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Emergency Triage, Treat, and Transportation Model (ET3) if Successfully Implemented in North Carolina: A Simulation Based on 2017 Medicare Billing Data

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EMERGENCY TRIAGE, TREAT, AND TRANSPORTATION MODEL (ET3)

IF SUCCESSFULLY IMPLEMENTED IN NORTH CAROLINA:

A SIMULATION BASED ON 2017 MEDICARE BILLING DATA

BY

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A doctoral project submitted to the faculty of the Medical University of South Carolina in partial fulfillment of the requirements for the degree Doctor of Health Administration in the College of Health Professions

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Abstract

Emergency department (ED) visits are increasing and a growing number of non-emergency patients are using EMS for non-urgent transportation to EDs. The costs of ED visits far exceed the costs of physician office visits and a significant number of patients are transported to EDs by EMS for low-acuity visits that have the potential to be seen in lower cost care settings. The objective of this study was to calculate potential cost savings from diverting EMS transports from traditional ED destinations to physician offices due to implementation of the ET3 Model. The (2017) Medicare 5% Limited Data Set and 2017 NC HCUP State Emergency Department Database were used to extract all records for Medicare beneficiaries, Medicaid beneficiaries, private payers, and other payers in North Carolina. All medical transportation bills associated with ambulance transport and low-acuity ED visits resulting in a discharge to home outcome were analyzed for cost savings related to ED charges and traditional office charges. With full implementation of ET3 in North Carolina, the potential annual Medicare savings is $3,240,762 with annual savings related to other payers of $5,330,024, (Medicaid), $52,911,342 (private) and $8,350,396 (other payers). This represents a cumulative cost savings of $69,832,524.

Key words: emergency department cost savings, low-acuity visits, ET3, EMS diversion, alternative destinations, physician office transports.

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Chapter 1-Introduction

1.1 Background and Need

Emergency medical services (EMS) was designed as a resource for serious and life-threatening emergencies, but a growing number of non-emergency patients are utilizing EMS for non-urgent transportation to emergency departments (EDs). In 2013, over 2.4 million low-acuity patients were transported to EDs in the United States (National Center for Health Statistics, 2016). Low-acuity patients do not require the specialized services provided by EDs and these patients may be treated more quickly, more effectively, and more cost-effectively in outpatient settings. The proportion of low-acuity patients transported to EDs has been steadily rising over time and this arrival stream has resulted in overcrowding and in care delays for ED patients (Weaver, Moore, Patterson, & Yearly, 2012). A mechanism to divert low-acuity patients from EDs to appropriate outpatient settings would result in significant cost savings and benefit hospital ED overcrowding (Webb & Mills, 2019). Previous studies have demonstrated the ability of paramedics to accurately identify and triage low-acuity patients (Brown et al., 2009; Kahveci, Demircan, Keles,, Bildik, & Aygencel, 2012; Neeki et al., 2016; Webb & Mills, 2019).

Presently, Medicare reimbursement models only permit payment to emergency medical services (EMS) providers for transport to emergency departments and provision no alternative transport options to locations such as physician offices and urgent care centers following a 911 call. Despite the ability of EMS paramedics to effectively triage low-acuity patients effectively,

EMS agencies transport almost all patients to EDs as a matter of policy as result of antiquated reimbursement guidelines (Alpert, Morganti, Margolis, Wasserman, & Kellermann, 2013).

In an effort to address the inefficiencies associated with EMS transporting almost all patients to EDs after receiving a 911 call, the Center for Medicare and Medicaid Innovation Center (Innovation Center) has developed the model concept of Triage, Treat, and Transport (ET3). This is a voluntary enrollment, five-year payment model providing additional options to patients and EMS personnel in lieu of traditional emergency department transports. Under the ET3 model, the Centers for Medicare and Medicaid Services (CMS) will be permitted to pay participating EMS agencies and ambulance providers to 1) transport a patient to a hospital emergency department (ED) or other destination covered under the model, 2) transport to an alternative destination (such as a physician's office, urgent care, or clinic), or 3) provide on scene treatment with a qualified provider, either physically present or via telehealth. The goal of the ET3 model is to provide emergency care for critical patients and assist lower-acuity patients with transport to appropriate care settings based upon clinical and social needs.

1.2 Performance Metrics

The ET3 model will require participants to monitor care satisfaction, utilization measures, and outcome measures to identify gaps in care and focus on quality improvement initiatives. The monitoring metrics to assess the operational components of ET3 have not been fully developed but will be designed to effectively evaluate the impact on:

- "system cost analysis (pre/post) (EMS agency, physician services, ED costs, hospital costs, public health;
- access to primary, specialty, and emergency care;

- patient safety, outcomes and satisfaction; and
- education, licensure, and workforce”

(CMS, 2019, p. 13.)

1.3 ET3 Summary and Potential Challenges

ET3 represents a bold step and radical departure in longstanding U.S. healthcare policy. No template exists to benchmark the effectiveness of ET3, so funding and participation in the model represents a significant leap of faith by CMS and the program participants. CMS acknowledges many uncertainties in the ET3 Model and has indicated changes might be required during program implementation based upon unanticipated issues and outcomes. In the initial draft document, CMS predicts future iterations of ET3 might involve partnerships and integration of accountable care organizations into ET3 to function as a true population health initiative (CMS, 2019). Another potential benefit is to incorporate similar ET3 models into state Medicaid populations if ET3 achieves intended results with Medicare beneficiaries. Frequent reviews will be required to identify program challenges with rapid-cycle interventions developed to ensure the evolution and ongoing success of ET3. If correctly implemented, ET3 has the potential to alter the landscape of longstanding U.S. healthcare policy, resulting in improved access and reduced costs.

The goal of the current project is to examine the potential impact of ET3 using currently available data from Medicare and from the Healthcare Cost and Utilization Project (HCUP) ED visits from the state of North Carolina. This will allow us to simulate the potential impact of the ET3 program to the Medicare population. We will further model the potential impact to other payers.

Chapter 2-Literature Review

2.1 Research Overview

The increasing number of hospital ED visits, many of which are related to primary care needs, involves many issues regarding equity, access to care, and overutilization of emergency medical services (EMS) in the United States. One of the most pressing issues is the capacity of hospitals to provide emergency care when emergency rooms are crowded with patients seeking basic care (Begley, Courtney, Abbass, Ahmed, & Burau, 2013). A literature search was conducted to examine these issues and over 2,000 articles were located addressing these topics. The idea of ED overcrowding and overutilization of EMS seems to be universally supported in the literature. Emergency department overcrowding is an ongoing challenge in the United States and this phenomenon has contributed to sub-optimal and delayed care (Hearld & Alexander, 2012; U.S. GAO, 2009). In 2017, there were over 22.3 million emergency department (ED) visits by patients 65 years of age and older in the United States and 32.6% of patients arrived by 911 response ambulances (Rui & Kang, 2017). From 2007 to 2010 Medicare expenditures averaged $5.2 billion annually on 16.6 million ambulance transports to emergency departments and payments per beneficiary increased 19.1 percent (Medicare Advisory Council, 2012). EMS utilization has increased 31% during a ten-year period and in 2002, the Inspector General for the Centers for Medicare and Medicaid Services (DMS) determined that 13% of all EMS transports were medically unnecessary. The associated costs of overutilization were $220 million (Weaver, Moore, Patterson, & Yealy, 2012). The ED visit rates for injury and illness vary by age but increase in both categories with age (Albert, Rui, & McCaig, 2017). The rates for adults 65 years of age and older is 12 per 100 persons for injury and 36 per 100 persons experiencing illness. Adults $\geq$ 85 experience the highest visit rates (25 per 100 persons for injury and 57 per

100 persons for illness) and adults aged 65-74 experience lower visit rates (29 per 100 persons for illness and 9 per 100 persons for injury) (Figure 1). When comparing visit rates to gender, women over the age of 65 experienced higher injury visit rates (14 per 100 women) compared to men (10 per 100 men) (Figure 2.1). The ED visit rate did not differ significantly for illness visits between men (36 per 100 men) and 37 per 100 for women (Figure 2).

