Where to From Here?

Linda O'Brien-Pallas

This issue of the *Canadian Journal of Nursing Research* focuses on health human resource planning (HHRP), a means of determining the appropriate quantity, mix, and distribution of health personnel. The different kinds of clinical and non-clinical staff who make each individual and public health intervention happen are the most important inputs of the health system (World Health Organization [WHO], 2000). Many consider that the continuous cycles of over- and under-supply of health human resources worldwide reflect inadequate projection methods for estimating future requirements for expanding health systems and/or a failure to consider the evidence supplied by labour market trends. HHRP in most countries has been poorly conceptualized, intermittent, uneven in quality, profession-specific in nature, lacking in vision, and lacking in data upon which to base sound decisions. To ensure efficiency and effectiveness, planning activities should be needs-based, responsive to a changing system, and outcomes-directed.

There is no unambiguous "right" number and mix of health professionals (O'Brien-Pallas, Birch, Baumann, & Tomblin Murphy, 2001). Rather, health-provider requirements will be determined by broader societal decisions concerning the commitment of resources, funding and delivery of programs, and level and mix of services. Although there may always be more that *should* be done to meet a population's needs in terms of services, whether more *will* be done depends on what must be forgone in order to provide the additional resources — considerations that are essentially subjective.

Globally, the evidence suggests that not many countries have made the link between population health outcomes and planning, quality of

