

RACIAL AND ETHNIC DISPARITIES IN EATING DISORDER DIAGNOSIS  
AND FOLLOW-UP CARE AMONG PATIENTS AT AN ACADEMIC MEDICAL  
CENTER

BY

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## ABSTRACT

**Background:** There is limited information about racial/ethnic disparities in eating disorders. The aims of this study were:

- (1) Characterize the population of patients at Wake Forest Baptist Medical Center (WFBMC) diagnosed with an eating disorder over the past 11 years (2006 – 2016), and compare this to nationally reported patterns;
- (2) Examine racial/ethnic disparities in one-year follow-up visits after initial diagnosis of an eating disorder among racial/ethnic groups.

**Methods:** The WFBMC Translational Data Warehouse (TDW) and Clarity databases were utilized. Patient characteristics included race/ethnicity, age, sex, BMI, diagnosing department, follow-up visit, and health insurance status.

**Results:** Data from 618 patients were analyzed. Majority of patients were non-Hispanic White (82%) and female (91%). Binge-eating disorder was the most commonly diagnosed condition (20%), while bulimia nervosa was the least commonly diagnosed (14.2%). Black and Hispanic patients were less likely to have a follow-up visit compared to non-Hispanic Whites.

**Conclusion:** Non-Hispanic White women were more likely to be diagnosed with an eating disorder. It is important to conduct more evaluations to confirm other race/ethnic groups are not being under-diagnosed. Fewer Racial/ethnic minority patients had a follow-up visit, but are more likely to lack health insurance. Further research is needed to elucidate this issue.

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## LIST OF ABBREVIATIONS

AN- Anorexia Nervosa

BCBS- Blue Cross Blue Shield

BED- Binge-Eating Disorder

BN- Bulimia Nervosa

IntMed- Internal Medicine

NH- Non-Hispanic

NIMH- National Institute of Mental Health

Peds- Pediatrics

Psych- Psychiatry

SES- Socioeconomic Status

TDW- Translational Data Warehouse

WFBMC- Wake Forest Baptist Medical Center

WMC- Weight Management Center

## BACKGROUND

### **Defining Eating Disorders**

An estimated 30 million Americans will suffer from an eating disorder at some point in their life, and this number is expected to increase (National Eating Disorder Association). Eating disorders are most likely to occur in the teen years and young adulthood, although some cases have occurred as young as 10 years of age (National Institute on Mental Health). Approximately half a million adolescents are affected by eating disorders, also known as “disordered eating” (National Eating Disorder Association). Anorexia nervosa has the highest mortality rate of any mental illness (National Eating Disorder Association). Eating disorders disproportionately affect women, occurring at a rate of 2 ½ times that of men.

Risk factors for eating disorders include genetics, biological, behavioral, and psychological factors and social conditions (National Institute on Mental Health). Examples of psychological risk factors that contribute to the onset of an eating disorder are low self-esteem, depression, anxiety, stress, loneliness, or feeling of lack of control in life (National Institute on Mental Health). Social risk factors include the cultural pressure of “thinness” and obtaining the “perfect body,” or stress related to racial/ethnic norms (National Institute on Mental Health). The diagnosis of an eating disorder, such as anorexia nervosa (AN), bulimia nervosa (BN), and binge eating disorder (BED), has been shown to create extreme emotional, attitudinal, and behavioral chaos that surrounds a person’s food and weight issues (National Eating Disorder Association).

## **Anorexia Nervosa**

According to criteria set by the DSM-V, a person must experience a “persistent restriction of energy intake leading to significantly low body weight” in order to be diagnosed with AN (Alliance for Eating Disorder Awareness). He/She must also have a severe fear of gaining weight and exhibit behavior that restricts gaining weight.

Approximately 0.9% and 0.3% of the US female and male population, respectfully, will suffer from AN during their life (Stojek & Fischer, 2013). As many as 50% of patients with AN have a comorbid mood disorder of anxiety or depression (Stojek & Fischer, 2013). Approximately 1 in 5 deaths from patients with AN are by suicide (Stojek & Fischer, 2013).

Treatment for AN usually involves a combination of psychological therapy and supervised weight gain (National Health Service, 2016). One of the most common psychological treatments for AN is known as cognitive behavioral therapy (CBT). This involves showing the patients how their condition is often associated with unhealthy and unrealistic thoughts and beliefs about diet and food. CBT encourages patients to adopt a healthier and realistic way of thinking that may lead to more positive behavior (National Health Service, 2016). Non-Hispanic Whites are most likely to be affected by AN (National Eating Disorder Association) compared to other racial/ethnic groups.

## **Binge-Eating Disorder**

A person diagnosed with BED must have “recurrent episodes of binge eating” (Alliance for Eating Disorder Awareness). An episode of binge eating is characterized by both of the following: (1) eating, in a discrete period of time, an amount of food that is definitely larger than most people would eat during a similar period of time and under

similar circumstances (Alliance for Eating Disorder Awareness)” and, (2) there is a sense of a lack of control towards eating during an “episode” and being unable to stop or control the amount of food one is consuming (Alliance for Eating Disorder Awareness). Binge episodes occur a minimum of two times per week for a duration of six months (Eating Disorder Hope, 2014). BED often leads to unwanted weight gain, which can further reinforce compulsive eating behaviors (Eating Disorder Hope, 2014). CBT and group therapy sessions have been shown to be effective in treating binge-eating disorder. (Eating Disorder Hope, 2016). BED affects 3.5% of women and 2.0% of men in the US during their lifetime. More than half of patients with BED have a comorbid diagnosis of anxiety disorder (Stojek & Fischer, 2013). Statistics have shown that the prevalence of BED in minority patients has been increasing over the past 10 years (National Eating Disorder Association).

### **Bulimia Nervosa**

A person diagnosed with BN consumes excessive amounts of food and then engages in purging behaviors to prevent weight gain. In order to be clinically diagnosed with bulimia these behaviors must occur at least once a week for three months (Alliance of Eating Disorder Awareness). Purging behaviors can include forced vomiting, use of laxatives, and prolonged exercise. These behaviors are a result is a frantic effort to undo a binge episode (Bulimia nervosa, 2016). Approximately 1.5 % and 0.5% of American women and men will suffer from BN during their lifetime, and more than half of these women also suffer from a comorbidity of anxiety disorder (Stojek & Fischer, 2013, National Association of Anorexia Nervosa and Associated Disorders). Non-Hispanic

White women have the highest rates of BN, but the prevalence of BN in non-Hispanic Black women has been increasing (National Eating Disorder Association).

Being diagnosed with an eating disorder comes with many other conditions underlying the construct of the eating disorder. As noted previously, most are coupled with another mental health disorder such as anxiety or depression which adds to the complexity of treating an eating disorder (Stojek & Fischer, 2013).

