend analysis, continuous monitoring and evidence-based practice. The benefits of including nursing data is explained and outcomes research methods currently in use are explored.

Chapter 12 applies all topics discussed in previous chapters to the residential long-term care and community care sectors to identify significant differences. This is of paramount importance given the growing ageing population and an expected growing increase in service demand. Patient acuity is also valid in this sector and needs to incorporate lifestyle support needs. The primary differences between acute and residential long-term care are the funding mechanisms which in turn determine data collection and reporting requirements, without a focus of supporting the capacity to provide holistic day to day care.

The final chapter summarizes findings and recommendations by looking to the future highlighting the unique contributions made by nurses and midwives and initiatives underway to provide greater public visibility. A detailed list of benefits to be obtained from using nursing data is provided along with descriptions of cutting-edge digital transformation activities as examples for others to follow. Two case studies detailing the authors patient acuity research studies are provided as appendices.

Evelyn J.S. Hovenga

Cherrie Lowe

Acknowledgments

This book is dedicated to the thousands of nurses and midwives who have contributed by their data collection efforts for the many research studies we have independently undertaken in numerous hospitals, and aged care facilities located in six countries. These studies would not have been possible without the support of the many senior health service executives who believed in us. We are indebted to our co-workers, staff and our external national and international collegial networks who have contributed to the knowledge gained, challenged us throughout our journeys, and accommodated and rewarded us for our relenting persistence towards realizing our vision.

A special acknowledgement to the international health and nursing informatics communities who have supported us, and the many technical standards development experts and researchers from multiple disciplines participating in the many stimulating cutting-edge technical discussions aimed at developing solutions, have collectively contributed to new knowledge gained by sharing practical experiences.

We also thank our family and friends who have cared for us, supported and encouraged us when times were tough.

Evelyn J.S. Hovenga
Cherrie Lowe

Dynamic health care environments

How is capacity to care defined?

The term "capacity" refers to one's ability to successfully undertake any type of activity to achieve a desired objective or outcome, including the ability to apply a degree of competence associated with any physical or cognitive activity. Capacity also refers to a quantity of things that can produce or deliver required objects or services. Within the healthcare service industry there is an emphasis on building workforce capacity in terms of numbers and skill mix. Capacity building may be defined as:

> promoting an environment that increases the potential of individuals, organisations and communities to receive and possess knowledge and skills as well as to become qualified in planning, developing, implementing and sustaining health related activities according to changing or emerging needs [1].

Crisp et al. [2] identified four capacity building strategies, a bottom-up organizational approach, a top-down organizational approach, the use of partnerships, and a community organizing approach. In essence this is about building social capital. We're interested in measuring the nursing and midwifery capacity to care, where caring is the desired outcome measure and in building capacity among those who need to plan, develop, implement and sustain nursing and midwifery service delivery.

Caring processes may be referred to as personalization, participation and responsiveness as applied when meeting a person's health and care needs while making them feel "cared for" [3]. These three concepts were defined following extensive research by Strachan as follows:

- *Personalization is the degree to which the healthcare team gets to know the person. This includes those interpersonal behaviors that demonstrate: connecting, knowing and empathizing.*
- *Participation is the degree to which the healthcare team respects the involvement of the person, and those close to them, in their healthcare. This includes those interpersonal behaviors that demonstrate: involving, goal setting and sharing decisions.*
- *Responsiveness is the degree to which the healthcare team monitors and responds to the person's health & care needs. This includes those interpersonal behaviors that demonstrate: being attentive, anticipating and reciprocity.*

A capacity to care requires sufficient human resources with the appropriate knowledge and skills to achieve these desired outcomes when and wherever health services are provided. Nurses and midwives are at the center. The data and information collected and used by nurses and midwives are fundamental to our ability to measure our collective capacity to care. This group of health professionals apply their scientific knowledge and skills, as members of multidisciplinary teams of health professionals, supported by lesser qualified staff within a large variety of health care environments.

