Introducing Workforce Planning, Human Resources and Service Planning

Linda O’Brien-Pallas, Stephen Birch, Andrea Baumann and Gail Tomblin Murphy

INTRODUCTION

Changes in health systems worldwide have created new challenges for health human resource planning (HHRP). The World Health Organization (WHO) has been instrumental in modifying the principles of health human resource planning by emphasizing the integration and coordination of services and human resources, and the provision of education according to a Primary Health Care model (1). WHO (2) notes that provision of health care involves putting together a considerable number of resource inputs to deliver an extraordinary array of different service outputs. HHRP should be broad in nature, incorporating the entire health workforce. Key stakeholders including health providers, planners and government policy makers must be involved in the entire planning process to facilitate acceptance of HHRP recommendations. Health system inputs must consider the appropriate balance between human and physical capital. Human capital decisions include the appropriate quantity, mix, and distribution of health services. Finding this balance requires continuous monitoring, careful choices given the realities of countries, and the use of research evidence to ensure that population health needs are addressed effectively and efficiently. Trends in societal factors such as determinants of health, needs of consumers and the knowledge and skills of health providers need to be considered in planning (3). The Canadian Institute for Health Information (CIHI) (4) has confirmed that better health is associated with greater levels of income, education, employment, better housing, supportive environment, and opportunities for early childhood development. These factors may not be under the control of departments and Ministries of

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Health in many countries. This paper will describe the extent to which integrated health human resource and service planning can and do facilitate this process in the year 2000. We shall therefore: identify how labour market analysis can be integrated into workforce planning; discuss whether planning is sufficiently responsive and flexible to retain relevance and validity in rapidly changing health systems; describe different models and approaches to linking and integrating workforce planning and service planning; discuss approaches to integrating the planning for different groups of health workers (multi-disciplinary/multi-profession planning); and examine effective approaches for the use of computer-based scenario modeling to support assessment of current and future planning options.

BACKGROUND

Hall describes the health human resource process as involving three major and interrelated steps: planning, production, and management (5). The focus on one component at the expense of the others will do little to ensure an effective and efficient health system. While the goal of integrated workforce planning is articulated by many, it lacks a clear definition (6). In this paper, integrated health human resource planning (IHHRP) involves determining the numbers, mix, and distribution of health providers that will be required to meet population health needs at some identified future point in time. It deals with aggregate level resource planning processes in a long-term horizon. Hall (7) has identified that intermediate IHHRP should be concerned with the next 5-15 years and long term planning with 15-30 years. Longer-range planning projections involve greater uncertainty of the planning variables in comparison to intermediate range planning (8, 9).

Service planning in many countries is generally limited to shorter time periods. While some countries plan services with one- to two-year horizons, there is growing recognition that this planning must occur over a longer time span. Short-term planning is aimed at ensuring that resources for health are allocated and managed in an efficient and effective manner, and is concerned with the number and type of health resources allocated among different sectors and among human and physical capital – e.g., technology, drugs, human resources, and the renewal of existing infrastructures or planning for new ones.
If undertaken properly, both service planning and IHHRP consider an integrated human resource process and the principles that underpin good IHHRP practice also underpin good service planning. Both should be seen as part of a continuous quality-improvement process which is updated at least biannually and where each activity informs the other. Both sets of activities should be based on evidence of best practice. Labour market analysis is a useful tool for understanding the shortfalls of previous planning decisions, the current context, and provides clues for future corrective action to be taken in all planning horizons.

IHHRP AND SERVICE PLANNING

To ensure system efficiency and effectiveness both IHHRP and service planning activities should be needs-based and outcome directed. Furthermore, planning at all levels requires good quality data. In describing the approaches to modeling or service planning, we assume that the data that form the basis for resource planning are currently available and of good quality: it is consistently reported (reliability) and actually measure the key variables that must be measured in order to estimate human resources requirements (validity). Needs-based approaches, in which resource requirements are based on the estimated health needs of populations, create greater data demands than the approaches required for planning based on supply/utilization. The requirement to link needs to outcomes will initially create greater data challenges. To plan services and/or to model human resources requirements without high quality data will only lead to unreliable estimates of future human resource needs and erroneous service planning models. Planning should be conducted when planners are confident that the data that underpin the estimates are of good quality. The WHO toolkit has assisted many countries to identify what data to collect – and how – for approaches to modeling and planning based on supply and utilization. Formulae and data collection guidelines are detailed in the toolkit.