### **Racial and Ethnic Disparities and Cultural Differences Associated with Eating Disorders**

The prevalence of eating disorders diagnosed in racial/ethnic minority groups has begun to increase (National Eating Disorder Association). A recent study by Rodgers et. al (2017) investigated if racial/ethnic minority adolescents with overweight issues are at increased risk of disordered weight control behaviors (DWCB). Study participants indicated if during the last 30 days if they had dieted, engaged in behaviors to maintain their weight such as vomit, take laxatives, or diet pills. Weight status differences were present for prevalence of DWCB among girls classified as “other” race/ethnicity. The investigators reported that within all racial/ethnic groups, 34% to 50% of participants who were overweight were more likely to report dieting compared to participants without obesity issues (9.6 to 29.6%) (Rodgers et. al, 2017). There were five (7.94%) non-Hispanic Black girls with overweight issues, seven (6.86%) Latina/o, and eighteen (20.69%) “other” compared to twenty-one (2.97%) non-Hispanic White girls with overweight issues (Rodgers et. al, 2017). Girls classified as “other” race consisted of Hawaiian/Pacific Islander, American Indian/Alaskan Native and other girls that self-identified as other (Rodgers et. al, 2017). Participants identifying themselves in the

“other” racial/ethnic minority group had the highest rates of DWCB, which could suggest that identifying with a smaller minority group maybe associated with an increased risk of DWCB (Rodgers et. al, 2017).

Non-Hispanic White women are most frequently diagnosed with eating disorders. This has been examined, although not carefully in the scientific literature. Recent literature has suggested several reasons for the disparities that are found in the diagnosis of the eating disorders AN, BN, and BED. One reason provided for why minority women are less likely to be diagnosed with these eating disorders is that minority women are more likely to have better social support from family and friends compared to non-Hispanic whites (Mason & Lewis, 2016). Work by Mason and Lewis suggests that in BED, non-Hispanic Black women value and rely on the support of family compare to non-Hispanic White women, who may find peer support more vital or pressure to be thin due to social support increases their likelihood of developing an eating disorder. Interestingly, support from family members among non-Hispanic white women was associated with a greater likelihood of binge eating. Optimism among non-Hispanic Black women was associated with less possibility of exhibiting binge-eating behaviors (Mason & Lewis, 2016).

Research has shown that non-Hispanic Blacks desire a less thin body type as part of their culture, which would result in the lower frequency of eating disorders, particularly AN (Stojek & Fischer, 2013). One’s ethnic identity is their self-identification, self-concept, and sense of belonging and commitment to a specific group (Stojek & Fischer, 2013). In their article, *“Thinness expectancies and restraint in Black and White college women: A prospective study,”* Stojek and Fischer (2013) stated that non-

Hispanic Black participants had higher rates of BN compared to non-Hispanic White participants. This could be due to differences in ethnic identity experienced by each group. Non-Hispanic Black women who have a strong sense of ethnic identity have lower rates of binge eating than women with a low sense of ethnic identity (Stojek & Fischer, 2013).

A study published by Kronefeld et. al (2009) presented data from a survey of 4,000 women ages 25-45 and revealed that after controlling for BMI, non-Hispanic Blacks and women reporting “other” race favored a larger body type than non-Hispanic White women. Non-Hispanic Black women reported lower dissatisfaction with their body type compared to non-Hispanic White women (Kronefeld et. al, 2009). The study also found that non-Hispanic White women differed from non- Hispanic Black women, but did not differ from Asian and Hispanic women. This may be because in the non-Hispanic Black community, there is the shared belief that a woman’s body represent strength and valued due to their maternal role rather than the need to be manipulated and conform to the ideal thin body stereotype (Grabe, 2006).

Minority patients however, are more likely to be uninsured and therefore not seek professional help for their illness (Lau et. al, 2013). This is an important consideration because minority and low income patients could be suffering from eating disorders, but are unable to seek care due to the cost of that care (Lau et. al, 2013). More research is needed to better understand the causes for and differences in rates of eating disorder diagnoses among minority patients.

## **Health Insurance**

Racial/ethnic minorities are more likely to live in poverty and less likely to have health insurance, which may affect the likelihood of receiving medical care for an eating disorder. Marques et al. (2010) used data from the NIMH Collaborative Psychiatric Epidemiological Studies which showed that BN was more common in non-Hispanic Blacks and Hispanics than in non-Hispanic Whites. These data also indicated that a lifetime prevalence of any BED was greater among Hispanics, Asians, and non-Hispanic Blacks in comparison to non-Hispanic Whites. They indicated that minorities with an eating disorder utilize mental health services less frequently compared to non-Hispanic Whites. Lau et al., (2013) conducted a retrospective chart review of 22 outpatients aged 8-25 that had been referred for evaluation due to malnutrition. They compared demographic factors such as health insurance type, BMI, and number of clinic visits at their intake visit, and compared these to 6 and 12 month visits (Lau et. al, 2013). Hispanics, Asians, and non-Hispanic Blacks were more likely to use public insurance and have fewer clinic visits within the first 6 months of their treatment compared to non-Hispanic Whites (Lau et. al, 2013). Minorities were also more likely to have fewer mental health visits. This is important because, as stated earlier, mood disorders/other mental health issues are linked with disordered eating.

## **Study Aims**

Because more research on the topic of racial and ethnic disparities and the diagnosis and treatment of eating disorders is needed, this study examined data obtained from patients seen at Wake Forest Baptist Medical Center (WFBMC). This secondary data analysis has two aims: (1) To characterize the overall population of patients ages 10-

65 years at WFBMC with a diagnosis of an eating disorder, and to describe the characteristics of these patients (e.g., race/ethnicity, age, BMI) across four sub-categories of eating disorder type: AN, BN, BED, and “other”. It is hypothesized that the eating disorder patient population at WFBMC will be similar to that reported in existing literature (the majority of the population will consist of non-Hispanic White females); (2) To examine whether differences exist between racial/ethnic groups in the likelihood of participating in a follow-up visit within one year of diagnosis. We also aimed to examine whether follow-up rates differed according to insurance status as we felt this could be an important cofounder of race/ethnicity: follow-up relationship. It is hypothesized that minority patients will be less likely to have a follow-up visit for their eating disorder within a year compared to non-Hispanic Whites.

## METHODS AND MEASURES

### **Study Design, Data Source, and Patient Population**

In this secondary data analysis, for Aim 1 a cross-sectional descriptive evaluation was conducted while for aim 2 a retrospective cohort design was utilized. This study used data from the Translational Data Warehouse (TDW) and Clarity database at WFBMC. TDW is a comprehensive data warehouse that integrates clinical and research information from multiple data sources. The Clarity database is a subset of data containing all patient data since September 22, 2012 that is transferred from WakeOne, the electronic health record (EHR) at WFBMC, which uses an Epic™ platform. Patient data from January 1<sup>st</sup>, 2006 to December 31<sup>st</sup>, 2016 from both Clarity and TDW were used for both aims of this study, because prior to that date WFBMC used a different database source and data was

unable to be compiled and analyzed. Due to changes in the data systems, insurance history was only recorded from 2012 to present day.

Male and female patients from any racial/ethnic group, aged 10-65 years who had been diagnosed with AN, BN, BED, or “other” eating disorder were included in our sample for Aim 1. Aim 2 was limited to only those patients with specific diagnosis codes for AN, BN or BED. Because of the generic nature of some of the ICD9/10 codes in the “other” category, these patients could have actually had AN, BN, or BED (therefore could have been misclassified) and it was important not to compare this category to the other diagnosed eating disorder categories.

We considered a patient to have AN, BN, BED or “other” eating disorder if (s)he had at least one relevant ICD9/10 code (see Table 1.1) at either an inpatient or outpatient visit during the time period examined. Based on these criteria, a total of 16,105 patient encounters were pulled from the patient database for this study. Patients with codes for more than one type of eating disorder were then excluded. A patient’s first encounter date/first diagnosis was used for categorization of eating disorder, and other subsequent visits were not factored into this categorization. Records of follow-up visits with any code for eating disorder, however, were captured in order to assess utilization patterns across race/ethnic groups for Aim 2 of the study.

