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## Nurse practitioners, canaries in the mine of primary care reform

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### ABSTRACT

A strong and effective primary care capacity has been demonstrated to be crucial for controlling costs, improving outcomes, and ultimately enhancing the performance and sustainability of healthcare systems. However, current challenges are such that the future of primary care is unlikely to be an extension of the current dominant model. Profound environmental challenges are accumulating and are likely to drive significant transformation in the field. In this article we build upon the concept of “disruptive innovations” to analyze data from two separate research projects conducted in Quebec (Canada). Results from both projects suggest that introducing nurse practitioners into primary care teams has the potential to disrupt the status quo. We propose three scenarios for the future of primary care and for nurse practitioners' potential contribution to reforming primary care delivery models. In conclusion, we suggest that, like the canary in the coal mine, nurse practitioners' place in primary care will be an indicator of the extent to which healthcare system reforms have actually occurred.

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### 1. Introduction

A strong and effective primary care capacity has been demonstrated to be crucial for controlling costs, improving

outcomes and ultimately enhancing the performance and sustainability of healthcare systems [1–4]. However, the primary care capacities of Canada's provincial healthcare systems are meager in comparison to those of other rich countries [5–13]. Moreover, the weakness of primary care in Canada is not a transient feature. Despite being identified as a priority in all provinces and despite significant investments, the promised results have not materialized [5,6]. This suggests that the causes are structural in nature and that the current situation is likely a product of deeply-rooted systemic characteristics [14,15].

As we argue, current challenges are such that the future of primary care is unlikely to be an extension of today's dominant model. Very significant environmental

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challenges are accumulating and likely to drive significant transformation in the field.

In this article, we summarize and integrate the findings from two originally unrelated research projects to consider scenarios for the future of primary care delivery models and the potential role of nurse practitioners (NPs) in primary care reform. We use the term NP to describe nurses with graduate level university training and an extended scope of practice, including some prescribing rights, which allows them to diagnose autonomously and treat a variety of common conditions.

At the conceptual level, we use and extend the concept of “disruptive innovations” proposed by Christensen and colleagues [16–18] to discuss empirical data derived from two separate but surprisingly complementary research projects. The first was on primary care NP integration in Quebec. The second focused on core stakeholders’ perceptions of the challenges facing Quebec’s healthcare system and solutions to overcome them. The unexpected level of convergence in the results of those projects prompted us to reflect on NPs’ role and position in the context of primary care reform. In the first section, we present and discuss the concept of “disruptive innovations” and its contribution to understanding primary care system reform. We then briefly describe the data and results of both projects and how their intersection supports a discussion of different scenarios for the future of primary care delivery.

## 2. Disruptive innovations and healthcare reform

Nearly two decades ago, Christensen [19] developed the concept of disruptive innovations that has since been further discussed and applied in several other publications [16–18]. The core idea is that from time to time a truly radical innovation will fundamentally reorganize a field by changing the very nature of products and the way they are embedded in a market. The process is somewhat similar to the concept of paradigm change in the evolution of science [20]. An interesting feature of the process as described in Christensen’s works is that disruption is usually brought about by products or services that may be viewed, at least in the beginning, as not as good as the dominant ones. This is because, as dominant products evolve, they grow ever more sophisticated and expensive, until they exceed the needs of most consumers.

This idea was specifically applied to the field of healthcare by Christensen et al. [16], who argued that the autonomous evolution of the healthcare services market is poorly matched to the evolution of patients’ needs. The sophistication, specialization and price of healthcare services are all steadily increasing, with little benefit to most patients. Care is mainly delivered in excessively expensive structures (general hospitals) by a highly skilled and ever more specialized workforce, but without much consideration for service convenience or for optimizing the efficiency of processes. Healthcare is also a particularly interesting context in which to apply the notion of disruption because of growing evidence that, in healthcare, less is often more [4,21–28]. In other words, the clinical benefits of many invasive, intensive and expensive treatments and of technology-intensive models of care are often modest at

best. This implies that many patients would benefit from more primary care than specialized care, more home care than hospital care, and more low-tech interventions than heroic medicine. Likewise, whenever possible, substituting family doctors for specialist physicians, and nurses, pharmacists and other professionals for family doctors allows efficiency and clinical gains [29–37].

