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ACUTE CRISIS CARE FOR PATIENTS WITH MENTAL HEALTH CRISES: INITIAL ASSESSMENT OF AN INNOVATIVE PREHOSPITAL ALTERNATIVE DESTINATION PROGRAM IN NORTH CAROLINA

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ABSTRACT

Objective: Emergency Departments (ED) are overburdened with patients experiencing acute mental health crises. Pre-hospital transport by Emergency Medical Services (EMS) to community mental health and substance abuse treatment facilities could reduce ED utilization and costs. Our objective was to describe characteristics, treatment, and outcomes of acute mental health crises patients who were transported by EMS to an acute crisis unit at WakeBrook, a North Carolina community mental health center. **Methods:** We performed a retrospective cohort study of patients diverted to WakeBrook by EMS from August 2013–July 2014. We abstracted data from WakeBrook medical records and used descriptive statistics to quantify patient characteristics, diagnoses, length of stay (LOS), and 30-day recidivism. **Results:** A total of 226 EMS patients were triaged at WakeBrook. The median age was 38 years, 55% were male, 58% were white, and 38% were uninsured. The most common chief complaints were suicidal ideation or self-harm (46%) and substance abuse (19%). The most common diagnoses were substance-related and addictive disorders (42%), depressive disorders (32%), and schizophrenia spectrum and other psychotic disorders (22%). Following initial evaluation, 28% of patients were admitted to facilities within WakeBrook, 40% were admitted to external psychiatric facilities, 18% were stabilized and discharged

home, 5% were transferred to an ED within 4 hours for further medical evaluation, and 5% refused services. The median LOS at WakeBrook prior to disposition was 12.0 hours (IQR 5.4–21.6). Over a 30-day follow-up period, 60 patients (27%) had a return visit to the ED or WakeBrook for a mental health issue. **Conclusions:** A dedicated community mental health center is able to treat patients experiencing acute mental health crises. LOS times were significantly shorter compared to regional EDs. Successful broader programmatic implementation could improve care quality and significantly reduce the volume of patients treated in the ED for acute mental health disorders. **Key words:** emergency medical services; emergency medicine; mental health; substance-related disorder; triage

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INTRODUCTION

Emergency medicine addresses a broad spectrum of patient care and is impacted by high patient volumes in the United States (US) with an estimated 136 million emergency visits every year (1). North Carolina (NC) had 4.8 million emergency department (ED) visits in 2012 (2). Addressing emergency mental health care is critical due to the increasing prevalence of mental illness and its resulting impact on ED patient volumes. The total US adult population in 2014 suspected to suffer from any mental illness and serious mental illness was 18.1% and 4.1%, respectively (3). Rates of mental illness in NC have been comparable to national rates (4). Patients suffering from acute mental health crises often seek treatment in EDs and represent an increasingly significant portion of ED patients. Visits with a primary mental health diagnosis, excluding substance abuse, accounted for approximately 10% of all NC ED visits in 2012 (2). NC ED visits with a mental health diagnosis increased by 18% from 2008 to 2010, while all NC ED visits increased by only 5% (5).

Rising proportions of mental health-related ED visits are concerning due to inefficiency, inadequate care, and high costs. Patients are often admitted or held involuntarily due to inaccessibility of on-call psychiatrists. A 2008 survey of US ED Medical Directors revealed 62% of responding EDs had no psychiatric services involved in the care of boarded patients awaiting

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psychiatric admission or transfer (6). Inappropriate commitments and admissions lead to unnecessary psychiatric boarding and increased hospital costs. In NC, the admission rate of mental health-related ED visits (27.6%) was more than twice that of the average ED visit admission rate (12.8%) in 2012 (2). Psychiatric beds are generally limited, leading to extended ED boarding times while awaiting admission. During a six-month study of NC state hospital admission delays in 2010, patients waited an average of 63.1 hours for admission to a state hospital psychiatric bed. Over 80% of those patients waited in an ED bed (7). Extended delay in psychiatric facility admission can interfere with patient crisis stabilization and these delays contribute to ED crowding and further postponements in care.

Traditionally, Emergency Medical Services (EMS) have transported patients with any acute mental health crisis to an ED. In 2009, EMS and local health care facilities in Wake County, NC developed a pilot intervention program as an alternative approach to evaluating patients with acute mental health crises, including substance abuse crises. Wake County EMS' Advanced Practice Paramedic (APP) program allows for transport to alternative destinations for 9-1-1 patients experiencing an acute mental health crisis per protocol criteria. To train paramedics as qualified APPs, Wake County EMS developed a curriculum requiring over 200 didactic hours and 128 clinical hours. Regarding the mental health components of the curriculum, the training includes crisis intervention management, increased awareness and education regarding local mental health resources, and reinforced knowledge of psychiatric and mental pathophysiology. Clinical training hours include observing and assessing patients at local mental health and substance abuse treatment centers. For transport to an alternative treatment setting, APPs must confirm a primary mental health crisis and exclude other emergent medical conditions per specialized protocols. Under Wake County's pilot intervention program, appropriate patients can be diverted by APPs to community mental health and substance abuse treatment facilities. Among these facilities is the University of North Carolina (UNC) Health Care's WakeBrook Campus, a community mental health center located in Raleigh, NC, or other community resources for mental health assistance. If alternative transport criteria are not met or the patient refuses WakeBrook or other alternative services, EMS personnel transport the patient to a local ED. Each patient who meets alternative destination criteria, including the absence of emergent medical conditions requiring care at an ED, is eligible for transport to a range of community mental health facilities and works with the APP to identify the best facility for their care. Standard responding EMS personnel may cancel an APP evaluation prior to an APP's arrival if