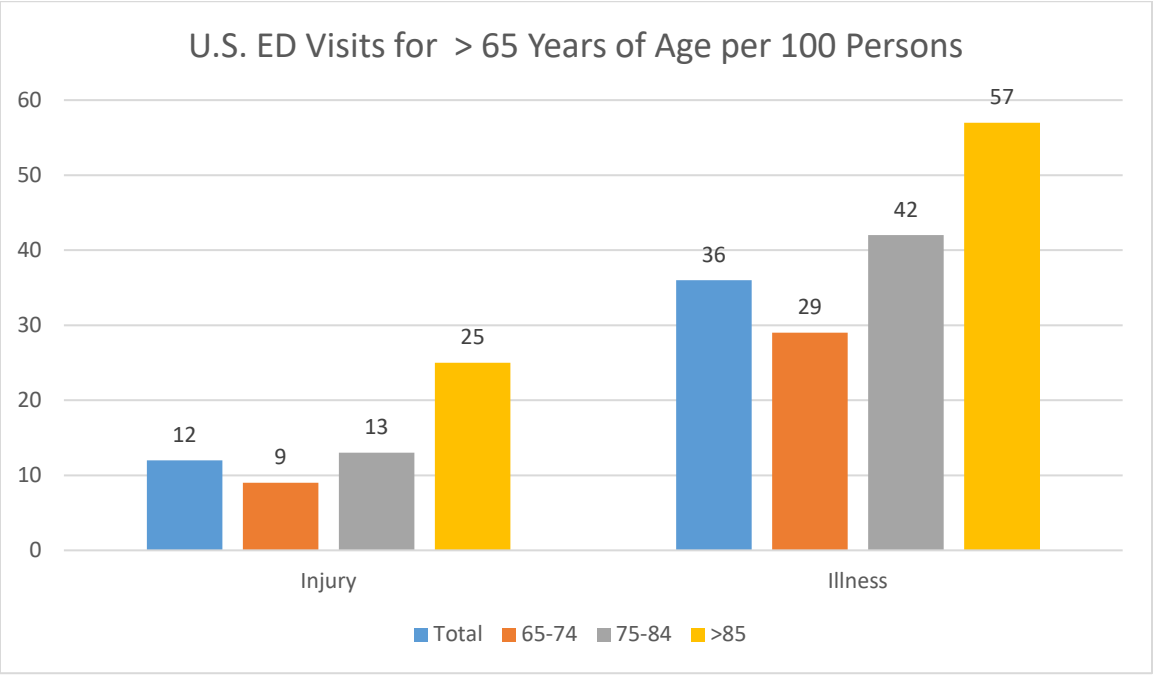

Figure 1

1Significantly different from women based on a two-tailed t test ($p < 0.05$). Estimates are based on 2-year averages. Visit rates are based on the July 1, 2012 and July 1, 2013 sets of estimates of the civilian noninstitutionalized population developed by the U.S. Census Bureau's Population Division. Access data table for Figure 2 at: https://www.cdc.gov/nchs/data/databriefs/db272_table.pdf#2.

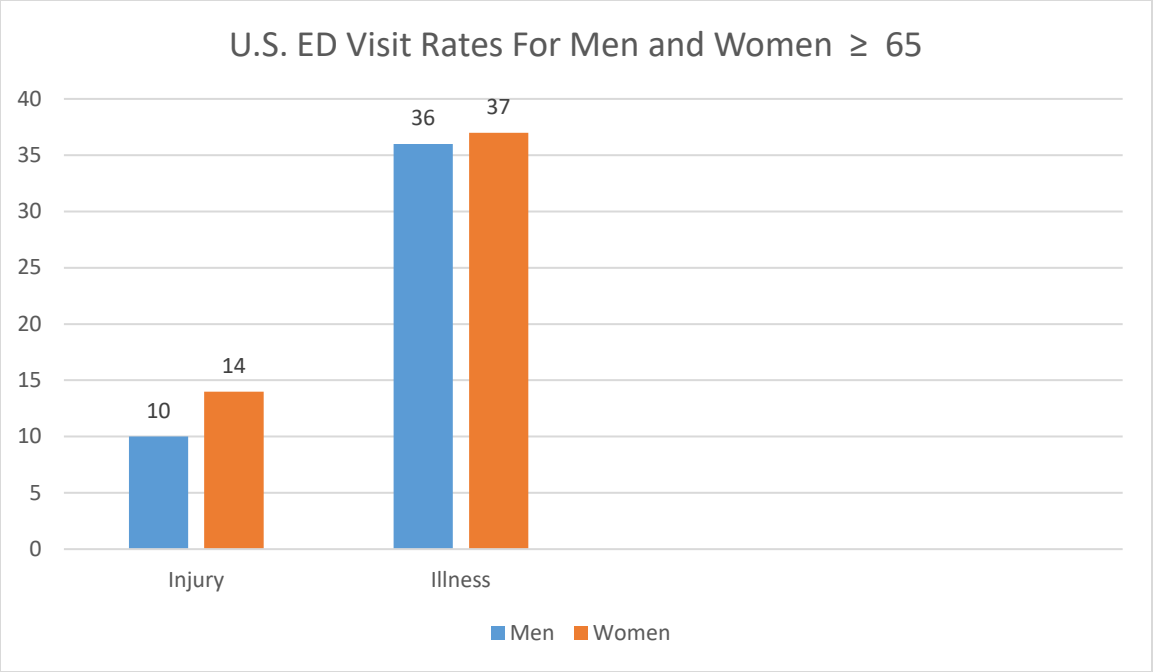

Figure 2

Results are different from women based on a two-tailed t test ($p < 0.05$); estimates are based on 2-year averages. Visit rates are based on the July 1, 2012 and July 1, 2013 sets of estimates of the civilian noninstitutionalized population developed by the U.S. Census Bureau's Population Division. Access data table for Figure 2 at: https://www.cdc.gov/nchs/data/databriefs/db272_table.pdf#2.

SOURCE: NCHS, National Hospital Ambulatory Medical Care Survey, 2012–2013.

Emergency department visits by adults aged 65 and over arriving by ambulance was higher for injury visits (39%) compared with illness visits (32%) (Figure 3.1). A greater percentage of ambulance patients were admitted to hospital wards as result of illness (32%) compared to injury (17%). A significantly smaller percentage of injury patients were admitted to ICU (2%) compared with ICU admissions related to illness (5%).

2.2 ET3 Model Design

The goal of ET3 is to achieve person-centered care, appropriate utilization of services, and increase efficiency in the EMS system. The antiquated model of utilizing expensive vehicles (ambulances), with highly-trained personnel (paramedics and EMTs), to only offer transport to

high-cost and high-acuity settings (emergency departments) limits the ability to provide timely, cost-effective care by the appropriate provider at an appropriate destination. Participating EMS agencies in the ET3 Model may offer up to three options when responding to a 911 call placed by a Medicare beneficiary. The first option is transport to a destination currently covered under Medicare regulations (i.e. emergency department). In the event EMS responds to a 911 call and determines a Medicare beneficiary may safely be treated at an appropriate lower-acuity destination or safely treated on location at the scene of the 911 response, the EMS agency may also offer some of the following ET3 interventions: 1) transport the patient to an alternative destination; or 2) facilitate treatment in place by a qualified health care provider either in-person on the scene or via telehealth. At a minimum, all ET3 EMS providers selected to participate in the program must provide traditional ED transport and transport to alternative destinations. Some may also select the option of providing an on-scene provider or a telehealth provider, but this level is optional. ET3 is authorized under Section 1115A of the Social Security Act and authorizes the CMS Innovation Center to test innovative payment and care delivery models to decrease expenditures while simultaneously enhancing the quality of care provided to program participants (CMS, 2019).

In addition to the alternate transport destination and on-scene provider assessments in person or by telehealth, CMS anticipates adding an additional component incorporating 911 triage into the model after the selection of the initial ET3 applicants in eligible regions. The advantage of incorporating 911 systems into the model are the added benefits of quicker triage resulting in more rapid disposition and conservation of EMS resources. Local governments or other entities that operate 911 systems in regions in which ET3 participant agencies operate will

be permitted to apply for cooperative agreement funding to facilitate appropriate patient disposition prior to sending EMS resources to a caller's location.

In order to apply to the ET3 program, each applicant must propose a model region located in a state or states comprised of at least 15,000 Medicare fee-for-service 911 ambulance transports occurring in the 2017 calendar year. If an applicant proposes a region encompassing more than one state, each state must contain the minimum 15,000 transport volume of Medicare fee-for-service transports. ET3 participants must partner with alternative destination sites and these sites must be enrolled in Medicare and employ or contract with Medicare-enrolled practitioners. Each site must have the ability to meet the needs of the Medicare beneficiaries transported to these sites through the model. The alternative sites may partner with each applicant agency to furnish these services either on the scene in-person at the 911 call or by telehealth. The alternative destination and telehealth sites may be available at different times of the day but an alternative site to ED transport must always be available as an alternative to traditional ED transport. Each applicant must have a plan to communicate the availability of each site prior to transporting to the site and identify the availability of telehealth (if provisioned).

The anticipated timelines for Round 1 application process are listed below (Figure 3). Additional application rounds are not guaranteed but may be scheduled based upon program needs.

