FEASIBILITY OF A COMMUNITY PARAMEDICINE PROGRAM

IN NEW CASTLE COUNTY, DELAWARE

by

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ABSTRACT

With many people throughout the United States over utilizing the emergency department, costs are rising, and patient satisfaction is falling. Many solutions have been attempted, but the problem persists. A new solution, Community Paramedicine, is growing in popularity across the nation. No such program has been attempted in New Castle County, Delaware. This thesis examined the population of the county, and analyzed Medicaid data to propose a Community Paramedicine pilot program. Census data for New Castle County and the United States as a whole were compared to provide a clear picture of the population of New Castle County in comparison to the nation. Medicaid data was then collected from the University of Delaware's database. The data was ordered by ICD 9 Codes to determine a disease population for which to attempt a pilot protocol for a Community Paramedicine program. The Medicaid data indicated that a common disease that generates Medicaid claims is asthma. This would be a good disease to focus on for the pilot protocol because it is chronic in nature and without proper management, it can flare up and a life-threatening situation can arise. An analysis of the number of claims per patient revealed that a small percentage of the Medicaid population created an incredibly large portion of the claims. This group of high utilizers would also benefit greatly from such a program. The data also revealed that Medicaid patients who self reported themselves as being "black" generated twice as many claims as would be expected based on the percentage of the population that they represent.

Chapter 1

INTRODUCTION

Emergency Department overcrowding in the United States of America is a rapidly growing issue in healthcare. Many patients seek out care at the Emergency Department (ED) for non-emergent health issues, and this causes costs to increase as well. Patients who over utilize the ED typically also abuse the 911 system as a "taxi" to the hospital. This ties up ambulances, emergency department beds, and hospital staff in an effort to treat a non-emergent patient in an emergent setting. Costs skyrocket while ED efficiency and patient satisfaction suffer. Many solutions have been attempted to mitigate this issue, but the problem persists.

A new solution, Community Paramedicine, has been rapidly spreading throughout the United States, but no such program has been explored here in New Castle County, Delaware. In a Community Paramedicine program, experienced paramedics visit these high utilizers in their homes on a non-emergent basis to help prevent them from becoming acutely ill and requiring a trip to the hospital. Community Paramedics assess the patient's health, ensure they are compliant with their prescribed treatments, and educate patients on their health conditions. The program has been shown to be extremely successful elsewhere in the US. Thus, this investigation will explore the feasibility of a Community Paramedicine program in New Castle County, Delaware.

In order to bring Community Paramedicine to New Castle County, a pilot protocol will need to be put into place so that a small scale investigation of its efficacy

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can be performed. In order to effectively implement this pilot protocol, it is essential to use a data-driven selection process for determining the target patient population. This study will provide the foundational evidence needed to select the target population that can be used in a pilot Community Paramedicine project in New Castle County, Delaware.

Chapter 2

BACKGROUND

2.1   The Problem: Emergency Department Overcrowding

The state of healthcare in the United States is tumultuous at best. Emergency department wait times are skyrocketing due to the increased volume of patients. In fact, Emergency department visits increased by 36% between the years of 1996 and 2006 (Joint Commission on Rural Emergency Care, 2016). Hospitals have an extremely tough time keeping up with the increased volumes. As a consequence, wait times and patient experience have suffered. Studies have shown that an alarmingly large portion of visits to the emergency department come from patients who do not have health issues severe enough to warrant a trip to the emergency room. One study determined that between fourteen and twenty-eight percent of the patients seen in emergency departments could have been treated elsewhere without negative outcomes (Weinick, 2010). These patients could have been treated just as effectively by their primary care physicians, in an "urgent care" clinic, or in another retail medical facility. The study asserts that not only would the patient care outcomes have been similar, but would have also resulted in less cost for the patient and their insurance company. In fact, it was estimated that 4.4 billion dollars could have been saved if these patients in question had not received care at the emergency department (Weinick, 2010). Furthermore, the "healthcare experience" would have also been better for the patient because they would avoid the overcrowded emergency department waiting rooms.
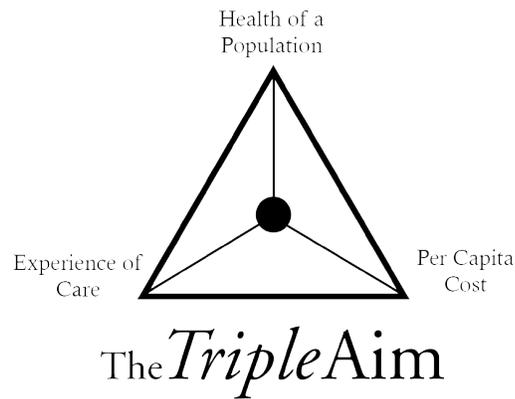
The *Triple* Aim

