

Advance Practice Nursing in the Pre-Hospital Setting (Z)

Lisa Apolinar

Arizona State University

## Advance Practice Nursing in the Pre-Hospital Setting (Z)

**Abstract**

Emergency department (ED) overcrowding is expected to increase at a rate of 1.9% yearly, leading to the inability to provide efficient and timely care, causing preventable medical errors and delays in time sensitive care. The Agency for Healthcare Research and Quality estimates that 21-33% of all ED visits are non-emergent and increased age correlates with increased use of Pre-hospital EMS systems and emergency rooms. This study aimed to determine if an advance practice nurse (APN) in an older adult pre-hospital setting could reduce the use of 911 for non-urgent calls and transports, using the para-medicine model of care. Available evidence demonstrated a decrease in non-urgent transports with potential for significant savings to the healthcare system. This study was conducted in a community where 86.3% of residents are over the age of 65. The local fire department employed a full time APN who evaluated patients identified by EMS crews as at risk for repeat use of the 911 system. Following a 911 call and a referral by medics, the APN contacted patients to arrange a home visit. The purpose served to evaluate current health status, risks, and gaps in care. Interventions included assistance reducing safety concerns, assistance with coordination of care, and working with patient primary care providers to meet patient needs. Data collection included patient age, gender, number of 911 calls 30 days prior and 30 days post intervention, number of ambulance transports following intervention and PEI score after the initial APN visit. Six patients (32%) accepted the intervention and 13 or (68%) refused the intervention, with a mean age of 86 years of age. Wilcoxin signed rank test indicates the number of pre-intervention 911 calls was statistically significantly higher than the number of post-intervention 911 calls.  $Z = -2.23$ , Asymp. Sig. (2 tailed) = 0.03. A Fisher's exact test and Pearson's Chai squared test did not demonstrate a

statistical significance in the number of ambulance transports, which could be attributed to the low participation rate in the intervention (n=6). These results indicate that an APN in the pre-hospital setting can have an impact on use of 911 calls for non-urgent problems and.

Furthermore, the ability to assist with care coordination and advocate for available services within the circle of the medical home closes gaps in care that are currently left unfilled.

### **Introduction**

ED overcrowding has been an issue for the past decade and ED's were tasked with creating a solution for this. However, due to the rapid increase in patient visits and a decrease in total ED's, this has not been accomplished. Furthermore, ED visits are estimated to increase by 1.9% annually and is not attributed to population growth (Filippatos & Karasi, 2015, Pitts, Pines, Handrigan, & Kellermann, 2012). The negative impact that ED overcrowding has is substantial. Most significantly, it potentiates the risk of medical errors, delays critical care and increases mortality for patients.

It is estimated that by 2020, 16% of the population will be over the age of 65. Increasing age is connected to higher utilization of ambulance use, ED visits and wait times (Knapman & Bonner, 2010; Lowthian et al., 2011). The AHRQ and Healthcare Cost and Utilization Project (H-CUP) estimated that 21-33% of all emergency room visits for all ages were discharged to home while others estimate this number to be 8-62% when looking at non-urgent visits (Filippatos & Karasi, 2015). The Agency for Healthcare and Research Quality (AHRQ) in 2011 issued an executive summary to healthcare systems indicating the need to address ED overcrowding (McHugh, VanDyke, McClelland, & Moss, 2011). In 2010, the Institute of Medicine (IOM) issued a brief, stating an overhaul of the healthcare system must include rethinking the roles of healthcare providers. The following paper will review the literature

addressing the viability of advance practice providers (APN) delivering care in the pre-hospital setting using the para-medicine model. The literature review will be followed by the project implemented integrating an APN into the pre-hospital setting and discuss the conceptual model and the evidence based model chosen to for the project implementation.

### **Background and Significance**

The definition of emergency room overcrowding is; “An ED is considered crowded when inadequate resources to meet patient care demands leads to a reduction in the quality of care” (Centers for Disease Control [CDC], 2012). The reasons for congestion in ED’s are multifactorial and not related to a single cause. Current research cites the ease of access to ED’s compared to the availability of primary care providers, patients’ perception of severity of illness and inability to obtain appointments in a timely manner at primary care offices, as reasons for utilizing the ED (Marques- Acosta & Dias da Silva Lima, 2015).

