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Air Quality Monitoring in the Southeast Community in the City of Newport News, VA

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Abstract

Purpose: The objective of this study was to assess air quality in the Southeast Community of Newport News, VA by monitoring air pollutants, including $PM_{2.5}$, PM_{10}, VOCs, NO_2, and SO_2. Currently, there is a lack of community specified air quality data in Newport News despite observed environmental degradation and public health problems.

Methods: Three air sampling sites were located within residential areas of the Southeast Community, while four industrial air sampling sites were chosen based on proximity to potential pollution sources, including traffic emissions, the coal pier, and industrial activities. All of the industrial sites were located on the boundaries of the community. Each site was continuously monitored for eight hours per day and was sampled at least twice for data accuracy. A GRIMM PM monitor was used to measure $PM_{2.5}$ and PM_{10} and a MultiRae PRO (model PGM-6248) was used to continuously quantify VOCs, NO_2, and SO_2.

Results: While average $PM_{2.5}$ and PM_{10} from all sample sites were within the acceptable range of EPA air quality criteria, averaged VOCs in the industrial and highway areas were higher than those in the community.

Conclusion: The findings of this research suggest a need for long-term monitoring air quality with a series of air pollutants in the community.

Keywords: Air Quality Monitoring, Newport News Virginia, Air Pollutants, GRIMM, Environmental Public Health

Introduction

The Southeast Community in the City of Newport News, Virginia is four miles long and two miles wide. The community has a total population of 34,707, with greater than 78% being African American, and a disproportionately high number of citizens being of a low socioeconomic status (U.S. Census Bureau, 2010). Air quality is of high concern to residents, with asthma, heart disease and chronic lower-respiratory disease age-adjusted death rates being higher for African Americans in Newport News than in other areas of the Peninsula Health District and in the Commonwealth of Virginia (United States Environmental Protection Agency (US EPA), 2017a). The aforementioned public health concerns partially stem from local sources of contamination including increased traffic on highway I-664, shipyard facilities, coal terminals, and the Newport News Port (US EPA, 2017a).

Currently in the city of Newport News, seven out of 16 known industrial facilities operate in the Southeast Community. Two out of these seven industrial facilities have been operating in the Southeast Community since 1890 (Newport News Shipyard and Dry Dock Company) and one since 1892 (Coal Pier, now Dominion Terminal and Pier IX Terminal). These terminals house a ground storing capacity of 1.7 million tons of coal and a dumper with a dumping capacity of 5200 tons per hour (Dominion Terminal Associates, n.d.). Coal dust can spread into the surrounding environment from these sites during the transportation and storing of coal. Additionally, port operations, Interstate 664 traffic emissions, and local transportation are probable mobile sources of air pollutants for residents, including particulate matter (PM), nitrogen oxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), greenhouse gases, volatile organic compounds (VOCs), and metals. According to the most recent annual data available from 2013, of the toxic air emissions in the city, 72% occurred in the Southeast Community with

more than 246,759 lbs. of toxic air released including 39,000 pounds of toluene, a known developmental toxicant (Sierra Club, 2020).

Despite environmental degradation from air pollutants, both mobile and point source, and disproportionately high rates of asthma, heart disease and chronic lower-respiratory disease, there is a lack of air quality data in the community. While the state is required to monitor air criteria pollutants, state monitors are not close enough to the community to provide air quality data that are community specific and relevant. The closest Department of Environmental Quality (DEQ) monitor tracking PM is located at the NASA Langley Research Center, more than 11 miles northeast of the community (Sierra Club, 2020). In order to fill the gaps of community specific data, the objective of this study was to monitor air quality in the Southeast Community by measuring air pollutants, including, $PM_{2.5}$, PM_{10}, VOCs, NO_2, and SO_2.

Methods and Materials

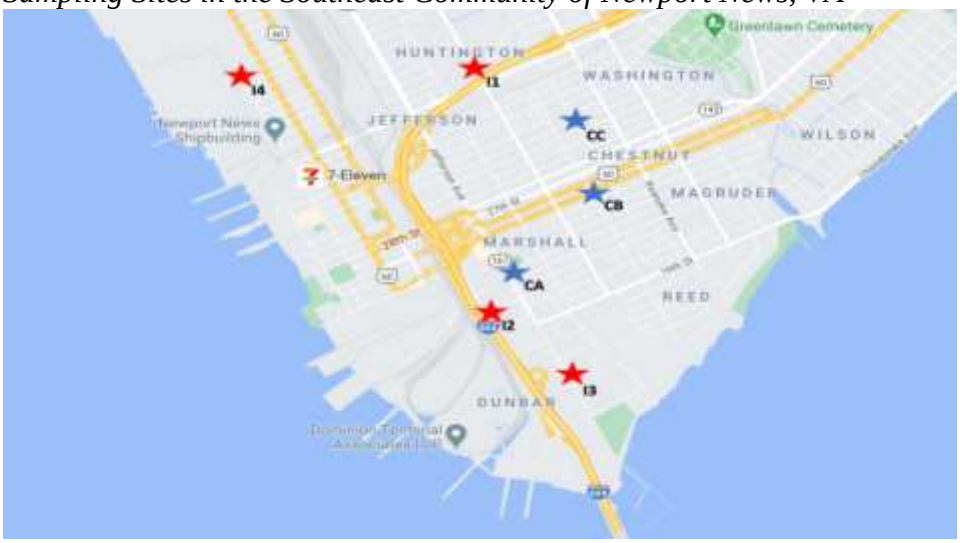
Sample locations

A total of seven sampling sites were selected (Table 1, Figure 1). Three sampling sites were designated *residential sites* (CA, CB, CC), and were selected to analyze residents' exposure to air pollution and obtain a representative spread of sites across the predominately residential housing area. Four sites were designated *industrial sites* (I1, I2, I3, I4), and sites I2, I3 and I4 were chosen based on their proximity to potential pollution sources, including the coal pier, Newport News Shipbuilding, and industrial activities (Figure 1). Site I1 was located closer to Highway I-664 in order to assess the impact of traffic emissions on air pollutants (Figure 1). All industrial sites were located on the outskirts of the predominately residential area (Figure 1). Specific sampling locations along with the latitude and longitude of each sampling site is provided in Table 1.

Table 1
Southeast Community Sampling Sites

Site code	Sampling location	Latitude	Longitude
	Residential		
CA	Jefferson Avenue & 21st Street	36.9781887	-76.4190854
CB	25th Street & Wickham Avenue	36.9846619	-76.4129986
CC	Orcutt Avenue & 32nd Street	36.9897629	-76.4142359
	Traffic		
I1	Marshall Avenue & 41st Street	36.9938189	-76.4220285
	Industry		
I2	19th Street & Terminal Avenue	36.9758576	-76.4210056
I3	900 Jefferson Avenue	36.9707913	-76.4140951
I4	Washington Avenue & 49th Street	36.9930610	-76.4396819

Figure 1
Sampling Sites in the Southeast Community of Newport News, VA



Note. Blue stars indicate community sampling sites; orange stars indicate industrial and traffic sampling areas.

Sampling strategy

Each site was continuously monitored for eight hours per day and each site was sampled at least twice (two days) for data accuracy. This ensured peaks and trends during hours of greatest business and social activity were captured in the data. To avoid the effect of rain on air pollutant concentrations, sampling only took place at least two days after rain events. Meteorological data, including ambient temperature, wind direction, and speed, were recorded during the sampling. Sampling was conducted between the days of Monday and Friday in the late summer and early fall.

A GRIMM PM (particulate matter) monitor was used to detect $PM_{2.5}$ and PM_{10}. The GRIMM monitor draws the air sample into a detection chamber where PM is classified and quantified by scattering light measurement. The particle size is proportional to the intensity of the reflected light beam. PM concentrations were determined from the particle count and the volumetric flow rate. Measurements were set at a 15-seconds interval. MultiRae PRO model PGM-6248 was used to continuously quantify VOCs (volatile organic compounds), NO_2 (nitrogen dioxide), and SO_2 (sulfur dioxide). This device uses PID photo ionization detectors, which meet EPA Method 21 compliance for the air pollutant detection, with detection limits of 10 ppb, 0.1 ppm, and 0.1 ppm for VOCs, NO_2, and SO_2, respectively. Each measurement was set at a 1-minute interval. Both devices were placed approximately 3 feet from ground level with the receiving valve of the instruments faced towards the road during sampling.

Quality control and assurance was conducted by following manufacturers' instructions. Each site monitoring session was recorded twice. Prior to daily sampling, the devices were calibrated according to manufacturer's recommendations. The machines were routinely checked during sampling to ensure correct operations. During monitoring, confounding factors such as nearby construction and lawn care were recorded in the field notebook. All of the readings were

downloaded from the temporary memory of the devices to an excel sheet. Outliers were removed and all the data was laid out and presented as a times series to show a trend of PM. Mean and standard deviation were calculated for each pollutant. T-tests were utilized to measure for significance of pollutant measurements at the given locations.

Results

Particulate Matter (PM)

Figures 2-8 below display daily continuous measurements of PM_{10} and $PM_{2.5}$ for the seven sampling sites. As displayed in these figures, community PM concentrations fluctuated throughout the day with a stable trend. However, three sites located at the intersections of Marshall Avenue & 42nd Street, Washington Ave & 49th Street and Orcutt Ave & 32nd Street, had spikes of PM concentrations in the morning (7:30 am – 9:30 am) or in the afternoon (3:30 pm-5:30 pm).

As shown in Table 2, daily average PM_{10} concentrations for the community sites, including Jefferson Avenue & 21st Street (CA), 25th Street & Wickham Avenue (CB) and Orcutt Avenue & 32nd Street (CC), ranged from 10.86 µg/m^3 to 12.69µg/m^3, while average $PM_{2.5}$ concentrations ranged from 6.09 µg/m^3 to 10.87 µg/m^3 . The traffic site, Marshall Avenue & 41st St. (I1), saw an average PM_{10} concentration of 23.05 µg/m^3 and an average $PM_{2.5}$ concentration of 15.85 µg/ m^3. Daily average PM_{10} concentrations for the industrial sites, 19th St. & Terminal Ave (I2), 900 Jefferson Ave (I3) and Washington Avenue & 49th Street (I4), ranged from 9.18 µg/m^3 to 26.98 µg/m^3 while daily average $PM_{2.5}$ concentrations ranged from 4.87 µg/ m^3 to 17.74 µg/ m^3 (Table 2).

The highest daily average PM_{10} concentration of the seven sites (26.98 µg/ m^3) was recorded at the industrial site located on the intersection between Washington Avenue and 49th

Street (I4) and closest to the shipbuilding lot. The lowest daily average PM_{10} concentration (9.18 µg/ m^3) was recorded at the intersection between 19th St. & Terminal Avenue (I2) (Table 2). The highest daily average $PM_{2.5}$ concentration of the seven sites (17.74 µg/ m^3) was recorded at the site closet to the shipbuilding lot, while the lowest average $PM_{2.5}$ concentration (4.87 µg/ m^3) was recorded at 900 Jefferson Ave (I3), where a chemical operation complex is located. Both of the highest and lowest average PM_{10} and $PM_{2.5}$ concentrations were recorded at industrial sites (Table 2).

Volatile Organic Compounds (VOC)

The sampling sites in the community saw a range of daily average VOC concentrations from 19.15 ppb to 42.24 ppb. (Table 2). The traffic site, located at the intersection of Marshall Avenue & 41st St. (I1), saw a daily average VOC concentration of 268.8 ppb. The sites in the industrial area saw a range of daily average VOC concentrations from 32.23 ppb to 154.21 ppb (Table 2). The highest daily average VOC concentration of all sample sites was recorded at the traffic site, located at the intersection of Marshall Avenue & 41st St. (I1), with a measurement of 268.8 ppb (Table 2). In contrast, the lowest daily average VOC concentration was recorded at the community site located at the intersection of 25th St. & Wickham Ave (CB), with a value of 19.15 ppb (Table 2).

Nitrogen dioxide (NO_2) and Sulfur Dioxide (SO_2)

NO_2 and SO_2 were relatively stable with minute detection levels at the sample sites (Table 2). Of the community sites, the highest daily average NO_2 concentration was recorded at the intersection of Jefferson Avenue and 21st Street (CA) with a value of 0.04 ppm. The highest NO_2 concentration of industrial and traffic sites was recorded at both 900 Jefferson Ave (I3) as well as at the intersection of Marshall Avenue & 41st St. (I1) with a value of 0.15 ppm (Table 2).

Of the community sites, the highest average SO_2 concentration (0.15 ppm) was recorded at the intersection of 25th St. & Wickham Avenue (CB) (Table 2). The highest SO_2 concentration of the traffic and industrial sites were recorded at the intersections of 19th St. & Terminal Avenue (I2), 900 Jefferson Avenue (I3) and Washington Avenue & 49th Street (I4) with a value of 0.15 ppm (Table 2). The highest concentrations of NO_2 and SO_2 were both recorded at industrial sites.

