

# The Impact of Patient Attachments to Nurse Practitioners in a Primary Care Clinic: A Comparative Analysis of Acute Care Utilization

## Authors:

**Sarah Crowe, MN, PMD-NP(F), NP, CNCC(C)**  
Nurse Practitioner Clinician Scientist  
Fraser Health Authority

**Dr. Laura Housden, PhD, MN-NP(F), NP**  
Executive Director Nurse Practitioners  
Fraser Health Authority

## ABSTRACT

**Background:** The rising demand for accessible primary care services in the face of an aging population and increasing chronic conditions underscores the need to optimize healthcare delivery models. This study investigates the efficacy of patient attachments to Nurse Practitioners (NPs) in reducing acute care utilization in an urban primary care clinic in British Columbia.

**Method:** Through a comparative analysis of patient panels managed by NPs, including before and after attachment data, significant reductions in emergency department visits, in-patient admissions, and readmissions within 30 days of discharge were observed post-attachment.

**Analysis:** Statistical analyses confirmed the effectiveness of NP attachments across all providers. Economic analysis revealed substantial cost savings associated with reduced acute care utilization.

**Conclusion:** These findings underscore the pivotal role of NPs in delivering comprehensive, proactive care, and highlight the economic benefits of investing in patient attachment programs. Moreover, beyond healthcare system benefits, patient attachments to NPs offer direct benefits to patients, enhancing overall well-being and quality of life. Further research into the long-term implications of NP-led primary care and patient attachment programs is warranted to inform healthcare policies and practices, advancing patient-centred, sustainable healthcare delivery models.

## Introduction

As the global population ages and individuals live longer with an increasing prevalence of chronic conditions, the demand for accessible and comprehensive primary care services has become more pronounced than ever (Heale et al., 2018). Primary care, often regarded as the cornerstone of healthcare delivery, encompasses a broad range of preventive, promotive, and curative services to address the diverse healthcare needs of individuals and communities (Government of Canada, 2012). However, amidst the growing need for primary care, the scarcity of access to primary care has contributed to a concerning trend towards frequent use of emergency departments and acute care services (Assadpour, 2021; van den Berg, van Loenen & Westert, 2016). In this context, the imperative to foster strong patient-provider relationships within primary care settings has garnered heightened attention. This highlights the critical importance of bolstering primary care resources and optimizing healthcare delivery models to better meet patients' evolving needs. Among these models, patient

attachments to nurse practitioners (NPs) in primary care clinics has been established as a successful approach to improving healthcare outcomes while optimizing resource utilization (Assadpour, 2021; DiCenso et al., 2010; Government of Canada, 2007; Stewart, 2018). Establishing a consistent and trusting relationship between patients and their healthcare providers is paramount in primary care settings, where patient needs span a spectrum of acute and chronic conditions (Bonner et al., 2019; Canadian Nurses Association, 2023; Grembowski et al., 2014). With their holistic approach to care and emphasis on preventive measures, NPs are uniquely positioned to cultivate such relationships (Heale et al., 2018; Maier, Aiken & Busse, 2017). By promoting continuity of care and personalized interventions, patient attachments to NPs is successful in mitigating the need for frequent reliance on acute care services, thereby alleviating strain on healthcare systems and improving overall patient outcomes (van den Berg et al., 2016).

This paper will delve into the existing empirical evidence that supports the efficacy of patient attachments to NPs in reducing acute care utilization at a primary care

clinic in urban British Columbia. Through a comparative analysis of relevant statistics collected before and after the implementation of patient attachment programs in NP clinics, we aim to elucidate the tangible impacts of these initiatives on healthcare utilization patterns. By examining indicators such as emergency department visits, hospital admissions, and urgent care utilization, we quantify how patient attachments to NPs contribute to a more efficient and sustainable healthcare delivery model. In synthesizing these findings and presenting insights from our analysis, this paper aims to underscore the pivotal role of patient attachments to NPs in British Columbian healthcare. By illuminating the benefits of these relationships, we hope to inform policymakers, healthcare administrators, and providers of the value of investing in initiatives that promote continuity and collaboration in patient care.

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## Patient Attachment

Patient attachment to a primary care provider requires establishing a designated relationship to support care longitudinally. This phenomenon is distinguished by the consistent engagement of patients with the same primary care provider over an extended period, with the hope of facilitating continuity of care and engendering confidence (Bonner et al., 2019; DiCenso et al., 2010; Grembowski et al., 2014; Hayes, 2007; Heale et al., 2018). Central to patient attachment is continuity, wherein patients recurrently seek healthcare services from a familiar provider, fostering a deep understanding of the patient’s medical history, preferences, and values. This sustained relationship enables primary care providers to deliver personalized care tailored to meet each patient’s individualized needs and circumstances, recognizing the changing needs over time. Moreover, attached primary care providers are pivotal in comprehensive care coordination, serving as the linchpin for integrating various healthcare services and specialties; through proactive engagement and emphasis on preventive care strategies, patient attachment endeavours to mitigate the onset of chronic conditions and promote overall wellness. Furthermore, patient attachment empowers individuals by fostering collaborative decision-making and active participation in their healthcare journey, enhancing treatment adherence and patient outcomes. Cumulatively, patient attachment to a primary care provider embodies a collaborative, patient-centred

approach to healthcare delivery, characterized by trust, communication, and continuity of care, which has been shown to yield improved health outcomes and greater patient satisfaction while mitigating healthcare costs through judicious utilization of resources.

