

Improving Access to Dermatological Care in Prince Edward Island: A Nurse Practitioner-Led

Initiative

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## TABLE OF CONTENTS

Abstract.....	iv
Acknowledgements.....	v
Background.....	1
Part	
I Needs Assessment.....	2
The Nature of the Need.....	2
Contributing Factors.....	4
Impact of the Problem.....	13
Promising Approaches.....	16
Target Population.....	20
II Project Goals and Objectives.....	21
Rationale to Support Objectives.....	21
III Project Design and Implementation.....	23
Project Overview (Theoretical Framework).....	24
Project Overview (Practical Framework).....	28
Project Activities and Timeline.....	30
IV Project Evaluation.....	33
Objective One.....	33
Objective Two.....	34
Objective Three.....	35
V Knowledge to Action Plan.....	35
Audience.....	36

VI	Budget.....	36
VII	Implications for Practice.....	37
	Clinical Practice.....	38
	Collaboration, Consultation and Referral.....	38
	Research.....	39
	Leadership.....	40
	Conclusion.....	40
	References.....	42
	Appendices.....	64
	Appendix A: Activity Timeline to Program Implementation.....	64
	Appendix B: Nurse Practitioner Satisfaction Survey.....	66
	Appendix C: Proposed Annual Budget.....	67

## Abstract

Skin diseases are common and occur throughout the lifespan. Researchers estimate that between 30 and 70% of the world's population live with a skin condition. Most dermatologic diseases are chronic in nature and decrease the daily quality of life. Untreated or poorly managed skin conditions pose a significant financial burden to the Canadian healthcare system. There is a shortage of dermatologists in Canada with no clear plan to address this shortage. Primary care providers have identified that they feel underprepared to diagnose and treat many complex dermatologic conditions. Prince Edward Island (PEI) has one dermatologist to care for its expanding population which has led to prolonged wait times. In this document, a nurse practitioner-led pilot project to increase accessibility to specialized dermatologic care is proposed. The pilot project will serve individuals of all ages and provide pharmacological and nonpharmacological interventions with regular follow-up to decrease the burden of skin conditions on this population. Nurse Practitioners (NP) possess the competencies to deliver comprehensive dermatologic care and demonstrate increased/improved patient satisfaction, symptom management, and quality of life. The proposed integration of an NP into existing dermatologic services on PEI will build capacity, improve wait times, and provide more ongoing support to those who suffer with dermatologic conditions on PEI.

*Keywords:* nurse practitioner, dermatology, wait times, patient satisfaction, accessibility

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# Improving Access to Dermatological Care in Prince Edward Island: A Nurse Practitioner-Led Initiative

## **Background**

Dermatology is a diverse specialty of medicine that cares for ailments of the skin, hair, and nails. There are an estimated 3000 types of disorders of the skin (Canadian Skin Patient Alliance [CSPA], 2012). Many skin disorders are considered a minor illness or condition, however, they can range in severity from life-altering to life-threatening. Skin disease is prevalent in all populations, newborn to elderly, and is the most commonly encountered reason for accessing primary health care (Lowell, Froelich, Federman, & Kirsner, 2001; Sauver et al., 2013; Schofield, Fleming, Grindlay, & Williams, 2011). Patients who do not have access to a primary care provider must obtain care at walk-in clinics or emergency departments (Health PEI, 2017).

The CSPA, a national non-profit organization dedicated to advocate, educate, and support Canadians living with skin diseases, has called for a concerted effort to improve access for those who live with acute and chronic dermatologic conditions (CSPA, 2012). Wait times for persons seeking assessment and treatment of dermatologic conditions in Prince Edward Island (PEI) are longer than the recommended provincial wait times due to the dermatology service only having one dermatologist providing care for the expanding Island population. Primary health care (PHC) providers are also underprepared to care for patients in this highly specialized area of health care (Shah, Pozo-Garcia, & Koulouroudias, 2015; Whiting et al., 2016).

Nurse Practitioners (NPs) are advanced practice nurses who are educated and trained to diagnose, order and interpret diagnostic tests, perform specific procedures, and prescribe medications (Canadian Nurses Association [CNA], 2009). An NP with specialized training in

dermatology can see patients autonomously, assist to control health care expenditures, increase the quality of care provided, and assist to alleviate wait times for comprehensive dermatological care (Mundinger et al., 2000; Schuttelaar, Vermeulen, & Coenraads, 2011; Schuttelaar, Vermeulen, Drukker & Coenraads, 2009; Tierney, Hanke, & Kimball, 2011).

The increased prevalence of dermatologic conditions within the general population, lack of access to specialized dermatologic assessment and treatment, increased complexities of the sequelae of untreated or poorly managed dermatologic conditions, and the evidence of NP success all provide support for the development and implementation of a pilot project of an NP-Led dermatologic clinic in Summerside, PEI.

## **Part I: Needs Assessment**

### **The Nature of the Need**

It is estimated that half of all Canadians suffer from a skin condition (CSPA, 2012). Worldwide, approximately 30 to 70% of individuals live with a skin condition or skin disease, with notably increased rates in at-risk sub-populations (Bickers et al., 2006; Hay & Fuller, 2012). Dermatologic conditions are experienced throughout the lifespan and spare no race or group. However, experts identify children and those over the age of 70 as being more vulnerable to skin disease (Baibergenova & Shear, 2011; Hay et al., 2014; Kramkimel et al., 2010; Tamer, Ilhan, Polat, Lenk, & Alli, 2008). Children most commonly present with atopic dermatitis or eczema and viral infections (Nanda, Hasawi, & Alsaleh, 1999; Vakirlis et al., 2017). The elderly most commonly present with pruritus, dermatitis, cutaneous infection, xerosis, and asteatotic eczema (Wey & Chen, 2010). Those with coexisting chronic illness experience increased incidence of co-morbid skin conditions (Furue, Tsuji, Chiba, & Kadono, 2017; Jääskeläinen, Hagberg,

Forsblom, & Järvinen, 2017). Experts attribute this increase to disease complications and treatment of the illness (Jääskeläinen et al., 2017).

Over one-third of primary care visits involve assessment and treatment of disorders of the skin (Lewis et al., 2018). Primary care physicians have limited training in dermatology and as a result they are less confident and accurate in diagnosing skin conditions (Kirshen, Shoimer, Wismer, DesGroseilliers, & Liu, 2011; Shah et al., 2015; Whiting et al., 2016). Inappropriate diagnosis and management, as well as delayed specialist referral, may result in increased cost and reduced quality of care (Federman, Concato, & Kirsner, 1999; Goulding, Levine, Blizard, & Swale, 2009).

Researchers estimate that between 3.3 and 8% of all emergency department (ED) visits involve a dermatological problem (Baibergenova & Shear, 2011; Jack et al., 2011; Lai-Kwon, Weiland, Chong, & Jelinek, 2014). The most frequently cited reasons for obtaining emergency care for a skin problem include infections of the skin, dermatitis, urticaria, and skin appendage disorders (Baibergenova & Shear, 2011; Lai-Kwon et al., 2014). The majority of dermatological ED presentations are classified as non-urgent or semi-urgent and would be appropriate for primary care assessment (Baibergenova & Shear, 2011; Lai-Kwon et al., 2014). The extra workload places a significant strain on an already overextended health care system adding to ED wait times, overcrowding, and financial cost (Enard & Ganelin, 2013).

When care is beyond the scope of the primary care provider, or most appropriately done by a dermatologist, timely access for patients is limited (CSPA, 2012; Suneja et al., 2001). There is a shortage of dermatology providers provincially and nationally (Chow & Searles, 2010; Kimball & Resneck, 2008; Resneck & Kimball, 2004). According to the CSPA (2012), 11 of 13 provinces and territories received a failing grade in regards to a patient's ability to access

dermatological care. The other two provinces require improvement to meet the basic requirement for timely access to services. In PEI, one dermatologist provides care for the entire province. The lack of resources results in prolonged wait times which, in turn, leads to prolonged suffering, anxiety, and delayed treatment for the patient (Bonotis et al., 2015; Cazzaniga et al., 2016; Gooderham et al., 2016; Kouris et al., 2016; Yang et al., 2014). The delay in treatment can also lead to increased workplace absenteeism, decreased workplace productivity, and increased financial strain for the patient and the system (CSPA, 2012; Mattila, Leino, Mustonen, Koulu, & Tuominen, 2013; Politiek, Oosterhaven, Vermeulen, & Schuttelar, 2016).

The provision of the appropriate care by the right provider in the right setting has been identified as a key principle of the strategic plan for health care on PEI (Health PEI, 2013). Better access to specialized dermatology care aligns with this goal. As healthcare costs soar, it is essential to identify creative ways to utilize a wide variety of resources to optimize care. Utilization of NPs has been shown to provide comprehensive and cost-effective care (Davis & Wright, 2012; DiCenso et al., 2010; Martin-Misener et al., 2015). An NP can work autonomously and collaboratively with a dermatologist to assess, diagnose, and treat skin conditions. Despite the lack of Canadian literature regarding the utilization of NPs in the dermatology setting, this service has been successful when implemented in other countries (Oliveria et al., 2001; Resneck & Kimball, 2004; Schuttelaar et al., 2009). The implementation of an NP-led dermatology care clinic in PEI can provide affordable, accessible, holistic care, thereby improving outcomes for patients with skin problems.

### **Contributing Factors**

The determinants of health represent a tapestry of interwoven personal, economic, social, and environmental factors that contribute to the health and wellness of a population (Advisory

Committee on Population Health [ACPH], 1999). Inequities in the determinants of health result in some parts of a society achieving better health outcomes than others depending on their personal, economic, social, and environmental situation. There are several factors that contribute to the lack of access to dermatology services in PEI. These factors include health services, personal health practices, and coping skills.

**Health services.** Health services, especially those with the intent to sustain or promote health or prevent disease and regain health, contribute to an individual's or a population's health (ACPH, 1999). Access to primary and secondary health services is an important indicator of the health of a population (ACPH, 1999). When limited human resources are available or resources that are available are not adequately equipped to deal with the health issue, there can be a significant impact on the health and wellness of an individual.

**Limited human resources.** There are national and international shortages of dermatologists, while at the same time increased requirements for this specialized care exist (Chow & Searles, 2010; Kimball & Resneck, 2008; Resneck & Kimball, 2004). Resneck and Kimball (2004) attribute the rising demand for dermatological services to the expanding scope of practice of the dermatologist, as well as the growing needs of an aging population. Increased skin cancer in the aging population is proposed as one of the leading factors driving demand (Harris Williams & CO., 2013). There is also increased demand among the general population who request to see a specialist as a way to ensure an accurate diagnosis and treatment plan. Finally, with the growing economy, there is an associated increased demand for cosmetic dermatology services (Harris Williams & CO., 2013).

An American dermatologist workforce survey by Kimball and Resneck (2008) revealed a divergent trend of growing dermatology practices that specialize in surgical and cosmetic

dermatology while medical dermatology practices decline. The authors also showed that although there is an identified unmet demand for dermatology services, it is unlikely this need will be filled by dermatologists. The residency program positions in the United States for dermatology training declined between the year 2007 and 2008. A comparison of practice traits among experienced dermatologists and novice dermatologists found that the experienced dermatologists worked, on average, 6 more hours per week than non-experienced dermatologists (Chow & Searles, 2010). Reduced hours of practice has been identified as desirable in many areas of medicine, with a greater physician focus placed on improving work-life balance (Carr, Gareis, & Barnett, 2003).

The Canadian dermatologist population has increased in age, with over 50% of dermatologists in Canada aged 55 years and older in the year 2015 (Canadian Medical Association, 2016; Chow & Searles, 2010). In 2010, it was predicted that within 10 years nearly half of the dermatologists in active practice would retire and create a significant shortage of dermatologic services (Chow & Searles, 2010). A study on the workforce of dermatologists in Canada from 2006, revealed that training programs only produce 60% of the practitioners needed to replace retiring physicians. Training spaces for a specialty in dermatology are limited and time to complete the program is 5 years post-doctorate (Chow & Searles, 2010; CSPA, 2012). Although there has been an increase in the number of dermatology seats available for residency training in Canada between 2001 and 2017, it is not expected to meet the increased need for the specialty (Canadian Resident Matching System [CARMS], 2017; Chow & Searles, 2010). There has been an increase in both residents who apply to the dermatology speciality and the speciality being ranked as the preferred choice in the previous 11 years with applications that exceed the training opportunities available (CARMS, 2017).

Models for remuneration of dermatologists have also been identified as a contributor to the shortage. Fees paid for services between provinces vary within dermatology; areas where remuneration fees are lower may result in increased difficulty to recruit and retain this specialized service (CSPA, 2012). Without strategic interventions, the scarcity of dermatologists in Canada may worsen and may leave many Canadian provinces without accessible dermatological care.

The CSPA reports on how Canadian provinces perform in respect to dermatological access and care (CSPA, 2012). The report provides information on: wait times for care, access to dermatology care, physician-patient ratios, care provision (e.g., access to medical procedures and medication coverage for dermatological conditions). Prince Edward Island received a failing grade in access to dermatological care, procedures, and medications (CSPA, 2012). Only one dermatologist currently practices in PEI and provides possible referral care for the entire population of over 145,000 residents. The Canadian recommended standard for dermatologic access is one full-time equivalent (FTE) dermatologist and one half FTE dermatology nurse for every 65,000 people (CSPA, 2012). This CSPA recommendation supports two FTE dermatologists and one FTE dermatology nurse for the population of PEI (CSPA, 2012).