the patient requires immediate ED care.; however, an APP evaluation is always required for patient transport to an alternative destination. As an alternative destination for mental health and substance abuse crisis patients, WakeBrook offers a unique range of services on one campus. Patients transported to WakeBrook are initially assessed in Crisis and Assessment Services (CAS). CAS serves as an acute 24/7 crisis unit and entry point to the psychiatric facility. WakeBrook also provides an inpatient psychiatric unit, residential treatment, and an alcohol and drug detoxification unit.

To our knowledge, few studies have described similar care models in which EMS protocols allowed for transport of patients to alternative care destinations such as community mental health centers (8,9). In addition, we could find no previous studies that evaluated the potential impact of a similar EMS care model on patterns of patient care and outcomes. The objective of this study is to describe the characteristics, treatment, and outcomes of patients diverted by EMS to a dedicated community mental health center (WakeBrook) instead of an ED.

METHODS

Study Design

A retrospective cohort study of patients evaluated by APPs and diverted to WakeBrook between August 2013 and July 2014 was performed.

Compliance with Ethical Standards

The University of North Carolina and WakeMed Institutional Review Board (IRB) Committees reviewed this study's procedures. Each IRB approved an informed consent exemption due to the absence of direct interaction with patients and retrospective collection of patient data.

Study Setting and Population

Wake County EMS developed a process by which APPs can identify and transport patients with primary mental health and substance abuse crises to alternative destinations instead of the ED in 2009. This process is explained in the Wake County EMS Protocol 92 (Figure 1).

EMS Response

EMS personnel respond to 9-1-1 calls identified as patients with a possible acute mental health or substance abuse crisis. Typically, either standard EMS personnel notify an APP that a patient is a candidate for an alternative destination or an APP responds to the initial call with standard EMS personnel. To ensure APPs are dispatched to relevant calls, Medical Priority