## Data Collection

Our analysis included comparing the patient panels of four NPs working in an urban primary care clinic in British Columbia in October 2020. These four NPs provide primary care for both attached and unattached patients, who had been identified through community services of hospital-based services as requiring a primary care provider. Many of these patients had multiple chronic conditions, and many were homebound. We aimed to understand patients’ utilization of acute care services, including emergency department visits and in-patient hospital admissions, before and after attachment to an NP. Aggregate patient data was collected from the NP’s electronic medical record system (Profile aEMR) and the regional health authority electronic medical record system (Meditech) utilized in the surrounding hospitals for two years before and after attachment. No specific identifiable patient-level data were collected.

## Findings

At the time of data collection, the clinic provided care primarily to unattached patients who were awaiting permanent attachment. Through this initiative 409 unattached complex patients were permanently attached to four NP primary care providers at the clinic, accounting for 4913 clinic appointments. The average age of the patients who were attached to the NPs was 59.3 years, and most sought appointments related to chronic disease management (e.g. hypertension, diabetes, and prescription renewal). Table 1 provides an overview of the attached patients by provider with a summary of the most frequent international classification of disease version 9 codes (ICD-9).

Acute care usage, including emergency department (ED) visits, in-patient admissions and readmissions to the hospital within 30 days of initial discharge, was reduced from 835 total visits to 349 following patient attachment to a regular primary care NP provider, demonstrating a profound decrease in acute care service utilization. Table 2 provides a summary by provider comparing before and after attachment visits.

Using the Wilcoxon signed-rank test ( $\alpha$  level 0.05), a non-parametric equivalent of a paired t-test, comparing the *median* differences before and after an intervention (patient attachment), found a statistically significant difference across all four NP providers ( $p < 0.05$ ). Table 3 summarizes mean visits per patient, including ED visits, acute care admissions, average length of stay, and the associated Wilcoxon signed-rank significance results.

**Table 1. Attached Patients per Nurse Practitioner (NP)**

| NP | Attached Patients (N) | Gender (n)                       | Average Age (in Years) | Overall Number of Appointments | Most Common Documented ICD-9 Codes   |
|----|-----------------------|----------------------------------|------------------------|--------------------------------|--|
| 1  | 74                    | Female 38% (28)<br>Male 62% (46) | 56.7<br>57.3           | 378                            | Hypertension<br>General Physical Exam<br>Prescription Renewal                  |
| 2  | 140                   | Female 59% (82)<br>Male 41% (58) | 58.4<br>57.8           | 2786                           | Hypertension<br>Diabetes<br>Chronic Pain                                       |
| 3  | 128                   | Female 50% (64)<br>Male 50% (64) | 59.5<br>60.7           | 1298                           | Prescription Renewal<br>Hypertension<br>Diabetes                               |
| 4  | 67                    | Female 45% (30)<br>Male 55% (37) | 63.2<br>60.5           | 451                            | Prophylactic Influenza Vaccination<br>Anticoagulant Management<br>Chronic Pain |

**Table 2. Acute Care Visits, including Emergency Department Visits and In-Patient Admissions Before and After NP Attachment**

| NP           | Before Attachment |                     |   | Post Attachment |                     |   |
|--------------|-------------------|---------------------|---|-----------------|---------------------|---|
|              | ED Visits (n)     | Acute Admission (n) | Readmission to Hospital (within 30 days of discharge) | Ed Visits (n)   | Acute Admission (n) | Readmission to Hospital (within 30 days of discharge) |
| 1            | 161               | 36                  | 2   | 27              | 3                   | 0   |
| 2            | 162               | 45                  | 23  | 152             | 31                  | 7   |
| 3            | 223               | 38                  | 2   | 63              | 14                  | 0   |
| 4            | 108               | 32                  | 3   | 43              | 9                   | 0   |
| <b>Total</b> | <b>654</b>        | <b>151</b>          | <b>30</b>   | <b>285</b>      | <b>57</b>           | <b>7</b>  |

**Table 3. Acute Care Usage Means and Significance Before and After NP Attachment**

| NP | Annual ED Visits per Patient |                      |         | Acute Care Admissions per Patient |                      |         | Acute Care Admission Length of Stay (days) per Patient |                      |         |
|----|------------------------------|----------------------|---------|-----------------------------------|----------------------|---------|--|----------------------|---------|
|    | Before Attachment (M)        | After Attachment (M) | P (Mdn) | Before Attachment (M)             | After Attachment (M) | P (Mdn) | Before Attachment (M)                                  | After Attachment (M) | P (Mdn) |
| 1  | 3.72                         | 0.51                 | <0.05   | 1.62                              | 0.08                 | <0.05   | 10.27  | 1.38                 | <0.05   |
| 2  | 2.23                         | 1.97                 | 0.08    | 1.42                              | 0.68                 | <0.05   | 8  | 8.75                 | <0.05   |
| 3  | 2.94                         | 0.85                 | <0.05   | 1.41                              | 0.33                 | <0.05   | 21.79  | 2.97                 | <0.05   |
| 4  | 2.55                         | 0.95                 | <0.05   | 1.72                              | 0.20                 | <0.05   | 28.12  | 2.52                 | <0.05   |