Linda O'Brien-Pallas, RN, PhD, holds the CHSRF/CIHR National Chair in Nursing Human Resources and is Professor, Faculty of Nursing, University of Toronto, Ontario, Canada. She is a Co-Principal Investigator of the Nursing Effectiveness, Utilization and Outcomes Research Unit for the University of Toronto site.
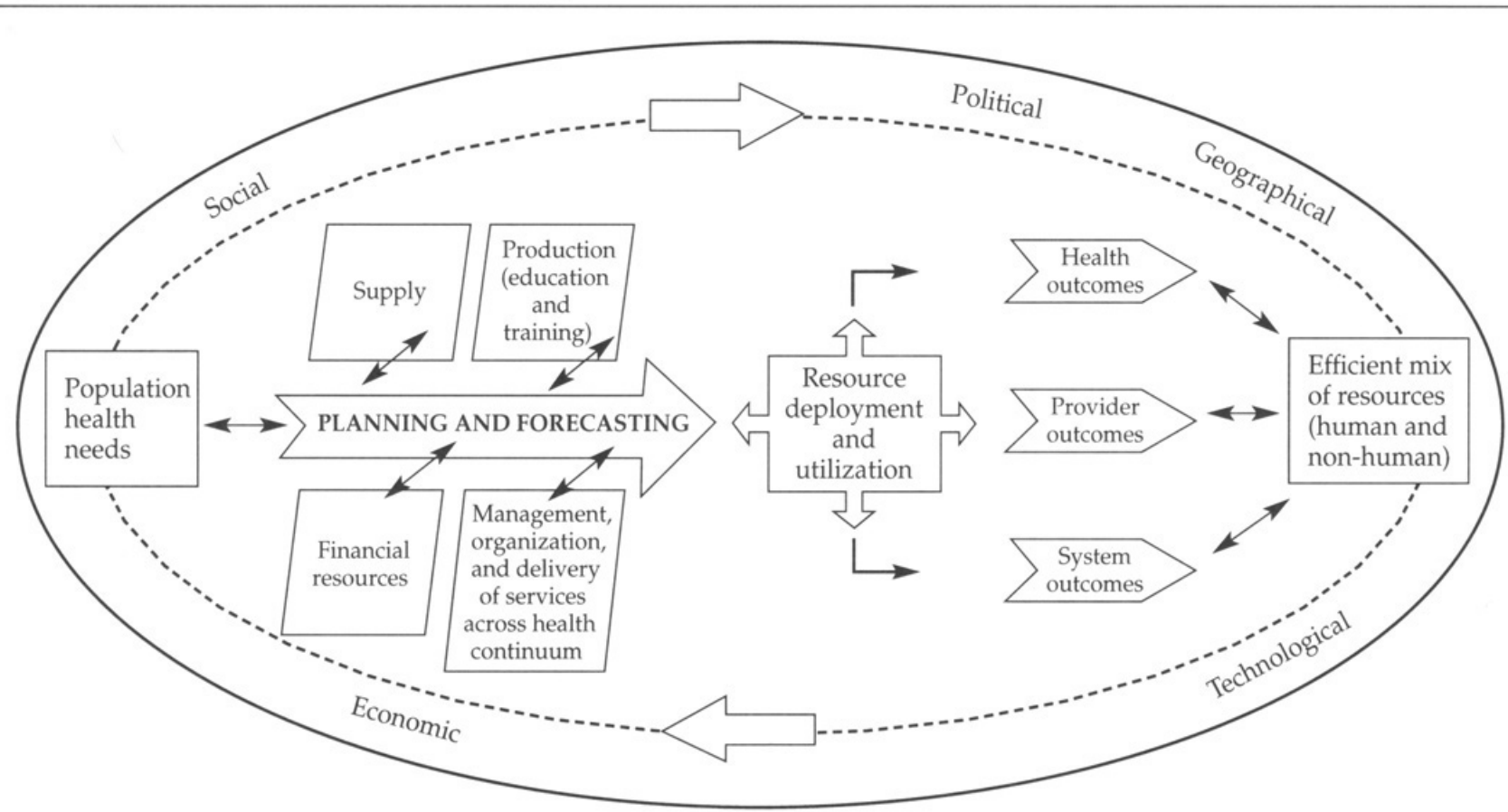
work environments, and recruitment and retention of nursing personnel. In 2001, despite more than 75 years of expressed concern about cycles of shortages and surpluses of nursing personnel, the nursing workforce situation is critical. Never before has a demographic shift such as the baby boomer bulge coincided with such a challenging array of professional choices for young people. In order to maintain our current workforce and provide an attractive and competitive opportunity for future nurses, we must address the workplace concerns of nurses and conceptualize these as part of the HHRP framework. A recently completed policy synthesis of the nursing workforce in Canada (Baumann et al., 2001) identifies a composite of key issues currently facing it: shortage of qualified personnel (with those who remain experiencing work overload); unsafe work environments; lack of support and leadership; scheduling, flexibility, stress, and control issues; lack of respect and lack of influence; and poorly rewarded efforts. While a variety of authors have conceptualized these issues in different ways and included contextual adjustments to reflect international realities, the themes are common across studies.

How, then, can researchers and policy and management decision-makers make sense of these two overwhelming and often conflicting dialogues, research and social? How can nurses find meaning and satisfaction in their work? How can the population benefit from our knowledge about these issues? Gottlieb and Gordon (1999) challenge the research community to make sense of the work that has been done.

As with any other journey, unless we have a road map to provide direction and indicate the overall terrain leading to our destination, the odds are small that we will take the most direct route. According to Hall (1993), the human resource process comprises three inter-related steps: planning, production, and management. The focus on one component at the expense of the others does little to ensure an effective and efficient health-care system (O'Brien-Pallas, Baumann, Birch, & Tomblin Murphy, 2000). Yet a review of the HHRP work done to date reveals that these conceptual linkages have not been made.