The province of PEI has only ever employed one dermatologist despite the expanding population of the Island (Lauren Kelly, personal communication, July 20, 2016). When the only dermatologist retired in 2011, PEI residents lost access to comprehensive dermatological care. Dr. Richard Wedge, Health PEI's Director of Medical Programs (2012-2016), spoke to the challenges of recruitment. He cited lack of available dermatologists and disinterest in independent practice as the most substantial issues (CBC News, May 27, 2011). In September 2014, a spokesperson for Health PEI announced a full-time dermatologist was successfully

recruited to PEI and would begin practice in 2015 (CBC News, September 19, 2014). The current sole dermatologist began practice in January 2015 and, as of November 2016, was still working to clear the backlog created by the absence of dermatologic care on the Island during the previous years (CBC News, November 14, 2016). Wait times for routine care is estimated at 3 to 4 months. Although understandable, based on the patient to provider ratio, this far exceeds the recommended benchmark of 5 weeks (CSPA, 2012). The dermatologist also indicated there are still services that patients have to access off-Island due to lack of access to specific testing and services offered on Island such as skin patch testing for eczema (CBC News, November 14, 2016).

***Lack of provider education.*** General practitioners (GPs) typically enter practice with very little dermatological knowledge or training (Shah et al., 2015; Whiting et al., 2016). A Canadian study that examined the extent to which dermatology is being taught in the 17 Canadian medical schools showed a mean of 20.5 hours of the curriculum (including clinical time) was dedicated to dermatology education (Kirshen et al., 2011). The results of a needs assessment study revealed that less than 40% of primary care residents believed that they were adequately prepared to diagnose and treat common skin conditions (Hansra, O’Sullivan, Chen, & Berger, 2009). Dermatology education and experience opportunities across schools vary widely, as do the methods by which dermatology is taught (Kirshen et al., 2011). In Canada, there are no accreditation requirements for dermatological education in medical school (Kirshen et al., 2011). With as much as 25% of primary care visits involving skin disorders, many practitioners lack the skill and/or the confidence to accurately diagnose or treat common and complex dermatological conditions (Hansra et al., 2009; Kirshen et al., 2011; Shah et al., 2015; Whiting et al., 2016). Many studies have examined the diagnostic accuracy of GP care compared to specialist care and

have found a GP's diagnosis accuracy rate in dermatology to be between 26% and 54% when compared to dermatology specialists (Baade, Del Mar, Lowe, Stanton, & Balanda, 2005; Morrison, O'Loughlin, & Powell, 2001; Offidani et al., 2002; Tran, Chen, Lim, Jabbour, & Shumack, 2005). Diagnostic inaccuracy highlights the importance of providing specialized care for specialized healthcare issues. If inadequately prepared, care providers may make inaccurate diagnoses or choose inappropriate treatments. This lack of preparedness by health care providers may increase disease exacerbations or the prescription of therapies that are of no therapeutic benefit and prolong treatment.

**Personal health practices and coping skills.** Personal health practices and coping skills can impact a person's health and wellbeing. These health practices and coping skills refer to the way a person cares for him or herself, copes with challenges, or makes choices that impact health (ACPH, 1999). Personal lifestyle choices such as smoking and sun exposure, contribute significantly to the development and treatment of skin disease. Sun exposure, increased age, smoking, and stress can also increase the incidence of skin disease and treatment difficulties. Increased skin disease incidence leads to heightened demand for dermatological services.

**Skin cancer.** Skin cancer is one of few cancers that continue to increase in incidence (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). Over the last 30 years, there has been a higher number of skin cancers diagnosed than all other diagnoses of cancers combined (Skin Cancer Foundation, 2016). In Canada and the world, skin cancer is the most frequently diagnosed cancer and melanoma individually ranks among the top 10 (Canadian Dermatology Association, 2014a, 2014b). Despite the Canadian Skin Cancer Foundation's efforts to increase visibility and promote methods to protect the skin from damaging ultraviolet rays, the rates of melanoma rose 46% from 1986 to 2010 (Canadian Cancer Society, 2014). The

Canadian Dermatology Association estimated 6,500 new cases of melanoma would be detected in 2014 in Canada and an estimated 1,060 fatalities as a result (2014b). The increased cancer rates further contributes to the burden of care and wait times for dermatologic access.

Prince Edward Island, the smallest province in Canada, has the highest rates of melanoma skin cancer and other non-epithelial skin cancers in all of Canada (Statistics Canada, 2015). By comparison, the incidence of melanoma of the skin in PEI reached 34.7/100,000 in 2013, more than double the rate of 15.4/100,000 in 2003 (Statistics Canada, 2015). The national average recorded in 2015 for new cases of melanoma was only 20.8/100,000 for comparison (Statistics Canada, 2015). The Island's sole dermatologist attributes PEI's high incidence of melanoma to the increased number of residents with Celtic backgrounds with characteristic features of fair completions, red hair, and blue eyes (CBC News, November 14, 2016). The evidence surrounding the increased risk for those of Celtic origin is contentious, yet some evidence supports a higher incidence of melanoma among those of Celtic descent (Long & Marks, 1995; Long, Darke, & Marks, 1998). There is strong evidence however, that supports a higher incidence melanoma in those with fair complexion and light coloured eyes and hair (Gandini et al., 2005).

***Sun exposure.*** PEI is a province where the residents live, work, and play in the sun. The primary industries which employ Island residents include; farming, fishing, and tourism, all which potentiate extensive sun exposure (Government of Prince Edward Island, 2017). Farming and fishing have long been a part of the Island's culture (Randall, Desserud, & MacDonald, 2015). Working outdoors in the summer for long hours with limited protection from damaging UV rays may be a factor contributing to the high rates of melanoma in the province. PEI promotes its outdoor spaces as part of its tourism industry (Tourism PEI, 2017). The Island is

touted by tourism campaigns as a big outdoor playground to entice its residents and visitors to enjoy its golf courses, beaches, and amusement parks (Tourism PEI, 2017). Rising obesity rates have prompted health practitioners to encourage people to get outdoors and be active (Go! PEI, n.d.; U.S. Department of Health and Human Services, 2011). As PEI has a short summer season, Islanders enjoy much of the summer months outdoors in the sun, on the beaches, on the trails, and on the water. A meta-analysis of 57 studies indicates intermittent sun exposure and sunburn history play a significant role in the development of melanoma (Gandini et al., 2005). Increased sun exposure has also been related to increased development or worsening of other dermatologic conditions such as vitiligo or chronic spontaneous urticaria (Dunlap et al., 2017; Kulthanan et al., 2016). The culture of increased sun exposure places the residents of PEI at risk for increased development and exacerbation of skin disease. This, in turn, increases the demand for dermatological care. Any increase in demand is difficult when the Island is already underserved for dermatological coverage.

*Age.* With age, the skin becomes wrinkled, thin, dry, and easier to tear (McCance & Huether, 2010). Decreased vasculature and lymphatic drainage contribute to the loss of the protective barrier, and reduction of cell proliferation, diminished blood supply, and reduced immune response all contribute to delayed wound healing in aging skin (McCance & Huether, 2010). The changes in aging skin contribute to increased numbers of complex dermatological problems. As with most cancers, skin cancer prevalence increases with age. A possible contributing factor to PEI's high skin cancer rates is the aging population. Prince Edward Island has the third oldest population in Canada (Statistics Canada, 2016b).

Skin conditions exist in patients of all ages and races. Rash/skin eruptions and contact dermatitis/eczema are the seventh and tenth most common presenting condition in walk-in-

clinics for children aged 0 to 18 years (Touchie, 2013). Researchers implicate the development of allergic skin conditions found in children to their immature immune systems (Chad, 2001; Koning, Baert, Oranje, Savelkoul, & Neijen, 1996). During adolescence, acne vulgaris is the most common dermatological condition encountered, with up to 85% of all persons having experienced acne to some extent (El-Hamd, Nada, Moustafa, & Mahboob-Allah, 2017). The presence of dermatological issues across the lifespan means that not just one group or population are in need of this service.

**Smoking.** Daily lifestyle and skin health are interrelated. Smoking prematurely ages the skin, interrupts the natural process of skin regeneration, and decreases blood flow to the skin via vasoconstriction (Simpkin, 2016). Smoking is related to delayed wound healing and wound-related complications through several mechanisms which include vasoconstriction, pro-thrombotic effects, and altered wound inflammation and contraction (Basnett, 2016; Simpkin, 2016). The cumulative effect results in hypoperfusion and places those who smoke at risk for skin necrosis (Basnett, 2016). Smoking exacerbates inflammatory skin diseases, including acne, and causes increased treatment difficulties (Simpkin, 2016). Smoking also doubles the likelihood to develop squamous cell carcinoma (Simpkin, 2016).

Prince Edward Island's daily smoking rates have historically been high and are consistently 4% greater than the Canadian average (Chief Public Health Office, 2016). The province also has the second highest rate of youth smoking (10 to 18 year-olds), almost double the national rate (CBC News, October 20, 2016). Health Canada estimates 85% of current smokers began smoking by the age of 19 years (Health Canada, 2001). The cumulative effect of smoking exacerbates skin conditions and renders an individual slow to heal. Ultimately, this will increase the need for specialized dermatological care.

**Stress.** Skin specialists attribute mental, physical, and emotional stress to many cutaneous manifestations (Gupta, Jarosz, & Gupta, 2017). The brain perceives stress, which then releases stress hormones such as corticotrophin-releasing hormone (CRH), glucocorticoids, and epinephrine (Chen & Lyga, 2014). This response triggers the body to react and respond in many ways to adjust to the stress. Added stress can increase a person's cortisol production, which increases oil production in the skin and causes flare-ups of acne, eczema, and psoriasis (Chiu, Chon, & Kimball, 2003; Gupta et al., 2017). Stress, and the resultant increase in cortisol production, slows and impairs wound healing by as much as 20% (Chen & Lyga, 2014). Thirteen percent of Islanders perceive their life stress to be high (Statistics Canada, 2016a). There is great potential for this increased stress to impact the skin health of Islanders and increase the demand for dermatological services.

### **Impact of the Problem**

Society often trivializes dermatologic conditions since few dermatological conditions present as life-threatening (Ackerman, 1991; Kennedy, 2014). When dermatologic conditions are not accurately assessed, monitored, and treated there is a compelling impact on the management of the direct, indirect, and intangible costs associated with the illness (Bonotis et al., 2015; Cazzaniga et al., 2016; Gooderham et al., 2016; Kouris et al., 2016; Yang et al., 2014). The economic and human burden of dermatologic conditions can be difficult to separate, and the costs weigh heavily on society.

**The direct costs to the system.** Skin disease is one of the leading causes of disease burden in the world, with millions affected worldwide (Lim et al., 2017). Direct costs of skin disease include assessment and treatment costs, hospital costs (short- and long-term), outpatient follow-up, pharmaceutical interventions, and laboratory testing. The Public Health Agency of

Canada (PHAC) (2014) indicates that skin disease in Canada had a direct cost of over \$680 million annually. The Canadian Cancer Society (2014) estimates in 2011 there was \$532 million in costs associated with melanoma; \$66 million attributed to the direct primary, surgical, and hospital-based care. Skin disease causes a substantial financial burden globally in the context of health (Bickers et al., 2006; Hay et al., 2014). Several studies reveal that the financial burden of skin disease has risen to the millions for specific disorders and to the billions in the United States (Lim et al., 2017; Narla, Hsu, Thyssen, & Silverberg, 2017). In a study looking at the burden of skin disease in the United States and Canada, the estimated direct costs associated with skin ulcers and wounds has an annual cost of 4.8 million based on 2004 numbers (Kalia & Haiducu, 2012).

**Indirect costs to the system.** Indirect costs are related to disability and employment limitations and the resulting loss of productivity. Evidence indicates individuals who live with dermatologic conditions have high rates of absenteeism, presenteeism (working while sick), unemployment, and increased health care utilization (CSPA, 2012; Mattila et al., 2013; Politiek et al., 2016). High rates of psychosocial and psychological illness are also noted within the patient population and add to the strain on health care, workplaces, and society in general (Cazzaniga et al., 2016; Gooderham et al., 2016; Kouris et al., 2016; Yang et al., 2014). In 2003, a USA study examined the economic burden of skin disease (Dehkharghani, Bible, Chen, Feldman, & Fleischer, 2003). An estimated \$1.6 billion had been spent in association with lost work days attributed to dermatological conditions (Dehkharghani et al., 2003). A further \$6.1 billion of future earnings is lost to premature death, \$2.9 billion is lost due to missed work of the individual or caregiver, and \$1.2 billion dollars are lost due to reduced activity while in the workplace (Kalia & Haiducu, 2012). The 2010 Global Burden of Disease survey indicated that

atopic dermatitis has the highest disability-adjusted life-years as a result of disease prevalence and patient burden (Silverberg, 2017). Disability-adjusted life years measures the number of years lost due to ill-health, disability, or early death. When dermatological conditions are accurately assessed and treated by health care providers, the comorbid effects are improved and decrease the all-encompassing costs of the illness (Federman et al., 1999; Goulding et al., 2009).

**Intangible costs.** Intangible costs associated with illness include associated pain, suffering, depression, anxiety, stress, and activity or participation impairments (Yousefi et al., 2014). These costs are often linked with indirect expenses since they frequently impact productivity. The impact of intangible costs is measured by the reduction in the quality of life a person experiences. The lack of access to comprehensive and specialized dermatological care may exacerbate, worsen, or prolong an illness. Patients with dermatologic conditions have reported feelings of depression, anxiety, helplessness, low self-esteem, loneliness, and social isolation (Kouris et al., 2016; Yang et al., 2014). As a result, those with dermatological conditions may have reduced quality of life, increased rates of major depression, and increased rates of suicide (Bonotis et al., 2015; Cazzaniga et al., 2016; Gooderham et al., 2016; Halvorsen, Lien, Dalgard, Bjertness, & Stern, 2014; Kouris et al., 2016; Yang et al., 2014). A multicenter, international study completed by Dalgard et al. (2015) included almost 5,000 participants and found patients with skin conditions to have a 4.4% higher rate of suicidal ideation compared to the controls. There is also a relational decrease in psychiatric and mental illness with better dermatological symptom management and disease control (Bonotis et al., 2015; Gooderham et al., 2016).

## **Promising Approaches**

Several promising approaches have been utilized to support and provide care for people with dermatological problems. Technology, continuing education opportunities, and alternative health care providers have all been successfully used to bridge the gap in access in dermatological care.