Internal causes of ED overcrowding identified are an increase in admissions, lack of sufficient staffing and ED boarding of admitted patients due to insufficient inpatient bed resources (Wong, Morra, Caesar, Carter, & Abrams, 2010). Filippatos and Evridiki (2015) support this finding citing causes of inadequate staffing, hospital bed shortages and reduced numbers of centers with ED’s. Once an ED becomes overcrowded, the wait times increase; how much these wait times increase can be related to severity of illnesses being treated, and age of patients being seen (George, Jell, & Todd, 2006). As the age and severity of illness increase, the wait times also significantly increase (George, Jell, & Todd, 2006). Multiple studies (Epstein et al., 2011; Filippatos & Karasi, 2015; Knapman & Bonner, 2010) correlate ED overcrowding with delays in treatment, higher risk for medication errors, preventable medical errors, adverse clinical outcomes and increased mortality rates. Currently, the CDC reports that 21% of

individuals over the age of 65 were seen in an ED at least twice in 2013. Two studies (George, Jell & Todd, 2006; Knapman & Bonner, 2010) support the theory that an ageing clientele negatively impacts ED wait times.

Current estimates report that ED visits cost the healthcare system 150-180 billion dollars annually and one estimate is that decreasing the number of non-urgent visits could save a minimum of four billion dollars annually (Weinick, Burns, Mehrotra, 2010). A strategic health goal in the Patient Protection and Affordable Care Act is to strengthen health care. This includes improving healthcare quality and safety, emphasis on primary and preventative care services linked with community services. Additional objectives are to reduce healthcare cost and increase efficiency, while ensuring access of care provided by a variety of healthcare professionals in a coordinated care model (United States Department of Health and Human Resources [HHS], 2015). One way to improve healthcare is by using the para-medicine model of care. This model utilizes existing infrastructure of local fire departments and their paramedic/EMT teams by using their education, training and skills in “non-traditional” community-based environments and applying expanded scopes of practice (O’Meara, Sterling, Reust, & Martin, 2016).

While the para-medicine model of care is new, early research supports the efficacy of this model of care. A meta-analysis examining the impact of new prehospital practitioners being used in the field to reduce the demand for ED services by providing care at the scene or referring the patient to alternative health services, found; that these services reduced transport to ED’s, and that patients were more likely to be discharged at the scene (Hideo, Williams, Jacobs, Bremner, & Finn, 2013). Unfortunately, while there was a reduction in unnecessary transportation, it was not clear as to whether this decreased ED visits. The study also cited lack of evidence supporting the appropriateness of the decisions made by the prehospital practitioners. A study looking

specifically at the ability of APN's to reduce ambulance transports at mass gathering events found a significant statistical role of the APN in reducing ambulance transports and referrals to external resources (Kemp, 2015). A recently completed scholarly project examined the use of a community care unit in the reduction and or redirection of non-urgent emergency department visits and found promising results. The project concluded that the community care unit consisting of an APN or Physician Assistant was able to treat and discharge from the scene 57.45% of all calls that met inclusion and exclusion criteria. These calls were referred to the community care unit by the 911 emergency systems once determined to be low priority and by paramedic/firefighter units who after evaluating patients felt transport to an emergency department was not required (Kania, 2015). The estimated savings of this service was \$218,511.93 in ambulance cost alone (Kania, 2015).

Advance practice nurses (APN) have long been found competent in providing care for minor injuries and illnesses. Three systematic reviews found similar evidence supporting high levels of patient satisfaction when evaluated and treated by pre-hospital providers. Furthermore, the evidence supported findings that the APN had better outcomes when it came to blood pressure and glucose control as compared to physicians (Stanik-Hutt et al., 2013). A descriptive cohort study evaluated diagnostic ability and accuracy of NP's versus physicians related to minor illness and injury. The study found the NP had a 97.3% accuracy rate for diagnosis and treatment, finding no significant differences between the APN and physicians related to missed injuries and inappropriate treatment (Van Der Linden, Reijnen, & DeVos, 2010).

