



Nurse Practitioner-Sensitive Outcomes

2016 Summary Report



College of
**REGISTERED NURSES
OF NOVA SCOTIA**
Setting the Standard for Care.

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A Summary Report Background

The College of Registered Nurses of Nova Scotia (CRNNS) believes that health policy, at both the provincial and national level, is influenced and strengthened by evidence related to outcomes of nursing practice. Thus, one of the key initiatives of CRNNS is to provide stakeholders, including government, registered nurses, nurse practitioners, employers and other health professionals, with access to evidence of the contributions made by registered nurses (RN) and nurse practitioners (NP) to health outcomes.

This document provides an overview of NP outcomes research, a summary of key research findings about outcomes sensitive to NP practice, and references and annotations of key articles. The intent is to update this document once a year with the latest research in the hopes that CRNNS will have an ongoing comprehensive resource of literature related to nursing outcomes for use by key stakeholders.

Introduction

The creation of the NP role was first established in the United States to increase access to health care for underserved paediatric populations (Mason, Vaccaro, & Fessler, 2000) and in Canada to meet the health care needs of underserved populations residing in the rural and remote northern areas (DiCenso et al. 2010; DiCenso, Paech & IBM Corporation., 2003; Tarrant & Associates, 2005). The implementation of the NP role was expected to reduce the costs of care, ensure high quality care (Nies et al. 1999; Sidani & Irvine, 1999), and increase access to health care services (Fahey-Walsh, 2004; DiCenso et al., 2003; Ingersoll, McIntosh & Williams, 2000).

NPs are registered nurses with advanced knowledge, skills and abilities to assess, diagnose, and treat patients with a variety of health problems or concerns. A large component of NP practice includes health promotion and prevention of disease and illness through health teaching, counselling, and screening of patients (Canadian Nurses Association, 2010; College of Registered Nurses Nova Scotia, 2011). The NP role has been studied more than any other role of the health care team. Studies have demonstrated that patients are satisfied with the care provided by NPs and when comparing similar outcomes with similar patient populations NPs provide care comparable to or better than physicians (DiCenso, et al., 2007; Kleinpell, 2001).

The purpose of this summary report is to identify research that demonstrates patient health outcomes sensitive to NP interventions. Patient health outcomes are defined as those changes that occur in patient's health status as a result of NP interventions (Nies et al. 1999). NP interventions are based on the NP's use of knowledge, skills, judgment, and experience in the care of patients (Kleinpell & Gawlinski, 2005). Identifying NP-sensitive outcomes will:

- Contribute to a better understanding of NP contributions,
- Provide valid rationale for the implementation of the NP role,
- Support ongoing integration of the NP role, and
- Make NP-sensitive interventions visible to the health care system.

Search Strategy

The search strategy used for this project sought to identify quantitative and qualitative published and unpublished studies of NP-sensitive patient health outcomes in the English language. This report is updated annually. Although randomized controlled trials (RCT) are acknowledged as the ‘gold standard’ for experimental research, NP interventions are complex and must be captured within the context of NP practice and patient relationships (Nies et al. 1999; Spilsbury & Meyer, 2001). Thus, findings were not limited to RCTs. Inclusion criteria were studies that demonstrated patient health outcomes specific to NP interventions; interventions within the scope of practice of NPs; and results that indicated a positive relationship between an NP intervention and patient health outcomes. Articles were reviewed to 1) identify quality indicators; 2) models used to establish quality indicators; and 3) use of standardized models to determine quality indicators, such as those developed by the National Committee on Quality Assurance’s (NCQA) Health Plan Employee Data and Information Set (HEDIS). Quality indicators included in HEDIS are immunization status, smoking cessation, treatment of hypertension, health screenings, and prenatal care (Buppert, 2000). Electronic databases searched were:

- CINHAL
- Medline
- The Cochrane Library
- Digital Dissertations
- Evidence Based Medicine
- EBSCO
- Google Scholar
- PsychInfo
- Summons
- Web of Science

Search terms included:

- nurse practitioner
- outcomes
- nurse practitioner and outcomes
- evaluation
- nurse practitioner “practice”

Conceptual Framework

The Nursing Role Effectiveness Model (NREM) was used as the conceptual framework to guide the inclusion of studies. The NREM is one of the early conceptual models to incorporate the structure- process-outcomes model of quality care (Irvine, Sidani, & McGillis Hall, 1998). Defining a nursing conceptual model to NP practice contributes to a deeper understanding of NP practice patterns. Sidani and Irvine (1999) found that much of the early research on the outcomes of NP practice lacked a theoretical framework and failed to demonstrate a relationship between the interventions and outcomes of care, as well as the inability to differentiate outcomes that were NP sensitive. Use of a theoretical framework to guide research contributes to differentiation of outcomes unique to NP practice. Although early outcomes research originated in medicine (Burns & Grove, 2001), nursing has undertaken major efforts to identify nursing-sensitive patient outcomes (Pringle & Doran, 2003). The NREM is one of the early conceptual models to incorporate the structure-process-outcomes model of quality care (Irvine et al. 1998).

The importance of the NREM is its contribution to the identification of nursing-sensitive patient outcomes. Irvine et al. separates the process of care into nurses’ independent, dependent and interdependent role functions. Outcomes

of care are then related directly to various nursing role functions. The NREM demonstrates how structure variables influence the process of how nurses provide care and thus the outcomes of care that could be directly related to nursing practice. The NREM has also been applied to advanced practice nurses (Sidani & Irvine, 1999) and thus has been used in this critical analysis.

The NREM is grounded in Donabedian's theory of evaluation of quality health care. Sidani and Irvine (1999) used the NREM to develop a conceptual framework for evaluating NP practice in the acute care setting. The framework considers multiple relationships among structural variables and multiple dimensions of influence on the process of care (Ingersoll, 2005). The NREM attempts to focus on those outcomes that are specifically the result of NP interventions (Ingersoll, 2005; Sidani & Irvine, 1998).

Results

This report has been update annually since 2008 and new articles, that met the inclusion criteria, have been added. Articles are excluded if the findings cannot be directly related to NP practice, no difference between comparison groups, or the use of terms made it difficult to associate findings to NP specific practice. Articles are also excluded if the terms advanced practice nurse and nurse are used without the designation of NP. We also have included an article that looked at the manager's role in NP implementation because the findings may assist managers who face similar issues.

Summary of Findings

Studies include those related to; patient satisfaction with care provided by NPs, comparisons of care provided by NPs to MDs and other providers, evaluation of various models of care provided by NPs, managers' responsibilities during NP role implementation, and literature reviews and synthesis of NP practice and outcomes research. There are also provincial level reports of the evaluation of NP role implementation and integration and texts that provide comprehensive information pertaining to studies of advanced practice nursing (APN) outcomes. Additionally, several internet resources are provided. Although the internet resources do not discuss NP sensitive outcomes, they provide valuable information related to the quality of care and cost-effectiveness of the NP role, and a toolkit for implementation and evaluation of the NP role.

In this report, we found that patient satisfaction and education (Kleinpell, 2009) are the most commonly researched patient related outcomes associated with NP practice. Increasingly studies relating NP interventions to patient health outcomes other than satisfaction levels are being published as demonstrated by various models of NP practice in this report.

Overall, researchers have consistently found that patients are satisfied with the care provided by NPs, would recommend NPs to others, and would see the NP again for care. Similar health outcomes were achieved when care provided by NPs and physicians is compared. Collaboration between NPs and MDs and NP/paramedic/physician teams achieve positive patient outcomes. Care provided by NPs reduces costs, length of stay, and wait times. NPs provide patient education, health promotion, and involve patients in care. NPs spend time with patients and have expert communication skills. NPs accurately order and interpret diagnostic tests, prescribe medications appropriately, and use clinical practice guidelines.

For the purpose of convenience, articles and reports are grouped into the following categories: 1) patient satisfaction with care received from NPs, 2) comparison of care provided by NPs and MDs, 3) comparison of care provided by NPs and other providers, 4) models of NP practice 5) literature review of NP outcomes research, 6) overview and synthesis of NP outcomes research, 7) managers implementing NP role, 8) reports, 9) textbooks, and 10) internet resources.

Patient Satisfaction with Care Received from Nurse Practitioners

Article 1 (new for 2016)

Sangster-Gormley, E., Griffith, J., Schreiber, R., Feddema, A., Boryki, E., & Thompson, J. (2015). Nurse practitioners changing health behaviours: One patient at a time. *Nursing Management*, 22(6), 26-31.

The aim of the paper was to report findings from a mixed methods study of patient satisfaction with NP care and behavioural changes they undertook as a result of the care.

Type of Study: Multiphase three year mixed-methods design including a researcher developed patient survey that included the Patient Satisfaction with Nurse Practitioner Care Instrument (PSNPCCI) and open and closed-ended questions patient and interviews. The PSNPCCI measures three areas of patient satisfaction: comprehensiveness, inattentiveness and caring. Patients of NPs were recruited through the offices of NPs who had previously completed a survey in the first year of the project and advertisement in community newspapers. A total of 148 patients completed the survey and 24 patient interviews were conducted.

Findings: Patients were satisfied with the comprehensiveness of their care, they indicated NPs were not inattentive, instead they found NPs were attentive and caring. Patients indicated on the survey that NPs improved access to care by providing comprehensive, convenient and continuity of care. As a result of NP care patients were exercising more, made dietary changes and understood the reasons for taking medications better.

Article 2

Gogan, M.J. & Maybee, P. (2011). Patient satisfaction with nurse practitioner care in primary care settings. *Australian Journal of Advanced Nursing*, 28(4), 12-19.

The purpose of this paper was to determine the level of patient satisfaction and acceptance of the NP role in New Zealand.

Type of Study: Descriptive study using the Satisfaction with Care Survey to obtain data on two outcomes of NP practice, patient satisfaction with and acceptance of care provided by NPs. The Satisfaction with Care Survey is made up of 21 items measuring attentiveness, comprehensive care and role clarity. Two additional items were added, one to capture overall satisfaction and the second to address acceptance of the role. Patients from two practice settings participated in the study. One setting was a primary care clinic where one NP worked 2 days/ week and the second was a university health clinic where an NP intern worked 1 day/week. Data was collected over 6 months and 193 surveys representing 193 patients were completed and returned.

Findings: Younger patients were more satisfied with NP care. There was no correlation between waiting time and satisfaction, shorter wait times did not correlate to higher satisfaction or longer wait times with lower satisfaction. Males and females reported similar levels of satisfaction with NP care. Level of satisfaction was similar regardless of reason for the patient visit. Participants had a moderate level of understanding of the role although it is new to New Zealand, younger participants were more satisfied and accepting of the role that those who were older.

Article 3

Budzi, D., Lurie, S, Singh, K. & Hooker, R. (2010). Veterans' perceptions of care by nurse practitioners, physician assistants, and physicians: A comparison from satisfaction surveys. *Journal of the American Academy of Nurse Practitioners*, 22, 170-176.

The purpose of this study was to examine the difference in patient satisfaction with care provided by NPs, physician assistants (PA), and physicians in the Veterans Health Administration system (VHA) in the US.

Type of Study: A descriptive, correlational design using secondary data obtained from the Survey of Healthcare Experiences of Patients (SHEP). Total surveys from veterans receiving outpatient care were 1,601,828 of these 2212 received care from a PA, 7185 from an NP, and 12,527 from a physician.

Findings: Patients were more satisfied with care provided by NPs. Patients were satisfied with how NP paid attention to their educational needs, individualized their care and were active listeners. Most of the outpatients surveyed preferred to see an NP for primary care rather than a PA or physician.

Article 4

Jennings, N., Lee, G., Chao, K. & Keating, S. (2009). A survey of patient satisfaction in a metropolitan emergency department: Comparing nurse practitioners and emergency physicians. *International Journal of Nursing Practice*, 15, 213-218.

The purpose of this study was to explore patient satisfaction with care provided in emergency departments (ED) in Australia by an emergency NPs (ENP) and ED doctors.

Type of Study: A patient survey consisting of 16 questions and using a Likert scale of strongly agree to strongly disagree was developed from previously validated tools. Questions related to patients' ED experience. The survey was distributed to patients in the Fast Track area of the ED. A total of 202 patients completed the survey, 103 patients were seen by the ENP and 99 by the ED doctor.

Findings: More patients in the ENP group were satisfied with their care than in the ED doctor group.

Article 5

Sidani, S. & Doran, D. (2010). Relationships between processes and outcomes of nurse practitioners in acute care: An exploration. *Journal of Nursing Care Quality*, 25(1), 31-38.

The purpose of this study was to explore the relationships between processes of care provided by acute care NPs (ACNP) and patient outcomes. Data from this study was obtained from a larger study that compared the practice patterns and outcomes of NP and physician residents in acute care settings in Canada. Processes of care provided by ACNPs included coordination of patient care and provision of patient education and counselling. Outcomes selected for this study include symptom resolution, functional status and satisfaction with care.

Type of Study: A repeated-measures design. Patients were followed at three points in time: Time 1 within 24 to 48 hours of admission to an inpatient unit; Time 2 within one week post-discharge, Time 3 within six to eight weeks post-discharge. A convenient sample of 320 patients recruited from eight acute care institutions. Several scales were adapted for use these included: Perception of counselling and education was measured with relevant items from the Patient-Centered Comprehensive Subscale of the Individualized Care Index, symptom resolution was measured with an adapted version of the symptom distress scale, functional status was measured with relevant subscales of the Medical Outcomes Study Short-Form (SF-36) acute version, and patient satisfaction was measured with the Satisfaction with the Hospital Quality Questionnaire.

Findings: Coordination of care was associated with increased patient satisfaction and improvement in mental health. The provision of education and counselling by the ACNP resulted in patients' improved physical and social functioning.

Article 6

Benkert, R., Hollie, B., Nordstrom, C., Wickson, B. & Bins-Emerick, L. (2009). Trust, mistrust, racial identity and patient satisfaction in urban African American primary care patients of nurse practitioners. *Journal of Nursing Scholarship*, 41(2), 211-219.

Benkert, R., Peters, R., Tate, N. & Dinardo, E. (2008). Trust of nurse practitioners and physicians among Americans with hypertension. *Journal of the American Academy of Nurse Practitioners*, 20, 273-280.

The purpose of this study was to expand on the work in patient satisfaction by describing patient and provider demographics; level of cultural mistrust, medical mistrust, racial identity and satisfaction with NP care; and relationships between patient variables (cultural mistrust, medical mistrust, and racial identity; trust of providers;

and patient satisfaction) in African American patients of NPs in the US. The results of this study were report in two articles, both listed above.

Type of Study: Descriptive cross-sectional study using a convenient sample of self-identified African American or Black patients (n=100) of NPs. Several scales were used: Trust in Provider Scale (TPS), Black Racial Identity Attitude Scale (BRIAS), Group Based Medical Mistrust Scale (GBMMS), and patient satisfaction scale Michigan Academic Consortium patient satisfaction questionnaire.

Findings: Female participants were satisfied and trusted the NPs providing care in a nurse-managed centre.

Article 7

Thrasher, C. & Purc-Stephenson, R. (2008). Patient satisfaction with nurse practitioner care in emergency departments in Canada. *Journal of the American Academy of Nurse Practitioners*, 10, 231-237.

The purpose of this study was to develop a valid and reliable measure of patient satisfaction with various components of care provided by an NP in the emergency department.