Figure 2

Jefferson Avenue & 21st St. (CA)

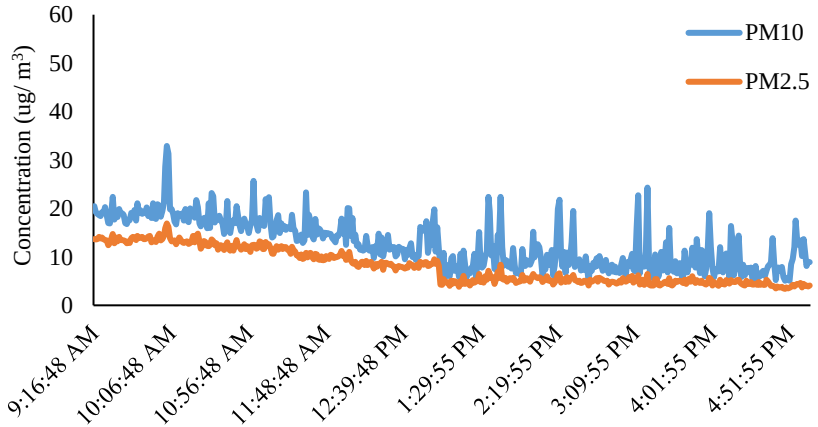


Figure 3

25th St. & Wickham Avenue (CB)

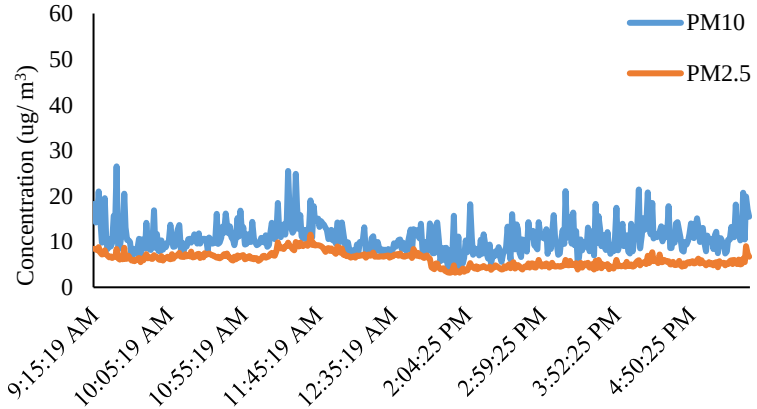


Figure 4

Orcutt Ave & 32nd St. (CC)

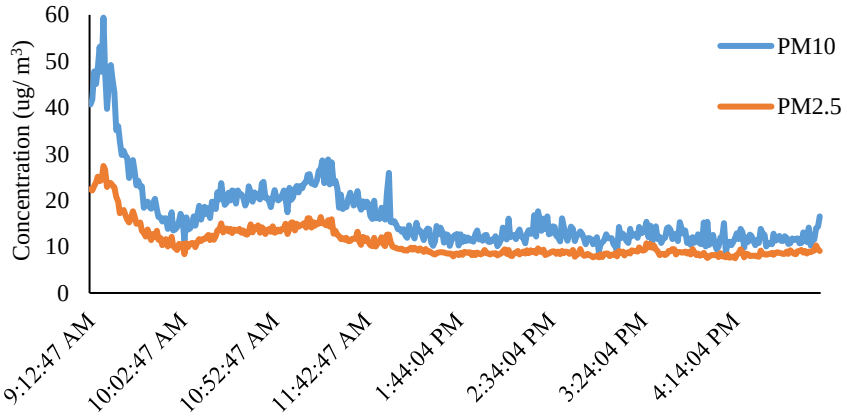


Figure 5

Marshall Ave & 41st (I1)

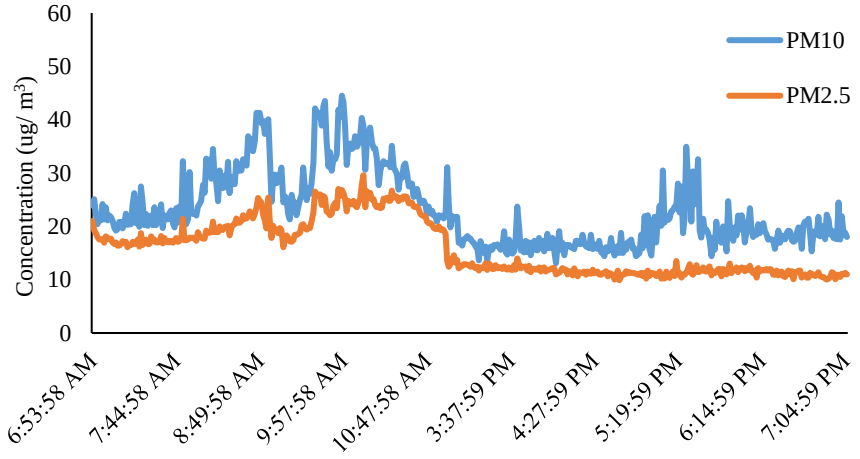


Figure 6

19th St. & Terminal Ave (I2)

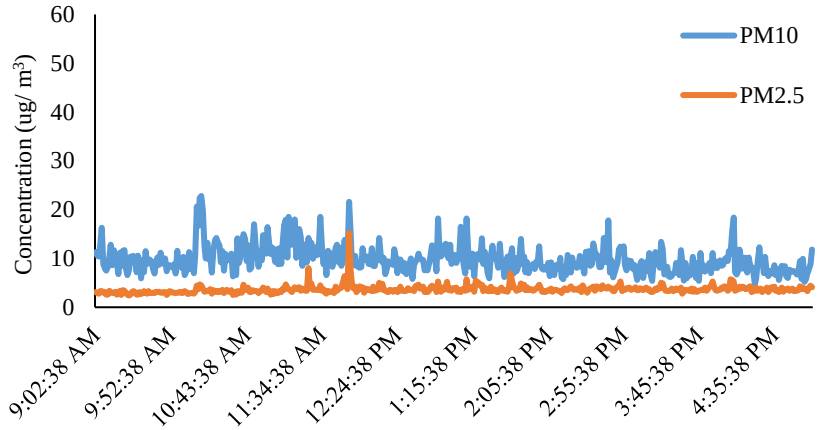


Figure 7

900 Jefferson Avenue (I3)

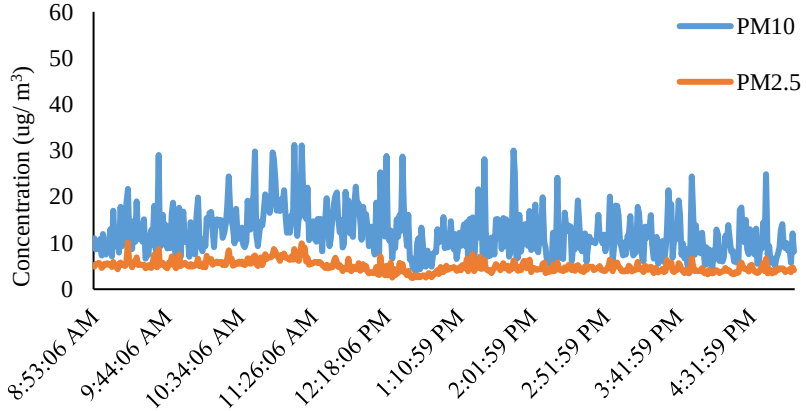


Figure 8

Washington Ave & 49th St (I4)

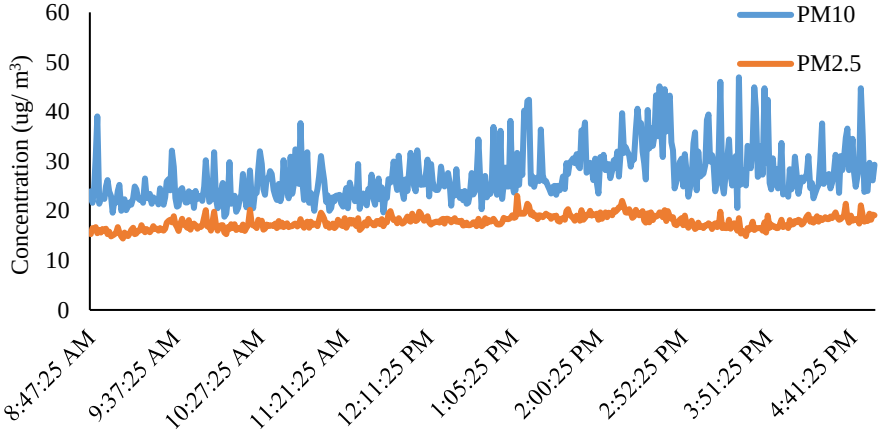


Table 2

Daily average concentrations of PM, VOC, NO_2 and SO_2 in the Southeast Community

Air Pollutant	Daily average	
	M	± SD
Jefferson Avenue & 21st Street (CA)		
PM10	12.69	5.03
PM2.5	7.99	3.59
VOC	26.12	47.96
NO_2	0.04	0.06
SO_2	0.06	1.36
25th Street & Wickham Avenue (CB)		
PM10	10.86	3.27
PM2.5	6.09	1.48
VOC	19.15	42.34
NO_2	0.03	0.22
SO_2	0.15	0.15
Orcutt Avenue & 32nd Street (CC)		
PM10	16.69	7.65
PM2.5	10.87	3.55
VOC	42.24	76.64
NO_2	0.001	0.01
SO_2	0.01	0.03
Marshall Avenue & 41st Street (I1)		
PM10	23.05	7.05
PM2.5	15.85	5.11
VOC	268.8	178.2
NO_2	0.15	0.15
SO_2	0.05	0.01
19th Street & Terminal Avenue (I2)		
PM10	9.18	3.21
PM2.5	5.70	0.92
VOC	154.21	243.3
NO_2	0.10	0.13
SO_2	0.15	0.15
900 Jefferson Avenue (I3)		
PM10	12.16	4.98
PM2.5	4.87	1.19
VOC	32.13	49.23
NO_2	0.15	0.15
SO_2	0.15	0.15

Washington Avenue & 49th Street (I4)		
PM10	26.98	5.23
Air Pollutant	Daily Average	
	M	± SD
PM2.5	17.74	1.29
VOC	45.92	54.32
NO_2	0.05	0.06
SO_2	0.15	0.15

Discussion

Environmental degradation has affected the Southeast Community of Newport News for decades stemming from toxic air emissions, especially those from electric utilities, ports, heavy traffic, coal terminals and industry (Sierra Club, 2020). Several studies have cited that exposure to $PM_{2.5}$ increases chance of cardiopulmonary problems and mortality due to lung cancer (Schwartz, 2000; Franklin et al., 2008). Additionally, VOC, while more of an exposure concern indoors, can cause photochemical smog under certain conditions outdoors, posing additional health concerns (US EPA, 2017b). This study is the first to record air quality monitoring results specific to the community. These results help provide baseline air quality readings for the community and a better understanding of the sources of observed environmental degradation.

Industrial activities and traffic emissions were possible pollution sources of VOCs, NO_2 and SO_2 in this community due to increased concentrations of air pollutants that were recorded at the sites adjacent to the ship building yard and Highway I-664. Both traffic and industrial emissions exhibited the greatest impact on air quality in the form of elevated VOC levels. Traffic emissions also attributed to elevated SO_2 and NO_2 concentrations.

The residential site of Orcutt Ave & 32nd Street was observed to have had higher VOC readings as compared to the other two residential sites. This site was located closest to the traffic site and two industrial sites as compared with other residential sites. Based on the weather

records, wind may have transported VOCs from these traffic and industrial sites to the intersection of Orcutt Ave & 32nd when sampling took place. In addition, a school was located three minutes from the sampling site where school buses may have contributed to the elevated VOC levels.

The trends of PM_{10} and $PM_{2.5}$ levels for most sampling sites remained stable. However, elevated trends and spikes in the morning and in the afternoon were observed at the traffic site (I1), which is the site closest to Highway 664. This suggests that traffic emissions from the highway may be attributed to increased PM levels. In addition, an elevated trend of PM at the residential site Orcutt Ave & 32nd Street was observed. As mentioned previously, school buses in this area may have contributed to the elevated PM levels. Compared to VOCs, average PM concentrations were comparable among the residential, industrial and traffic sites. Average PM concentrations did not reflect impact from specific pollution sources. Based on the daily measurements, all recorded PM concentrations did not exceed EPA's criteria or the World Health Organization's recommended 25 $\mu g/m^3$ and 50 $\mu g/m^3$ 24-hour mean exposure limit for $PM_{2.5}$ and PM_{10} respectively (EPA, 2008; WHO, 2005). Due to the limited, short-term sampling period, future studies with robust data are needed for long-term monitoring to determine whether PM readings in the community meet the EPA's criteria.

The patterns observed in these recorded daily averages are not permanent but rather what was observed on the site during the individual sampling days. This data should be carefully interpreted and weighed against EPA standards which are calculated on a 30-day average as compared to daily averages, which can be impacted by fluctuations in temperature, weather and surrounding environmental conditions. Additionally, these sample sites may have seen a change in average traffic patterns that could skew daily averages and produce readings that are not

representative of 30-day averages. Measuring PM only may not completely depict air quality status in the community. Future studies and research should incorporate more frequent and elongated sampling periods, with multiple air quality indicators, such as PM, VOC, NO_2 and SO_2 concentration readings for a robust data set. Additionally, this study did not include metals due to budget and time constrains; it is recommended future studies investigate metals in PM and soil.

Conclusion

Air quality data is important for community members who are concerned about environmental degradation due to air pollution as well as state and federal public health officials, who are tasked with identifying and addressing air quality related public health concerns in communities. These data will add to the expanding research surrounding air quality and pollution in the City of Newport News, Virginia. In this study, elevated concentrations of air pollutants, particularly VOCs, were observed. Industrial activities and traffic emissions may have attributed to the elevated concentrations of the air pollutants. While no EPA exceedances of PM was observed, NO_2 and SO_2 were detected at these data collection sites in the Southeast Community. It is recommended that air quality monitoring continue to gain a better understanding of air quality and contributing pollution sources, and to develop long term monitoring strategies for robust data.

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COVID-19 in Congregate Settings: A Literature Review

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Abstract

Purpose: Virginia has numerous and varying congregate living facilities, to include correctional facilities, skilled nursing facilities, and 13 state-operated mental/behavioral health/rehabilitation facilities. The purpose of this literature review is to review COVID-19 trends in congregate settings and identify suggested mitigation efforts.

Methods: The target population for the literature search was individuals in congregate living facilities. Both correctional facilities and nursing homes were included as congregate settings.

Findings: Studies reviewed reported on disease transmission, the use of universal and serial testing, and reported additional information. Early and frequent testing to guide resident cohorting and exclusion of individuals from work was recommended. This includes the testing of asymptomatic individuals. Pre-emptive testing was associated with significant lower overall disease prevalence in one study.

Conclusions: Researchers across studies recommended testing early and often to inform prompt cohorting of infected individuals and to guide infection control measure. As such, early and frequent testing of individuals living and working in congregate settings is an important tool in controlling the spread of COVID-19.

Recommendations: In addition to frequent and early testing, further research regarding the spread and control of COVID-19 within Virginia congregate living facilities is recommended to inform future mitigation efforts.

Background

The COVID-19 case rate as of June 5, 2020 for prisoners was 5.5 times higher than the US population case rate (Saloner et al., 2020). Evaluation of COVID-19 management at congregate living facilities and evaluation of facility case rates is necessary to determine how to adequately mitigate the spread of this disease in congregate settings.

The SARS-CoV-2 virus and the accompanying clinical syndrome, COVID-19, was identified by the World Health Organization on February 11, 2020, in Wuhan, China (CDC, 2020b). Person-to-person spread of the virus through respiratory droplets is significantly increased in spaces where individuals are less than 6 feet from one another (CDC, 2020b). As such, maintaining an appropriate distance is a challenge for individuals in congregate living facilities, such as nursing homes, prisons, detention centers, and rehabilitation centers. Individuals who are incarcerated or detained work, study, live, eat and participate in activities of daily living together, creating ample opportunity for virus proliferation (CDC, 2020a). Additionally, those individuals may transfer between facilities, have medical, legal, or family visits, or staff interactions; all of these create opportunities for virus introduction into the facility (CDC, 2020a).

Forty correctional facilities fall under the onus of the Virginia Department of Corrections (Virginia Department of Corrections, n.d.). The total number of incarcerated individuals in major Virginia correctional facilities as of December 2020 totaled 21,324 (Virginia Department of Corrections, 2020). Data from the Centers for Medicare and Medicaid Services (CMS) in 2015 counted 284 nursing homes in Virginia, with a majority (51.8%) having 100-199 beds (CMS, 2015). On February 4, 2020, just under 10% of reported COVID-19 in Virginia were associated with outbreaks in long-term care facilities, correctional facilities, and other congregate settings

(VDH, 2020). Additionally, the Commonwealth of Virginia currently provides care to individuals in 12 of 13 facilities for a variety of needs: individuals with psychiatric diagnoses, individuals with intellectual disabilities, individuals civilly committed for behavioral rehabilitation, and those seeking substance abuse services (Virginia Department of Behavioral Health and Developmental Services, n.d.).

Purpose

The purpose of this literature review was to review COVID-19 trends in congregate settings and identify suggested mitigation efforts.