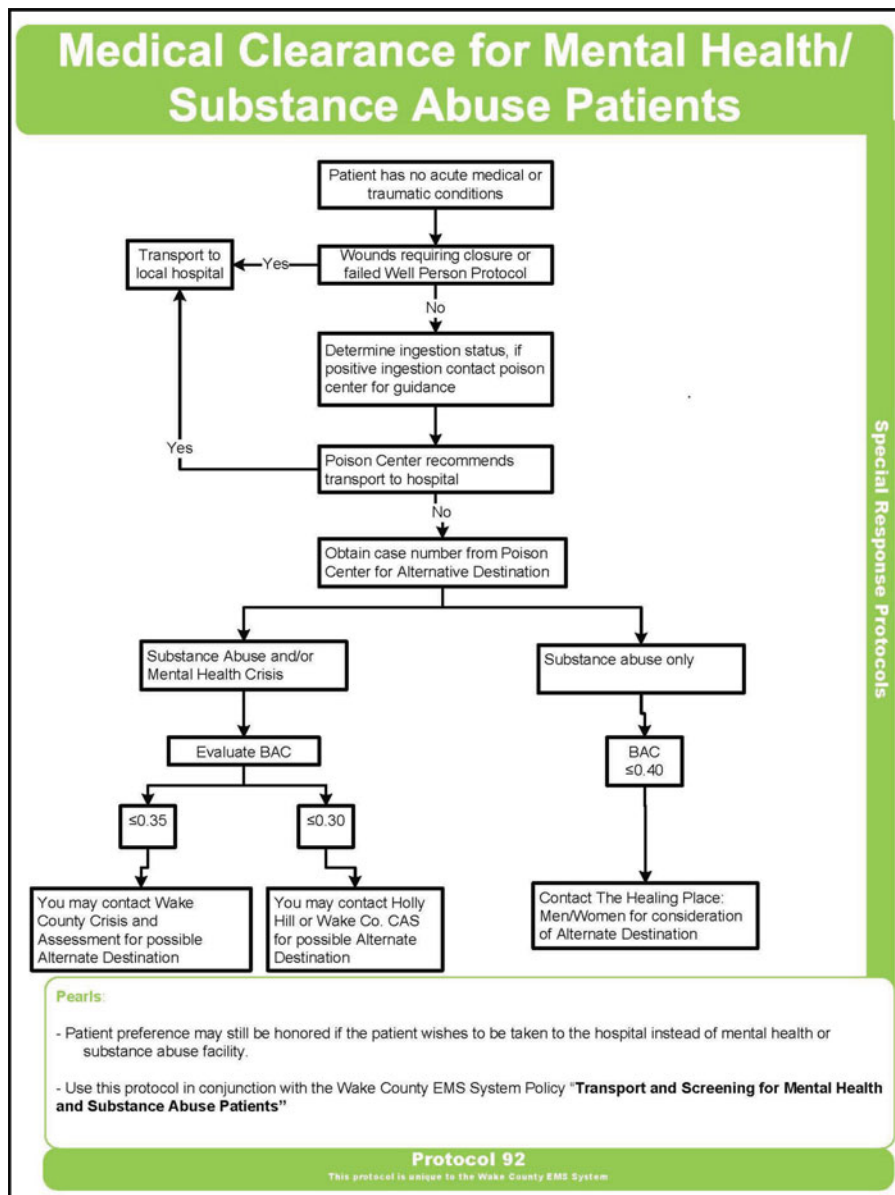


FIGURE 1. Wake County EMS Protocol 92.

Dispatch System codes 23 (overdose/poisoning) and 25 (psychiatric/suicide attempt) are verified for each call. Upon arrival, the APP assesses the patient to confirm a primary acute mental health or substance abuse crisis. Once confirmed, the APP performs a medical screening to determine if transport to WakeBrook is appropriate by using the following screening checklist:

- No acute medical issues or traumatic injuries are present. Wounds requiring closure or exhibiting excessive bleeding require transport to an ED.
- No unexplained mental status change(s) persists or intermittently recurred during encounter.
- Blood alcohol concentration is less than 0.35, and candidate can tolerate oral fluids.

- Pulse is less than 120 beats per minute.
- Candidate is compliant with medications for chronic medical issues, or patient knows medications and dosages and will take medications.
- Candidate has not taken medications outside normal dose, or poison control was contacted, and recommendation and case information were recorded.
- Candidate has no history of diabetes, or blood glucose level is less than 300 mg/dL with no evidence of ketoacidosis.
- Candidate performs daily living activities independently.

If the patient meets all criteria, the APP inquires whether the patient is willing to be transported to

WakeBrook or another alternative facility instead of the ED. APPs will always provide transportation to an ED if requested by the patient. EMS personnel then transport the patient to WakeBrook, another alternative facility, or the ED dependent upon patient preference.

Alternatively, if a patient fails to meet one or more of the checklist screening, EMS personnel transport the patient to the ED. If arriving first to the scene, standard EMS personnel may notify an APP that a patient is no longer a candidate for an alternative destination due to the patient requiring immediate medical attention. EMS personnel transport the patient to an ED after cancellation of the APP evaluation. However, EMS personnel may not transport a patient to an alternative treatment facility without a complete APP evaluation.

Additionally, when EDs and alternative facilities such as WakeBrook reach maximum capacity, they may go "on diversion," temporarily suspending new patient admissions via ambulance. In cases where an alternative facility is "on diversion," patients may be transported to an ED despite meeting the criteria for and requesting care at an alternative facility.

Community Mental Health Facility

WakeBrook serves as a community mental health center for Wake County, NC. Patients receiving care at WakeBrook usually arrive by one of three methods: as a patient initiated walk-in, transported by law enforcement, or transported by EMS personnel. As previously described, this facility offers an acute crisis unit, residential treatment, an acute inpatient psychiatric unit, and a detoxification unit. As the entry point to WakeBrook, CAS provides mental health and substance abuse services, including screening, assessment, intervention, and stabilization of acute crises. The primary purpose of this unit is to avoid unnecessary transport to EDs, psychiatric hospitals, and criminal justice system facilities, while also stabilizing acute crises of patients and assigning appropriate psychiatric dispositions. Facility-Based Crisis (FBC) is a short-term residential treatment program. FBC provides mental health and substance abuse treatment services for up to sixteen patients, preventing unnecessary ED evaluation and hospitalization or referral to psychiatric hospitals. WakeBrook's Inpatient Unit (IPU) has sixteen psychiatric beds for psychiatric admissions. The sixteen-bed Alcohol and Drug Detoxification Unit (A&DD) offers non-hospital medical detoxification for substance abuse designed to provide addiction treatment, education, and facilitates for further treatment in the community.

Inclusion Criteria

The study included patients at least 10 years of age who were evaluated by Wake County EMS APPs and trans-

ported to WakeBrook between August 2013 and July 2014. Any patients who did not meet these criteria were excluded.

Data sources

We accessed two data sources for this study. Wake County EMS provided APP patient encounter data. These data included name, date of birth (DOB), and date of service (DOS). We accessed WakeBrook medical records through UNC's electronic health record (EHR) system, which houses all UNC Health Care data. The EHR allows for data searches by patient name and DOB.