Figure 3. ET3 Application Process Timeline

Event	Timeline
Request for Applications Released	Summer 2019
Request for Application Submissions	Summer 2019
Participants Selected	Winter 2020
Performance Start	Fall 2020
Performance End	December 2024

(CMS, 2019)

In February 2020, CMS announced the selection of 205 applicants to participate in the ET3 Model. These agencies were selected from 36 states and the District of Columbia and represent a cross section of the United States (CMS, 2020). Based upon the success of the first cohort, CMS plans to solicit future participants at yet unspecified intervals.

ET3 is currently pre-implementation and is an evolving model. The stated goals of the Model involve speculative benchmarks such as system cost analysis, access to primary, specialty, and emergency care, patient safety, and outcomes and satisfaction (CMS, 2019). Each of these metrics will be evolving and subject to discussion and scrutiny for the duration of the ET3 Model.

The ET3 Model represents a bold initiative to expand the current fee-for-service model for EMS agencies by reimbursing for assessments and treatments at home as well as transporting to alternative care settings. The goal is to transform an antiquated "one size fits all" transport model into coordinated healthcare policy that incentivizes value by rewarding innovation, quality, and performance. CMS acknowledges some potential financial downsides of ET3

including the potential need to significantly increase funding to entice providers to accept after-hours visits. Current estimates may not be accurate and there is no literature or accurate market analysis to suggest the correct amount of incentive that will guarantee adequate provider availability. Another unaddressed issue is a defined method to verify Medicare eligibility prior to alternative destination transports under ET3. Currently, EMS agencies transport to EDs without question and Medicare eligibility is verified days later by a billing specialist. One of the greatest challenges will be the potential abuse of Medicare beneficiaries calling 911 to achieve rapid care, either by telehealth, onsite provider, or by rapid access and transportation to providers. One study found that lack of a ride caused 25 percent of patients to miss at least one medical appointment (Silver, Blustein, & Weitzman, 2012) and potential exists for ambulances to become convenient taxis to alternate destinations. EMS presently encounters systemic system abuse and this might represent an unprecedented demand on EMS.

An alternative to overutilization of EMS might be addressed by utilizing rideshare services to facilitate movement to alternate provider destinations of offices and urgent care centers. Since 2015, Houston Fire Department EMS has been employing telehealth in partnership with the University of Texas Health Science Center to perform ambulance-based triage to facilitate telemedicine visits and transportation to primary care clinics if needed. A primary component of this model is successful utilization of Uber, Lyft, and taxis to facilitate patient movement, resulting in greater costs savings and less EMS utilization (Versel, 2017). The requirement that ambulances serve as the only accepted transportation modality for patient transports appears to be a short-sighted limitation in ET3. Although not addressed in the current ET3 performance metrics, documenting lack of clinical changes occurring during ambulance transports to alternative destinations might provide clinical evidence supporting the use of Uber

and Lyft in amended models of ET3. Other unanswered questions involve EMS coordinating access to alternative sites and granular issues such as timely receipt of patient reports and turnaround time for EMS crews transporting to alternative destinations. Another concern not addressed is significant time spent by EMS on scene coordinating telehealth visits and potential reporting and handoff delays upon arrival at alternative destinations. Finally, some patients transported to provider offices and urgent care centers might require additional clinical workup after provider assessment, facilitating another 911 call for hospital transport.

2.3 Telemedicine

A literature search of telemedicine in EMS yielded over 1,200 studies. Analysis of these articles involved feasibility studies, reliability of telemedicine, diagnostic accuracy of telemedicine, paramedic accuracy in triage, telehealth impact on primary care related ambulance transports, and the use of diagnostic accuracy (Arnold, 2015; Champagne-Langabeer et al.,2019; Ellis, Mayrose, Jehle, Moscati, & Pierluisi, 2001). These studies were comprised of randomized controlled trials, case-control studies, and observational and descriptive studies.

2.4 Databases and Published Studies

Few studies were found in the literature describing the patient characteristics and the potential benefits of alternate destinations for low acuity patients, and no published paper has attempted to identify cost savings within one state. No published analysis within a state has been conducted to assess the potential financial savings related to the successful implementation of ET3. The current project has the potential to represent the first published analysis of cost

savings related to ET3 in one state. These results will be generalized to estimate the potential costs savings if fully implemented by all payers.

2.5 ETHAN

ETHAN (Emergency Telehealth and Navigation) is a study involving twenty-six hospitals in Houston, Texas in 2011 that classified ED visits as primary care related or non-primary care related and examined patient demographics, payor type, and geographic characteristics of the patients (Begley, Courtney, Abbass, Ahmed, & Burau, 2013). The ETHAN project data was analyzed and published by the University of Texas Health Science Center. This study involved 5,570 patients in the first year of ETHAN compared to the same size control group. There was a 56% absolute reduction in ambulance transports to the ED with the intervention compared to the control group (18% vs. 74%, $P<0.001$). EMS productivity (defined as median time from EMS dispatch to back in service) was 44 minutes faster for the ETHAN group (39 vs. 83 minutes). There were no statistically significant differences in mortality or patient satisfaction (Langabeer et al., 2016). This ETHAN study involved only the geographic response area of the Houston Fire Department, receiving approximately 800-900 emergency 911 calls a day, and has potential limitations for generalization to a national model such as ET3. No other studies involving alternate destination with concomitant utilization of telemedicine were found.

An abundance of publications exists on ED visit types and the global utilization of telemedicine to positively impact population health. Other than ETHAN, significantly powered studies examining well-developed EMS alternative destination programs have not been published in the literature. It is confounding CMS did not credit or acknowledge the ETHAN telehealth program of the Houston Fire Department in the CMS white paper outlining the basis

for ET3 (CMS, 2019) as this is the only significant experiment that has been conducted on alternate EMS destination transports. ET3 represents an opportunity to examine a newly evolving program and attempt to forecast potential financial implications if fully enacted in North Carolina. An Appendix is attached to catalog the comprehensive literature search reviewed in preparation and compiling this document.

Chapter 3-Project Methods

3.1 Methods

Objective: The objective of this study is to estimate the ET3 volume and potential savings to Medicare and all payers if fully implemented in North Carolina.

Study Population: The study population will include all North Carolina Medicare beneficiaries with ED visits with associated transportation bills in the year 2017.

Data Sources: The (2017) Medicare 5% Limited Data Set will be used to extract all records for beneficiaries in North Carolina. From this data set, we will extract all medical transportation bills associated with an ED visit resulting in a discharge to home outcome. The 2017 NC HCUP State Emergency Department Database will be utilized to make projections. The New York University (NYU) ED algorithm (ED) will be utilized to classify the ED visits into emergent versus non-emergent categories.

The analysis of the Medicare 5% billing data gives us a good indication of the type of visits that might be avoided through ET3, however, since it is only a 5% sample, it is inadequate for accurately estimating 1) the volume of Medicare patients that may be expected from the program; and 2) the magnitude of potential cost savings that could be realized if other payers (Medicaid and private insurers) adopted a similar policy. We will use NC archival billing data from the Medicare 5% sample to establish a baseline rate of non-emergent ED visits. Outpatient claims from Medicare 5% limited data set will be considered. The NYU ED algorithm is claims-based and will help in evaluating which ED visits could have potentially been treated in an office visit. ED visits will be classified into two distinct categories:

- Non-Emergent (NE): Visits that do not need immediate medical care for 12-hours;
- Emergent: All other visits that include primary care treatable, preventable/avoidable, and non-preventable.

The NYU ED algorithm corresponds to International Classification of Diseases 10th Revision (ICD-10) codes for ED visits and includes assigned probability for each diagnosis code. Diagnosis codes that exceed 50% likelihood of not needing an emergency treatment will be used.

HCUP databases contain encounter-level information on inpatient stays, emergency department visits, and ambulatory surgery in U.S. hospitals. The State Emergency Department Databases (SEDD), part of HCUP, is a set of longitudinal data that capture discharge information for ED visits that do not result in an admission for collaborating states. The North Carolina SEDD data will be used to estimate the expected volume and potential savings that might accrue for ET3 once implemented, and the savings that may accrue to other NC payers if they follow Medicare's example. The potential effects of ET3 if implemented for other payors than Medicare will be based on applying the findings from the 5% Medicare sample to all non-emergent ED visits in NC.

3.2 Analysis

Descriptive characteristics of the North Carolina Medicare population will be examined using means and standard deviations for continuous variables, and counts and percentages for categorical variables. The subgroup of ET3 eligible visits will similarly be described. Total payments will be summarized for the ET3 eligible visits and the non-eligible to estimate cost of current practice. The proportion of ET3 eligible visits will then be used to estimate the potential

cost of that subgroup had they avoided the ED. The mean cost of Medicare office visits as defined by CPT code 99203 will be utilized to estimate the potential cost of non-emergent conditions treatable in an office visit. The difference between the ET3 eligible total payments and the ET3 potential cost in an office visit will represent the potential cost savings to Medicare. Number of visits avoided will also be summarized. Simulation of potential ET3 impact to other payers will be examined by applying the percent of ED visits identified for the Medicare group to non-emergent ED visits in the 2017 HCUP SEDD database for NC. Potential cost savings to other payers will be similarly estimated. All analyses will be performed using SAS version 9.4 (Cary, NC).