Type of study: Self-reported 21-item questionnaire distributed to patients (n=114) over a one-week period in five emergency departments in Ontario. Survey components included attentiveness of the NP, comprehensive care provided by the NP, and patient understanding of the NP role.

Findings: Patients were highly satisfied with the NP and had a moderate understanding of the role. Patients felt the NP spent enough time with them, took their problems seriously, and gave them a chance to discuss their concerns. Patients were also satisfied with their treatment and health information received from the NP and believed they had a good understanding of the NP role.

Article 8

Sidani, S., Doran, D., Porter, H., Lefort, S., O'Brien-Pallas, L, Zahn, C., et al., (2007). Outcomes of nurse practitioners in acute care: an exploration. *Internet Journal of Advanced Nursing Practice*, 8(1), 3.

The purpose of this Canadian study was to compare the outcomes achieved by adult patients, who did (n=78) and did not (n=45) receive care from an acute care nurse practitioner (ACNP), within one week following discharge.

Type of study: A comparative, cross-sectional design. Outcomes assessed were patient satisfaction with care, functional status, symptom resolution, and sense of well-being. Satisfaction with care was measured by the Satisfaction with the Hospital subscale of the Patient Judgment of Hospital Quality Questionnaire (PJHQ). Functional status was measured with the Medical Outcome Study-Short Form (SF-36), acute version. Symptom resolution was measured with an adapted version of the Symptom Distress Scale (SDS). Sense of well-being was measured with the General Health Perceptions Subscale of the SF-36.

Findings: Patients who received care from the ACNP were more satisfied with their care, had a higher level of physical functioning, less role limitations due to physical and mental health, and higher levels of social functioning. This study begins to demonstrate that the process of care provided by ACNPs contribute to the health sensitive outcomes of satisfaction and functional status.

Article 9

Beal, J. & Quinn, M. (2002). The nurse practitioner role in the NICU as perceived by parents. *Maternal Child Nursing (MCN)*, 27(3), 183-188.

The purpose of this study was to understand and describe parents' perception of the care delivered by an NP in the newborn intensive care unit (NICU) to critically ill neonates.

Type of Study: In this phenomenological study parents' (n=8) of critically ill neonates were interviewed to obtain their point of view of care provided by an NP in the neonatal intensive care unit (NICU) in the US.

Findings: Five themes emerged from the parents' descriptions of care provided by the NP. Themes obtained from interviews were "being positive and reassuring", "being present", "caring", "translating of information", and "making parents feel at ease" (pg. 185). An underlying thread detected by the researchers was NPs expert communication skills. These skills contributed to parents feeling that the NP was present, approachable, and available to them. Parents overall felt positive about care provided to their infant by the NP.

Article 10

Barr, M., Johnston, D. & McConnell, D. (2000). Patient satisfaction with a new nurse practitioner service. *Accident & Emergency Nursing*, 8, 144-147.

The purpose of this study was to determine patient satisfaction with care received from a NP newly introduced into the emergency department, determine the NP's accuracy of ordering and interpreting x-rays, and assess perceptions of other disciplines of the NP role in the emergency department in Northern Ireland.

Type of study: patient satisfaction. Survey Design, N=241 questionnaires. Additionally 85 x-ray films were assessed for appropriate ordering and accuracy of interpretation compared with senior house officers (SOH). Four unstructured interviews with other disciplines were conducted to assess subjective perceptions of other disciplines of the NP role in the emergency department.

Findings: 100% of patients receiving care from a NP were satisfied with their care, would recommend NP services to others, and would see the NP again. Recommendations for improvement of NP services included having a NP on site all of the time and having more NPs available to provide care. Evaluation of x-rays indicated a high level of accuracy in interpretation of films. Consultant radiologist felt the NP was ordering x-rays on a satisfactory portion of patients seen in the emergency department. Interviews conducted with other disciplines demonstrated strong support for the NP role.

Comparison of Care Provided by NPs and MDs

Article 1 (new for 2016)

David, D., Britting, L., Dalton, J. (2015). Cardiac acute care nurse practitioner and 30-day readmission. *Journal of Cardiovascular Nursing*, 30(3), 248-255.

The purpose of this study was to determine if the addition of a cardiac acute care NP (CACNP) to an existing team would improve utilization outcomes in patients admitted to a CCU.

Type of Study: Quantitative retrospective, 2-group comparison design. One group of patients were cared for by the CCU physician house staff team that included a CACNP and the other group were cared for by the CCU house staff (1 attending, 1 cardiology fellow, 3 residents and 3 interns) without a CACNP. Patients (n=185) admitted directly to the CCU from the emergency department or an outside hospital between December 1, 2008 and September 1, 2010 were assigned to either teams based on team availability and received care from nursing, social work, physical therapy, nutritionists, and other disciplines as required.

Findings: Patients receiving care from the team that included the CACNP were less likely to return to hospital within 30 days after discharge. The 30-day emergency department return rate was 11.9% for the team with the CACNP and 25% for the team without. Hospital readmission rate for the CACNP team was 13.8% and 28.9% for the team without a CACNP. The authors attributed the CACNP's patient teaching, care coordination, and multidisciplinary integration contributed to reduced rehospitalizations of patients with heart failure and MI.

Article 2 (new for 2016)

Kuo, Y., Chen, N., Baillargeon, J., Raji, M., & Goodwin, J. (2015). Potentially preventable hospitalizations in Medicare patients with diabetes. A comparison of primary care provided by nurse practitioners versus physicians. *Medical Care*, 53(9), 776-783.

The aim of this study was to compare the rate of potentially preventable hospitalizations of patients with diabetes between NPs and physicians.

Type of Study: Cross-sectional and longitudinal analysis of diabetic patients who received all of their care in a given year from an NP (n=93,443) or a physician (n=252,376). The national Medicare database was to identify the cohort, data were obtained for years 2007-2010. The outcome was hospitalization for potentially preventable condition in a given year. A variety of statistical analyses were performed including multivariable analyses, inverse probability treatment weighting with a pooling propensity score, nonpooling propensity score adjustment, nonpooling propensity score matching and instrumental variable analyses.

Findings: There was no evidence to suggest that older patients with diabetes receiving all of their care from NPs were at higher risk of potentially preventable hospitalization than patients who received their care from a physician.

Article 3 (new for 2016)

Solomon, D., Fraenkel, L., Lu, B.m Brown, E., Tsao, P., Losina, E. ... Bitton, A. (2015). Comparison of care provided in practices with nurse practitioners and physician assistants versus subspecialist physicians only: A cohort study of rheumatoid arthritis. *Arthritis Care & Research*, 67(12), 1664-1670.

The purpose of this study was to compare care provided by NPs or physician assistants (PAs) and a rheumatologist to care provided by rheumatologist alone.

Type of Study: Practices selected were a convenience sample of 7 rheumatology practices in the US (4 with NPs or PAs and 3 without). A repeated-measures analysis using generalized linear progression compared patients' disease activity for visits to practices with and without NPs/PAs. Data were abstracted from medical records from the most recent two years and included 301 patients representing 1,982 visits. Disease activity measures were a Disease Activity of Score in 28 joints, a Clinical Disease Activity Index score or a Routing Assessment of Patient Index Data 3 score.

Findings: The mean number of visits per patient was higher in practices with an NP or PA (7.4+ 2.6 vs. 5.7 + 1.9). In practices with NP or PA 61.9% of visits did not include a rheumatologist. Patients in practices with NPs or PAs had lower disease activity than those seen in the rheumatologist-only practice. More visits with the NP or PA included laboratory and/or radiology tests and more patients were on synthetic and/or biologic DMARDs. Increasing NPs or PAs in subspecialty practices does not compromise the process or outcomes of care.

Article 4 (new for 2016)

Virani, S., Maddox, T., Chan, P., Tang, F., Akeroyd, J., Risch, S. ...Petersen, L. (2015). Provider type and quality of outpatient cardiovascular disease care: Insights from the NCDR PINNACLE registry. *Journal of the American College of Cardiology*, 66(16), 1803-1812.

The aim of this study was to determine whether there was clinical differences in the quality of care delivered by advanced practice providers (APPs) [NPs and PAs] versus physicians.

Type of Study: Cohort study of patient with coronary artery disease (CAD), heart failure (HF), or atrial fibrillation (AF) who received care in an outpatient cardiology clinic between January 1, 2012 and December 31, 2012. The unit of analysis was the individual provider. Inclusion criteria for primary analysis included patients (n=459,669) in practices with both an APP and a physician (n=41 practices/883 providers). Care provided by APPs (n=43,531 patients; n=141 NPs, 26 PAs) was compared to that of physician (n=416,138 patients; n=716 physicians). Secondary analysis included

patients in practices with both an APP and physician compared to patients in practices with only a physician (n=49 practices with 189,240 patients).

Findings: Patients of APPs were slightly older, female, African American and had no health insurance and were diabetic, less likely to use tobacco and lower prevalence of MI. These patients had fewer visits to see the APP in the last 12 months. The quality of outpatient CVC care measured by compliance with documented performance measures by APPs was similar to physicians. APPs were more likely to meet the performance measures of smoking cessation and cardiac rehabilitation referral for their patients with CAD than physicians. As well, the quality of outpatient CVD care delivered in practices with both physicians and APPs was equivalent to that delivered in practices with physician only.

Care provided by NPs and PAs was not compared or separated in the study. Overall, collaborative care by APPs and physicians seemed to provide care quality equivalent to physician only.

Article 5

Wall, S., Scudamore, D., Chin, J., Rannie, M., Suhont, T., Reese, J., & Wilson, K. (2014). The evolving role of the pediatric nurse practitioner in hospital medicine. *Journal of Medicine*, 9(4), 261-265.

The intent of the program evaluation was to compare cost and pediatric patient outcomes among pediatric NP hospitalist team, an PNP/MD team and two resident teams without PNPs.

Type of Study: Retrospective review of administrative and electronic medical record (EMR) data from July 1, 2009 to June 30, 2010 (n=1664). Measures included adherence to clinical care guidelines, length of stay, and cost of care. Approximately 20% of admissions were followed by the PNP team, 45% followed by resident teams and 35% were on the PNP/MD team.

Findings: Evidence suggests that PNP hospitalists provide comparable care to resident teams at lower costs for patients with uncomplicated bronchiolitis, pneumonia, and asthma.

Article 6

Reuben, D. B., Ganz, D.A., Roth, C.P., McCreath, H.E., Ramirez, K.D., & Wenger, N.S. (2013). Effect of nurse practitioner comanagement on the care of geriatric conditions. *Journal of the American Geriatric Society*, 61, 857-867.

The purpose of this study was to determine if physician and NP co-management using the Assessing Care of Vulnerable Elders (ACOVE)-2 model could improve the quality of care for geriatric conditions.

Type of Study: Case study involving two community based primary care practices in the US. One practice included seven MDs and one NP, the other five MDs and one NP. The ACOVE-2 model incorporates principles of the Chronic Care Model and is designed for use in community based practice by changing how clinicians and support staff work together. In each practice NPs were expected to co-manage four conditions: 1) falls, 2) urinary infections (UIs), 3) dementia, and 4) depression.

Patients in each of the practices that met the inclusion criteria were assigned to be co-managed by an NP or by an MD alone with no NP involvement. Quality of care was assessed by chart review using the ACOVE-3 quality indicators (QIs) (falls 11 QIs, UI 10 QIs, dementia 14 QIs, and depression 16 QIs) which were developed to evaluate care of community dwelling vulnerable elderly adults. In this study 485 patients were enrolled, n=237 saw an NP for co-management of at least one condition and n=248 were managed by an MD without NP involvement.

Findings: Co-managed care by an NP was positively and significantly associated with patients receiving recommended care. Quality scores were higher for all patients who saw an NP for falls 80% vs 34%, UI 66% vs 19%, and dementia 59% vs 38%. Quality scores for patients with depression were no different, 63% vs 60%.

Article 7

Weitz, T., Taylor, D., Desai, S., Upadhyay, U., Waldman, J., Battistelli, M., & Drey, E. (2013). Safety of aspiration abortion performed by nurse practitioners, certified nurse midwives and physician assistants under a California legal waiver. *American Journal of Public Health, 103*(3), 454-461.

The objective of this evaluation research was to examine the impact of patient safety if NPs, certified nurse midwives (CNMs) and physician assistants (PAs) were permitted to provide aspiration abortions in California.

Type of Study: Prospective, observational study to evaluate the outcomes of 11487 early aspiration abortions completed by MDs (n=5812) and newly trained NPs, CNMs, and PAs (n=5675) in five different settings in the US.

Findings: Complications resulted in 1.3% (n=152) cases; 1.8% for NP, CNM, PA performed aspirations and 0.9% for MD performed aspiration. The unadjusted risk difference for total complications between the two groups was 0.87 (95% confidence interval [CI]=0.45, 1.29) indicating clinically equivalent between newly trained NPs, CNMs and PAs and MD.

Article 8

Dinh, M., Walker, A., Parameswaren, A., & Enright, N. (2012). Evaluating the quality of care delivered by an emergency department fast track unit with both nurse practitioners and doctors. *Australasian Emergency Nursing Journal, 15*, 188-194.

The aims of this Australian study were to describe the quality of care delivered by the fast track unit and to compare the quality of care provided by an emergency nurse practitioner (NP) and emergency doctors.

Type of Study: Observational study of a convenient sample of emergency patients. Patients who consented to participate in the study were randomized by the triage nurse to either the NP or the emergency doctor.

Randomization was achieved using sealed envelopes in a computer generated sequence. Patient participants completed a self-administered satisfaction survey and rated their care at discharge from the emergency department's fast track. Quality of care was measured by patient satisfaction scores, overall rating of care at discharge, health status at two weeks and adverse events. Follow-up status was assessed with the Short Form 12 health version two (SF12V2). The electronic patient tracking system (Power Chart) radiology reports, and self-reports were used to assess for secondary outcomes. Descriptive statistics were used to summarize quality of care delivered. A total of 320 patients were enrolled into the study, n=155 to emergency doctors and n=165 to the NP.

Findings: The results suggest that care provided by NPs and doctors working together in a fast track unit is high quality. Patient satisfaction with care provided by the NP appeared to be slightly higher. Overall health outcomes and adverse event rates were similar in the two groups at two weeks.

Article 9

Dierick-van Daelle, A., Metsemakers, J., Derckx, E., Spreeuwenberg, C. & Vrijhoef, H. (2009). Nurse practitioners substituting for general practitioners: randomized controlled trial. *Journal of Advanced Nursing, 65*(2), 391-401.

The aim of this study was to evaluate process and care outcomes provided by NPs or general practitioners (GP) in primary care in The Netherlands.

Type of Study: Randomized controlled trial, a convenience sample of 12 NPs and 50 GPs participated. Patients (n=1501) were enrolled in the study and randomized to the NPs (n=817) and GPs (n=684). The researchers identified six areas of interest, these were: 1) demographics and health status, 2) patient perceptions of quality of care, 3) effectiveness of the consultation and follow-up consultations, 4) duration of consultation, 5) compliance with practice guidelines for GPs, and 6) medical resource consumption. Patients' perception of quality of care was assessed with 12 items derived from previously validated instruments. Effectiveness of the consultation and follow-up consultation was

assessed by using the EQ- 5D which measures five attributes: mobility, self-care, usual activity, pain/discomfort, and anxiety/depression. Three questionnaires were used for data collection and self-administered before the consultation, immediately after the consultation and two weeks after the consultation and returned via mail.

