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This article highlights mechanisms that may further sustainable technological development for the 21st century. The distributional effects associated with the adoption and diffusion of health care technologies are addressed wherein the capacity to capitalize on the health gains from the adoption of technology varies in society. These effects are caused by the actions of individuals as they segment themselves into distinct social groups. The circumstances under which social institutions are further segmented are explored and may motivate public sector limits on the funding for and diffusion of health care technologies. Safety and efficacy benchmarks are necessary but insufficient conditions for sustainability as product advantage on grounds of cost-effectiveness must also be demonstrated. Furthermore, given the substantial role played by public sector decision makers in purchasing health care technologies, the distributional consequences associated with the uptake and diffusion of technology need to be gauged by product designers and those responsible for marketing.

Keywords: *adoption; diffusion; health care settings; health care technology; health policy; social context*

INTRODUCTION

Unprecedented growth in health care expenditures has become a common feature of health care for all Western countries. Indeed, over the past 40 years, member countries of the Organization for Economic Cooperation Development (OECD) have experienced at least a 50-fold increase in total health expenditures, a 20-fold increase in per capita health expenditures, a 10-fold increase in inflation-adjusted health expenditures, a 5-fold increase in inflation-adjusted per capita health expenditures, and a doubling of health expenditures in gross domestic product (GDP; Canadian Institute for Health Information, 2004). Such pressure on society's available, yet limited, resources raises questions about the sustainability of health care and the ability of the public sector, which accounts for approximately 75% of total health expenditures in OECD countries (www.who.org), to continue to fund the sector in a manner to which it has been accustomed.

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These fiscal pressures have been the backdrop to an equally important explosion in the availability of innovative health care technologies and products that offer the potential to enhance health outcomes and, sometimes, to contain the growth in costs. These new user-friendly, miniaturized, and innovative technologies (that occur throughout the spectrum of devices, drugs, and information systems) have been the precursors to changes in health care practices (such as nursing care), services, and settings and have important implications for the efficient, effective, and equitable allocation and use of health care resources. These technologies are reshaping the contours of the health care landscape and dramatically altering the manner in which health care is sought, organized, delivered, and received (McKeever & Coyte, 2002). As a consequence, a comprehensive assessment of the sustainability of technological innovations needs to consider not just the technology itself but the manner in which these innovations alter the context in which health care transactions occur.

Health care in the 21st century includes more than one or two traditional health care settings, such as hospitals and clinics, and many more than a few privileged providers. Today, health care is sought, delivered, and received in a wide variety of settings (Winch, Creedy, & Chaboyer, 2002) and is mediated by providers of care (paid and unpaid) and health care technologies, including medical products (Coyte & McKeever, 2001). These configurations of people, places, and technologies are as diverse as the underlying health needs of the population. Moreover, these health care settings include very different institutional and social settings and sites than traditional health care settings as they encompass places where people live, work, play, and attend school (Armstrong, 1983, 1995; Holmes & Gastaldo, 2002). Although these flexible configurations are the hallmark of health care in the 21st century, little is known about the consequences of seeking, providing, and receiving technology-mediated health care in these diverse settings and sites. This article responds, in part, to the urgent need to assess, from an interdisciplinary perspective, the spatial, technological, and social dimensions of contemporary health care.

More specifically, this article highlights mechanisms that need to be addressed to achieve sustainable technological development for the 21st century. We are concerned with the distributional effects associated with the adoption and diffusion of health care technologies but, in particular, where the capacity to capitalize on the health gains from the adoption of technology varies in society. For example, only a segment of society may have the mental and/or physical capacity to take advantage of technologies that provide the opportunity to self-manage an underlying health condition, thereby yielding distributional effects. These distributional effects are brought about by the actions of individuals as they segment or stratify themselves into distinct social groups. This stratification represents a separating equilibrium that may be considered a form of social exclusion as some members of society may be excluded from the potential benefits associated with a new technology. Thus, one further purpose of this article is to explore the circumstances under which such divisive policies and associated institutions are created, maintained, and enforced. These potential distributional consequences are important to recognize as they may motivate public sector limits to the funding for and diffusion of health care technologies. Specifically, the article shows that although health care technology may be developed within a laboratory and adopted in a health care setting, there are major social dimensions to the diffusion of technology, especially when the public sector plays a significant purchaser role. Technologists should become more aware of the broader social implications associated with the uptake and diffusion of technology and, accordingly, develop strategies to minimize any potential adverse distributional consequence. Assurance that health care technology satisfies safety and efficacy considerations is not sufficient for it to garner a market niche. Rather, broader social issues, such as cost-effectiveness and distributional considerations, need to be addressed to enhance the course of product design and marketing.