Given that many routes have been taken towards HHRP and that these do not seem to have been built upon each other, we have created a system-based framework to guide our inquiry. Building on Andersen's (1995) service utilization model, Donabedian's (1966) quality of care framework, Leatt's conceptualization of technology in human services organizations (Leatt & Schneck, 1981), and the work the Canadian think tank summarized by Kazanjian, Pulcins, and Kerluke (1992), our conceptual model considers the key elements of human

Figure 1 *Health Human Resources Conceptual Framework*

Social

Political

Geographical

Supply

Production (education and training)

Population health needs

PLANNING AND FORECASTING

Financial resources

Management, organization, and delivery of services across health continuum

Resource deployment and utilization

Health outcomes

Provider outcomes

System outcomes

Efficient mix of resources (human and non-human)

Economic

Technological

O'Brien-Pallas, L, Tomblin Murphy, G., Baumann, A., & Birch, S. (2001); adapted from O'Brien-Pallas and Baumann (1997).

resource planning. This dynamic, open-system-based framework has been selected to guide decision-making about elements that should be considered in human resource planning (Canadian Institute for Health Information, 2001). The framework is based on the following considerations.

Population Characteristics Related to Health Levels and Risks (Needs-Based Factors) reflect the multivariate characteristics of individuals in the population that create the demand for curative as well as preventative health services. Population health need is not an additive function, and it is influenced by several mediating factors (Eyles, Birch, & Newbold, 1993) such as actual and perceived population health status, socio-economic status, demographic characteristics, enabling and predisposing factors, and health behaviours (Aday & Andersen, 1974). Health need is directly or indirectly influenced by social, cultural, political, contextual, geographical, environmental, and financial factors. Population health need is also influenced by the determinants of health, the collective label given to the multiple factors that are thought to contribute to the health of populations. They include such factors as people's biological endowment and individual responses, the social and physical environment in which they live, the economic conditions (i.e., productivity and wealth) of their society, and the accessibility and quality of their health-care system.

Planning and Forecasting reflect the array of methodologies used to predict service requirements and the numbers of providers needed to deliver these services. The choice of the modelling approach is often influenced by data availability. Historically, supply-based models have been used most frequently for forecasting and planning because of ease of data access. Lavis and Birch (1997) note that there is no unambiguous "right" way to model human resources. Rather, the conceptual basis for human resource planning will depend on the question being asked. Do we want to know how many nurses or physicians are required to continue serving populations in the way they are currently served? Or how many are required to support the services needed to meet all or a proportion 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, Lavis, Markham, Woodward, and O'Brien-Pallas (1994) refer to these three approaches to human resource planning as utilization-based, needs-based, and effective demand-based. The unit of analysis for the three approaches is the same (e.g., physician consultations, dentist courses of treatment, nursing hours). However, the underlying driver of this measure differs among the approaches, reflecting differences in how a society views the

delivery of health care, the provision of services, the population's needs, and the commitment of scarce resources.

In some ways, each approach builds upon the principles of the previous one and introduces additional considerations (Birch et al., 1994). Although this might be seen as enriching the applicability of the approaches to epidemiological, economic, and political realities and thus enhancing the policy relevance of the analyses, this will depend on the philosophical basis of the particular health-care system being studied. For example, in societies where health care is delivered through private markets and access to services is determined by willingness and ability to pay at the individual level, there would be little value in basing future nurse or other health-provider requirements on the estimated care needs of the population, or the estimated future commitment of government resources to health care, since neither of these factors will be important in determining the future deployment of available health providers. Thus the future plans for funding, delivery, and configuration of services determine the appropriate approach.

Forecasting and planning must be seen as a continuous quality-improvement process that is updated regularly. Longer-range projections involve greater uncertainty of the planning variables than intermediate-range projections (Cooper, Laud, & Dietrich, 1998; O'Brien-Pallas et al., 1998).

Supply reflects the actual number, type, and geographic distribution of regulated and unregulated providers available to deliver health services at a given point. Supply is fluid in nature and is influenced by several factors, including the International Labour Organization's (n.d.) Key Indicators of the Labour Market. These include but are not limited to participation rates, provider-to-population ratios, demographic and educational characteristics of individual providers, full-time and part-time status, employment sector, underemployment, unemployment, and inactivity. Death, retirement, and emigration and immigration rates influence supply at any given point. The role — including scope of practice — undertaken by any regulated provider is determined by licensing/regulation standards of practice. The role of unregulated workers is excluded from licensure/regulation and is generally determined by employers.