Figure 1: The Triple Aim Identifies Areas to focus on in Order to Improve Healthcare
(Berwick, 2008)

Avoiding the emergency department for these patients would satisfy all three points of "The Triple Aim" triangle that is pictured above in Figure 1. The Triple Aim is the three goals that the Institute for Healthcare Improvement has set for all new healthcare endeavors. It is postulated that if healthcare systems achieve all three goals, it will improve healthcare as a whole in the United States. The patients would accrue less cost for the care rendered (decrease the per capita cost), have shorter wait times (increase experience of care), and receive equal care to that of the emergency department (health of a population) (Berwick, 2008). Because the care is held constant for these patients, the net effect of seeking alternative treatments is similar care for less money and a better patient experience.
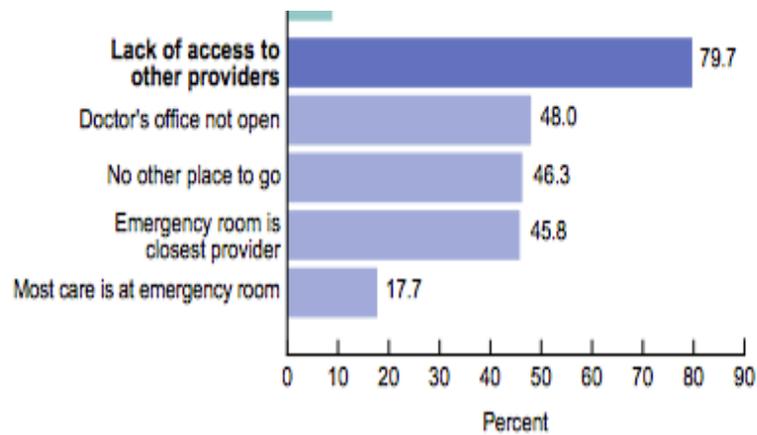
Figure 2: "Why I Went to the ER" Shows the most common reason that patients chose to be seen in the Emergency Department rather than another healthcare facility (US Department of Health and Human Services, 2015)

So why aren't more people seeking alternate care? It seems that many people live in areas that the US Department of Health and Human Services have deemed as "Health Professional Shortage Areas" or HPSAs. (US Department of Health and Human Services, 2015). HPSAs are defined as an area of the country where there were more than 3,500 patients for every physician. There are currently 6,100 areas designated as HPSAs in the United States, affecting 54 million Americans that live in these areas.

The Department of Health and Human Services estimates that 8,200 additional primary care physicians would need to be added in order to eliminate all of the HPSAs. (US Department of Health and Human Services, 2015). Due to this shortage of primary care physicians (or their equivalent), patients seek care in whatever form they can get it: even if it means astronomical ER costs and congested wait rooms. In fact, it seems that the most common reason that patients visit emergency department is

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not because of the severity of their health condition. (Gindi, 2012) Figure 2 shows that the most popular reason that people visited the provider was "Lack of access to other providers." The following answers to the question also seem to show that people are not going to the emergency department because they believe they need ER quality care, but because it is most convenient.