Data Linkage

Linkage was manually performed between EMS patient encounter data and WakeBrook EHR data using three variables: patient name, DOB, and DOS. A patient name provided by EMS data was matched to an EHR by first searching for an exact name match, then a phonetic name match, and ultimately, a common alias name match, if initial attempts were unsuccessful. Once a matching name was found, DOB was manually verified with at least two of three criteria matching (i.e., month, day, and/or year). If a DOB was not available in EMS data, this step of matching was excluded, but only if the name match resulted in a single match (i.e., exact, phonetic, or common alias) and no other patients existed with an identical name. Finally, WakeBrook DOS was matched to EMS DOS. Either DOS in the EHR data had to match EMS DOS exactly or DOS in the EHR data could not surpass EMS DOS by greater than one day. Extending a date match by one day allowed for inclusion of patients who were evaluated by EMS prior to midnight and arrived at the facility after midnight the subsequent date. Patients were excluded from further analyses if the patient name retrieved from EMS data could not be matched to an EHR based on these criteria.

Defining Variables and Coding Schemes

To describe our patient population, treatment received at WakeBrook, and patient outcomes in depth, we selected multiple variables in EHRs to abstract and analyze that require defining. Chief complaint was abstracted from triage notes and provider notes in the EHRs. Our coding scheme for chief complaint was developed after a literature review of prior studies involving similar patient populations. Chronic medical conditions were determined by diagnoses and past medical history fields where available in EHRs with the purpose of identifying common chronic comorbidities. Frequent co-morbidities, such as hypertension or diabetes, were isolated for analyses, while

others were categorized into commonly accepted groupings of disorders based upon expert physician opinion. Medications were coded according to their drug class listed in the Epocrates v16.4 (Watertown, MA: athenahealth, Inc.) medical reference application, which classifies medications based upon their most medically relevant use. Laboratory and diagnostic tests were coded to groups differentiated by primary diagnostic purpose. Mental and substance use disorder diagnoses were determined by diagnoses in EHRs with the purpose of identifying common mental and substance use disorder diagnoses, as established in the DSM-V. Recidivism was defined as a return visit to WakeBrook or a local ED for any reason within 30 days of the patient's discharge date.

Patient Record Review

Study team members reviewed patient records. To ensure an accurate and consistent review of patient records, we applied Cohen's kappa for interrater agreement to the key patient record variables of 4% of patient records. Interrater agreement was perfect or near perfect for all selected key variables, including abnormal vitals ($k = 1$), chief complaint ($k = 1$), diagnosis ($k = 1$), involuntary commitment ($k = 1$), disposition ($k = 0.96$), and insurance status ($k = 0.87$). Due to the discrete nature of many EHR variables, many of our kappa values were equal to 1. These Cohen's kappa scores indicated that reviewers consistently agreed on coding patient record data.

Analysis

Descriptive statistics (e.g., count, percent, interquartile range [IQR], etc.) were used for patient characteristics, diagnoses, dispositions, length of stay (LOS), and recidivism. All analyses were completed using Microsoft Excel for Mac 2011 (Microsoft Corp, Redmond, WA).

RESULTS

Between August 2013 and July 2014, 1,555 patients met inclusion criteria for the study (Figure 2). Sixty percent ($n = 937$) of patients were not eligible for an alternative destination according to Wake County's medical clearance protocol and required transport to an ED per protocol. Forty percent ($n = 620$) were eligible for diversion to an alternative destination. Fifteen percent ($n = 232$) of patients were eligible for diversion, but either preferred transportation to the ED or refused transportation to any treatment facility, including EDs. Twenty-five percent ($n = 386$) of patients were eligible for diversion and agreed to transportation to an alternative destination. Eleven percent ($n = 165$) of patients were eligible for diversion and transported to alternative destinations

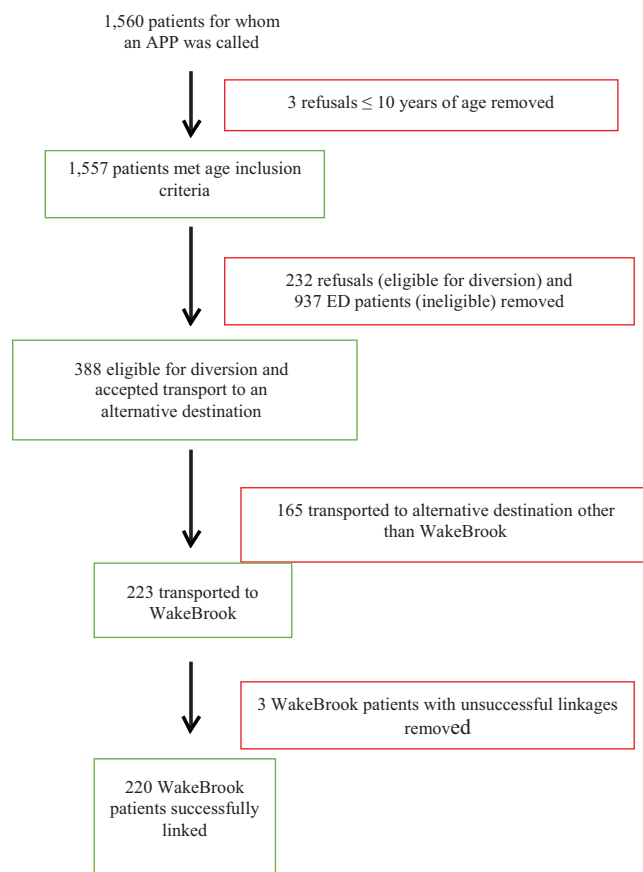


FIGURE 2. Inclusion and linkage process.

other than WakeBrook, including regional psychiatric hospitals or residential detox centers, among other destinations, based on the judgment of APPs and patient preference. Fourteen percent ($n = 220$) of patients were eligible for diversion and transported to WakeBrook, resulting in the final study population.