Regarding the optimization of care delivery, it should be noted that the disruption framework is a highly functionalist perspective focused on the technical aspects of care. Such a perspective disregards social factors at play in the definition of diseases, legitimate health interventions and professional boundaries. We believe redefining professional boundaries (who treats whom) will have an important impact on the definition of illness and care (how to treat what). Perspectives anchored in structuralist traditions [38–41] suggest that disrupting the status quo involves much more than replacing physicians by nurses for the same technical intervention. Moving toward interdisciplinary primary care teams has implications for professional boundaries, the nature of the professions involved and what is understood by primary care and health. Conceiving of the disruption of the care delivery status quo as a complex social phenomenon will be useful in understanding the challenges involved.

With respect to the necessary conditions for change, the disruptive innovations conceptual framework is anchored in economic theory and underlying rational behavior approaches. It stresses that neither technological innovations nor market forces on their own could explain disruptions. It is the combination of an innovation (technological enabler), a viable business model to develop this innovation, and a market for it (value network) that will imbue a given innovation with disruptive potential. Thus, disruptive potential does not depend so much on an innovation’s intrinsic characteristics as on its compatibility with the larger context and market.

In Canada’s healthcare market, most services are covered by provincial, universal and public insurance systems funded through general taxation (Beveridgean System). Services are free for patients at the point of care. In Quebec, where our studies were conducted, hospitals and other health institutions are generally funded though historically set budgets. Non-physician staff and professionals are almost entirely salaried from those budgets, whereas physicians are mostly paid through fee-for-service (FFS) from a separate envelope. There is thus no employment tie between hospitals and physicians practicing inside their walls, and even less direct control over primary care physicians outside hospitals. Over the past decade, a bundle of financial incentives has been rolled out for physicians to increase patient rostering and improve accessibility and continuity, but with limited effect. Given the nature of the healthcare services market in Canada and Quebec, three aspects of the framework as presented by Christensen et al. [16] warrant discussion. First, for the overwhelming majority of care provided, patients incur no co-payments and thus are not sensitive to the cost of services provided. Yet the overall costs of healthcare services are borne by all citizens and exert a powerful pressure on public finances. Moreover, even if patients are not sensitive to the cost of

services, the limited accessibility of primary care services translates into significant opportunity costs for them, such as lost work time, and patients are very sensitive to the convenience, or lack of thereof, of services. Second, for primary care services there is little or no surplus capacity. It is thus likely that every provider will obtain a satisfying market share regardless of the quality or convenience of services provided. Third, even if most of the market-based pressures are absent, there are strong environmental forces pushing for redefinition of the value network of primary care delivery, which we should discuss in some detail here.

The performance of primary care delivery structures in Quebec is disappointing in terms of accessibility, continuity and comprehensiveness, all of which translates into one of the lowest healthcare system confidence rates among rich countries [5,6,9,10,42]. Whether warranted or not, the current level of patient dissatisfaction and lack of confidence in the healthcare system is in itself a strong political threat to the status quo [14,43]. Similarly, the long-term linearity and pace at which health expenditures are outstripping economic growth is a powerful incentive to implement radical change [44]. The status quo is also being challenged from the inside, as many older family doctors who follow large patient panels are retiring or will be retiring soon; even though the ratio of doctors to inhabitants is rising, newly trained family doctors seem to follow fewer patients and spend more time in hospitals, making it even more unlikely that accessibility problems in primary care practice will dissipate on their own. Recent investments in physician compensation seem to have, if anything, exacerbated the problems [45].

### 3. Data sources and methods

As stated in the Introduction, this article is based on data from two unrelated research projects whose results unexpectedly intersected. The first was a study on the integration of NPs into Quebec's primary care teams. The second was a study of stakeholders' views about the future of Quebec's healthcare system, its problems, and how to improve its performance and ensure its sustainability. There was some overlap in team composition, as two researchers were involved in both projects (the first project involved eight members and the second, six). However, the projects were conducted independently and no interconnection in content was anticipated beforehand. For the sake of brevity, the detailed methodology of these two projects will not be described here, but the following paragraphs present an overview of the data collected.