**Technology.** In recent years, technology has been utilized to address shortages and gaps identified in health care (Tensen, Van der Heijden, Jaspers, & Witkamp, 2016, World Health Organization [WHO], 2010b). Teledermatology is an approach that allows dermatologists to practice at a distance through cellular and computer technology (Lowie, 2012). Store-and-forward teledermatology (SAFT) allows a provider seeking input on a skin condition to take a digital image of the skin condition and forward this picture, along with subjective and objective data about the patient's health, to a dermatologist (Lowie, 2012; Tensen et al., 2016). This method is cost effective, reduces wait times for specialist referrals, and improves access to care (Lowie, 2012; Tensen et al., 2016; Warshaw et al., 2011). Risks associated with this method include: lack of privacy and malpractice concerns, dependence on technology, poor image quality, and lack of professional completeness of consulting providers (Lowie, 2012). Live interactive or real-time interactive teledermatology facilitates live video streaming between the patient, consulting practitioner(s), and dermatologist (Lowie, 2012; Tensen et al., 2016). Although several studies associate this method with higher patient satisfaction, the cost makes it prohibitive to institute (Lowie, 2012; Tensen et al., 2016; Warshaw et al., 2011). Finally, a hybrid technology using a combination of the two methods discussed above allows for live consultation with still digital images. This has been associated with increased provider and patient satisfaction (Lowie, 2012).

Teledermatology was used in PEI between 2011 and 2015 to compensate for the absence of an employed dermatologist. Health PEI provided training opportunities to six family doctors in 2011. Five of those trained continue to be utilized by practitioners as a supplemental resource for dermatology services on PEI (CBC News, May 27, 2011; CBC News, September 19, 2014).

**Advanced education for general practitioners (GP).** Family physicians are frequently the first point of patient contact when dealing with dermatologic conditions (Wilmer et al., 2014). Although many physicians take care of patients with dermatological diseases, dermatology training received in medical school is limited (Shah et al., 2015; Whiting et al., 2016). This training, limited by both content and clinical experience, has been identified as a critical factor by GPs who struggle with the correct diagnosis of dermatologic conditions (Moreno, Tran, Chia, Lim, & Shumack, 2007; Morrison et al., 2001; Tran et al., 2005). Several advanced training opportunities have been created in partnership between the dermatology and primary care communities. These have shown success in enhanced dermatology diagnostic accuracy and treatment efficacy of GPs (Garg et al., 2015; Gerbert et al., 1998; Goiriz et al., 2016; Shariff, Roshan, Williams, & Platt, 2010). These advanced training opportunities are optional for GPs but could help improve comfort and accuracy within the field of dermatology in the primary health care setting.

**Dermatology registered nurses.** Registered nurses (RNs) have worked in the specialty of dermatology for many years (Chuh, 2004). Registered nurses take histories, perform skin exams, review diagnostic tests, and provide perioperative care and education among other duties (Gapmedics, 2015). In the UK, where legislation supports nurse prescribing, nurse-led care has shown to be safe and results in reduced illness severity (Courtenay & Carey, 2006). Studies indicate that nurse prescribing is associated with high levels of patient satisfaction in the

management of dermatologic problems and has resulted in reduced wait times (Courtenay & Carey, 2006). A number of additional studies have found that RN prescribing was well received by patients, has enhanced access, and improved continuity of care (Bhanbhro, Drennan, Grant, & Harris, 2011; Jones, Edwards, & While, 2011). A valuable asset for patient education, advocacy, and support, dermatology RN care is provided under the direct supervision of the attending physician (Chuh, 2004). Registered nurses duties are limited by legislation in Canada and, at this time, in most provinces they are not permitted to diagnose or prescribe (Chuh, 2004). At the present time, a number of jurisdictions across Canada have implemented, or are considering, some level of RN prescribing (CNA, 2015).

**Dermatology physician assistants.** Physician assistants (PA) are health care providers who are trained in the medical model of care and function to support or extend physician care (Canadian Association of Physician Assistants [CAPA], 2016). Many studies indicate PAs perform their duties safely and effectively under the supervision of their overseeing physician (Freedman, Jillson, Coffin, & Novick, 1986; Goldman, Occhiuto, Peterson, Zapka, & Palmer, 2004; Krasuski et al., 2003). The use of PAs in dermatology began approximately two decades ago as a partial solution to the dermatologist shortage and increased demand for dermatology services (Arnold, 2008; Resneck & Kimball, 2008; Tierney, Hanke, & Kimball, 2011). In 2007, it was estimated that 1,800 PAs worked in the field of dermatology in the United States (Arnold, 2008). The role and responsibilities of the PAs vary with the supervising physician's practice and preferences (Arnold, 2008).

Physician assistants do not function as an autonomous provider. Their scope of practice varies by the province in which they work and on the agreement established with their supervising physician (CAPA, 2016). Duties may include: perform physical exams, order and

interpret diagnostic tests, provide medical counseling, and write prescriptions (Arnold, 2008; CAPA, 2016). Prescriptive allowances for PAs are limited to only those medications that the supervising physician would typically provide; this is determined by the agreement between the PA and supervising physician (Mikhael, Ozon, & Rhule, 2007).

Most PAs work in medical dermatology settings and assess and treat common skin conditions such as acne, rosacea, and atopic and contact dermatitis (Arnold, 2008). Physician assistants most commonly present their assessment to the supervising physician for shared discussion and decision-making. As the PA progresses in experience, more responsibility may be permitted. Under the guidance of a dermatologist, and given extended dermatological training, PAs have shown comparable care to that of dermatologists (Satyaprakash et al., 2007). Researchers have not fully explored the dermatological outcomes of patients under the care of a physician assistant. Currently there are only four provinces in Canada that have implemented PAs and, at this time, this role has not been introduced on PEI (CAPA, 2017).

**Dermatology nurse practitioners.** Nurse practitioners are advanced practice nurses who are educated and trained to diagnose, order and interpret diagnostic tests, perform specific procedures, and prescribe medications (CNA, 2009). Nurse practitioners are regulated and guided by provincial legislation to provide comprehensive health care and integrate their broad scope of knowledge with health promotion, illness prevention, and disease management. Nurse practitioners see patients autonomously, assist to control health care expenditures, increase the quality of care provided, and assist to alleviate wait times for comprehensive dermatological care (Mundinger et al., 2000; Schuttelaar et al., 2011; Schuttelaar et al., 2009; Tierney et al., 2011).

Nurse practitioners practicing with a dermatology focus are a relatively new advancement. There were almost 400 members registered with the United States Nurse

Practitioners Society of Dermatology in 2007 (Resneck & Kimball, 2008). They provide care that is similar to that of the PA but can do so autonomously. It is within the scope of practice of an NP to assess, diagnose, and prescribe medications and treatments for ailments including those of the skin.

Once certified as an NP, practitioners who wish to specialize in dermatology require additional training. The NP Society (NPS) of the Dermatology Nurses' Association (DNA), a national organization dedicated solely to NPs who practice within the specialty of dermatology, developed a formal examination to certify nurse practitioners in the field of dermatology (Bobonich & Cooper, 2012). To qualify to write the certification examination, the nurse practitioner must have a minimum of 3000 hours of clinical experience in the field of dermatology (DNA, n.d). Many NPs gain this experience by working closely with a dermatologist in a collaborative relationship in a dermatology practice or can apply to obtain a formal residency in dermatology training (DNA, n.d.). With additional dermatological preparation, NPs can provide care that is cost-effective, achieve patient outcomes comparable to that of dermatologists, and attain a high degree of patient satisfaction (Mundinger et al., 2000; Schuttelaar et al., 2011; Schuttelaar et al., 2009). As a holistic care provider, and with the ability to practice autonomously, an NP with a specialty in dermatology is an ideal solution to assist in the care of the underserved population of PEI in their dermatological needs.

### **Target Population**

The proposed target group for this initiative includes individuals from all demographics, with new, acute, or chronic skin conditions who have been referred for dermatology care by a primary care provider. Participation is voluntary, and patients reserve the right to decline NP care without fear of loss of access to care. Exclusion criteria include individuals whose care falls

outside the scope of practice of the NP. For example, care of a patient with a potentially life or limb threatening disease or those exhibiting signs or symptoms of significant systemic illness would be transferred to a physician. Those who require advanced biopsy procedures or lesion removal techniques that are not within the skill set of the NP would also be transferred to a physician for care. Those who do not meet the inclusion criteria or who chose to decline NP care would be referred to the dermatologist for assessment.

## **Part II: Project Goals and Objectives**

The goal of this project is to facilitate access to dermatologic services to adults and children of all ages with new, acute, and chronic skin conditions. The establishment of all objectives will be created using the SMART philosophy. SMART is an acronym that is used to guide the development of measurable goals. Each objective is designed to be specific measurable, achievable, relevant, and time-oriented (Government of Canada, 2017). The objectives will be evaluated 2 years following the implementation of the initiative and include:

1. Reduce the wait time for routine dermatology consultations in PEI by 35%
2. Demonstrate that 80% of those who obtain services by the NP-led initiative are satisfied or very satisfied with the care they receive.
3. Twenty-five percent of all routine dermatological referral care in PEI will be seen by the NP.

### **Rationale to Support Objectives**

The current wait time for routine dermatological appointments in PEI is approximated to be 12 to 16 weeks (CBC, November 14, 2016). The CSPA recommends a target wait time of no more than 5 weeks for this service (CSPA, 2012). A reduction in a wait time of 33-50% has been shown to be attainable by the addition of an NP to an existing service (Carter & Chochinov,

2007; Ducharme, Alder, Pelletier, Murray, & Tepper, 2009). A Canadian study involving the addition of an NP to an Ontario ED looked at the impact the NP had on patient flow (Ducharme, et al., 2009). When NPs were added to the ED, patients were more than twice as likely to be seen within wait-time benchmarks and their length of stay was reduced by half. The integration of NPs into the health care teams has shown improved patient access to health care and decreased wait times (Carter & Chochinov, 2007; College of Registered Nurses of Nova Scotia [CRNNS], 2014).

Patient satisfaction is an important indicator of the quality of care received. Nurse practitioner-led care in dermatology and primary care has been shown to provide care that is rated high in regards to patient satisfaction (DiCenso et al., 2010; Jones, Hepburn-Brown, Anderson-Johnson, & Lindo, 2014; Schuttelaar et al., 2009; Venning, Roland, Roberts, & Leese, 2000). In previous NP satisfaction studies, the NP has provided satisfying or very satisfying care in over 80% of those surveyed (Jennings, Clifford, Fox, O'Connell, & Gardner, 2014; Jones et al., 2014). Increased patient satisfaction in dermatology has been associated with increased patient adherence to treatment and consequently better health outcomes (Renzi et al., 2001). Measures of high patient satisfaction will contribute to the success of the initiative.

Evidence of improved access to dermatology care and NP utilization is also an essential measure of the success of the project (Liu & D'Aunno, 2012; Rhoads, Ferguson, & Langford, 2006). Many specialty practices have added NPs to their outpatient settings as a way to improve access to care, reduce wait times, and improve the quality of care (Dower & Christian, 2009). A study completed by the Center for the Health Professions at the University of California, San Francisco examined health care models with the addition of NPs and PAs and determined that these models improved access, reduced wait times, and were financially sustainable (Dower &

Christian, 2009). Efforts to measure utilization help to demonstrate the project's value within the healthcare system on PEI concerning cost and benefit analysis (Drummond, Sculpher, Claxton, Stoddart, & Torrance, 2015).

### **Part III: Project Design and Implementation**

Project planning involves the formulation of a plan, in a step-wise fashion, that determines how to reach a particular goal (Department of Education [DED], 2015). The goal needs to be clearly stated and may be identified through a needs assessment or strategic plan developed by a community or group (DED, 2015). Project planning identifies barriers that stand in the way of achieving the set goal, as well as describes the benefits that will result from goal achievement (DED, 2015). Finally, project planning determines the resources or funding necessary to execute the project (DED, 2015). There are several steps that must be implemented before the dermatology NP begins practice at the dermatology clinic. These steps are integral to the project's success and its seamless integration into PEI's health care system.

An NP with an interest and specialized training in dermatology will be integrated into the Harbourside Health Care (HHC) clinic in Summerside, PEI. As a 2-year pilot project, the clinic will operate in collaboration with the dermatologist located in Charlottetown, PEI. The NP will assess new, acute, and chronic skin conditions, as well as provide ongoing care to established patients of the Charlottetown clinic with ongoing dermatologic issues. Within his/her scope of practice, the NP will perform skin assessments, conduct excision and biopsies, create care plans, prescribe medications, and offer primary, secondary, and tertiary dermatologic care. The following section details the project design and implementation plan developed for the initiation of the Dermatology NP clinic.

## **Project Overview (Theoretical Framework)**

Advanced practice nursing (APN) places great value in the utilization of research-based guidelines and knowledge to guide practice (Hagedorn, 2004). However, patient specific individualized care plans are a priority among advanced nurse providers (Hagedorn, 2004). To accomplish this, the APN must view the patient holistically and provide individually-tailored diagnoses, treatments, and clinical decisions based on a patient's own unique life situation (Hagedorn, 2004). The *Theory of Primary Caring* can guide the NP's approach to patient interactions, education opportunities, and research interpretation and application (Hagedorn, 2004). This theory is designed to guide NP care in their interactions with patients, families, and communities through a nursing lens rather than from a medical perspective.

Those unfamiliar with the role of the NP often challenge the practitioner to define his/her role from a nursing perspective (Geden et al., 2001). Usually, this challenge is a result of the misunderstanding that NP's chief role is to diagnose and treat illness by means of prescriptive pharmacology products (Geden et al., 2001). Although these are important components of the NP role, Susan Hagedorn's (2014) proposed *Theory of Primary Caring*, explains the greater breadth and depth of NP practice. This theory and its five domains: connection, consistency, commitment, community, and change will underpin the care delivered by the NP to individuals living with skin disease in the outlined dermatology initiative.