Findings: In both groups patients greatly appreciated the quality of care provided. There was no statistically significant difference between the two groups in terms of health status, medical resource consumption or compliance with practice guidelines. Patients in the NP intervention group were invited to return for appointments more often, had more follow-up consultations and the appointments took significantly longer.

Article 10

Jennings, N., O'Reilly, G., Lee, G., Cameron, P., Free, B. & Bailey, M. (2008). Evaluating outcomes of the emergency nurse practitioner role in a major urban emergency department, Melbourne, Australia. *Journal of Clinical Nursing*, 17(8), 1044-1050.

The aim of this study was to assess the impact of the introduction of Emergency Nurse Practitioner Candidates (ENPC) on waiting times and length of stay of patients seen in an urban Emergency Department (ED) in Australia.

Type of Study: Retrospective case series of ATS category 3-5 patients presenting to the ED during a 12 month period. Data were compared between care provided by an ENPC and the traditional model (TM). Outcome measures were length of stay and wait times.

Findings: Patients seen by the ENPCs (n=572) had shorter waiting times and length of stay than patients in the TM group (n=2584).

Article 11

Sidani, S., Doran, D., Porter, H., LeFort, S., O'Brien-Pallas, L., Zahn, C. et al. (2006). Processes of care: Comparison between nurse practitioners and physician residents in acute care. *Canadian Journal of Nursing Leadership*, 19(1), 69-85.

The purpose of this Canadian study was to compare performance of role functions, provision of comprehensive care, and coordination of services of acute care NPs (ACNP) and physician residents (PR).

Type of study: Cross-sectional comparative design, using questionnaires, ACNP N=31, PR N=10, patients N=366 (320 patients care for by ACNP & 46 patients care for by PR).

Findings: Both groups spent the majority of their time in clinical practice providing care planning, diagnostic, and consultative activities. ACNPs spent more time in management tasks and informal coordination of care activities. These activities are associated with prevention of complications associated with care delivery, reduced costs of care, and decreased length of stay. Patients reported higher levels of care coordination, participation in care, counselling, and education from ACNP. These aspects of care are associated with more patient-centred care.

Article 12

Lenz, E., Mundinger, M., Kane, R., Hopkins, S. & Lin, S. (2004). Primary care outcomes in patients treated by nurse practitioners or physicians: Two-year follow-up. *Medical Care Research and Review*, 61(3), 332-351.

This is a two-year follow-up study of patients who were seen by NPs and physicians in a primary care setting in the US.

Type of study: Comparison study of NP and physician practice outcomes, N=406.

Findings: In this follow-up study there was no difference between patients followed by NPs or physicians in self-reported health status, physiological indicators related to hypertension and asthma, satisfaction with care, and utilization of health services at two years. Comparison of the two groups also indicated that there was no difference between the two groups in terms of utilization of specialists, emergency care services, or frequency of hospitalization.

Article 13

Lenz, E., Mundinger, M., Hopkins, S., Lin, S., Smolowitz, J. (2002). Diabetes care processes and outcomes in patients treated by nurse practitioners or physicians. *The Diabetes Educator*, 28(4), 590-598.

This study is part of a larger US study conducted by Mundinger, et al. in 2000. The aim of the study was to compare the processes of care provided by NPs and physicians caring for patients with diabetes.

Type of study: Analysis of data obtained for chart audits of 145 patients with type 2 diabetes treated by either a NP or physician. Charts were audited to determine evidence of specific patient education, monitoring, and referrals.

Findings: NPs were more likely than physicians to document general diabetic education related to nutrition, weight, exercise, and medication. NPs ordered urinalysis and glycosylated hemoglobin (HbA1C) more often than physicians. Patients of NPs and physicians had similar health outcomes. The levels of glycosylated hemoglobin reflected inadequate diabetes control in both groups of patients. These findings support evidence of patient education and health promotion activities carried out by NPs.

Article 14

Kinnersley, P. Anderson, E., Parry, K., Clement, J., Archard, L., Turton, P. et al. (2000). Randomized controlled trial of nurse practitioner versus general practitioner care for patients requesting “same day” consultations in primary care. *British Medical Journal*, 320, 1043-1048.

The purpose of the study was to determine differences in NP and general practitioner care for patients in primary care settings in south Wales and south west England.

Type of study: Randomized control trial. Patients requesting same day consultation were randomized to be assessed by either an NP (n=652) or physician (n=716). Patients in both groups completed a pre-consultation questionnaire assessing their level of discomfort and concerns and a post-consultation satisfaction questionnaire. A second questionnaire was mailed to patients two weeks after the visit to determine resolution of symptoms and their current level of concern, whether they had sought additional treatment since the last visit, and how they would deal with similar illnesses in the future. Primary outcomes were patient satisfaction immediately after the consultation, resolution of symptoms at two weeks, and resolution of concerns at two weeks. Secondary outcomes included care in the consultation (length of consultation, information provided), resource use (prescriptions, investigations, referrals), follow up consultations, and patients’ intentions for dealing with future similar illnesses.

Findings: Patients who saw the NP were more satisfied with care, NP consultation time was longer, and patients reported receiving more information. There was no difference between patient groups in reported symptoms or concerns at two weeks. There was no difference in prescriptions written, diagnostic tests ordered or referrals made.

Comparison of Care Provided by NPs and Other Providers

Article 1

Hannan, J. (2013). Supporting parents and families: APN telephone follow up to low-income first time mothers. *Journal of Clinical Nursing*, 22, 262-270.

The aim of this US study was to examine the effects of a telephone intervention made by an NP for two months post-birth to low-income first time mothers of healthy full term infants in the US.

Type of study: A two group randomized clinical trial. Maternal health (perceived stress, social support and perceived physical health), infant health (routine medical follow up visits, immunizations, weight gain), infant morbidity (urgent care visits, emergency room visits, re-hospitalizations) and health care charges (urgent care visits, emergency room visits, re-hospitalizations) were compared between two groups of mothers and newborns, control group (n=69), intervention group (n=70). The intervention group received routine hospital discharge care and follow up telephone

calls from an NP for 8 weeks after discharge. The control group received routine hospital discharge care.

Maternal health was measured using the Perceived Stress Scale, Multidimensional Scale of Perceived Social Support (MSPSS) and Maternal Perception of Health Scale. Infant health was measured by asking mothers to document acute care visits, hospitalizations and routine infant health visits for immunizations and weight gain. Health care charges were obtained from infants' medical records of emergency room visits, acute care visits or re-hospitalizations. Charges for NP services were determined by adding total time spent on telephone follow-up, charting, filing, administrative time and consultation with physicians.

Findings: Mothers in the intervention group had significantly lower perceived stress, significantly greater perceived health and social support; infants had healthier weight gain, fewer emergency room visits; and significantly lower total health care charges (\$14,333 vs. \$70,834) compared to the control group.

Article 2

Nieuwkerk, P.T., Nierman, M.C., Visser, M.N., Locadia, M., Greggers-Peusch, P., Knape, L.P.M.,...Stroes, E.S.G. (2012). Intervention to improve adherence to lipid-lowering medication and lipid-levels in patients with an increased cardiovascular risk. *American Journal of Cardiology*, 110(5), 666-672.

The purpose of this study was to investigate whether nurse practitioner-led cardiovascular risk-factor counseling improved statin adherence and lipid levels without increasing patient anxiety.

Type of Study: Using computer randomization, patients were randomly assigned to one of two groups, routine care (RC) n= 100, or extended care (EC) n=101. All participants visited an NP in addition to their regular physician. RC included measuring body weight, blood pressure and lipid profile at each visit. Patients in the EC group received RC and multifactorial risk-factor counseling by the NP who also discussed modifiable and non-modifiable risk factors. Counseling focused on changing modifiable risk factors such as increasing physical activity, weight loss, smoking cessation and medication adherence. The Framingham risk score was calculated to demonstrate ten-year risk and target risk. A total of 201 patients were enrolled into the study from outpatient clinics in two hospitals in Amsterdam, the Netherlands.

Findings: Patients in the EC group reported significantly higher levels of adherence to lipid-lowering medications, significantly lower levels of anxiety and lower LDL cholesterol.

Models of NP Practice

Article 1 (new for 2016)

Echeverry, L., Lamb, K., & Miller, J. (2015). Impact of APN home visits in reducing healthcare costs and improving function in homebound heart failure. *Home Healthcare Now*, 33(10), 532-537.

The purpose of this pilot project was to improve health outcomes of homebound older adults with heart failure and decrease the costs of healthcare by providing primary care visits in the home.

Type of Study: Pilot quality improvement project. Forty homebound patients with Class III or IV heart failure and who had not sought care in the last year and were not receiving home care were included. The NP was notified of one of the participating patient's hospital admission and discharge by either a physician, case manager or social worker. The NP made an initial home visit within 7 to 10 days of hospital discharge to review instructions on medications, verify the patient obtained the medications, and had appropriate referrals in place. Subsequently, the NP made monthly and as-needed visits. During each visit the NP reviewed medication adherence, adverse effects, asked the patient about heart failure symptoms, completed a physical examination and developed ongoing treatment plans with the patient. Patients completed the Kansas City Cardiomyopathy Questionnaire initially and at three months and NYHA classification and short form-36 quality of life form.

Results/findings: Hospitalizations decreased from 88 before the project was implemented to 9 during the three months of the project representing a cost savings of \$900,000. Patients were satisfied with the care they received in their home.

Article 2 (new for 2016)

McDonnell, A., Goodwin, E., Kennedy, F., Howley, K., Gerrish, K., & Smith, C. (2015). An evaluation of the implementation of Advanced Nurse Practitioner (ANP) roles in an acute hospital setting. *Journal of Advanced Nursing*, 71(4), 789-799.

The purpose of the study was to evaluate the impact of adding advanced NPs on patients, staff and organizational outcomes in an acute hospital.

Type of Study: Collective case study in an English hospital. Data sources included stakeholder interviews (n=13) and three case studies, one on a medical unit, one on a surgical unit and one is orthopedics. Data sources for case studies included interviews with patients (n=7), healthcare staff (n=25), NPs (n=6) and follow-up interviews (n=5) and non-participant observation of practice. Interview data was recorded and transcribed. Thematic analysis was used to identify themes and interpret the findings.

Findings: NPs on the surgical unit covered gaps when junior doctors were not available, on the medical unit they were on the unit when the junior doctors' workload was the heaviest and on the orthopedic unit they cared for patients with a fractured femoral neck. On all units they initiated care plans, prescribed medications, ordered diagnostic tests and provided advice to nurses.

Their impact on patients included providing holistic assessments and continuity of care from admission to discharge, and understanding the patient's perspective. Staff commented that the NPs' were capable, knowledgeable and skilled. Staff also indicated NPs' presence on the unit positively affected patient outcomes and safety by picking up on problems quickly and taking action. For example, on the orthopedic unit the rate of catheterizations and UTIs decreased.

Junior doctors valued the NPs' expertise and their knowledge of clinical policies and how the hospital systems worked. NPs also shared the workload with junior doctors on the surgical and medical units. Nurses indicated the NPs provided advice and shared knowledge with them and provided a clear rationale for clinical decisions. Overall collaboration and team work was positively influenced by NPs.

Article 3 (new for 2016)

Ono, M., Miyauchi, S., Edzuki, Y., Saiki, K., Fukuda, H., Tonai, M. ... Murashima, S. (2015). Japanese nurse practitioner practice and outcomes in a nursing home. *International Nursing Review*, 62, 275-279.

The study's aim was to describe how Japanese NPs practice in a nursing home.

Type of Study: Descriptive case study in one nursing home with one practicing NP. The nursing home had 68 beds for long-term stay and 23 for short-term. Staff included one NP, one full-time physician, 19 nurses and other healthcare and social workers. Outcomes of care including, the number of hospitalizations, cases of ambulance transfer and symptoms/events leading to hospitalization, were compared via chart audit before and after the NP was hired. The pre-intervention group consisted of 260 residents admitted between April 2009 and March 2011. The post-intervention group had 219 residents admitted between April 2011 and March 2013.

Findings: The rate of hospitalizations decreased from 45.8% before the NP was hired to 30.1%. The rate of ambulance transfers decreased from 7.3% to 2.3%. Fever, bone fracture, consciousness disorder, chest pain and high/low blood pressure reduced the need for transfers.

Article 4

Hall, M.H., Esposito, R.A., Pekmezaris, R., Lesser, M., Moravic, D., Jahn, L. ...Hartman, A. (2014). Cardiac surgery nurse practitioner home visits prevent coronary artery bypass graft readmissions. *The Annals of Thoracic Surgery*, 97, 1488-1495.

The purpose of this study was to pilot test a home transition care program called Follow Your Heart (FYH) involving cardiac surgery NPs providing after-discharge care to patients undergoing coronary artery bypass graft (CABG) surgery.

Type of Study: A retrospective observational cohort study using prospectively data using the New York Cardiac Surgery Reporting System and The Society of Thoracic Surgeons database. Patients undergoing CABG between May 1, 2010 and August 31, 2011 who were discharged home were included n=401; 169 were enrolled in FYC and 232 received usual care (UC). Primary outcome was readmission or death within 30 days of discharge.

One out of four NPs working in collaboration with a cardiac surgeon provided FYH care, which included two home visits in the first week to 10 days after discharge, surgeon office visit 10 to 14 days after discharge, multiple phone calls from the NP and 24/7 availability by phone of hospital personnel. During the home visit, the NP provided a directed physical exam, including weight, reconciliation of discharge medications, patient education and change medications as indicated. UC included pre-discharge education, a phone call from an NP within 24 hours of discharge, a discharge summary and medication list faxed to the patients' physicians, enrollment in community-based visiting nurse service, and return visit to cardiac surgical clinic within two weeks and six weeks after discharge. NPs were responsible for communicating with other providers, including the patient's primary care physician, home care providers, cardiologists and cardiac surgeons.

SPSS 20 software was used to identify predictors of readmission. Binary logistic regression analysis was used to determine the independent significance and odds ratio for readmission for each of the predictors. SAS 9.3 software was used for comparison between the two groups.

Findings: Patients in the UC group were 2.99 times more likely to be readmitted within 30 days than patients in the FYH group. UC group had significantly higher readmission/death rates (18 of 156 or 11.54%) than FYH group (6 of 156 or 3.85%). Direct costs of readmission for the UC group were \$86,187 (average \$4,788.17). Total cost for FYH group including readmission direct costs (\$27,147) and costs of NP visits (\$16,380) was \$43,527, a cost savings of \$41,078.04.

Article 5

Oliver, G.M, Pennington, L., Revellw, S. & Rantz, M. (2014). Impact of nurse practitioners on health outcomes of Medicare and Medicaid patients. *Nursing Outlook*, 62(6), 440-447.

The purpose of this study was to examine the significance between the level of NP practice and three data sets: potentially avoidable hospitalizations for Medicare-Medicaid beneficiaries, readmission rates 30 days after discharge from inpatient rehabilitation and annual hospitalizations of nursing home residents.