THE STATE OF THE ART

Government planners have used various approaches to forecast supply and demand related to health human resources (HHR) (9, 10). Traditional approaches have been further developed, and many disciplines have added
unique design and analytical methods to the array of tools available to researchers. However, the wide choice of methods, the lack of comprehensive data bases, and the inaccurate projections of population growth have not improved the accuracy of forecasting (9–11). HHRP in most countries has been poorly conceptualized, intermittent, varying in quality, profession-specific in nature, and without adequate vision or data upon which to base sound decisions (9–13). The assumptions that underpin HHR modeling activities need to be evaluated for relevance and accuracy on an ongoing basis. Failure to conduct ongoing HHRP has led to the fragmentation of therapeutic tasks into sub-occupations (14).

Furthermore, HHRP has only been weakly linked to national health policies (15) and population health needs (16). In the United Kingdom, human resource problems are dogging the National Health System: “Junior doctors are threatening to strike, consultants are voicing frustration, and nurses are voting with their feet. Though their concerns are less visible (...) other members of the profession allied to medicine are also facing major challenges. The problems have been well rehearsed but the solutions seem as far away as ever. If the healthcare needs of this new millennium are to be met, more radical approaches to collaborative work will need to be explored” (17). Many nurses and midwives around the world are experiencing a life where quality of work is poor, with under- and over-utilization, geographic distribution problems, role ambiguity and role overlap, particularly in relation to physicians (18).

The efficiency and effectiveness of service delivery depends to a great extent on the effective deployment and use of personnel (19). Recent findings in the World Health Report 2000 (2) suggest that there remain great variations internationally in the level and mix of health resources (technology, drugs, hospital beds, and human resources) devoted to health care. In Thailand, health spending is primarily directed towards technology (e.g. CT scanners) and drugs rather than to human resources, whereas in Mexico and Egypt the opposite is true. However, Mexico has the highest ratio of physicians to nurses and – together with Thailand – the lowest expenditure on nurses within the case study countries (2). Yet Mexico reports that as many as 15% of physicians are inactive, underemployed or unemployed. The balance among human and physical capital inputs, the mix of human resources, and the distribution of health resources between urban and rural settings remain a critical issue (2, 12). To date there is but
limited evidence of the use of substitution roles among human resource providers (12).

**THE ROLE OF LABOUR MARKET INDICATORS IN PLANNING**

How can labour market analysis be used in workforce planning? Many consider that the continuous cycles of over- and under-supply of health human resources world-wide reflect the inadequate projection methods used to estimate future requirements for expanding health systems and/or the failure to consider the evidence supplied by ongoing labour market trends (6, 9, 11, 20–23). Buchan and O'May (23) acknowledge that migration of health professionals in and out of countries must be part of HHRP. The potential for modeling international nurse flows is limited by the international lack of mobility data for modeling (24). Ethical issues arise as they relate to the global migration of the nursing workforce. For instance, some countries produce nurses simply for export while binding these nurses to severe financial commitments to the home country. Alternatively, wealthier countries have the potential to strip the health professional workforce of poorer countries who cannot compete with the financial packages offered. Globalization and the migration of workforces have increased the need to make use of labour market indicators in planning. The International Labour Office (ILO) has played a major role in defining the Key Indicators of the Labour Market (KILM). Eighteen indicators (see Table 1) were developed based on three criteria: conceptual relevance, data availability, and compatibility across regions (http://www.ilo.org./public/English/employmentstrat/polemp/kilm/toc_f.htm) and are intended to monitor trends. The KILM can assist countries in examining the overall status of the health workforce in the broader labour market of their country, by comparison with countries at similar levels of development (such as OECD countries) and/or by WHO regions.