**Connection.** In Hagedorn's proposed *Theory of Primary Caring* the effectiveness of the NP is based upon relationship-centred caring with the patient, the family, and the community. As advocates in health care and in patient-provider relationships, NPs provide a strong sense of leadership within the communities they serve (Cooke, 2016). Social relationships between patients and their families, caregivers, and health care providers affect the patient's mental

health, physical health, and health behaviours (Cooke, 2016). With a strong commitment to patient-centred care, the NP builds and maintains relationships with clients based on empathy, trust, and understanding (Cooke, 2016). Care plans are developed through direct patient engagement and active listening. Use of these strategies enables the NP to tailor education, improve patient compliance, and reduce unnecessary hospitalization (Cooke, 2016).

In the proposed initiative, the NP's practice is based on engagement with the patient, the family, and the community. Through authentic listening, the NP serves patients with respect and compassion. This is particularly important since individuals living with skin conditions often face psychologic challenges which, in turn, impact their quality of life. A wide range of communication strategies and interpersonal skills will be used to establish and maintain the NP-client relationship.

An important initial step will be to make the public and the providers aware of the NP Dermatology Clinic. Local media platforms (e.g., radio and newspaper) will be used to inform the public of the newly established service. An announcement will be made to all providers (via Health PEI email) to outline the scope of services available and the patient triage criteria. It will also be essential to ensure easy access to the available services for patients and providers. To facilitate these connections, the clinic will accept self-referrals from clients with dermatologic conditions and electronic and paper referrals from healthcare practitioners. In addition, clinic hours will be designed to provide flexible access to the NP. Traditional hours (i.e., 8 am to 4 pm Tuesday, Wednesday, and Friday) will be combined with less traditional hours (i.e., 11 am to 7 pm Monday and Thursday) to allow those who may not be to attend the clinic during daytime hours to attend in early evening. This may also make it easy on families who have childcare concerns throughout the daytime.

The primary care provider is a critical member of the patient's care team. It will be important to maintain strong connections with the primary health care providers to ensure success of the project. Mutual respect and trust between collaborators and other primary care providers is important to establish collegial relationships (College of Physicians and Surgeons of British Columbia, 2009). Following each patient visit, a detailed written consult will be forwarded in a timely manner to the referring healthcare provider. The NP will also be available via phone to consult with providers and attend meetings where the input of the NP is needed to explain this new role.

**Consistency.** Consistency describes the importance of evidence- and theory-based care in NP practice. The provision of consistent and clinically competent health care improves patients' positive health outcomes. Consistency refers to the importance of consistent care and care providers and a healthcare home. As a healthcare provider, the NP's responsibility is to provide the best possible care to the patients and their families. One way to optimize care is the use of evidence-based and best practice guidelines in the day-to-day clinical practice setting, respectful navigation of client-provider relationships, and to create shared decision-making opportunities in the creation of care plans.

The NP-led initiative will employ evidence-based practice to guide the flow and function of the clinic. Evidence-based practice is more complex than just utilizing research to guide practice; it also integrates a shared decision making process with the patient and family to ensure that their needs and values are addressed within the clinical decision making process (Blazek, 2015). Guidelines will be chosen based on the most robust evidence, and standardized treatment protocols will be employed and regularly evaluated. The NP will work to full scope of practice

but not beyond. The clinic will employ routine chart audits to ensure consistent evidence-based care is provided within the clinic.

**Commitment.** Commitment describes how the NP is bound to serve each patient and family to her or his best ability. The NP is committed to provide ethical care within a context of confidentiality, compassion, and respect.

Referrals will be triaged based on the CSPA's wait-time benchmarks. Routine, non-urgent referrals will be seen in a target time of fewer than 5 weeks. The clinic will not accept emergent referrals for those who do not meet the inclusion criteria described in Target Population. If another care provider refers a client and upon presentation to the clinic, the patient's care is beyond the scope of the NP, the patient will be redirected to the most appropriate provider. If a patient self-refers and his/her presentation is beyond that of the scope of the NP, an alternative care plan will be provided, and the patient will be referred to the most appropriate care provider. If a patient presents with a high acuity requiring emergency care, he/she will be directed to the Prince County Hospital with appropriate transportation arranged. The clinic will not address health concerns of the patient that are not dermatologic in nature. For example, if someone presents with a skin eruption secondary to a PHC prescribed medication – recommendations for care would be formulated and forwarded to the PHC provider. The clinic will also leave space in the daily schedule for three acute presentations or same-day referrals.

**Community.** Community illustrates the role of the NP in facilitating full access to healthcare for all persons and strives to meet unmet community health needs. The NP manages patients' care and connects the patient to the services she or he needs to attain optimal health. The NP will provide culturally competent care and will listen openly and sensitively to the patients' cultural stories and empathize with the cultural influences of each patient's experience of health

and disease. The dermatology NP will create a healthcare setting where patients and providers feel welcomed and information is freely shared in an open and supportive healthcare environment. S/he will evaluate the health needs of individuals, families, providers, or communities, serve as a resource to other providers and facilitate learning and best practice. This will be accomplished through the offering of education sessions to other primary care providers, or in the community setting when appropriate.

**Change.** Change explains how NPs introduce innovative models of healthcare and share decision-making with patients. S/he must be involved in social change in order to support patient and community health initiatives. The NP also functions as a member of a healthcare team that includes not only health professionals but also auxiliary specialists. This model of care is a departure from the traditional primary care role for NPs in PEI. This would require that the NP be a leader in the advancement of NP utilization. The NP would work in a consultant role to provide care to patients and to share his/her dermatology experience with other primary health care providers.

### **Project Overview (Practical Framework)**

**Physical space.** Harbourside Health Centre is an existing healthcare setting that excels in collaborative health care. The proposed clinic will be located in Summerside, PEI and will offer dermatology services to the residents in the western PEI. The current dermatology clinic is located in Charlottetown, in the eastern part of the province. The Harbourside location will lessen the burden of travel on those making several trips for dermatologic services and follow-up on western PEI. Offices are ground floor and wheelchair accessible. There is existing office space for the NP and visiting collaborators, clinic space, examination rooms: including that of a procedure room that has cryotherapy and cautery equipment available. A large patient waiting

room is available, as well as ample administrative support space room for storage of charts. The office also has an established electronic charting record system (Populus) for efficient patient documentation and care coordination. The office has existing housekeeping services provided in kind by Health PEI.

**Dermatology health clinic team.** Given the complexity of health care, a multidisciplinary approach to provide health services is ideal to deliver the best possible care. Interprofessional team-based health care allows each member of the team to bring his/her individual knowledge and expertise to the table in an effort to provide comprehensive patient-centred care (Mitchell et al., 2012). The high-performing interprofessional team is an essential tool for constructing more patient-centred, coordinated, and effective provision of healthcare (Mitchell et al., 2012). The proposed team will consist of a full-time NP, a collaborating dermatologist, a shared licensed practical nurse (LPN) (50%), and a shared medical secretary (50%). The shared LPN and medical secretary will work full-time at HHC, but their time will be divided equally between one primary care provider and the dermatology clinic. The pilot project will be in operation by July, 2019. Activities required to implement a dermatology clinic at the Harbourside clinic are presented in a timeline in Appendix A.

**Nurse practitioner.** The successful NP lead of the dermatology clinic will exhibit quality health care delivery. The NP will also serve as a leader within the clinic itself and be involved in all facets of clinic operation. For example, the dermatology NP will assist in the development of policy and procedures for the position. The NP will also present educational sessions directed toward PHC providers during medical rounds in the hospital. Clinical and professional leadership is an important aspect of the NP role. It is the expectation of the dermatology NP to demonstrate leadership and promote the role on PEI.

In his/her clinical role, the NP will perform skin assessments; conduct excision and biopsies; create care plans; prescribe medications; and offer primary, secondary, and tertiary prevention education. To gain the necessary skills and broaden his/her dermatology knowledge base, the NP will spend 6 months working alongside the collaborating dermatologist in her clinic. This intensive residency period will also serve to develop a strong collaborative working relationship.

**Collaborating physician.** Weekly collaboration time to discuss routine care concerns will be negotiated with the province's dermatologist. There will be an allotted 1-hour time slot booked 1 day a week to discuss routine patient cases and address issues if they arise. If there are urgent care concerns, the NP will consult the dermatologist over the phone.

**Licensed practical nurse.** The support of an LPN will add to the patient experience. The shared LPN will prepare clinic rooms, bring clients to the appropriate rooms, perform vital signs, obtain a brief history, assist in procedures, and conduct venipuncture when appropriate. The LPN will be provided dermatology specific education sessions and trained to provide patient education.

**Medical secretary.** The shared medical secretary will represent the vision and the philosophy of the dermatology clinic and ensure patient access to the clinic is optimized. The duties will include coordination of patient care through the clinic: patient registration, respond to patient inquiries, provide post-appointment service, and monitor the waiting room environment. The medical secretary will answer enquires in a personal, helpful, and respectful manner.

### **Project Activities and Timeline**

A detailed project management timeline helps to set clear directions and priorities for the project. Such a plan helps to ensure that all members of the team share the same vision, agree on

the approach, and ensure that individual goals and objectives are aligned. The development of a detailed project management timeline drives critical thinking, comprehensive planning, and team communication. It also increases productivity by the reduction of duplicate work and aids in early problem identification.

**Stakeholder engagement.** The creation of an NP-led dermatology clinic in Summerside, PEI will require a detailed plan that begins with the buy-in of stakeholders (McKenzie, Neiger, & Thackeray, 2013). The first step is to offer a detailed, evidence-based plan to key stakeholders for feedback. The key stakeholders to be approached include the PEI Department of Health and Wellness, Health PEI, the Harbourside Health Care Centre, the Health PEI Dermatologist, Laboratory Services, primary health care providers of PEI, emergency room physicians, and local pharmacists. The Department of Health and Wellness and Health PEI will provide funding and support for the initiative. The HHC will provide the workspace and shared auxiliary staff. The dermatologist will provide training to the NP for dermatology procedures, ensure quality assurance for the project, and engage in a collaborative relationship with the NP. Local pharmacists will serve as prescribing resource, particularly with compounding. Stakeholder engagement activity will take approximately 9 months but will be ongoing during the project.

**Budget development.** The role of the NP has been the most studied role in healthcare, with over 4 decades of evaluation and research consistently demonstrating that NP care is equivalent to that of physician colleagues and provides high quality, cost-effective care (Bauer, 2010; Stanik-Hutt et al., 2013). A broader discussion related to budget development is located in Section VI of this paper.

**Resource acquisition (human).** Acquisition of properly trained staff ensures the clinic will run smoothly and helps to establish proper delegation of duties.

***Job description, interview, hire.*** Upon approval of the budget, a job description will be developed, posted, interviewed for and awarded to the successful candidate. A job description for the NP will be completed by the Executive Director of Community Health. The Prince Edward Island Nurse Practitioner Association (PEINPA) and the province's dermatologist will be consulted about the development of the job description of the NP position. The job description will be written and posted for 2 weeks, with interviews occurring over the following 2 weeks.

Essential qualifications include: current NP registration with the Association of Registered Nurses of Prince Edward Island (ARNPEI), successful completion of a Nurse Practitioner Program at a Master's level, and a willingness to complete the National Academy of Dermatology Nurse Practitioners (NADNP) Dermatology Certificate Program upon being successful in securing the position. The successful NP applicant should also demonstrate a basic understanding of dermatology diagnostic and treatment guidelines. The successful candidate should exemplify leadership and strong communication and collaborative skills. The required support staff currently exist at the HHC facility but will require formalized training to work with the dermatology clinic.

**Resource acquisition (equipment and supplies).** The HHC has a fully equipped procedure room including stretcher, lighting, minor procedure trays with suturing material, dressing supplies, cautery, and availability of liquid nitrogen. The clinic will need to monitor the availability of these supplies so the NP does not interfere with supplies for existing primary care providers. Twenty more procedure trays and surgical instruments will be purchased along with a variety of dressing supplies. A dermascope will also be purchased for use in the clinic. This is an essential tool to distinguish malignant lesions from benign.

**Laboratory.** At this stage, the local laboratory at the Prince County Hospital will be contacted to ensure its awareness of a new dermatologic service in the community. A meeting will be held with the laboratory manager to ensure the facility's ability to handle the increase in specimens, as well as to determine what specimens may have to be sent off Island for analysis. This meeting will be designed to eliminate possible barriers to care, ensure efficiency of NP orders, and avert delays in specimen pathology analysis.

#### **Part IV: Project Evaluation**

Evaluation of the program is necessary to determine the success of the initiative and will evaluate the fulfillment of objectives, ensure efficiency of NP orders, and effectiveness of the initiative. Data from the evaluation can help identify successes and failures of the program and assist in future program development.

##### **Objective One**

The first objective is to reduce the wait time for routine dermatology consultations in PEI by 35%. The CSPA recommends a target wait time of no more than 5 weeks for this service (CSPA, 2012). The addition of a dermatologic NP will make this goal much more realistic for PEI. Administrative support will track incoming referrals and requests for appointments and will record the time the referral or request was received and the time the patient was initially seen. The wait time will measure the time lapse between the date of referral receipt and the first day that care was provided by the NP. As HHC has computerized charting, this will be recorded and tracked electronically. The NP will share these data with stakeholders quarterly. The evaluation of this objective will help determine if the initiative meets its objective of improved access to dermatological care. Although the evaluation will take place at the end of 2 years, these data will

be tracked as soon as the clinic opens. Data will be reviewed on a monthly basis and strategies will be employed to ensure efficacy of patient flow.

## **Objective Two**

The second objective is to demonstrate that 80% of those who obtain services by the NP-led initiative are satisfied or very satisfied with the care they receive. The Nurse Practitioner Satisfaction Survey (NPSS) will be used to measure the second objective (see Appendix B for NPSS). The NPSS is a 28-item inventory rated on a 5-point Likert type scale with responses ranging from 'strongly disagree' to 'strongly agree' or 'undecided' (Agosta, 2009a). The patient indicates his/her answer by marking the corresponding box. Its purpose is to measure patient satisfaction with the NP's care and the principal factors contributing to this level of satisfaction (Agosta, 2009a). Specifically, the survey inquires about general satisfaction, communication, accessibility, and convenience (Agosta, 2009b). Higher scores indicate a higher degree of satisfaction. The survey was reviewed by a panel of doctorally prepared NPs and nursing faculty to ensure content validity (Agosta, 2009a). Cronbach's alpha measure of internal consistency for the general satisfaction subscale was measured to be 0.98 (Agosta, 2009b).