Patients with codes for “anorexia” that were felt to indicate a medical (e.g. pregnancy, cancer, aging) rather than psychological origin of the anorexia, were also excluded. These codes are included in Table 1.2. When we examined data at the patient level rather than the encounter level (as there could be multiple encounters per patients in

our data), this left a total patient population of 618 individuals with a diagnosed eating disorder of interest between January 1<sup>st</sup>, 2006 and December 31<sup>st</sup>, 2016.

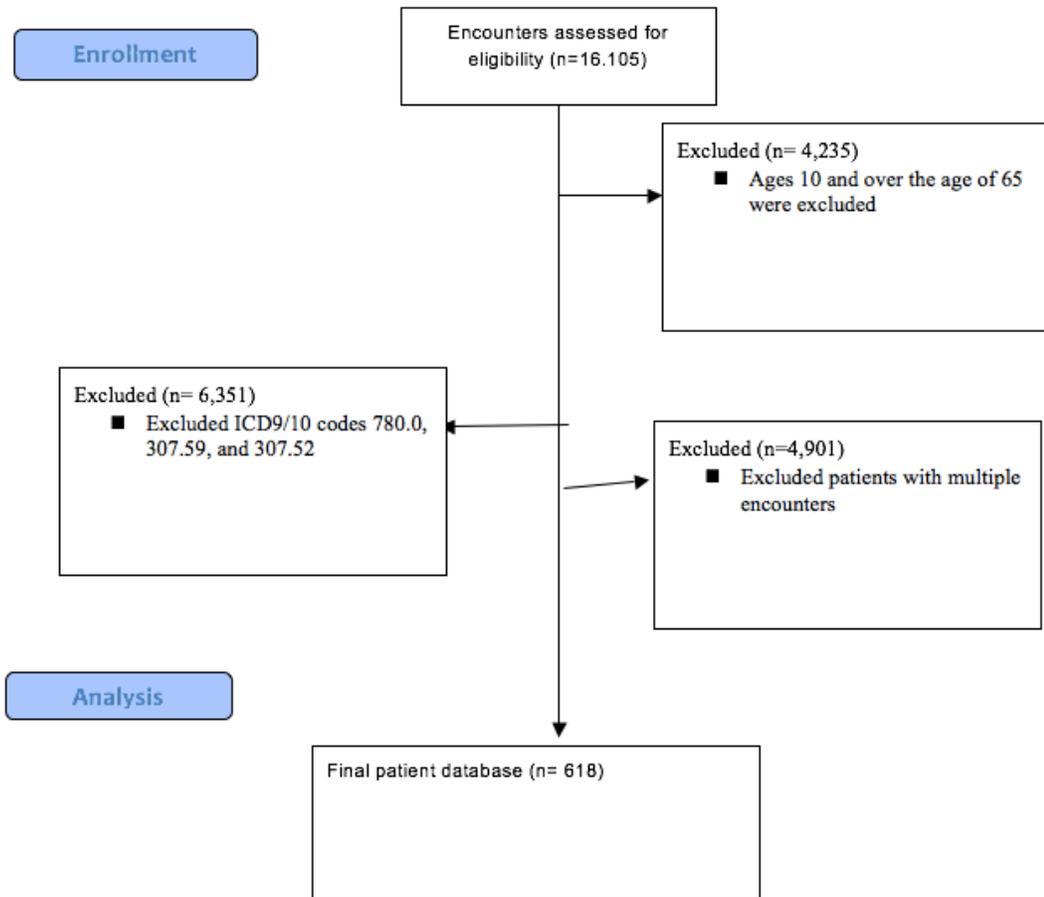


Table I. Consort diagram

Diagnostic criteria for eating disorder categories for this study shown in Table II:

<b>Eating Disorder Category and ICD9/10 code</b>			
<b>Anorexia Nervosa</b>	<b>Bulimia Nervosa</b>	<b>Binge-eating disorder</b>	<b>Other</b>
Anorexia nervosa <b>307.1</b>	Atypical bulimia nervosa <b>307.51</b>	Binge eating <b>F50.81</b>	Disorder of eating <b>307.50</b>
Anorexia nervosa, restricting type <b>F50.01</b>	Bulimia <b>F50.2</b>	Binge-purge behavior <b>F50.02</b>	Eating disorder <b>307.51</b>
Appetite disorder <b>F50.8</b>	Bulimia nervosa <b>F50.2</b>	Eating, excessive indulgence <b>F50.81</b>	Eating disorder, nonorganic <b>F50.8</b>
Voluntary starvation <b>307.1</b>	Bulimia nervosa, purging type <b>F50.2</b>	Recurrent binge eating <b>F50.81</b>	Eating disorder, unspecified <b>F50.89</b>
			Other eating disorders <b>307.50</b>
			Psychogenic rumination <b>307.53</b>
			Psychogenic vomiting <b>307.54</b>
			Rumination disorder <b>307.53</b>

Table II. List of ICD9/10 codes and eating disorder category used and excluded in this secondary data analysis

### **Main Exposure Variable/Independent Variable**

The original dataset included race and ethnicity variables separately, but these were combined in this study as a single variable called “race/ethnicity”. The combined race/ethnicity variable used the following four categories: non-Hispanic White, Non-Hispanic Black, Hispanic, and other. Patients who were included in the non-Hispanic White category self-identified as White and non-Hispanic, patients in the non-Hispanic Black category self-identified as Black and non-Hispanic, Patients in the Hispanic category identified themselves as Hispanic regardless of their racial identity, and patients in the other racial category self-identified as Asian, American Indian/Alaska Native, and Hawaiian Native/Pacific Islander.

### **Outcome Measures**

There was no “outcome measure” for Aim 1, as this aim is purely descriptive in nature.

The outcome of Aim 2 is a dichotomous variable that indicates whether or not a given patient had a follow-up visit for his/her eating disorder within a year of the initial diagnosis in the WFBMC system. A follow-up visit was defined as being related to an eating disorder if the visit had any code related to an eating disorder from the ICD9/10 list used to categorize the initial diagnosis. This means the diagnosis of interest did not have to be the primary code for that visit, but could be counted as related to an eating disorder if any such code was used for a given encounter. Inpatient and outpatient follow-up visits were considered eligible and we did not separately examine these 2 categories of visit types.

### **Other Variables of Interest**

Mean BMI was calculated for all patients (regardless of age) in the sample using the formula: weight in kilograms (kg) divided by height (m) squared. Height was only used if collected within three months for patients under age 18 and used if collected within two years if the patients was an adult. Weight was counted as missing if it was not collected at the most recent visit date.

Health insurance status was collected from the Clarity and TDW database at WFBMC and re-categorized into four categories: no payer, Blue Cross Blue Shield (BCBS), MedCost, and Carolina. No payer information means that the historical data was not carried over in the WFBMC data or the patient is uninsured. The benefit plan was excluded if fewer than three people were using that type of health insurance. Insurance providers that were removed include the following; Medicare, Medicaid, Centerpoint Human Services, CHAMPVA, Cigna, Coventry, Gateway Health Alliance, Generic Commercial, Golden Rule Insurance, Guilford Community Care, Healthgram, NC Healthchoice, Partners, Sandhills Center CA LME, Transamerica, Tricare, UHC, and United. These insurance providers were excluded if there were three or fewer patients in these groups because the SES of those patients may vary dramatically. The included insurances are shown in Table III.