Chapter 4-Results

4.1 Results

A 5% sample of the 2017 Medicare Limited Data set was used to extract the records of Medicare beneficiaries in North Carolina resulting from low acuity ED visits who were discharge to home. Death and ED transports resulting from locations such as physicians' offices and other hospitals were excluded. All data was adjusted to reflect overall state counts. The potential effects of ET3 were then examined based upon the Medicare findings (low visit acuity of 15.86% for non-emergent ambulance transports) for all payers with acute visit indicators and the same primary diagnosis codes and comorbidity burden as identified for Medicare patients. The aggregate Medicare data is summarized in table 1.

Table 1. Medicare 5% Billing Data-Comparison of Ambulance Transport and ED Classification

	Non-Emergent	**Emergent**
Ambulance Transport	**N (%)**	**N (%)**
Yes	15,100 (15.86)	104,940 (19.89)
No	80,080 (84.14)	422,540 (80.11)
Total	95,180	527,480

The data for age, sex, and race/ethnicity was examined by means and standard deviations for continuous variables, and counts and percentages for categorical variables (Table 2).

Table 2. Patient Descriptive Characteristics of those Transported by Ambulance

	Non-Emergent (N=15,100)	**Emergent (N=104,940)**
Age mean (SD)	71.26 (14.43)	69.29 (15.80)
Race n (%)		
Black	3,940 (26.09)	26,840 (25.58)
Hispanic	140 (0.93)	360 (0.34)
Other	380 (2.52)	2,680 (2.55)
White	10,640 (70.46)	75,060 (71.53)
Sex n (%)		
Female	9,820 (65.03)	63,300 (60.32)
Male	5,280 (34.97)	41,640 (39.68)

In the non-emergent cohort, 15.86% arrived by ambulance and 84.14% arrived by private vehicle or other mode of transportation. Inclusion criteria for all ED classifications were discharge to home and all deaths were excluded. Transports from other hospitals, clinics, and freestanding emergency departments were excluded. The New York Emergency Department Algorithm (EDA) was used to categorize emergent and non-emergent visits (Billings, Parikh, & Mijanovich, 2000). Due to confounders in visit classification, EDA excludes visits deemed primarily related to drug, alcohol, or mental health issues. The Medicare 5% data sample (CMS, 2019) was used and adjusted to reflect visit counts for North Carolina in 2017. The mean age in the ambulance transport cohort was 71 years of age for non-emergent and 69 years of age for emergent ED classifications. The sex distributions in both emergent, non-emergent, ambulance, and non-ambulance utilization (Table 2) remained consistent across all categories with females exhibiting the greatest utilization of both ambulance and ED visits. Whites represented the greatest percentage utilizing ambulance transport for emergent visits (71.53%) compared to non-emergent visits (70.46%). This was followed by blacks (25.58% emergent, 26.09% non-emergent), Hispanics (0.34% emergent, 0.93% non-emergent), and other (2.55% emergent, 2.52% non-

emergent) (Table 2). Surprisingly, the black and Hispanic cohorts utilized ambulance transport more frequently for non-emergent visits than for emergent visits.

4.2 Cost Savings

In order to calculate potential cost savings, the Medicare 5% sample was adjusted to reflect overall state counts and 15,100 eligible low-acuity ED visits utilizing ambulance transport (15,100 x 15.86%) were identified. The mean cost for non-emergent ED visits utilizing ambulance transport was $292 based upon the Medicare 5% sample of North Carolina data (Table 3) and this was used to calculate the payment amount for non-emergent ED visits arriving as a result of ambulance transport.

Table 3. Medicare 5% Data: North Carolina Charges and Payments

Transport	ED Acuity	Variable	N	Mean	Std Dev.	Median	Minimum	Maximum
Yes	Non-Emergent	Ambulance Total Line Submitted Charge Amount	755	$684	$250	$625	$286	$2,665
		Ambulance Total Line NCH Payment Amount	726	$353	$70	$347	$98	$866
		Total Revenue Center Payment Amount (ED Visit)	752	$292	$152	$252	$4	$1,679
	Emergent	Ambulance Total Line Submitted Charge Amount	5,247	$725	$1,037	$620	$16	$31,983
		Total Revenue Center Payment Amount (ED Visit)	5,041	$362	$174	$345	$20	$4,483
		Total Revenue Center Payment Amount (ED Visit)	5,209	$311	$184	$263	$2	$3,049

(CMS, 2019)

Using 15,100 identified low-acuity ED visits multiplied by $292 (mean cost of non-emergent ED visit) yielded an ED visit cost of $4,409,200. This figure does not include ED physician charges related to the visit. The potential cost savings of diverting low-acuity transports to urgent care centers as a result of ET3 was determined using the average payment amount of $77.38 for office visit CPT code 99203 (CMS, 2020).

Assuming the same number of low-acuity visits (N=15,100) were redirected to urgent care centers or physician offices, the associated costs would result in a total cost of $1,168,438 (15,100 X $77.38). The potential cost savings for CMS if ET3 if fully implemented in North Carolina was estimated by the costs of ED low-acuity visits arriving by ambulance ($4,409,200) less the costs of the urgent care visits ($1,168,438), which results in a difference of $3,240,762.

4.3 Medicaid, Private, and Other Payers

In an effort to project savings that might accrue if other payers (Medicaid, private insurers, and others) adopted a similar policy, NC archival data was obtained from State Emergency Department Database from the Healthcare Cost and Utilization Project-HCUP (HCUP, 2017). Cost savings were calculated using 15.86% percent from the Medicare sample set for all one hundred counties in North Carolina and the results are in Appendix Tables 1-7. The greatest number of visits (246,535) were in the private payer group followed by Medicaid (54, 230) and other payers (38,905). As a result, the greatest potential savings (see Table 4) was largest in the private payer group ($52,911,342) followed by other payers ($8,350,396), and lastly by the Medicaid payers ($5,330,024). The cumulative savings among all payers was $66,591,762 and the mean savings for Medicaid, private, and other payer groups was $53,300, $529,113, and $665,918 respectively.

Table 4. Total Visits and Savings by North Carolina Payer

	Payer	Total Visits	Mean Savings	Total Savings (ED Costs Less Urgent Care Costs)
	Medicaid	54,230	53,300	$5,330,024
	Private	246,535	529,113	$52,911,342
	Other	38,905	665,918	$8,350,396
	Total	339,670	$1,248,331	$66,591,762

The potential cumulative savings among all payers and complete analysis of all data can be found in Appendix Tables 1-7. In the County analysis, the greatest potential opportunity in cost savings (Appendix Tables 5-7) were found in the urban and geographically large counties across all payers (Mecklenburg, Wake, Guilford, Forsyth, and Cumberland Counties). Private payer savings remained greatest in all counties due to the greater number of patients in the private payer group.

Chapter 5-Discussion of Results

5.1 Discussion of Results

Analysis has been conducted on potential financial implications of ET3 at the national level but no published accounts were discovered on the potential cost savings due to ET3 implementation in one state. This study expands the model of ET3 beyond Medicare beneficiaries and conservatively projects cost savings among all payers. The current model of ET3 requires the option of 24/7 alternative care either by access to an urgent care provider or via telehealth and many rural areas will be challenged to provide 24/7 alternative destination care. It might be feasible for telehealth to eventually expand into rural areas, but this most likely will occur later after larger urban areas have experimented with the model and optimized the telehealth option.

It is not known if other payers will follow the lead of CMS in adopting the ET3 Model. However, other payers typically follow the example set by Medicare (Clemens & Gottlieb, 2013), especially when cost savings are realized. A limited experimental model using a small number of insurance providers might provide insight into potential cost savings if the current experimental model of ET3 results in significant cost savings with Medicare beneficiaries. Based upon conservative projections, full adoption of ET3 among all private payers in North Carolina represents potential cost savings of 2,055% ($3,240,761/$66,591,762) compared to Medicare projections. This substantial savings might accelerate adoption of ET3 among other payers if the model proves successful with Medicare beneficiaries.

5.2 Conclusion

Activation of EMS and ED utilization patterns are increasing and remain an important part of the healthcare continuum. For many, EMS is the portal for which healthcare is accessed and appropriate triage with transport to cost-effective care destinations has the potential to conserve resources and dollars.