The proposed site reported a high number of non-urgent 911 calls requiring response by the fire department and ambulance transports. Due to limitations of time and resources firemen were unable to address non-urgent needs identified, leading to the exploration of the para-

medicine model. This local fire department serves a retirement community in a suburban region of Arizona. According to the United States Census Bureau, 83.6% of the community is over the age of 65 (United States Census Bureau, 2015). In the year 2014-15, the department's emergency personnel responded to 7,322 medical complaint calls from the 911 system. 445 of 7,322 calls were classified as non-emergent. Patients who call frequently for non-urgent reasons are often referred to as "loyal customers", these multiple calls require a minimum response of a fire engine and 4 firemen, which effectively put the unit out of service to actual calls and increase the costs of the department's services. This led to the clinical PICOT question: In an elderly community, can a visit by an advance practice nurse following the use of the "911" system for a low priority call, compared to no follow up visit, affect the number of non-emergent transports to an emergency department?

### **Search strategy**

Databases searched for relevant studies included CINAHL, PubMed and Cochrane Library from periods 2010 to current. Additional databases searched were the ASU libraries for gray or unpublished literature. MeSH terms were cultivated and derived from the NIH MeSH browser and were systematically put into each database. Additional sources were identified from reference lists within papers that were found to be relevant to topic.

Key search terms derived from MeSH and alternative terms found within international literature were included in search strategy. Key word search terms included: nurse practitioner, family nurse practitioner, advance practice nurse, mid-level provider, emergencies, emergency medical services, emergency care, medical services emergency, emergency services medical, emergency medical services, mobile care unit, community care unit, ambulance, first aid, mobile

emergency unit, mobile integrated care unit, para-medicine, community para-medicine, pre-hospital care, 911, aged, elderly, frail elderly and home care.

Inclusion criteria were any research that occurred in the pre-hospital setting and functioned within an existing emergency care system. The Study must have targeted care provided by a pre-hospital provider. Furthermore, all studies must be in English and occurred within the last eight years.

Exclusion criteria included any setting within the inpatient hospital setting, or within an urgent care type setting. Studies that used any type of telephone triage or advice lines were eliminated from the final pool of recovered studies. Additional factors that excluded studies were published dates exceeding eight years or were not in English.

### **Critical Appraisal of Body of Evidence**

Ten studies related to PICOT question were included in the final critical appraisal process consisting of three systematic reviews one included a meta-analysis, one qualitative review, two observational studies, two retrospective chart review, one literature review and one feasibility study. The level of evidence ranged from five to seven, with a level five the highest level of measurement (Melnyk & Fineout-Overholt, 2011). Seven studies retained were given a level five and consisted of systematic reviews of descriptive or qualitative studies. Included in the critical appraisal are two level six studies, a blinded prospective observational study and a study considered grey literature recently completed in an urban setting in Arizona. The decision to keep this gray literature was based on the similarities of stated PICOT, including interventions planned, community it served and location within the same state. The final study was rated a level seven, as it was an estimation of potential cost savings if Centers for Medicare and Medicaid Services (CMS) reimbursed EMS providers for a wider range of services.



When assessing for bias none of the appraised studies reported any conflict in document. However, in one study it must be noted that the researchers were employed as APN's working on the Community Care Units during the data collection period. Six of the ten studies were located in either Canada or the United Kingdom both of which have a National Health System (NHS) in place. This became relevant when looking for potential bias if funding was provided by the NHS. Specifically one systematic review was funded by and set in the U.K. Five additional studies conducted in countries with a NHS, did not provide the source of funding or were funded by grants. Researchers in two studies located within the United States, were contracted by the Department of Health and Human Services (DHHS) to conduct the research and would not constitute bias. The final study Hoskins 2010 was performed without funding and no other conflicts were reported in the document.

The setting for each retained study is considered pre-hospital, however, the pre-hospital settings varied. Seven studies focused on care provided to patients on scene or at a residence and either called 911 or similar emergency medical system. Three studies used pre-hospital providers to perform health care assessments within specific housing communities and care delivered was not in response to an emergency call. The terms "Community dwellings" and "emergency calls" were used in the literature search by two systematic reviews.

The healthcare provider utilized in the appraised studies was not homogenous, this was due to differing scope of practice, assigned titles, and intervention performed. However, all of the studies utilized what would be equivalent in the United States to an EMT or paramedic. Additionally, many of the paramedics or EMT's had additional training and education which broadened their scope of practice as seen in four studies that included ECP's, EmCP, and PPP. Four studies included registered nurses or nurse practitioners as part of the intervention.