The NPSS was initially created to assess patient satisfaction of NPs in a women's clinic. Because of this, permission to adapt will be requested, and the survey will be adapted to assess patient satisfaction with the NP-led dermatology clinic. The patients will be allotted time alone in the examination room following the appointment to complete the survey for the purposes of privacy and anonymity. The surveys will be placed in a sealed envelope, and upon exiting the room, the patient will place the survey in a locked box located outside the examination room. Sealed surveys will be stored in a locked filing cabinet and will be reviewed every 3 months to allow the NP time to address issues identified. Completing the surveys is completely voluntary

and confidential. Patients may refuse without fear of negative effects on their care. Information derived from the NPSS assists to direct care that best responds to the needs of the patient/family and supports the value of the NP role in dermatology. The results of the evaluation will be disseminated to key stakeholders to support future sustainability, program development, and funding for the project.

### **Objective Three**

By the end of the second year of operation, 25% of all routine dermatological referral care in PEI will be completed by the NP. The indicator will be assessed by the number of patients who received dermatological NP services. This number will be compared to the total amount of referrals made to dermatological services in PEI. The administrative staff will gather the data at the end of each month for the project. Total referrals for the dermatology NP and total referrals for the provincial dermatologist will be tallied and the percentage of referrals the NP is seeing will be calculated from these data. It would be anticipated that as knowledge of the NP service increases, that the referral numbers will increase. The data will be presented to key stakeholders to demonstrate the project's value within the health care system on PEI.

### **Part V: Knowledge to Action Plan**

Knowledge translation has been defined as a process “that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system” (Canadian Institutes of Health Research [CIHI], 2015, para. 1). Implementation of research-based knowledge in real life is complex and faces many barriers (WHO, 2010a).

Knowledge translation models can help guide the application of knowledge to inform practice. A significant amount of time can pass between the production of research and the development of

programs, before the integration of it into daily practice (WHO, 2010a). Therefore, it is imperative to have a plan of action to disseminate outcomes to stakeholders and the general public (WHO, 2010a).

### **Audience**

Dissemination strategies will target various audiences including: key stakeholders (i.e., PEI's sole dermatologist, ARNPEI, PEI Nurses Union [PEINU], Chief Executive Officer of Health PEI, PEI directors of primary care and chronic disease management, staff at HHC) healthcare professionals (i.e., primary care providers and RNs), and the general public. For health care professionals outside of PEI who may be interested in the role of the NP in dermatology and program implementation, an article will be published in the *Canadian Nurse* magazine, which is aimed at a national audience. The local dissemination process will begin with presenting the findings to the key stakeholders. This increases the likelihood that the information will be processed most appropriately and affords them the opportunity to read and discuss findings (McKenzie et al., 2013). Dissemination will continue with a combination of short, individualized oral presentations to interested parties and a brief appearance on the local news program. The goal of the dissemination of information is to bring awareness to the initiative, discuss challenges faced, and seek input regarding stakeholder's ideas to improve the program.

### **Part VI: Budget**

A budget must be developed in the planning phase of a project to facilitate the planning process (Hodges & Videto, 2011). The lack of a comprehensive budget may complicate implementation and derail the project's success. The budget has to be determined through robust and open dialogue with the stakeholders, funders, and program developers (McKenzie et al., 2013). The budget for the dermatology clinic will be further developed in partnership with

Health PEI, PEI's dermatologist, and the NP involved in the program. The budget for this proposal is found in Appendix C entitled 'Proposed Annual Budget.'

The dermatology clinic will require a core staff of three employees. The only full-time employee will be the NP. Wages are based on the highest pay scale for an NP on PEI plus benefits. Both the dermatology clinic LPN and the administrative assistant will be 50% shared positions with the Harbourside Health Centre. The budgeted labour costs for these positions are quoted at the highest salary level to be inclusive of all potential applicants. Supplies will include items that are necessary to run a dermatology clinic such as printer paper, ink, file folders, and binders. Equipment costs will be initially high, as the office is set up and will include desks and computers, if not presently available at HHC. The purchase of a dermascope is also necessary. A dermascope is an important tool for a practitioner to examine the skin and is useful to assist in distinguishing benign from malignant lesions. Expenditures are expected to decline as the clinic is established and upfront costs are covered. Pre-existing office space will be provided within the HHC building, a provincial health care building, and will be granted in kind by Health PEI.

### **Part VII: Implications for Practice**

The Canadian Nurse Practitioner Core Competency Framework (2010) describes the integrated knowledge, skills, judgment and characteristics that guide nurse practitioner practice. Nurse practitioners are advanced practice nurses who provide ethical, professional, and autonomous care to individuals (CNA, 2010). Nurse practitioners build and expand upon the competencies of an RN to work independently and collaboratively in consultation with other health professionals to provide high-quality care to individuals in a variety of contexts and settings (CNA, 2010). The National Framework describes four categories of competencies that define advanced practice nursing for nurse practitioners. These categories are professional role,

responsibility, and accountability; health assessment and diagnosis; therapeutic management; and health promotion and prevention of illness and injury (CNA, 2010). Professional competency is distinctive in that it is divided into four practice nursing subsets. These are clinical practice; collaboration, consultation, and referral; research; and leadership (CNA, 2010). These sub-competencies are integral to defining the roles and responsibilities of the NP and exemplify the advanced nursing practice that NPs exhibit.

### **Clinical Practice**

As the role of the dermatology NP is defined, and the policies and procedures are developed for the clinic, the NP will ensure these protocols are in accordance with federal and provincial/territorial legislation, as well as professional and ethical standards (CNA, 2010). The responsibilities and accountabilities will be clearly defined and will fall within the scope of practice of a nurse practitioner. The NP will incorporate knowledge of diversity and the determinants of health in the assessment, diagnosis, and therapeutic management of dermatology clients and evaluation of clinical outcomes. Principles of resource allocation and cost-effectiveness will be integrated into all clinical decision-making of the dermatology NP. The NP will engage in ongoing professional development and accept personal responsibility for the development and maintenance of competency within the field of dermatology (CNA, 2010). It is the expectation that the successful candidate will complete the NADNP certificate program, complete a minimum of 6 months of residency training with the province's dermatologist, and attend dermatology-related education opportunities.

### **Collaboration, Consultation and Referral**

The NP will collaborate with the existing provincial dermatologist to develop the role, as well as the development of the policies and procedures. When patient care is beyond the NP's

scope of practice, the NP will refer to the dermatologist for assessment. S/he will work in a consultative role with other primary health care providers on PEI. One barrier that may impede the success of the initiative is awareness of the NP's scope of practice within the setting of dermatology. Despite the growth of the NP role on PEI, discrepancies still exist among primary care providers' knowledge of the NP role. The NP will attempt to minimize this barrier by providing clear and concise role clarification during the introduction of the role to primary health care providers and as the service unfolds. The NP will also develop a short, concisely written pamphlet that summarizes the role and responsibilities of the NP at the dermatology clinic. This document will also detail the process of referral, the role of each care provider, and the clinic contact information. This strategy will require ongoing relationship building and communication among care providers.

## **Research**

To ensure consistent and competent practice, the NP will be required to critically appraise research and engage in evidence-informed practice (CNA, 2010). Another important component of the dermatology NP role is the development of policies and procedures that ensure clients receive up-to-date, best-practice, coordinated health services. These policies and procedures will be grounded in the literature and based on the best available evidence. Two days a month, during the residency period, will be dedicated by the NP to review up-to-date, evidence-based research for the diagnosis and treatment of dermatological illnesses. Following the residency period, 2 afternoons a month will be dedicated to reviewing dermatological literature and education opportunities. The NP will also commit to attending dermatology-focused education opportunities when available. S/he will act as a change agent through knowledge translation and dissemination of new knowledge through a variety of methods including: completing formal

presentations, writing publications, facilitating informal discussions, and developing best practice guidelines and policies (CNA, 2010).

### **Leadership**

The NP will provide leadership in the management of clinical dermatology care and act as a resource person, educator, and role model in this new role (CNA, 2010). This leadership will be exemplified in the development and integration of the dermatology nurse practitioner role within the healthcare system on PEI. S/he will act as a resource to other provinces considering the addition of the role to their healthcare systems. The dermatology NP will serve as a preceptor and mentor to other members of the healthcare team. As a commitment to this leadership role, s/he will provide monthly education sessions to interested healthcare providers on various dermatology related topics. The new role of the dermatology NP will provide an opportunity to advance the role of the NP, as well as add improved access to dermatology services in PEI. This new, specialized role for NPs may also open doors for other NP-Led programs in PEI, which would further expand the NP role and continue to improve PEI residents' access to health care services.

### **Conclusion**

As wait times for specialized healthcare continue to increase in Canada and PEI, it is important to consider the utilization of alternative healthcare models to address this complex problem. Wait times can, and do, have serious consequences such as increased pain, prolonged treatment times, and increased healthcare costs. In certain instances, they can also result in inferior medical outcomes and serious physical and mental anguish for the patient and his/her loved ones. Dermatologic issues are present in all stages of life and require specialized assessment and treatment to improve treatment outcomes. The integration of an NP into current

dermatology services is an innovative, cost-effective approach to meeting the needs of Islanders with dermatologic problems. This proposal supports the integration of an NP into the dermatology service on PEI. The addition of an NP ensures patients and their families have the ability to access consistent and holistic care in a timely manner for dermatologic issues on PEI. Leadership is required on all levels; this includes a commitment on the part of Health PEI to invest in the NP as an integral member of the dermatologic service.

## References

- Ackerman, A. B. (1991). Dermatology is a profound specialty that must not be trivialized. *The American Journal of Dermatopathology*, *13*(3), 305-306.
- Advisory Committee on Population Health. (1999). *Toward a healthy future; Second report on the health of Canadians*. Retrieved from <http://publications.gc.ca/collections/Collection/H39-468-1999E.pdf>
- Agosta, L. (2009a). Patient satisfaction with nurse practitioner-delivered primary healthcare services. *Journal of the American Academy of Nurse Practitioners*, *21*(11), 610–617. doi:10.1111/j.1745-7599.2009.00449.x
- Agosta, L. (2009b). Psychometric evaluation of the Nurse Practitioner Satisfaction Survey (NPSS). *Journal of Nursing Measurement*, *17*(2), 114-33. doi:10.1891/1061-3749.17.2.114
- Arnold, T. (2008). Physician assistants in dermatology. *The Journal of Clinical and Aesthetic Dermatology*, *1*(2), 28-31. Retrieved from [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2989822/pdf/jcad\\_1\\_2\\_28.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2989822/pdf/jcad_1_2_28.pdf)
- Baade, P. D., Del Mar, C. B., Lowe, J. B., Stanton, W. R., & Balanda, K. P. (2005). Clinical diagnosis and management of suspicious pigmented skin lesions: A survey of GPs. *Australian Family Physician*, *34*(1/2), 79.
- Bhanbhro, S., Drennan, V. M., Grant, R., & Harris, R. (2011). Assessing the contribution of prescribing in primary care by nurses and professionals allied to medicine: A systematic review of literature. *BMC Health Services Research*, *11*, 1-10. doi:10.1186/1472-6963-11-330

- Baibergenova, A., & Shear, N. H. (2011). Skin conditions that bring patients to the emergency department. *Archives of Dermatology*, *147*(1), 118–120.  
doi:10.1001/archdermatol.2010.246
- Bickers, D. R., Lim, H. W., Margolis, D., Weinstock, M. A., Goodman, C., Faulkner, E., ... Society for Investigative Dermatology. (2006). The burden of skin diseases: 2004 a joint project of the American Academy of Dermatology Association and the Society for Investigative Dermatology. *Journal of the American Academy of Dermatology*, *55*(3), 490-500. doi:10.1016/j.jaad.2006.05.048
- Basnett, A. M. (2016). *Cutaneous manifestations of smoking*. Retrieved from <https://emedicine.medscape.com/article/1075039>
- Bauer, J. C. (2010). Nurse practitioners as an underutilized resource for health reform: Evidence-based demonstrations of cost-effectiveness. *Journal of the American Academy of Nurse Practitioners*, *22*(4), 228-231. doi:10.1111/j.1745-7599.2010.00498.x
- Blazek, N. (2015). *NPs important leaders for evidence-based practice, improving patient outcomes*. Retrieved from <http://www.clinicaladvisor.com/napnap-2015-meeting-coverage/nurse-practitioners-evidence-based-practice-patient-outcomes/article/403251/>
- Bobonich, M. A., & Cooper, K. D. (2012). A core curriculum for dermatology nurse-practitioners: Using delphi technique. *Journal of the Dermatology Nurses' Association*, *4*(2), 108-120. doi:10.1097/JDN.0b013e31824ab94c
- Bonotis, K., Pantelis, K., Karaoulanis, S., Katsimaglis, C., Papaliaga, M., Zafiriou, E., & Tsogas, P. (2015). Investigation of factors associated with health-related quality of life and psychological distress in vitiligo. *Journal of the German Society of Dermatology*, *14*(1), 45-48. doi:10.1111/ddg.12729