Methods

The target population for the literature search was individuals in congregate living facilities. Both correctional facilities and nursing homes were included as congregate settings for this literature review. Eligibility criteria for articles included full-text availability, English language, and publication from January-December 2020. The following search terms were combined in the APA PsychInfo database, in the following format (covid-19 or coronavirus or 2019-ncov or sars-cov-2 or cov-19 AND corrections or prison or jail or incarceration) and (covid-19 or coronavirus or 2019-ncov or sars-cov-2 or cov-19 AND nursing homes or care homes or long-term care or residential care or aged care facility and mitigation or prevention or reduction). The National Criminal Justice Reference Service (NCJRS) database was also searched for (correctional facility or prison or jail or imprisonment or incarceration AND covid-19 or coronavirus or 2019-ncov or sars-cov-2 or cov-19). Additionally, the following terms were combined to search CINAHL; (corrections or prison or jail or incarceration AND covid-19 or coronavirus or 2019-ncov or sars-cov-2 or cov-19) and (covid-19 or coronavirus or 2019-ncov or sars-cov-2 or cov-19 AND nursing homes or care homes or long-term care or residential care or

aged care facility AND mitigation or prevention or reduction). From the combined searches, 207 total results were returned and titles screened for relevance. Twenty-two relevant titles had abstracts reviewed, and from those, 13 articles were included in this literature review. Opinion/commentary pieces, studies including home-based participants, those evaluating quality of life issues or social support for policies, and studies outside the United States were excluded from this literature review (Figure 1).

Figure 1. Flow chart of article retrieval and selection

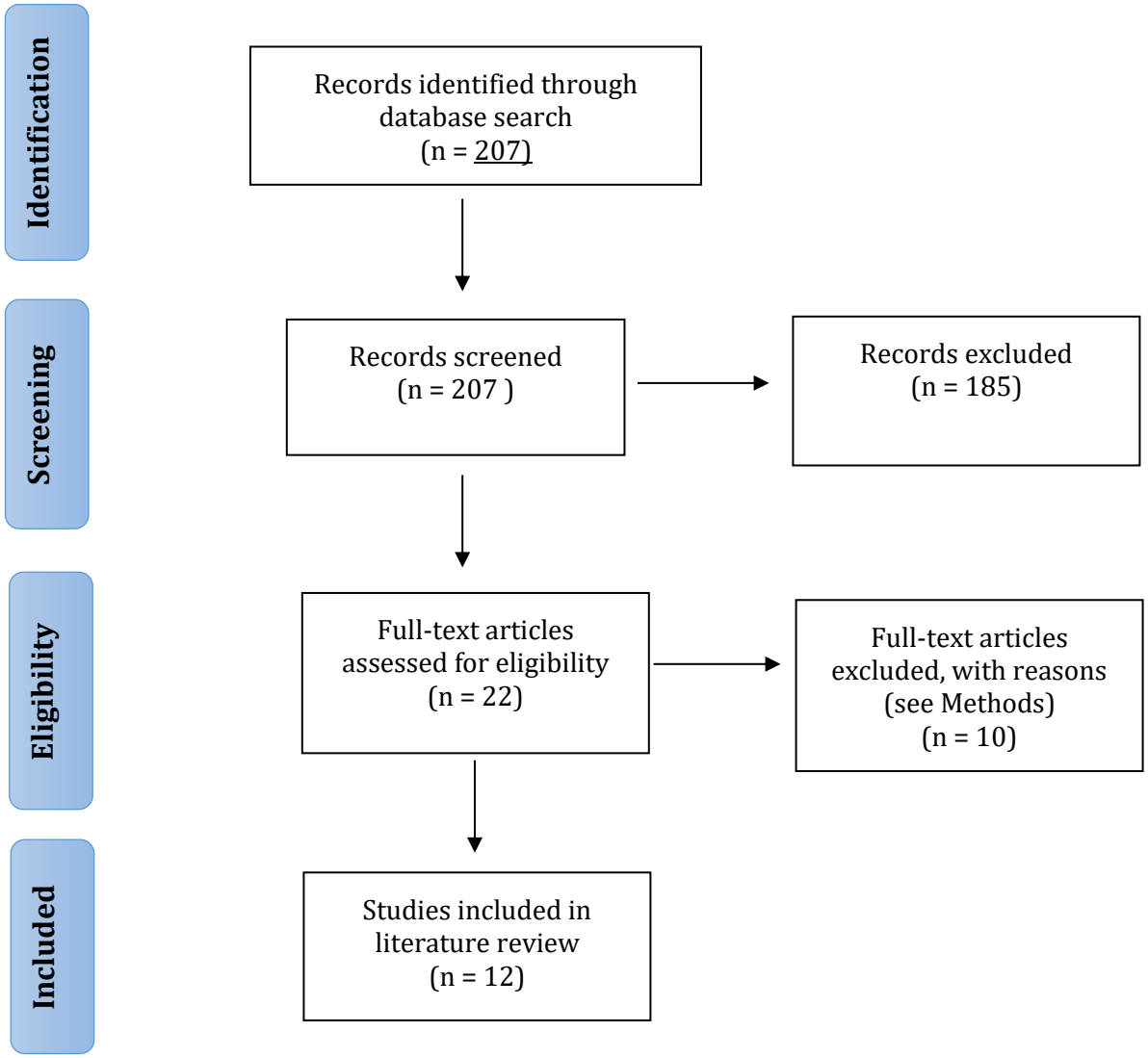

Figure 1. PRISMA flow chart for article retrieval and selection. Adapted from Preferred Reporting Items for Systematic Reviews and Meta-analyses (Moher, Liberati, Tetzlaff, &Altman, 2009).

Findings

Studies reviewed reported on disease transmission, the use of universal and serial testing, and reported additional information.

Transmission

An epidemiologic investigation from a nursing home in Washington in the beginning of the COVID-19 pandemic in the U.S. highlights the deadly potential of SARS-CoV-2 in a long-term care facility. After an index case at Facility A in Washington was identified on February 28, 129 total positive cases were identified by March 9; of those, the case fatality rates were 27.2 % among residents, 7.1 % among visitors, and 0% among health care providers (McMichael et al., 2020). Regarding community incidence relating to facility incidence, in a study of 125 nursing homes, Hatfield et al. (2020) found no association between cumulative county incidence and odds of identifying a nursing home case.

In a point prevalence survey at a state psychiatric facility, Callaghan et al. (2020), reported hospital implemented admission screening and infection control and prevention appeared to mitigate the spread of infection to other residents and staff after the admission of two SARS-CoV-2 residents in April 2020. While this study is limited due to point prevalence and lack of staff participation, researchers indicated that infection control and prevention measures are important due to the linkage of psychiatric facilities to other facilities with higher SARS-CoV-2 risk (Callaghan et al., 2020). Davlantes et al.(2020) gave a case report of Puerto Rico's prison system avoiding any outbreak through stringent screening and cohorting of inmates, with only 0.3% of 8,619 inmates testing positive for immunoglobulin G antibodies (indicative of past infection) and 0.0% testing positive for immunoglobulin M antibodies (indicative of recent or current infection).

Universal testing

Findings from mass or universal testing in nursing homes or correctional facilities were reported in three studies. In a study of 16 jails and prisons from six jurisdictions (41,454 total persons studied), Hagan et al. (2020) reported that symptom-based testing underestimates the number of SARS-CoV-2 cases in a facility. In their study, mass testing increased known cases revealed a median 12.1-fold increase over symptom-based testing alone. Hatfield et al. (2020) studied 288 nursing homes in six U.S. jurisdictions and found the number of days from first known case to completion of facility-wide testing was a median of 29.5 days; each additional day was associated with 1.3 more cases. From this study, it was suggested that early facility-wide testing after the first known cases improved the feasibility and effectiveness of cohorting (Hatfield et al., 2020). McBee et al. (2020) echoed these suggestions in a study of West Virginia nursing homes.

Serial testing

Multiple studies reported on serial testing. Njuguna et al. (2020) discussed the significance of serial testing in Louisiana correctional facilities after finding 25% of 98 individuals quarantined for close contact with a case had positive results after one or two negative tests. Additionally, 45% of RT-PCR individuals were not symptomatic, with study authors making similar recommendations for testing to inform prompt cohorting of infectious individuals (Njuguna et al., 2020). Sanchez et al. (2020) made similar recommendations for serial testing to guide early cohorting and infection prevention and control measures in their study of serial testing in Detroit nursing homes. Taylor et al. (2020) echoed those recommendations and included testing of healthcare personnel in skilled nursing facilities to guide exclusion from work. Researchers further suggested serial testing of all residents and

health care providers until no new cases are detected after 14 days, infection prevention and control education, flexible medical leave, and personal protective equipment (Taylor et al., 2020). Telford et al. (2020) studied preemptive testing in relation to COVID-19 infections in long-term care facilities in Fulton, Georgia and found that preemptive testing resulted in lower overall prevalence when compared to response testing (testing due to known cases). The difference between the groups was found to be significant: response group: residents positive, 28% initially and 42.4 % on follow-up testing, staff positive, 7.4% and 11.8% on follow-up testing (Telford et al., 2020). Pre-emptive group residents were positive 0.5% initially, and 1.5% on follow-up testing; staff positives were 1.0% and 1.7% on follow up testing (Telford et al., 2020). Recommendations throughout the studies on serial testing included early and repeated testing to guide prompt cohorting and proper infection prevention and control education.

Additional Data and Implications

Evaluation of aggregate data by Wallace et al. (2020a) from correctional facilities in 54 jurisdictions showed a response rate of 69%, with 86% of responding jurisdictions reporting at least one positive case. While this data was evaluated relatively early in the pandemic, Wallace et al. (2020a) acknowledged testing and daily symptom screening as important mitigation strategies, and cited staff movement in and out of the facility to the community as a concern for transmission into other facilities. An additional study by Wallace et al. (2020b) evaluated data collected using the COVID-10 Management Assessment and Response Tool (CMAR) in Louisiana detention facilities. COVID-19 hospitalization and death rates for detainees and staff were nearly identical in this report (Wallace et. al., 2020b). Additionally, some facilities reported isolating infected individuals for longer than 14 days or using test-based instead of time-based release from isolation, increasing use of resources (Wallace et al., 2020b).

Conclusions

Individuals residing in congregate settings face an increased risk to contract COVID-19 due to difficulties maintaining social distance and the droplet transmission of the virus (CDC, 2020a). Based on this literature review, early and frequent testing of individuals living and working in congregate settings is an important tool in controlling the spread of COVID-19. Researchers across studies recommended testing early and often to inform prompt cohorting of infected individuals and to guide infection control measures. One study found that pre-emptive testing resulted in lower overall prevalence of COVID-19 cases when compared to testing in response to known cases. Testing in other studies revealed a significant percentage of asymptomatic cases, further supporting routine, facility-wide testing to identify and cohort or exclude individuals from work. Additionally, one study highlighted serial testing of individuals quarantined for close contact, as a positive test was preceded by one to two negative tests. Beyond testing, Taylor et al. (2020) went further to make recommendations regarding recommended duration of testing after detection of the last positive case, sick leave for employees, infection prevention and control education, and personal protective equipment. Another study identified increased use of resources due to extensive isolation periods and use of test-based release from isolation.

Available literature for this review included data from relatively early in the pandemic. Approaches to infection control in congregate settings may have changed since this review was completed, and literature may now reflect recommendations in addition to early and frequent testing.

Recommendations

Early and frequent testing per CDC and VDH guidelines is recommended for congregate settings. Further data collection from Virginia congregate living facilities regarding cases, morbidity, mortality, employee and resident infection control education, testing compliance, and personal protective equipment availability and use is recommended to understand the impact of these measures on the spread of COVID-19 in such facilities. This data can guide future mitigation efforts in order decrease morbidity and mortality in congregate settings in the Commonwealth. Additionally, it is recommended that facility clinicians and decision-makers be provided with the most-up-to date information regarding testing, quarantine, and isolation in order to minimize resident time away from intended activities and to avoid unnecessary use of resources.

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Social Determinants of Health and the Prevalence of Overweight Status and Mental Health Conditions Among Non-Hispanic Black and Hispanic Children in the United States

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Abstract

Purpose: A growing concern in the United States has been the rise of anxiety and depression and its relation to excessive weight status among non-Hispanic Black and Hispanic children, racial groups with higher-than-average rates of overweight status and obesity. This study explored this prevalence by analyzing individual, interpersonal, and community factors among this population. The study also sought to determine if a correlation exists between elevated weight and mental health issues in the study population.

Methods: Using data from the 2017's National Survey of Children Health (NSCH), the prevalence of anxiety and depression was investigated among Black and Hispanic children ages 10-17 years old with a BMI greater than the 85^{th} percentile, defined by the CDC as being overweight/obese (N=10,839).

Results: Two-way chi square tests were conducted in SPSS, determining that statistically significant correlates ($p < 0.05$) existed between the prevalence of overweight/obesity in children and individual, interpersonal, and community factors, with the most significant correlates being individual factors. A significant correlate was found to exist between overweight/obesity and the prevalence of anxiety and depression ($p < 0.05$, for both); however, when categorized by either race, no significant correlate was observed ($p = 0.40, 0.26$). Using a simple linear regression model, the most significant variables that correlated with overweight/obese were age, Mental Health Index, Adverse Childhood Experiences (ACE) score, and *Family Received Assistance in*

Last 12 Months. Family Received Assistance in Last 12 Months was indicated as a question on the NCSH.

Conclusion: The results of the study found the most significant correlates to be between individual factors and overweight/obesity in children. The multiple logistic regression model demonstrated that only three variables were significant predictors of overweight/obesity in children after running stepwise selection. Additional studies investigating mental health (MH) and behavioral health factors among children who are overweight or obese (o/o) is recommended.

Purpose

Increased rates of childhood overweight and obesity status has been a public health issue in the United States for the past decade, as it is a comorbidity of multiple, preventable diseases (Bhadoria et al., 2015; Mannan et al., 2016). In 2019, the Centers for Disease Control and Prevention (CDC) estimated that 18.5% of children in the United States were obese. Childhood obesity is most common in Hispanic (25.8%) and non-Hispanic Black children (22.0%) while non-Hispanic, upper class White children were cited to have the least prevalence of childhood obesity (CDC, 2019)[1].

A national effort to reduce racial and ethnic disparities, including education, income, location, and other social factors, can be exhibited in the establishment of the Racial and Ethnic Approach to Community Health (REACH) program (CDC, 2020). This program is focused on reducing health disparities in specific ethnic and racial groups of communities with high rates of chronic diseases, such as obesity, through a variety of means, including support for tobacco free living and providing more healthy nutrition options. According to the literature, obesity intervention and prevention strategies that use behavioral components, such as dietary and physical activity behaviors, are effective strategies towards weight loss (Ewart-Pierce et al., 2016; Castillo et al., 2015; Gariepy et al., 2009).Within the framework of targeting behavior to address childhood obesity, considerations include community, interpersonal, and individual factors (Loring & Robertson, 2014; CDC, 2019). Prominent individual factors associated with

[1] "Obese," "overweight," "healthy weight," and "underweight" are defined by the CDC in terms of Body Mass Index (BMI) quartile percentages in age and sex-specific growth charts. Obese is at or greater than the 95th percentile, overweight is between the 85th and 94th percentiles, "healthy weight is between the 5th and 84th percentile, and underweight is at or less than the 5th percentile ("Childhood," 2020).

childhood obesity include mental health factors such as anxiety and depression (Rankin et al., 2016).