ET3 is a new national initiative that has not been fully implemented. As a result, there are many potential issues that might affect the performance of a largely untested program. It is not known if patients will consent for transport to alternative destinations and if they will prefer urgent care visits over ED visits. Some patients may require hospitalization after being evaluated by urgent care providers, resulting in a greater cost by incurring a second EMS transport fee and greater patient dissatisfaction. It is also unknown if patient clinical outcomes seen in lower-acuity settings would be the same or improved when compared with historical ED visits. An additional risk is 911 calls might increase if patients view EMS alternate destination as a quick and convenient portal to access care. This would further burden participating EMS systems and potentially add unanticipated costs. Increased cost savings might also be realized by using lower cost methods of transportation (i.e., taxi, Uber, Lyft, privately owned vehicle) when transporting a patient to a lower cost destination. Future studies should be conducted to incorporate the lessons learned during implementation of ET3 to project the national financial implications and incorporate this knowledge into future optimized models of ET3.

5.3 Limitations

There are several limitations in this study. This study represents data from only one state, so generalization to other states and localities should be limited. The Medicare 5% Sample

Limited Data Set is limited to one year, 2017, for this study. A 15.86% rate of ED low acuity Medicare ambulance transports was used to simulate low acuity ambulance transports across all payers, and this assumes similarity of ambulance utilization for low acuity visits among all payers. When utilizing the New York University ED classifications, only one emergent visit classification; Emergent, Primary Care Treatable (E-PCT) was used in the analysis. While it might seem reasonable to include a second category of Emergent-Preventable/Avoidable (E-PA), this category includes complex diagnoses (i.e., asthma exacerbation, diabetes management, etc.) and might over-represent opportunities of ET3 cost savings. Although physician fees are included in CPT coding for office and urgent care visits, only emergency department billing was analyzed for this study. As a result, additional provider costs would be incurred for ED visits, resulting in potentially greater savings if patients were diverted away from emergency departments. ET3 participants have the option of providing care and consultation via telehealth in addition to or in lieu of alternative destination transports. This study did not examine telehealth options, so the financial impact of the telehealth option is unknown. Finally, although a small number, the data compiled for each County in North Carolina was based upon the patient's address. As a result, some patients choosing to cross state lines to receive care would not be included in the potential cost savings related to ET3.

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Appendix

Appendix Table 1. Medicaid Payer by North Carolina County

County	Low Acuity Ambulance Transports-Adjusted	ED Transports	Urgent Care Transports	Savings
Alamance	291	$84,972	$22,518	$62,454
Alexander	61	$17,812	$4,720	$13,092
Alleghany	33	$9,636	$2,554	$7,082
Anson	159	$46,428	$12,303	$34,125
Ashe	61	$17,812	$4,720	$13,092
Avery	37	$10,804	$2,863	$7,941
Beaufort	156	$45,552	$12,071	$33,481
Bertie	99	$28,908	$7,661	$21,247
Bladen	81	$23,652	$6,268	$17,384
Brunswick	254	$74,168	$19,655	$54,513
Buncombe	592	$172,864	$45,809	$127,055
Burke	213	$62,196	$16,482	$45,714
Cabarrus	463	$135,196	$35,827	$99,369
Caldwell	237	$69,204	$18,339	$50,865
Camden	12	$3,504	$929	$2,575
Carteret	128	$37,376	$9,905	$27,471
Caswell	28	$8,176	$2,167	$6,009
Catawba	402	$117,384	$31,107	$86,277
Chatham	90	$26,280	$6,964	$19,316
Cherokee	62	$18,104	$4,798	$13,306
Chowan	56	$16,352	$4,333	$12,019
Clay	17	$4,964	$1,315	$3,649
Cleveland	575	$167,900	$44,494	$123,407

Columbus	181	$52,852	$14,006	$38,846
Craven	303	$88,476	$23,446	$65,030
Cumberland	984	$287,268	$76,126	$211,142
Currituck	20	$5,696	$1,510	$4,187
Dare	28	$8,197	$2,172	$6,025
Davidson	394	$115,083	$30,497	$84,586
Davie	69	$20,006	$5,302	$14,705
Duplin	169	$49,368	$13,082	$36,285
Durham	737	$215,347	$57,067	$158,280
Edgecombe	236	$69,050	$18,298	$50,752
Forsyth	689	$201,268	$53,336	$147,932
Franklin	102	$29,917	$7,928	$21,989
Gaston	723	$211,133	$55,950	$155,183
Gates	11	$3,334	$884	$2,451
Graham	25	$7,178	$1,902	$5,276
Granville	135	$39,411	$10,444	$28,967
Greene	48	$13,940	$3,694	$10,246
Guilford	1,254	$366,275	$97,063	$269,212
Halifax	204	$59,649	$15,807	$43,842
Harnett	296	$86,417	$22,900	$63,516
Haywood	220	$64,373	$17,059	$47,314
Henderson	197	$57,380	$15,206	$42,174
Hertford	83	$24,128	$6,394	$17,734
Hoke	157	$45,709	$12,113	$33,596
Hyde	6	$1,621	$430	$1,191
Iredell	414	$121,011	$32,068	$88,943
Jackson	121	$35,289	$9,352	$25,938
Johnston	441	$128,653	$34,093	$94,560
Jones	34	$10,050	$2,663	$7,386
Lee	180	$52,471	$13,905	$38,566

Lenoir	302	$88,223	$23,379	$64,844
Lincoln	283	$82,619	$21,894	$60,725
McDowell	183	$53,489	$14,175	$39,315
Macon	108	$31,631	$8,382	$23,248
Madison	47	$13,801	$3,657	$10,144
Martin	83	$24,360	$6,455	$17,904
Mecklenburg	2,407	$702,819	$186,247	$516,572
Mitchell	52	$15,097	$4,001	$11,097
Montgomery	106	$30,890	$8,186	$22,704
Moore	153	$44,783	$11,867	$32,915
Nash	280	$81,786	$21,673	$60,112
New Hanover	444	$129,625	$34,351	$95,274
Northampton	61	$17,784	$4,713	$13,071
Onslow	357	$104,154	$27,601	$76,553
Orange	125	$36,493	$9,671	$26,823
Pamlico	22	$6,345	$1,681	$4,663
Pasquotank	189	$55,064	$14,592	$40,472
Pender	176	$51,452	$13,635	$37,817
Perquimans	37	$10,791	$2,859	$7,931
Person	128	$37,466	$9,928	$27,537
Pitt	665	$194,229	$51,471	$142,758
Polk	46	$13,384	$3,547	$9,837
Randolph	284	$82,897	$21,968	$60,929
Richmond	326	$95,308	$25,257	$70,052
Robeson	342	$99,801	$26,447	$73,353
Rockingham	296	$86,324	$22,876	$63,448
Rowan	406	$118,696	$31,454	$87,241
Rutherford	213	$62,242	$16,494	$45,748
Sampson	167	$48,766	$12,923	$35,843

Scotland	219	$64,002	$16,961	$47,042
Stanly	186	$54,230	$14,371	$39,859
Stokes	67	$19,451	$5,154	$14,296
Surry	176	$51,405	$13,622	$37,783
Swain	48	$13,940	$3,694	$10,246
Transylvania	122	$35,660	$9,450	$26,210
Tyrrell	5	$1,389	$368	$1,021
Union	372	$108,507	$28,754	$79,753
Vance	248	$72,292	$19,157	$53,134
Wake	1,448	$422,729	$112,023	$310,706
Warren	44	$12,967	$3,436	$9,531
Washington	58	$16,950	$4,492	$12,458
Watauga	36	$10,652	$2,823	$7,829
Wayne	363	$105,914	$28,067	$77,847
Wilkes	175	$51,128	$13,549	$37,579
Wilson	298	$86,880	$23,023	$63,857
Yadkin	69	$20,192	$5,351	$14,841
Yancey	46	$13,338	$3,534	$9,803
			Total	$5,330,024