- Canadian Association of Physician Assistants. (2016). *FAQ*. Retrieved from <https://capa-acam.ca/features/faq/>
- Canadian Association of Physician Assistants. (2017). *Physician assistant implementation: 2017 national report card*. Retrieved from <https://capa-acam.ca/2017/11/physician-assistant-implementation-2017-national-report-card/>
- Canadian Cancer Society. (2014) *Melanoma: Deadliest type of skin cancer is on the rise*. Retrieved from <https://www.cancer.ca/en/about-us/for-media/media-releases/national/2014/2014-canadian-cancer-statistics/?region=on>
- Canadian Cancer Society's Advisory Committee on Cancer Statistics. (2014). *Canadian cancer statistics 2014*. Retrieved from <http://www.cancer.ca/~media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2014-EN.pdf>
- Canadian Dermatology Association. (2014a). *Melanoma by the numbers 2014*. Retrieved from <http://www.dermatology.ca/wp-content/uploads/2015/03/2014-Melanoma-By-the-Numbers.pdf>
- Canadian Dermatology Association. (2014b). *2014 skin cancer fact sheet*. Retrieved from <http://www.dermatology.ca/wp-content/uploads/2015/03/2014-Skin-Cancer-Fact-Sheet.pdf>
- Canadian Institutes of Health Research. (2015). *Knowledge to action: What it is and what it isn't*. Retrieved from [http://www.cihrirsc.gc.ca/e/documents/kt\\_in\\_health\\_care\\_chapter\\_1.1\\_e.pdf](http://www.cihrirsc.gc.ca/e/documents/kt_in_health_care_chapter_1.1_e.pdf)

- Canadian Medical Association. (2016). *Dermatology profile*. Retrieved from <https://www.cma.ca/Assets/assets-library/document/en/advocacy/profiles/dermatology-e.pdf>
- Canadian Nurses Association. (2009). *Position statement. The nurse practitioner*. Retrieved from [http://www.cna-aiic.ca/~media/cna/page-content/pdf-fr/ps\\_nurse\\_practitioner\\_e.pdf](http://www.cna-aiic.ca/~media/cna/page-content/pdf-fr/ps_nurse_practitioner_e.pdf)
- Canadian Nurses Association. (2010). *Canadian nurse practitioner core competency framework*. Retrieved from: [http://www.cno.org/Global/for/rnec/pdf/CompetencyFramework\\_en.pdf](http://www.cno.org/Global/for/rnec/pdf/CompetencyFramework_en.pdf)
- Canadian Nurses Association. (2015). *Framework for registered nurse prescribing in Canada*. Retrieved from [https://www.cna-aiic.ca/~media/cna/page-content/pdf-en/cna-rn-prescribing-framework\\_e.pdf?la=en](https://www.cna-aiic.ca/~media/cna/page-content/pdf-en/cna-rn-prescribing-framework_e.pdf?la=en)
- Canadian Resident Matching Service. (2017). *National data on CMG applications and quota in the R-1 match by disciplines (2006-2017) 1<sup>st</sup> iteration only*. Retrieved from <https://www.carms.ca/en/data-and-reports/r-1-match-interactive-data/>
- Canadian Skin Patient Alliance. (2012). *Skin deep: Report card on access to dermatological care and treatment in Canada 2012*. Retrieved from <http://www.canadianskin.ca/en/docman/report-card/english/national/1-national-report-card/file>
- Carr, P. L., Gareis, K. C., & Barnett, R. C. (2003). Characteristics and outcomes for women physicians who work reduced hours. *Journal of Women's Health, 12*(4), 399–405. doi:10.1089/154099903765448916

- Carter, A. J., & Chochinov, A. H. (2007). A systematic review of the impact of nurse practitioners on cost, quality of care, satisfaction and wait times in the emergency department. *Canadian Journal of Emergency Medicine*, 9(4), 286-95. Retrieved from <https://www.cambridge.org/core/journals/canadian-journal-of-emergency-medicine>
- Cazzaniga, S., Ballmer-Weber, B. K., Grani, N., Spring, P., Bircher, A., Anliker, M. S.,...Simon, D. (2016). Medical, psychological and socio-economic implications of chronic hand eczema: a cross-sectional study. *Journal of European Academy of Dermatology and Venereology*, 30(4), 628-637. doi:10.1111/jdv.13479
- CBC News. (2016, October 20). *Physical inactivity, smoking and drinking issues for P.E.I. youth: School survey*. Retrieved from <http://www.cbc.ca/news/canada/prince-edward-island/pei-shapes-smoking-drinking-bullying-1.3813849>
- CBC News. (2011, May 27) *Family doctors being trained in tele-dermatology*. Retrieved from <http://www.cbc.ca/news/canada/prince-edward-island/family-doctors-being-trained-in-tele-dermatology-1.1029488>
- CBC News. (2016, November 14). *Skin cancer, psoriasis keeping new dermatologist busy*. Retrieved from <http://www.cbc.ca/news/canada/prince-edward-island/pei-rodriquez-dermatologist-1.3849531>
- Chad, Z. (2001). Allergies in children. *Paediatrics Child Health*, 6(8), 555-566. doi:10.1093/pch/6.8.555
- Chen, Y., & Lyga, J. (2014). Brain-skin connection: Stress, inflammation and skin aging. *Inflammation and Allergy Drug Targets*, 13(3), 177-190. doi:10.2174/1871528113666140522104422

Chief Public Health Office. (2016). *PEI Chief Public Health Office Strategic Plan 2016-2018*.

Retrieved from [https://www.princeedwardisland.ca/sites/default/files/publications/cpho\\_strategic\\_plan\\_final\\_web\\_0.pdf](https://www.princeedwardisland.ca/sites/default/files/publications/cpho_strategic_plan_final_web_0.pdf)

Chiu, A., Chon, S. Y., & Kimball, A., B. (2003). The response of skin disease to stress: Changes in the severity of acne vulgaris as affected by examination stress. *Journal of the American Medical Association, 139*(7), 897-900. doi:10.1001/archderm.139.7.897

Chow, E. Y., & Searles, G. E. (2010). The amazing vanishing Canadian dermatologist: Results from the 2006 Canadian Dermatology Association member survey. *Journal of Cutaneous Medicine and Surgery, 14*, 71-79. doi:10.2310/7750.2010.09025

Chuh, A. (2004). Pityriasis rosea: Roles of the dermatology nurse. *Dermatology Nursing, 16*(2), 130-137. Retrieved from <http://search.ebscohost.com>

College of Physicians and Surgeons of British Columbia. (2009). *Professional standards and guidelines. Expectations of the relationship between the primary care / consulting physician and consultant physician*. Retrieved from <https://www.cpsbc.ca/files/pdf/PSG-Expectations-of-the-Relationship-Between-Physicians.pdf>

College of Registered Nurses of Nova Scotia (CRNNS). (2014). *2014 NP sensitive outcomes 39 summary report*. Retrieved from [http://crnns.ca/documents/NP\\_Sensitive\\_Outcomes\\_2014.pdf](http://crnns.ca/documents/NP_Sensitive_Outcomes_2014.pdf)

Cooke, C. (2016). *Relationship-centered care and nurse practitioners*. Retrieved from <https://participatorymedicine.org/2016/relationship-centered-care-and-nurse-practitioners/>

Courtenay, M., & Carey, N. (2008). Nurse independent prescribing and nurse supplementary prescribing practice: National survey. *Journal of Advanced Nursing, 61*(3), 291-299. doi:10.1111/j.1365-2648.2007.04512.x.

- Dalgard, F., J., Gieler, U., Tomas-Aragones, L., Lien, L., Poot, F., Jemec, G., ... Kupfer, J. (2015). The psychological burden of skin diseases: A cross-sectional multicenter study among dermatological out patients in 13 European countries. *Journal of Investigative Dermatology*, 135, 984- 991. doi:10.1038/jid.2014.530
- Davis, L. & Wright, J. (2012). The million hearts initiative: How nurse practitioners can help lead. *Journal of the American Academy of Nurse Practitioners*, 24, 565-568. Retrieved from <http://www.aanp.org/Publications/JAANP/>
- Dehkharghani, S., Bible, J., Chen, J. G., Feldman, S. R., & Fleischer, A. B. (2003). The economic burden of skin disease in the United States. *Journal of the American Academy of Dermatology*, 48(4), 592-599. doi:10.1067/mjd.2003.178
- Department of Education. (2015). *Introduction to project planning and development*. Retrieved from <https://sites.ed.gov/aapi/files/2015/08/Grant-Writing-Training-Manual.pdf>
- Dermatology Nurses Association (n.d.). *DCNP certification*. Retrieved from <https://www.dnanurse.org/dnaeducation/certification/dcnp-certification/>
- DiCenso, A., Bourgeault, I., Abelson, J., Martin-Misener, R., Kaasalainen, S., Carter, N.,... Kilpatrick, K. (2010). Utilization of nurse practitioners to increase patient access to primary healthcare in Canada--thinking outside the box. *Canadian Journal of Nursing Leadership*, 23 (Special Issue December), 239-259. Retrieved from <http://www.longwoods.com>
- Dower, C., & Christian, S. (2009). *Physician assistants and nurse practitioners in specialty care: Six practices make it work*. Retrieved from <https://www.chcf.org/wp-content/uploads/2017/12/PDF-NPPAModels.pdf>

- Drummond, M. F., Sculpher, M. J., Claxton, K., Stoddart, G. L., & Torrance, G. W. (2015). *Methods for the economic evaluations of health care programmes*. Oxford, UK: Oxford United Press.
- Ducharme, J., Alder, R. J., Pelletier, C., Murray, D., & Tepper, J. (2009). The impact on patient flow after the integration of nurse practitioners and physician assistants in 6 Ontario emergency departments. *Canadian Journal of Emergency Medicine, 11*(5), 455-461. Retrieved from <https://www.cambridge.org/core/journals/canadian-journal-of-emergency-medicine>
- Dunlap, R., Wu, S., Wilmer, E., Cho, E., Li, W. Q., Lajevardi, N., & Qureshi, A. (2017). Pigmentation traits, sun exposure, and risk of incident vitiligo in women. *The Journal of Investigative Dermatology, 137*(6), 1234-1239. doi:10.1016/j.jid.2017.02.004.
- Enard, K. R., & Ganelin, D. M. (2013). Reducing preventable emergency department utilization and costs by using community health workers as patient navigators. *Journal of Healthcare Management, 58*(6), 412-428. Retrieved from [https://www.ache.org/pubs/jhm/jhm\\_index.cfm](https://www.ache.org/pubs/jhm/jhm_index.cfm)
- El-Hamd, M. A., Nada, E. E., Moustafa, M. A. K., & Mahboob-Allah, R. A. (2017). Prevalence of acne vulgaris and its impact of the quality of life among secondary school-aged adolescents in Sohag Province, Upper Egypt. *Journal of Cosmetic Dermatology, 00*(1), 1-4. doi:10.1111/jocd.12328
- Federal Provincial and Territorial Advisory Committee on Population Health. (1999). *Toward a healthy future: Second report on the health of Canadians*. Ottawa, ON: Minister of Public Works and Government Services Canada. Retrieved from [http://www.phac-aspc.gc.ca/ph-sp/report-rapport/toward/pdf/toward\\_a\\_healthy\\_english.PDF](http://www.phac-aspc.gc.ca/ph-sp/report-rapport/toward/pdf/toward_a_healthy_english.PDF)

- Federman, D. G., Concato, J., & Kirsner, R. S. (1999). Comparison of dermatologic diagnoses by primary care practitioners and dermatologists: A review of the literature. *Archives of Family Medicine*, 8(2), 170-172.
- Freedman, M. A., Jillson, D. A., Coffin, R. R., & Novick, L. F. (1986). Comparison of complication rates in first trimester abortions performed by physician assistants and physicians. *American Journal of Public Health*, 76(5), 550-554.
- Furue, M., Tsuji, G., Chiba, T., & Kadono, T. (2017). Cardiovascular and metabolic diseases comorbid with psoriasis: Beyond the skin. *Internal Medicine*, 56(13), 1613-1619. doi: 10.2169/internalmedicine.56.8209.
- Gandini, S., Sera, F., Cattaruzza, M. S., Pasquini, P., Picconi, O., Boyle, P., & Melchi, C. F. (2005). Meta-analysis of risk factors for cutaneous melanoma: III. Family history, actinic damage and phenotypic factors. *European Journal of Cancer*, 41(14), 2040-2059. doi:10.1016/j.ejca.2005.03.034
- Gapmedics. (2015). *Becoming a dermatology nurse*. Retrieved from <http://www.gapmedics.com/blog/2015/02/23/becoming-a-dermatology-nurse/>
- Garg, A., Biello, K., Hoot, J. W., Reddy, S. B., Wilson, L., George, P.,... Geller, A. C. (2015). The skin cancer objective structured clinical examination (SCOSCE): A multi-institutional collaboration to develop and validate a clinical skills assessment for melanoma. *Journal of the American Academy of Dermatology*, 73(6), 959-965. doi:10.1016/j.jaad.2015.08.014
- Geden, E. A., Isaramalai, S., & Taylor, S. G. (2001). Self-care deficit nursing theory and the nurse practitioner's practice in primary care settings. *Nursing Science Quarterly*, 14(1), 29-33. doi:10.1177%2F089431840101400110

- Gerbert, B., Bronstone, A., Wolff, M., Maurer, T., Berger, T., Pantilat, S., & McPhee, S. J. (1998). Improving primary care residents' proficiency in the diagnosis of skin cancer. *Journal of General Internal Medicine, 13*(2), 91-97. doi:10.1046/j.1525-1497.1998.00024.x
- Go! PEI. (n.d.). *About us*. Retrieved from <https://www.gopei.ca/about/>
- Goiriz, R., Butler, C., Rajpopat, S., Sahota, A., Hubbard, V., & Jolliffe, V. (2016) Perceived benefits following completion of a clinical dermatology online programme for general practitioners. *Education for Primary Care, 4*, 1-3. doi:10.1080/14739879.2016.1197050
- Gooderham, M., Gavino-Velasco, J., Clifford, C., MacPherson, A., Krasnoshtein, F., & Papp, K. (2016). A review of psoriasis, therapies, and suicide. *Journal of Cutaneous Medicine and Surgery, 20*(4), 1-11. doi:10.1177/1203475416648323
- Goldman, M. B., Occhiuto, J. S., Peterson, L. E., Zapka, J. G., & Palmer, R. H. (2004). Physician assistants as providers of surgically induced abortion services. *American Journal of Public Health, 94*(8), 1352-1357. Retrieved from <http://www.ncbi.nlm.nih.gov.proxy.library.upei.ca/pmc/articles/PMC1448455/>
- Goulding, J. M. R., Levine, S., Blizard, R. A., & Swale, V. J. (2009). Dermatological surgery: A comparison of activity and outcomes in primary and secondary care. *British Journal of Dermatology, 161*(1), 110-114. doi:10.1111/j.1365-2133.2009.09228.x
- Government of Canada. (2017). *Writing smart objectives*. Retrieved from <https://www.canada.ca/en/environment-climate-change/services/environmental-funding/tools-for-applying/writing-smart-objectives.html>
- Government of Prince Edward Island. (2017). *Prince Edward Island industries*. Retrieved from <https://www.princeedwardisland.ca/en/information/prince-edward-island-industries>