2.2   Current Solutions

Many different solutions to the issue of Emergency Department overcrowding have been attempted. The most popular and effective strategies attempt to treat patients at alternate facilities, or in some cases, in the patient's home. One popular alternative plan of care is visiting nurse services. This is not a new plan: the first visiting nurse agency called "friends of the poor" was founded in New York City in 1909 to serve the homeless and poor citizens of the city who could not afford healthcare. (Rothstein, 1995) It blossomed from there and now there are many commercial visiting nurse agencies all across America. This service is attractive to many elderly or bedridden patients because it allows patients to be treated in the comfort of their own home. Visiting nurses have the ability to monitor patients and ensure and ensure that they do not require more advanced care. The visiting nurse also has a unique opportunity to get to know patients and develop a rapport with them. A major downside to visiting nurses is the immense costs associated with compensating the nurses and providing transportation.

Another solution to the problem takes aim not at keeping patients out of the ED, but rather attempts to increase efficiency of doctors in the emergency department. Many hospitals have found that the documentation aspect of a doctor's job takes up a considerable amount of time. This causes providers to see fewer patients, decreasing

efficiency. Many doctors now have "scribes" who shadow them as they see patients and write their patient care reports. An interview with an emergency department scribe, Audrey Snyder, explains a bit more about how scribes improve the efficiency of the ED: "I accompany a doctor or P.A. throughout their shift and help them with their PCR (patient care report). We are able to see more patients in a shift and this really helps to keep the waiting room as empty as possible. With so many patients coming in, I don't think the providers would be able to keep up with the volume of patients we see here." (Snyder, 2016) When asked about how critically ill most of her patients are, she asserted, "most people should probably have gone to an urgent care… the amount of 'flu like symptoms' charts I write is outrageous."

Another more unorthodox solution to the problem is being attempted in Bangor, Maine. Their fire department receives many non-emergent calls for service, so they are considering adding additional fees for these unnecessary calls. For example, there is an individual who dialed 911 to request an ambulance 171 separate times in the past year. There has been some backlash, but they assert that it is costly and dangerous to tie up an ambulance for so long when the call is such a low priority. Should an actual emergency arise, there would be no available ambulances to respond in a timely manner. (McCrea, 2016)

2.3   Community Paramedicine

Community Paramedicine, also known as Mobile Integrated Healthcare, is a newly emerging field in the emergency medical services. Paramedicine itself is actually only about 45 years old: it was started in the 1960's as a response to car crashes on the country's highways. It quickly evolved to include more advanced practices and standardized training. (Kruperman, 2010) Paramedicine continues to

evolve today all over the nation as the scope of practice of paramedics and EMT's is slowly growing to include more non-emergent treatment options. This paved the way for EMT's and paramedics to begin visiting patients with a high risk of activation of the 911 system on a non-emergent basis. These programs are rapidly spreading across the nation, *but none have appeared in the state of Delaware.* One program has been particularly successful, so we will examine it in more detail to help determine the feasibility of a similar one in New Castle County.

Seven years ago, a novel solution to the problem of ED overuse was piloted in Fort Worth, Texas. A company called MedStar EMS launched a program called Mobile Integrated Healthcare/Community Paramedicine. This program takes aim at high utilizers of the 911 system. (MedStar EMS, 2014) The goal of the program is to reduce the frequency of unnecessary 911 calls by enrolling "frequent flyers" in a program where *community health paramedics* (CHP'S) visit them at home on a non-emergent basis.   Patients enrolled in this program "typically do not have health insurance and rely on EMS and emergency departments for their healthcare." (The Joint Commission on Rural Emergency Care, 2016) This results in "higher costs and the diversion of valuable resources away from true emergencies" according to the Agency for Healthcare Research and Quality. (Medstar EMS, 2014)

The program has three goals: (MedStar EMS, 2016)
1) Reduce the probability of providing acute emergency medical care for at-risk patients and the medically underserved, thereby reducing unnecessary health care expenditures.
2) Increase the outreach activity and public education components of EMS providers.

3) Generate a potential revenue stream, including reimbursement for services as permitted by agreements with payers.