<b>Insurance Status</b>		
<b>Blue Cross Blue Shield BCBS</b>	<b>Carolina</b>	<b>Medcost</b>
BCBS Blue Medicare	Carolina Access	Medcost
BCBS Blue Options PPO	Carolina Behavioral Health	Medcost-WFBH, Cornerstone
BSBS Federal Employees Plan		Medcost Other
BCBS State Health Plan		
Blue Value		

Table III. List of insurance names re-coded for each payer.

The clinical department where each patient had their eating disorder diagnosis coded was grouped into six different categories: Emergency, Psychiatry (Psych), Internal Medicine/Family Practice (IntMed), Specialty, Weight Management Center (WMC), and Pediatrics (Peds). The individual locations and how they were re-coded to specific departments is listed in the appendix.

### **Statistical Analyses**

Continuous variables were summarized using means and standard deviations, while categorical variables were presented as counts and relative frequencies. Variables of interest such as health insurance, BMI, height, weight, age, and follow-up visit were summarized overall and across categories of eating disorder diagnosis and race/ethnicity, and comparisons of continuous means and categorical proportions across categories were conducted using analyses of variance and chi-square tests for aims 1 and 2. Aim 1 compares continuous and discrete demographic and health characteristics across eating disorder categories, while in aim 2 the proportion of individuals with follow-up visits across payer and race/ethnic categories is compared. All analyses were performed using SAS v9.4 and SAS Enterprise Guide, and comparisons were deemed significant at the  $p <$

0.05 significance level. Due to the exploratory nature of the analyses we did not account for multiple comparisons.

## RESULTS

### **Aim 1**

Table IV below provides characteristics of the eating disordered patients at their first encounter in the data set, grouped according to the category of eating disorder diagnosis and race/ethnicity. The overall mean (SD) age of patients with any eating disorder was 28.9 (14.8) ( $p = 0.001$ ). The majority of patients diagnosed with any eating disorder were female (90.9%) ( $p < 0.001$ ). The mean (SD) BMI for the overall eating disorder population was 28.0 (11.0). The mean (SD) weight for the overall eating disorder population at WFBMC was 168 (71.1) pounds.

### **Anorexia Nervosa**

Among all eating disordered patients examined, the total number with AN was 121 (20%). The mean (SD) age of AN patients was 25.5 (13.2) years, and 88.9% of AN patients were female. The mean (SD) weight for patients with AN was 120.6 (30.9) pounds ( $p < 0.001$ ). The mean (SD) BMI for AN patients was 20.3 kg/m<sup>2</sup> (4.7). The majority of patients diagnosed with AN were non-Hispanic White (86.8%). There were 6 (5%) non-Hispanic Black patients with AN, 7 (5.8%) were Hispanic patients, and 4 (3.3%) were “other” race/ethnicity. There were 25 (20.7) patients with AN who had a follow-up visit.

### **Bulimia Nervosa**

The sample of patients with eating disorder included 88 (14%) patients diagnosed with BN with a mean (SD) age of 28.1 (11.9) years. Of patients with BN, 92.9% of

patients were females. The mean (SD) weight for patients with BN was 159.9 (49.2) pounds ( $p < 0.001$ ). The mean (SD) BMI for patients with BN was 26.8 (7.9)  $\text{kg/m}^2$ . There were 66 (75%) non-Hispanic White patients, 9 (10.2) non-Hispanic Black patients, 7 (8.0%) Hispanic patients, and 6 (6.8%) “other” patients ( $p < 0.001$ ). There was 20 (22.7) patients with BN who had a follow-up visit ( $p < 0.001$ ).

### **Binge-Eating Disorder**

There were 129 (21%) patients who were diagnosed with BED. All of the patients diagnosed with BED were females. The mean (SD) age for BED patients was 41.7 (13.9) years ( $p < 0.001$ ). The mean (SD) weight for BED patients was 238.6 (68.5) pounds ( $p < 0.001$ ). The mean (SD) BMI for BED patients was 39.0 (10.2)  $\text{kg/m}^2$  ( $p < 0.001$ ). There were 109 (84.5%) non-Hispanic White patients, 13 (10.1%) non-Hispanic Black patients, 5 (3.9%) Hispanic patients, and 2 (1.6%) “other” patients diagnosed with BED. There was 52 (40.3) patients with BED who had a follow-up visit.

### **Other Eating Disorders**

There were 285 (46%) patients in the “other” eating disorders category with a mean (SD) age of 24.8 (13.4) years ( $p < 0.001$ ). Of these patients, 87.2% (225) were females. The mean (SD) age was 24.8 (13.4) years. The mean (SD) weight for “other” patients was 155.3 (64.8) pounds ( $p < 0.001$ ). The mean (SD) BMI for patients who listed themselves in the “other” category was 25.9 (9.9)  $\text{kg/m}^2$ . There were 222 (79.3%) non-Hispanic White patients, 36 (12.9%) non-Hispanic Black patients, 15 (5.4%) Hispanic patients, and 7 (2.5%) in listed the “other” racial/ethnic category. There were 65 (23.2%) patients in “other” category that had a follow-up visit ( $p < 0.001$ ).

	<b>Overall, n=618</b>	<b>AN, n=121</b>	<b>BN, n=88</b>	<b>BED, n=129</b>	<b>Other, n=285</b>	
<b>Description</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>P-value for group</b>
Age (yrs)	28.9 ± 14.8	25.5 ± 13.2	28.1 ± 11.9	41.7 ± 13.9	24.8 ± 13.4	<.001
Female (pct)	517 (90.9)	104 (88.9)	79 (92.9)	109 (100.0)	225 (87.2)	0.001
Weight (lbs)	168.0 ± 71.1	120.6 ± 30.9	159.9 ± 49.2	238.6 ± 68.5	155.3 ± 64.8	<.001
Height (lbs)	64.8 ± 3.5	64.5 ± 3.4	64.7 ± 3.6	65.5 ± 3.4	64.7 ± 3.4	0.074
BMI (kg/m <sup>2</sup> )	28.0 ± 11.0	20.3 ± 4.7	26.8 ± 7.9	39.0 ± 10.2	25.9 ± 9.9	<.001
<b>Race/Ethnicity</b>						
NH White (pct)	501 (81.1)	104 (86.0)	66 (75.0)	109 (84.5)	222 (79.3)	0.159
NH Black (pct)	64 (10.4)	6 (5.0)	9 (10.2)	13 (10.1)	36 (12.9)	0.159
Hispanic	34 (5.5)	7 (5.8)	7 (8.0)	5 (3.9)	15 (5.4)	0.159
Other	19 (3.1)	4 (3.3)	6 (6.8)	2 (1.6)	7 (2.5)	0.159
<b>Follow-up visit</b>	162 (26.2)	25 (20.7)	20 (22.7)	52 (40.3)	65 (23.2)	<.001

Table IV. Characteristics of patients diagnosed with AN, BN, BED, Other eating disorder, and overall at their first encounter.