Following our linkage criteria, 100% ($n = 220$) of patients provided by APP records were linked to WakeBrook EHRs (Figure 2). Of these 220 WakeBrook patients, 55% ($n = 122$) were male, 58% ($n = 127$) were White, 36% ($n = 79$) were Black or African American, and 5% ($n = 10$) were of Hispanic or Latino ethnicity. The median age was 38 years, and the mean age (\pm SD) was 39 (± 17) years. Regarding payer status, 38% ($n = 83$) of patients were uninsured and 39% ($n = 85$) had Medicare or Medicaid coverage. Only 24% ($n = 52$) of patients had private health insurance. Forty-four percent ($n = 133$) of patients had a chronic medical condition; the most common chronic co-morbidities were hypertension (20%, $n = 44$) and neurological disorders (14%, $n = 30$). Regarding patient reasons for requesting treatment, the most common chief complaints were suicidal ideation or self-harm (46%, $n = 101$) and substance abuse (19%, $n = 41$) (Table 1).

The most common classes of laboratory and diagnostics tests ordered at WakeBrook were chemistry panels (21%, $n = 45$) and toxicology tests (20%, $n = 44$).

TABLE 1. WakeBrook patient characteristics ($n = 220$)

	Median	Range
Age	37.5	11-88
	%	<i>n</i>
10-15	5.00	11
16-19	9.55	21
20-25	13.18	29
26-30	10.00	22
31-40	14.09	31
41-50	19.55	43
51-60	19.09	42
61+	9.55	21
Gender		
Male	55.45	122
Female	44.55	98
Race		
White	57.99	127
African American or Black	36.07	79
Asian or Pacific Islander	0.91	2
Multiracial	0.46	1
Ethnicity		
Hispanic or Latino	4.57	10
Non-Hispanic or Latino	95.43	209
Payer Status		
None	37.73	83
Private	23.64	52
Medicare	20.00	44
Medicaid	18.64	41
Chronic Medical Conditions		
Any Chronic Medical Condition	44.09	133
Hypertension	20.00	44
Diabetes	9.09	20
Neurological Disorders	13.64	30
Chronic Pain	10.45	23
Dyslipidemia	6.82	15
Respiratory Disorders	10.45	23
Rheumatic Diseases	6.36	14
Thyroid Diseases	7.27	16
Liver Diseases	5.00	11
Cardiovascular Diseases	4.55	10
History of Cerebrovascular Accident or Transient Ischemic Attack	2.73	6
Other	40.45	89
Chief Complaint		
Substance Abuse	18.64	41
Overdose	1.36	3
Suicidal Ideation or Self-Harm	45.91	101
Affective Symptoms	8.18	18
Agitation, Aggression, or Assault	6.36	14
Altered Mental Status	0.45	1
Other Psychiatric or Behavioral Complaint	15.00	33
Other Medical Complaint	1.36	3
Patient Left Prior to Triage	2.73	6

Imaging was ordered for only 0.9% ($n = 2$) of patients, including one chest radiography and one right hand radiography. Medications, excluding home medications, were administered to 54% ($n = 118$) of patients. The most common medications ordered and administered to patients included psychotropic (48%, $n = 105$), analgesics (24%, $n = 52$), and nutrition/electrolytes (23%, $n = 51$). The most often administered psychiatric medications were intermediate benzodiazepines

TABLE 2. Mental and substance use disorder diagnoses of WakeBrook patients

Diagnosis	%	<i>n</i>
Any Mental or Substance Use Disorder	87.27	192
Schizophrenia Spectrum and Other Psychotic Disorders	22.27	49
Depressive Disorders	32.27	71
Bipolar and Related Disorders	13.64	30
Unspecified Mood Disorders	11.82	26
Trauma and Stressor-Related Disorders	10.00	22
Anxiety Disorders	8.18	18
Personality Disorders	7.27	16
Neurodevelopmental Disorders	6.36	14
Disruptive, Impulse-Control, and Conduct Disorders	1.82	4
Sleep-Wake Disorders	0.91	2
Neurocognitive Disorders	0.45	1
Obsessive-Compulsive and Related Disorders	0.45	1
Feeding and Eating Disorders	0.45	1
Medication-Induced Movement Disorders and Other Adverse Effects of Medication	0.45	1
Other Conditions	0.91	2
Any Substance-Related and Addictive Disorder	42.27	93
Alcohol-Related Disorder	30.91	68
Cannabis-Related Disorder	11.36	25
Opioid-Related Disorder	5.45	12
Sedative-, Hypnotic-, or Anxiolytic-Related Disorder	1.36	3
Stimulant-Related Disorder	12.27	27
Tobacco-Related Disorder	5.91	13

(28%, $n = 61$), non-SSRI or SNRI antidepressants (19%, $n = 42$), and atypical antipsychotics (16%, $n = 35$) (Data not shown).