Balancing the many factors contributing to any nation's health system's capacity to care is very challenging, given the continuing significant changes in the world around them such as workforce availability, technology changes and increasing service demands. Health systems and organizations need to be adaptive. Within the international medical informatics community it is an accepted fact that sustainable health systems require successful implementations of future proof digital technologies within every healthcare organization delivering services [4]. This is also required to enable us to measure our capacity to care. Sustainable information systems need to be semantically interoperable to realize operational effectiveness and efficiencies through the retention of meaning (context) despite electronic data transfers and processing. This requires the linking of data elements to standard terminologies and associated ontologies as a foundation and capability of machine processing. Semantic interoperability, and its significance in terms of resulting system functionality, potential return on investments, data integrity for decision support, ability to aggregate valid data for public health use and practice evaluation, appear not to be well understood by key decision makers and many software vendors.

Healthcare environments

Healthcare environments can be described from any one of many different perspectives, such as financial, organizational, industrial, behavioral, philosophical, physical (healthcare building design) or population health trends. Health systems overall are influenced not only by service demand but also by external factors such as Government policies and legislation. Recipients of health services tend to view their healthcare environment from the perspective of access to services, service effectiveness and their experiences related to caring and welcoming aspects. Health service providers are likely to view their healthcare environment in terms of location, organizational facilities and culture, type and amount of service demand, resource availability, available support services, equipment, supplies and technologies, research opportunities, or environmental factors influencing health outcomes. From a workforce perspective, the adoption of environmental standards pertaining to the supply of workers, labeling, work protocols and procedures can contribute to improved patient safety.

The literature on healthcare environments primarily considers physical environments in terms of interior design, color schemes, acoustics, lighting, space usage, room and unit configuration, ventilation, environmental hygiene or links between internal and external environments [5].

The design of healthcare facilities is ideally influenced by a desire to design "healing environments." Healthcare facility design must consider the needs and cultural preferences of the patient, family and staff. In addition designs need to meet various safety requirements to reduce opportunities for infection transmission, visitor, patient and staff injuries, enhance workflow patterns and processes, and minimize cleaning, building maintenance and heating/cooling costs.

In recognition of available evidence regarding the critical role of nurses in patient safety, the Institute of Medicine was asked to undertake a study some years ago to identify the key aspects of the work environment for nurses likely to have an impact on patient safety [6]. This study found evidence indicating that organizational management practices, workforce deployment practices, work design and organizational culture, that collectively make up the nurses' work environment, all contributed to many serious threats to patient safety. Nursing and midwifery working environments are covered in some depth in Chapters 6 and 11.

What influences the capacity to care?

This book's view of the health care environment is from a workforce capacity to care perspective. Such capacity is influenced not only by the knowledge, skills and numbers of staff that make up the available workforce, but also by all the nuances identified above, that collectively make up their working environment. Many of these factors are constantly changing based on service demands at any point in time. Changes occurring at other levels within the health industry may also have an impact at the point of care and/or influence service demand. Collectively these factors create a dynamic work environment for those directly or indirectly engaged in meeting health service demands. It is imperative that individuals making up the health service workforce have sound contextual knowledge of their dynamic working environment.

In situations where any of these supporting environments have deficits, health professionals tend to innovate and problem solve in an effort to minimize the impact on patient care. Their actions and behaviors directly address the actual survival of their patients/customers. This makes getting it right the first time imperative. Health service delivery is very much dependent upon collaborative teamwork. Individual team members depend on effective communication and information flows.

Fundamental to the delivery of health services is access to the right information and ease of access to this information in a timely manner. Information guides actions and assists in decision making. The absence of the right information is likely to cause delays in workflows, which in turn can result in extended periods of patient discomfort or adverse patient outcomes. The overall efficiency and effectiveness of health services actually delivered (productivity) is very much dependent upon service co-ordination, communication and information transfer strategies adopted.

Society and healthcare delivery systems have, and continue to experience major changes resulting from our ability to generate more data, and to transfer more information faster to more people at any one time than ever before. As a consequence, people's expectations are changing and the health industry, being information and knowledge intensive, is well suited to maximize the benefits of the new digital world. There is an urgent need for the health workforce as a whole to think differently about our communication methods, data and information flows, data collections and the way our key data assets are managed and made available for use.