The ILO intends to focus on 5 indicators (labour force participation rates; employment to population ratio; employment by sector; unemployment, under employment, and inactivity; youth employment) out of the 18 used for world comparison purposes. The capacity of countries to participate varies widely around the world. For example, there are better data bases in those countries that have regulatory bodies mandated to collect information about their professional constituency. In Canada and...
the WHO European Region, nursing and allied health data, population demographics, hospitals, number of beds, ratios, etc. are available to provide the necessary information in each of the five categories designated by the ILO (websites: www.CIHI.ca, www.statscan.ca, www.WHO.dk). However, some countries lack data, organisational structures, technical staff, electronic infrastructure and the financial resources for information technology, as well as the training required to support the collection of information. This is a challenge when there is a struggle in many countries to provide even the most basic of health care services. However, it is important to consider that some of the current human resource difficulties experienced in some countries may be due to the absence of such data and related planning. It is recognized that “sound data on the existing numbers and distribution of human resources, especially linked to data on health system performance, can contribute to the formulation of policies and plans to address health problems” (2).

The World Health Report 2000 (2) highlights many problems of under- and over-employment, participation rates, employment by sector, and urban sector employment. World-wide numerical imbalances (e.g. too few qualified health personnel in sub-Saharan Africa versus an overall surplus of physicians in Egypt), training and skill mix imbalances (as in mismatches between available skills and needs in Eastern and Central Asia), and distribution imbalances (urban/rural imbalances and difficult to service areas – in Cambodia for instance 85% of the population lives in rural areas but only 13% of health providers work there) (2). These are examples of situations where careful analysis of labour market indicators could be useful to inform decision-making. In both developed and developing countries there remain significant challenges in meeting the needs of populations outside urban areas. At the present time it is difficult to make comparisons among countries across all sectors, including health.
### Table 1. International Labour Organisation’s Key Indicators of the Labour Market (KILM)

#### Participation in the World of Work

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<td>Status in Employment</td>
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<td>Employment by Sector</td>
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<td>Part-time Workers</td>
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<td>Hours of Work</td>
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<td>Urban Informal Sector Employment</td>
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<td>Unemployment by Educational Attainment</td>
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<td>Real Manufacturing Wage</td>
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<td>Hourly Compensation Costs</td>
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<td>Labour Productivity and Unit Labour Costs</td>
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<td>Poverty and Income Distribution</td>
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ENSURING RESPONSIVENESS AND FLEXIBILITY OF PLANNING TO RETAIN RELEVANCE AND VALIDITY IN RAPIDLY CHANGING HEALTH SYSTEMS?

Flexibility, relevance and validity in planning require both ready access to timely and accurate information and the use of appropriate conceptual and analytic techniques for planning in a rapidly changing health system. Computer-based modeling eases the computational difficulties and burdens experienced in previous years. However, the component parts of these models need to be understood in order to identify the contribution of the various elements of the models to predicted outcomes. Planners must remember when planning for smaller provider groups that the smaller the group the greater the uncertainty around the estimates derived from the model. Modelers may have no choice but to use the less sophisticated analytic techniques. Excellent linkages and exchanges among key stakeholders, multidisciplinary expertise (nursing, economics, computer science, epidemiology, medicine, sociology, etc.) working in collaboration with policy and administrative decision-makers and planners, and the availability of accurate and comprehensive data are thought to enhance the relevance, responsiveness and acceptance of planning activities. HHRP is an interactive process and can benefit from the experience of other sectors. However, the direct transfer of techniques must be based on careful scrutiny and a full understanding of the unit of analysis.

HEALTH HUMAN RESOURCE PLANNING – AN OVERVIEW

IHHRP involves estimating future requirements for human resources and identifying efficient ways of providing for those requirements. There is no unambiguous ‘right’ number and mix of health professionals (2, 25). Instead, health provider requirements will be determined by broader societal decisions about the level of commitment of resources to health care, the organisation of delivery and funding for health care programmes, and the level and mix of health care services. Although more may always be done in terms of service delivery to meet populations’ needs, whether more should be done will depend on what other things have to be forgone in order to provide the additional resources – considerations which are essentially subjective.
Assuming that the role of HHRP research is to reduce uncertainty, public policy makers must weigh research-based facts – along with several other factors – to determine action. Yet today we know that public policy is not based on good human resource research. To add value to traditional research activities and improve “evidenced-based” decision-making requires the involvement of a number of actors including decision-makers, research funders, researchers, and other professionals in an interactive synergistic process. Each step in the process requires relationship-building and improved communication between decision-makers and researchers as well as across health sectors. Further, using evidence in decision-making is a “virtuous cycle” and any weak link in the chain may interrupt the optimal flow of research into decision-making.