Type of Study: Review of studies with a national scope that have state by state ranking and scoring of the ranking system, using data collected since 2012 when health ranking and categorization of full, reduced or restricted NP practice occurred. Two studies and two reports were included. Full NP practice was defined as absolute independent practice, an NP is responsible exclusively to a state board of nursing; reduced practice was a collaborative practice agreement between a physician and an NP specifying the scope of practice allowed; and restricted practice required a physician to oversee all care provided by an NP.

Two-sampled t-tests were performed on the data sets to determine the significance of full practice of NPs. This was followed by one-way analysis of variance to determine the impact of the level of NP practice on the data sets. Finally a Tukey test for pair-wise comparison was completed on analysis of variance data to identify differences between full and reduced practice, full and restricted practice, and reduced and restricted practice.

Findings: States with full NP practice had decreased hospitalizations of Medicare and Medicaid beneficiaries.

Article 6

Roots, A. & MacDonald, M. (2014). Outcomes associated with nurse practitioners in collaborative practice with general practitioners in rural settings in Canada: a mixed methods study. *Human Resources for Health*, 12, 2-11.

The purpose of the study was to identify outcomes associated with NPs in collaborative primary care practices.

Type of Study: Mixed methods study using a case study approach that included interviews, observations, field notes, document review, analysis of data before and after salaried NPs (n=3) were hired into fee-for-service practices (n=3) to identify changes to patient access in the practice and hospitalizations and emergency department visits. All NPs in the study were salaried employees of one regional health authority.

Findings: NPs provided community based care for hard to serve populations such as the frail elderly and people with mental health issues, addictions and HIV. Interprofessional communication improved and NPs and GPs collaborated in caring for patients which facilitated group practice instead of siloed care, which existed before the NP was hired. The data found that collaborating resulted in team members being more satisfied with their job. There was increased access to care and decreased wait time for appointments by offering same day appointments for urgent patients or within 3 days.

There was a decrease in hospital admissions and visits to the emergence department, although the researchers acknowledged confounding factors that could have contributed to the decreases.

Article 7

Southey, D., Mishra, P.K., Nevill, A., Aktuerk, D., & Luckraz, H. (2014). Continuity of care by cardiothoracic nurse practitioners: Impact on outcome. *Asian Cardiovascular & Thoracic Annals*, 22(8), 988-947.

The purpose of this study was to evaluate the impact of introducing NPs to cover the cardiovascular ward 24 hours a day, seven days a week on readmission to cardiac ICU, hospital stay and mortality after cardiac surgery.

Type of Study: A prospective study of all patients undergoing cardiac surgery between June 2005 and October 2011. Patients were categorized as either pre-NP (before the NP was introduced in 2005-Oct. 2007) n= 2385 or post-NP (after NP introduction Nov. 2007-2011) n=3910. Patient data were entered into the Central Cardiac Audit Database, national Institute for Cardiovascular Outcomes Research. Data were analyzed using SPSS 11.5, logistic regression analysis was used to identify independent factors related to survival.

Four NPs managed the care of adult cardiothoracic patients on one cardiac ICU with as needed supervision by 7 consultants in Wolverhampton, UK.

Findings: Following the introduction of the NPs readmission to the cardiac ICU decreased from 2.6% to 1.9% (p=0.05). Hospital stay decreased from 10 to 8 days (p<0.01). Overall survival after surgery improved from 96.5% to 98% (p<0.01) after the introduction of NP lead care. Patients were twice as likely to survive their surgery 6 months after the introduction of NPs to the unit and a 50% reduction in patient mortality. Logistic regression analysis confirmed that the presence of NPs was the strongest predictor of survival.

Article 8

Mason, H., DeRubeis M.B., Foster, C., Taylor, J., & Worden, F.P. (2013). Outcomes evaluation of a weekly nurse practitioner-managed symptom management clinic for patients with head and neck cancer treated with chemoradiotherapy. *Oncology Nursing Forum*, 40(6), 581-586.

The purpose of this evaluation was to determine whether improved monitoring through close follow-up with an NP in an NP-led clinic could enhance treatment compliance and decrease frequency of hospitalizations.

Type of Study: A retrospective chart review of patients with head and neck cancer was performed in a comprehensive cancer centre in the US. Data were abstracted from charts of patients treated with stage III or IV oropharyngeal cancers (n=50 prior to development of the NP-led clinic, n= 51 patients were selected after the development of the clinic). Three clinical outcomes were extracted from the chart review: 1) occurrence of any hospitalization within two weeks of treatment initiation, 2) chemotherapy dose reduction, and 3) chemotherapy regimen completion, defined as successful completion of all seven cycles of planned chemotherapy. All were measured as dichotomous outcomes (“yes” or “no”).

Patients in the NP-led clinic were seen weekly by an NP who focused on treatment toxicities and patient and/or significant other’s concerns. Physical, psychological, social, and spiritual needs were assessed, including weight, activity, exercise, and fatigue level.

Findings: Patients followed in the NP-led clinic had significantly lower rates of hospitalization for toxicity (28% versus 12%) and chemotherapy dose reductions (48% versus 6%) than those treated before the initiation of the NP-led clinic. Ninety percent (90%) of patients treated after clinic initiation completed all seven planned cycles of chemotherapy, compared with 46% before.

Article 9

Skinner, H., Skoyles, J., Redfearn, S., Jutley, R., Mitchell, I., & Richens, D. (2013). Advanced care nurse practitioners can safely provide sole resident cover for level three patients: impact on outcomes, cost and work patterns in a cardiac surgery programme. *European Journal of Cardio-Thoracic Surgery*, 43, 19-22.

The purpose of this study was to evaluate the safety and feasibility of NPs delivering first-line care in an intensive care unit with MDs remaining non-resident (not on the unit).

Type of Study: Before and after service evaluation on a cardiac intensive care unit of changes to staffing model when NPs provided first line care and junior doctors and other specialists were available for consultation. Key measures were mortality rate, surgical trainee attendance in theatre (operating room), and cost before and after the change. After hour calls by NPs to MDs and subsequent action was also audited for changes. Seven NPs and five junior doctors who were non-resident at night worked in 15 bed cardiac unit and participated in the study. Data was collected for 12 months and compared to the preceding year.

Findings: The mortality rate changed from 2.8% before the change to 2.2% after the change. The odds ratio for death after the change relative to before was .83, 95% CI 0.41-1.69 in favor of change. NPs made 192 calls to MDs for consultation and in 57% of the calls telephone advice was sufficient. The annual staffing cost of NP and junior doctors went from £933,344 to £764,691 after the change. The new work arrangement allowed trainees to spend more of their time in the hospital during normal working hours.

Article 10

Wand, T., White, K., Patching, J., Dixon, J., & Green, T. (2012). Outcomes from the evaluation of an emergency department-based mental health nurse practitioner outpatient service in Australia. *Journal of the American Academy of Nurse Practitioners*, 24, 149-159.

The aim of this study was to evaluate the feasibility and acceptability of mental health nurse practitioner (MHNP) in the emergency department (ED) outpatient service.

Type of Study: Realistic evaluation incorporating a mixed-methods design using descriptive data of participants, baseline and follow-up self-report measures, a satisfaction survey, and individual interviews.

In this study, realistic evaluation refers to an adaptation of critical realist philosophy. The major feature of realistic evaluation is the ability to emphasize explanations in order to highlight the process of successful implementation. Participants completed the K-10 measure of psychological distress, the General Self- Efficacy Scale (GSES), and

satisfaction tool used to evaluate nurse-led outpatient services. Outpatient participants and ED staff were interviewed. A total of 101 outpatients participated.

Findings: Outpatient participants indicated that they benefited from being listened to and appreciated a health promotion focus. The MHNP's supportive, understanding and non-judgmental approach were valued by outpatient participants. Findings provided strong support from outpatient participants and staff for the efficacy and safety of the MHNP outpatient service established on the principles of the nurse-led clinic and located in the ED.

Article 11

Owens, D., Erb, K., Burson, S., Green, M., McGoodwin, W., & Isaac, M. (2012). Primary palliative care clinic pilot project demonstrates benefits of a nurse practitioner-directed clinic providing primary and palliative care. *Journal of the American Academy of Nurse Practitioners*, 24(1), 52-58.

The purpose of this pilot project was to determine if patients with life-limiting illness receiving primary and palliative care from an NP would have improved symptom management and reduced emergency department (ED) use.

Type of Study: The pilot project was conducted over a two month period in the primary palliative care clinic (PPCC) in the US. Participants (n=49) were interviewed either at the time of their appointment or telephone by an RN from the PPCC. Eight items from the Edmonton Symptom Assessment Scale (ESAS) measuring pain, fatigue, nausea, depression, anxiety, drowsiness, appetite and dyspnea using a 0 (best possible) to 10 (worst possible) scale. At the time of each interview patients disclosed the number of ED visits since the last interview.

Findings: An NP led outpatient PPCC can reduce ED visits and to some extent improve symptom management.

Article 12

Kerr, J, Price, M., Kotch, J., Willis, S., Fisher, M., & Silva, S. (2012). Does contact by a family nurse practitioner decrease early school absence? *The Journal of School Nursing*, 28(1), 38-46.

The aim of the study was to evaluate the implementation of a Head Start Family Nurse Practitioner (FNP) role in the school system in North Carolina, US.

Type of Study: Two elementary schools and a Head Start program were included. Letters were sent to parents of children attending the schools describing how and why the FNP would contact them if their child's absence from school reached a certain level. The FNP contacted parents of students with attendance as chronically absent to assess the reason (n=117 students). If the reason for the absence was illness the FNP offered to make a home visit or to see the child in the nurse's office in the school. Each conversation ended with statements to reinforce the importance of school attendance.

Findings: There was a statistically significant increase in attendance at the elementary school level, but not at Head Start level.

Article 13

Kelly, M, Crotty, G., Perera, K. & Dowling, M. (2011). Evaluation of bone marrow examinations performed by an advanced nurse practitioner: An extended role within a haematology service. *European Journal of Oncology Nursing*, 15, 335-338.

The aim of this project was to present findings from an audit of bone marrow (BM) examinations performed by an advanced practice nurse (APN) in a specialist haematology centre in Ireland. In this study APNs were nurses with five years of experience in their specialty and a Masters degree.

Type of Study: Using a chart audit of BM examinations carried out by an NP to assess quality of method and the ability to make a diagnosis based on the examination. Over a two year period one NP obtained 156 BM samples, of those 30 were included in the audit.

Findings: The audit indicated that 100% of the samples (n=30) were sufficient to make a diagnosis indicating that the NP was competent to perform BM examinations.

Article 14

Van Soeren, M., Hurlock-Chorosteck, C. & Reeves, S. (2011). The role of nurse practitioners in hospital settings: Implications for interprofessional practice. *Journal of Interprofessional Care*, 25, 245-251.

The aim of this paper was to report on findings from a study that investigated the NP role in clinical settings in Ontario. In this paper the authors reported on how NPs contributed to patient care by enacting their profession-specific advanced practice nursing role, and the results of collaborating within an interprofessional team.

Type of Study: A mixed methods study using data obtained from research assistant (RA) observations of NPs in their clinical setting and NPs self-reporting their activities using individual logs, and focus groups with multiple healthcare professionals. A purposive sample of 9 hospitals sites that employed NPs in Ontario was selected. NPs (n=46) representing all setting participated. RAs observed, recorded, and categorized NP activities on five randomly selected occasions during normal working hours over 9 months. Field notes were transcribed to record different role components. The CNA, APN framework was used to categorize the NP roles into: leadership, acting as a change agent, research, and consultation and collaboration. Using individual log records, NPs self-reported the types and number of services provided to patients and others as a result of consultation and types of services they accessed through consultation with others. NPs completed the logs over five 1-week time intervals over 9 months. Twenty-four focus groups lasting one hour were conducted with multiple health care professionals (n=243) locate across the 9 sites. Interprofessional participants included 59% nursing, 10% medicine, and 31% from pharmacy, dietary, respiratory therapy, physiotherapy, social work, and chaplaincy.

Findings: NPs spent 46% of their time in clinical practice, 30% collaborating and consulting with others, 8% of time in leadership activities and 7% of their time in activities related to research. Collaborating and consulting activities involved discussing patient related concerns. Leadership activities included advocating to patients, mentoring others on the team, administrative responsibilities, and participating on internal and external committees. Research activities involved reviewing literature and developing protocol and other activities. Findings indicate that NPs support effective interprofessional communication, provide a central coordinating role, and ensure care is provided in safely and effectively.

Article 15

Ducharme, J., Alder, R., 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.

The purpose of this study was to assess the impact of the integration of NPs and physician assistants (PA) on patient flow, wait times, and the number of patients who left without being seen in six Ontario emergency departments (ED).

Type of Study: A retrospective review of health records of patients (n=19,592) treated in six Ontario EDs. Data were collected during two periods, once when the NP and PA roles were first implemented in the EDs (n=9585) and 6-months post-implementation (n=10,007). In total, NPs were involved in 298 patient visits and PAs were involved in 396 visits. Information obtained from health records included; the date of the patient visit, time of triage, type of physician involved, whether an NP or PA was involved in patient treatment, Canadian Emergency Department Triage and Acuity Scale score, wait time, length of stay, and discharge disposition.

Findings: When NPs and PAs were on duty and involved directly or indirectly with patient care in the six Ontario EDs wait times were reduced, length of stay in the ED was shorter, and number of patients leaving the ED without being seen was reduced.

Article 16

Gilbert, D. & Hayes, E. (2009). Communication and outcomes of visits between older patients and nurse practitioners. *Nursing Research*, 58(4), 283-293.

The purpose of this US study was to examine the characteristics, content, and relationship components of older patients and NP communication on patients' proximal outcomes (satisfaction and intention to adhere to NP recommendations) and longer-term outcomes (changes to presenting problems, and physical and mental health) and how proximal outcomes contribute to longer-term outcomes.

Type of Study: Patient visits were video recorded of NPs (n=31) and older patients (n=155). Communication between the NP and older patients were measured using the Roter Interaction Analysis System was used to code 69 categories of frequency of all verbal complete or partial thoughts expressed aloud by patients and NPs. Nonverbal activities such as nods, gazes, eyebrow movements, smiles, and interpersonal touches for patients and NPs were scored. Dimensions of relationship messages were measured by a 30 item relational themes inventory. A one item derived from the Consumer Assessment of Health Care Providers Survey was used to measure satisfaction with the visit. Intention to adhere to recommendations made by the NP were measured immediately after the visit by asking patients to identify the NP recommendations and how likely they were to adhere to the recommendation. Patients were telephoned four weeks after the NP visit and asked if they had adhered to the NP's recommendations. Longer-term outcomes of changes to presenting problems were measured by asking patients at four weeks about a change to the presenting problem. The SF-12 Health Survey (Version 2.0) was used to measure changes to physical and mental health.

Findings: Communication between older patients and NPs was effective regarding seeking and giving biomedical and psychosocial information. Communication involving lifestyle was not as effective. Greater intention to adhere to NP recommendations was associated with greater improvement in patients' presenting problems.

Article 17

Sunday, D, Crecek, E. & Del Casino, P. (2010). Rapid response teams: NPs lead the way. *The Nurse Practitioner Journal*, 35(5), 40-46.

The purpose of this study was to evaluate the effectiveness of an acute care NP led rapid response team to improve quality of care by reducing transfers to the intensive care unit (ICU) or a neonatal intensive care unit (NICU) through early critical care decision support and intervention.