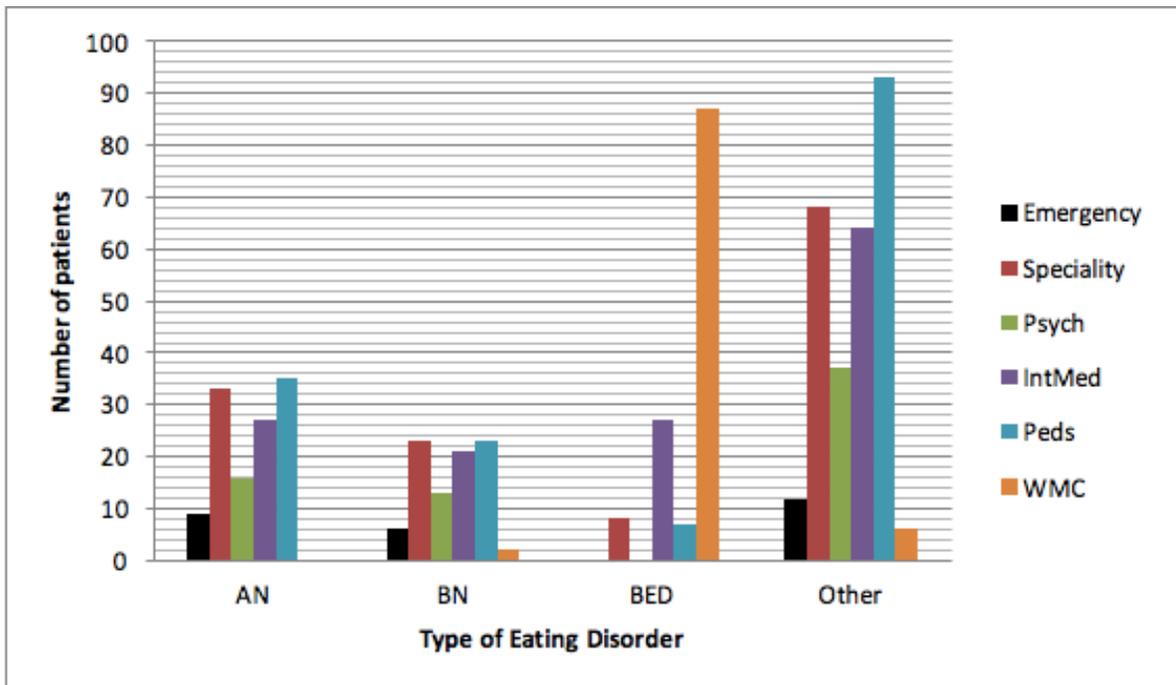


Figure 1. Distribution of patient visits according to type of eating disorder and diagnosing department

Figure 1 above shows the location of where the patients received their initial diagnosis within the WFBMC system, categorized by type of eating disorder. Almost all patients with BED were seen at the WMC. Specialty and pediatrics were the most common departments for diagnosing AN (Specialty 33, Pediatrics 35) and BN patients (Specialty 23, Pediatrics 23). The majority of patients (87) with BED were seen at the WMC. “other” eating disorders were included in this figure to demonstrate the wide distribution of where eating disorders were first encountered.

**Aim 2**

Table V provides the number of follow-up visits within one year in the overall patient population and by race/ethnicity. For the racial/ethnicity variable, 599 patients

were used to characterize patients by their race/ethnicity at their first encounter. There were 501 (84%) non-Hispanic White patients, 64 (11%) non-Hispanic Black patients, 34 (1%) Hispanic patients, and 19 (4%) “other” patients. This table shows the probability of follow up visited based on race/ethnicity. Of the total eating disorder population, 162 (26.2%) patients had a follow up visit for an eating disorder within one year of the initial diagnosis in our system. Follow-up rate was not statistically significant across race/ethnic groups, with 134 (26.7%) non-Hispanic White patients that had a follow-up visit, 10 (15.6%) non-Hispanic Black patients, 13 (38.2) Hispanic patients with a follow-up visit, and 5 (26.3%) of “other race/ethnicity” patients with a follow-up visit within one year of their initial encounter (p=0.097).

	<b>Overall, n=599</b>	<b>NH White, n=501</b>	<b>NH Black, n=64</b>	<b>Hispanic, n=34</b>	<b>Other, n=19</b>	
<b>Description</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>P-value for group</b>
<b>Follow-up visit (pct)</b>	162 (26.2)	134 (26.7)	10 (15.6)	13 (38.2)	5 (26.3)	0.097

Table V. Characteristics of the study sample at follow-up visit, overall, and by race/ethnicity

Table VI characterizes follow-up rates by health insurance type because we felt this could be an important confounder in the relationship between race/ethnicity and likelihood of follow-up after initial diagnosis.

	<b>Overall, n=618</b>	<b>Blue Cross Blue Shield BCBS, n=111</b>	<b>Medcost, n=49</b>	<b>Carolina, n=45</b>	<b>No payer, n=319</b>	
<b>Description</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	<b>P- value for group</b>

<b>Follow-up visit (pct)</b>	162 (26.2)	46 (41.4)	24 (49.0)	20 (44.4)	38 (11.9)	<.001
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Table VI. Characteristics of the study sample at follow-up visit, overall, and by health insurance

Follow-up visit rates varied significantly across insurance status categories.

There were 111 patients with BCBS health insurance, 49 patients with MedCost health insurance, 45 patients with Carolina health insurance, and 319 patients with no payer health insurance. There were 46 (41.4%) patients with BCBS health insurance that had a follow-up visit, 24 (49%) MedCost patients with a follow-up visit, and 20 (44.4%) patients with Carolina health insurance who had a follow-up visit, and 38 (11.9%) patients with no payer information with a follow-up visit within one year of their initial diagnosis ( $p < 0.001$ ).

## DISCUSSION

There were two aims to this secondary data analysis study. The first aim was to describe the disordered eating patient population that is treated at the WFBMC using patients ages 10-65 and factoring in race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic and other) and sex (male/female). The second aim was to examine whether there was evidence of disparities across racial/ethnic categories in patient follow-up visits between racial/ethnic groups by comparing the rate of follow-up visits within one year of the initial diagnosis. Currently, research is limited in the area of disparities in diagnosis of eating disorders. This investigation was conducted to examine those differences

In Table 1, the mean age (41.7 years) of binge-eating disorder patients is significantly higher than the other eating disorders, which have a mean age ranging in the 20s. Of the eating disorder population at WFBMC, the majority (90.9%) of the patients were females and also non-Hispanic White (84%), which is consistent with existing

literature (National Eating Disorder Association). Differences in diagnosis of eating disorders were also found in body weight. Patients with BED typically weigh more (238.6 lbs. and BMI mean 39) in the current population, which is consistent with previous data on BED (National Association of Anorexia Nervosa and Associated Disorders).

Because the vast majority of the patient population were non-Hispanic Whites, we may not have been able to detect differences in non-Hispanic Blacks and other races due to the small percentage of these patients seen at WFBMC.

After assessing follow up visits, patients diagnosed with BED were more likely to have a follow up visit at 40.3 % compared to patients with AN (20.7%), BN (22.7%), and other eating disorders (23.2%). Patients seen at the WMC are typically enrolled in a weight loss program and have many follow up visits per their treatment protocol, which contributes to the higher percentage of return visits compared to AN and BN patients. AN Patients had the highest likelihood of being classified as having no payer information and having the lowest likelihood of returning for a follow up visit. It is possible that patients with AN are more likely to be uninsured and therefore cannot or will not follow up with a health care provider.