To complicate matters, the science underpinning HHRP is young. Approaches to estimating human resource requirements have been few and plagued with methodological and conceptual limitations. One key challenge has been the lack of easily accessed clinical, administrative and provider data bases to conduct complex modeling activities such as the use of data based on health needs, system and caregiver outcomes, as well as management information systems which reflect utilization and costs. Governments require a variety of human and material resources to inform the policy decisions related to HHR. Ministries also need the following resources: visionary project leaders who have epidemiological, human resource planning and modeling knowledge and who are familiar with the health services being modeled. These individuals must work within government structures that have responsibility for human resources policy decision-making and benefit from political support and financial resources in order to take action on HHR decisions.

As O’Brien-Pallas (25) notes with respect to nursing resources, nurse planning does not exist in isolation from the world in which these services are delivered. Future planning models must explicitly place the health care industry in the general context of the economy. Lavis and Birch (24) also note there is no unambiguous right way to model human resources. Instead, the conceptual basis for HRP will depend on the question(s) being asked. Do we want to know how many nurses or physicians are required to continue to serve populations in the way they are currently served? or how many are required to support the services required to meet all (or part) of the expected needs of the population? or how many...
are required to satisfy the expected development and plans for the future provision of health care services?

Birch et al. (26) refer to these three approaches as utilization-based, needs-based and effective demand-based approaches to HRP. The ‘unit of analysis’ across the different approaches is the same – physician consultations, dentist courses of treatment, and nursing hours, but the underlying ‘driver’ of this measure differs and reflects the various ways in which societies think about the delivery of health care, the provision of services, the population’s needs, and the commitment of society’s scarce resources. In some ways, each approach builds upon the principles of the previous approach and introduces additional considerations (26). Although this might be seen as enriching the applicability of the approaches to epidemiological, economic, and political realities – and hence enhancing the policy relevance of the analyses, the philosophical basis of the particular health care system being studied is of importance. For example, in societies where health care services are delivered through private markets and access to services is determined by the individuals willingness and ability to pay for services, there would be little value in basing future requirements for nurses or other health providers on the estimated needs for care of the population, or on the estimated future commitment of government resources to health care, since neither of these factors will be paramount in determining the future deployment of available health providers. In this way, the future plans for funding, delivery, and configuration of services determine the appropriate approach to be followed.

NEEDS-BASED APPROACH

A needs-based approach approximates most closely that described by WHO. The needs-based approach estimates future requirements on the basis of the estimated health deficits of the population as well as on the potential for addressing these deficits using a mix of different health care human resources to provide effective service intervention in efficient ways. Nursing requirements are therefore an epidemiological concept, based on the age- and sex-specific needs of the population – needs that are independent of current service utilization but are interdependent with the requirements for other health human resources. This approach avoids the perpetuation of existing inequities and inefficiencies in the deployment of nursing or other health provider services. Insofar as current needs are not
all met, unmet needs will be included in the estimation process. Similarly, the estimation process will not be ‘contaminated’ by any current inappropriate use of services.

The approach is based on three underlying assumptions: all health care needs can and should be met; cost effective methods of addressing needs can be identified and implemented; and health care resources are utilized in accordance with relative levels of need.

Although it has the advantage of focusing attention on the efficient use of resources within the health care sector, this approach ignores the question of efficiency in the allocation of resources between health care and other activities. The allocation of resources between sectors of the economy is essentially a political decision. Needs for care may be an important input into this decision, but they are unlikely to be the only one.

A second issue that arises from the needs-based approach is that there is no a priori reason why resource requirements derived from a needs-based approach will necessarily be used to meet needs. Human resources may be used to meet demands that do not coincide with underlying needs while the needs of ‘hard to reach’ populations may remain unmet. In this way, even estimates based on needs-based approaches may appear to be inadequate to meet all needs – because of inefficiency in the use of nursing resources, for example – and this may lead to demands for further increases in nursing resources. In other words, the epidemiological principles underlying the needs-based approach must be linked to economic principles about the opportunity costs of resources, both within and beyond the health care sector.