Type of Study: A retrospective review of data obtained at year one and year two after the implementation of a rapid response team with an acute care NP as team leader, along with intensive care nurses and a respiratory therapist. The study took place in a multispecialty community hospital providing a broad range of surgical and medical services in the United States. Quality indicators tracked included; rapid response called within 24 hours of initial response, rapid response called within 24 hours of admission, rapid responses that progressed to cardiac arrest.

Findings: The acute care NP led rapid response team reduced unanticipated transfers to the ICU by 8.6% from year 1 to year 2. Nursing staff's reviews of their expectations of the rapid response team indicated that the team exceeded staff's expectations.

Article 18

Stone, R., Rao, R., Sevick, M., Cheng, C., Hough, L., Macpherson, D., Franko, C., Anglin, r., Obrosky, D. & DeRubertis, F. (2010). Active care management support by home telemonitoring in veterans with type 2 diabetes. *Diabetes Care*, 33(3), 478-484.

The purpose of this study was to compare the short-term efficacy of home telemonitoring combined with active management of medications by an NP to a monthly care coordination telephone call on glycemic control in veterans with type 2 diabetes and entry A1C greater than 7.5% receive care at the VA Pittsburgh Healthcare System.

Type of Study: This was a randomized controlled trial. Patients were randomly assigned to either active care management with home telemonitoring (experimental group n=73) or a monthly care coordination telephone call (control group n=77). Both groups received monthly telephone calls for diabetic education and self-care management review. Participants in the control group received monthly telephone contact with a diabetes nurse educator. Participants in the experimental group received active medication management by an NP.

Findings: Participants receiving consultation from an NP in the active care management with home telemonitoring group demonstrated significantly greater reductions in A1C at 3 and 6 month. Participants in both groups whose diabetes was previously inadequately controlled demonstrated improved glycemic control.

Article 19

Chen, C., McNeese-Smith, Cowan, M, Upenieks, V. & Afifi, A. (2009). Evaluation of a nurse practitioner-led care management model in reducing inpatient drug utilization and cost. *Nursing Economics*, 27(3), 160-168.

The aims of this study were to determine the prevalence and patterns of usage of antibiotics and evaluate the effect of an NP-led intervention to reduce drug utilization and cost compared to usual care.

Type of Study: Retrospective data analysis of pharmaceutical claims of hospitalized, acutely ill, general medicine participants (n=1200) participating in the Multidisciplinary Physician and Nurse Practitioner (MDNP) Study.

The MDNP study (also included in this report see Cowan et al. 2006) was a prospective, quasi-experimental controlled trial originally designed to assess the effect of a multidisciplinary care team on organizational and patient outcomes for acutely ill, hospitalized, general medicine patients. This article reports on the findings of analysis of data obtained during the MDNP study related to pharmaceutical claims. Outcome measures were total drug cost (all pharmaceuticals consumed by the patient during the hospitalization), daily drug cost (total drug costs divided by length of stay in days), and drug days (each day a drug is used).

Findings: The NP-led care resulted in reduced total cost of drugs, lower number of drug days, reduced antibiotic costs and antibiotic days per hospitalization.

Article 20

Klaasen, K., Lamont, L. & Krishnan, P. (2009). Setting a new standard of care in nursing homes. *Canadian Nurse*, 105(9), 24-30.

The purpose of this study was to evaluate the implementation of an NP as the primary care provider for all residents in a 116-bed not-for-profit nursing home in Canada. The model of care included the medical director of the facility acting as consultant to the NP.

Type of Study: Prospective data collection from multiple pre-existing data sources including patient satisfaction surveys, quality of care indicators and cost effectiveness, and unstructured interviews.

Findings: Medication usage was reduced resulting in a 17% reduction in costs of medications, 55% decrease in polypharmacy, and 63% reduction of the use of antipsychotic drugs. Emergency department transfers were reduced by 20% and family satisfaction with the quality of care was increased by 24%. Staff interviews indicated that all were satisfied with this model of care.

Article 21

Kozlowski, L. (2008). The acute pain service nurse practitioner: A case study in the postoperative care of the child with bladder extrophy. *Journal of Pediatric Health Care*, 22(6), 351-359.

The purpose of this case study was to describe the role of a pediatric nurse practitioner (PNP) based, anesthesiologist-supervised acute pediatric pain service model of care. The team of PNPs and anesthesiologists provide 24-hour,

7-days-a-week consultation for postoperative pain management of pediatric patients recovering from repair of bladder exstrophy.

Type of Study: This is a descriptive case study of the PNP role in acute pain management at John Hopkins Children's Centre.

Findings: Although not a research study, the author describes the role of the PNP in an acute care setting collaboratively managing post-operative pain. The article describes how the PNP functions and types of interventions provided to patients and staff. Interventions included initiation of pain medications, as well as titrating and weaning patients from medications.

Article 22

Marion, L., Finnegan, L., Campbell, R. & Szalacha, L. (2009). The well woman program: A community-based randomized trial to prevent sexual transmitted infections in low-income African American women. *Research in Nursing & Health*, 32(3), 274-285.

The purpose of this research was to test the efficacy of a high-intensity well woman program (WWP) intervention that included NP care in Chicago, Illinois.

Type of Study: A two group randomized controlled trial comparing the WWP intervention (n=172) to a low-to-moderate intensity minimal intervention (MI) (n=170). Women were randomized into one of two groups. Care and education for the WWP group was provided by an NP. Each participant received 5-7 hours of care over the study period. The MI group received 1 hour of care over the study period and care was provided by a research associate who was not an NP.

Findings: At the completion of the study women in the WWP group who had received individualized sexually transmitted infection (STI) prevention care by NPs along with peer-led group sessions had fewer diagnosed STIs than women in the MI group.

Article 23

Pirret, A. (2008). The role and effectiveness of a nurse practitioner led critical care outreach service. *Intensive and Critical Care Nursing*, 24, 375-382.

The purpose of this study was to describe the role and effectiveness of an NP led critical care outreach service (CCORS) in a 750-bed tertiary hospital in New Zealand. The CCORS is a service provided on the hospital ward once the patient is transferred out of the intensive care unit (ICU).

Type of Study: Before and after comparison study of outcome measures, patient demographics, and NP activities for patients (n=133) discharged from the ICU to CCORS on hospital wards.

Findings: Patients on the ward referred to the CCORS and cared for by the NP resulted in reduced readmission to the ICU <72 hours; from 28 admissions prior to the implementation of the NP to 9 readmissions during the study period.

Article 24

Russell, G., Dabrouge, S., Hogg, W., Geneau, R., Muldoon, L. & Tuna, M. (2009). Managing chronic disease in Ontario primary care: The impact of organizational factors. *Annals of Family Medicine*, 7, 309-318.

The purpose of this study was to describe and compare four models of primary care delivery; community health centre, fee for service, family health groups, and family health networks. The intent of this article was to discuss how chronic disease management (CDM) differs across models of care and organizational factors associated with high-quality CDM.

Type of Study: Cross-sectional study employing quantitative (analysis of questionnaires and chart abstraction) and qualitative (interviews) methods.

Findings: High-quality CDM occurred most commonly in community health centres employing NPs.

Article 25

McAiney, C., Haughton, D., Jennings, J., Farr, D., Hillier, L., & Morden, P. (2008). A unique practice model for nurse practitioners in long-term care homes. *Journal of Advanced Nursing*, 62(5), 562-571.

The purpose of this study was to examine a practice model for NPs working in long-term care (LTC) homes in Ontario and the impact on preventing hospital admissions, as well staff confidence and promoting early hospital discharge.

Type of study: Prospective data collections by NPs' (n=3) working in the LTC home of their clinical activities and outcomes of interventions and questionnaires completed by the Directors of Care (n=18) of the LTC homes.

Findings: Care provided by NPs reduced the number of residents transferred to hospital.

Article 26

Martin-Misener, R., Downe-Wamboldt, B., Cain, E., Pike, M. (2007). A community partnership to evaluate a remodeling of primary health care and emergency health services: The Long and Brier project report.

Martin-Misener, R., Downe-Wamboldt, B., Cain, E. & Pike, M. (in press). A longitudinal mixed methods study evaluating the impact of a nurse practitioner, paramedic, physician model of primary health care in a rural community. *Primary Health Care Research and Development*.

The purpose of this study was to evaluate the effectiveness of a model of primary health care service delivery provided by on-site NPs and paramedics in collaboration with an off-site family physician.

Type of study: Longitudinal study occurring over three years. Data was collected using questionnaires completed by adults (n=221); individual interviews (n=16) with NPs, paramedics, physicians, administrators and community leaders; group interviews (n=4) with health care providers, community residents, and community volunteers; extraction of the number of hospital and family physician visits from the Health Services Administrative Databases; and review of practice-based reports completed by the participating NPs and paramedics.

Findings: The NP/paramedic/family physician team increased accessibility to primary health care services, residents were satisfied with health services, and health care costs were reduced. Additionally, care provided by the NP/paramedic team increased early detection and screening services, greater emphasis on health promotion and illness prevention, and management of acute and chronic health conditions. Residents traveled off the island less often for hospital and family physician visits, thus reducing travel for Island residents.

The effectiveness of this model of care can serve as an example for other rural and remote areas searching for ways to provide comprehensive primary health care to residents.

Article 27

Cowan, M., Shapiro, M., Hay, R., Afifi, A., Vazirani, S., Rogers, C. et al. (2006). The effect of a multidisciplinary hospitalist/physician and advanced practice nurse collaboration on hospital costs. *Journal of Nursing Administration*, 36(2), 79-85.

The purpose of this US study was to evaluate the effect different models of care have on patient outcomes.

Type of study: Comparative, 2-group, quasi-experimental design. Experimental group N=581 had three components, 1) patients were followed by a NP during admission and for 30 days after discharge, 2) a hospitalist physician and NP (MDNP) team followed patients during admission, and 3) daily multidisciplinary rounds were conducted. The control

group N=626 received usual care which did not include the MDNP team or multidisciplinary rounds.

Findings: Length of stay was reduced by one day in the experimental group, which resulted in “back fill” profit for the hospital of \$1591 per patient. There was no difference between the groups in readmission or mortality rates.

Article 28

Meyer, S. & Miers, L. (2006). Cardiovascular surgeons and acute care nurse practitioners’ collaboration on postoperative outcomes. *ACCN Clinical Issues*, 16(2), 149-158.

The purpose of this US study was to examine patient and economic outcomes between two groups of patients in a cardiovascular intensive care unit (CVICU) whose care was directed by either a CV surgeon alone or a CV surgeon in collaboration with an ACNP. This study examines the result of care provided by a cardiovascular (CV) surgeon collaborating with an acute care NP (ACNP).

Type of study: Retrospective 2-group comparison study. Charts were reviewed from two separate time periods, 1998 for the CV surgeon alone, N=145 and 2001 for the collaborating team of ACNP and CV surgeon N=70.

Findings: Collaboration between the CV surgeon and ACNP results in reduced length of stay by 1.91 days and reduction in total cost of care per episode of care by \$5,038.91.

Systematic Reviews of NP Outcomes Research

Article 1 (new for 2016)

Martin-Misener, R., Harbman, P., Donald, F., Reid, K., Kilpatrick, K., Carter, N. ... DiCenso, A. (2015). Cost-effectiveness of nurse practitioners in primary and specialized ambulatory care: systematic review. *British Medical Journal Open*, 5, e007167. doi:[10.1136/bmjopen-2014-007167](https://doi.org/10.1136/bmjopen-2014-007167)

The objective of the systematic review was to determine the cost-effectiveness of NPs delivering primary and specialized ambulatory care.

Type of Review: Systematic review of randomized controlled trials from 1980-July 2012 in primary ambulatory care and specialty ambulatory care. Inclusion criteria included NPs functioning in alternative or complementary roles. Alternative roles are those where NPs substitute for a physician NPs and provide similar services and in complementary roles NPs provide additional services that complement existing services. Objective measures of NP cost-effectiveness included use of services, cost of healthcare and health resource use. Furthermore, patient and provider outcomes included patient health status, quality of life, satisfaction, quality of care, and job satisfaction.

Findings: Eleven trials conducted in the USA, UK or the Netherlands were included in the review, most were published since 2000. Patients in a subgroup of patients with chronic disease were more satisfied with NP care and patients reported the NP told them about the cause of their condition, how to relieve symptoms and what to do if their problem worsened. In one meta-analysis NP consultation time was 4.1 minute longer than the comparator physician, however in another study consultation was significantly longer.

In many of the trials the sample size was small with fewer than 10 NPs participating or the NPs were novices contributing to the authors’ comment that the literature on cost-effectiveness of NPs was limited because of quality and quantity of evidence. Nonetheless, the review provides some support that NPs in alternative provider roles in primary and specialized ambulatory care are cost-effective by increasing preventive care and patient education through increased contact time, visits and costs.

Article 2 (new for 2016)

Martinez-Gonzales, N., Rosemann, T., Tandjung, R., & Djalali, S. (2015). The effect of physician-nurse substitution in primary care in chronic diseases: a systematic review. *Swiss Medical Weekly*, 145, 1-21.

This is the second article published from a large systematic review and meta-analysis project. Martinez-Gonzales, et al. 2014 (listed below) assessed the clinical effectiveness and costs of nurses working as substitutes for physicians in primary care. In this paper the authors assessed the effect of physician-nurse substitution on process of care outcomes.

Type of Review: Systematic review following the PRISMA guidelines and a framework published by a Cochrane review. Studies with all nursing roles (NP, RN or licensed nurse (LN), and physicians, pediatricians and geriatrician were included.

Findings: Fourteen RCTs conducted in the UK, the Netherlands, USA and Russia were included with a total of 10,743 randomized participants. In 9 RCTs NPs were employed and 5 trials employed either NPs, RNs or LNs. In all trials they worked as physician substitutes in physician offices, nurse clinics, outpatient clinics, reference clinics and medical health centres. Studies from the UK, Netherlands and Russia did mention the nurses' educational degree.

In terms of process of care outcomes, special trained nurses including NPs can provide care that is at least equivalent to physicians for patients with diabetes, cardiovascular disease, asthma, COPD and hypertension.

Article 3 (new for 2016)

Morilla-Herrera, J.C., et al. (2015). A systematic review of the effectiveness and roles of advanced practice nursing in older people. *International Journal of Nursing Studies*, 53(Jan), 290-307. <http://dx.doi.org/10.1016/j.jnurstu.2015.10.010>

The purpose of the systematic review was to assess and summarize evidence of the effect on advanced practice nurses' (APNs') interventions when caring for adults 65 and older in acute, out-patient, home and residential care.

Type of Review: Systematic review, registered with PROSPERO, that included randomized controlled trials (RCTs), quasi-experimental and observational studies. Patient outcomes included functionality, mortality, quality of life, morbidity, satisfaction, adverse drug events, falls, failure to rescue and cognitive status. APNs included practice nurses, NPs, experienced RNs, and CNSs.

Findings: Fifteen RTCs and intervention studies published between 1999-2014 were included in the review. APN role features included professional autonomy, case management, advanced assessment, diagnostic and decision-making skills, consultancy to other team members and program development. Significant results were found in long-term care settings including reduced mortality and admissions, improved self-care, and increased patient and caregiver's satisfaction. APNs provide continuity of care and are the link between health systems and patients and other external providers. In the majority of studies APNs were members of multidisciplinary teams there the authors were unable to identify specific effect attributed solely to the APN.