Generally, treatment diagnoses included a mental disorder (45%, $n = 99$), a substance use disorder (6%, $n = 13$), or co-occurring mental and substance use disorders (36%, $n = 80$). No diagnosis was available in 13% ($n = 28$) of visits due to patients refusing services or requiring transfer to an ED upon CAS assessment. The most common diagnoses were substance-related and addictive disorders (42%, $n = 93$), depressive disorders (32%, $n = 71$), and schizophrenia spectrum and other psychotic disorders (22%, $n = 49$). Alcohol-related disorders (31%, $n = 68$) and stimulant-related disorders (12%, $n = 27$) were the most prevalent specific substance-related and addictive disorders (Table 2).

Dependent upon patient needs, several options for disposition from CAS were available. Eighteen percent ($n = 40$) of patients were stabilized and discharged home from CAS. For patients requiring psychiatric or substance abuse services beyond CAS, 11% ($n = 24$) of patients were admitted to the WakeBrook IPU for psychiatric reasons, 17% ($n = 37$) were accepted to FBC for residential treatment, and 40% ($n = 89$) were transferred to an external inpatient psychiatric or detoxifi-

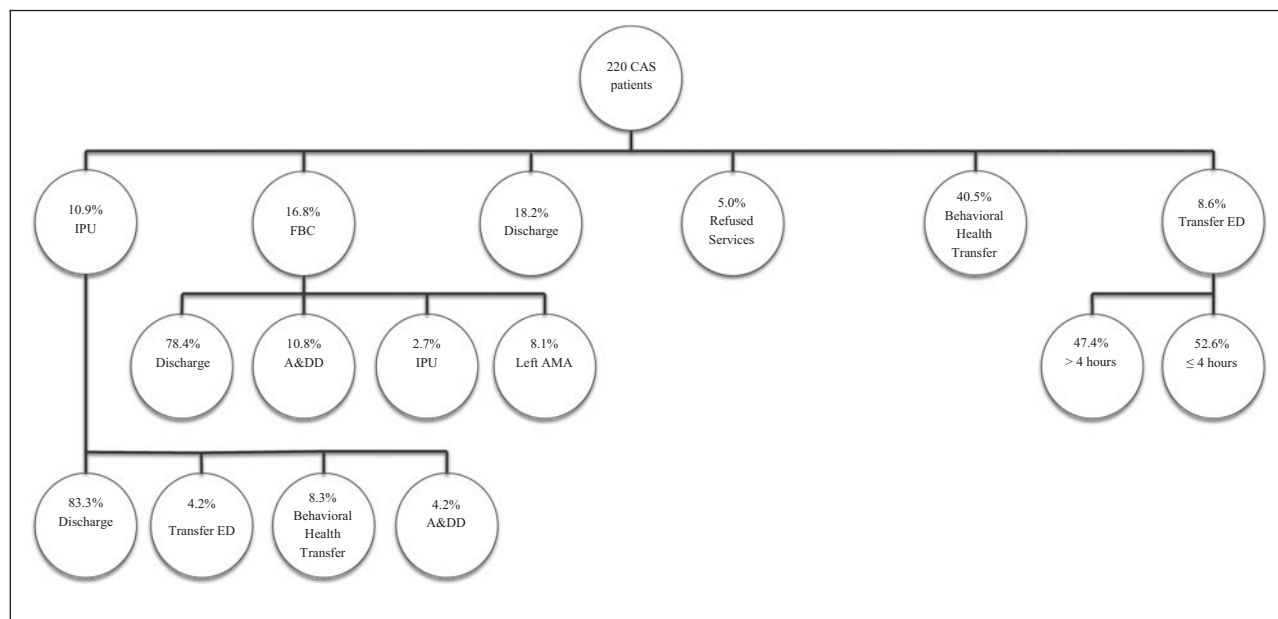


FIGURE 3. WakeBrook patient dispositions.

cation facility for admission. Nine percent ($n = 19$) of patients were transferred to an ED after CAS assessment (Figure 3). Of the nineteen patients transferred to an ED from WakeBrook CAS, 53% ($n = 10$) were transferred within four hours of arrival to CAS. This four-hour window is Wake County EMS's standard for determining if patients were accurately assessed and transported to the correct destination. Fewer patients who require inter-facility transfer from WakeBrook to an ED within the initial four-hour window indicates a more effective protocol. Reasons for transfer to an ED for these patients include chest pain, shortness of breath, violent behaviors requiring restrictive interventions, possible overdose, or evaluation for another medical condition. Of patients transferred for further medical care within this four-hour window, diagnoses in the ED include chest pain, redness or discharge of the eye, asthma with exacerbation, other general symptoms, hemorrhage of the gastrointestinal tract, unspecified nonpsychotic disorder, major depressive disorder, paranoid schizophrenia, unspecified psychosis, and unknown reasons. EHR review of these transferred patients indicates no known adverse outcomes; however, with a small sample size, this result should be further examined in larger patient samples.