Utilization-Based Approach

Under this approach the quantity, mix, and population distribution of current health care resources are adopted as a baseline for estimates of future requirements. The level of utilization of human health resources services is expressed in relation to the demographic profile of the population to produce subgroup-specific average rates of provider utilization.

The population characteristics used are generally confined to age and sex, since there is evidence that health care needs vary systematically according to these factors. Age- and sex-specific rates of utilization are applied to estimates of the future size and demographic profile of the
population to produce nurse requirements for the future. In principle, this range of characteristics could be increased to incorporate other population characteristics related to needs. However, the confounding influence of variations in supply on variations in populations’ use of services have tended to deter researchers from incorporating these factors in the utilization-based approach. In its simplest form the approach is based on three broad assumptions: the current level, mix, and distribution of nursing services in the population are appropriate; the age and sex specific resource requirements remain constant in the future; the size and demographic profile of the population changes over time in ways predicted by currently observed trends in age and sex specific rates of mortality, fertility, and migration patterns.

The validity of any one of these assumptions is arguable. Markham and Birch (27), for instance, note that practice patterns and modes of delivery are continually developing over time in ways that affect the per capita use of specific provider-specific services. Indeed, applications of the approach have relaxed some of the assumptions Denton et al. (28) consider alternative assumptions about trends affecting the future demographic profile of the population. However, the underlying question remains: “How many nursing (or other provider resources) hours will the population use in the future?” As patterns of behaviour such as smoking and alcohol consumption change over time, the health risks associated with these behaviours will also change, with consequences for the demographic profile of service requirements. Similar arguments can be made about changes in environmental exposures, employment profiles, and many other factors associated with health risks. Markham and Birch (27) argue that the main problem arising from this approach is that, from a policy perspective, it overlooks the consequences of the ‘errors’ arising from these assumptions proving to be invalid. Because service utilization is not independent of supply, any overestimate or underestimate of requirements will be reflected in changes in the levels of services per capita population (i.e. service intensities). Thus, current service intensities, which form the basis of the utilization-based approach, emerge from the estimating errors of the past and not from the epidemiological characteristics of the present or even from the current willingness and ability of the population to pay for services.
EFFECTIVE DEMAND-BASED APPROACH

Under the effective demand-based approach, economic considerations are introduced to complement the epidemiological principles of the needs-based approach. As Lomas et al. (29) argue, fiscal resources have not historically been factored into projecting supply requirements, presumably because the forecasting task has been seen as an attempt to assess requirements based on needs. Because of the social nature of healthcare needs, the assumption has been made that resources could be found. However, we have seen that definitions of need are less than precise and, more importantly, that there are clear possibilities for resource trade-offs. It would be unwise, therefore, to omit fiscal resource constraints in future forecasting exercises”. The approach remains interested in ensuring that human resources are deployed efficiently (i.e. in ways that have greatest impact on health needs). But, by relaxing the assumption that all needs can and should be met, the approach can focus on relative levels of needs within the entire population affected by those needs.

Using this approach, the starting point is to estimate the future size of the economy for which nursing services as well as all other commodities are to be funded. This estimate is then used to assess the proportion of total resources that might be allocated to health care, and the share of this health care allocation that should be devoted to nursing or other provider resources. Epidemiological information on the level and distribution of needs in the population interact with the roles that nursing or other provider human resources can play in meeting those needs for different health human resources. In many countries, special consideration of economic issues may have better prepared us for the ultimate swing in over- and under-supply of nursing personnel we currently face.

THE PAKISTAN STORY

In many countries, the regulatory body is a repository of information relating to supply and labour market indicators. In some countries however, the regulatory body lacks even the most basic information on its members. In Pakistan, data on both labour force and labour market are incomplete, fragmented, and not readily available. In her study Amarsi (30) has noted that “the nursing human resource development situation is unclear” and identified an excess demand for nursing personnel, but no ability to
evaluate current utilization and distribution of nurses. The lack of quantitative data has led Amarsi (30) to use a qualitative approach in order to investigate critical issues in health human resources for nursing.