- Gupta, M. A., Jarosz, P., & Gupta, A. K. (2017). Posttraumatic stress disorder (PTSD) and the dermatology patient. *Clinical Dermatology*, 35(3), 260-266.  
doi:10.1016/j.clindermatol.2017.01.005.
- Hagedorn, M. I. (2004). *Caring practices in the 21st century: The emerging role of nurse practitioners*. Retrieved from [https://www.medscape.com/viewarticle/496372\\_3](https://www.medscape.com/viewarticle/496372_3)
- Halvorsen, J. A. Lien, L., Dalgard, F., Bjertness, E., & Stern, R. S. (2014). Suicidal ideation, mental health problems, and social function in adolescents with eczema: A population-based Study. *Journal of Investigative Dermatology*, 134, 1847-1854.  
doi:10.1038/jid.2014.70
- Hansra, N. K., O'Sullivan, P., Chen, C. L., & Berger, T. (2009). Medical school dermatology curriculum: Are we adequately preparing primary care physicians? *Journal of the American Academy of Dermatology*, 61(1), 23-29. doi:10.1016/j.jaad.2008.11.912
- Harris Williams & Co. (2013). *Dermatology market overview*. Retrieved from [http://www.harriswilliams.com/system/files/industry\\_update/dermatology\\_market\\_overview.pdf](http://www.harriswilliams.com/system/files/industry_update/dermatology_market_overview.pdf)
- Hay, R. J., & Fuller, L. C. (2012). The assessment of dermatological needs in resource poor regions. *International Journal of Dermatology*, 50(5), 552-557.  
doi:10.1111/j.13654632.2011.04953.x.
- Hay, R. J., Hohns, N. E., Williams, H. C., Bolliger, I. W., Dellavalle, R. P., Margolis, D. J., ...Naghavi, M. (2014). The global burden of skin disease in 2010: An analysis of the prevalence and impact of skin conditions. *Journal of Investigative Dermatology*, 134, 1527-1534. doi:10.1038/jid.2013.446

- Health Canada. (2001). *Canadian tobacco use monitoring survey (CTUMS)*. Retrieved from [http://www.hc-sc.gc.ca/hcps/tobac-tabac/research-recherche/stat/\\_ctums-esutc\\_fsif/2001-overview-eng.php](http://www.hc-sc.gc.ca/hcps/tobac-tabac/research-recherche/stat/_ctums-esutc_fsif/2001-overview-eng.php)
- Health PEI. (2013). *Strategic plan 2013-2016. One Island health system supporting improved health for Islanders*. Retrieved from [http://www.gov.pe.ca/photos/original/hpei\\_stratpl\\_16.pdf](http://www.gov.pe.ca/photos/original/hpei_stratpl_16.pdf)
- Health PEI. (2017). *Patient Registry Program*. Retrieved from <https://www.princeedwardisland.ca/en/information/health-pe/patient-registry-program>
- Hodges, B., & Videto, D. (2010). *Assessment and planning in health programs*. Sudbury, MA: Jones and Bartlett Learning.
- Jääskeläinen, I. H., Hagberg, L., Forsblom, E., & Järvinen, A. (2017). Microbiological etiology and treatment of complicated skin and skin structure infections in diabetic and nondiabetic patients in a population-based study. *Open Forum Infectious Diseases*, 4(2). doi:10.1093/ofid/ofx044.
- Jack, A. R., Spence, A. A., Nichols, B. J., Chong, S., MD, Williams, D. T., Swadron, S. P., & Peng, D. H. (2011). Cutaneous conditions leading to dermatology consultations in the emergency department. *Western Journal of Emergency Medicine*, 12(4), 551-555. doi:10.5811/westjem.2010.4.1653
- Jennings, N., Clifford, S., Fox, A. R., O'Connell, J., & Gardner, G. (2014). The impact of nurse practitioner services on cost, quality of care, satisfaction and waiting times in the emergency department: A systematic review. *International Journal of Nursing Studies*, 52, 421-435. doi:10.1016/j.ijnurstu.2014.07.006

- Jones, K., Edwards, M., & While, A. (2011). Nurse prescribing roles in acute care: An evaluative case study. *Journal of Advanced Nursing*, 67, 117-126. doi: 10.1111/j.1365-2648.2010.05490
- Jones, K., Hepburn-Brown, C., Anderson-Johnson, P., & Lindo, J. L. (2014). High patient satisfaction with nurse practitioner delivered services at two health centres in urban Jamaica. *Contemporary Nurse*, 48(2), 181-189. doi:10.1080/10376178.2014.11081939
- Kalia, S., & Haiducu, M. L. (2012). The burden of skin disease in the United States and Canada. *Dermatologic Clinics*, 30, 5-18. doi:10.1016/j.det.2011.09.004
- Kennedy, M. (2014). *Many think of dermatology as superficial: Survey*. Retrieved from <http://www.reuters.com/article/us-health-dermatology-public-perception-idUSKBN0HD2BO20140918>
- Kilpatrick, K. (2010). Utilization of nurse practitioners to increase access to primary health care in Canada – Thinking outside the box. *Nursing Leadership*, 23, 239-259. doi:10:12927/cjnl.2010.33381
- Kimball, A. B., & Resneck, J. S. (2008). The US dermatology workforce: A speciality remains in shortage. *Journal of the American Academy of Dermatology*, 59(5), 741-745. doi:10.1016/j.jaad/2008.06.037
- Kirshen, C., Shoimer, I., Wismer, J., DesGroseilliers, J., & Lui, H. (2011). Teaching dermatology to Canadian undergraduate medical students. *Journal of Cutaneous Medicine and Surgery*, 15(3), 150-156. doi:10.2310/7750.2011.10021
- Koning, H., Baert, M. R., Oranje, A. P., Savelkoul H. F., & Neijen, H. J. (1996). Development of immune functions related to allergic mechanisms in young children. *Pediatric Research*, 40, 363-375. doi:10.1203/00006450-199609000-00001

- Kouris, A., Christodoulou, C., Efstathiou, V., Tsatovidou, R., Torlidi-Kordera, E., Zouridaki, E., & Kontochristopoulos, G. (2016). Comparative study of quality of life and psychosocial characteristics in patients with psoriasis and leg ulcers. *Wound Repair and Regeneration*, 24, 443-446. doi:10.1111/wrr.12416
- Kramkimel, N., Soussan, V., Beauchet, A., Duhamel, A., Saiag, P., Chevallier, B., & Mahé, E. (2010). High frequency, diversity and severity of skin diseases in a paediatric emergency department. *Journal of the European Academy of Dermatology and Venereology*, 24(12), 1468-1475. doi:10.1111/j.1468-3083.2010.03672.x.
- Krasuski, R. A., Wang, A., Ross, C., Bolles, J. F., Moloney, E. L., Kelly, L. P.,... Sketch, M. H. (2003). Trained and supervised physician assistants can safely perform diagnostic cardiac catheterization with coronary angiography. *Catheter Cardiovascular Interventions*, 59(2), 157-160. doi:10.1002/ccd.10491
- Kulthanan, K., Tuchinda, P., Chularojanamontri, L., Chanyachailert, P., Korkij, W., Chunharas, A., ... Ngamphaiboon, J. (2016). Clinical practice guideline for diagnosis and management of urticaria. *Asian Pacific Journal of Allergy and Immunology*, 34(3), 190-200. Retrieved from <http://apjai-journal.org/wp-content/uploads/2016/10/3.-AP0817.pdf>
- Lai-Kwon, J., Weiland, T. J., Chong, A. H., & Jelinek, G. A. (2014). Which dermatological conditions present to an emergency department in Australia? *Emergency Medicine International*, 2014. doi:10.1155/2014/463026
- Lewis, H., Becevic, M., Myers, D., Helming, D., Mutrux, R., Fleming, D., & Edison, K. (2018). Dermatology ECHO - An innovative solution to address limited access to dermatology expertise. *Rural Remote Health*, 18(1), 4415. doi:10.22605/RRH4415

- Lim, H. W., Collins, S. A., Resneck, J. S., Bologna, J. L., Hodge, J. A., Rohrer, T. A.,...Moyano, J. V. (2017). The burden of skin disease in the United States. *Journal of the American Academy of Dermatology*, 76(5), 958-972. doi:10.1016/j.jaad.2016.12.043
- Liu, N., & D'Aunno, T. (2012). The productivity and cost-efficiency of models for involving nurse practitioners in primary care: A perspective from queueing analysis. *Health Services Research*, 47(2), 594-613. doi:10.1111/j.1475-6773.2011.01343.x
- Long, C. C., & Marks, R. (1995). Increased risk of skin cancer: Another Celtic myth? *Journal of the American Academy of Dermatology*, 33(4), 658-661. doi:10.1016/0190-9622(95)91289-4
- Long, C. C., Darke, C., & Marks, R. (1998). Celtic ancestry, HLA phenotype and increased risk of skin cancer. *British Journal of Dermatology*, 138, 627-630.
- Lowell, B. A, Froelich, C. W., Federman, D. G., & Kirsner, R. S. (2001). Dermatology in primary care: Prevalence and patient disposition. *Journal of the American Academy of Dermatology*, 45(2), 250-255. doi:10.1067/mjd.2001.114598
- Lowie, A. M. (2012). Tele dermatology: A tool for nurse practitioner practice? *The Journal for Nurse Practitioners*, 8(8), 617-620. doi:10.1016/j.nurpra.2012.06.003
- Martin-Misener, R., Harbman, P., Donald, F., Reid, K., Kilpatrick, K, Carter, N.,...Dicenso, A. (2015). Cost-effectiveness of nurse practitioners in primary and specialised ambulatory care: Systematic review. *BMJ Open*, 5. doi:10.1136/bmjopen-2014-007167
- Mattila, K., Leino, M., Mustonen, A., Koulu, L., & Tuominen, R. (2013). Influence of psoriasis on work. *European Journal of Dermatology*, 23(2), 208-211. doi:10.1684/ejd.2013.1969
- McCance, K. L., & Huether, S. E. (2010). *Pathophysiology. The biologic basis for disease in adults and children* (6<sup>th</sup> ed.). Maryland Heights, MO: Mosby/Elsevier.

- McKenzie, J. F., Neiger, B. L., & Thackeray, R. (2013). *Planning, implementing & evaluating health promotion programs* (6th ed.). Glenview, IL: Pearson.
- Mikhale, N., Ozon, P., & Rhule, C. (2007). *Defining the physician assistant role in Ontario*. Retrieved from <https://www.healthforceontario.ca/UserFiles/file/AHP/Inside/PA-role-april-2007-en.pdf>
- Mitchell, P., Wynia, M., Golden, R., McNellis, B., Okun, S., Webb, C. E.,... Von Kohorn, I. (2012). *Core principles & values of effective team-based health care*. Retrieved from [http://micmrc.org/system/files/Core\\_Principles\\_%26\\_Values\\_of\\_Effective\\_Team-Based\\_Health\\_Care.pdf](http://micmrc.org/system/files/Core_Principles_%26_Values_of_Effective_Team-Based_Health_Care.pdf)
- Moreno, G., Tran, H., Chia, A. L., Lim, A., & Shumack, S. (2007). Prospective study to assess general practitioners' dermatological skills in a referral setting. *The Australasian Journal of Dermatology*, 48(2), 77-82. doi:10.1111/j.1440-0960.2007.00340.x
- Morrison, A., O'Loughlin, S., & Powell, F.C. (2001). Suspected skin malignancy: A comparison of diagnoses of family practitioners and dermatologists in 493 patients. *International Journal of Dermatology*, (40)2, 104-107. doi:10.1046/j.1365-4362.2001.01159.x
- Mundinger, M., Kane, R., Lenz, E., Totten, A., Tsai, W., Cleary, P., ... Shelanski, M. (2000). Primary care outcomes in patients treated by nurse practitioners or physicians. *Journal of the American Medical Association*, 238(1), 59-68. doi:10.1001/jama.238.1.59
- Nanda, A., Al-Hasawi, F., & Alsaleh, Q. A. (1999). A prospective survey of pediatric dermatology clinic patients in Kuwait: An analysis of 10,000 cases. *Pediatric Dermatology*, 16(1), 6-11. doi:10.1046/j.1525-1470.1999.99002.x

- Narla, S., Hsu, D. Y., Thyssen, J. P., & Silverburg, J. I. (2017). Inpatient financial burden of atopic dermatitis in the United States. *Journal of Investigative Dermatology*, *137*(7), 1461-1467. doi:10.1016/j.jid.2017.02.975
- Offidani, A., Simonetti, O., Bernardini, M. L., Alpagut, A., Cellini, A., & Bossi, G. (2002). General practitioners' accuracy in diagnosing skin cancers. *Dermatology*, *205*, 127-130. doi:10.1159/000063887
- Oliveria, S. A., Nehal, K. S., Christos, P. J., Sharma, N. Tromberg J. S., & Halpern, A. C. (2001). Using nurse practitioners for skin cancer screening: A pilot study. *American Journal of Preventative Medicine*, *21*(3), 214-217.
- Politek, K., Oosterhaven, J. A., Vermeulen, K. M., & Schuttelar, M. A. (2016). Systematic review of cost-of-illness studies in hand eczema. *Contact Dermatitis*, *75*(2), 67-76. doi:10.1111/cod.12590
- Randall, J. E., Desserud, D., & MacDonald, K. (2015). *State of rural Canada report: Prince Edward Island*. Retrieved from file:///C:/Users/Jennifer/Downloads/SORC2015PE.pdf
- Renzi, C., Abeni, D. Picardi, E., Agostini, C. F., Melchi, P., Pasquini, P.,... Braga, M. (2001). Factors associated with patient satisfaction with care among dermatological outpatients. *British Journal of Dermatology*, *145*(4), 617-623. doi:10.1046/j.1365-2133.2001.04445.x
- Resneck, J., & Kimball, A.B. (2004). The dermatology workforce shortage. *Journal of the American Academy of Dermatology*, *50*(1), 50-54. doi:10.1016/j.jaad.2003.07.001
- Rhoads J., Ferguson, L. A., & Langford, C. A. (2006). Measuring nurse practitioner productivity. *Dermatology Nursing*, *18*(1), 32-38. Retrieved from [https://www.medscape.com/viewarticle/524677\\_2](https://www.medscape.com/viewarticle/524677_2)