The outcomes measured were heterogeneous in nature; however, four studies found that expanding the role of the pre-hospital provider decreased the number of transports to the ED. Unfortunately reduction in ED overcrowding was found in only one study. Two studies assessing patient satisfaction found a positive relationship when treated by a pre-hospital provider. Additional findings of two studies indicated a positive perception the pre-hospital providers by other healthcare workers. Patient safety was evaluated in three studies with two studies finding “no safety concerns”. Conversely, the third study was not able to determine a positive or negative relationship related to patient safety. Financial outcomes were also heterogeneous due to the inability to charge for pre-hospital care, unless the patient was transported to the ED. The results for all studies were estimates based on care received and averted transports. A positive relationship between pre-hospital programs that provided flexibility in the delivery of care and reported savings was found in two studies. Furthermore, two studies were unable to find a positive relationship between patients cared for by the pre-hospital program and traditional pathways of care.

### **Conclusions from the Evidence**

There is mixed heterogeneity in all aspects of the literature reviewed. Therefore, the limited number and lack of homogeneity, suggest further research in the area of pre-hospital medicine needs to be done. The results are promising when evaluating the ability to decrease transports to the ED, however, it is not clear what the impact will be on the ED overcrowding crisis. With the constraints of billing by pre-hospital providers, it will be difficult to determine the feasibility of sustaining a paramedicine model. The reimbursement rules must coincide with the available opportunities to reduce costs and provide quality care in alternative ways. When looking at the sources of funding it is clear, the national health systems recognize the gaps in

care that can be filled by healthcare infrastructure that is already in place. Adding NP's to this model is an opportunity to provide financial support because of the ability to bill for services. While this critical appraisal does not reflect an abundance of strong evidence, it does support the need for further research using the paramedicine model, which utilizes existing infrastructure to deliver care in non-traditional ways.

### **Implications of Proposed Process**

The proposed project of a paramedicine model in an elderly community has multiple implications for practice. The evidence shows that an increase in age correlates to an increased use of the EMS system. Additionally, evidence supports that when implementing a mobile health unit the unit can reduce the number of non-emergent transports, while maintaining patient satisfaction (Hideo et al., 2013, Hill, McMeekin, & Price, 2014, Hoskins, 2010, Kania, 2015). The reduction of ambulance transports cannot be defined simply. What it does equate to, is an engine company of four firefighters and an ambulance crew of 2 having the ability to remain in service. This ensures the readiness and proximity of highly trained firefighters and EMT's in the event of a true emergency. Additionally, the addition of an APN will not only reduce the overall cost of care delivered, but also provide the ability to bill for services otherwise not covered by the current reimbursement structure (Agency for Healthcare Research and Quality [AHRQ], 2015, Aiken & Buchan, 2008).

### **Conceptual Theoretical Framework**

The Chronic Care Model (CCM) will drive the proposed intervention of utilizing an advance practice nurse in the pre-hospital setting. The CCM can be applied to a multitude of chronic illness, health care settings and target populations. While this intervention is not specifically targeting a chronic illness, the target population is at greater risk for chronic illness

related to their advance age. The initial elements of this model include the community, healthcare system, self-management support, delivery system design, decision support and clinical information systems (Gugiu, Westine, Coryn, & Hobson, 2012). Additional elements have been added to this model to reflect the advances in the field of chronic care that have been derived from health systems that have implemented the model and research. The additional elements added are, patient safety, cultural competency in delivery design, care coordination, community policies, and case management. The CCM was chosen for this setting because it recognizes healthcare is a complex interwoven relationship, between the community and the health systems that provide care in a multitude of settings.

### **Process Framework**

The process Framework used to help guide the implementation of the proposed project is the Lean methodology. This model was developed by the Toyota brand as a unique approach to manufacturing and has been adopted by healthcare in the last decade (Johnson, Patterson, & O'Connell, 2013). Lean methodology uses an approach called A3. There are three core elements to the Lean Methodology and these are plan, do, and check. The A3 plan brings the front line caregivers into the problem solving process. Additionally, it allows for real time problem solving based on the current situation by the workers involved in the process. The cycle of Lean Methodology starts with identifying the problem the root cause, develop and implementation plan (Act). The second stage is implementation of the plan (Do), followed by the check phase which includes evaluating and measuring results and corrective and preventative action. The final phase is to establish a process standard. Due to the nature of the pre-hospital environment and the new para-medicine care model, the lean methodology will allow flexibility to adapt and flow with the needs of the patient and current environmental setting. Furthermore,

the model will support the proposed CCM, focusing on patient safety, healthcare delivery design, and cost containment. The proposed model of care and implementation design, offer flexibility, inclusion of the pre-hospital system to close the loop of the healthcare provided to the patient and a cost effective way to provide care by an infrastructure already in place.