#### 3.1. Project 1: NP integration in Quebec

In 2010, Quebec's government announced it would support NP practice and fund the integration of 500 NPs into primary care teams over the next decade [46]. This was the starting point for a research project focused on supporting primary care teams that integrated NPs to optimize care delivery models, processes and roles. Project 1 began with a logic analysis, in which we systematically searched the scientific literature to identify peer-reviewed and grey documents addressing NP integration and practice

models. Logic analysis [47] shares many similarities with the realist review approach [48], but is specifically focused on understanding the causal mechanisms between an intervention and its effects. Our aim was to understand the factors and mediating variables that influence the effectiveness of NP integration into primary care teams. We selected and iteratively analyzed 58 documents to build a preliminary conceptual model, following the realist review approach [48–51].

Then, we conducted an implementation analysis using a case study research design ( $n=6$ ) in three health regions of Quebec. Each case was defined as a clinical team into which one or more NPs had been integrated. The case studies included 34 semi-structured interviews with clinical team members and other key actors, as well as analysis of available documentation.

Although the aim of the project was to provide practical advice to primary care teams, it also contributed to broader macro-level evidence on the determinants of successful integration of NPs into primary care teams.

#### 3.2. Project 2: stakeholders' views on the future of Quebec's healthcare system

Project 2, still ongoing as this article was being written, is more macro and policy-oriented in focus. Its starting point was the hypothesis that there is general consensus among healthcare system stakeholders that changes are needed to improve the performance and sustainability of Quebec's healthcare system, but that there is significant divergence in their policy preferences. To assess the level of consensus on the need for significant reform of Quebec's healthcare system and to identify policy preferences, we conducted semi-structured interviews with core stakeholders in the system [52,53]; in all, 31 interviews were conducted, lasting from 45 min to 2 h. Informants were selected because they occupied or had occupied central positions within organizations potentially influencing the evolution of the health system (e.g. deans of health profession faculties, presidents of professional associations, CEOs of large institutions). The interviews were loosely structured around four questions: (1) What are the strengths of the current healthcare delivery system? (2) What are the main challenges and problems facing the health system? (3) What are the solutions needed to tackle those challenges and improve the performance of the system? (4) Who are the most powerful actors and interest groups able to shape policy-making in the healthcare system? Sophisticated coding based on social network analysis and data visualization techniques were used to make sense of the data [52,53].

### 4. Results: two projects that intersect

Analysis of those two projects' results showed that many of the best practices and facilitating factors for integrating NPs into primary care delivery structures corresponded to the macro solutions suggested by core stakeholders to improve the healthcare system's performance and sustainability. This strong intersection was the starting point for our hypothesis that the place occupied by

NPs in primary care delivery systems is a crucial determinant of the potential for disrupting the current model.

A striking observation from the available evidence is that NP integration is not a simple and straightforward process. Because NPs' scope of practice and roles are at the intersection of medicine and nursing, their integration involves challenging existing role definitions of both registered nurses and physicians. This is not a *sine qua non* condition for integration; many settings did not redefine roles and instead gave NPs either a nurse-plus or physician-minus role. However, failure to redefine professional roles and work organization within teams jeopardizes the capacity to implement significant primary care reform. In this regard, NP integration can be seen as a catalyst, as it provides an opportunity to challenge the status quo and optimize subsidiarity in role definition.

In Quebec, as in most Canadian provinces, the dominant model of primary care delivery is still influenced by solo medical practice [54]. That is, even though most physicians now practice in group settings, the dominant model in terms of care processes is one in which each physician autonomously provides care to his/her own patients. In such settings, nurses often have a narrow scope of practice, and the sharing of resources and responsibilities among clinicians (physicians, nurses, and others) is limited, as is team accountability for patient care. Yet available evidence [15,54–58] shows effectiveness and efficiency are improved by moving to a truly interprofessional model in which nurses, NPs, pharmacists, social workers, psychologists, and other health professionals all work to the full extent of their scope of practice, and in which patients, resources and responsibilities are shared by the whole team and professional roles are defined in accordance with patients' needs.