After admission to IPU, 83% ($n = 20$) of admitted patients were discharged home, 4% ($n = 1$) were transferred to an ED, 4% ($n = 1$) were accepted to WakeBrook's A&DD for detoxification, and 8% ($n = 2$) were transferred to an external inpatient psychiatric or detoxification facility. For patients accepted to FBC for residential treatment, 78% ($n = 29$) were discharged home, 11% ($n = 4$) were accepted to A&DD, 3% ($n = 1$) were subsequently admitted to IPU, and 8%

($n = 3$) left against medical advice (Figure 3). Of the whole patient population, 40% ($n = 89$) were exclusively treated and stabilized in WakeBrook's various units and discharged home.

Median LOS varied by patient disposition. Median LOS was brief for patients who refused services (3.03 hours, IQR 0.85–9.04), were discharged home (3.69 hours, IQR 2.48–6.49), or required transfer to an ED (3.55 hours, IQR 1.28–7.58). For patients accepted to FBC, median LOS was 10.33 hours (IQR 5.83–12.63) prior to residential treatment. Patients who required transfer to an external psychiatric facility had a median LOS of 17.49 hours (IQR 13.70–23.60) prior to transfer. For patients admitted to IPU, median LOS was the longest at 20.08 hours (IQR 8.40–45.98) prior to admission while awaiting an available WakeBrook psychiatric bed (Table 3).

Over a 30-day follow-up period, 27% ($n = 60$) of patients had a return visit to a regional ED or WakeBrook for any complaint. These sixty patients were responsible for 111 visits during a 30-day follow-up period. WakeBrook visits accounted for 23% ($n = 25$) of return visits while ED visits were responsible for 77% ($n = 86$) of return visits.

DISCUSSION

The Wake County program for alternative destination for mental health and substance abuse patients, which includes collaboration between Wake County EMS, WakeBrook, local EDs, and other facilities and agencies, offers a unique system of triage and care for the community. Few descriptions of similar models have been published. We are only aware of two studies

TABLE 3. WakeBrook CAS LOS in hours by disposition

	<i>n</i>	CAS LOS Median (IQR)	% Missing Time	<i>n</i>	% Missing Date & Time	<i>n</i>
Total CAS	220	12.21 (5.44–21.84)	0.5	1	0.5	1
Inpatient Psychiatric Unit	24	20.08 (8.40–45.98)	0	0	0	0
Facility Based Crisis	37	10.33 (5.83–12.63)	0	0	0	0
Discharge	40	3.69 (2.48–6.49)	0	0	0	0
Transfer to ED	19	3.55 (1.28–7.58)	0	0	0	0
Transfer to Inpatient Psych or Detox	89	17.49 (13.70–23.60)	1.1	1	0	0
Refused Services	11	3.03 (0.85–9.04)	0	0	8.3	1
Inpatient Psychiatric Unit	<i>n</i>	CAS LOS Median (IQR)	% Missing Time	<i>n</i>	% Missing Date & Time	<i>n</i>
Discharge	20	20.08 (8.71–45.98)	0	0	0	0
Transfer to Inpatient Psych or Detox	2	23.42 (13.67–33.17)	0	0	0	0
A&DD	1	127.03 (<i>n</i> = 1)	0	0	0	0
Transfer to ED	1	7.65 (<i>n</i> = 1)	0	0	0	0
Facility Based Crisis	<i>n</i>	CAS LOS Median (IQR)	% Missing Time	<i>n</i>	% Missing Date & Time	<i>n</i>
Discharge	29	10.33 (5.83–16.92)	0	0	0	0
A&DD	4	10.86 (9.45–12.73)	0	0	0	0
IPU	1	11.30 (<i>n</i> = 1)	0	0	0	0
Left AMA	3	5.57 (4.48–7.62)	0	0	0	0

which reviewed the patient populations and safety of similar EMS alternative destination programs (10, 11). Comparing diversion screening criteria, WakeBrook distinguishes itself from other alternative destinations examined in those previous studies by its ability to serve a more diverse patient population. Other models diverted only specific behavioral subgroups, such as alcohol-intoxicated patients or psychiatric patients in the absence of substance abuse. Wake County's program is less restrictive, likely due to WakeBrook's capability to stabilize various crises of ranging acutities.

Limited literature exists describing demographics of patients who are transported to alternative destinations in lieu of the ED; however, to better provide and assess patient care, the demographics of these patients should be studied and compared to the larger community. WakeBrook's patient population differs from the general Wake County population in numerous ways. The patient population at WakeBrook is comprised of more males, more African Americans, and fewer Hispanics or Latinos than Wake County's general population. (10) Patients evaluated by APPs and transported to WakeBrook are slightly older than the median age of Wake County residents. (11) In addition, more than one-third of WakeBrook patients were uninsured and nearly half presented with a comorbidity. Not only were more uninsured patients transported to WakeBrook compared to Wake County, (12) the State of NC, and US populations, (13) but mental health patients are at far greater risk for numerous comorbidities, (14) including some prevalent comorbidities identified in this sample. The increased prevalence of minority demographics in addition to the increased prevalence of uninsured and comorbid patients confirms WakeBrook provides healthcare to a challenging patient population. Treating significantly more minority and uninsured subgroups, this community mental health center is providing services to groups known to have poorer

access to health care and worse patient outcomes (15, 13).