      The CHP's typically visit enrolled patients a few times per week and perform actions detailed in table 1. They help to ensure that the patient is not acutely ill, will not become acutely ill, and will receive the long-term preventative care that they need. The efficacy of the program has been confirmed by a study of its enrollees: graduates of the Community Paramedicine program activated the 911 system 90% less frequently than they did before enrolling. (The Joint Commission on Rural Emergency Care) MedStar estimates that this freed up 14,000 emergency department bed hours and reduced ED charges by 9 million dollars between July 2009 and August 2011. (MedStar EMS, 2014) What's more? The program only cost Medstar EMS $46,000 to start, and did not increase their annual staffing costs. (The Joint Commission on Rural Emergency Care) Although Community Paramedicine has been extremely successful elsewhere in the United States, no such program has been attempted in the state of Delaware. This thesis will focus on examining the feasibility of bringing Community Paramedicine to New Castle County.

Table 1: Expanded EMS Functions (Joint Commission on Rural Emergency
                  Care,2016)

Assessment	-Checking vital signs -Blood pressure screening and monitoring -Prescription drug compliance monitoring -Assessing patient safety risks (e.g., risk for falling)
Treatment/ Intervention	-Breathing treatments -Providing wound care, changing dressings -**Patient education** -Intravenous monitoring
Referrals	-Mental health and substance use disorder referrals -Social service referrals
Prevention and Public Health	-Immunizations -Well Baby Checks -Asthma management -Fluoride varnishing and oral health activities -Disease investigation

Chapter 3

SPECIFIC AIMS

The overall goal of this thesis is to examine feasibility of a Community Paramedicine in New Castle County. Due to this, we will focus mainly on New Castle County.

There are three specific aims for this project:

3.1 Specific Aim 1: Describe the overall population of New Castle County.

3.2 Specific Aim 2: Identify and characterize patients who present to the Emergency Department most commonly in New Castle County.

3.3 Specific Aim 3: Propose a pilot protocol for a Community Paramedicine program in New Castle County.

Chapter 4

METHODS

4.1 Specific Aim 1: Describe the overall population of New Castle County

Before trying to describe the population of patients presenting to the emergency department, it is important to understand the population of New Castle County as a whole. In order to describe New Castle County, online data from the United States Census Bureau was accessed. The data set on their website allowed researchers to specify the area of interest, and provided multiple pieces of data. This project will utilize facts such as the age distribution, gender distribution, race, ethnicity, and income level of citizens of New Castle County. These values were also compared to the national averages that the Census Bureau publishes. Knowing what the average citizen of New Castle County looks like helped to draw conclusions about the population that utilizes the emergency department.

4.2 Specific Aim 2: Identify and describe patients who present to the ED Most commonly

In order to accomplish specific aim number 2, data from the Delaware Medicaid Claims Data Set was used. Mary Joan McDuffie from the University of Delaware's Center for Community Research and Services was integral in obtaining this data. Ms. McDuffie is a senior research associate in the center's health policy research group. The data is provided to the University on a weekly basis, then was aggregated into data for the fiscal years of 2013 and 2014. The data was restricted to only show claims in which the "place of service" was the emergency department. This

filtered out all claims that were made outside of the ED, allowing the data to only reflect the claims we are concerned with. A similar restriction was placed on the county code, so only New Castle County emergency department claims were reflected in the data. Since the Delaware Medicaid Claims Data Set does not include any demographic information (just payment information), the claim numbers were merged with a client file that included gender and race of the client. Due to HIPPA issues and the University's policies, patients over the age of 89 had their age reported as 89. The idea behind this was to protect the identity of the elderly, because there are theoretically fewer of them and it would be easier to identify a patient of advanced age due to the scarcity of patients with higher values for the age category. Additionally, date of claim was removed from the data set. A claim order number replaced this, and if multiple claims were made on the same day, they were assigned the same number. For example, if two claims were made on January 2nd and another was made on January 8th they would be reported as 1, 1, 2. Additionally, each of the patients was assigned a Master Client ID by the Medicaid program, and this is traceable to each patient. This ID was removed and replaced with a randomized study ID that is not traceable to any specific individual. Each individual claim was accompanied by the primary diagnosis code. An ICD-9 codebook was provided in order to decipher what disease each diagnosis code indicates. The billed amount, gender of the patient, and race of the patient were also attached to each claim. The data set was password protected so that only members of the research group would be able to access it.