Beyond role definition, primary care teams should also take the opportunity to rethink their care delivery models. In most clinics the model is supply-driven rather than need-based; that is, services offered, hours, appointment scheduling, etc., are generally defined according to physicians' preferences rather than patients' needs or preferences. Since most family doctors are self-employed entrepreneurs paid mostly through FFS, and since primary care demand outstrips supply by a vast margin, there is little incentive to change. Quebec's NP integration plan [59–62] involves dispatching NPs, who are salaried public sector employees, to work in collaboration with physicians in their clinics. The incentives for salaried NPs and FFS-remunerated physicians are rather different [15,56,63]. Defining how physicians and NPs will share patient panels and which patients should be followed by NPs will have an impact on physicians' workload and, potentially, income. More generally, once a team starts to reflect on care delivery model appropriateness, effectiveness and efficiency, it also opens the door to a broader questioning. For example, is it realistic to expect a truly team-based practice when different remuneration models are applied to physicians (FFS) and NPs (salaries)? Which professional is best suited to offer what care to which patient? Is anyone specifically accountable for accessibility of services and continuity of care? If so, is that accountability shared by the team, or is it one-on-one between one clinician and one patient? If taken

seriously, those questions are likely to challenge existing professional roles and scopes of practice and ultimately the underlying logic of professional boundaries [38].

More generally, the available evidence reveals considerable overlap between the scientific literature on the characteristics of high performance primary care models and the literature on best practices in NP integration [1,30,35,52,64–70]. Such an overlap is also obvious in the results from the NP integration project and those from the project on stakeholders' views. When the salience of the challenges confronting Quebec's healthcare system was analyzed, four of the five most salient problems and 20 of the 41 problems raised by informants were found to have a direct relation with NP integration into primary care teams. Similarly, four of the five most salient solutions discussed by informants and 17 of the 46 in total had to do with best practices or facilitators for NP integration and practice [52].

First, this means core stakeholders shared, to a very large extent, the view that the solutions to the challenges facing the current system are anchored in a stronger and broader primary care capacity. Second, it is noteworthy that, taken together, the solutions present a quite coherent model to reform primary care delivery. This reform model calls for significant structural changes, such as departing from the current mostly FFS funding mechanism; strengthening providers' accountability toward patients and toward system-wide goals; relying increasingly on non-physician professionals working within a larger scope of practice; and developing organizational structures to support the work of such interprofessional teams. Third—and this was the surprise for us—the structural changes needed to improve primary care and, ultimately, the overall performance and sustainability of the healthcare system are, to a remarkable extent, the same as those on the list of best practices and facilitating factors for NP integration.

In our view, this intersection between the two lists—of solutions for improving healthcare system performance and sustainability and of best practices for NP integration—suggests NPs may be the “canary in the coal mine” of this transformation process. That is, a primary care delivery system displaying a high ratio of NPs in the workforce, exercising the full scope of their practice and embedded in truly interprofessional teams, would be the healthcare equivalent of a last-century coal mine with a healthy canary—a sign things are going well. Conversely, a system in which NPs struggle to find a coherent place in primary care delivery structures and are pushed toward niche practice or into working according to a “solo-in-a-group” mode, would be a sure sign that the whole primary care model is still very far from implementing the needed transformations.

## 5. Discussion: three scenarios for the future of primary care

In this section, we present three scenarios for the future of primary care delivery models based on developing the idea that successful NP integration is both a marker of primary care reform and a potential catalyst for reform.