Appendix Table 2. Private Payers by North Carolina County

County	Low Acuity Ambulance Transports-Adjusted	ED Transports	Urgent Care Transports	Savings
Alamance	4078	$1,190,776	$315,556	$875,220
Alexander	959	$280,028	$74,207	$205,821
Alleghany	274	$80,008	$21,202	$58,806
Anson	1354	$395,368	$104,773	$290,595
Ashe	606	$176,952	$46,892	$130,060
Avery	408	$119,136	$31,571	$87,565
Beaufort	1012	$295,504	$78,309	$217,195
Bertie	746	$217,832	$57,725	$160,107
Bladen	657	$191,844	$50,839	$141,005
Brunswick	2202	$642,984	$170,391	$472,593
Buncombe	3770	$1,100,840	$291,723	$809,117
Burke	1873	$546,916	$144,933	$401,983
Cabarrus	5783	$1,688,636	$447,489	$1,241,147
Caldwell	2082	$607,944	$161,105	$446,839
Camden	171	$49,932	$13,232	$36,700
Carteret	1149	$335,508	$88,910	$246,598
Caswell	374	$109,208	$28,940	$80,268
Catawba	4971	$1,451,532	$384,656	$1,066,876
Chatham	1127	$329,084	$87,207	$241,877
Cherokee	356	$103,952	$27,547	$76,405
Chowan	367	$107,164	$28,398	$78,766
Clay	78	$22,776	$6,036	$16,740
Cleveland	3460	$1,010,320	$267,735	$742,585
Columbus	965	$281,780	$74,672	$207,108
Craven	2964	$865,488	$229,354	$636,134

Cumberland	7639	$2,230,588	$591,106	$1,639,482
Currituck	209	$61,028	$16,172	$44,856
Dare	543	$158,556	$42,017	$116,539
Davidson	4673	$1,364,516	$361,597	$1,002,919
Davie	1256	$366,752	$97,189	$269,563
Duplin	1252	$365,584	$96,880	$268,704
Durham	5962	$1,740,904	$461,340	$1,279,564
Edgecombe	1833	$535,236	$141,838	$393,398
Forsyth	9866	$2,880,872	$763,431	$2,117,441
Franklin	1310	$382,520	$101,368	$281,152
Gaston	5811	$1,696,812	$449,655	$1,247,157
Gates	118	$34,456	$9,131	$25,325
Graham	124	$36,208	$9,595	$26,613
Granville	1577	$460,484	$122,028	$338,456
Greene	345	$100,740	$26,696	$74,044
Guilford	14060	$4,105,520	$1,087,963	$3,017,557
Halifax	1617	$472,164	$125,123	$347,041
Harnett	2956	$863,152	$228,735	$634,417
Haywood	3619	$1,056,748	$280,038	$776,710
Henderson	2200	$642,400	$170,236	$472,164
Hertford	514	$150,088	$39,773	$110,315
Hoke	1478	$431,576	$114,368	$317,208
Hyde	42	$12,264	$3,250	$9,014
Iredell	5449	$1,591,108	$421,644	$1,169,464
Jackson	1774	$518,008	$137,272	$380,736
Johnston	4462	$1,302,904	$345,270	$957,634
Jones	358	$104,536	$27,702	$76,834
Lee	1641	$479,172	$126,981	$352,191
Lenoir	1959	$572,028	$151,587	$420,441
Lincoln	2446	$714,232	$189,271	$524,961

McDowell	1004	$293,168	$77,690	$215,478
Macon	790	$230,680	$61,130	$169,550
Madison	242	$70,664	$18,726	$51,938
Martin	715	$208,780	$55,327	$153,453
Mecklenburg	27712	$8,091,904	$2,144,355	$5,947,549
Mitchell	317	$92,564	$24,529	$68,035
Montgomery	782	$228,344	$60,511	$167,833
Moore	1437	$419,604	$111,195	$308,409
Nash	2798	$817,016	$216,509	$600,507
New Hanover	3385	$988,420	$261,931	$726,489
Northampton	504	$147,168	$39,000	$108,168
Onslow	2757	$805,044	$213,337	$591,707
Orange	2006	$585,752	$155,224	$430,528
Pamlico	220	$64,240	$17,024	$47,216
Pasquotank	1395	$407,340	$107,945	$299,395
Pender	1208	$352,736	$93,475	$259,261
Perquimans	336	$98,112	$26,000	$72,112
Person	1174	$342,808	$90,844	$251,964
Pitt	4813	$1,405,396	$372,430	$1,032,966
Polk	403	$117,676	$31,184	$86,492
Randolph	3535	$1,032,220	$273,538	$758,682
Richmond	1886	$550,712	$145,939	$404,773
Robeson	2315	$675,980	$179,135	$496,845
Rockingham	3077	$898,484	$238,098	$660,386
Rowan	3641	$1,063,172	$281,741	$781,431
Rutherford	1388	$405,296	$107,403	$297,893
Sampson	1621	$473,332	$125,433	$347,899
Scotland	1021	$298,132	$79,005	$219,127
Stanly	1623	$473,916	$125,588	$348,328
Stokes	1040	$303,680	$80,475	$223,205

Surry	2075	$605,900	$160,564	$445,337
Swain	399	$116,508	$30,875	$85,633
Transylvania	662	$193,304	$51,226	$142,078
Tyrrell	58	$16,936	$4,488	$12,448
Union	5082	$1,483,944	$393,245	$1,090,699
Vance	1800	$525,600	$139,284	$386,316
Wake	22046	$6,437,432	$1,705,919	$4,731,513
Warren	465	$135,780	$35,982	$99,798
Washington	282	$82,344	$21,821	$60,523
Watauga	750	$219,000	$58,035	$160,965
Wayne	2902	$847,384	$224,557	$622,827
Wilkes	2268	$662,256	$175,498	$486,758
Wilson	2426	$708,392	$187,724	$520,668
Yadkin	972	$283,824	$75,213	$208,611
Yancey	324	$94,608	$25,071	$69,537
			Total	$52,911,342

Appendix Table 3. Other Payer Sources by North Carolina County

County	**Low Acuity Ambulance Transports-Adjusted**	**ED Transports**	**Urgent Care Transports**	**Savings**
Alamance	660	$192,720.00	$51,071	$141,649
Alexander	126	$36,724.78	$9,732	$26,993
Alleghany	29	$8,521.26	$2,258	$6,263
Anson	146	$42,745.24	$11,327	$31,418
Ashe	78	$22,785.11	$6,038	$16,747
Avery	61	$17,829.81	$4,725	$13,105

Beaufort	197	$57,518.51	$15,242	$42,276
Bertie	111	$32,325.22	$8,566	$23,759
Bladen	99	$28,898.19	$7,658	$21,240
Brunswick	390	$113,832.93	$30,166	$83,667
Buncombe	434	$126,707.44	$33,577	$93,130
Burke	381	$111,285.81	$29,491	$81,795
Cabarrus	697	$203,445.10	$53,913	$149,532
Caldwell	360	$105,219.05	$27,883	$77,336
Camden	31	$9,030.68	$2,393	$6,638
Carteret	310	$90,445.77	$23,968	$66,478
Caswell	43	$12,550.34	$3,326	$9,224
Catawba	869	$253,739.06	$67,241	$186,498
Chatham	152	$44,412.44	$11,769	$32,643
Cherokee	83	$24,313.38	$6,443	$17,870
Chowan	73	$21,442.09	$5,682	$15,760
Clay	16	$4,816.36	$1,276	$3,540
Cleveland	579	$169,082.19	$44,807	$124,275
Columbus	188	$54,786.15	$14,518	$40,268
Craven	716	$209,141.38	$55,422	$153,719
Cumberland	1400	$408,881.58	$108,354	$300,528
Currituck	57	$16,672.03	$4,418	$12,254
Dare	103	$29,963.35	$7,940	$22,023
Davidson	707	$206,547.95	$54,735	$151,813
Davie	114	$33,205.13	$8,799	$24,406
Duplin	249	$72,615.96	$19,243	$53,373
Durham	1319	$385,123.94	$102,058	$283,066
Edgecombe	350	$102,208.82	$27,085	$75,123
Forsyth	1222	$356,966.73	$94,596	$262,371
Franklin	187	$54,647.22	$14,482	$40,166
Gaston	1091	$318,667.37	$84,447	$234,221

Gates	19	$5,511.03	$1,460	$4,051
Graham	16	$4,770.05	$1,264	$3,506
Granville	222	$64,743.06	$17,157	$47,586
Greene	85	$24,915.43	$6,603	$18,313
Guilford	2444	$713,748.21	$189,143	$524,605
Halifax	270	$78,729.04	$20,863	$57,866
Harnett	516	$150,789.27	$39,959	$110,830
Haywood	303	$88,361.77	$23,416	$64,946
Henderson	311	$90,769.95	$24,054	$66,716
Hertford	94	$27,369.92	$7,253	$20,117
Hoke	277	$80,905.67	$21,440	$59,466
Hyde	7	$2,176.63	$577	$1,600
Iredell	756	$220,719.18	$58,491	$162,229
Jackson	115	$33,575.62	$8,898	$24,678
Johnston	707	$206,316.40	$54,674	$151,643
Jones	69	$20,237.99	$5,363	$14,875
Lee	376	$109,850.17	$29,110	$80,740
Lenoir	408	$119,112.41	$31,565	$87,548
Lincoln	402	$117,352.58	$31,098	$86,254
McDowell	103	$30,148.59	$7,989	$22,159
Macon	125	$36,400.60	$9,646	$26,754
Madison	30	$8,752.82	$2,319	$6,433
Martin	104	$30,426.46	$8,063	$22,363
Mecklenburg	4118	$1,202,377.69	$318,630	$883,748
Mitchell	47	$13,661.80	$3,620	$10,041
Montgomery	143	$41,772.70	$11,070	$30,703
Moore	256	$74,792.59	$19,820	$54,973
Nash	437	$127,726.29	$33,847	$93,879
New Hanover	727	$212,197.92	$56,232	$155,965