A more recent concern among public and pediatric health is the increasing rates of anxiety and depression among children (CDC, 2020; Bitsko et al., 2018). According to data from the CDC, family, community, and healthcare factors are related to children's mental health status. Common mental health disorders that have been diagnosed in children include attention-deficit/hyperactivity disorder (ADHD), anxiety, and behavior disorders. Additionally, among children living below 100% of the federal poverty level, more than 1 in 5 (22%) were found to have a mental, behavioral, or developmental disorder (CDC, 2020). Few studies have investigated mental health and obesity prevalence among non-White children in the framework of social determinants of health. This study further investigated this association to contribute to the narrative surrounding health disparities and inequities in health-vulnerable communities.

Objective

This study aims to investigate if significant correlates exist between the prevalence of overweight status and obesity in children among individual, interpersonal, and community factors in the social determinants of health model. Additionally, the study aims to investigate if a significant correlate exists between the prevalence of overweight and obesity and anxiety or depression among Non-Hispanic African American and Hispanic children.

Hypothesis

There will be a significant difference in the prevalence of overweight status and obesity in children among individual, interpersonal, and community factors within the social determinants of health framework. Additionally, it is hypothesized that there will be a significant difference in the prevalence of mental health factors such as anxiety and depression in Non-

Hispanic African American and Hispanic overweight and obese children as compared to children who are not who are not overweight or obese.

Methods

Data from the 2017 National Survey of Children's Health (NSCH) was used for this study[2]. The population examined were children aged 10-17 years old who were overweight or obese (N = 10,839). Data was analyzed using IBM SPSS Statistics (Version 26) predictive analytics software (IBM, 2019).

Independent variables were selected and coded into a Mental Health Index (MH Index) and race. The MH Index was calculated by the addition of *"ever having had anxiety or depression".* The question for MH Index asked if the child had ever had depression and anxiety. The question pertaining to race asked what race the child was. Responses for MH Index were *none reported mental health issue*s, *one reported mental health issue*, and *reported mental health issues.* Responses for race included *Hispanic, White non-Hispanic, Black non-Hispanic,* and *Other/Multi-Racial Non-Hispanic*.

Dependent variables for individual, interpersonal, and community factors were selected and coded by weight status. The question was *"What is the current weight of the child?"* with responses as *Underweight, Healthy Weight,* and *Overweight* or *Obese*. Simple descriptive statistics including frequencies and percentages were conducted for the primary independent variable of MH Index and race and the dependent variables of weight status as grouped by

[2] The National Survey of Children's Health is sponsored by the Health Resources and Services Administration's (HRSA) Maternal and Child Health Bureau (MCHB) under the U.S. Department of Health and Human Services (HHS). The survey provides detailed data regarding health, well-being, and access to amenities for non-institutionalized children, ages 0-17 years (2018).

children ages 10-17. Chi square tests were performed on weight status and MH Index as filtered by race and age of child.

A simple logistic regression method was performed individually, which included odds ratios and confidence intervals for various independent variables such as race, gender, and other index scores. The dependent variable, weight status, was dichotomized as underweight or normal weight (0) and obese or overweight (1) and weight status was filtered as equal to obese or overweight as grouped by children ages 10-17. A multiple logistic regression method including odds ratios and confidence intervals was performed for MH Index, ACE score, and *family receiving assistance within the last 12 months* as our independent variables simultaneously via stepwise selection to determine the significant predictors for obese or overweight weight status as grouped by children ages 10-17. The ACE score was a composite of adverse childhood experiences measured by parental divorces, deaths, a parent being in jail, and discrimination, which could lead to anxiety or depression among children. Families receiving assistance within the last 12 months were chosen as a variable due to access to food stamps and other programs has been shown to improve nutritional access and affect obesity rates.

Results

Individual factors of social determinants of health that were tested for significant associations (n=20) with prevalence of overweight or obese children aged 10-17 included anxiety, behavioral problems, depression, emotional support for parents (counselor, health care provider, (peer) support group, family and friends, place of worship, intellectual disability, learning disability, race/ethnicity, and sex of child (Table 1). Interpersonal factors (n=8) of social determinants of health that were tested for significant associations with the prevalence of overweight or obese children (ages 10-17) included, hard to cover basics such as food and

housing, ACE (parents divorced or separated), food stamp recipient in the past 12 months, mental health status of mother, ACE (parent died), ACE (parent in jail), ACE (discrimination), and anyone in house uses cigarettes (Table 1). Community factors (n=3) of social determinants of health that were tested for a significant association with the prevalence of overweight or obese children (ages 10-17) were community participation, safe neighborhood, and safe school (Table 1).

Table 1: Significant Associations between Individual, Interpersonal, and Community Factors and BMI > 85th Percentile in Children, ages 10-17

Individual Factors	**p-value**
Anxiety	0.000
Anxiety Currently	0.000
Autism – ASD	0.000
Behavioral Problems (previously)	0.000
Behavioral Problems (currently)	0.000
Depression (previously)	0.000
Depression (currently)	0.000
Emotional Support – Counselor	0.001
Emotional Support - Health Care Provider	0.011
Emotional Support - Support Group	0.000
Emotional Support – Other	0.000
Emotional Support - Family, or Friend	0.001
Emotional Support - Peer Support Group	0.011
Emotional Support - Place of Worship	0.015
Emotional Support – Spouse	0.000

Intellectual Disability	0.000
Learning Disability (previous)	0.000
Learning Disability (currently)	0.000
Race/Ethnicity	0.000
Sex of the selected child	0.000
Interpersonal Factors	**p-value**
Hard to cover basics like food and housing	0.000
ACE (i.e. parents divorced or separated)	0.000
Food stamp recipient past 12 months	0.000
Mental health status of mother	0.000
ACE (i.e. parent died)	0.000
ACE (i.e. parent in jail	0.000
ACE (i.e. discrimination)	0.037
Anyone in house uses cigarettes	0.000
Community Factors	**p-value**
Community Participation	0.000
Safe neighborhood	0.000
Safe school	0.000

At the national level, out of 10,839 children, 6.4% were found to be underweight, 66.2% were of healthy weight, and 27.4% were found to be obese (Table 2). Within the children found to be overweight or obese, 11.1% were Hispanic, 69.4% were non-Hispanic White, 6.9% were non-Hispanic Black, and 12.6% were other multi-racial or non-Of the 10,839 children (N), 6.1% noted ever having anxiety and depression and 10.2% indicated ever having either anxiety or

depression. In the MH Index, the responses consisted of no reported mental health issues, one reported mental health issue, and more than one reported mental health issue. Of the 10,839 responses, 83.7% reported having no mental health issue, 10.2% reported having one mental health issue, and 6.1% reported having more than one mental health issue. Hispanics.

Table 2: Frequencies of MH Index, Race, and Weight Status Among non-Hispanic Black and Hispanic Children[2]

Variable	**Responses**	**n (%)**
MH Index[1]	No reported mental health issues	11256 (83.7)
	One reported mental health issue	11256 (10.2%)
	Two reported mental health issues	11256 (6.1%)
Race	Hispanic	10839 (11/1%)
	White non-Hispanic	100839 (69.4%)
	Black non-Hispanic	10839 (6.9%)
	Other /Multi-Racial Non-Hispanic	10839 (12.6%)
Weight Status	Underweight = <5th Percentile	11315 (6.4%)
	5th to 84th Percentile=Healthy Weight	11315 (66.2%)
	85th Percentile or Above=Overweight or Obese	11315 (27.4%)

Note:
1: Mental health index composite of two variables (ever had or currently has anxiety and depression)
2 Percentages in table may not add up to 100% due to missing data.

A two-way chi-square value of 5.233 ($p = 0.05$) statistical test was then used to investigate the correlation between obesity and anxiety and obesity and depression in Hispanic children. A two-way chi square value of 4.021 ($p=0.05$) statistical test was also used to investigate the correlation between obesity and anxiety and obesity and depression in African American children. The p-values for both the Hispanic and non-Hispanic African American populations indicated that a significant association did not exist ($p > 0.05$) (Table 3). All p-

values were greater than the accepted p-value ($p > 0.05$), indicating that there was not a significant correlation between these variables. Using data from the 2017's NSCH, statistically significant associations were identified between the prevalence of childhood obesity and individual, interpersonal, and community factors via a two-way chi-square statistical test ($X^2_{1\text{-}9}$,CI 95%, $p < 0.05$) (Table 3).

Table 3: Chi Square Results of Association between MH Index and Weight Status Among non-Hispanic Black and Hispanic Children

Variable	**Responses**	**X^2 (p-value)**
Race	Hispanic	5.233 (0.264)
	African American	4.021 (0.403)

Note:
Not shown: MH Index and Weight Status as variables were filtered by race but are included in p-value

Using descriptive statistics, the study scope was expanded by including individual factors along with age and race. The total surveyed population was broken down into subgroups or representative samples based on each variable to gain a better, more comparable collection of responses. Of 2,968 children, 100% were ages 10-17 years old. Of 1,678 children, 56.5% were male. Of 1,290 children, 43.5% were female. Of 417 children, 14% were Hispanic. Of 1,926 children, 64.9% were white non-Hispanic. Of 285 children, 9.6% were black non-Hispanic. Of 316 children, 10.6% were other, multi-racial, non-Hispanics. Of 2,380 children, 80.2% noted never ever having had a mental health issue. Of 307 children, 10.3% noted having at least one mental health issue. Of 266 children, 9% reported having had more than one mental health issue. Of 251 children, 8.5% reported never having had a behavioral health issue. Of 2,344 children, 79% reported having had at least one behavioral health issue. Of 233 children, 7.9% reported having ever had more than one behavioral health issue. Of 2,490 children, 84.9% reported no developmental disability. Of 306 children, 10.4% reported having had at least one

developmental disability. Of 112 children, 3.8% reported having had more than one developmental disability. Of 1,995 children, 67.2% reported having no difficulty keeping or making friends in the past 12 months. Of 693 children, 23.3% reported having a little difficulty keeping or making friends in the last 12 months. Of 252 children, 8.5% reported having a lot of difficulty keeping or making friends in the last 12 months. Of 248 children, 8.4% reported no emotional support. Of 961 children, 43.4% reported having emotional support (Table 4).

Table 4: Descriptive Statistics for Individual Factors of Obese and Overweight Children, aged 10-17[5]

Individual Factors	**Responses**	**Frequency (%) Mean (SD)**
Gender of Study Child	Male	1678 (56.5)
	Female	1290 (43.5)
Race	Hispanic	417 (14.0)
	White Non-Hispanic	1926 (64.9)
	Black Non-Hispanic	285 (9.6)
	Other/Multi-Racial Non-Hispanic	316 (10.6)
Mental Health Index[1]	No Mental Health Issues	2380 (80.2)
	One Mental Health Issue	307 (10.3)
	Two Mental Health Issues	266 (9.0)
Behavioral Health Index[2]	No Behavioral Health Issues	251 (8.5)
	One Behavioral Health Issue	2344 (79.0)
	Two Behavioral Health Issues	233 (7.9)

Developmental Disability Index[3]	No Developmental Disabilities	2490 (84.9)
	One Developmental Disability	306 (10.4)
	Two Developmental Disabilities	112 (3.8)
Difficulty Keeping or Making Friends in the Past 12 Months	No difficulty	1995 (67.2)
	A little difficulty	693 (23.3)
	A lot of difficulty	252 (8.5)
Parenting Emotional Support[4]	No emotional support	248 (8.4)
	Emotional support	961 (43.4)

Note: weight-status was defined as overweight and obese.
1: Mental Health Index was a composite of: two variables if the study child had ever had or has depression or anxiety.
2: Behavioral Health Index was a composite of: two variables of children currently have behavioral or conduct problems – age 3-17 years and ADD/ADHD ever.
3: Developmental Disability Index was a composite of: ASD ever, intellectual disability ever, and learning disability.
4. Parental emotional support included: spouse, family or close friend, health care provider, place of worship or religious leader, specific condition support group, peer support group, mental health professional, and other.
[5] Percentages in table may not add up to 100% due to missing data.

Using a logistic regression model, odds ratios was determined for each of the individual factors along with age and race. A significant relationship was not found between children aged 10 years and older and weight status (85th percentile) due to the odds ratio was within the confidence interval. The odds of male children being overweight or obese was 2.35 times as likely compared to females. Of the children aged 10-17 years old, the odds of Hispanic, non-Hispanic White, and non-Hispanic Black children being obese or overweight were 0.956 times more likely as compared to other multi-racial children. Of the children aged 10-17 years old, the odds of ever having had no mental health issue or one mental health issue were 1.30 times as likely compared to having had more than one mental health issue. Of the children aged 10-17 years old, the odds of ever having had no behavioral health issue or one behavioral health issue were 1.211 times as likely compared to having had more than one behavioral health issue. Of the children aged 10-17 years old, the odds of ever having had no or one developmental disability were 1.396 times as likely compared to ever having had more than one developmental

disability. Of the children aged 10-17 years old, the odds of having no or a little difficulty making or keeping friends within the past 12 months was 0.997 as likely compared to having a lot of difficulty making or keeping friends. Of the children aged 10-17 years old, the odds of no emotional support were 0.997 times as likely compared to having emotional support (Table 5).

Table 5: Simple Logistic Regression for Individual Factors related to obesity in non-Hispanic Black and Hispanic Children, ages 10-17

BMI Obese or Overweight BMI %ile (ref: 1)	
Individual Factors	**OR (95% CI)**
Age of Child (years)	0.953 (0.936,0.971)
Gender of Study Child Male vs Female	 2.35 (1.23,3.44)*
Race Hispanic White Non-Hispanic Black Non-Hispanic Other/Multi-Racial Non-Hispanic[R]	0.956 (0.906,1.009)*
Mental Health Index[1] No Mental Health Issues One Mental Health Issue Two Mental Health Issues[R]	1.30 (1.208,1.399)*
Behavioral Health Index[2] No Behavioral Health Issues One Behavioral Health Issue Two Behavioral Health Issues[R]	1.211 (1.126,1.302)*

Developmental Disability Index[3] No Developmental Disabilities One Developmental Disability Two Developmental Disabilities[R]	1.396 (1.283,1.518)*
Difficulty Keeping or Making Friends in the Past 12 Months No difficulty A little difficulty A lot of difficulty[R]	0.997 (0.993,1.001)*
Parenting Emotional Support No emotional support Emotional support[R]	0.997 (0.954,1.043)*

1: Mental Health Index was a composite of two variables if the study child had ever had depression or anxiety.
2: Behavioral Health Index: was a composite of two variables if the children currently have behavioral or conduct problems, age 3-17 years and ADD / ADHD Ever.
3: Developmental Disability Index: was a composite of three variables ASD Ever, intellectual disability ever, and learning disability.
R: Reference Group
* p<0.05, **p<0.01, ***p<0.001

Using descriptive statistics, the study scope was expanded by including interpersonal factors along with age and race. The total surveyed population was broken down into subgroups or representative samples to gain a better, more comparable collection of responses. Of 220 children, 7.4% reported definitely being bullied, picked on, or excluded by others. Of 683 children, 23% reported being somewhat bullied, picked on, or excluded by others. Of 2,035 children, 68.6% reported never being bullied, picked on, or excluded by others. Of 1,251 children, 42.8% reported no adverse childhood experience. Of 772 children, 26.4% reported having one adverse childhood experience. Of 902 children, 30.8% reported having two or more adverse childhood experiences. Of 551 children, 19.2% reported that the family received assistance in the last 12 months. Of 1,919 children, 67% reported that their family received no assistance in the last 12 months. Of 1,845 children, 62.2% reported that the mental health status of the mother was excellent or very good. Of 737 children, 24.8% reported that the mental

health status of the mother was good, fair, or poor. Of 474 children, 82.7% reported no tobacco use in the house. Of 99 children, 17.3% reported tobacco use in the house (Table 6).