SETTING THE STAGE

This article is the product of interdisciplinary reflection (health economy and nursing) concerning the distributional effects of health care technologies advanced by various levels of government, nongovernmental organizations, corporations, or groups of individuals. Our intention is to take a critical stand to challenge taken-for-granted "truths" (dominant discourses) with regard to so-called "universal" benefits of innovations to health care technology.

This approach enables us to highlight the factors that might limit the diffusion of health care technologies, even when such innovations yield universal gains to those who adopt such technology. Therefore, our objectives are to explore the consequences to care recipients (and their unpaid caregivers) from the adoption of health technology; to gauge the intended and unintended effects of technology diffusion; and last, to examine the circumstances under which limits to technology diffusion are created, maintained, and enforced.

Suppose we were to embark on a series of health policy initiatives designed to advance innovations in and the uptake of health care technologies. Suppose further that the uptake of such technologies occurs at the level of the individual care recipient and that these technologies have satisfied safety and efficacy requirements. Under these circumstances, health care services and settings may be enhanced, and population-based health outcomes improved. These policies and the complementary organizational and personal strategies designed to operationalize them may advance the well-being of care recipients in health care decision making; may provide for the customization (or tailoring) of health care services and technologies to the unique circumstances of care recipients; and may offer the potential for a better match between individual resources (and willingness to pay) and the underlying preferences and needs of care recipients. But once the onus shifts to care recipients (and their unpaid caregivers) to articulate their needs and preferences and, accordingly, to select a course of action, and associated technologies, from an array of competing alternatives, the outcome may be one where the benefits garnered from the diffusion of technology are unevenly distributed in society.

The difference in payoffs that stem from the diffusion of health care technology might be attributed to variations in the return to the effort expended in articulating health needs and preferences or may be due to variations in the capacity to either expend such effort or capture such returns. For example, some individuals are better able to explain to care providers their symptoms and health needs, whereas others are better able to use the technology that may address their needs. These distributional effects emerge from the actions (or inaction) of care recipients when they and their resources (physical, psychological, financial, time, and social capital) confront a modified policy environment.

In the next section, we initiate dialogue by outlining a simple conceptual representation of society that highlights the factors that influence the adoption of health care technology and, simultaneously, has the potential to yield social segmentation as the outcome of the atomistic actions of care recipients and their caregivers. We then turn our attention to the factors that are important in the determination of public policies that advance or limit the diffusion of health care technologies. We suggest that if those who benefit from the diffusion of health care technology are numerous, if they stand to obtain significant advantage (or incur limited costs) in advancing their own well-being, or if those adversely (or not) affected are scarce or hidden (or are perceived to suffer only marginally), then diffusion is more likely to occur. Brief concluding remarks are offered at the end of the article.

HEALTH CARE TECHNOLOGY ADOPTION

This article examines the distributional consequences associated with the adoption of health care technologies and assesses whether these consequences might impede the diffusion of such technologies within a fiscally constrained environment for health care. To achieve our goal, we outline a simple conceptual representation of society that highlights the factors that influence the adoption and diffusion of health care technology.

Individual Adoption Decisions

Consider a society in which individuals differ in their capacity, K, to capitalize on a new technology, for instance, where individuals may differ in their ability to use a technology either because of physical, psychological, or intellectual limitations. Let individuals have the freedom to adopt or not to adopt such technology in their everyday life. Adoption entails uniform costs, C, but the benefits, B, to adoption are an increasing general function of each individual's underlying capacity to use (or to capitalize on) the technology, B(K). Under these circumstances, individuals adopt the technology if the benefits of adoption exceed the associated costs, namely, $B(K) > C$. As long as the benefit function, $B(K)$, were an increasing function of underlying capacities, there would be a capacity threshold for adoption, K^*. Individuals with capacities in excess of that threshold would be the only members of society to adopt the new technology.