For aim 2, a significant difference in no payer information accounting for insurance, with regards to race was identified. In the case of having no payer, it is possible that the patient is uninsured. Patients with no insurance are perhaps more likely to have disparities in other health conditions that could have contributed to their diagnosis of an eating disorder, including mental health conditions such as anxiety or depression. non-Hispanic Black patients were also found to have a higher risk of being

uninsured (National Health Service). When evaluating the likelihood of having a follow up visit with race/ethnicity, more non-Hispanic White patients had a follow up visit compared to non-Hispanic Black patients. Hispanic patients were the most likely to have a follow up visit with 38.2% (n=13), although the p-value was not statistically significant. This could be influenced by the small number of patient data. Only 15.6% (n=10) of the non-Hispanic Black patients returned for a follow up visit. However, 13 (38.2%) Hispanic patients returned for a follow-up visit within one year of initial diagnosis. When examining follow-up by health insurance status, patients insured with Medcost had the most follow-up visits (49%). This suggests that Medcost provides better mental health coverage for all eating disorder, whereas patients covered by BCBS were more likely to have follow up visits if diagnoses with binge-eating disorder. An important consideration, however, is that many of the Medcost patients could have been seen in the WMC, where a high number of follow-up visits was likely due to the intensive in-person nature of the medical weight loss program. The WMC sees a large share of Medcost patients, and was responsible for the vast majority of BED diagnoses in our sample.

Patients with no payer information were least likely to have a follow-up visit (11.9%, n=38). This is consistent with other literature and has been linked to minority patients being more likely to be uninsured.

It should be noted that significant differences in no-payer information could be due to lack of collection of the patient insurance status and the interpretation of these results should be with caution.

### **Significance and Limitations**

An important aim this study addresses is that it covers an area other studies have not, that of examining characteristics of a population that has been screened for an eating disorder. Patients seen at the WMC at WFBMC are all screened for BED. This screening has been implemented because these patients need psychiatric health care and should not undergo bariatric surgery or be placed on full meal replacement plans. This study examined eating disorders across a wide range of patients aged 10-65 years, while the majority of research studies have focused on eating disorders among college women. While AN and BN are common during college years for women, this data shows that those disorders can also be common in the pre- and post-college years. Differences in the prevalence of eating disorder type for patients under 18 years of age. This is an important finding that should be further investigated in young females with AN and BN.

This study also examined where each patient with AN, BN, BED, and other disorder were seen at WFBMC. It is important to note that for BN and AN, Internal Medicine and Specialty Departments diagnosed more patients than Psychiatry. It is significant to note that the majority of first encounters as reported in this study for an eating disorder were seen by Internal Medicine or a Specialty Department as opposed to Psychiatry. Importantly, the patient's first encounter may not have been her initial encounter/diagnoses. It is possible that patients had been seen before January 1, 2016 and their follow up encounter was included in this study as their first encounter. This may have impacted the results as it may have reduced the overall number of follow up visits. follow-up visits.

This study provides a set list of ICD 9 and 10 codes that could be used in future research studies to examine data in eating disordered populations. Also, having a screened BED population is a strength of this study and a strength of the WMC clinic, because it removes the possibility of racial/ethnic disparities in the WMC patients. All patients in the WMC clinic are screened regardless of race/ethnicity.

There are limitations that must be mentioned. Because this was a secondary analysis study, associations can be made but it cannot address causation. However, the results do infer that future research is needed to better understand racial differences that can be found in the diagnosis of eating disorders. One limitation is that WFBMC does not have an eating disorder treatment program, which could have impacted screening and follow-up visit in this secondary data analysis. Patients who have been referred out to another treatment facility would not be present in our dataset, which could have excluded numerous patients. Another limitation is that many codes such as “loss of appetite” are being used for eating disorders at WFBMC and are used for less specific issues regarding appetite issues and body weight in these patients. Having separate categories for these patients would help accuracy of patients to better characterize those patients who have an actual eating disorder. Although general eating disorder codes were excluded from the data-analysis, it is still possible that some patients included may not have actually had a diagnosed eating disorder.

Another limitation is the lack of data recorded for a current body weight for some patients. This missing weight data could be systematic and related to severity of eating disorder, in clinical situations where weighing patients could trigger worsening of symptoms or relapse. By excluding patients who had an eating disorder, but not a weight,

recorded at a given visit, it is possible that those in the severely ill eating disorder population were excluded from our sample. The WFBMC databases TDW and Clarity have only been used since changing to the Epic software system in the past 6 years. Although there is historical data in the TDW database, ethnicity and insurance was not imported for historical data. This did not allow for the opportunity to examine whether different ethnicities have higher levels of diagnosis compared to others, and to better examination of the role of insurance, since it was shown to be statistically significant in this study.

Data regarding follow-up visit was not separately characterized for outpatient and inpatient visits. This is a limitation because patients seen in inpatient care are more severe eating disorder cases and would have more follow up visits. Excluding patients with more than one eating disorder could have impacted follow-up visit numbers. Finally, due to lack of weight data collection, BMI percentile was not calculated differently for adolescent and adult patients. Therefore, BMI mean should be interpreted with caution. These limitations however, provide opportunities for future research studies.

### **Future Research**

There are several logical next steps that could be taken to further investigate this important topic. Conducting a very similar study that has accurate and complete data on the race/ethnicity, insurance, weight, height, and education variables would allow for a better understanding of disparities found in the diagnosis of eating disorders. The race/ethnicity data was self-reported and it is common for ethnicity to have limited options on a medical form. Therefore, it is more likely for patients to choose “other” because they feel there is not an accurate option for their ethnicity. According to Wynia

and Baker (2006), hospitals are more likely to look at disparities in patient care to improve the quality of care if they are able to look at data from their own institution. Additionally, many patients do not fill out their education level, which limits the ability to examine the influence of education as a covariate on eating disorder diagnosis. Making sure medical centers obtain this information would allow for examination of these covariates when researching disparities found in those with eating disorders.

Creating an official list of codes that are specific to eating disorders would help to eliminate issues of misdiagnosis. The ICD code 783.0 is used when any patients has issues with weight, which is often due to an unrelated medical issue. Patients above 65 with a loss of appetite are coded into the system with diagnosed AN, when, in reality, their loss of appetite is due to their age and their illness. Patients under the age of 10 are also unlikely to have an eating disorder and are categories using the general eating disorder codes with AN in the patient database. Creating a category for weight issues unrelated to an eating disorder would help both physicians and research when looking and entering eating disorder patient data.

Patients seen at the WMC are all screened for BED, however patients are not screened for AN or BN. This screening would be beneficial to avoid misdiagnosis and under-diagnosis. Creating an eating disorder questionnaire and administering it to patients seen at WFBMC would create a more accurate representation of eating disordered patients. The National Eating Disorder Association has an online questionnaire for a potential eating disorder with questions such as “How much more or less do you feel you worry about your weight and body shape than other people your age?” (National Association of Anorexia Nervosa and Associated Disorders).

Administering even this single question could help to better capture patients with true eating disorders.