- Satyaprakash, A., Balkrishnan, R., Camacho, F. T., Jayawant, S. S., Fleischer, A. B., & Feldman, S. R. (2007). Quality of dermatologic care delivered by physician assistants: An analysis of prescribing behavior for the combination antifungal agent clotrimazole betamethasone. *Archives of Dermatology*, *143*(12), 1589-1603. doi:10.1001/archderm.143.12.1591-b.
- Sauver, J. L., Warner, D. O., Yawn, B. P., Jacobson, D. J., McGree, M. E., Pankratz, J. J., ... Rocca, W. A. (2013). Why do patients visit their doctors? Assessing the most prevalent conditions in a defined US population. *Mayo Foundation for Medical Education and Research*, *88*(1), 56-67. doi:10.1016/j.mayocp.2012.08.020
- Schofield, J. K., Fleming, D., Grindlay, D., & Williams, H. (2011). Skin conditions are the commonest new reason people present to general practitioners in England and Wales. *British Association of Dermatologists*, *165*, 1044-1050. doi: 10.1111/j.1365-2133.2011.10464.x
- Schuttelaar, M., Vermulan, K., Drukker, N., & Coenraads, P. (2009). A randomized controlled trial in children with eczema: Nurse practitioner vs. dermatologist. *British Journal of Dermatology*, *162*, 162-170. doi:10.1111/j.1365-2133.2009.09502.x
- Schuttelaar, M. L., Vermeulen, K. M., & Coenraads, P., J. (2011). Costs and cost-effectiveness analysis of treatment in children with eczema by nurse practitioner vs. dermatologist: Results of a randomized, controlled trial and a review of international costs. *British Journal of Dermatology*, *165*(3), 600-611. doi:10.1111/j.1365-2133.2011.10470.x.
- Shah, H., Pozo-Garcia, L., & Koulouroudias, M. (2015). Dermatology- A compulsory part of the UK medical school curriculum? *Medical Education Online*, *20*, 1-2. doi:10.3402/meo.v20.30212

- Shariff, Z., Roshan, A., Williams, A. M., & Platt, A. J. (2010). 2-Week wait referrals in suspected skin cancer: Does an instructional module for general practitioners improve diagnostic accuracy? *The Surgeon, (8)*, 247-251. doi:10.1016/j.surge.2010.03.004
- Simpkin, S. (2016). *Smoking and its effect on the skin*. Retrieved from <https://www.dermnetnz.org/topics/smoking-and-its-effects-on-the-skin>
- Skin Cancer Foundation. (2016). *Skin cancer facts & statistics*. Retrieved from <http://www.skincancer.org/skin-cancer-information/skin-cancer-facts>
- Sliverberg, J. I. (2017). Public health burden and epidemiology of atopic dermatitis. *Dermatologic Clinics, 35*, 283-289. doi:10.1016/j.det.2017.02.002
- Stanik-Hutt, J., Newhouse, R. P., White, K. M., Johantgen, M., Bass, E. B., Zangaro, G., . . . Weiner, J. P. (2013). The quality and effectiveness of care provided by nurse practitioners. *The Journal for Nurse Practitioners, 9*(8), 492-500. doi:10.1016/j.nurpra.2013.07.004
- Statistics Canada. (2015). *Table 103-0554 Number of new cases and age-standardized rates of primary cancer (based on the November 2017 CCR tabulation file), by cancer type and sex, Canada, provinces and territories CANSIM*. Retrieved from <http://www5.statcan.gc.ca/cansim/a47>
- Statistics Canada. (2016a). *CANSIM table 105-0501- Perceived life stress, quite a lot, by sex, by province and territory* Retrieved from <http://www.statcan.gc.ca/tables-tableaux/sum-som/101/cst01/health107a-eng.htm>
- Statistics Canada. (2016b). *Text table 2.2- Population estimates, age distribution and median age as of July 1, 2016, Canada, provinces and territories* Retrieved from <http://www.statcan.gc.ca/pub/91-215-x/2016000/t593-eng.htm>

- Suneja, T., Smith, E. D., Chen, J., Zipperstein, K. J., Fleischer, A. B., Feldman, S. R. (2001). Waiting times to see a dermatologist are perceived as too long by dermatologists. *Journal of American Medical Association Dermatology*, 137(10), 1303-1307. doi: 10.1001/archderm.137.10.1303
- Tamer, E., Ilhan, M. N., Polat, M., Lenk, N., & Alli, N. (2008). Prevalence of skin diseases among pediatric patients in Turkey. *The Journal of Dermatology*, 35(7), 413-418. doi: 10.1111/j.1346-8138.2008.00495.x.
- Tensen, E., van der Heijden, J. P., Jaspers, M. W. M., & Witkamp, L. (2016). Two decades of teledermatology: Current status and integration in national healthcare systems. *Current Dermatology Reports*, 5, 96-104. doi:10.1007/s13671-016-0136-7
- The Association of Registered Nurses of Prince Edward Island. (2012). *Nurse practitioner standards for practice*. Charlottetown, PE: Author.
- The Public Health Agency of Canada. (2014). *Economic burden of illness in Canada, 2005-2008*. Retrieved from <http://www.phac-aspc.gc.ca/publicat/ebic-femc/2005-2008/assets/pdf/ebic-femc-2005-2008-eng.pdf>
- Tierney, E. P., Hanke, C. W. & Kimball, A. B. (2011). Practice models and roles of physician extenders in dermatologic surgery. *Dermatologic Surgery*, 37, 677–683. doi:10.1111/j.1524-4725.2011.01984.x
- Touchie, C. (2013). *Report of the incidence and prevalence of diseases and other health related issues in Canada*. Retrieved from <http://mcc.ca/wp-content/uploads/Touchie-Incidence-Prevalence-Report.pdf>

- Tourism PEI. (2017) *Economic development and tourism PEI annual report 2016-2017*. Retrieved from [https://www.princeedwardisland.ca/sites/default/files/publications/2016-2017\\_economic\\_development\\_tourism\\_annual\\_repot.pdf](https://www.princeedwardisland.ca/sites/default/files/publications/2016-2017_economic_development_tourism_annual_repot.pdf)
- Tran, H., Chen, K., Lim, A. C., Jabbour, J., & Shumack, S. (2005). Assessing diagnostic skill in dermatology: A comparison between general practitioners and dermatologists. *Australasian Journal of Dermatology*, 46(4), 230-234. doi:10.1111/j.1440-0960.2005.00189.x
- U.S. Department of Health and Human Services. (2011). *Playing outside could lead to healthier children*. Retrieved from <https://health.gov/paguidelines/blog/post/Playing-Outside-Could-Lead-to-Healthier-Children.aspx>
- Vakirlis, E., Theodosiou, G., Apalla, Z., Arabatzis, M., Lazaridou, E., Sotiriou, E., ... Ioannides, D. (2017). A retrospective epidemiological study of skin diseases among pediatric population attending a tertiary dermatology referral center in Northern Greece. *Clinical, Cosmetic, and Investigational Dermatology*, 10, 99-104. doi:10.2147/CCID.S130126
- Venning, P., Roland, M., Roberts, C., & Leese, B. (2000). Randomised controlled trial comparing cost effectiveness of general practitioners and nurse practitioners in primary care. *British Medical Journal Open*, 320, 1048-1053. doi:10.1136/bmj.320.7241.1048
- Warshaw, E. M., Hillman, Y. J., Greer, N. L., Hagel, E. M., MacDonald, R., Rutks, I. R., & Wilt, T. J. (2011). Teledermatology for diagnosis and management of skin conditions: A systematic review. *Journal of the American Academy of Dermatology*, 64(4), 759-772. doi:10.1016/j.jaad.2010.08.026
- Wey, S., & Chen, D. (2010). Common cutaneous disorders in the elderly. *Journal of Clinical Gerontology and Geriatrics*, 1(2), 36-42. doi:10.1016/j.jcgg.2010.10.010

- Whiting, G., Magin, P., Morgan, S., Tapley, A., Henderson, K., Oldmeadow, C., ... Stocks, N. (2016). General practice trainees' clinical experience of dermatology indicates a need for improved education: A cross-sectional analysis from the registrar clinical encounters in training study. *Australasian Journal of Dermatology*, 58(4), 1-8. doi:10.1111/ajd.12493
- Wilmer, E. N., Gustafson, C. J., Ahn, C. S., Davis, S. A., Feldman, S. R., & Huang, W. W. (2014). Most common dermatologic conditions encountered by dermatologists and nondermatologists. *Cutis*, 94, 285-292. Retrieved from <http://www.cutis.com/view-pdf.html?file=uploads/media/CT094120285>
- World Health Organization. (2010a). *Science-driven innovations for combating maternal and perinatal ill-health: The G.R.E.A.T. project*. Retrieved from [http://www.who.int/reproductivehealth/topics/best\\_practices/Great\\_Project\\_2010.pdf?ua=1](http://www.who.int/reproductivehealth/topics/best_practices/Great_Project_2010.pdf?ua=1)
- World Health Organization. (2010b). *Telemedicine: Opportunities and developments in member states: Report on the second global survey on eHealth*. Retrieved from [http://www.who.int/goe/publications/goe\\_telemedicine\\_2010.pdf](http://www.who.int/goe/publications/goe_telemedicine_2010.pdf)
- Yang, Y., Tu, H., Hong, C., Chang, W., Fu, H., Ho, J., Chang, W., ... Lee, C. (2014). Female gender and acne disease are jointly and independently associated with the risk of major depression and suicide: A national population-based study. *BioMed Research International*, 2014, 1-7. doi:10.1155/2014/504279
- Yousefi, M., Assari Arani, A., Sahabi, B., Kazemnejad, A., & Fazaeli, S. (2014). Household health costs: Direct, indirect and intangible. *Iranian Journal of Public Health*, 43(2), 202-209. Retrieved from <http://ijph.tums.ac.ir/>

Appendix A

Activity Timeline to Program Implementation

2018-2019	Sept	Oct	Nov	Dec	Jan	Feb	Mar-Aug	Sept.	Oct	Nov	Dec	Jan
1). Submit detailed plan of my initiative to Health PEI to seek support, feedback and funding.												
2). Obtain approval and funding from Health PEI for initiative.												
3). A job description will be developed, posted, interviewed for and awarded to a successful candidate												
4). The successful candidate will complete the NADNP certificate program												
4). The dermatology NP in will assist in developing policy and procedures for the position. These guidelines will receive approval from collaborating dermatologist and Health PEI.												
5). The NP will then spend six months working alongside the dermatologist in the clinic to learn and develop a collaborative working relationship.												
6). Ancillary staff at HHC trained in												

triaging dermatologic acuity and assisting in biopsy procedures and documentation.												
7). Contacting local laboratory to ensure readiness for specimen processing												
8). Contacting local pharmacies to ensure their awareness of new service												
9). Present at hospital primary care rounds to promote awareness of the service												
10). Begin TV, radio and internet advertisement												
11). Preparations to move into office at HHC, including purchasing required equipment and supplies												
12). Start seeing patients!												

## Appendix B

### Nurse Practitioner Satisfaction Survey

**Nurse Practitioner Satisfaction Survey**

**We are conducting a study of patient satisfaction regarding the use of nurse practitioners. The survey is completely confidential and only summary information will be reported in the study results. Thank you in advance for your help with this survey.**

Please indicate your degree of satisfaction with the following statements:  
 "SD"= Strongly Disagree "D"= Disagree "A"= Agree "SA"= Strongly Agree "U"= Uncertain

*Fill in the bubbles like this:* ●

	SD	D	A	SA	U
1. Overall I was satisfied with my visit with the nurse practitioner(NP) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I am likely to recommend the NP to others _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I am likely to schedule appointments with the NP in the future _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The NP was not rushed _____	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I would rather see the NP than my regular physician _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I was able to schedule a convenient appointment with the NP _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. When I feel the need to see a healthcare provider, I can get an appointment with the NP without a problem _____	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The Woman's Hospital Employee Health clinic is easy to access _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Scheduling an appointment with the Woman's Hospital Employee Health Clinic NP is easier than scheduling with my usual physician _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. My NP is a skilled healthcare provider _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. My NP discusses methods other than medication to treat my problem _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I am satisfied with how the NP treated me _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I was satisfied with the amount of time the NP spent with me _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. My NP is caring _____	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. My NP is knowledgeable about health problems _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I trust my NP _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. My NP knows when to refer to or consult with a physician _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. The NP listened to what I had to say _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. The NP was interested in my health concerns _____	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. The NP respected me _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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## Appendix C

### Proposed Annual Budget

Expenditures Amount NP Salary + 18% benefits	\$114,612
National Academy of Dermatology NursePractitioners (NADNP) Dermatology Certificate Program	\$6000
LPN Salary + benefits (50% shared)	\$31,305 (max rate)
Administrative Assistant salary + benefits (50% shared)	\$29,636 (max rate)
Supplies: pens, pencils, paper, photocopying, etc.	\$2000
Equipment: procedure trays, dermascope, etc.	\$5000
Education material, teaching props	\$1000
Medical office space in existing building	Provided in-kind by Health PEI
Advertising	\$3000
Educational Materials	\$4000
Total Costs	\$196,553