### **Methods**

Following IRB approval and a community needs assessment which included; review of community demographics, 911 calls, and key department personnel, NCFMD implemented their “Community Health and Wellness Program” (CHWP). Department leadership and the APN developed a process which began from the point of 911 contact, through to the visit of the APN. This process included IT involvement to create an electronic consent form that patients could sign at the time of the 911 call to the documentation in the EMR by the APN. The inclusion of the IT involvement was critical to closing the loop of care coordination within the fire department. The intended goal for the APN was to perform home visits of patients that were identified by firefighters, as high risk for utilizing the 911 system. These risks included patients who were having difficulty navigating their healthcare needs, self-care deficits, safety concerns and were known to be loyal users of the 911-call system. After formal training of all firefighters, Medics, and EMT’s utilizing a power point and question and answer session the program went live November 15, 2016. Utilizing the existing electronic medical records system (EMR), which was HIPPA compliant, firefighters responding to a 911 call could make an electronic referral to the CHWP. These referrals were based on a firefighter’s assessment of the patient’s ability to manage their healthcare needs, safety concerns or family concerns and consent for phone contact was obtained. Upon receipt of the referral, the advance practice nurse contacted the patient and scheduled a home visit. Acceptance of the APN’s services was strictly voluntary, and patient’s

that declined visits did not receive the interventional visit; however, we did track utilization of the 911 system following a declination of a visit. Visits by the APN included safety assessments, review of medical history, and chief concerns of patient or family. Once needs were identified the APN with the patient and family would develop a plan to overcome identified barriers. This plan included health services available to patient, connecting patient with services, working with PCP's to close gaps in care, acting as an advocate to ensure patient needs were being met and serving as a resource to patients and families when encountering difficulties navigating their healthcare. During the visit, patients or their caregivers were asked if they would be willing to participate in the research study which included completing the patient enablement instrument (PEI) 1 week following the APN visit. Community medicine modules incorporated into the EMR allowed electronic documentation of these visits, and were visible to members of the medical team who encountered the patient in the future. This allowed all caregiver's to determine what needs had been identified and interventions implemented. This module also met documentation requirements when billing for services. The program initially began taking internal referrals only; however, the program is now actively working with the local ED to begin accepting referrals for patients that have been identified as high utilizers of the emergency department by staff or case managers.

Outcome measurements collected included patients age, gender, number of 911 calls 30 days prior APN visit, number of 911 calls 30 days post APN visit, ambulance transports 30 days following visit, and PEI score. The PEI is used to evaluate patient's feelings of empowerment following a provider visit. This tool has been found to have a Cronbach's confidence interval of 95% and test-retest reliability score CI =95%. Patient empowerment is a proven patient self-care strategy to improve health outcomes and quality of life among the chronically ill (Wallerstein,

2006). One issue encountered during data collection was the assumption that each 911 call would generate a medical chart. However, we discovered that many 911 responses did not generate a medical chart and this required accessing the 911 call system log to determine actual number of calls. The ability to access both systems allowed for the capture of all 911 calls to patient in addition to any medical charts generated.

### **Results**

Utilizing SPS 23® for data analysis descriptive statistics were used to describe the sample and outcome variables. 19 older adults in a retirement community were referred to the CHWP and included in the statistical analysis. Six patients or (32%) participated in the intervention and 13 patients or (68%) refused the intervention. There were 9 males or (47%) and 10 females or (53%) referred to the program. The mean age of patient referrals was 86 years with a range of 74-96. Five participants took the PEI assessment with mean of 5.2 (S.D. 1.30) with a range of 3-12. There were 2 ambulance transports for 1 patient who refused APN intervention and zero ambulance transports for the group of patients who accepted the intervention. A Wilcoxin matched-pairs signed rank test was used to determine if a significant difference existed between the number of 911 calls prior to intervention of APN visit and number of 911 calls following the APN visit. The Wilcoxin matched-pairs signed rank test indicates a statistically significant reduction  $Z = -2.23^b$ ,  $p = 0.03$  Asymp. Sig (2-tailed) for 911 calls following the intervention. Data analysis found no correlation between PEI scores and the number of post intervention 911 calls, but could have been affected by the small sample size.