Table 6: Descriptive Statistics for Interpersonal Factors of Obese and Overweight Children, ages 10-17[3]

Variable	**Variable**	**Variable**
Interpersonal Factors		**Frequency (%)**
Bulled, Picked-on, or Excluded by Others	Definitely true Somewhat true Not true	220 (7.4) 683 (23.0) 2035 (68.6)
ACE Score[5]	Child Experienced 0 ACEs Child Experienced 1 ACE Child Experienced ≥ 2 ACEs	1251 (42.8) 772 (26.4) 902 (30.8)
Family Received Assistance in Last 12 Months[6]	Assistance No assistance	551 (19.2) 1919 (67)
Mental Health Status of Mother	Excellent or very good Good, fair or poor	1845 (62.2) 737 (24.8)
Tobacco Use in House	No tobacco use Tobacco use	474 (82.7) 99 (17.3)

Note:

3Percentages in table may not add up to 100% due to missing data.

5. (ACEs) Adverse Childhood Experiences
Child Experienced: Hard to Cover Basics Like Food or Housing, Parent or Guardian Divorced, Parent or Guardian Died, Parent or Guardian Time in Jail, Adults Slap, Hit, Kick, Punch Others, Victim of Violence, Lived with Mentally Ill Person, Lived with Person with Alcohol/Drug Problem, Treated Unfairly Because of Race)

6. Family received assistance in the past 12 months included: food stamps, WIC, cash, and free or reduced lunch.

Using a logistic regression model, an odds ratio was determined for each of the interpersonal factors along with age and race. A significant relationship was not found between children ages 10-17 years old being bullied, picked on, or excluded by others and being obese or overweight due to the odds ratio being within the confidence interval. A significant was not found between children ages 10-17 years old having had an adverse childhood experience and

being obese or overweight due to the odds ratio being within the confidence interval. Of the children ages 10-17 years old, the odds of the family receiving assistance was 1.473 times as likely as having received no assistance. Of the children ages 10-17 years old, the odds of the mental health status of the mother being excellent or good was 1.426 times as likely compared to being good, fair, or poor (Table 7).

Table 7: Simple Logistic Regression for Interpersonal Factors related to Obesity in Non-Hispanic Black and Hispanic Children, Aged 10-17

BMI Obese or Overweight BMI %ile (ref: 1)	
Variable	**OR (95% CI)**
Interpersonal Factors	
Bulled, Picked-on, or Excluded by Others Definitely true Somewhat true Not true[R]	0.996 (0.992,1.000)
ACE Score[5] Child Experienced 0 ACE Child Experienced 1 ACE Child Experienced ≥ 2 ACE[R]	1.003 (1.000,1.007)
Family Received Assistance in Last 12 Months[5] Assistance No assistance[R]	1.473 (1.391, 1.559)*
Mental Health Status of Mother Excellent or very good Good, fair or poor[R]	1.426 (1.288, 1.580)*
Tobacco Use in House No tobacco use Tobacco use[R]	1.303 (0.982, 1.731)

Note:
Weight-status was defined as overweight and obese.
5. ACEs) Adverse Childhood Experiences (need to include a list of what these are in the methods:
Child Experienced: Hard to Cover Basics Like Food or Housing, Parent or Guardian Divorced, Parent or Guardian Died, Parent or Guardian Time in Jail, Adults Slap, Hit, Kick, Punch Others, Victim of Violence, Lived with Mentally Ill Person, Lived with Person with Alcohol/Drug Problem, Treated Unfairly Because of Race)
6: Assistance included, food stamps, WIC, cash, and free or reduced lunch.

Using descriptive statistics, the study scope was expanded by including community factors along with age and race. The total surveyed population was broken down into subgroups

or representative samples to gain a better, more comparable collection of responses. Of 710 children, 23.9% reported no neighborhood cohesion. Of 364 children, 12.3% reported neighborhood cohesion. Of 453 children, 15.7% reported having no neighborhood amenities. Of 350 children, 12.1% reported having neighborhood amenities. Of 2,254 children, 78% reported not having neighborhood elements. Of 403 children, 13.9% reported having neighborhood elements (Table 8).

Table 8: Descriptive Statistics for Community Factors in Obese and Overweight Children, ages 10-17

Variable	**Responses**	**Frequency (%)**
Neighborhood Cohesion[6]	No Cohesion Cohesion	710 (23.9) 364 (12.3)
Neighborhood Amenities[7]	Does not have neighborhood amenities Has neighborhood amenities	453 (15.7) 350 (12.1)
Detracting Neighborhood Elements[8]	Does not have neighborhood elements Has neighborhood elements	2,254 (78.0) 403 (13.9)

Note:
Weight-status was defined as overweight and obese.
6: Neighborhood Cohesion includes: people helping each other out, people watching out for each other's children, child being safe in neighborhood, and us knowing where to go for help in our community.
7. Neighborhood amenities includes: sidewalks/walking paths, park/playground, recreation center, and library/book mobile.
8. Detracting Neighborhood Elements include: litter/garbage, poorly kept rundown housing, and vandalism/graffiti.

Using a logistic regression model, an odds ratio was determined for each of the community factors along with age and race. A significant relationship was not found between children aged 10-17 having tobacco use in the house and being obese or overweight. A significant relationship was also not found between children aged 10-17 having neighborhood cohesion and being obese or overweight due to the odds ratio being within the confidence interval. Of the children aged 10-17, the odds of not having neighborhood amenities was .931

times as likely as having neighborhood amenities. Of the children aged 10-17, the odds of not having neighborhood elements was 1.205 times as likely as having neighborhood elements (Table 9).

Table 9: Simple Logistic Regression for Community Factors Related to Obesity for non-Hispanic Black and Hispanic Children, Aged 10-17

BMI Obese or Overweight BMI %ile (ref: 1)	
Variable	**OR (95% CI)**
Community Factors	
Neighborhood Cohesion[6] No Cohesion Cohesion[R]	1.000 (0.999, 1.001)
Neighborhood Amenities[7] Does not have neighborhood amenities Has neighborhood amenities[R]	0.931 (0.903, 0.959)*
Detracting Neighborhood Elements[8] Does not have neighborhood elements Has neighborhood elements[R]	1.205 (1.133, 1.282)*

Note:
6: Neighborhood cohesion included people helping each other out, people watching out for each other's children, child being safe in neighborhood, and us knowing where to go for help in our community.
7: Neighborhood amenities included sidewalks/walking paths, park/playground, recreation center, and library/book mobile.
8: Detracting neighborhood elements included litter/garbage, poorly kept rundown housing, and vandalism/graffiti.
R: Reference Group
* $p<0.05$, ** $p<0.01$, *** $p<0.001$

A stepwise selection method was used within the multiple logistic regression model to determine which factors significantly contributed to being obese or overweight. Results showed age of child, mental health index, adverse childhood experiences score, and family receiving assistance in the last 12 months to be significant (Table 10).

Table 10: Combined Model of Individual, Interpersonal, and Community Factors Related to Obesity for non-Hispanic Black and Hispanic Children, Aged 10-17

BMI Obese or Overweight BMI %ile (ref: 1)	
Variable	**OR (95% CI)**
Age of Child (years)	1.057 (1.036,1.077)*
Mental Health Index[1]	1.649 (1.332,2.040)*
ACE Score[2]	0.801 (0.757,.848)*
Family Received Assistance in Last 12 Months[3]	0.686 (0.281, 1.676)*

Note:
1: Mental Health Index was a composite of two variables if the study child had ever had depression or anxiety.
2: (ACEs) Adverse Childhood Experiences: Child Experienced: Hard to Cover Basics Like Food or Housing, Parent or Guardian Divorced, Parent or Guardian Died, Parent or Guardian Time in Jail, Adults Slap, Hit, Kick, Punch Others, Victim of Violence, Lived with Mentally Ill Person, Lived with Person with Alcohol/Drug Problem, Treated Unfairly Because of Race)
3: Assistance included, food stamps, WIC, cash, and free or reduced lunch.
R: Reference Group
* p<0.05, **p<0.01, ***p<0.001

Discussion

Significant associations were found between the prevalence of overweight and obese children and individual, interpersonal, and community factors. A significant association was also found between the prevalence of overweight status or obesity and prevalence of anxiety or depression in children aged 10-17 years old. However, when further broken down by race, non-Hispanic Black and Hispanic children, a significant association was not found. A follow-up study investigating childhood obesity among non-Hispanic Black and Hispanic populations and the prevalence of mental health conditions, including but not limited to anxiety and depression, as well as behavioral health conditions, could further contribute to findings on health disparities and inequities based on the social determinants of health. This could also identify potentially under-funded communities or barriers, such as access, to services such as preventative and mental health.

Data from this study supports the greater narrative that social determinants of health affect health outcomes among different populations. Low-income and non-White communities are known to have poorer health outcomes. If these communities have a higher prevalence of childhood obesity, a comorbidity of other chronic and serious conditions, and are the most disproportionately affected by social health disparities, then the health outcomes will be more severe if the current trend is upheld. Therefore, recommendations to local policy-makers would be to implement accessible programs for preventative health care and mental health services, in addition to health educational resources among low-income and non-White communities.

Conclusions

Using data from the 2017 NSCH and SPSS statistical analytical software, the study concluded that a significant correlate was not observed between non-Hispanic African-American and Hispanic obese children and the prevalence of anxiety and depression. These findings are consistent among national data (Mannan, Mamum, Doi, and Clarvino, 2016). The study literature review demonstrated that many variables contribute to childhood obesity including behavior and social determinants of health (includes mental health factors such as anxiety and depression). The study concluded that further investigation between the prevalence of mental health factors and childhood obesity should be conducted in order to determine if modifications are needed in program interventions on community, intrapersonal, and individual levels of social determinants of health.

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Systemic Racial Bias in Health Care Delivery to Women

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Abstract

Introduction: The main hypothesis is that racial bias towards minority women perpetuates systemic racism in the U.S., health care system resulting in negative health outcomes and detrimental incidences.

Methods: In this semi-systematic and literature review, an informational web-based search was used from the U.S. National Library of Medicine at the National Institutes of Health, Elsevier, the Centers for Disease Control and Prevention, and ResearchGate. Inclusion criteria were adult women over the age of eighteen, women of color restricted to the United States only, and different areas of health care delivery.

Results: This review found that women of color, especially black women, faced substantially more systemic racial bias in the United States health care delivery system and felt more excluded from adequate health care from clinicians due to racial discrimination.

Discussion: There is very little literature on how to combat racial bias in health care delivery in the U.S. The mainframe of this stereotypical behavior from health care workers is conventional conscious and subconscious biases. Change needed for this type of behavior needs to start at the cognitive level.

Keywords: Health care delivery, minority women, racial bias, implicit racial bias, gender bias

Introduction

Minorities face societal biases in the United States health care system that are a result of prejudicial and discriminatory acts and behaviors yielding depraved health outcomes (Lewis et al., 2016). Women, especially minority women, are often subjected to these experiences, leaving them feeling marginalized, avoiding wellness visits, and scheduled physician appointments because of these racially bias incidences (Lewis et al., 2016; Gary, et al., 2015). Minority women face racial disparities in many aspects in health care delivery in the U.S. health care system as in the United States, African American women represented 60% of new HIV infections and had a 2.8-3.7 times higher likelihood of dying from pregnancy-related deaths (Prather, et a., 2016). The aim of this study was to identify documented incidents of systemic racism in health care delivery against minority women in the U.S. health care system. The overall goal of the present review was to investigate racial biases towards minority women, which perpetuates systemic racism in the U.S. health care system resulting in negative health outcomes and detrimental incidences.

Methods

For this study, a semi-systematic review was conducted following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (Snyder, 2019; Moher et al., 2009). In addition, a literature review was conducted when PRMISA guidelines were not met (Snyder, 2009). The review included quantitative and qualitative, English only published studies. The timeframe of this study was conducted within the last 18 years from 2002 to 2020, in order to capture the more recent data. This research review was conducted using the National Center for Biotechnology Information (NCIB/PubMed), and U.S. National Library of Medicine databases. The following search terms, “racial bias”, “gender bias”, “health care delivery, and the “United States” were used for the review. Additional research sources included

Elsevier, the Centers for Disease Control and Prevention (CDC), ResearchGate, and Google search engine to locate additional articles, using the same search terms. The study's semi-systematic and literature review was conducted during the months of October and November 2020.

The study reviewed qualitative and quantitative research articles that studied the impacts of racial and gender bias in health care delivery in the U.S. for women of color. Research articles included in this search were adult women over the age of eighteen, women of color, restricted to the U.S. only, and different areas of health care delivery. Research articles excluded from this search were women under the age of eighteen, men regardless of race, Caucasian women, and racial and gender bias in health care delivery outside of the United States.

Data extraction was conducted based on the area of health care delivery, the aim and/or objective of the study, methodological study and data collection methods, and the research study design (CASP, 2018; Moher et al., 2009). This data extraction resolved the issue of duplications. A total of 33 references were considered for this research review based on the title and abstract. Of the 33 references considered, 15 articles were excluded that did not meet the inclusion criteria based on their aims and/or objectives. A total of 18 articles were considered to have met the inclusion criteria.

Findings

Areas of racial bias identified in the U.S health care delivery system were maternal mortality and pregnancy-related mortality rates, health care provider interactions, insurance-based discrimination in health care delivery, and racial and gender bias in labor pain management. These topics were chosen due to the high rates of racial disparities, unconscious

racial bias impacting health care delivery, and the unique perspective of the victim's point of view.