Article 4 (new for 2016)

Swan, M., Ferguson, S., Chang, A., Larson, E., & Smaldone, A. Quality of primary care by advanced practice nurses: a systematic review. *International Journal for Quality in Health Care*, 27(5), 396-404.

The purpose of the review was to evaluate RCTs regarding the cost and quality of care provided by APNs in primary care.

Type of Review: Systematic review following guidelines in the PRISMA Statement to identify RCTs that compared outcomes of primary care provided to adults by APNs and physicians. APN scope of practice and titles varied across studies and included NPs, nurse specialist in diabetes, and practice nurse. APNs in the study had to be identified as primary care providers

Findings: Ten studies were included representing 10911 participants in seven RCTs. Five studies were conducted in Europe and 2 in the US. Patients in the APN group had better control of their cholesterol/high-density lipoprotein ration and diastolic BP at 6 months. In three studies patients had higher satisfaction with care from an APN. Three

studies estimated cost of care by using the provider salary, of these two found APNs were less expensive. One study found that APN care was less expensive for laboratory services. In three studies APN consultation time was 3.0 to 4.3 minutes longer than physicians' consultation time. Two studies reported that APNs more often asked patients to return for follow-up and their patients were more likely to keep the appointment. One study found that APNs had higher rates of adherence to clinical practice guidelines. Again, sample sizes are small and these cannot be generalized to all APNs, however this is support that APNs in primary care perform as well as physicians in terms of clinical outcomes and patient satisfaction.

Article 5

Masso, M. & Thompson, C. (2014). Nurse practitioners in NSW "Gaining Momentum": *Rapid review of the nurse practitioner literature*. Centre for Health Service Department, University of Wollongong. Ministry of Health: NSW.

The purpose of this rapid review was to provide an assessment of what is known about NPs, particularly in the Australian context and to identify options for consideration at the policy level. Two questions guided the review: 1) how are NPs used, in what context and what outcomes can be attributed to NPs and 2) what factors influence successful implementation of NPs?

Type of Review: Rapid review of literature from 2000-2013, including review of existing reviews, 68 papers and 28 reviews were included.

Findings: Outcomes achieved by NPs: NP practice in collaboration with other providers attributing particular outcomes to NPs is difficult. Outcome measures are generic in nature, such as wait times for treatment and patient satisfaction. These do not reflect the holistic, nursing approach of NPs. Evidence for patient satisfaction is the strongest outcome. Very little research has looked at the cost-effectiveness of NPs.

In the Australian literature, there is an absence of theory to inform research or developed as a result of the research. As well, researchers have not drawn on literature from organization change, implementation science, diffusion of innovations or knowledge translation to inform methods or interpret findings. There is a gap in the Australian literature of studies of NPs working in rural and remote locations. About two-thirds of NP time involves direct or indirect care activities and the remainder in service related activities.

Based on the synthesis of evidence in the review the authors conclude there is little to be gained from continuing to try to answer the question is NP practice efficient (can it work?). They conclude that the answer is yes, but this may be the wrong question to ask at this stage of NP development in Australia. They also conclude that comparing NPs to physicians assumes medical care to be the gold standard and that NPs and physicians do the same things in the same ways, but these are both open to debate.

Researchers might instead look at ways to identify the unique contributions NPs make to patient care, such as how NPs improve coordination and reduce fragmentation of patient care services. Furthermore, there is a need to study NPs in established settings to identify how and why their practice is successful or not successful. Using knowledge from organizational change, implementation science, diffusion of innovations or knowledge translation might be a lens to consider evidence in future studies. Finally the question of cost effectiveness of NPs is the least studied. Again, the authors suggest this may be the wrong question to ask because much of health care is delivered in team-based environments. Instead, identify models of care that are cost effective, e.g. fast track in emergency departments and identify the role of an NP in the model. Masso and Thompson point out that in rural and remote areas it may be care provided by an NP or no care, the same could be said in some areas of Canada.

In summary, this review posed some thought provoking questions around what to study and not study. Although much of the review looks at Australian literature, there are similarities that translate in the Canadian context.

Article 6

Martinez-Gonzalez, N., Djalali, S., Tandjung, R., Huber-Geismann, F., Markun, S., Wensing, Michel, & Rosemann, T. (2014). Substitution of physicians by nurses in primary care: a systematic review and meta-analysis. *BMC Health Services Research*, 14 (214), 1-17.

The purpose of this review was to assess the clinical effectiveness and costs of nurses working as substitutes for physicians in primary care.

Type of Review: Systematic review and meta-analysis of randomized controlled trials from any country in which any type of nurse substituted for physicians in providing autonomous or delegated care was compared to physician care in community or ambulatory care settings and reported patient satisfaction, quality of life (QoL), hospital admissions, mortality and cost of services. Twenty-six RCTs and two economic evaluations studies comprising of 38,974 randomized participants were included. Nurses defined in studies were NPs, RNs and LNs.

Findings: Nurse-led care resulted in significant increase in patient satisfaction scores, RNs had a stronger effect than NPs on patient satisfaction, significant reduction in all-cause hospital admissions, NPs had a positive effect in reducing hospital admissions, and reduced all-cause mortality.

Article 7

Canadian Nurses Association. (2012). Effectiveness of registered nurses and nurse practitioners in supporting chronic disease self-management. Ottawa, CA: Canadian Nurses Association. <http://www.cna-aiic.ca/en/search-results?q=Effectiveness%20of%20registered%20nurses%20and%20nurse%20practitioners%20in%20supporting%20chronic%20disease%20self-management>

The purpose of this environmental scan was to further define and advance the role of RNs and NPs in chronic disease management.

Type of Review: Environment scan of literature reviews, best practice guidelines, key informant interviews, and a focused discussions.

Findings: The scan identified contributions of RNs and NPs in supporting chronic disease self-management and issues that influence their ability to make these contributions at the individual, organizational and systems levels. Gaps in research were identified and policy recommendations at the individual, organizational and system levels were presented.

Article 8

Donald, F., Martin-Misener, R., Carter, N., Donald, E., Kaasalainen, S., Wickson-Griffiths, A. ... DiCenso, A. (2013). A systematic review of the effectiveness of advanced practice nurses in long-term care. *Journal of Advanced Nursing*, 69(10), 2138-2161.

The purpose of this systematic review was to answer three research questions: 1) do advanced practice nurses (APNs) improve the quality of care, quality of life, functional and health status, health services use and satisfaction of older adults living in long-term care (LTC), 2) do APNs improve quality of life and satisfaction of family members of older adults in LTC, and 3) do APNs improve the skills, quality of care and job satisfaction of healthcare staff in LTC?

Type of Review: Quantitative systematic review using Cochrane Collaboration systematic review methods to specify inclusion and exclusion criteria, search and retrieve studies, appraise study quality, and synthesize findings. Randomized controlled trials and non-randomized quantitative studies with a comparison group were included. Four studies were included in the review, CNS=2, NP/MD=2. Each study tested different outcome measures.

Findings: CNS: 1. *Minnesota Study:* CNS intervention goals were to reduce urinary incontinence, pressure ulcers, depression, and aggressive behavior by facilitating the application of evidence-based protocols, provide staff education,

consultation, and direct care to residents post admission. As a result of CNSs working with certified nursing assistants (CNAs) urinary incontinence, pressure ulcers, aggressive behaviors, and loss of affect in cognitively impaired residents improved or the rate of decline was reduced.

2. *Restraint Study*: CNS education intervention aimed to increase staff's awareness of restraint hazards and how to manage residents' behavior in one home and education plus 12 hours/week of CNS consultation with the staff for 6 months in a second home, third LTC home had usual care. In the LTC home where CNS provided education and consultation residents were 25-40% less likely to be restrained with no increase in staffing, psychoactive drug use or falls.

NP/MD: 1. Goal-attainment Study: NP/MD team (intervention group) providing care to residents in LTC was compared to MD only care (control group). Adaption-related goals (a personal goal of improved ambulation) differed significantly for residents receiving care from NP/MD team. Cost-per-patient associated with primary care encounters, non-hospital, hospital and nursing home care was approximately the same for intervention and control group.

2. *EverCare Study*: Compared care provided by NP/MD team to usual care. Family members were more satisfied with care from the NP/MD team.

Overall the findings from the included studies indicate that APNs make an important contribution to the care of residents in LTC residential settings.

Article 9

Stanik-Hutt, J., Newhouse, R., White, K., Johantgen, M., Bass, E., Zangaro, G., ... Weiner, J. (2013). The quality and effectiveness of care provided by nurse practitioners. *The Journal of Nurse Practitioners*, 9(8), 492-500.

The purpose of this systematic review was to answer the question: how do NPs affect patient outcomes on measures of care quality, safety, and effectiveness? This study was part of a larger review and focused only on NP outcomes.

Type of Review: Systematic review following processes for Evidence Based Practice Centres. Thirty seven studies were included; 14 RCT and 23 observational studies. Eleven patient outcomes were identified. Quality of care measures include patient satisfaction with provider/care, patient self-assessment of perceived health status, functional status, number of unexpected visits to emergency departments, hospitalizations, duration of ventilation and length of stay.

Effectiveness of care was indicated by blood pressure, blood glucose, and serum lipid levels. Mortality was the only safety outcome.

Findings: Quality: when comparing outcomes for quality of care provided by NPs with care provided by MDs, the strength of the evidence was high, indicated similar satisfaction with care provided by NPs and MDs, self-reported health status, functional status, number of unexpected visits to emergency departments and hospitalization rates. Moderate strength of evidence indicated that care involving NPs was similar to care involving only MDs in terms of hospitalization length of stay. A low strength of evidence indicated duration of ventilation of adults was similar for care involving NPs compared to care involving MDs.

Safety: when comparing safety of care provided by NPs to care involving MDs the strength of the evidence was high indicating similar patient outcomes for mortality. Comparing outcomes of effectiveness of care by NPs with care involving MDs, strength of evidence was high indicating similar patient outcomes for blood glucose and blood pressure.

Effectiveness: there was high strength of evidence for better effectiveness on outcomes of serum lipid levels for care provided by NPs.

Article 10

Newhouse, R.P., Stanik-Hutt, J., White, K.M., Johantgen, M., Bass, E.B., Zangaro, G...We, J.P. (2011). Advanced practice nurse outcomes 1990-2008: A systematic review. *Nursing Economic\$,* 29(5), 230-251.

The purpose of this systematic review was to answer the question: compared to other providers (physicians or teams without advanced practice registered nurses (APRNs) are APRN patient outcomes of care similar? APRNs included NPs, CNSs, certified nurse midwives (CNWs), and certified nurse anesthetists (CRNAs).

Type of Review: Systematic review following processes for Evidence Based Practice Centres.

Findings: Sixty-nine studies were included in the review, NP=37, CNS=11, CNM=21, CRNA=0, 20 randomized controlled trials (RCTs) and 49 observational studies.

NP: The review included 37 studies related to NPs (14 RCTs and 23 observational studies) that identified 11 patient outcomes. These were patient satisfaction with provider/care, patient self-assessment of perceived health status, functional status, blood glucose, serum lipids, blood pressure, emergency department visits, hospitalization, duration of ventilation, length of stay and mortality rates.

When comparing NP to MD care, there was a high level of evidence to support equivalent levels of patient satisfaction, self-reported perception of health, functional status, control of blood glucose and blood pressure, emergency department visits, hospitalizations and mortality rates. There was high level of evidence that NPs managed serum lipids levels better. When comparing NPs to MDs, there was a low level of evidence to support equivalent duration of mechanical ventilation and moderate level of evidence to support equivalent length of stay.

CMW: The review included 21 studies related to CNMs (2 RCTs and 19 observational studies) 13 outcomes of care were identified. When comparing CNMs to MDs there was a high level of evidence to support CMWs had: lower rates of caesarean sections; lower rates episiotomies and third and fourth degree lacerations; and reduced use of labour analgesia and vaginal operative delivery (use of forceps, vacuum or both); and equivalent infants birth weights. When comparing CNMs to MDs there was a moderate level of evidence to support CMWs had: lower rates of epidurals and labour augmentation; equivalent or lower rates of induction; comparable or lower rates of infants admitted to NICUs; higher rates of breast feeding; comparable of higher rates of vaginal birth after caesarean section. When comparing CNMs to MDs infants had similar APGAR scores.

CNS: There were 11 studies related to CNSs (4 RCTs and 7 observational studies) four outcomes were identified, satisfaction, hospital length of stay, hospital costs and complications. Findings indicate that when comparing CNS and non-CNS groups; there is a high level of evidence to support equivalent group satisfaction scores indicating that CNSs do not have a direct effect on patient satisfaction; equivalent of lower patient length of stay; CNS group has lower costs of care; and moderate level of evidence to support that CNSs decrease complication rates.

CRNA: No studies were identified related to CRNA.

In summary, this systematic review indicates that patient outcomes of care provided by NPs and CNM in collaboration with physicians is similar to or better than care provided by physicians alone. The use of CNSs in acute care can reduce patient's length of stay and cost of care for hospitalized patients.

Article 11

Sangster-Gormley, E., Martin-Misener, R., Downe-Wamboldt, B. & DiCenso, A. (2011). Factors affecting nurse practitioner role implementation in primary health care settings: an integrative review. *Journal of Advanced Nursing*, 67(6), 1178-1190.

The purpose of the integrative review was to identify factors influencing NP role implementation in Canadian practice settings. The review was limited to Canadian settings that had implemented the role between 1997 and 2010.

Type of Review: Integrative review.

Findings: Ten studies and two provincial reports were included in the review. Multiple barriers and facilitators to role implementation were identified and analyzed to identify themes. Three concepts that influence NP role implementation emerged from the thematic analysis; involvement, acceptance and intention. Involvement was defined as stakeholders actively participating in the early stages of NP role implementation, acceptance relates to recognition

and willingness to work with the NP; intention relates to how the role was defined.

Article 12

Caird, J., Rees, R., Kavanagh, J., Sutcliffe, K., Oliver, K., Dickson, K., Woodmean, J., Barnett-Page, E. & Thomas, J. (2010). The socioeconomic value of nursing and midwifery: A rapid systematic review of reviews. London: EPPI Centre, Social Science Research Unit, Institute of Education, University of London.

The purpose of this rapid systematic review of reviews was to provide evidence of the benefits and costs of nursing and midwifery. The scope of the review was limited to three areas: 1) mental health nursing, 2) long-term conditions, and 3) role substitution, only systematic reviews were included. Nursing and midwifery was defined as “any paid employment of a person with a recognized statutory nursing or midwifery qualification to deliver interventions not exclusively allocated to nursing in any health care or home setting (pg. 6).”

Type of Review: Rapid systematic review of reviews.

Findings: Thirty-two reviews were included in this review, 17 in the area of long-term conditions, 5 in mental health, and 23 related to role substitution. Evidence found in the area of long-term conditions revealed that:

- Specialized cancer nursing care had a positive effect on psychological and organizational outcomes for breast cancer patients and symptoms experienced by patients with lung cancer.
- Enhanced nursing care may result in fewer visits to emergency departments for patients with respiratory conditions and there may be a cost savings associated with nurse led hospital at home care
- General practice nurses may reduce some of the risk factors for cardiovascular disease when compared to usual or no care.