After the data was received, it was imported into JMP, a statistical analysis program that the University of Delaware provides to all students. With the help of Dr. Papas, the data was analyzed to show which primary diagnosis codes were represented

the most frequently. The data was sorted by the most frequently occurring ICD-9
codes for the entire set of data. The top 15 codes were then searched in the codebook
to discover what the actual diagnosis is for each individual code. The data was then
analyzed by gender using the same methods. This helped to isolate the target
population for the pilot protocol. Age and race statistics were also analyzed to be even
more specific in choosing the patient population.

4.3   Specific Aim 3: Propose a pilot protocol for a Community Paramedicine Program in New Castle County

In order to propose a pilot protocol, one specific disease from the top diseases
discovered by specific aim 2 was selected. The ideal disease for a pilot protocol
would be a chronic disease that caused patients to have "flare ups" when the patient
did not comply with their prescribed treatments (i.e. checking blood glucose in a
diabetic patient). These chronic diseases can be well managed if patients are educated
about their condition and know how to manage their illness properly, so a community
paramedicine program would be most effective for these patients. Once a disease is
selected, other successful Community Paramedicine programs were examined in order
to design a proposal for a Community Paramedicine program here in New Castle
County.

Chapter 5

RESULTS

5.1 Specific Aim 1: Describe the overall population of New Castle County

The information reported in Table 2 was obtained from the US Census Bureau (United States Census Bureau, 2015). Statistics for New Castle County, Delaware are compared to the United States as a whole.

Table 2: Demographic Characteristics of New Castle County, Delaware and the United States as a Whole

	New Castle County	United States Average
Population Estimate (7/1/2015)	556,779	321,418,820
Persons Under Age 18	22.2%	23.1%
Persons 65 Years and Over	13.8%	14.5%
Race is "White"	67.1%	77.4%
Race is "Black"	24.9%	13.2%
Race is "Asian"	5.2%	5.4%
Veterans	6.1%	6.4%
Foreign Born Persons	10.0%	13.1%
Median Gross Rent	$1,030	$920
Persons Per Household	2.62	2.63

Speak Language Other Than English at Home	15%	20.9%
High School Graduate (over age 25)	89.8%	86.3%
Have a Disability (under age 65)	7.9%	8.5%
Does Not Have Health Insurance	10%	12%
Per Capita Income	$32,616	$28,555
Persons in Poverty	12.3%	14.8%
Population Per Square Mile	1263.2	87.4

5.2 Specific Aim 2: Identify and describe patients who present to the emergency department most frequently

Data from this section (Table 3) reflects the Medicaid data obtained from the University of Delaware's Center for Community Research and Services. Data was reported examining the most common diagnoses for patients utilizing the Emergency Department who reside in New Castle County, Delaware. (Data re-examined overall, as in Table 3 and by gender.) The top diagnoses for males are listed in Table 4 and for females in Table 5.

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Table 3: Most Common Diagnoses in NCC Emergency Departments – Whole
Population

ICD-9 Code	Diagnosis	Count (#)	Percent (Data Set)	Percent (Total)
78650	Chest Pain, Not Otherwise Specified (NOS)	12800	17%	5%
78909	Abdominal Pain, Other Specified State	10229	14%	4%
7840	Headache	5821	8%	2%
4659	Acute URI NOS	5477	7%	2%
78060	Fever NOS	5010	7%	2%
78605	Shortness of Breath	4840	6%	2%
64683	Pregnancy Complications	4747	6%	2%
78900	Abdominal Pain Unspecified	3845	5%	1%
9597	Lower Leg Injury NOS	3774	5%	1%
95901	Head Injury NOS	3688	5%	1%
78703	Vomiting Alone	3546	5%	1%
3829	Otitis Media NOS	3336	4%	1%
7295	Pain in Limb	3061	4%	1%
49392	Asthma NOS	2817	4%	1%
7242	Lumbago (Lower Back Pain)	2750	4%	1%