Financial Resources reflects the overall portion of the Gross Domestic Product that is dedicated to health and education. Finances available for the health system can reflect both public and private payers. Health system inputs must consider the appropriate balance between human and physical capital. Human capital decisions concern

the appropriate quantity, mix, and distribution of health services. Finding this balance requires continuous monitoring, careful choices made in the context of the financial realities of the situation, and the use of research evidence to ensure that population health needs are addressed effectively and efficiently. The mix of financial resources for health must strike a balance between non-human resources (e.g., technology, drugs, hospital beds) and human resources (WHO, 2000).

Production involves the education and training of future health providers. The array of preparatory programs include both university education and on-the-job training. The number of formal positions offered by an educational institution is influenced by financial resources and designated number of funded places. The link between population health needs and future capacity to meet those needs ought be considered in setting production targets for places in any health discipline.

Management, Organization, and Delivery of Health Services are key variables influencing the delivery of care across the continuum. Management and organizational characteristics influence the amount and quality of care provided, provider health and satisfaction, and costs associated with the delivery of services. Organizational characteristics such as structural arrangements, degree of formalization and centralization, environmental complexity, and culture influence the way work gets done and impacts on outcomes. In nursing, for example, it has been demonstrated that managerial resource-allocation decisions can have a negative impact on job satisfaction (Blegen, 1993; Kramer & Schmalenberg, 1988) and health (Amick et al., 1998; Josephson & Vingard, 1998), as well as on patient outcomes (Aiken, Smith, & Lake, 1994; Blegen, Goode, & Reed, 1998; Blegen & Vaughn, 1998; Brooten & Naylor, 1995; Kovner & Gergen, 1998), patient satisfaction with the care received (Leiter, Harvie, & Frizzell, 1998; McGillis Hall et al., 2001), level of productivity (O'Brien-Pallas, Thomson, Alksnis, & Bruce, 2001), and the number of visits a client receives in the community (O'Brien-Pallas, Irvine Doran, et al., 2001).

Resource Deployment and Utilization reflects the amount and nature of the resources deployed to provide health services to the population at large. Utilization reflects the nature and type of resources used by the population to meet health needs. The efficiency and effectiveness of service delivery depends to a great extent on the effective deployment and use of personnel (Ozcan, Taranto, & Horney, 1995). The World Health Organization (2000) notes that provision of health care involves putting together a considerable number of resource inputs to deliver an extraordinary array of service outputs. Decisions concern-

ing the deployment and use of personnel across all sectors of the system influence access to services and utilization by the population and outcomes.

Health Outcomes refers to the health status of the population. Outcomes assessment has two broad objectives: to establish effectiveness of care, and to assess quality of care (Foz & Fine, 2000). These outcomes are classified into those that focus on individual health and those that focus on the health of populations or communities. Similar to the US Public Health Services (Aday, Begley, Lairson, & Slater, 1998) and Roos et al. (1999), our team of researchers (Linda O'Brien-Pallas, Gail Tomblin Murphy, Stephen Birch, Christine Alksnis, Andrea Baumann, and Gerarda Darlington) have developed many indicators of health status from both primary and secondary sources, including population health surveys, vital statistics mortality data, cancer registry data, hospital discharge diagnoses, and the diagnoses appearing on physicians' claims for visits. Examples of these indicators are: premature mortality rate (PMR — i.e., death before 75); socio-economic status (e.g., education, unemployment rates, percentage of single mothers, housing costs); life expectancy; standardized mortality rates; mortality from cancer, injury, and chronic diseases; disease incidence; medical conditions associated with poor functional status and poor perceived health status; low birth weight; prenatal care outcomes; and poverty. These indicators capture various dimensions of community health, ranging from mortality/morbidity due to cancer, injuries, and chronic diseases, to disability among youths, to medical conditions associated with functional limitations and restricted-activity days among the elderly. Even though databases show great promise and it is imperative that they be used to inform health-related decisions and policy, it must be recognized that the relationship between health and health care is not a straightforward one.