Racial Bias Impacting Maternal Mortality and Pregnancy-Related Mortality Rates

Maternal mortality in the U.S. exhibits one of the most notable racial disparities in women's health outcomes (Maternal Health Task Force, n.d.). Despite the significant increase in financial support in hospital-based maternity care and its participation in the Millennium Development Goals (MDGs), the maternal mortality ratio, as of 2018, was 17.4 deaths per 100,000 live births (CDC, 2019a; Maternal Health Task Force, n.d.). The National Center for Health Statistics reported disproportionate rates of racial and ethnic maternal deaths in 2018; 37.3 deaths per 100,000 live births were reported for non-Hispanic black women, 14.9 deaths per 100,000 live births for non-Hispanic white women, and 11.8 deaths per 100,000 live births for Hispanic women (CDC, 2019a). African American women were three to four times more likely to have a higher maternal mortality rate (Maternal Health Task Force, n.d.). Conversely, African American women also experienced higher pregnancy-related mortality deaths (PRMRs) with 40.8 deaths per 100,000 live births as compared to their white counterparts, (Maternal Health Task Force, n.d.).

From 2007-2016, PRMR's increased from 15.0 to 17.0 per 100,000 live births from 2007–2016 (CDC, 2019b). The CDC's implementation of the Pregnancy Mortality Surveillance System, that tracked pregnancy-related deaths from 1987 to 2017, saw an increase from 7.2 deaths per 100,000 births to 17.3 deaths per 100,000 live births, respectively in the U.S. (CDC, 2020a). Black, American Indian, and Alaska Native women were found to be two to three times more likely to die from pregnancy-related deaths, with disparities increasing over the age of 30 and PRMRs four to five times higher in this group than their white counterparts (CDC, 2019b).

Non-communicable diseases, such as cardiomyopathy, thrombotic pulmonary embolism, and hypertensive disorders, contributed to more pregnancy-related deaths in black women than their white counterparts (CDC, 2019b; Maternal Health Task Force, n.d.). Delayed prenatal care visits also contributed to pregnancy-related deaths, with 25% of women in the U.S. not receiving the recommended prenatal visits (Maternal Health Task Force, n.d.). This decline in prenatal care visits was found to occur in 34% of African American women and 41% of American Indian and Alaska Native women (Maternal Health Task Force, n.d.). From 2000 to 2017, while the world saw a reduction in maternal mortality deaths by 38%, the U.S failed to not only meet its national goals of a reduction in MMR by 10% between 2007 and 2020, but also the Healthy People 2020 goal of decreasing the MMR from 12.7 maternal deaths per 100,000 live births in 2007 to 11.4 maternal deaths per 100,000 live births (Maternal Health Task Force, n.d., USHHS, 2014).

Interactions with Health Care Providers

Unconscious, implicit cultural, and stereotypical characterization has led to racial and gender biases which have inadvertently socially grouped individuals into a categorically accepted minority of social norm(s) (Burgess et al., 2016; Burgess et al., 2007). This, in turn, has influenced the interpretation of behaviors and symptoms, under the assumption that it is typical conduct for an individual's race, ethnicity, and sex (Burgess et al., 2016; Burgess et al., 2007). These unconscious biases have led to poor health care delivery for women of color, often leading to prolonged undiagnosed health problems or poor treatment of a diagnosed issue (Burgess et al., 2016; Gary et al., 2015; Burgess et al., 2007). Gary et al., (2015) stated that the lack of communication and poor clinician-to-patient interactions often led to incomplete diagnostic information and curative recommendations for women, particularly for black women. As cited in one patient's experience:

> *When the doctor come in he'd cross his leg, and say "How you doing; you doing fine? Well, is there anything bothering you?" "Well," I'd say, "my back is still bothering me." He'd say, "Well, it'll get better. Sign this paper. Take this." That doctor did not put his hands on me. Never touched me*! (Gary et al., 2015, p. 7).

Clinicians' aversion to performing proper physical assessments of their patient's issues can create an unwelcoming environment, furnished with racial undertones, sending an implicit, yet strong message, that the patient is to the clinician, subhuman, disgusting, or dirty in some way (Gary et al., 2015). Okoro et al., (2020) reported one participant's experience with a health care provider:

> *They treat you different, even with the way they greet you. - ...because you African American. You do get treated a little bit different, because they don't even have the compassion a lot of times to Afro Americans. They don't consider that a lot of things is serious with us when it is* – (Participant #2) (p. 4).

Insufficient time spent with patients by clinicians and other health care providers has jaded many black women, knowing they have been unheard and underserved. This type of behavior from clinicians can influence women of color's perception of clinicians, often delaying them in scheduling or not scheduling follow-up appointments at all as reported in one participant's experience by Okoro et al.(2020):

> *I thought about not going to that dentist office anymore because when we go there I feel we're stared at. It's super uncomfortable in there. I called it, "We're ink on paper." We are the spot on paper, ink on paper. That's how I feel when I go in there with all the white people around. 'I was gonna stop going because of the stares, because of the feeling I have because I'm in there telling my kids, "Be still. Don't do anything." Even*

> *though all these little white kids are running around. "Don't you stand up, don't move because we will be look at. You will destroy it. If something is broke, it will be because of you. If you are there and it's over there, it'll be because of you." I do that with my kids. That's not right, so I stopped.* (Participant #4) (p.4).

Insurance-Based Discrimination in Health Care Delivery:

Insurance-based discrimination can have negative health outcomes for women of color and can impact their perceptions of care from clinicians and other health care providers (Weech-Maldonado et al., 2012). Research by Weech-Maldonado et al., (2012) reported that Medicaid enrolls roughly 60 million Americans, providing health insurance coverage to an estimated 27% of all blacks or African Americans. This same study also reported that women of color were three times more likely to experience insurance-based and racial and ethnic discrimination when enrolled in the Medicaid program. Medicaid and Medicare beneficiaries also expressed grievances about their hospital experiences, reporting a lack of quality of care and a more hostile environment because due to their type of insurance (Gary et al., 2015; Weech-Maldonado et al., 2012). Women of color, especially African American women who are economically disadvantaged and living in low-income areas, have significantly wider health gaps and lower health statuses compared to their white counterparts living in suburban areas (Okoro et al., 2020).

Racial and Gender Bias in Labor Pain Management

The Institute of Medicine (IOM) determined that implicit racial bias, stereotyping, and prejudice exist in health care providers' conscious and subconscious thinking contributing to discriminatory behaviors in health care practice (Dehon et al., 2017). As reported by the 2012 National Healthcare Disparities, black patients received poorer health care service than white

patients for 40% of the quality and disparity measures (Dehon et al., 2017). For example, patients of color were 22% to 30% less likely to receive analgesic medication and 17% to 30% were less likely to receive narcotic analgesics (Dehon et al, 2017). Patients of color also had an increased chance of experiencing longer wait times and were less likely to be admitted to the hospital as compared to their white counterparts (Dehon et al, 2017).

In women of color, labor pain has been found to be interpreted differently by clinicians based on the perceptions of the individuals' culture, race, and ethnicity (Mathur et al., 2020). A study by Mathur et al., (2020) suggested that prior evidence has shown that clinicians show racial maternal bias in childbirth pain, contributing to the unequal distribution of pain management for women of color. According to Mathur et al., (2020), White American women were perceived to have experienced more significant labor pain than all women of color and Hispanic American women were perceived to experience less significant labor pain. The same study noted that women overall in the U.S. did report variations in pain sensitivity according to different races; however, African Americans reported greater pain sensitivity compared to both Hispanic and White women (Mathur et al., 2020).

During childbirth, women of color's opinion about their pain management were commonly not sought after, with the stigmatization of being uncooperative if they requested or declined the same treatment as white patients (Mathur et al., 2020). The lack of understanding and the inaccurate understanding of how labor affects women of all cultures can influence maternal racial bias resulting in the inequitable treatment of labor pain management (Mathur et al., 2020). Conversely, the dehumanization of women of color by clinicians who presumed that they experience less pain during childbirth also suggests the inequitable management of labor pain (Mathur et al., 2020). Conversely, the cultural super humanization of the African American

woman as a “Strong Black Woman/Superwoman,” who is resilient in the face of adversity, may lead to undermining labor pain and inappropriate health care treatment (Mathur et al., 2020, p. 8). This type of stereotyping can lead to decreased reasons to help women of color and a decline in the welfare of women during labor pain (Mathur et al., 2020). This same study found that socio-demographic and -geographic factors did not influence presumptive stereotypes, but rather stereotypical cultural constructs held by clinicians significantly influenced their application of pain management for women of color (Mathur et al., 2020).

Summary

Women of color, especially black or African American women, face more racial bias in health care delivery as compared to Caucasian women. The IOM found that clinicians stereotyping, and prejudicial behaviors have led to the inequitable distribution of health care delivery to women of color in the U.S. Women of color also experienced diminished health care delivery in hospital settings, especially those insured with Medicare and Medicaid, as some reported being met with hostile and dismissive attitudes from health care providers. The presumptive stereotypical constructs held by providers have also led to the bias and mismanagement of labor pain sensitivity for women of color. The mainframe of this stereotypical behavior from providers is the conventional conscious and subconscious biases, which infects and becomes relevant in the health care delivery system. The change needed for this type of behavior needs to start at the cognitive level, with health care providers being made aware of their prejudices and learning how to correct their behaviors.

Discussion

Despite the racial biases that plague health care delivery to women of color, there is extraordinarily little literature on direct interventions to improve health care delivery in the U.S.

The social determinants of health constructs of race/ethnicity, socioeconomic status, and gender are stereotypically reinforced by both individuals and society, altering the psychosocial behaviors of how women of color are perceived individually, versus how they are stereotypically perceived socially (Okoro et al., 2020). Advocating for a social medicine curriculum that includes the social determinants of health in medical school education, may also afford health care providers with a more complete understanding of the social constructs surrounding the various minority populations they serve (Axelson et al., 2017). Incorporating the Social-Ecological Model in health care will help clinicians to better understand how the influential and overlapping complexities of each level can address and prevent racism in health care on a multilevel system (CDC, 2020b).

Further, literature and systematic reviews of cognitive-behavioral therapies on racial biases could be helpful to clinicians' psychological thinking in overcoming racial prejudices (Zeidan et al., 2018; Burgess et al., 2016; Burgess et al., 2007). Health care facilities could also incorporate cognitive-behavioral and mindful-based therapies that address behavioral biases towards systemic racism in health care delivery (Zeidan et al., 2018; Burgess et al., 2016). Implicit racial bias training programs should be introduced into health care settings to see if implicit racial bias does contribute to the reduction in the quality of care delivered to women of color (Zeidan et al., 2017). Tracking racial disparities in health care delivery at the government and non-profit levels, while at the same time addressing racial biases through structural competency, can help to access the inequalities in institutionalized social conditions that determine health-related resources (CDC, 2019; Metzl and Hansen, 2014).

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Association Between Breastfeeding During Infancy and Obesity During Adolescence

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Introduction

- The short-term benefits of breastfeeding for both mothers and their infants are now well-recognized beyond any doubt.
- Childhood obesity and its consequences represent a major public health problem.
- Globally, it has been estimated that 18% of children and adolescents aged 5-19 years old were either obese or overweight.
- While the short-term benefits of breastfeeding are well-recognized for infants and young children, there is currently a huge interest in whether breastfeeding also has long-term benefits beyond early childhood, such as during adolescence or adulthood.
- According to the Developmental Origin of Health and Disease (DOHaD), breastfeeding, as an early life exposure, has been proposed to play a role in reducing the risk of overweight/obesity throughout life.
- Several epidemiological studies have attempted to demonstrate the link between breastfeeding during infancy and the risk of obesity in adolescence or adulthood, but the findings remained inconclusive.

Purpose

This study aimed to investigate the association between breastfeeding during infancy and overweight/obesity during adolescence.

Methods

Study Site and Participants:
- This is a cross-sectional study in which data were collected on schoolgirls attending public and private high schools (age range: 14 – 22 years).

Data Collection:
- Data were collected from schoolgirls by self-administered questionnaire.
- Mothers were considered the only source of information about history of breastfeeding. Data from mothers were collected through telephone interview using structured questionnaire.
- Body weight was measured to the nearest 0.1 kg using calibrated digital scales (Beurer GS 19) without shoes or heavy clothing.
- Height was measured to the nearest 0.1 cm using a stadiometer with full extended knees and shoes off.

Statistical Methods:
- Body mass index (BMI) was calculated as weight in kg ÷ height in meters.
- BMI-for-age z-scores were calculated using WHO growth charts. Overweight was defined as >1 SD to ≤2 SD & obesity > 2 SD using WHO growth reference median.
- BMI cut off points for adults was used for schoolgirls aged >18 years. (<18.5 kg/m2 underweight, 18.5-24.9 kg/m2 normal weight, 25.0-29.9 kg/m2 overweight, > 30.0 kg/m2 obese).
- Prevalence Ratio was calculated using Stata command "oddsrisk".
- Univariable and multivariaIbe logistic regression was used to assess the association between obesity and breastfeeding during infacny while adjusting for potential confounders.

Results

- The total number of schoolgirls included in this analysis was 775 schoolgirl.
- The mean (SD) age was 16.7 (1.1) years.
- The prevalence of overweight and obesity was (23.6%) and (22.2%) respectively. The prevalence was not significantly different between public and private schools (p=0.926).

Table (1): Prevalence of overweight or obesity in 775 female students by school type (public and private)

Table (2): Factors associated with overweight/obesity among 775 adolescent females in univariable analysis.

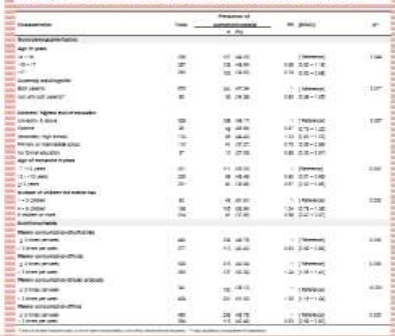
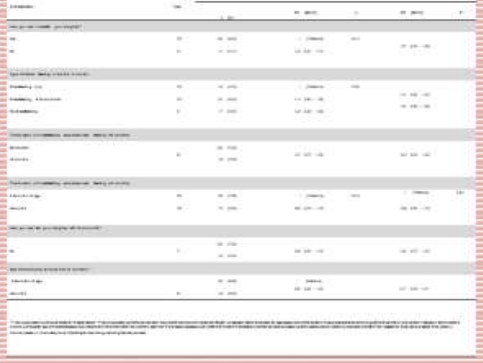


Table (3): Association between overweight/obesity during adolescence and feeding practices during infancy before and after adjusting for potential confounders



Findings

- Whether the schoolgirl was ever breastfed or not showed no association with overweight/obesity; crude PR=1.32 [95%CI: 0.81 - 1.74], (P=0.214) and adjusted PR=1.07 [95%CI: 0.52 - 1.65], (P=0.813).
- Type of breastfeeding (exclusive, mixed, no breastfeeding) during infancy was not significantly associated with overweight/obesity in both univariable (P=0.293) and multivariable analysis (P=0.589).
- There was no significant association between duration of breastfeeding and overweight/obesity, whether it was fitted as a continuous or a categorical variable as (≤4 compared to >4 months of life) and also as (≤6 compared to >6 months) and conducted separate analyses.
- Whether the participant was formula fed or not was not significantly associated with overweight/obesity; crude PR:0.89 [95%CI: 0.64 - 1.15], (P=0.410) and adjusted PR: 1.06 [95%CI: 0.70 - 1.43], (P=0.758).
- There was no significant association between the age at which formula milk feeding was initiated whether fitted as a continuous or a categorical variable (≤ 4 vs. > 4 months of life).