Table 4: Top Diagnoses in NCC Emergency Departments – Males Only

ICD-9 Code	Diagnosis	Count	Percent (Data Set)	Percent (Total)
78650	Chest Pain NOS	5100	17%	4%
78909	Abdominal Pain, Other Specified State	2888	10%	3%
4659	Acute URI NOS	2537	9%	2%
78060	Fever NOS	2453	8%	2%
95901	Head Injury NOS	1805	6%	2%
78605	Shortness of Breath	1798	6%	2%
9597	Lower Leg Injury NOS	1667	6%	1%
3829	Otitis Media NOS	1638	5%	1%
7840	Headache	1627	5%	1%
78703	Vomiting Alone	1531	5%	1%
30500	Alcohol Abuse	1403	5%	1%
49392	Asthma NOS	1367	5%	1%
78900	Abdominal Pain Unspecified	1362	5%	1%
7295	Pain in Limb	1339	4%	1%
78039	Convulsions	1287	4%	1%

Table 5: Top Diagnoses in NCC Emergency Departments – Females Only

ICD-9 Code	Diagnosis	Count	Percent (Data Set)	Percent (Total)
78650	Chest Pain NOS	7700	16%	5%
78909	Abdominal Pain, Other Specified State	7340	15%	4%
64683	Pregnancy Complications	4747	10%	3%
7840	Headache	4194	9%	3%
78605	Shortness of Breath	3042	6%	2%
4659	Acute URI NOS	2938	6%	2%
78060	Fever NOS	2557	5%	2%
78900	Abdominal Pain Unspecified	2483	4%	2%
9597	Lower Leg Injury NOS	2107	4%	1%
64403	Threatened Premature Labor	2023	4%	1%
78703	Vomiting Alone	2015	4%	1%
5990	Urinary Tract Infection NOS	1994	4%	1%
95901	Head Injury NOS	1883	4%	1%
7295	Pain in Limb	1722	4%	1%
3829	Otitis Media NOS	1698	4%	1%

Table 6: Number of Claims by Race

Race	Number of Claims	Percent
Asian	3025	1%
Black	137856	48.4%
Caucasian	98270	35.2%
Hispanic	39515	14.2%

Table 7: Age Statistics

Mean:	30
Standard Deviation	21
Max	89
	(supresed)
Min	0
25th Quartile	13
75th Quartile	46

Table 8: Number of Claims Per Patient

Average Claims Per Patient	4.95
Standard Deviation	10.85
25th Quartile	1
75th Quartile	5
90% number of claims	10
97.5% number of claims	27
Maximum number of claims	244

Chapter 6

DATA ANALYSIS

6.1   Specific Aim 1: Analysis of New Castle County

From the data obtained from the United States Census Bureau's website, we can draw many conclusions about New Castle County. Obviously Delaware is a small state relative to the rest, but New Castle County is actually quite representative of the population of the entire country. Statistical measures such as age distribution (percent of people under 18 or over 65 years of age) are very similar to the United States average. Other benchmarks such as the high school graduation rate and monthly average rent are also very similar to national averages. The mean per-capita income is slightly above the national average.

Some of the data points, however are quite different form the averages. People who identify their race as Black represent 24.9% of the population, and the national average is 13.2%. Fewer people in New Castle County do not have health insurance, and fewer people live in poverty. The most striking difference is the population per square mile. New Castle County has 1263.2 residents per square mile, while the national average is 87.4.

6.2   Specific Aim 2: Characterizing the Patients Who Make Medicaid Claims

The data from the University of Delaware's Center for Community Research and Services was imported into the JMP software, which was used to analyze it. The ICD-9 codes were ordered by the frequency they appeared. This was repeated for both males and females. Not surprisingly, the top complaint for males, females and the

entire population was "chest pain NOS." This complaint will not be focused on as far as a community paramedicine pilot program goes because of the presumed acuity of the patients with this complaint. This is a group of patients that should most likely be treated in the emergency room. Abdominal pain is the next most popular complaint in both males and females, but again, this is not a complaint that a Community Paramedic would likely be able to remedy, so we will not focus on it.   Males and females typically presented with similar complaints throughout the rest of the list. Obviously, females presented with "pregnancy complications" more often than males. Another interesting code that was present for males but not females was "alcohol abuse."