In the area of mental health:

- Home visits by nurse and midwives appear to have beneficial effect on postpartum depression In the area of role comparison:
- Midwife led care for low-risk women compared to doctor-led care appears to reduce the number of procedures in labour and increase satisfaction with care.
- Specialist cardiac nurses and general practice nurses when compared with general practitioners improved mortality rates, general health, diet and levels of exercise and angina symptoms, as well as increased follow-up rates and reduced hospitalizations.

Article 13

Charlton, C., Dearing, K., Berry, J. & Johnson, M. (2008). Nurse practitioners' communication styles and their impact on patient outcomes: An integrative literature review. *Journal of the American Academy of Nurse Practitioners*, 20, 382-388.

The purpose of this integrative review of the literature (1999-2005) was to examine literature related to NP-patient communication and determine best practices to affect patient outcomes. Communication was defined as the act of providing verbal and/or nonverbal information. Evidence indicates that NPs use a biopsychosocial or patient-centred communication style. Patient-centred communication involves the patient in discussions and decision-making.

Patients are encouraged to express their thoughts and ideas, and partner with their care provider. Providers assess emotional and social factors as well as physical symptoms and use open-ended questions when talking with patients.

Type of Review: Integrative review of the literature

Findings: Seven articles were included in this review. Overall, NPs use a patient centred communication style. This style of communication resulted in

- Increased patient satisfaction
- Adherence to treatment plans
- Improved patient health

Article 14

Kleinpell, R., Ely, E., & Grabenkort, R. (2008). Nurse practitioner and physician assistants in the intensive care unit: An evidence-based review. *Critical Care Medicine*, 36(10), 2888-2897.

The purpose of this review was to identify literature (1996 to August 2007) on the role of the NP and physician assistant (PA) in acute and critical care settings and provide a summary of the impact and outcomes of NPs and PAs providing care in intensive care settings.

Type of review: Evidence-based review of the literature

Findings: A total of 31 articles were included in this review. Although limitations to all studies identified, overall existing research demonstrates that patient care provided by NPs and PAs:

- Has a positive impact in acute care settings,
- Enhances work flow and resident work hours without changing patient outcomes or hospital costs,
- Achieves similar outcomes of care to resident physicians,
- Reduces length of stay in ICU and time on ventilators,
- Increases collaboration and adherence to clinical practice guidelines, and
- Is satisfying to patients.

Article 15

Laurant, M., Harmsen, M., Wollersheim, H., Grol, R., Faber, M., & Sibbald, B. (2009). The impact of nonphysician clinicians Do they improve the quality and cost-effectiveness of health care services? *Medical Research and Review*, 66(6), 36A-89S.

The purpose of this review was to synthesize the available evidence in order to inform future efforts to revise roles between physicians and non-physician clinicians. Included in the review are the non-physician clinician roles of nurses, nurse practitioners, specialist nurses, physician assistants, and pharmacists.

Type of Review: Systematic review. Electronic search included all publications up to February 2008 that compared physician care to non-physician clinician care and reported outcomes related to clinical, patient, process of care, resource utilization, and costs/cost-effectiveness. Twenty-four systematic reviews were found, comprising 28 articles in total. Eighteen systematic reviews of role revision between physicians and APNs (NPs and nurse specialists) were included.

Findings: Sixteen of the 18 articles measured clinical outcomes e.g. mortality, reduction of symptoms, metabolic/pathological parameters, and quality of life. Overall the studies indicated no difference in clinical outcomes of care provided by physicians or APNs.

Patient outcomes such as satisfaction, compliance, and knowledge were included in 12 of the 18 reviews. In primary health care settings, all reviews showed significantly higher levels of patient satisfaction with nurse-led care. No appreciable difference was found in patient compliance or knowledge between those cared for by physicians or nurses.

The process of care, e.g. appropriate management, appropriate diagnostic/screening, testing and investigation and record keeping was measured in eight reviews. Evidence was strongest for appropriate advice giving, patients were

more informed by nurses than physicians. Nurses were more likely to offer advice to patients and were better communicators.

Resource utilization was measured in 16 of the 18 reviews, the number of tests ordered being the most frequent outcome studied. Findings indicated that nurses ordered significantly more tests and investigations than physicians, or there was no difference between the two groups. The review included two reviews for PAs and four reviews that reported the effectiveness of pharmacist intervention. There was no significant difference between clinical outcomes of care provided by PAs and physicians, patients were satisfied with care provided by PAs, access to care was improved and PAs contributed to increased productivity.

Interventions by pharmacists led to reduced HbA1c, it is unclear whether pharmacist-led care increased drug compliance, inappropriate prescribing was reduced, decrease in resource utilization, and pharmacists produced cost savings.

Overall, the findings suggest that non-physician clinicians may work as substitutes or supplements for physicians. Care provided by non-physician clinicians can maintain and often improve the quality of care and outcomes for patients.

The level of evidence for PAs and pharmacists is not as strong as the evidence for nurse-led care. The primary reason is the paucity of research into pharmacists and physician assistants. Evidence from this review suggests that revision of professional roles between physicians and non-physicians is a viable approach to improving quality of care, outcomes for patients, and improving service capacity. The use of non-physician clinicians does not eliminate the need to increase physician capacity as non-physicians cannot substitute to physicians across the full spectrum of health care.

Article 16

Horrocks, S. Anderson, E & Salisbury, C. (2002). Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors. *British Medical Journal*, 324, 819-123.

This systematic review includes research from as early as 1974 to 2001. Overall findings from the review indicate that care provided by NPs is as good as physician care and at times better and short-term health outcomes are comparable to care provided by physicians.

- Summary statistics for five studies from general practice settings, 3 in United Kingdom (UK) and 2 from United States (US) suggest that patients are satisfied with consultation with NPs.
- Comparison of 7 randomized controlled trials (RCT) to determine health status or quality of life showed no significant differences in patient health outcomes.
- Process outcomes demonstrated that NP undertake significantly more investigations and provide longer consultation times than physicians.
- Quality of care measures from 6 RCTs indicate that NPs identify physical abnormalities more often; give more information to patients; complete more patient records; offer more advice on self-care to patients; score better with communication; and are as accurate as physicians in ordering diagnostic testing and interpreting x-rays.

Overview and Synthesis of APN Outcomes Research and Reports

Report 1

Browne, G., Birch, S., & Thabane, L. (2012). Better care: An analysis of nursing and healthcare systems outcomes. *Canadian Health Services Research Foundation*. Retrieved from <http://www.cfhi-fcass.ca/PublicationsAndResources/ResearchReports/ArticleView/12-06-18/dced281f-7884-4d36-8b0f-a797aa7eec41.aspx>

This report documents the results of a systematic review of literature and studies of how models of nursing care are able to effect chronic disease management, home and community care, primary care and mental health settings.

Objectives of the report were to:

- Analyze recent evidence of the impact of nursing care across a range of outcomes variables: mortality and morbidity, systems impacts, and patient impacts
- A list of nurse-led or nurse-involved innovations
- Highlight innovations at provincial and national levels
- Recommendation key clinical programs for achieving better care for Canadians
- Comment on strategic investments

Type of Study: Systematic review of the literature of the effects of models nursing interventions. Included in the review were 27 high-quality systematic reviews, 29 high-quality studies and nine Ontario economic evaluation studies of comparative nursing models for people with chronic conditions.

Findings: Based on the analysis of the literature compared with current usual care, it is effective and efficient to use specialty-trained nurses to lead teams of professionals, including those with physicians, to care for chronically ill patients. This model of care would be more effective and less or no more costly, or at least equally effective but less costly, than the current on demand physician-led model. Physicians could continue to be involved along with replacement nurse practitioners to manage acute and episodic care.

Report 2

Jacobson, P.M. & HDR Inc. (2012). Evidence synthesis for the effectiveness of interprofessional teams in primary care. *Canadian Health Research Foundation*. Retrieved from <http://www.cfhi-fcass.ca/SearchResultsNews/12-06-27/0f362096-8b8e-4f67-b2c0-65f6e95b2bdf.aspx>

The purpose of this synthesis report was to review published and grey literature for the contributions of nurse-led and interprofessional teams in chronic disease, health promotion, prevention, improved health outcomes and access to care. Specifically, the contributions of registered nurses, advanced practice nurses, and nurse practitioners in the management of complex chronic diseases in primary care.

Conclusions from review of literature of nursing effectiveness:

- In some case, nurses were shown to provide equivalent care to physicians within their legislated scope of practice.
- Nurse-led initiatives were shown to improve outcomes, access and continuity of care, however cost savings may not be realized if more resources are used.
- Needs, demographics, payment modality, and structure of healthcare systems will influence the ability to compare studies and reviews to each other and to the Canadian context.
- Study length may affect the results obtain because some gains may appear later.

Conclusions from grey literature of effectiveness:

- Nurses can be effective in the management of chronic diseases if able to use their full scope of practice and skill sets.
- Target additional resources to populations with the most health deficits.
- Existing financing and healthcare structures create challenges to greater utilization of nurses.

Generalizations related to primary care financing:

- The fee-for-service payment system maximizes patient contact and minimum time per patient. This payment system rewards volume and not intensity of service.
- Incentives to use non-physician providers are limited unless directives and compensation are explicitly incorporated into the payment system.
- Intensive patient contacts are associated with more effective chronic disease management and are more likely obtained in comprehensive capitation or blended compensation systems.

Conclusions: Enhanced use of nursing resources can improve patient contact, education and disease management. The use of interprofessional teams offers the potential for cost-effective improvements to healthcare assess and to health outcomes if they are appropriately valued in cost-effectiveness analysis.

Report 3

National Governors Association. (2012). *The role of nurse practitioners in meeting increasing demand for primary care*. Retrieved from <http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-health-publications/col2-content/main-content-list/the-role-of-nurse-practitioners.html>

Changes to the healthcare system in the United States (US) will result in increased numbers of individuals accessing primary care services. This report was sponsored by the National Governors Association (NGA) to re-examine the scope of practice laws governing nurse practitioners (NPs) in the US. The aim of the review of the literature and state rules governing NP scope of practice was to answer three questions related to how NPs could meet increasing demand for primary care:

1. How do NP scopes of practice, licensure and other conditional requirements vary from state to state?
2. To what extent do states' rules and requirements for NPs deviate from evidence-based research of appropriate practices of NP?
3. What would be the effect of changes to scope of practice laws and regulations on health care access and quality?

Type of Review: Systematic review of peer-reviewed 22 articles. Two broad themes were used to organize the results: quality and access. Quality results were further divided into process and outcome measures. Process measures included patient satisfaction, time spent with patients, prescribing accuracy and providing preventive education. Outcomes measures include decreased cholesterol, blood pressure, and weight.

Findings: Process measures: Patients are equally or more satisfied with NPs than physicians and NPs tend to spend more time with patients during clinical visits. NPs generally prescribe medications appropriately and follow clinical practice guidelines.

Outcome measures: NPs successfully manage patients with hypertension, diabetes and obesity.

Access: NPs were more likely to work in underserved urban and rural areas. None of the studies raised concern with quality of care and suggest that NPs may provide access to care.

Conclusion: NPs are qualified to deliver certain elements of primary care. States might consider changing the scope of practice restrictions and assuring adequate reimbursement for NP services.

Report 4

DiCenso, A. & Bryant-Lukosius, D. (2010). Clinical nurse specialists and nurse practitioners in Canada: A decision support synthesis. *Canadian Health Services Research Foundation (CHSRF)*. Retrieved from <http://www.cfhi-fcass.ca/SearchResultsNews/10-06-01/b9cb9576-6140-4954-aa57-2b81c1350936.aspx>

This CHSRF commissioned report was developed to increase understanding of the roles of advanced practice nurses (APN) in Canada, the context in which they practice, and factors influencing effective integration of APNs into the Canadian healthcare system. APN roles included clinical nurse specialists (CNS), primary health care NPs (PHCNP) and acute care NPs (ACNP).

Methods: Three methods were used for this project. The first an advisory board comprised of multidisciplinary, multi-jurisdictional representatives oversaw the project. A scoping review of the literature was the second method used to identify relevant literature. The search yielded 468 papers that were included in the review. The third method was key informant and focus group interviews.

Findings:

Key factors essential for integration of APN roles include:

- Establish mechanisms to support APN's full scope of practice
- Increase public awareness of the functions of APNs
- Clearly define the roles
- Strong administrative leadership that supports the implementation of APN roles

Recommendations coming out of the report include:

- Create a vision statement for APN roles
- Facilitate implementation of APN roles by establishing a pan-Canadian multidisciplinary task force
- Consider APN as part of human resource planning based on population health needs
- Standardize APN regulatory and educational standards
- Address interprofessionalism in undergraduate and post-graduate health professional education
- Develop a communication strategy to disseminate the positive contributions of APNs
- Protect funding for APN positions and education
- Conduct further research on the value added of APN roles, their impact on healthcare costs, and the CNS role

Report 5

Delamaire, M. & Lafortune, G. (2010). *Nurses in advanced roles: A description and evaluation of experiences in 12 developed countries*. Paris, France: Head of Publications Service OECD. Retrieved from http://www.oecd-ilibrary.org/social-issues-migration-health/nurses-in-advanced-roles_5kmbrcfms5g7-en

The aim of this report was to review how APN roles in primary care were being developed in 12 countries (Australia, Belgium, Canada, Cyprus, Czech Republic, Finland, France, Ireland, Japan, Poland, United Kingdom and United States), review motivating factors for developing APN roles, and the impact of the roles on access, quality of care and costs, and determine facilitators and barriers to APN role development.

Methods: Policy and data questionnaires completed by designated national experts in participating countries and review of the literature.

Findings:

- Motivation for developing APN roles: In most countries the primary reason for developing APN roles was to improve access to care for areas with a limited supply of doctors, enhance quality patient care, and contain costs.
- State of APN role development: Countries varied in their stage of role development, some like the United States, Canada and the United Kingdom, had more than 30 years of experience with the role, while others, such as Belgium, the Czech Republic, France, Japan and Poland, the role was in its infancy. NPs tend to work in primary care providing first contact care and the NP is seen as substituting for doctors in order to reduce demands on doctor's time, improve access to care and possibly reduce costs. The CNS role tends to be found in hospitals where role expectations include providing leadership and education for staff nurses. The main aim for CNSs is to improve quality. Educational requirements vary across countries.
- Impact of APN on patient care and costs: Most evaluation studies have been carried out in the United States, Canada, United Kingdom and Finland. Available evaluations demonstrate that APNs improve access to care, reduce wait times, and deliver the same quality of care as doctors provided they have proper education. Patients are satisfied with care provided by APNs primarily because APNs spend more time with them and provide more education and counselling. Limited evaluations have attempted to estimate the impact of APNs on cost and those that have attempted have limitations. A factor that affects cost relates to whether the APN role is a substitute for or a supplement to the doctor.
- Barriers or facilitators to the development of APN roles: Four factors were identified in this study; 1) professional interests of doctors and nurses, 2) the funding and organization of care, 3) legislation and regulation of health professionals, and 4) capacity of educational programs to provide nurses with increased skills.

In all countries where APN roles have developed governments have facilitated the process by providing support and leadership to help overcome barriers.

Evaluation studies need to use a broader approach and move away from evaluating one specific role (APN) and begin to consider the overall organization of care services.