### 5.1. Scenario one: perpetuation of the status quo

The first scenario consists essentially of a continuation of the existing situation. In this scenario, primary care remains overwhelmingly provided by autonomous physicians working in loosely structured teams. Delivery structures remain mostly under the direct control of physicians, who maintain their autonomy in deciding when, where and how they practice and which patients they treat. Most family physicians are part of team practices, but those structures are little more than a way to share overhead costs and constraints. At the system level, there might be some significant but non-disruptive modifications, such as a gradual increase in non-FFS incentives, greater reliance on contract-like agreements with the public third-party payer related to achieving clinical targets, and other similar efforts to exert top-down control over medical practice. In this scenario, most NPs work as sub-physician substitutes—the oft-used term “physician-extender” is revealing here—under the direct supervision of physicians and within physician-controlled organizational structures. Moreover, data from the US suggest that NPs will not, in themselves, drive a shift in the availability or price of healthcare services [66]. As we argue in the next scenario, to disrupt the status quo, what matters most is the restructuring of the care delivery model and not simply the presence or absence of NPs. In other words, if NPs are forced to find a niche in the existing ecosystem, or value network, of primary care delivery rather than being able to contribute to changing the ecosystem [16], no disruption will occur.

### 5.2. Scenario two: disruption through competition

The second scenario is mostly what Christensen et al. [16] describe. According to this view, because NPs can respond to a large proportion of primary care needs [36,71–74], especially if they work in collaboration with other non-physician professionals, they could be instrumental in disrupting the dominant model of primary care delivery. Indeed, NP-intensive interdisciplinary teams have all the traits of a disruptive business model: more efficient, more convenient substitutes for a dominant service that is growing more and more disconnected with what clients need and want.

Conceived this way, this is a scenario of competition, in which distinct models of care delivery emerge and compete for resources and market share. One model is likely to be a medical model roughly equivalent to the status quo described above. Another likely model would be anchored in nurse-based teams providing a non-trivial portion of the overall supply of primary care. Nurses in those teams would include both NPs working to the full extent of their scope of practice and outside of medical supervision and RNs with advanced skills in disease-based or population-based primary care. Such NP-based primary care structures are already well-established in the US and exist in Ontario, Canada [71,72,75–77].

It should, however, be stressed that such a scenario of competition may turn out to be quite far from the micro-economic ideal of a competitive market. The situation in

the US suggests it may be more realistic to expect some form of segmentation through submarkets defined around the nature of care, specific populations, or reimbursement rules [63]. In the US, NP-based primary-care delivery is quite clearly skewed toward rural communities and poorer patients [56,65,66]. In the same way, ongoing pilot projects in Quebec are targeted toward marginalized populations or rural settings that are not attractive to physicians.

We believe there might currently be a window of opportunity for the emergence of a value network supporting the NP-centered business model described above. Opening the opportunity for NP-centered primary care teams to get access to the same reimbursement funds from which medical services are paid could be the tipping point where a competitive scenario becomes possible [15].

### 5.3. Scenario three: disruption through restructuring

In our view, the competition scenario described above is neither the only nor the most desirable way in which NPs can play a role in disrupting primary care delivery. In the third scenario, disruption is achieved through the restructuring of primary care delivery models. This scenario could be the culmination of a previous competitive process, in which a disruptive model would end up occupying most of the market.

Here, the emergence of successful nurse-intensive primary care delivery models, combined with market and political pressures—especially efforts at cost-control—would spur the redefinition not only of delivery structures, but also of the nature of primary care.

Because of the nature of their training and scope of practice, NPs would likely have an important contribution to make in redefining professional boundaries and roles. In such a scenario, care delivery would be a team, rather than individual, responsibility and funding mechanisms would reflect this fact. Teams would be truly interdisciplinary and include MDs, RNs, NPs, social workers, pharmacists and others. More diverse and larger teams of less-expensive professionals remain the most promising avenue to improve the current system's efficiency by simultaneously increasing accessibility and controlling costs. In this scenario, physicians would be a minority of the team's overall workforce.