Technically it is possible to almost simultaneously collect, aggregate and process lots of data about all possible confounding variables associated with any specific health issue and gain new insight regarding the best possible treatment or care options in a very short space of time. It's about our ability to collect practice based evidence. We need to be able to collect every bit of data once at the point of encounter, and use it many times to suit multiple purposes. Health system performance can be measured in a variety of ways. How should accountability boundaries be described? Murray and Frenk [7] argue that *"it is unfair to hold health systems accountable for things that are not completely under their control; and health systems can achieve greatest impact through influencing non-health system determinants of health."* The latter is what contributes significantly to health service demand that in turn influences the capacity to care. They have developed a framework for health system performance measurement on the basis of:

1. The levels to which health system goals have been attained irrespective of the reasons that explain the results.
2. A country's control of the level of non-health system determinants through effective intersectoral action such as tobacco smoking, safety requirements such as helmets for motorbike riders, and road safety measures.
3. A narrower scope of accountability that refers to sub-systems and institutions within an overall national health system architecture.

According to the World Health Organisation (WHO) [8], health system performance may be viewed according to Tanahashi's model of successive cascading levels, each dependent on the previous level. From the target population perspective each of these levels need to perform optimally. The highest best performing level that influences all other levels is accountability and coverage, this is followed by the supply level, required to meet demands, then quality. The least well performing level globally is financial coverage. Each of these cascading levels has great potential for performance improvements through the use of digital health interventions. The latter is addressed in Chapter 9.

The Australian Institute of Health and Welfare has developed a conceptual framework against which to understand and evaluate the health of Australians and the Australian health system. It has 14 health dimensions grouped under three domains; health status, determinants of health and health system performance [9]. The latter has six categories that collectively indicate

effectiveness in terms of relevance to client needs, accessibility in terms of universal access, continuity of care, responsiveness, safety, efficiency and sustainability in terms of achieving the desired results with the most effective use of resources and health system capacity.

The WHO has developed a Health System framework [10] consisting of the following six building blocks that can be adopted to measure the overall performance of national health systems:

- Leadership and governance (accountability and coverage)
- Healthcare financing (financial coverage)
- Health workforce (supply)
- Medical products, devices and technologies (supply)
- Health service delivery and (meeting demand)
- Information and research (quality).

Leadership and governance

Any healthcare workforce consists of many who are among the most highly educated within a service industry. Relations between health professionals directly responsible for the provision of clinical services are built on trust and collaboration. These complex interrelationships are further influenced by those occupying positions of organizational power. Leadership is provided in various ways by different people within any one organization. This may be provided by those with formal positional authority or by those who are recognized for their specific area of expertize or professional standing or personal attributes.

Governance is about ensuring compliance with legal, regulatory, professional, ethical, policy and procedural requirements. Organizational behaviors, applied leadership and governance strategies at any level within a national health system or healthcare facility, influence healthcare delivery environments, patient safety and the ability to optimize the capacity to care.

Healthcare financing

The funding of health services is a fundamental requirement. Financial capacity determines which services can or cannot be accessed or provided by location or by type of healthcare facility or service. Any nation's health budget is a large component of its Gross Domestic Product (GDP). This ranges considerably between nations averaging at around 10%. There are also significant variations regarding the distribution of health funds between primary care and hospital services. In many instances the provision of hospital services represents the most costly component of any nation's health budget. Healthcare funding is subject to any number of national and local policy initiatives. Healthcare financing influences the demand for service and determines who needs to pay for the service, their capacity to pay and the urgency of the healthcare need.

Nursing budgets tend to be the largest component of any hospital budget. As a consequence, financial managers often consider this budget to be an easy target to use to prop up other departmental budgets. In our experience nursing directors are not always provided with the most accurate information about their budgets by their co-executives, they tend to have to "make do" with their budget allocation. The number of staff, skill mix and salaries paid, plus on costs including leave arrangements and penalty rates for over time or working unsociable hours, relative to service demands, ultimately determine to a large extent any healthcare facility's capacity to care. It is therefore imperative to manage these resources in a manner that optimizes the match between service demand and resource allocation. A number of chapters in this publication focus on this complexity by exploring the many variables that influence staff resource allocations and utilization.

Health workforce

The health workforce is large and diverse covering many occupations, ranging from support staff to highly qualified professionals. The availability of health workers with the necessary knowledge and skill mix in appropriate numbers where and when needed is fundamental to any nation's health outcomes. Costs associated with contractual employment agreements or regulatory working conditions that apply to specified groups of employees or occupations within the healthcare sector, is influenced by industrial and political activities undertaken by various professional organizations and unions who represent various categories of staff or contractors. This can provide limitations or constraints for managers regarding the allocation of human resources to individual workplaces. This is of particular concern regarding the nursing, midwifery, and to a lesser extent, other clinical professions, as these groups need to be required to provide their services 24/7 for 365 days per annum. Thus service scheduling and rostering is an important component of managing costs while maximizing the capacity to care.