A four-year programme, entitled The Development of Women Health Professional Programme (DWHP), focuses on the need to collect quantitative data on the nursing workforce and to develop an integrated data system. A computerized database developed at the regulatory body provides quantitative as well as demographic information on licensed nursing personnel within each cadre of the profession. That information has negated many of the widely accepted perceptions regarding labour force participation. Contrary to popular belief, many women continue to work in nursing after marriage and motherhood. Reliable information on the number of nursing personnel in each cadre demonstrates the gap between the number of nursing personnel reported in government planning documents (35,000) and that observed in reality (15,000) as regards registered nurses.

The computerized database developed at the nursing examination boards provides information on the students enrolled in basic nursing educational programmes and on newly qualified nursing personnel. Profiles of the student body and new graduates became available to planners. The development of a computerized data base on the labour force participation (e.g. distribution across facilities, hours of work, status in employment, underemployment, unemployment) encountered numerous problems as the information coming into the central nursing offices was unreliable and incomplete. The need for a comprehensive on-site survey of each service and educational facility in the country became an essential first step. Once a data-gathering tool has been developed and pre-tested (31) and, once it becomes functional, it will be linked to the other data sets, providing a comprehensive data base readily available for planning.

Before 1995 there were no databases on the nursing labour force and no ability to forecast the number of nurses that would be needed. The situation in Pakistan demonstrates the need for an infrastructure with the capacity to gather reliable and valid data and to establish linkages with information systems on other health care providers and on the changing market conditions for labour. At the same time there is considerable pressure “to upgrade human resources through continued expansion of education and health services”.
O'Brien-Pallas et al. (9) have built a dynamic system-based framework that takes into account: population characteristics related to health levels and risks (needs-based factors); service utilization and personnel deployment for nurses and others who provide similar or the same services (utilization-based factors); the economic, social, contextual, and political factors that can influence health spending (effective demand-based factors); population clinical and health status elements, provider and system outcomes resulting from the different types of nurse and other health provider utilization.

This model incorporates each of the three methodological approaches outlined earlier but places these approaches in the context of the assessment of needs and outcomes for service provision. Simulations of the health system provide needs-based estimates that are used to optimize outcomes. Members of the research team are currently testing the practical applications of the model.

Simulation is a powerful technique. Hall (7) suggests that it allows planners to explore consequences of alternative policies, facilitates input and output sensitivity analysis, and makes it easier to involve stakeholders throughout the process. Simulations are a means to assist planners to make decisions; they are not an end in themselves. The extent to which simulation provides useful scenarios for consideration depends on the quality of the data used in the model and on the extent to which the variables modeled reflect the system as a whole. In tracing key challenges to the use of WHO's simulation tools through the 1990s, Hall (7) found that planners want short-term estimates since they may be reluctant to project “estimates”, in the longer term because of complex data requirements. Planners do not understand the concept of scenario testing and view scenarios as outcomes rather than as information to be used by planners in order to influence the training and deployment of health professionals and hence avoid or reduce the probability of shortfalls or surpluses in health planning.

Personnel to population ratios, population based rates and utilization-based rates have been used as the basis for computerized simulations (32–34). However, these are not considered to be typical simulation models. They are static models and lack the capacity to examine the dynamic relationships among inputs/outcomes. Although techniques
such as production functions, linear programming, and Markov chains are attractive because the resulting models can be solved analytically, they often require significant simplification of a problem to make it fit the required form. Simulation is much more flexible, in that it can model the evolution of a real-world system over time according to mathematical or logical relationships between objects and to probability distributions. Rather than generating an exact mathematical solution, an iteration of a simulation generates one possible outcome. The model is run repeatedly to get an estimate of how the system will behave overall. Simulation probably offers the most useful tools for assessing substitution across and within professions and for addressing issues such as the geographic distribution of health personnel. Simulations are often used to analyze ‘what if’ scenarios, a capability essential for use in health system planning. While they are easier to apply than analytical methods and require fewer simplifying assumptions, simulations can be costly to implement because of their detailed data requirements.