### **Discussion**

The overall analysis found that an APN could help to reduce the number of 911 calls made by older adults in a retirement community for non-urgent reasons. These findings are

consistent with previous studies, looking at the effectiveness of the para-medicine model of care. Additionally, there was a substantial impact observed in the clinical setting. The needs of this age group were far greater than anticipated. Connecting patients with community resources and being the bridge between the patient and healthcare providers added tremendous value to this program. Difficulties navigating the healthcare system seemed to be the biggest obstacle faced by the patients, requiring knowledge of what services are available and how to get these services to the where they were needed most. There was no correlation between PEI scores and 911 calls following the intervention, but patients verbally reported having increased knowledge and resources to meet their needs. Limitations of this study were the short duration, small sample size, and limitations of APN availability. Strengths of the study were the commitment of the fire department to meeting the needs of their community members, fire-fighters engagement and engagement of the local ED, and community resources. The clinical significance of the professional inter-collaboration that occurred due to gaps in care is something that needs further research to see if this model adequately engages the existing EMS infrastructure in closing known gaps in care. The amount of resources needed for referred patients was high, and the cost of these resources had to be considered. However, when looking at the cost of multiple ED visits, ambulance transports, EMS response to 911 calls and preventable hospital admissions, this cost could be seen as minimal, and has not been studied.

### **Conclusion**

The para-medicine model of care has shown that it is an alternative method to delivering healthcare at the point of need. The implemented program identified patient needs and gaps in care that were not being met. Inter-professional collaboration was a primary concept of this project and reinforced the importance of linking all healthcare providers involved in a patients



care. For organizations looking to implement this model, importance must be placed on creating an individual program designed to meet the specific needs of the target community. The holistic approach to care utilized for this projects participants cannot be found in the medical model or EMS medical training. The APN is uniquely positioned to assist with development and implementation of this model given nursing's focus on a holistic approach rather than a disease focused approach.

## References

- Agency for Healthcare Research and Quality. (2015). *Health Services Research on Aging: Building on Biomedical and Clinical Research*.
- Agency for Healthcare Research and Quality. (2016). Healthcare Cost and Utilization Project (HCUP). Retrieved from <http://www.ahrq.gov/research/data/hcup/index.html>
- Aiken, L., & Buchan, J. (2008). Solving Nursing Shortages: A common priority. *Journal of Clinical Nursing, 17*(24).
- Epstein, S. K., Huckins, D. S., Liu, S. W., Pallin, D. J., Sullivan, A. F., Lipton, R. I., & Camargo, C. A. (2012, April 2012). Emergency department crowding and risk of preventable medical errors. *Internal Emergency Medicine, 7*(2), 173-180.
- Filippatos, G., & Karasi, E. (2015). The effect of emergency department crowding on patient outcomes. *Health Science Journal, 9*(1:6).
- George, G., Jell, C., & Todd, B. (2006). Effect of population ageing on emergency department speed and efficiency: A historical perspective from a district general hospital in the UK. *Emergency Medicine Journal, 23*, 379-383.
- Gugiu, C. P., Westine, C. D., Coryn, C. L., & Hobson, K. A. (2012, April 3). An Application of a New Evidence Grading System to Research on the Chronic Care Model. *Sage Journals, 36* (1). Retrieved from <http://journals.sagepub.com.ezproxy1.lib.asu.edu/doi/full/10.1177/0163278712436968>
- Hideo, T., Williams, T. A., Jacobs, I., Bremner, A., & Finn, J. (2013). *The impact of new prehospital practitioners on ambulance transportation to emergency department: a systematic review and met-analysis*. Australia: Curtin's Institutional Research Repository.