Effective workforce planning together with sound educational opportunities are required to ensure the continuing availability of staff and contractors with the required knowledge and skills. In addition, it's important to optimize workforce participation by those suitably qualified. Dysfunctional work environments lead to high staff turnover, a reduction in hours actually worked by individuals and reduced participation rates. This impacts on any health facility's capacity to care. Workforce planning is covered in more detail in Chapter 8.

Medical products, devices and technologies

The availability of and access to various medical products, devices and technologies is influencing the work methods and processes employed for the delivery of various health care services. This includes the use of telehealth and information systems. Their use changes workflows, communication patterns and support service needs. Their use may enhance or

impede any facility's capacity to care. Their use is referenced and explored further where relevant in many of the following chapters.

Health service delivery

The delivery of health services covers all clinical and caring services provided in any location or type of health service and is labor intensive. These services rely heavily on any number of support services all of which need to be well co-ordinated to avoid delays and the inefficient use of available resources. The challenge is to maintain a continuity of care throughout any patient journey. Good planning plus a sound supportive infrastructure contribute to a health service's capacity to care. The following chapters detail how the capacity to care can be achieved.

Information and research

Research adds knowledge, a fundamental requirement of critical importance to the health industry. Existing and new knowledge must be made available to all relevant health care workers in any health care delivery location. Ideally data and information captured at the point of care, and entered into an information system, can be processed immediately and reported on in a timely manner. Real time operational systems providing routine and standard information as well as facilitating the processing of ad hoc requests, are instrumental in supporting the capacity to care at all times in any location. A digital health care ecosystem is highly recommended as it is very time consuming to do this manually. A number of chapters to follow provide the rationale and ideal system requirements.

What are the desired health system outcomes?

The WHO health framework [4] includes four high level goals or outcomes. These are:

- Improved health — both level and equity
- Responsiveness
- Financial risk protection
- Improved efficiency

Improved health, efficiency, responsiveness and caring

Health systems consist of many health care providers, both organizations and individuals whose primary interest is to promote, restore or maintain health. This is achieved by delivering and coordinating direct health services in a timely, safe and effective manner making use of available support services and resources with minimum resource wastage to those who need them when and where needed. Health systems which perform at a high level of quality and productivity generally utilize a well connected digital infrastructure supporting maximum

automation and using real time operational data. This type of automation ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, service demand, resource distribution and use, and the ability to provide practice based evidence of service delivery effectiveness and patient outcomes.

A well performing and effective health workforce is responsive to meeting service needs in a competent, fair, efficient and effective manner to optimize health outcomes within the available location, resource and circumstantial constraints. The concept of nursing is best described by Henderson's definition adopted by the International Council of Nursing (ICN):

> *The unique function of nurses in caring for individuals, sick or well, is to assess their responses to their health status and to assist them in the performance of those activities contributing to health or recovery or to dignified death that they would perform unaided if they had the necessary strength, will, or knowledge and to do this in such a way as to help them gain full or partial independence as rapidly as possible [11].*

The ICN also notes that:

> *within the total health care environment, nurses share with other health professionals and those in other sectors of public service the functions of planning, implementation, and evaluation to ensure the adequacy of the health system for promoting health, preventing illness, and caring for ill and disabled people.*

Health and caring services are not only provided by nurses or midwives, however it is clear from this definition that nurses contribute to, must have access to and make use of, all data and information that collectively describes both an individual's health status, required diagnostic, treatment and caring services and supporting infrastructures. There is an increasing desire to be able to demonstrate nursing's contributions to improving the quality of services delivered and cost reductions as well as evaluate and improve an understanding of care inputs, processes and outcomes [12].

Nursing data at the center

We argue that nursing and other data used by nurses regarding all aspects associated with health care service delivery, need to be at the center of all decision making. From a workforce perspective nurses and midwives are the most prevalent in terms of numbers and they are responsible for the bulk of all direct health care delivery services globally. They provide a crucial support service to all specialized clinical services, are available on a 24/7 basis and represent a critical link between the recipients of care, their families and communities as well as between the many providers of care. Nurses and midwives fill the gaps especially after hours when other health professionals are not on duty. They work with and contribute to real time operational data. The continuity of care provided by nurses and midwives enhances data