To yield a closed-form solution to the optimization problem, let us suppose that the capacity to capitalize on new technology is uniformly distributed between K_1 and K_2, where $K_2 > K_1$. Furthermore, let the benefit from adoption be linear in capacity, K, with the maximum benefit defined as M. Specifically, suppose that the benefit from adoption is specified as

$$B(K) = [(K - K_1)/(K_2 - K_1)]\ M. \tag{1}$$

Under these circumstances, the threshold for adoption, K^*, is defined where the incremental gain from adoption, $[(K - K_1)/(K_2 - K_1)]\ M$, is just offset by the incremental cost of adoption, C. Thus, the threshold for adoption is defined as

$$K^* = K_1 + [C(K_2 - K_1)/M]. \tag{2}$$

As a consequence, the larger the cost, C, or the smaller the maximum benefit, M, from adoption, the greater is the capacity threshold required for adoption. Moreover, because an increase in the range of capacities in society (namely, an increase in the difference between the capacity of the most and the least able), $(K_2 - K_1)$, is associated with a reduction in the benefit from adoption, an increase in that range would raise the capacity threshold and thereby reduce the number of adopters.

If the well-being of nonadopters is defined as U^*, then the well-being of adopters is written as

$$U^* + \{[(K - K_1)/(K_2 - K_1)]\ M - C\} \tag{3}$$

where well-being is greater for those with greater capacities to capitalize on the technology. Moreover, an increase in the maximum benefit from adoption, M, or a reduction in the cost, C, would both be associated with enhanced well-being for adopters and, hence, a greater propensity for technology uptake.

In this simple characterization of the technology uptake decision, individuals differ in their capacity to capitalize on the new health care technology. Technology adopters obtain a larger boost to their well-being than that received by nonadopters, and moreover, those with greater capacity to capitalize receive even larger gains than those who adopt with a limited capacity to capitalize. Society as a whole may benefit from the new technology, but it is important to note that not all members of society benefit. Indeed, to the extent to which the public sector incurs some of the costs associated with the diffusion of technology, it is possible that nonadopters may be worse off through diffusion, especially if public sector costs were borne through increased general taxation. These distributional consequences associated with the diffusion of health care technologies may play an important role, as described in the next section, in limiting access to health care technologies, especially when the public sector is a significant purchaser of such technology.

DIFFUSION UNDER VARIOUS OBJECTIVES

In this section, we consider the determination of health policies that may limit the diffusion of health care technology under various objective functions for policy decision makers. Traditionally, economists have advanced a utilitarian optimization maximand for health policy decision makers (Dolan, 2001). In this formulation, the distributional effects of public policies have no bearing, in themselves, on policy decision making. We discuss this situation in section 4.1, "The Utilitarian Approach." A more comprehensive approach to the formation of health policies is considered in section 4.2, "The Role of Distributional Concerns," wherein both distributional and aggregate well-being are important to health policy decision makers (Little, 2003). The associated policy outcomes derived in section 4.2 incorporate those derived in section 4.1 as a special case when the preferences of decision makers rest solely on aggregate well-being without there being any consideration for distributional concerns.

The Utilitarian Approach

There are various methods used to characterize the well-being of society as a whole. Suppose well-being were defined in a utilitarian manner (Bentham, 1879; Mill, 1848), namely, as the sum of the well-being derived by technology adopters (i.e., where $K > K^*$) and nonadopters (i.e., where $K < K^*$), less the costs of technology, T, incurred at a societal level. These technology costs are distinguished from those that are incurred at the level of the individual adopter/user, C. Thus, aggregate well-being in society is defined as

$$\{\int_{K^*} [U^* + B(K) - C]\, f(K)\, dK + \int^{K^*} U^*\, f(K)\, dK\}\, N - T \quad (4)$$

where f(K) reflects the distribution of the capacity to capitalize in a population of size N. Invoking the previously specified distributional and functional assumptions yields aggregate well-being as

$$N\, U^* + N\{[M - C]^2/2M\} - T. \quad (5)$$

Knowing that the number of technology adopters is defined as $N(K_2 - K^*)/(K_2 - K_1)$, which may be expressed as $N[M - C]/M$, and knowing that their average incremental gain in well-being is defined as $[M - C]/2$, Equation 5 indicates that aggregate well-being is equivalent to the level of aggregate well-being in the absence of technology adoption, $N\, U^*$, plus the incremental gain in well-being for those who adopt the technology, $N\{[M - C]^2/2M\}$, less the cost of the technology incurred at a societal level, T.