Two commonly used approaches to assessing uncertainty in health projections are deterministic sensitivity analysis and stochastic simulation (7, 35). Song and Rathwell (35) developed a simulation model to estimate the demand for hospital beds and physicians in China between 1990 and 2010. Using a simulation model they compared deterministic sensitivity analysis and stochastic simulation for the assessment of uncertainty in health projections. Their simulation model consisted of three sub-models: population projections, estimation of demand for medical services, and productivity of health resources. The outputs for the model included the number of hospital beds and the number of physicians required for the future. They produced three estimates, including the low and high limits, and the most likely value for each variable. Their findings indicate that the stochastic simulation method uses information more efficiently and produces more reasonable average estimates and a more meaningful range of projections than deterministic sensitivity analysis. However, Hall (7) cautions that detailed data requirements required for stochastic modeling usually make it difficult to use the stochastic model approach in developing countries.
OTHER APPROACHES

More recently, Bretthauer and Cote (36) have tested a model and solution method for the planning of resource requirements in Health Care Organisations. To determine resource requirements, they developed an optimizing/queuing network model that minimizes capacity costs while controlling for a set of performance constraints, such as setting an upper limit on the expected amount of time a patient should spend in the unit. This model needs further testing; however, it may be applied to capacity planning in a variety of health care settings, including the community.

Anderson and colleagues (37), describe a managed care model for projecting the number of otolaryngologists required in the United States. They suggest that unless assumptions are clear, different models used for the prediction of health human resource requirements will produce different results. This is a conclusion previously reached by Birch et al. (26) and O’Brien-Pallas et al. (38, 39). Whatever method used, O’Brien-Pallas et al. (9), Song and Rathwell (35), and Eyles et al. (40) suggest that estimates for requirements will not be exact numbers but a range of numbers. As models are developed further, sensitivity analysis will allow policy makers and planners to have different estimates of required resources from which to plan their service need and HHRP. The importance of continuously updating estimates cannot be overstated.

ARE WE DOING IHHRP TODAY?

There are limited indications that we have moved closer to IHHRP-based modeling. The published literature since 1995 continues to stress the need for IHHRP today, but few peer-reviewed publications discuss the results of such studies. Grey literature from WHO describes some of the structural and process factors needed for IHHRP and indicate that these activities are underway at the region and country level. The outcomes of these analyses have been hard to access despite a thorough search at WHO Headquarters and regional offices. Access to these findings on web pages would contribute to the science of IHHRP. While ‘pre-packaged’ methods for planning human resources are attractive because they offer documented methods for immediate action, approaches to planning must consider the goals of the exercise and the desired outcomes. Trade-offs between
conceptual and analytic advances, as well as rigor and ease of use, must be carefully considered in light of the user’s situation and the future orientation of planning.

Cooper (8) uses supply-based statistics to emphasize the need for integrated planning. Professions included in this exercise include physicians, and the ten most common non-physician clinicians (NPC) whose roles most strongly overlap with physician services. The non-physician groups include traditional NPCs like nurse practitioners (NPs), certified nursing midwives (CNMs), and physician assistants (PAs); alternative disciplines including chiropractors, naturopaths, practitioners of acupuncture and herbal medicine; and specialty disciplines including optometrists, podiatrists, certified registered nurses anesthetists (CRNAs) and clinical nurse specialists (CNS). Many of the practitioners are being prepared for primary care roles. Projections until 2005 revealed that, given supply and current enrollments in educational programmes, the number of NPCs would increase by 68% between 1995 and 2005. This is at a time when Cooper estimates there will be a surplus of physicians in the US. If misdistribution problems of providers can be corrected, the potential impact of the surplus may be somewhat mitigated. The study has several methodological limitations but does point to the needs for linking national and state workforce planning with the actual production of personnel and the integration of both. The author notes that the relationship between the demand for physicians and that for NPCs needs further evaluation. A link to needs of the population and health and system outcomes would provide the context for a thorough investigation of these issues.

Most of the approaches to IHHRP models described in the WHO Toolkit (7) are utilization- or supply-based subject to challenges of the related assumptions as was the case in the Cooper study. The toolkit approach to determining future requirements for integrated workforces uses among other things the ratio of other professions to the number of physicians. As health restructuring moves out of the hospital or clinic setting to non-traditional service settings, the number of ‘other’ personnel, may have to be “unbundled” from the data related to physicians in order to ensure that practices as defined in country and professional legislation are fully addressed. Inefficient substitution could lead to duplication of services.