Northampton	68	$19,960.13	$5,289	$14,671
Onslow	789	$230,259.29	$61,019	$169,241
Orange	257	$75,024.14	$19,881	$55,143
Pamlico	42	$12,226.16	$3,240	$8,986
Pasquotank	307	$89,658.48	$23,759	$65,899
Pender	244	$71,365.56	$18,912	$52,454
Perquimans	66	$19,358.08	$5,130	$14,228
Person	200	$58,398.42	$15,476	$42,923
Pitt	936	$273,421.32	$72,457	$200,965
Polk	47	$13,708.12	$3,633	$10,075
Randolph	444	$129,625.05	$34,351	$95,274
Richmond	340	$99,244.90	$26,300	$72,945
Robeson	348	$101,745.71	$26,963	$74,783
Rockingham	438	$127,957.85	$33,909	$94,049
Rowan	601	$175,380.51	$46,476	$128,905
Rutherford	220	$64,141.01	$16,997	$47,144
Sampson	251	$73,356.94	$19,440	$53,917
Scotland	210	$61,269.72	$16,236	$45,033
Stanly	279	$81,368.78	$21,563	$59,806
Stokes	91	$26,490.01	$7,020	$19,470
Surry	276	$80,720.42	$21,391	$59,330
Swain	58	$16,996.21	$4,504	$12,492
Transylvania	44	$12,967.14	$3,436	$9,531
Tyrrell	12	$3,519.65	$933	$2,587
Union	580	$169,221.12	$44,844	$124,378
Vance	322	$94,150.67	$24,950	$69,201
Wake	2653	$774,740.06	$205,306	$569,434
Warren	74	$21,581.02	$5,719	$15,862
Washington	60	$17,459.32	$4,627	$12,833
Watauga	89	$26,026.89	$6,897	$19,130

Wayne	596	$174,176.42	$46,157	$128,020
Wilkes	251	$73,218.01	$19,403	$53,815
Wilson	442	$129,161.94	$34,228	$94,934
Yadkin	124	$36,122.74	$9,573	$26,550
Yancey	31	$9,030.68	$2,393	$6,638
			Total	$8,350,396

Appendix Table 4. Cumulative Savings by All Payers (excluding Medicare)

County	**Medicaid Savings**	**Private Payer Savings**	**Other Savings**	**Total Savings: Medicaid, Private, & Other**
Alamance	$62,454.00	$875,220	$141,649	$1,079,323
Alexander	$13,092.00	$205,821	$26,993	$245,906
Alleghany	$7,082.00	$58,806	$6,263	$72,151
Anson	$34,125.00	$290,595	$31,418	$356,138
Ashe	$13,092.00	$130,060	$16,747	$159,899
Avery	$7,941.00	$87,565	$13,105	$108,611
Beaufort	$33,481.00	$217,195	$42,276	$292,952
Bertie	$21,247.00	$160,107	$23,759	$205,113
Bladen	$17,384.00	$141,005	$21,240	$179,629
Brunswick	$54,513.00	$472,593	$83,667	$610,773
Buncombe	$127,055.00	$809,117	$93,130	$1,029,302
Burke	$45,714.00	$401,983	$81,795	$529,492
Cabarrus	$99,369.00	$1,241,147	$149,532	$1,490,048
Caldwell	$50,865.00	$446,839	$77,336	$575,040
Camden	$2,575.00	$36,700	$6,638	$45,913
Carteret	$27,471.00	$246,598	$66,478	$340,547
Caswell	$6,009.00	$80,268	$9,224	$95,501
Catawba	$86,277.00	$1,066,876	$186,498	$1,339,651
Chatham	$19,316.00	$241,877	$32,643	$293,836
Cherokee	$13,306.00	$76,405	$17,870	$107,581
Chowan	$12,019.00	$78,766	$15,760	$106,545
Clay	$3,649.00	$16,740	$3,540	$23,929
Cleveland	$123,407.00	$742,585	$124,275	$990,267
Columbus	$38,846.00	$207,108	$40,268	$286,222

Craven	$65,030.00	$636,134	$153,719	$854,883
Cumberland	$211,142.00	$1,639,482	$300,528	$2,151,152
Currituck	$4,187.00	$44,856	$12,254	$61,297
Dare	$6,025.00	$116,539	$22,023	$144,587
Davidson	$84,586.00	$1,002,919	$151,813	$1,239,318
Davie	$14,705.00	$269,563	$24,406	$308,674
Duplin	$36,285.00	$268,704	$53,373	$358,362
Durham	$158,280.00	$1,279,564	$283,066	$1,720,910
Edgecombe	$50,752.00	$393,398	$75,123	$519,273
Forsyth	$147,932.00	$2,117,441	$262,371	$2,527,744
Franklin	$21,989.00	$281,152	$40,166	$343,307
Gaston	$155,183.00	$1,247,157	$234,221	$1,636,561
Gates	$2,451.00	$25,325	$4,051	$31,827
Graham	$5,276.00	$26,613	$3,506	$35,395
Granville	$28,967.00	$338,456	$47,586	$415,009
Greene	$10,246.00	$74,044	$18,313	$102,603
Guilford	$269,212.00	$3,017,557	$524,605	$3,811,374
Halifax	$43,842.00	$347,041	$57,866	$448,749
Harnett	$63,516.00	$634,417	$110,830	$808,763
Haywood	$47,314.00	$776,710	$64,946	$888,970
Henderson	$42,174.00	$472,164	$66,716	$581,054
Hertford	$17,734.00	$110,315	$20,117	$148,166
Hoke	$33,596.00	$317,208	$59,466	$410,270
Hyde	$1,191.00	$9,014	$1,600	$11,805
Iredell	$88,943.00	$1,169,464	$162,229	$1,420,636
Jackson	$25,938.00	$380,736	$24,678	$431,352
Johnston	$94,560.00	$957,634	$151,643	$1,203,837
Jones	$7,386.00	$76,834	$14,875	$99,095
Lee	$38,566.00	$352,191	$80,740	$471,497
Lenoir	$64,844.00	$420,441	$87,548	$572,833
Lincoln	$60,725.00	$524,961	$86,254	$671,940
McDowell	$39,315.00	$215,478	$22,159	$276,952
Macon	$23,248.00	$169,550	$26,754	$219,552
Madison	$10,144.00	$51,938	$6,433	$68,515
Martin	$17,904.00	$153,453	$22,363	$193,720
Mecklenburg	$516,572.00	$5,947,549	$883,748	$7,347,869
Mitchell	$11,097.00	$68,035	$10,041	$89,173
Montgomery	$22,704.00	$167,833	$30,703	$221,240
Moore	$32,915.00	$308,409	$54,973	$396,297

Nash	$60,112.00	$600,507	$93,879	$754,498
New Hanover	$95,274.00	$726,489	$155,965	$977,728
Northampton	$13,071.00	$108,168	$14,671	$135,910
Onslow	$76,553.00	$591,707	$169,241	$837,501
Orange	$26,823.00	$430,528	$55,143	$512,494
Pamlico	$4,663.00	$47,216	$8,986	$60,865
Pasquotank	$40,472.00	$299,395	$65,899	$405,766
Pender	$37,817.00	$259,261	$52,454	$349,532
Perquimans	$7,931.00	$72,112	$14,228	$94,271
Person	$27,537.00	$251,964	$42,923	$322,424
Pitt	$142,758.00	$1,032,966	$200,965	$1,376,689
Polk	$9,837.00	$86,492	$10,075	$106,404
Randolph	$60,929.00	$758,682	$95,274	$914,885
Richmond	$70,052.00	$404,773	$72,945	$547,770
Robeson	$73,353.00	$496,845	$74,783	$644,981
Rockingham	$63,448.00	$660,386	$94,049	$817,883
Rowan	$87,241.00	$781,431	$128,905	$997,577
Rutherford	$45,748.00	$297,893	$47,144	$390,785
Sampson	$35,843.00	$347,899	$53,917	$437,659
Scotland	$47,042.00	$219,127	$45,033	$311,202
Stanly	$39,859.00	$348,328	$59,806	$447,993
Stokes	$14,296.00	$223,205	$19,470	$256,971
Surry	$37,783.00	$445,337	$59,330	$542,450
Swain	$10,246.00	$85,633	$12,492	$108,371
Transylvania	$26,210.00	$142,078	$9,531	$177,819
Tyrrell	$1,021.00	$12,448	$2,587	$16,056
Union	$79,753.00	$1,090,699	$124,378	$1,294,830
Vance	$53,134.00	$386,316	$69,201	$508,651
Wake	$310,706.00	$4,731,513	$569,434	$5,611,653
Warren	$9,531.00	$99,798	$15,862	$125,191
Washington	$12,458.00	$60,523	$12,833	$85,814
Watauga	$7,829.00	$160,965	$19,130	$187,924
Wayne	$77,847.00	$622,827	$128,020	$828,694
Wilkes	$37,579.00	$486,758	$53,815	$578,152
Wilson	$63,857.00	$520,668	$94,934	$679,459
Yadkin	$14,841.00	$208,611	$26,550	$250,002
Yancey	$9,803.00	$69,537	$6,638	$85,978
			Total	$66,591,762