In the absence of concerns, at a societal level, about disparities in well-being, technological innovations that ensure that the incremental gains in well-being to adopters are more than sufficient to cover the costs of technology incurred at a societal level would permit the diffusion of technology; that is, if the gains to adopters are sufficiently large relative to the cost of the technology, adoption would be permitted. Specifically, if decisions concerning the diffusion of health care technologies were determined as the outcome of the optimization problem represented by Equation 5, then diffusion would occur if, and only if, the gains outweighed the costs, namely,

$$N\{[M - C]^2/2\, M\} - T > 0. \quad (6)$$

Thus, if the incremental gains captured by those who adopt the technology are more than sufficient to cover the costs incurred at the level of society, then social well-being would be enhanced through diffusion. Limits to diffusion would occur if the reverse took place, namely, if the number of technology adopters were small, if their average incremental gain in well-being were small, or if the costs of diffusion at the societal level were large. As a consequence, to enhance diffusion of health care technologies, it is not merely sufficient to demonstrate that the technology is safe and effective. There must also be a concerted effort to demonstrate (a) that the technology is cost-effective at the level of the individual adopter, so that the number of adopters is increased; (b) that the enhancement to well-being for adopters is increased at the individual level to ensure that the aggregate gains from adoption are increased; and (c) that the costs incurred at a societal level are contained so that the net gains for society are enhanced.

The Role of Distributional Concerns

Although section 4.1 discusses health policy decision making in the absence of distributional concerns, a more complete (and realistic) characterization of such decision making would be one in which distributional concerns are front and center. In fact, there are many circumstances in which advancement to well-being for one segment of society would not be pursued unless such benefits are also available to others in society. For example, if only one segment of society were to benefit from a new technology, and if there were strong feelings of envy if some were excluded from those benefits, limits may be placed on the introduction and diffusion of such technologies. In these circumstances, this section may be useful in offering an interpretation of why health policies might be pursued that limit the diffusion of health care technologies.

In general, there are many objective functions that might be advanced for health policy decision makers that characterize their preference ordering for enhancements to aggregate well-being and that also incorporate distributional concerns (Hauck, Smith, & Goddard, 2003; Mooney, 1998; Nord, Pinto, Richardson, Menzel, & Ubel, 1999; Rabin, 1998; Sen, 1970, 1992; Wagstaff, 1991; Wiseman, 1998). One such formulation is associated with the mean-variance approach to decision making under uncertainty (Feldstein, 1969; Markowitz, 1959; Tobin, 1969). Under the mean-variance approach to decision making, both the extent to which aggregate average well-being is enhanced ("the mean") and the distribution of that well-being among those in society ("the variance") are unique aspects to decision making. Whereas we have, to date, abstracted from uncertainty, the objective function advanced for decision makers who adopt a mean-variable approach, U(.), would be one that depends on only two parameters: first, aggregate average well-being for society, μ; and second, the variance of such well-being across individuals in society, σ^2. This may be written as

$$U(\mu, \sigma^2). \tag{7}$$

The well-being of decision makers (or the proxy well-being that guides their behavior) is defined as an increasing function of aggregate average well-being, μ, but a decreasing function of the variance of well-being in society, σ^2. (This might characterize a decision maker who is interested in avoiding controversy by advancing the interests of all in society in preference to advancing the interests of just a single subset of the population.) In this form, enhancement to aggregate average well-being, after holding distributional effects unchanged, is seen to improve the well-being of policy decision makers and thereby make them more likely to take actions that so enhance their well-being. Similarly, any reduction in the variance of well-being in society, holding aggregate average well-being constant, would also improve the well-being of decision makers and, again, would guide decision making. Thus, policies that both enhance aggregate average well-being and reduce the distribution effects are dominant policy options as they yield unambiguous gains in well-being for decision makers.