The diagnosis codes are somewhat vague, which makes determining exactly what the patient's disease diagnosis is. For example, the "abdominal pains NOS" diagnosis code could be caused by a plethora of different conditions. Due to the ambiguity of the codes, it is slightly more difficult to determine for sure which disease is causing the complaint. Only one diagnosis on the list of the top 15 is specific to any individual disease: this is asthma. Fortunately, asthma is a perfect condition to treat outside of the emergency department. It is a chronic condition that flares up if not properly managed. When patients become acutely ill from asthma, it becomes a life-threatening situation. There are many long-term treatments for asthma such as Atrovent or Singulair. When used properly the treatments are quite effective in preventing flare-ups, but without compliance to treatment plans, life-threatening events can occur. We can conclude that asthma patients would be a good group of patients to focus on for the Community Paramedicine pilot protocol.

The statistics for age and race of patients who generate Medicaid claims were also analyzed using the JMP software. The age of patients was not surprising, as the distribution of age of patients who generated claims was very representative of the overall population of the county. Analysis of the race variable, however, revealed some interesting facts about the population that generates Medicaid claims. Patients identifying as "Black" generated 48.4% of claims, followed by "Caucasians" (35.2%), "Hispanics" were next with 14.2%, and "Asians" accounted for the final 1% of claims. These percentages are of interest because they do not correlate well with the percentage of each race that resides within New Castle County. "Blacks" generated almost half of the Medicaid claims but only make up about one quarter of the population. This may indicate that people who identified as "Black" generate on average more Medicaid claims, so this group may be a good population to focus on for the pilot program.

Another aspect that was analyzed was the "Claim Number." This reflects the number of claims that the patient made throughout the time period of the data set, so the higher value for Claim Number indicates that an individual generated more Medicaid claims. After analyzing the spread of claims, it seems that the vast majority of patients (90%) generated a reasonable number of claims (less than 10 over a 2 year period.) It is important to note that the 97.5% group jumps to 27 claims per year. This demonstrates that abnormally large portions of the claims are being made by a small (2.5%) group of patients. This group of patients will be an excellent group to target for enrollment in a community paramedicine program because they generate so great of a portion of the total cost.

6.3 Specific Aim 3: Propose a Pilot Protocol for a Community Paramedicine Program in New Castle County, Delaware

In order to bring a full fledged Community Paramedicine program to New Castle County, it will be necessary to put a pilot program in place in order to demonstrate its safety and efficacy. It was decided that one specific disease should be targeted for the pilot protocol, and that a small group of about 25 patients will be enrolled initially. This group of patients will be patients with asthma that have generated multiple Medicaid claims during the time period studied. These patients could not be identified based on the data collected by the University of Delaware's Center for Community Research and Services because the patient's Master Client IDs had been removed and replaced with a study ID. Due to this, an additional study will be needed to recruit patients for the pilot program. Once patients who would benefit from this program have been identified, it will be necessary to conduct a chart review of their visits to the emergency department. This will help to ensure that when they visited, no advanced care was administered. If advanced care was given, we may want to avoid this patient population because keeping them out of the emergency department may be dangerous. Specific markers for "advanced care" such as admission to the hospital, intubation, and CPAP therapy would contraindicate treatment outside the hospital. If it is found that the patient was assessed and treated quickly and discharged without complication, it could be concluded that there is little risk in preventing their emergency department visit. A community paramedicine pilot protocol should be attempted in New Castle County, Delaware after the above research has been conducted.