## Discussion

This project investigated the impact of patient attachment to NPs on acute care utilization in an urban primary care clinic in British Columbia. Through analysis of patient panels managed by four NPs, the project found that attachment to NPs substantially reduced acute care service utilization, including emergency department visits, in-patient admissions, and readmissions within 30 days of discharge. Statistical analyses demonstrated significant differences before and after attachment across all NPs, highlighting the effectiveness of attachments to NPs as

a successful approach to reducing patient in hospital visits. The reduction in acute care utilization suggests that NPs play a crucial role in managing chronic conditions within primary care settings, potentially leading to improved health outcomes and cost savings. The findings underscore the importance of strengthening primary care systems and the role of NPs in delivering comprehensive, proactive care to address patients' needs and minimize reliance on emergency services and hospital admissions. These findings are consistent with other research recognizing the benefit of accessibility and continuity of primary care (Heale et al., 2018; van den Berg et al., 2016).

Further research could explore the long-term implications of NPs in primary care on healthcare resource utilization and patient outcomes.

In examining the economic impact of this work, the project yielded a reduction of 369 emergency department visits in the 2 years post-NP attachment, compared to the pre-intervention period. With each emergency department visit estimated at \$304, the total cost savings amount to approximately \$112,176 (CIHI, 2020). This substantial reduction in emergency department visits underscores the effectiveness of the project in mitigating unnecessary healthcare utilization and associated expenses, highlighting the economic benefits of optimizing primary care services and reducing reliance

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on acute care facilities. The project also significantly reduced hospital admissions, with a total reduction of 94 admissions compared to the pre-intervention period. Given the average daily cost of hospital admission estimated at \$8,103, this reduction translates to potential cost savings of approximately \$761,682 (CIHI, 2023) over a 2-year period. This substantial decrease in hospital admissions highlights the effectiveness of the project in minimizing the need for acute care services and the associated financial burden. The overall cost savings estimated in the 2 years post NP attachment was \$873,858, or \$2,136 per patient. Projecting these cost savings over 10 years, we estimate that secure attachment to an NP could save the health system \$10,682 per patient. These cost savings underscore the economic benefits of enhancing primary care services and reducing reliance on hospital admissions, contributing to healthcare delivery systems' overall efficiency and sustainability. Similar work has promoted the impact of NP primary care providers on long-term care residents' acute care usage (Assadpour, 2021; Mileski et al., 2020).

Furthermore, beyond the advantages evident within healthcare systems, patient attachments to NPs offer myriad direct benefits to patients themselves. One notable benefit lies in enhancing patients' overall well-being and quality of life, stemming from improved management of chronic conditions (Bonner et al., 2019; Grembowski et al., 2014). While this project primarily focused on quantifiable metrics such as acute care utilization, it is essential to acknowledge the impact on patients' health outcomes and daily lives, as underscored by previous research (Grembowski et al., 2014; Hayes, 2007). Effective management of chronic conditions alleviates symptoms, enhances physical health, and fosters

emotional and psychological well-being, enabling patients to lead more fulfilling lives (Smyth et al., 2022). These unmeasured benefits contribute to a more comprehensive understanding of the value of patient attachments to NPs and their potential to drive positive healthcare outcomes beyond the confines of conventional health system metrics. Moreover, by addressing underlying health concerns and promoting preventive measures, patient attachments have the potential to mitigate the progression of chronic conditions, ultimately reducing the burden on healthcare systems and improving overall healthcare utilization and efficiency.

## Conclusion

This study has shed light on the significant impact of patient attachments to NPs in primary care settings, particularly in an urban clinic in British Columbia. Through analysis of patient panels managed by NPs, the research has demonstrated a significant reduction in acute care service utilization, including emergency department visits, in-patient admissions, and readmissions within 30 days of discharge. The findings underscore the pivotal role of NPs in managing chronic conditions within primary care settings, leading to improved health outcomes and cost savings. By fostering strong patient-provider relationships and emphasizing continuity of care, patient attachments to NPs have emerged as a promising strategy to optimize healthcare delivery, minimize reliance on acute care facilities, and enhance overall patient satisfaction. The economic benefits of these interventions are evident through the considerable reduction in emergency department visits and hospital admissions, resulting in significant cost savings for healthcare systems. Moreover, while this study primarily focused on healthcare system benefits, it is essential to acknowledge the potential impacts on patients' overall well-being and quality of life through provider attachment, which could further influence healthcare costs and utilization. Continuing research into the long-term implications of NP-led primary care and patient attachment programs is crucial for informing healthcare policies and practices, ultimately advancing patient-centred, sustainable healthcare delivery models.

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