From our earlier discussion in section 4.1, whereas Equations 4 and 5 define aggregate well-being for society associated with health care technology, aggregate average well-being (or per capita well-being) is defined as

$$\mu = U^* + \{[M - C]^2 / 2M\} - T/N. \tag{8}$$

Furthermore, the variance of such well-being in society, σ^2, may be written as

$$\sigma^2 = \int_{K^*} \{U^* + [(K - K_1)/(K_2 - K_1)]\, M - C - T/N - \mu\}^2 f(K)\, dK + \int^{K^*} \{U^* - T/N - \mu\}^2 f(K)\, dK. \tag{9}$$

Here, the variance is made up of two portions. The first is attributable to technology adopters, and the second to nonadopters. Simplifying this expression yields

$$\sigma^2 = \{[M - C]/M\}\{[M - C]^2/12M^2\}\,[M^2 + 3C^2] + [C/M]\{[M - C]^2/2M^2\}^2 \tag{10}$$

where the variance of well-being across society depends on the sum of two components: first, the product of the proportion of technology adopters, $\{[M - C]/M\}$, and the squared deviation in their well-being from the societal average; and second, the product of the proportion of technology nonadopters, $[(K^* - K_1)/(K_2 - K_1)] = [C/M]$, and the squared deviation in their well-being from the societal average. Equation 10 may be summarized further to yield

$$\sigma^2 = \{[M - C]^3/12M^2\}[M + 3C]. \tag{11}$$

In the presence of concerns about the distributional implications derived from the diffusion of technology, the optimization problem faced by decision makers (or the process of decision making undertaken) entails a comparison of the potential enhancement in aggregate average well-being attributable to the diffusion of technology and any potential adverse consequences associated with an increase in the variance of well-being in society. If decision makers held strong preferences against an increase in inequality, then although an innovation might enhance aggregate average well-being, any upward growth in the variance of well-being in society might limit the diffusion of such technology on distributional grounds. Thus, if diffusion decisions were determined as the outcome of the optimization problem represented by Equation 7, diffusion occurs if the contribution to decision maker well-being attributable to enhancements to aggregate average well-being more than compensates for the disutility attributable to any potential increase in the variance of well-being in society. Of course, limits to diffusion occur if the gains in average well-being are insufficient to compensate for the disutility associated with the distributional effects.

Our discussion in this section has demonstrated that although safety and efficacy are necessary considerations for the adoption and diffusion of health care technologies, decision makers may also consider a wide range of other factors before they embrace such technologies. We believe nurses could play a determinant role in informing decision makers of the sociopolitical contexts and issues that influence the diffusion of health care technologies. In contrast to the discussion in section 4.1, we have shown that notwithstanding enhancements to aggregate average well-being, circumstances exist in which limits may be placed on the diffusion of technology if diffusion yields sufficiently large adverse distributional consequences.

Although the results advanced in section 4.1 are useful, they represent a special case of the more comprehensive framework advanced in section 4.2. Consider a situation in which the preferences of decision makers rest solely on aggregate well-being in society without there being any consideration of distributional concerns. In this case, the preferences of decision makers only emphasize the first parameter in Equation 7, namely, μ, which represents aggregate average well-being. This formulation is described in section 4.1, where policy decision makers are not concerned with distributional considerations.

One important "take home" message offered by this article is that although health care technology may be developed within a laboratory and adopted in a health care setting, there are major social dimensions to the diffusion of such technology, especially when the public sector plays a significant purchaser role. Technologists should become more aware of the broader social implications associated with the uptake and diffusion of technology and, accordingly, develop strategies to minimize any potential adverse distributional consequence. Assurance that health care technology satisfies safety and efficacy considerations is not sufficient for it to garner a market niche. Rather, broader social issues associated with the uptake and diffusion of technology, such as cost-effectiveness and distributional considerations, need to be addressed to enhance the course of product design and marketing.

CONCLUDING REMARKS

A confluence of technological, demographic, and fiscal forces has dramatically increased the range of settings and sites in which health care is sought, delivered, and received. Health care in the 21st century is technologically mediated and geographically dispersed. It is no longer solely available in restructured traditional settings, such as hospitals, but is also available in places designed for other purposes, such as the family home. This dispersion of technologically mediated health care to multiple settings highlights the significance of place and technology; it underscores the need to link an array of public policies, such as industrial development and housing, to health policies; and it opens the door for new understandings of health care practices and outcomes that demand contributions from hitherto nontraditional areas of health research.

The transformation of homes, schools, and other settings into clinical environments and the restructuring of traditional settings are advanced by medicine, engineering, and the basic sciences but will be best understood through the marriage of theories and concepts developed in the social sciences and the humanities with our knowledge of physiology, basic science, and clinical practice. There are clear opportunities and an urgent need to capitalize on the creative synthesis of the arts and the sciences to ensure that health research is relevant to the challenges of the new century.