Such a shift would also help redefine primary care as a more inclusive concept combining preventive, social, psychological and overall whole-person care [78], an approach nurses and NPs have been practicing for many years [79–81]. It is unlikely that the challenges facing healthcare systems can be effectively addressed by providing ever more intensive, expensive and specialized care. Disrupting the primary care delivery model requires a deep transformation of the nature of care provided, moving toward less invasive, less intensive treatment options, more patient participation, and a “less-is-more” view of care appropriateness. As such, the most disruptive characteristic of this third scenario would lie in its potential for redefining the nature of primary care. As the professionals involved in care delivery change, so will their underlying conceptions of illness and care. This evolution renders the transition toward a broader, more inclusive and less intensive definition or

primary care more likely than if care delivery remains a mostly medical endeavor.

These three scenarios range from one in which NPs' potential contribution is severely underexploited to one in which they are able to contribute to the optimal extent of their role. Returning to our “canary in the coal mine” analogy, in the status quo scenario, the confined place given to NPs is a clear sign that primary care delivery models have not moved from the path that led to the current problems—the barely breathing canary warns of the risk of a broader failure of the healthcare system. Conversely, the place and role of NPs envisioned in the disruption scenarios, and especially in the restructuring one, would be signs of desirable large-scale and systemic changes.

## 6. Conclusion

A profound reform of primary care delivery structures is called for in response to changing environmental conditions—technological, fiscal, social and demographic. As we have, we believe NPs will play a key role in the reform process. First, as Christensen et al. [16] have convincingly argued, NPs have a significant disruptive potential as substitute sources of primary care. Second, as the results of studies on NP integration have shown, because of the hybrid nature of their clinical roles, NPs' integration into primary care teams also has the potential to trigger an important redesign of delivery structures and processes. Finally, as NP integration is not a simple plug-and-play innovation, but rather a complex process involving a variety of professional and social issues, we believe that—again like the canary in the coal mine—the centrality of NPs' role in future primary care delivery systems will signal the extent to which the current dominant model has been disrupted and a healthier, more viable one established.

This brings us to the question of the direction of causality between NP integration and primary care reform. A first possibility is that optimal integration of NPs will occur only after successful transformation of the existing primary care production system or value network. The second, parallel possibility, which inverts that causal relationship, is that successful integration of NPs will require significant changes to the existing production system, which, if implemented, will lead to disruptive change in the primary care delivery structure. Instrumentally, this second possibility is much more appealing, as it opens the door to NPs' serving as catalysts for change. It should also be stressed that in practice those two causal relations can co-exist: progressive growth in the coherent integration of NPs in the system can spearhead the emergence of disruptive models of care.

Given the current evolution in the numbers of NPs and MDs in North America [82,83], there is little doubt that NP-based primary care structures will play a role in the future of primary care delivery. The real question is to understand the level and nature of disruption this is likely to bring. At one extreme, we could imagine an NP-based equivalent of the status quo medical model. Large retail stores in the US that offer walk-in clinics staffed by NPs are an obvious example of a market disruption that fails to achieve real innovation in the way care is defined and provided. At the other extreme, primary care teams such as described in

our third scenario would not only disrupt the primary care delivery market, but would also disrupt social identities and the definition of care.

In recent work, Christensen et al. [17] have suggested that disruption is much more likely in domains where innovations relate to well-defined, straightforward functions. In sectors where the disruption process would involve modifying deeply-rooted social identities, the initial model of disruptive innovations needs to be refined. This idea certainly has implications for the scenarios outlined here. The position medicine occupies in our society is very particular and anchored in a history of professional struggles won by the medical profession over centuries [38–41]. The chance that the definition of primary care would, in the short term, move away from a medically-centric concept is very small.

As we have argued here, we believe the hybrid nature of NPs and their potential contribution to primary care delivery could be catalyzing factors with the potential to trigger desirable disruptive changes in our healthcare systems. The second hypothesis regarding causality direction—that having more NPs in a system can catalyze a disruption of the primary care model—has, in our opinion, enough plausibility to merit being tried as a deliberate intervention to reform primary care delivery. Recent multilevel policy recommendations for optimizing interprofessional work in the health sector [15] have highlighted the interdependence of clinical, organizational and system-level interventions in achieving change. The ideas developed here are complementary with this notion of interdependence. We believe clinical and team-level innovations arising from NP integration have the potential to exert enough pressure on the system to achieve desirable and much-needed disruption.

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