## CONCLUSION

The purpose of this study was to describe the eating disorder patient population seen at WFBMC using age, sex, race/ethnicity, BMI, and insurance. This secondary data analysis supports findings from prior research that non-Hispanic White females are more commonly diagnosed with eating disorders (National Eating Disorder Association). The study used a wide age range as opposed to other current literature that focuses entirely on college aged women. Patients diagnosed with BED had a higher average age, BMI, and weight compared to patients with AN, BN, and other. This is due to the fact that those diagnosed with BED are associated with overweight/obesity and present later in life. Regarding all eating disorders, no payer insurance includes patients that were uninsured or data was unavailable. There were fewer Non-Hispanic Black and other patients with a follow up visit when compared to non-Hispanic White patients. AN patients were least likely to have a follow up visit compared to patients with BN, BED, and Other eating disorders. This amounted to a total of 52% of patients being diagnosed with an eating disorder. In evaluating all eating disorders, significant differences were seen in age, weight, BMI, and no payer insurance when accounting for race. This may be influenced by the fact that minority populations are potentially more likely to be uninsured. Future directions of this study should include conducting this study using patient data with a complete list of insurance, race/ethnicity, SES, and education data to determine if these variables have a greater influence on eating disorder diagnosis. In addition, creating a set

list of ICD codes pertaining to eating disorders, and to screen all patients for eating disorders.

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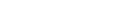
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Appendix  
Wake Forest Medical Centers separated into 6 departments by color

	Specialty
	Peds
	WMC
	Psych
	IntMed
	Emergency

AMOS BRENNER FIT  
 AMOS PEDIATRIC DEVELOPMENTAL  
 BC605 BROOKSTOWN PAIN SERVICES  
 BCE PEDIATRIC GASTROENTEROLOGY  
 BCE PEDIATRIC HEMATOLOGY ONCOLOGY  
 BRKSA PHLEBOTOMY AND LAB COLLECTION  
 C2311 01 BKR CLINICAL LABORATORY  
 C2311 01 CLINICAL LAB  
 C2311 01 MEDICAL PLAZA CLEMMONS OUTPATIENT PHLEBOTOMY  
 C2311 01 URGENT CARE DIAGNOSTIC IMAGING  
 C2311 02 UNIV INTERNAL MEDICINE- CLEMMONS  
 C2311 03 PEDIATRIC GASTROENTEROLOGY  
 C2311 03 PEDIATRIC HEMATOLOGY ONCOLOGY  
 C2311 03 PEDIATRIC NEUROLOGY  
 C2311 03 PEDIATRICS-CLEMMONS  
 C2341 02 MEDICAL PLAZA CLEMMONS OUTPATIENT PHLEBOTOMY  
 C2341 02 OBSTETRICS & GYNECOLOGY  
 C2341 03 OTOLARYNGOLOGY  
 CBU ABDOMINAL ORGAN TRANSPLANT PROGRAM  
 CBU UROLOGY  
 CC610 01 PEDIATRIC DIABETES CENTER  
 CC610 02 DIABETES & ENDOCRINOLOGY CENTER  
 CC614 01 COUNTRY CLUB COMMONS OUTPATIENT PHLEBOTOMY  
 CC614 01 WEIGHT MANAGEMENT CENTER  
 CC614 02 COUNTRY CLUB COMMONS OUTPATIENT PHLEBOTOMY  
 CC614 02 UNIV INTERNAL MEDICINE- COUNTRY CLUB

MC BC 07 PEDIATRIC INFECTIOUS DISEASES  
 MC BC 07 PEDIATRIC MEDICAL GENETICS  
 MC BC 07 PEDIATRIC NEPHROLOGY  
 MC BC 07 PEDIATRIC OTOLARYNGOLOGY  
 MC BC 07 PEDIATRIC PSYCHOLOGY  
 MC BC 08 PEDIATRIC GENERAL EXTENDED UNIT  
 MC BC 08 PEDIATRIC GENERAL UNIT  
 MC BC 08 PEDIATRIC SHORT STAY UNIT  
 MC BC 09 PEDIATRIC ADOLESCENT MED SURG UNIT  
 MC BC 09 PEDIATRIC HEMATOLOGY / ONCOLOGY UNIT  
 MC BC 09 PEDIATRIC HEMATOLOGY ONCOLOGY  
 MC BC 09 PEDIATRIC HEMATOLOGY ONCOLOGY OUTPATIENT PHLEBOTOMY  
 MC BC 10 PEDIATRIC BEHAVIORAL HEALTH UNIT  
 MC CC 03 COMPREHENSIVE CANCER CENTER OUTPATIENT PHLEBOTOMY  
 MC CC 03 HEMATOLOGY ONCOLOGY  
 MC CC 03 HEMATOLOGY ONCOLOGY INFUSION  
 MC CC 05 CANCER CENTER DAY HOSPITAL UNIT  
 MC CC 09 CANCER CENTER UNIT  
 MC EMERGENCY DEPARTMENT  
 MC JT 01 PEDIATRIC PERIOP  
 MC JT 04 GENERAL NEUROLOGY  
 MC JT 05 PEDIATRIC GENERAL SURGERY  
 MC JT 07 CARDIOLOGY  
 MC JT 07 INFECTIOUS DISEASE  
 MC JT 07 NCBH MEDICINE CLINIC  
 MC JT 07 NEPHROLOGY MEDICINE  
 MC JT 07 OUTPATIENT PHLEBOTOMY  
 MC JT 07 RHEUMATOLOGY  
 MC JT 09 NEUROPSYCHOLOGY  
 MC JT 09 PEDIATRIC NEUROLOGY

ECD HEMATOLOGY ONCOLOGY  
CR 01 FAMILY MEDICINE- SPORTS MEDICINE  
CR 01 NEUROPSYCHOLOGY  
CR 01 ORTHOPEDICS-OSTEOPOROSIS  
CR 02 COMP REHAB OUTPATIENT PHLEBOTOMY

MC BC 06 PEDIATRIC INTENSIVE CARE UNIT  
MC BC 06 PEDIATRIC INTERMEDIATE / GENERAL UNIT  
MC BC 07 BRENNER FIT  
MC BC 07 DIAGNOSTIC IMAGING PEDIATRICS  
MC BC 07 PEDIATRIC CARDIOLOGY  
MC BC 07 PEDIATRIC CLINIC OUTPATIENT PHLEBOTOMY  
MC BC 07 PEDIATRIC CLINICAL NUTRITION  
MC BC 07 PEDIATRIC DEVELOPMENTAL  
MC BC 07 PEDIATRIC ENDOCRINOLOGY  
MC BC 07 PEDIATRIC GASTROENTEROLOGY  
MC BC 07 PEDIATRIC GENERAL  
MC BC 07 PEDIATRIC GENERAL SURGERY

SHPST 01 MATERNAL FETAL AT CFCC  
SHPST 01 MATERNAL FETAL AT CFCC ULTRASOUND IMAGING  
SHPST 01 OBSTETRICS & GYNECOLOGY  
SHPST 01 OBSTETRICS AND GYNECOLOGY OUTPATIENT PHLEBOTOMY  
SHPST 02 STRATFORD INTERNAL MEDICINE OUTPATIENT PHLEBOTOMY  
SHPST 03 GASTROENTEROLOGY  
SHPST 03 GENERAL NEUROLOGY  
SHPST 03 RHEUMATOLOGY MEDICINE  
SR235 FAMILY MEDICINE CORNERSTONE  
TM TETTAMANTI INTERNAL MEDICINE  
TRST1 FAMILY MEDICINE CORNERSTONE  
VM740 WESTGATE PATIENT SERVICE CTR OUTPATIENT PHLEBOTOMY