IHHRP must determine the numbers of health professionals required to meet population health needs and examine questions such as
substitution and skill levels within and among professional cohorts. WHO (2) states that the relative price of different skill categories should guide decisions about the most efficient mix where labour markets are functioning. No direct account is taken of outcomes of interest. The basic goal of human resource planning is to ensure that populations in need receive essential services. In countries where some degree of planning is possible, de-skilling of the workforce must be carefully considered. In the case of nursing, recent literature has demonstrated that higher skill levels are associated with reduced incidence of nosochomial infections and adverse events (41-44). This knowledge must be balanced with country realities in the short term goals for future planning must include the notion of the right level of professional training, in the right place, to achieve best outcomes. Decisions on the skill levels of providers must be made judiciously and must take into account the evidence of ongoing research.

Restructuring initiatives in many countries have been driven by fiscal policy considerations rather than by the need to realign the system towards better outcomes. In the late 1990s, industrialized nations have faced two important challenges: the non-viability of the welfare state; demands for wide ranging services from consumers (45); (website: www1.worldbank.org/publicsector/civilservice/oecdcountries.htm).

The resulting activities of reform led to redesign of the government approaches with a focus on decentralization and local accountability. However, job losses occurred as a by-product of this process of “reinventing governments and reforms”. Resulting initiatives to retrain and assist with job searches to enhance re-employment opportunities have led to disappointing results. For example, registered nurses and other health professional were laid off or moved to part-time employment to reduce costs. However, these planning decisions have had some unanticipated consequences. In Australia, Canada, the United Kingdom and the United States, for example, nurses were laid off or became unemployed or underemployed. The media and others quickly identified that there was no certainty of full-time employment upon graduation. Enrollment in nursing schools declined as a consequence, partly through programme closures and partly because of a severe drop in the applicant pool as young men and women chose other career options with better employment potential. Nurses who remained in the system report concerns about unsafe practice environments and severe work overload. Given the transition period
between programme entry and graduation – even though enrollments have now increased in the meantime the impact of the reduced production of new nursing personnel is occurring at exactly the time when the supply of nursing personnel is decreasing because of aging of the nursing workforce. There is thus a potentially severe shortage in nursing. Changing public policy and the public perceptions of nursing as a career option and improving the work environments for nurses in order to attract new nurses and retain the aging nurses now in place will be difficult in the short time available. The nursing situation described above is true for other health disciplines such as physicians. Analysis of the potential impact of planning decisions must consider many factors that can influence both short and long term consequences.

CONCLUSION

This paper provides an analysis of how labour market indicators can be integrated into service planning, discusses whether planning is sufficiently responsive and flexible to retain relevance and validity in rapidly changing health systems, describes various models and approaches towards linking and integrating workforce planning and service planning, discusses methodological approaches to integrating planning and examines effective approaches to the use of computer based scenario modeling in support of the support assessment of current and future planning options. The context and broad cross-cutting themes of public sector, political, social, and macro-economic changes have been considered, using actual country examples. Where publications exist, empirical evidence serves as the basis for this analysis.

While strides have been made in resource planning, the following key themes emerge from this paper including: few empirical applications of the conceptual frameworks have been developed in the last 10 - 15 years; integrated and discipline-specific empirical applications are in place but do not build upon conceptual and analytic advances; discipline-specific studies still dominate the literature; labour market indicators, if collected, play an important role in planning for the workforce; many applications do not show a link to outcomes; modest financial investments to build upon conceptual and analytic advances and data requirements may result in large payoffs that greatly exceed investments; the opportunity costs of not
moving forward and relying on old methods must be considered (continued reliance on primarily supply and utilization based approaches have led to cycles of over and under supply approximately every four to five years in the physician and nursing workforce).

In order to move into the 21st century we need to make a concerted effort to move away from old and safe approaches and embrace conceptual and analytic complexity, with a focus on outcomes and integrated planning, in order to provide an efficient and effective health service for future generations.
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