Appendix Table 5. Medicaid Savings by County (largest to smallest)

County	
Mecklenburg	$516,572
Wake	$310,706
Guilford	$269,212
Cumberland	$211,142
Durham	$158,280
Gaston	$155,183
Forsyth	$147,932
Pitt	$142,758
Buncombe	$127,055
Cleveland	$123,407
Cabarrus	$99,369
New Hanover	$95,274
Johnston	$94,560
Iredell	$88,943
Rowan	$87,241
Catawba	$86,277
Davidson	$84,586
Union	$79,753
Wayne	$77,847
Onslow	$76,553
Robeson	$73,353
Richmond	$70,052
Craven	$65,030
Lenoir	$64,844
Wilson	$63,857
Harnett	$63,516
Rockingham	$63,448
Alamance	$62,454
Randolph	$60,929
Lincoln	$60,725

Nash	$60,112
Brunswick	$54,513
Vance	$53,134
Caldwell	$50,865
Edgecombe	$50,752
Haywood	$47,314
Scotland	$47,042
Rutherford	$45,748
Burke	$45,714
Halifax	$43,842
Henderson	$42,174
Pasquotank	$40,472
Stanly	$39,859
McDowell	$39,315
Columbus	$38,846
Lee	$38,566
Pender	$37,817
Surry	$37,783
Wilkes	$37,579
Duplin	$36,285
Sampson	$35,843
Anson	$34,125
Hoke	$33,596
Beaufort	$33,481
Moore	$32,915
Granville	$28,967
Person	$27,537
Carteret	$27,471
Orange	$26,823
Transylvania	$26,210
Jackson	$25,938
Macon	$23,248
Montgomery	$22,704
Franklin	$21,989
Bertie	$21,247
Chatham	$19,316
Martin	$17,904

Hertford	$17,734
Bladen	$17,384
Yadkin	$14,841
Davie	$14,705
Stokes	$14,296
Cherokee	$13,306
Alexander	$13,092
Ashe	$13,092
Northampton	$13,071
Washington	$12,458
Chowan	$12,019
Mitchell	$11,097
Greene	$10,246
Swain	$10,246
Madison	$10,144
Polk	$9,837
Yancey	$9,803
Warren	$9,531
Avery	$7,941
Perquimans	$7,931
Watauga	$7,829
Jones	$7,386
Alleghany	$7,082
Dare	$6,025
Caswell	$6,009
Graham	$5,276
Pamlico	$4,663
Currituck	$4,187
Clay	$3,649
Camden	$2,575
Gates	$2,451
Hyde	$1,191
Tyrrell	$1,021

Appendix Table 6. Private Payer Savings by county (largest to smallest)

Mecklenburg	$5,947,549
Wake	$4,731,513
Guilford	$3,017,557
Forsyth	$2,117,441
Cumberland	$1,639,482
Durham	$1,279,564
Gaston	$1,247,157
Cabarrus	$1,241,147
Iredell	$1,169,464
Union	$1,090,699
Catawba	$1,066,876
Pitt	$1,032,966
Davidson	$1,002,919
Johnston	$957,634
Alamance	$875,220
Buncombe	$809,117
Rowan	$781,431
Haywood	$776,710
Randolph	$758,682
Cleveland	$742,585
New Hanover	$726,489
Rockingham	$660,386
Craven	$636,134
Harnett	$634,417
Wayne	$622,827
Nash	$600,507
Onslow	$591,707
Lincoln	$524,961
Wilson	$520,668
Robeson	$496,845
Wilkes	$486,758
Brunswick	$472,593

Henderson	$472,164
Caldwell	$446,839
Surry	$445,337
Orange	$430,528
Lenoir	$420,441
Richmond	$404,773
Burke	$401,983
Edgecombe	$393,398
Vance	$386,316
Jackson	$380,736
Lee	$352,191
Stanly	$348,328
Sampson	$347,899
Halifax	$347,041
Granville	$338,456
Hoke	$317,208
Moore	$308,409
Pasquotank	$299,395
Rutherford	$297,893
Anson	$290,595
Franklin	$281,152
Davie	$269,563
Duplin	$268,704
Pender	$259,261
Person	$251,964
Carteret	$246,598
Chatham	$241,877
Stokes	$223,205
Scotland	$219,127
Beaufort	$217,195
McDowell	$215,478
Yadkin	$208,611
Columbus	$207,108
Alexander	$205,821
Macon	$169,550
Montgomery	$167,833
Watauga	$160,965

Bertie	$160,107
Martin	$153,453
Transylvania	$142,078
Bladen	$141,005
Ashe	$130,060
Dare	$116,539
Hertford	$110,315
Northampton	$108,168
Warren	$99,798
Avery	$87,565
Polk	$86,492
Swain	$85,633
Caswell	$80,268
Chowan	$78,766
Jones	$76,834
Cherokee	$76,405
Greene	$74,044
Perquimans	$72,112
Yancey	$69,537
Mitchell	$68,035
Washington	$60,523
Alleghany	$58,806
Madison	$51,938
Pamlico	$47,216
Currituck	$44,856
Camden	$36,700
Graham	$26,613
Gates	$25,325
Clay	$16,740
Tyrrell	$12,448
Hyde	$9,014

Appendix Table 7. Other Payer Savings by county (largest to smallest)

Mecklenburg	$883,748
Wake	$569,434
Guilford	$524,605
Cumberland	$300,528
Durham	$283,066
Forsyth	$262,371
Gaston	$234,221
Pitt	$200,965
Catawba	$186,498
Onslow	$169,241
Iredell	$162,229
New Hanover	$155,965
Craven	$153,719
Davidson	$151,813
Johnston	$151,643
Cabarrus	$149,532
Alamance	$141,649
Rowan	$128,905
Wayne	$128,020
Union	$124,378
Cleveland	$124,275
Harnett	$110,830
Randolph	$95,274
Wilson	$94,934
Rockingham	$94,049
Nash	$93,879
Buncombe	$93,130
Lenoir	$87,548
Lincoln	$86,254
Brunswick	$83,667
Burke	$81,795
Lee	$80,740
Caldwell	$77,336
Edgecombe	$75,123

Robeson	$74,783
Richmond	$72,945
Vance	$69,201
Henderson	$66,716
Carteret	$66,478
Pasquotank	$65,899
Haywood	$64,946
Stanly	$59,806
Hoke	$59,466
Surry	$59,330
Halifax	$57,866
Orange	$55,143
Moore	$54,973
Sampson	$53,917
Wilkes	$53,815
Duplin	$53,373
Pender	$52,454
Granville	$47,586
Rutherford	$47,144
Scotland	$45,033
Person	$42,923
Beaufort	$42,276
Columbus	$40,268
Franklin	$40,166
Chatham	$32,643
Anson	$31,418
Montgomery	$30,703
Alexander	$26,993
Macon	$26,754
Yadkin	$26,550
Jackson	$24,678
Davie	$24,406
Bertie	$23,759
Martin	$22,363
McDowell	$22,159
Dare	$22,023
Bladen	$21,240
Hertford	$20,117

Stokes	$19,470
Watauga	$19,130
Greene	$18,313
Cherokee	$17,870
Ashe	$16,747
Warren	$15,862
Chowan	$15,760
Jones	$14,875
Northampton	$14,671
Perquimans	$14,228
Avery	$13,105
Washington	$12,833
Swain	$12,492
Currituck	$12,254
Polk	$10,075
Mitchell	$10,041
Transylvania	$9,531
Caswell	$9,224
Pamlico	$8,986
Camden	$6,638
Yancey	$6,638
Madison	$6,433
Alleghany	$6,263
Gates	$4,051
Clay	$3,540
Graham	$3,506
Tyrrell	$2,587
Hyde	$1,600