Article 1

DiCenso, A., Auffrey, L, Bryant-Lukosius, D., Donald, F., Martin-Misener, R., Matthews, S. et al. (2007). *Primary health care nurse practitioners in Canada. Contemporary Nurse: A Journal for the Australian Nursing Profession*, 26(1), 104-115.

This article, prepared for publication, by DiCenso et al. provides a history of the evolution of the NP role in Canada, along with a discussion of scope of practice, supply of NPs across the country, models of NP practice, and where NPs are employed. The detailed history in the article takes readers from the inception of the NP role in Canada to current state of the role. DiCenso et al. also provide a brief description of two major studies, one national and the second conducted in Ontario that examines the implementation and integration of the NP role into the health care system. Complete findings of the two reports may be found in the reports themselves and references are provided. Briefly, barriers identified in both reports include: reimbursement mechanisms for fee-for-service MDs to hire NPs, perceptions that NPs could impede recruitment and retention of physicians, concern about liability issues, restricted

NPs' scope of practice, resistance from MDs, and lack of funding for NP positions. Both reports indicate that patients are highly satisfied with care provided by NPs.

Research evidence discussed in this article include research demonstrating patient satisfaction with attentiveness and comprehensive care provided by NPs in an emergency department and improvement of quality of care of residents and staff skills in long-term care. Finally the article briefly outlines findings of the Canadian Nurse Practitioner Initiative (CNPI). Although not a research article, this is an article that provides up-to-date information on the status of the NP role in Canada.

Article 2

Kleinpell, R. & Gawlinski, A. (2005). Assessing outcomes in advanced practice nursing practice: the use of quality indicators and evidence-based practice. *AACN Clinical Issues: Advanced Practice in Acute and Critical Care*, 16(1), 43-57.

This article offers an explanation of outcomes and how to determine health outcomes for advanced practice nurses (APN), as well as an analysis of research outcomes related to APNs. Findings from the studies included in this article indicate that APNs adhere to clinical practice guidelines, decrease length of stay, and decrease intubation time in acute/critical care areas. The strength of this article is its discussion of APN research, the identification of quality outcomes in intensive care areas, and how APNs utilize clinical practice guidelines with positive outcomes. A limitation of the article is the term APN includes NP and clinical nurse specialists (CNS) practice.

Managers Implementing NP Role

Article 1

Reay, T., Golden-Biddle, K. & Germann, K. (2003). Challenges and leadership strategies for managers of nurse practitioners. *Journal of Nursing Management*, 11, 396-403.

This article investigates the evolution of NP role implementation in Alberta, Canada. Type of study: interpretive epistemology and qualitative methodology utilizing open-ended interviews to obtain NPs (N=25) and managers' (N=7) perspectives of NP role implementation. Findings: Three themes referred to as managerial challenges emerged from the interviews, 1) clarifying the reallocation of tasks, 2) managing altered work relationships, and 3) continuing to manage the team as it evolves.

Challenge one: managers have an important role to play in facilitating the reallocation of tasks and establishing new routines after the implementation of the NP role. Strategies to manage this challenge include: allow time for team members to sort out who does what in the new environment, preserve job motivation when reallocating tasks, and consider how tasks have been reallocated when dealing with personal conflicts.

Challenge two: the need for managers to manage altered working relations within the team. Managers need to make sure all team members understand the goal of the NP role. NPs need to develop strong relations with all members of the team. Strategies to manage this challenge include paying attention to all working relationships and facilitating relationship issues between team members.

Challenge three: the need to continue to manage the team as it evolves. Managers need to think at the systems level, and focus on the larger context. Strategies to assist with overcoming these challenges include adopting a balcony perspective for leadership so that the manager is able to observe the process of NP role implementation, working with the team to develop overall goals, and sharing with other managers' experiences of implementing the NP role.

Provincial Reports of the Implementation and Evaluation of NP Role

Report 1

Martin-Misener, R., Crawford, T. DiCenso, A., Akhtar-Danesh, N., Donald, F., Bryant-Lukosius, D. et al. (2010). *A survey of nurse practitioner practice patterns in primary health care in Nova Scotia*. Retrieved from <http://www.crnns.ca/documents/PracticePatternsStudyJan31-2010.pdf>

This report, funded by the College of Registered Nurses of Nova Scotia and Dalhousie University, was undertaken to answer the following research questions:

1. What are the characteristics of NPs, their practice models and settings?
2. What is the profile of practice populations served by NPs?
3. What are the facilitators and barriers of NP role implementation?

Type of study: descriptive survey design, n=39 NPs responded to the survey.

Findings: Findings indicate that NPs are satisfied with their relationship with the physician with whom they collaborate most frequently. NPs perceived their main contributions to the health care system were; increased access to primary health care, increased quality of care, leadership, and cost savings to the health care system. Facilitators to role implementation were; administrative/management support, culture of teamwork, and physician support. Barriers to role implementation were; funding issues, scope of practice restrictions, and resistance to role implementation.

Report 2

DiCenso, A., Paech, G. & IBM Corporation. (2003). *Report on the integration of primary health care nurse practitioners into the province of Ontario*. Toronto, ON: Ministry of Health and Long-Term Care. Retrieved from http://www.health.gov.on.ca/english/public/pub/ministry_reports/nurseprac03/nurseprac03_mn.html

This report, funded by the Ontario Ministry of Health and Long-Term Care (MHLTC), was undertaken to assess barriers and facilitators of NP integration into the province of Ontario, and to examine practice models in which NPs function.

Type of study: Surveys of: NPs N=253, physicians working with NPs N=225 and physicians not working with NPs N=492, and patients surveys N=260. Population-based surveys N=428, and site surveys N=27 were also conducted.

Findings: Data collected from this project is extensive and is difficult to distil into a brief summary. However, from the overall findings, ten broad themes emerged from the data. These themes include issues related to: 1) practice models, 2) a shared vision for the NP role and role alignment, 3) role definition and clarity, 4) team dynamics, 5) resources, 6) scope of practice, 7) facilitators to integration, 8) barriers to integration, 9) other findings, and 10) results of survey of public and patients. From the ten themes 29 recommendations emerged and were submitted to the MHLTC.

Recommendations fall into the following categories 1) accountability for implementation of the NP role, 2) shared vision and NP role alignment, 3) NP role clarity, 4) team dynamics, 5) resources, 6) NP scope of practice, and 7) system integration. This report is a resource for those who are interested in NP role integration and approaches to assess integration.

Report 3

Goss Gilroy Inc. (2001). *Report on the evaluation of implementation of the role of nurse practitioner-primary health care in Newfoundland and Labrador*. St. John's Newfoundland: Health & Community Services Province of Newfoundland & Labrador.

This report is the first comprehensive evaluation of the implementation of NPs in Canada. The intent of the evaluation was to determine how NPs were implemented, the extent of NP role integration, the impact the NP role had on the health care system, and to identify how to deploy future NPs in the province.

Type of study: Surveys of NPs, managers, health professionals, and physicians working with NPs, along with interviews with key informants at the provincial level.

Findings included the importance of: 1) engaging senior management with an interest in NP implementation to develop action plans to overcome restraints, 2) providing guidance to assist regional boards to understand the role, planning for and managing all aspects of role implementation, 3) seeking opportunities to discuss future role integration with various stakeholders, 4) clarifying at the policy level issues of collaboration, liability and scope of practice, 5) developing a long-term human resource plan, and 6) seeking remuneration approaches that facilitate primary health care delivery. These findings can inform stakeholders who are interested in implementing a new NP role into their health care system.

Textbooks of NP Outcomes Research

Kleinpell, R. (Ed.). (2013). *Outcome assessment in advanced practice nursing* (3rd ed.). New York, NY: Springer Publishing Co.

The updated text provides insights into how to conduct outcomes assessments in APN practice. Updated resources and outcome measures, tools and methods are included in this text. This is a resource to assist in assessing outcomes of APN practice in any settings. This text may be used as a resource for those interested in conducting outcomes assessment and measurement. It contains a variety of resources and easy steps to follow to search the literature and locate measurement and assessment tools.

Kleinpell, R. (Ed.). (2009). *Outcome assessment in advanced practice nursing* (2nd ed.). New York, NY: Springer Publishing Co.

This text is an update to the 2001 edition described below. New to this edition is an updated review the literature on outcomes measures, a chapter on outcome assessment in primary care settings, useful guidelines to help locate instruments to be used in assessment of care provided by advanced practice nurses (APN). Also new to this edition is a chapter written by Canadians Bryant-Lukosius, Vohra, and DiCenso discussing resources such as the PEPPA framework and APN toolkit. There are also chapters discussing outcome measurement of nurse-midwifery and outcome assessment in nurse anaesthesia care.

Outcome measures are grouped by care related, patient related, and performance related outcomes. Consistently, APNs, which include NPs, improve access, competently manage patients in acute, long- term, and primary care settings, and provide high-quality of care that is satisfying to patients.

This text may be used as a resource for those interested in conducting outcomes assessment and measurement. It contains a variety of resources and easy steps to follow to search the literature and locate measurement and assessment tools.

Kleinpell, R. (Ed.). (2001). *Outcome assessment in advanced practice nursing*. New York, NY: Springer Publishing Co.

This text edited by Ruth Kleinpell offers an overview of outcome measures that have been used in APN effectiveness research. APNs are defined as CNS or NPs. The author provides an extensive list of research studies from 1975-2000 that have assessed care related outcomes of APN. Outcomes assessed were control of hypertension, diabetes, use of diagnostic tests, cost of care, patient satisfaction, length of stay, complications, appropriateness of prescribing, and quality of life. Findings indicate that APN interventions decrease hospitalizations and readmissions, reduce hospital costs, reduce length of stay, prescribe medications appropriately, and reduce glycosylate hemoglobin and weight.

A second list provides studies that have assessed patient related outcomes of APN care from 1993-1999. Patient outcome indicators include prevention of pulmonary complications, patient education, hospital admission rates, length of stay, wait times, patient satisfaction, and utilization of best practice guidelines. These studies indicate that APNs interventions reduce malpositioning of endotracheal tubes; decrease length of stay, health costs, hospital admission or readmission rates, and have positive impact on patient satisfaction; reduce wait times, provide more individualize care, and increase the amount of health information provided to patients.

Studies assessing performance-related outcomes of APN care from 1964-2000 are also provided. Outcome indicators include formulation of care plans, missed appointment, change in patient level of disability, services provided, physical examinations, number of newborn visits, time management, patient satisfaction, clinical activities, history taking, physical functioning, symptom relief, health service costs, patient compliance to seek follow-up care, waiting times, costs per episode of care, number of prescriptions, quality of care, management of patient care, length of stay, interpersonal skills, and diagnostic testing. Findings from these studies indicate that APN care contribute to reductions in patient's symptoms, increase patient satisfaction with care, led to shorter wait times, increase primary care visits and reduce hospital visits, and result in appropriate prescription writing. This text does not offer a systematic review of these findings; however the information provided represents research studies from as early as 1964 to 2001 that demonstrate positive outcomes of care provided by NPs and CNSs.

Internet Resources

OAPN Oncology Advanced Practice Nursing

<http://www.jcc.hhsc.ca/body.cfm?id=119>

This site is specifically for advanced practice nurses working in oncology. The goal of the OAPN is to improve the health of Canadians at risk for or affected by cancer through the effective use of APN roles. The website was established to provide a hub for OAPNs, increase OAPN's capacity for conducting research, provide education and mentorship, promote evidence-based oncology nursing practice and establish stakeholder awareness of OAPN roles. Resources found at the site include: a link to OAPN initiatives, recent publications, the OAPN newsletter, links to the APN Data Collection Toolkit and the toolkit for designing innovative cancer services and APN roles (the PEPPA framework).

CHSRF/CIHR Advanced Practice Nursing (APN) Chair Program, APN Data Collection Toolkit

<http://apntoolkit.mcmaster.ca/>

The site is a compendium of tools used in APN related research, an overview of the PEPPA and APN web-based resources and links. This site is useful for decision makers and stakeholders.

American Association of Nurse Practitioners

<http://www.aanp.org/AANPCMS2>

The American Association of Nurse Practitioners (AANP) is one of the oldest NP professional organizations in the US. This site has useful information that can be obtained by non-members. Two recent publications may be of use to stakeholders are described below.

Nurse Practitioner Cost-Effectiveness

<http://www.aanp.org/images/documents/publications/costeffectiveness.pdf>

This statement provides references and information related to the cost-effectiveness of the NP role. This paper supports NPs as cost-effective health care providers.

Quality of Nurse Practitioner Practice

<http://www.aanp.org/images/documents/publications/qualityofpractice.pdf>

This two-page statement provides support for the quality of care provided by NPs. This statement and the previous statement on cost-effectiveness are useful resources for stakeholders in need of information to support the use of the NP role.

Canadian Nurse Practitioner Initiative

http://www.npnw.ca/initiative/Default_e.aspx

Funded by the Primary Health Care Transition Fund in 2003, the CNPI ran from 2004-2006. The final report was submitted to the Canadian Nurses Association in June 2006. The intent of the CNPI was to establish a framework for the implementation and integration of NPs in Canada. All of the final reports of the initiative are found at the CNPI website. Resources available at the site include Tools for Partners, which list fact sheets related to NPs in emergency departments, long-term care, and rural and remote communities. One of the final reports of the CNPI is

the Implementation and Evaluation Toolkit for Nurse Practitioners in Canada. The toolkit provides a guide for assessing the need for a NP, steps to follow to support successful implementation, and information on monitoring and evaluation of the role. All information at the site can be easily copied for use.

Canadian Nurses Association, Nursing Practice, Advanced Nursing Practice

<http://www.cna-aiic.ca/en/on-the-issues>

Located at the “On the Issues” link are various CNA publications and position statements related to better health, better care, better value, and better nursing.

<http://www.cna-aiic.ca/en/pages/personal-stories-of-advanced-nursing-practice/>

Located at this link are stories from NPs and clinical nurse specialists (CNS) describing their work and how they are making a difference. This is one way to highlight NP and APN practice.

Canadian Institute for Health Information

Regulated Nurses, 2013-Report 2014

https://secure.cihi.ca/free_products/Nursing-Workforce-2013_EN.pdf

Regulated Nurses, 2013 highlights current trends in nursing practice across a variety of supply, employment and demographic characteristics. This report highlights data for RNs and NPs, LPNs and RPNs.

Regulated Nurses 2012-Summary Report

https://secure.cihi.ca/free_products/RegulatedNurses2012Summary_EN.pdf

This report provides trends in nursing practice across demographic, educational, mobility and employment characteristics. It includes data from the three groups of regulated nursing professionals in Canada: RNs, including NPs, LPNs and RPNs.

Conclusion

Although this summary report is not inclusive of all literature related to NP sensitive outcomes, it provides evidence demonstrating outcomes of NP practice. Consistently, research related to NP practice demonstrates that NPs improve access to care, reduce length of stay in hospitals, and reduce costs to the health care system. Overall patients are satisfied with care received from NPs. Research also demonstrates that NPs appropriately order and prescribe diagnostic testing and medications. NPs spend time with patients and provide educational information related to patient self-care.

This summary report is the first step to accumulation of evidence to support NP practice. CRNNS looks forward to ongoing dialogue among stakeholders, decision-makers and practitioners related to how best to implement and integrate the NP role into the Nova Scotia health system.

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