Conclusions

In conclusion, we found no significant association between breastfeeding or breastfeeding duration during infancy and overweight/obesity during adolescence. Breastfeeding has other indisputable benefits for mothers and children and should be encouraged whether or not it is associated with obesity later at life. Further longitudinal studies that collect data on breastfeeding and other feeding practices prospectively from birth until adolescence are needed to elucidate the long-term benefits of breastfeeding in terms of obesity during adolescence. Such studies should collect data on potential confounders such as genetic and epigenetic factors in addition to repeatedly monitor diet over the whole study period.

Association Between Meal Program Participation and Protein Intake in US Adults 65 and Older: A Cross-Sectional Analysis of the NHANES 2013-2018

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Virginia Commonwealth University School of Medicine

MAIN FINDINGS

- There was no significant difference in protein intake by meal program participation.
- Race may play a role in protein intake among individuals 65 years and older.
- Non-Hispanic Blacks experienced a two-day average 8.82 grams lower than their white counterparts [SE:1.48; p<.0001], even when gender, income, age, and marital status were controlled.
- Hispanic/Latinos' two-day protein average was 4.29 grams lower [SE:2.05; p=0.0426].

CONCLUSIONS

- Cross-sectional, complete case analysis design limits ability to make causal judgements or recommendations.
- Our research suggests that public health professionals should aim for more complete collection of food frequency information, especially protein sources, during health assessments.
- This may be especially important for individuals 65 and older from underrepresented minority groups.

Estimated Regression Coefficients Parameter	2 Day Mean Protein Intake in grams (standard error)	Pr > |t|
Intercept	94.43 (2.67)	<.0001
Site and Delivery	-2.87 (4.59)	0.5357
Only Site Meals	-1.99 (2.13)	0.3566
Only Delivery Meals	-2.15 (4.53)	0.6376
Neither	reference	.
80+	-11.27 (2.1)***	<.0001
75 to 79	-6.8 (2.58)*	0.0115
70 to 74	-5.93 (2.16)**	0.0085
65 to 69	reference	.
Other	1.93 (3.44)	0.5779
Hispanic/Latino	-4.29 (2.05)	0.0426
Non-Hispanic Black	-8.82 (1.48)***	<.0001
Non-Hispanic Asian	0.98 (2.66)	0.7146
Non-Hispanic White	reference	.
Under $20,000	-8.44 (2.47)*	0.0014
$20,000 to $44,999	-7.37 (1.8)***	0.0002
$45,000 to $74,999	-3.91 (2.08)	0.0661
$75,000+	reference	.
No Partner	1 (1.62)	0.5411
With Partner	reference	.
Female	-19.29 (1.31)***	<.0001
Male	reference	.

Boldface indicates statistical significance (*p<0.05, **p<0.01, ***p<0.001)

REFERENCES & ACKNOWLEDGEMENTS

All references available upon request.

Thanks to Peter Cunningham, PhD and Juan Lu, MD, PhD, MPH for contributing to the creation of this research question and for valuable discussion and feedback.

VCU School of Medicine
Health Behavior and Policy

BACKGROUND

- Protein calorie malnutrition (PCM) is a significant problem affecting up to one-third of adults aged 65 years or older.
- Up to 3% of adult inpatients experience PCM, which accounts for 12% of aggregate hospital costs.
- Despite the impact of malnutrition on hospital costs, little research has been done to examine protein intake among older adults who participate in meal programs.
- We used data from the National Health and Nutrition Examination Survey (NHANES) to analyze the pattern of protein intake among individuals aged 65 and older who provided an answer regarding their utilization of home-delivered meals or congregate site-accessed meals.

PURPOSE

- The purpose of this research is to provide a better understanding of the relationship between meal program participation and protein intake.

METHODS

The analyses in this study:

- utilized cross-sectional data on 2,845 individuals aged ≥65 years old who participated in the NHANES during 2013-2018 and provided data for two days of protein intake and at least one question assessing program utilization.
- examined relationships between meal participation and covariates (sex, race, marital status, income, and age) on protein intake using multiple linear regression in SAS, Version 9.4 for Windows.

$$protein\_avg = \beta_0 + \beta_1 program_1 + \beta_2 race_2 + \beta_3 income_3 + \beta_4 marital_4 + \beta_5 sex_5 + \varepsilon$$

RESULTS

- Protein intake did not differ significantly between individuals who participated in meal programs and those who did not.
- Race, income, age, and gender were significantly associated with decreased protein intake.
- Bivariate analyses significant difference in complete two-day protein data by race (p<.0001).

VCU School of Medicine
Health Behavior and Policy

Examining Motor Outcomes of Infants in Three Virginia Regions

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[1]University of Virginia School of Medicine; [2]Department of Pediatrics, Division of Neurodevelopmental and Behavioral Pediatrics, University of Virginia School of Medicine

UVA Health SCHOOL OF MEDICINE

BACKGROUND

- In 2018, 1 in every 10 babies was born premature (<38 weeks gestation)[1].
- Six to 25% of premature babies with low-birth-weight (<2500 grams) develop major neurodevelopmental impairment, the most common being **cerebral palsy**: "a disorder of motor development attributed to non-progressive disturbances occurring in the developing fetal/infant brain" [2,3].
- The Hammersmith Infant Neurological Examination (HINE), in combination with other assessments/CNS imaging, allows physicians to identify children with persistent motor differences and diagnose cerebral palsy at younger ages than historically detected[3].
- The HINE physical exam measures 34 items (total of 78 points) to assess tone, motor patterns, spontaneous movements, reflexes, cranial nerve function, and behavior, and can be used for children aged 2-24 months to predict motor outcomes [3].
- UVA Children's has a Level 4 Neonatal Intensive Care Unit with an extensive multi-disciplinary NICU developmental follow-up clinic. UVA Children's serves patients across the state of Virginia, especially from the Piedmont, Shenandoah Valley, and Southside Regions.

OBJECTIVE

The aim of this project is to determine if region of residence predicts HINE scores of infants in the UVA NICU follow-up clinic.

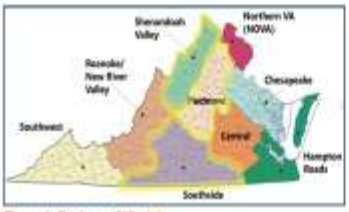

Figure 1: Regions of Virginia
Virginia Department of Housing and Community Development[4]

METHODS

A retrospective chart review of demographic and clinical characteristics of infants was performed using EMR data.

- *Sampling method: Convenience sampling*
- *n=426: Birth dates ranging from 12/2014 - 5/2020*

Region of residence was determined by mapping each patient's home address and county to one of the 9 regions of Virginia using the region map provided by the Virginia Department of Housing and Community Development (**Figure 1**).

The infants from each of the three regions were then stratified based upon HINE risk category (**Figure 2**):

- *>60= likely normal motor outcome*
- *41-60= risk for moderate motor impairment*
- *<40= risk for severe motor impairment*

Analysis Plan: Chi Square Testing (α=0.05) for categorical variable comparison with the follow hypotheses:

- *Ho= Region of residence and HINE score are independent of each other*
- *Ha= Region of residence and HINE score are not independent of each other*

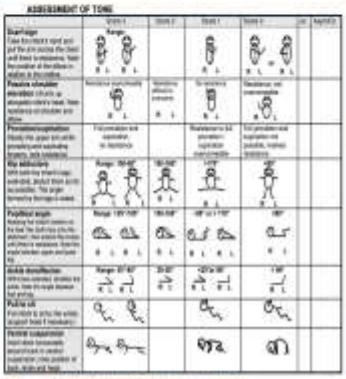

Figure 2: Sample HINE Tone Assessment[1]

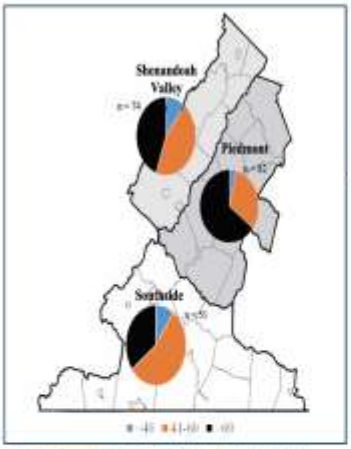

Figure 3: Percentage of HINE scores in each category within each region

RESULTS

207 infants of the sample's 426 received the HINE test and indicated their region of residence as:

- *Piedmont (n=82),*
- *Shenandoah Valley (n=74), or*
- *Southside (n=51).*

Percentage of HINE scores in each category from the three regions are as follows (**Figure 3**):

- Piedmont: <40 : 3.7% | 41-60 : 31.7% | >60 : 64.6%
- Shenandoah Valley: <40 : 10.8% | 41-60 : 44.6% | >60 : 44.6%
- Southside: <40 : 9.8% | 41-60 : 54.9% | >60 : 35.3%

Chi Square Testing: **$p = 0.00541$**, indicating there is a **significant difference** between HINE score and region of residence. Southside and Shenandoah Valley had a greater percentage of scores ≤60.

RESULTS (cont.)

Previous studies have shown that African American infants are disproportionately affected by prematurity in the U.S.[5] However, in comparing the racial demographics alone in these regions of VA, this did not account for the differences in HINE scores (**Figure 4**). Additionally, there was no significant difference in number of infants that received Early Intervention Services in different regions ($p = 0.388$).

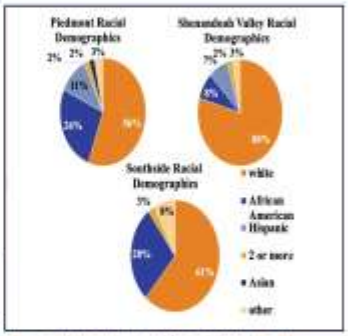

Figure 4: Racial Demographics of Infants from VA Regions.

CONCLUSIONS

- Infants in Southside and Shenandoah Valley regions have lower HINE scores compared to infants in the Piedmont region.
- Multivariate analysis is necessary to understand disparities leading to poorer outcomes in these regions.
- Making members of the care team more aware of a patient's residence is crucial to the delivery of equitable patient care.

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"References available upon request"

Fear, Frustration, and Fatalism: The Association Between Cancer Beliefs and Colorectal Cancer Screening Compliance in Virginia

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BACKGROUND

- Colorectal cancer (CRC) is the second leading cause of cancer-related deaths among men and women in the United States.[1] In Virginia, CRC is the third leading cancer in incidence rates and mortality rates among men and women.[2]
- CRC screening is recommended to begin at age 50–the preferred modality for screening is a colonoscopy performed every 10 years.[1]
- Despite recent increases in screenings, many age-eligible adults remain unscreened and rates remain below the state's goals of an 80% CRC screening rate.[3]
- Past studies have drawn correlations between certain negative cancer beliefs/barriers to access and screening compliance.
- Knowledge, attitudes, concerns, and perceptions about CRC and CRC screenings contribute to decision-making on screening compliance and adherence

OBJECTIVES

No Virginia-specific studies have been conducted to assess cancer beliefs/barriers with screening compliance

This study aims to measure **CRC screening compliance** assessed by several, specific cancer beliefs and behaviors among Virginians: **perceived causes of cancer, perceptions on cancer prevention, cancer fatalism, and frustration experienced when information-seeking.**

METHODS

- Cross-sectional design: **2020 University of Virginia and Virginia Commonwealth University Cancer Center Catchment Area survey data**
- Awarded by the National Cancer Institute in which each center surveyed populations in its catchment area using Health Information National Trends Survey (HINTS) questions to generate state-wide estimates of cancer beliefs and behaviors
- Collect estimates for the state of Virginia to guide health policy decisions, as HINTS is only available at the regional level

- Variables used:
  - Self-reported up-to-date colonoscopies (***"Is your colonoscopy up to date?"***)
  - Questions on several cancer beliefs, experiences, and perceptions
  - Demographic data
- Independent variables were derived from agreement/disagreement with the following statements:
  - ***"Everything causes cancer"***
  - ***"There is not much you can do to lower your chances of getting cancer"***
  - ***"You felt frustrated during your search for information"***
  - ***"When I think about cancer, I automatically think about death"***

RESULTS

Bivariate analysis showed lower rates of up-to-date colonoscopies among the those who agreed with the following statements:

Table 1. Population Estimates of Up-to-Date Colonoscopies by Agreement with Cancer Fatalistic Beliefs ($\chi^2(1) = 5.28$, $p = .02$)

"When I think about cancer, I automatically think about death"	Colonoscopy Up-to-Date	Colonoscopy Not Up-to-Date
Agree	52.09%	47.91%
Disagree	58.15%	41.85%

Table 2. Population Estimates of Up-to-Date Colonoscopies by Agreement with "Everything Causes Cancer" ($\chi^2(1) = 28.78$, $p < .0001$)

"Everything causes cancer"	Colonoscopy Up-to-Date	Colonoscopy Not Up-to-Date
Agree	48.35%	51.65%
Disagree	62.52%	37.48%

Table 3. Population Estimates of Up-to-Date Colonoscopies by Agreement with "There is Not Much You Can Do to Lower Your Chances of Getting Cancer" ($\chi^2(1) = 3.98$, $p = 0.04$)

"There is not much you can do to lower your chances of getting cancer"	Colonoscopy Up-to-Date	Colonoscopy Not Up-to-Date
Agree	49.82%	55.64%
Disagree	56.39%	43.61%

- A slight lower prevalence for up-to-date colonoscopies was also observed among those who agreed with the statement ***"you felt frustrated during your search for information"***, but the difference was **not significant** ($\chi^2(1) = .46$, $p = 0.50$)
- ***Controlling for sex:*** across all four independent variables, men had a higher prevalence of up-to-date colonoscopies than women. In almost all cases, the majority of men had updated colonoscopies despite agreement with the statements.

DISCUSSION

- **Lower prevalence rates of up-to-date CRC screenings among respondents who expressed more fatalistic or negative beliefs about cancer and prevention**
- Stratified by sex:
  - Men showed higher rates of up-to-date CRC screenings than women
  - A majority of men had updated screenings despite agreeing with fatalistic/negative cancer statements, where as a majority of women did not.

These findings highlight the need for interventions, policy, and emphasized provider input on addressing patient's fears, misconceptions, and increasing access to relevant cancer information in order to increase CRC screening compliance among populations in Virginia.

Addressing sex differences in CRC screening compliance in targeting these interventions is necessary given the similar prevalence rates of CRC among women and men in Virginia.

LIMITATIONS

- Given the limited scope of this study, other social determinants of health such as race, rurality, and socioeconomic status were not addressed, but should be assessed in future studies
- NoVa sample not large enough given region size, not covered by UVA or VCU cancer centers
- Only assesses one type of CRC screening (colonoscopy)

Acknowledgements

- Faculty advisor: Rajesh Balkrishnan, PhD
- This work was funded by the National Cancer Institute through grant P30CA044579-27S5

[1] American Cancer Society, 2021
[2] Virginia Department of Health, 2018
[3] Cancer Action Coalition of Virginia, 2018

Maternal perceptions of the child's weight in relation to the actual body weight of preschool children: Missed opportunity for health promotion

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Introduction

- Childhood obesity is one of the most important public health issues globally.
- Habitual food consumption and physical activity are key modifiable factors to mitigate obesity. While schoolchildren may have independence in selecting the food they consume or the amount of exercise, mothers shape these habits completely in preschool children, which highlight the potential of modifying maternal perceptions of the child weight status in preschool children.
- Previous Studies, that have attempted to link maternal perceptions of child weight and subsequent weight gain, have shown controversial findings. However those studies were on schoolchildren, the age at which mothers have no much control of their children's diet or physical activity.