DHP 01 OUTPATIENT PHLEBOTOMY  
DHP ADULT MEDICINE CLINIC  
DHP OBSTETRICS & GYNECOLOGY  
DHP PEDIATRIC  
DMCM DIAGNOSTIC IMAGING  
DMCP1 01 PHLEBOTOMY  
DMCP1 02 ORTHOPEDICS- OSTEOPOROSIS  
DMCP2 01 DIAGNOSTIC IMAGING  
ECD12 02 PSYCHIATRY & BEHAVIORAL MEDICINE CORNERSTONE  
ELK HEMATOLOGY ONCOLOGY  
FHPC FOOTHILLS OUTPATIENT PHLEBOTOMY  
FHPC PRIMARY CARE  
FMR FAMILY MEDICINE REYNOLDA  
FMR REYNOLDA OUTPATIENT PHLEBOTOMY  
FS305 FAMILY MEDICINE CORNERSTONE  
HC415 GENERAL SURGERY  
HL110 PEDIATRICS CORNERSTONE  
HLSD HILLSDALE FAMILY PRACTICE  
HLSD HILLSDALE OUTPATIENT PHLEBOTOMY  
HT799 FAMILY MEDICINE-NORTH DAVIDSON  
HT799 NORTH DAVIDSON OUTPATIENT PHLEBOTOMY  
JO791 MHS  
JO791 WF FT CLINIC  
KB114 PEDIATRICS CORNERSTONE  
KING FAMILY MEDICINE  
KVPED KERNERSVILLE PEDIATRICS  
L1219 SURGERY-THOMASVILLE  
LFM FAMILY MEDICINE- LEWISVILLE  
MP151 FAMILY MEDICINE CORNERSTONE  
MPELM 01 PEDIATRIC GASTROENTEROLOGY  
MPELM 01 PEDIATRIC HEMATOLOGY ONCOLOGY  
MPELM 01 WEIGHT MANAGEMENT BEHAVIORAL HEALTH  
MPELM 01 WEIGHT MANAGEMENT CENTER  
MPELM PATIENT SERVICE CTR OUTPATIENT PHLEBOTOMY

VM740 WESTGATE PATIENT SERVICE CTR OUTPATIENT PHLEBOTOMY  
WAKEHEALTHLINK  
WCONV 4 REYNOLDS ICU  
WCONV ABDOMINAL TRANSPLAN  
WCONV AMBULATORY SURGERY

WCONV BRENNER DAY HOSP

WCONV BRITTHAVEN-KERNERSVL  
WCONV BROOKRIDGE INDEP.LIV  
WCONV BROOKRIDGE NURS CTR  
WCONV BROOKSTOWN PAIN SVC  
WCONV CARDIAC CATH LAB  
WCONV CLINIC GASTROENTEROL

WCONV CLINIC GEN MEDICINE

WCONV CLINIC INFECT DISEAS  
WCONV CLINIC ONCOLOGY  
WCONV CLINIC OTOLARYNGOLOG

WCONV CLINIC PSYCHIATRY

WCONV CLINIC PULMONARY  
WCONV CLINIC RENAL  
WCONV CLINIC SURGERY  
WCONV CLINIC UROLOGY  
WCONV COAGULATION CLINIC

WCONV DAVIE HEALTH CENTER

WCONV DHP ADULT MEDICINE

WCONV DHP DIABETES CLINIC

WCONV DHP GYN CLINIC

WCONV DHP LAB

WCONV DHP LAB-CLINIC PT

WCONV DHP OBSTETRICS CL

WCONV DHP PEDIATRIC CLINIC

WCONV DIABETES EDUCATION

MS101 FAMILY MEDICINE CORNERSTONE

MW293 PEDIATRICS CORNERSTONE

MW293 PSYCHIATRY & BEHAVIORAL MEDICINE CORNERSTONE

OW861 INTERNAL MEDICINE CORNERSTONE

OW861 PEDIATRICS CORNERSTONE

OW900 LAUREL CREEK FAMILY MEDICINE

OW900 LAUREL CREEK PHLEBOTOMY

PA905 FAMILY MEDICINE CORNERSTONE

PD451 02 INTERNAL MEDICINE CORNERSTONE

PD451 02 OUTPATIENT PHLEBOTOMY CORNERSTONE

PD451 02 PEDIATRICS CORNERSTONE

PD805 INTERNAL MEDICINE CORNERSTONE

PH PEACE HAVEN FAMILY MEDICINE

PH PEACE HAVEN INTERNAL MEDICINE

PH PEACE HAVEN OUTPATIENT PHLEBOTOMY

PMV PEDIATRICS-MOCKSVILLE

PPI 02 FAMILY MEDICINE

PPI 03 FAMILY MEDICINE MODULE A

PPI 03 FAMILY MEDICINE MODULE B

PPI 03 FAMILY MEDICINE MODULE C

PPI 03 FAMILY MEDICINE MODULE D

PPI 03 FAMILY MEDICINE OUTPATIENT PHLEBOTOMY

SB365 HEMATOLOGY ONCOLOGY

SH150 FAMILY MEDICINE

MC NT 07 ICU CARDIOVASCULAR UNIT

MC NT 08 RENAL UNIT

MC NT 09 B UNIT

MC NT 09 UNIT

MC NT 10 BURN UNIT

MC NT 10 PLASTICS / BURN SURGERY UNIT

MC NT 11 DAY HOSPITAL UNIT

MC PEDIATRIC EMERGENCY DEPARTMENT

MC RT 04 ICU MEDICINE UNIT

MC RT 05 CARDIOTHORACIC SURGERY / VASCULAR UNIT

MC RT 06 INTERMEDIATE CARE UNIT

MC RT 07 CARDIOLOGY UNIT

MC RT 08 MEDICINE UNIT

MC RT 09 UNIT

MC RT 10 UNIT

MC RT 11 TRAUMA / GENERAL SURGERY UNIT

MC RT G CARDIAC ULTRASOUND

MC RT G EKG IMAGING

MC RT G PRE SURGICAL ASSESSMENT OUTPATIENT PHLEBOTOMY

MC RT G PREOPERATIVE ASSESSMENTS CLINIC

MC RT M DIAGNOSTIC NEUROLOGY

MC SB M CORE LABORATORY/CL MICROBIOLOGY LAB

MC SB M BKR CLINICAL CORE LABS

MC SC 01A ADULT BEHAVIORAL HEALTH UNIT

MC SC 01B REHABILITATION UNIT

MC SC 02 CLINICAL NUTRITION

MC SC 02A JOINT REPLACEMENT UNIT

MC SC 02B ACUTE CARE ELDERLY UNIT

MC SC 03A ACUTE BRAIN INJURY UNIT

MC SC 03B REHABILITATION UNIT

## SCHOLASTIC VITAE

Kelsey R. Edens

### **Education**

Master of Science: Health Disparities in Neuroscience-related Disorders

May 2017

*Wake Forest University, Winston-Salem, NC*

Bachelor of Science: Psychology with a specialty in Neuroscience

May 2015

*University of Evansville, Evansville, IN*

### **Research Experience**

Student Researcher, Department of Neuroscience, University of Evansville

2013-2015

- Researched two different types of food given to a set of rats bred by researcher in lab expanding knowledge of rodent behavior and proper handling techniques
- Maintained confidentiality of research and followed specific guidelines set by sponsorship, Mead Johnson Nutritionals
- Developed confidence interacting with professional, corporate scientists

Student Researcher, Department of Neuroscience, University of Evansville

2015

- Partnered with professor to research a chemical formula for treatment of Alzheimer's; studied ways for chemical to be injected into the tails of rats and monitored to see if it crossed through the blood-brain barrier into the central nervous system

### **Certifications:**

- **CITI:** Group 1 FDA Research

### **Academic Honors**

- **Dean's List:** University of Evansville