The pilot protocol should be a small-scale operation consisting of about 30 patients. The enrollees should all have the same chronic disease, such as asthma, in

order to simplify the program while it is still new. The healthcare providers should be at the advanced life support (ALS) level, because ALS level providers can administer far more drugs and perform more advanced patient assessment than a basic life support (BLS) provider could. The units would travel to the patient's homes in a non-transport capable vehicle, as this is cheaper and requires less maintenance than an ambulance. Should a patient require more advanced care such as the emergency room, a county ambulance could be summoned to transport the patient.   Patients would be enrolled in the program for 30 days, with 3 visits per week from the community paramedics. In order to determine the effectiveness of the program, the patient's number of trips to the emergency room in the three months prior to the program will be compared to the number of ED visits after graduation from the program. This will allow calculation of emergency department bed hours saved and dollars saved will be possible.

Chapter 7

CONCLUSIONS

After analysis of the data, it can be concluded that New Castle County, Delaware has a population of patients who over utilize the Emergency Department. This drives up cost and lowers patient satisfaction. The most common disease diagnosis that is acceptable to treat out of the hospital is asthma, so this would be an excellent disease to focus on for a Community Paramedicine pilot program. An analysis of the number of claims per patient reveals that the top 2.5% of Medicaid patients generate more than 27 claims every two years (the average is 5). These patients would also be good candidates to recruit for the pilot protocol.

Further research should include a chart review of the patients who are selected for the pilot program. This will ensure that no advanced care is being rendered in the ED. Should the chart review reveal that advanced care is being rendered, then the patient should be excluded from the pilot program because of the severity of their illness. After the chart review, the pilot protocol should be published and current paramedics should be retrained as Community Paramedics. Many programs throughout the nation share their training manuals free of charge, so setting up a training program in New Castle County would not be difficult. Once the new Community Paramedics are trained, they can begin seeing patients. After the patients graduate from the program, an analysis can be conducted to determine how effective the program was. Should the results be positive, the program could be expanded to include more diseases.

REFERENCES

Berwick, D., Nolan, T., & Whittington, J. (2008). The triple aim:Care, health , and cost. *Health Affaris, 27*(3), 759-769.

Clark, M. M., Gleisberg, G. R., Karrer, A. R., & Escott, M. E. (2015). Managing patient-centric care. montgomery county, texas, community paramedicine program sees early success. *JEMS : A Journal of Emergency Medical Services, 40*(4), 53-56.

Gindi, Cohen, & Kirzinger. (2012). *Emergency room use among adults aged 18–64: Early release of estimates from the national health interview survey.* National Center for Health Statistics.

Kruperman, K. (2010). History of community paramedicine. *Journal of Emergency Medical Services,*

McCrea, N. (2016, 3/22/16). Maine city considers fees for excessive non-emergency calls. *Bangor Daily News,*

MedStar EMS. *CP/MIH outcome measures project.* Retrieved 4/1/16http://www.medstar911.org/mih-cp-outcome-measures-project

MedStar EMS. (2014) *MedStar EMS community health program details.*http://www.medstar911.org/community-health-program

Meyer, L. (2015). In Rivera P. (Ed.), [Community Paramedicine Fact Sheet] (http://www.emsa.ca.gov/Community_Paramedicine ed.) California Office of EMS.

Rothstein, W. (1995). The cost of caring. *Readings in american healthcare: Current issues in socio-historical perspective* (pp. 57-58) Univ of Wisconsin Press.

Snyder, A. (2016). In Kalczynski J. (Ed.), *Interview with Audrey Lain Snyder; Emergency Department scribe*

The Joint Commission on Rural Emergency Care. *Beyond 911: State and community strategies for expanding the primary care role of first responders.* Retrieved 3/11, 2016, from http://www.ncsl.org/research/health/expanding-the-primary-care-role-of-first-responder.aspx

United States Census Bureau. (2015). *Quick facts: New castle county, delaware.*, 2016, from http://www.census.gov/quickfacts/table/PST045215/10003,00

US Department of Health and Human Services. (2015).

Shortage designation: Health professional shortage areas & medically underserved Areas/Populations. Retrieved 3/16, 2016, from http://www.hrsa.gov/shortage/

Weinick, R., & Burns, R. (2010). Many emergency department visits could be managed at urgent care centers and retail clincs.*29*(9), 1630-1636.