This article has demonstrated that if care recipients (and their unpaid caregivers) were to differ in their capacity to take advantage of new health care technologies and products, then the potential increase in inequality generated through the diffusion of such technologies might yield restrictions on the level of public funding for such technologies and, hence, limit their effective diffusion. However, if those who benefit from such technological innovations are numerous, if they stand to obtain significant advantage (or incur limited costs) in advancing their own well-being, or if those adversely (or not) affected are scarce or hidden (or are perceived to suffer only marginally), then diffusion is more likely to occur.

In addition, we believe that this article has highlighted the mechanisms that need to be addressed to achieve sustainable technological development for the 21st century. Achievement of safety and efficacy benchmarks are necessary but by no means sufficient conditions for success. Given the substantial role played by the public sector as a purchaser of health care services and technologies, product designers and those engaged in the marketing of such technologies need to also demonstrate product advantage on grounds of cost-effectiveness. Furthermore, because policy decision makers are often responsive to all members of society (rather than a defined subgroup), the potential distributional consequences associated with the uptake and diffusion of technology need to be gauged. The best chance for sustainable technological development is offered when product designers, developers, and marketers ensure that the adverse distributional consequences from diffusion are minimized and that the net gains to society are maximized.

REFERENCES

Armstrong, D. (1983). *Political anatomy of the body: Medical knowledge in Britain: The twentieth century*. Cambridge, UK: Cambridge University Press.

Armstrong, D. (1995). The rise of surveillance medicine. *Sociology of Health and Illness*, *17*, 393-404.

Bentham, J. (1879). *An introduction to the principles of morals and legislation*. Oxford, UK: Clarendon.

Canadian Institute for Health Information. (2004). *National health expenditure trends, 1975-2004*. Ottawa: Author.

Coyte, P. C., & McKeever, P. (2001). Home care in Canada: Passing the buck. *Canadian Journal of Nursing Research*, *33*(2), 11-25.

Dolan, P. (2001). Utilitarianism and the measurement and aggregation of quality-adjusted life years. *Health Care Analysis*, *9*(1), 65-76.

Feldstein, M. S. (1969). Mean-variance analysis in the theory of liquidity preference and portfolio selection. *Review of Economic Studies*, *36*, 5-12.

Hauck, K., Smith, P. C., & Goddard, M. (2003). *The economics of priority setting for health care: A literature review*. Washington, DC: The International Bank for Reconstruction and Development/The World Bank.

Holmes, D., & Gastaldo, D. (2002). Nursing as means of governmentality. *Journal of Advanced Nursing*, *38*(6), 557-565.

Little, I. M. D. (2003). *A critique of welfare economics*. New York: Oxford University Press.

Markowitz, H. M. (1959). *Portfolio selection*. New York: John Wiley.

McKeever, P., & Coyte, P. C. (2002, March 25). Here, there and everywhere. *University of Toronto Bulletin*, p. A16.

Mill, J. S. (1848). *Principles of political economy*. London: Longmans, Green and Co.

Mooney, G. (1998). Beyond health outcomes: The benefits of health care. *Health Care Analysis*, *6*(2), 99-105.

Nord, E., Pinto, J. L., Richardson, J., Menzel, P., & Ubel, P. (1999). Incorporating societal concerns for fairness in numerical valuations of health programmes. *Health Economics*, *8*(1), 25-39.

Rabin, M. (1998). Psychology and economics. *Journal of Economic Literature*, *36*, 11-46.

Sen, A. (1970). *Collective choice and social welfare*. Edinburgh: Oliver and Boyd.

Sen, A. (1992). *Inequality reexamined*. New York: Russell Sage Foundation.

Tobin, J. (1969). Comment on Borch and Feldstein. *Review of Economic Studies*, *36*, 13-14.

Wagstaff, A. (1991). QALYs and the equity-efficiency trade-off. *Journal of Health Economics*, *10*(1), 21-41.

Winch, S., Creedy, D., & Chaboyer, W. (2002). Governing nursing conduct: The rise of evidence-based practice. *Nursing Inquiry*, *9*(3), 156-161.

Wiseman, V. (1998). From selfish individualism to citizenship: Avoiding health economics' reputed "dead end." *Health Care Analysis*, *6*(2), 113-122.

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