Provider Outcomes include the health status of providers, retention rates, turnover rates, sick time, job satisfaction, and levels of burnout and other affective responses to work and the work environment. At the micro level, several studies have indicated that the work environment and job characteristics influence provider health (Irvine & Evans, 1995; O'Brien-Pallas, Baumann, & Villeneuve, 1994) and the quality of care provided to patients. Research across occupations suggests that long periods of job strain affect personal relationships and result in increased sick time, conflict, job dissatisfaction, turnover, and inefficiency. Job strain exacerbates medical problems and increases the risk of musculoskeletal injury and accidents, burnout, illness, substance abuse, and smoking (Baumann et al., 2001).

System Outcomes include the costs associated with resources dedicated to health services. These include hospitalization and re-admission rates, home visits, expenditures on the various health sectors, the number of people treated in each health sector, the neediness of the population being treated, case intensity, cost efficiency, discharge efficiency, proportion of acute versus non-acute care, outpatient/inpatient surgery rates, and bed occupancy rates.

Context (political, social, geographical, technological, and economic factors and "shocks to the system"). At the population level, there are many determinants of health besides medical care. Reconceptualizing the determinants of health as a means of health policy, Evans, Barer, and Marmor (1994) found that physical environment, social environment, individual behaviour, genetic endowment, and medical care are all factors in the health of a population. Population health is concerned with people's living and working environment, the conditions that enable people to make healthy choices, and the services that promote and maintain health (Advisory Committee on Population Health, 1994). Biological factors (including genetic predisposition to a specific disease), environmental factors (such as pollution), and individual socio-economic characteristics (poverty, unemployment, lack of education) have a strong impact on the health of a population (Advisory Committee on Population Health; Roos et al., 1995). Shocks to the system are unanticipated events that influence the health system and the human resource process.

Efficient Mix of Human and Non-human Resources reflects the number and type of resources that must be deployed in order to achieve the best population, provider, and system outcomes. Providing an efficient mix of human and non-human resources is different from simply providing services, in that the outcomes of the process are considered in the former.

Summary

Although this conceptual framework is easy to understand, the data requirements for the mathematical model that underpins the framework are complex and must be defined carefully. In our framework, simulations of the health system are used to provide needs-based estimates that are aimed at optimizing outcomes. This type of model builds on research conducted at the macro, meso, and micro levels in order to reflect the complexity of relationships in the health human resource process.

The papers in this issue of the Journal provide insight into specific constructs of the model. At the macro level, Tomblin Murphy explores methodological challenges in HHRP research. She examines common assumptions and the validity of their use in modelling in all aspects of the proposed framework. Tourangeau and colleagues report on the impact of hospital nurse-staffing decisions on 30-day mortality rates. Their model adds to our knowledge of the relationships among the management, deployment, and utilization of nursing services and patient/population outcomes. Shamian and colleagues explore the relationship between hospital-level indicators of the work environment and aggregated indicators of health and well-being for registered nurses employed in acute-care hospitals in the province of Ontario. This paper contributes to our understanding of how management decisions regarding the work environment influence nurse outcomes. Manojlovich and Ketafian explore the conflict between the practice of nursing and the organizational structure of many hospitals. This study provides insight into the management aspects of how the work unit is organized and the process of care delivery. Zboril-Benson examines the reasons for nurse absenteeism in the province of Saskatchewan.

Birch describes the need for the planning process to take into account demographic changes in both populations and provider groups. A major challenge in modelling health human resources is access to meaningful databases for planning purposes. Pringle describes a unique Ontario initiative currently underway to develop and validate a nurse-sensitive set of data that will be routinely collected and will enhance HHRP in that province. Since the science that underpins HHRP is complex and rapidly changing, few books have been written on the subject. Reflecting the dynamic nature of the science, Tomblin Murphy and Barrath provide an excellent review of "grey literature" and useful Web sites for those interested in HHRP.

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