- Hill, H., McMeekin, P., & Price, C. (2014, October). A systematic review of the activity and impact of emergency care practitioners in the NHS. *Emergency Medical Journal, 31*(10), 853-860.
- Hoskins, R. (2010). Evaluating new roles within emergency care: a literature review. *International Emergency Nursing, 19*, 125-140.
- Institute of Medicine. (2010). *The future of Nursing: Leading Change, Advancing Health*. Retrieved from <http://thefutureofnursing.org/sites/default/files/FutureofNursing2010ReportBrief.pdf>
- Johnson, P. M., Patterson, C. J., & O'Connell, M. P. (2013, December). Lean methodology: An evidence-based practice approach for healthcare improvement. *The Nurse Practitioner, 38*(12), 1-7.
- Kania, R. H. (2015). *Use of a community care unit in the reduction and/or redirection of non-urgent emergency department visits, a clinical scholarly project* (Unpublished doctoral project). Brandman University, Irvine, California.
- Kemp, A. E. (2015, January). Mass-gathering events: The role of advanced nurse practitioners in reducing referrals to local health care agencies. *Prehospital and Disaster Medicine, 31*(1).
- Knapman, M., & Bonner, A. (2010). Overcrowding in medium-volume emergency departments: Effects of aged patients in emergency departments on wait times for non-emergent triage level patients. *International Journal of Nursing Practice, 16*(), 310-317.
- Lowthian, J. A., Cameron, P. A., Stoelwinder, J. U., Curtis, A., Currell, A., Cooke, M. W., & McNeil, J. J. (2011). Increasing utilization of emergency ambulances. *Australian Health Review, 35*, 63-69.

- McHugh, M., VanDyke, K., McClelland, M., & Moss, D. (2011). Improving patient flow and reducing emergency department crowding: A guide for hospitals. Retrieved from <http://www.ahrq.gov/research/findings/final-reports/ptflow/index.html>
- Melnyk, B. M., & Fineout-Overholt, E. (2011). *Evidence-Based Practice* (2nd ed.). Philadelphia: Wolters Kluwer/ Lippincott Williams & Wilkins.
- National Center for Health Statistics (2014). *Health, United States, 2014: With special feature on adults aged 55-64*. Retrieved from <http://www.cdc.gov/nchs/data/hus/hus14.pdf>
- O'Meara, P., Reust, M., & Martin, A. (2015). Integrating a community paramedicine program with local health, aged care and social services: An observational study. *Australasian Journal of Paramedicine*, 12(5).
- O'Meara, P., Sterling, C., Reust, M., & Martin, A. (2016, February 2). Community paramedicine model of care: an observational, ethnographic case study. *BioMed Central Health Services Research*, 16(39).
- Pitts, S. R., Pines, J. M., Handrigan, M. T., & Kellermann, A. R. (2012, December). National trends in emergency department occupancy, 2001 to 2008: Effect of inpatient admissions versus emergency department practice intensity. *Annals of Emergency Medicine: An International Journal*, 60(6), 679-686.
- Powell, M. P., Yu, X., Isehunwa, O., & Chang, C. F. (2016). Trends in Urgency of Emergency Department Visits among Those with and without Multiple Chronic Conditions, 2007-2012. *Journal of Hospital and Medical Management*, 2(2:14).
- Stanik-Hutt, J., Newhouse, R. P., White, K. M., Johantgen, M., Bass, E. B., Zangaro, G., ... Weiner, J. P. (2013, September 2013). The quality and effectiveness of care provided by nurse practitioners. *The Journal for Nurse Practitioners*, 9(8).

- United States Department of Health and Human Resources (2015). *Strategic Goal 1: Strengthen Health Care*. Retrieved from [http://www.hhs.gov/about/strategic-plan/strategic-goal-1/#obj\\_e](http://www.hhs.gov/about/strategic-plan/strategic-goal-1/#obj_e)
- Van Der Linden, C., Reijnen, R., & DeVos, R. (2010, July). Diagnostic accuracy of emergency nurse practitioners versus physicians related to minor illnesses and injury. *Journal of Emergency Nursing*, 36(4), 311-316.
- Wallerstein, N. (2006). What is the evidence on effectiveness of empowerment to improve health? Retrieved from [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0010/74656/E88086.pdf](http://www.euro.who.int/__data/assets/pdf_file/0010/74656/E88086.pdf)
- Weinick, R. M., Burns, R. M., & Mehrotra, A. (2012, September). How Many Emergency Department Visits Could be Managed at Urgent Care Centers and Retail Clinics? *Health Affairs*, 29(9), 1630-1636.
- Wong, H. J., Morra, D., Caesar, M., Carter, M. W., & Abrams, H. (2010). Understanding hospital and emergency department congestion: an examination of inpatient admission trends and bed resources. *The journal of Canadian Association of Emergency Physicians*, 12(1).