To justify the existence of this EMS alternative destination program, treatment provided at WakeBrook must be both beneficial and safe. Low reported chief complaint frequencies of "overdose" (*n* = 3) or "altered mental status" (*n* = 1) are reassuring as these conditions may be more suited for treatment at an ED. Based upon the diversion screening criteria, patients with these complaints should be transported to the ED. In addition, the vast majority of patient records listed a mental health or substance use disorder diagnosis, suggesting patients with mental health needs are being appropriately triaged to a community health facility specializing in mental health care.

Evident by the array of medications and laboratory tests ordered, WakeBrook is appropriately prepared for management of a variety of chronic co-morbidities and identification of various acute medical conditions which require transfer to an ED. Patients also have a fair likelihood of being discharged home after stabilization of a crisis during their stay in WakeBrook, therefore avoiding potential ED boarding and medical hospitalization had they been transported to an ED initially. Yet, provision of exceptional care should be determined, additionally, by timeliness of care. Whereas EDs may board patients for days prior to psychiatric admission (9), WakeBrook is capable of safely limiting patients' LOS. LOS for CAS patients who required admission to IPU was only 20.08 hours. In addition to being shorter than the LOS at regional NC EDs, WakeBrook's LOS prior to psychiatric admission is also shorter than LOS's at similar alternative treatment facilities (8) Patients diverted to psychiatric emergency services in California had an average LOS of 16 to 22 hours. In addition, only 25% of those patients were admitted for psychiatric reasons and the remaining patients were discharged (16). WakeBrook has a clear capacity to care

for mental health crisis patients efficiently, with lower average LOS and higher stabilization and discharge rates.

The Wake County EMS APP program appears to be diverting patients appropriately and consistently to WakeBrook.; however, cases in which WakeBrook patients required subsequent transfer to an ED within four hours of their arrival ($n = 10$) require further investigation. Although EHR review indicated no adverse outcomes, further assessment of a large sample is required to determine if subsequent transfers could be the result of inappropriate triage or the result of stringent safety measures. In addition, a 27% rate of revisits to an ED or behavioral health facility among patients included in this study was higher than a US ED revisit rate of 19.8% observed in a prior study (17). Related literature is limited, but one study observed an ED revisit rate of 42.5% for patients with mental health conditions and 17.2% for all other patients, suggesting an increased likelihood of recidivism for this subgroup (18). Revisit rates from the literature may not capture visits to non-ED facilities, but further analysis is needed to determine if a higher revisit rate is at all due to poorly addressed medical concerns at the initial WakeBrook visit. Additional research is warranted to examine these transfers and revisits to assess the safety and efficacy of this EMS alternative destination program.

WakeBrook provides a continuum of advanced and timely care. Through this alternative destination program, disadvantaged patients in crisis are stabilized. Without this community resource, patients' conditions may be inadequately resolved in a less appropriate treatment setting or remain unresolved. Additional review of patients transported to an ED under this program, their treatment, and their outcomes may more effectively highlight the value of treatment at this dedicated community mental health center.

LIMITATIONS

UNC Health Care implemented a new EHR system in April 2014. Medical records of visits prior to April 2014 from the previous EHR system were scanned into this new EHR system as legacy documents. This software change did not allow for a consistent abstraction procedure of data elements. Certain information, such as diagnoses and orders, was located in different areas of the EHRs. Some data elements were not consistently available prior to the EHR change, resulting in our study using diagnoses as a conservative indicator of prevalence of chronic co-morbidities instead of past medical history when not available. In addition, due to the small sample size and specificity of this population, generalizations to a larger population are difficult. Data from alternate destinations other than WakeBrook were not available. WakeBrook is only able to serve a small population due to the number of available beds, and only a portion of patients arrives by EMS. WakeBrook,

like EDs, goes "on diversion" at times when the facility reaches maximum capacity. Therefore, some patients who met criteria to be transported to WakeBrook were ultimately transported to an open ED; unfortunately, we cannot specifically identify these cases. Finally, we were able link 100% ($n = 220$) of APP data to WakeBrook medical records. EMS and hospital data entry did not contribute to any limitation in linkage of these two data sources.

CONCLUSION

This pilot intervention, led by specially trained paramedics, allowed a significant volume of patients with acute mental health crises to be treated at a dedicated community mental health center in a more appropriate setting for this patient population rather than an ED. Additional studies are required to assess costs, patient outcomes, and safety. If further studies support the safety of this model and improved patient outcomes, broader implementation beyond this county-wide program could improve quality of care and significantly and safely reduce the volume of patients treated in EDs for acute mental health crises.

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