Purpose

This study aimed to assess maternal perceptions of the weight status of preschool children and link it to the actual objectively measured body weight using data from Kuwait Nutritional Surveillance System (KNSS), which is funded by the government to provide nationwide information on the trends of nutritional status on all age groups over time.

Methods

Study Site and Participants:

- We used data collected by Kuwait Nutritional Surveillance System (KNSS) preschool children from primary healthcare centers when attending for vaccination from 2015 to 2019.

Data Collection:

- The weight of preschool children was measured by a digital scale to the nearest 100 gm. While the Height was measured to the nearest 0.1 cm using a height scale.
- Mother's perception of their child's weight status was assessed by personal interview using the following question "Do you think the weight of your child for his/her age is normal weight, above the normal weight, or below the normal weight?" with the options "Normal for his/her age", "Above the normal for his/her age", "Below the normal for his/her age" or "I don't know".

Statistical Methods:

- BMI-for-age z-scores were calculated using STATA "zanthro" package.
- We defined obesity as BMI z-score ≥+3.00 SD and overweight as BMI z-score ≥+2.00 SD but < 3.00 SD.

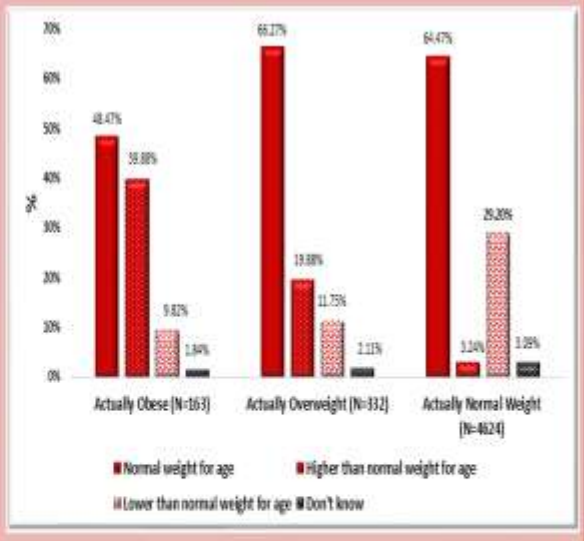
Results

- This study included 5,186 preschool children (2 to less than 5 years) from 2015 – 2019 of whom 2,612 (51.57%) were males and 2554 (48.43%) were females.
- The mean (SD) age was 3.14 (0.84) years.
- The prevalence of overweight/obesity among the study group was 9.66%.
- Forty-eight children were excluded. Therefore, this analysis comprised 5119 preschool children of whom, 4624 (90.33%) were normal weight,163 (3.18%) and 332 (6.48%) were obese and overweight respectively.

Findings

- Of 4,624 mothers with a normal weight child, 1,360 (29.20%) perceived the weight of their child as below the normal weight.
- Of 163 mothers with obese child, 79 (48.47%) thought their child was normal weight and another 16 (9.82%) thought their child is underweight.
- Of 332 mothers with overweight child, 220 (66.27%) and 39 (11.75%) perceived their child as normal weight or underweight respectively.
- Maternal perceptions of the weight status were not significantly different between boys and girls children among obese (p=0.554), overweight (p=0.414), or normal weight (p=0.103) children.

Figure (1): Maternal perceptions of the child weight status compared to objectively measured body weight among 5119 preschool (2-5 years old) children



Conclusions

Mothers generally underestimate the weight status of their preschool children in particular mothers with normal weight children. In fact, from every 10 mothers with normal weight child, 3 perceived their child as underweight, which may motivate mothers to overfeed their children. Because most of children at this age are normal weight, this likely to have great potential to increase childhood obesity. This highlights the importance of correcting mothers' misperceptions of their child's weight to combat childhood obesity. Every primary healthcare encounter including for vaccination is an opportunity to reassure mothers of normal weight children about their child weight.

Sexual function and Exercise in Perimenopausal and Postmenopausal women

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Introduction

- Women are living nearly ⅓ of their total lives post-menopause[1]
- Menopause is marked by physiological and psychological changes including sexual dysfunction [2]
- Sexual function includes desire, arousal, frequency, satisfaction and orgasm without any pain or discomfort[3]
- It is a public health initiative to improve health during menopausal years.
- Healthy People 2020 included 5 objectives for improving the health of this population
- Pharmaceutical options for treating sexual dysfunction are limited for postmenopausal women[4]
- Exercise is safe to perform during menopause and can help ease sexual dysfunction[5]

Purpose

To summarize the current literature on exercise and sexual function in perimenopausal and postmenopausal women and provide recommendations for future research on this topic.

Methods

- Search engines used to find relevant published research articles:
  - PubMed
  - EBSCOhost
  - Google Scholar.
- The following search terms were used:
  - {menopause, menopausal, postmenopausal, climacteric}
  - {exercise, physical activity, fitness, aerobic training, yoga, strength training, cardiovascular training}
  - {sexual function, sexual dysfunction, sexual wellbeing, sexual problems, sexual health, sexual difficulties, sexual satisfaction}

Exclusion criteria

- Published before 1999 (n=5)
- Focused on pelvic floor muscle exercises (n=4)
- Analyses did not differentiate between males and females (n=1)
- Participants were women who were surgically induced or medically induced into menopause (n=7)

Results

Construct	Association with exercise/PA
Urogenital symptoms of menopause.	Two positive association in observational studies. Two positive association in experimental studies.
Sexual symptoms of menopause	No study found association in observational studies. Three experimental studies reported positively associations.
Vaginal lubrication	Two studies found positive association.
Pain/dyspareunia	One positive relationship. One found no association.
Sexual satisfaction	Three studies showed positive association. Three studies showed no association.
Orgasm	Two studies found positive association. One study found no association.
Sexual desire	Two studies positively associated. One study found no association.
Frequency	One study positively associated.

Discussion: Orgasm and Vaginal Lubrication

- Because exercise improves cardiovascular health, it may contribute to increased genital blood flow[6]
- Blood flow to the vasculature of the clitoris and vagina is often needed to achieve an orgasm.[7]
- When blood diverts to the vagina, it causes a transudate of plasma into the vagina, which contributes to lubrication.[8]
- Thus, the ability to effectively divert blood flow to the vagina may result in greater lubrication.

Discussion: Sexual Desire and Frequency

- Exercising immediately before sexual activity increased sexual desire more than not exercising before sexual activity.[9]
- Basson's model of human sexual response poses that desire is only one aspect of what motivates a woman to engage in sexual activity.[10]
- Other reasons are emotional intimacy or closeness
- Sexual activity can be dyadic or solitary.
- Dyadic sexual activity is dependent on a partner's sexual desire
- Work or family responsibilities, may impede a person's opportunities to engage in sexual activity irrespective of having the desire to do so.

Conclusion

- The results may not be generalizable to all menopausal women.
- Exercise/PA most helpful to for urogenital symptoms and vaginal lubrication
  - It could also improve sexual desire, sexual satisfaction, orgasm, sexual symptoms of menopause.
  - Sexual pain may not be improved from a exercise program, data is limited.
- There is not enough research to develop specific exercise prescriptions to improve their sexual function.
- Yoga is the only form of exercise that has been replicated to improve sexual dysfunction
- Exercise can safely to added to most treatment plans for menopause-induced sexual dysfunctions as long there are no medical concerns.

Citations

Support and Depression Amongst Black Men

Francesca Whitfield
University of Virginia MPH Program

Background

- Depression affects individuals from all different socioeconomic statuses, ethnicities, and cultures
- Intersectionality of ideology, culture, and institutionalization promotes gender socialization, racism, and systematic oppression, defining barriers that hinder positive mental health outcomes
- Theoretical applications of syndemics, social cognition, and social support provide evidence of taboo in mental health communication, education, and literacy in the Black community

Methods

- Cross-sectional study design
- Target population: African American males aged 18 - 40 years old
- Population estimates calculated using survey responses of mental health and social support categories from the 2016 - 2019 Behavioral Risk Factor Surveillance System

Results

- Reported responses show that 44.0% (40.3% - 47.7%) of African American men experienced poor mental health
- No reported responses of social support from the BRFSS survey

Discussion

- African American men experience some form of mental health, but there is no comparative category to determine the degree
- Absence of responses to the social support categories can be indicative that data collection stopped short of receiving those responses, or the respondents did not want to respond and failed to document
- BRFSS should create a method that would encourage responses from African American men for the social support categories

Limitations

- Only included African American men who were not incarcerated or homeless
- Required that the respondent identify as male, but this is not exclusive to birth assignment

References

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The Impact of Military Base Presence on Tobacco Retailer Density in Texas

University of Virginia Health System

Jeannie Taylor, MPH Candidate Spring 2021

Introduction

- Tobacco use disproportionally affects military populations. In 2018 29.2% of military veterans reported tobacco use while only 19.7% of the civilian U.S. population did.[1,2]
- In 2015, the Department of Defense (DoD) found that of those active-duty military personnel that used tobacco products, 38% initiated use after enlisting.[3]
- The DoD spends over $2.7 billion annually treating tobacco related illnesses in military and veteran populations.[4]
- The tobacco industry has historically targeted the U.S. military through
    - Discount prices on bases and in commissaries
    - Targeted advertisements and campaigns
    - Advertising in military magazines distributed on bases.[5]
- **Objective**: to provide a census tract level analysis of the density of tobacco retailers around military bases using ArcGIS and SAS to understand spatial distributions of exposure to tobacco advertisements and retailers for military personnel.

Methods

Data Sources

- ArcGIS Hub, USDA, United States Census Bureau, Texas Comptroller of Public Accounts, Google Maps

Figure 1: Map of the 13 military bases in Texas included in analysis

GIS Development & Analytics (Using ArcMap v10.8 and SAS University Edition)

- Density mapping of tobacco retailers within 0.5-mile radius of census tracts.
- Proc SQL and proc survey select to randomly identify control tracts matched on Rural Urban Continuum Code (RUCC), population density, and educational attainment.
- Proc mixed in SAS was used to produce a linear regression model.

Results

Figure 2: Study retailer locations

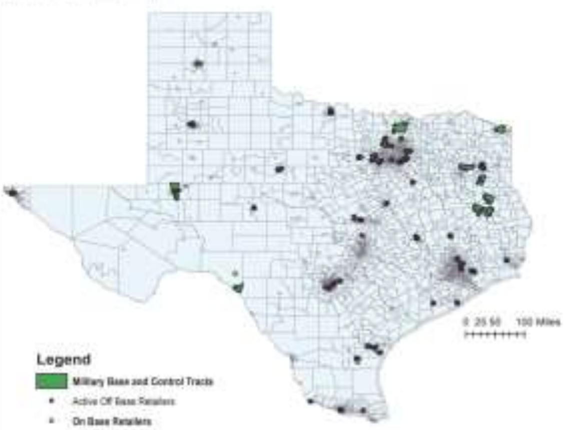

Figure 3: Example of close-up census tracts

Table 1: Retail outlet distribution by tract type

	Military Base Tracts	Control Tracts
Average Number of Retailers	11.23	16.31
Average Retail Density (per 100,000 population)	43.94	46.67

Table 2: Regression analysis results

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
Presence of Military Base	1	58	0.04	0.8472
Population Density	1	58	0.70	0.4046
Percent of Population with Bachelor's Degree	1	58	3.35	0.0766
RUCC Classification	1	58	5.60	0.0212**

Discussion

Tobacco Retailer Density Around Military Bases

- The results show no statistically significant relationship between the density of tobacco retailers within 0.5 miles and the presence of a military base.
- RUCC appeared to be a significant predictor of tobacco retailer density, which is expected as more populated areas have higher RUCC values and thus would likely have more retailers to meet the demands of a larger population.

Conclusions

- While the results do not show a statistically significant relationship between the density of tobacco retailers and the presence of a military base, this is an important factor for the Department of Defense to consider in efforts to reduce tobacco use in the military.

Future Studies

- Future studies are needed to study the density of retailers within driving distances of military bases as opposed to the 0.5-mile walking distance used in this study.
- Bases in the other states of the U.S. should be studied to provide a generalizable result for this relationship.

Continuation of project

- This project will be continued through May 2021 in the UVa MPH program.
- Further data analysis, visualization, and quality improvements will be made and written into a formal paper.

Literature & Limitations

- Limited data on current tobacco retailers on bases because they are exempt from tobacco taxes thus excluded from the registry of licensed tobacco retailers for the state of TX.
- Limited data the demographic characteristics of bases and control census tracts
    - Education data came from American Community Survey 2019
    - Population density came from ArcGIS Hub layer of US population density at the tract level in 2012
    - RUCCs were obtained from the county level using data from 2013 published by the USDA
- The radius around census tracts was set to 0.5-miles as this was considered the maximum reasonable walking distance. However, it may not be valid to assume people walk to the nearest tobacco retailer. Inclusion of a wider radius with reasonable driving distances may provide additional insight on this relationship.
- Limited data on e-cigarettes and tobacco products sold online to military members and control census tracts.

Acknowledgements

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Undergraduate Food Insecurity at a Private Liberal Arts College

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Introduction

- The USDA defines food security as "having enough food for an active, healthy life at all times."
- Food insecurity in US homes is 11.8%
- Food insecurity among US college students is 44%

Objectives

- The objective of this study was to determine rates of food insecurity on Roanoke College's campus and to compare characteristics of food insecurity before and after the COVID-19 pandemic.
- Additionally, this study seeks to determine best practices for implementation of an assistance program for students experiencing food insecurity.

Methods

- A needs assessment survey was developed in Fall 2019 following a literature review.
- The 12-item tool was distributed via Qualtrics to 926 students and 204 non-faculty staff members.
- The initial survey asked questions about food-related behaviors and sociodemographic information.
- 222 responses were received, a response rate of 19.6%.
- A second survey was administered to similar subgroups in Fall 2020.
- Again, 926 students and 204 staff members were sent surveys.
- This 14-item tool included two additional questions about COVID-19.
- The response rate was 14.1%.

Sample Survey Questions

Survey 1 (Fall 2019)

- In the last 12 months, were there days that you did not eat balanced meals because of financial concerns?
- In the last 12 months, did you ever skip meals or cut the size of your meals because there wasn't enough money for food?
- If you were to use an assistance program, would you be more likely to use a food pantry or free meal swipes in the dining hall?

Survey 2 (Fall 2020)

- Identical to the first survey, but added two COVID-19 specific questions:
- Has the COVID-19 pandemic changed you or your family's ability to afford and attain healthy, balanced meals?
- Do you feel as though you are more likely to use a food assistance program now than you were before the COVID-19 pandemic?

Results

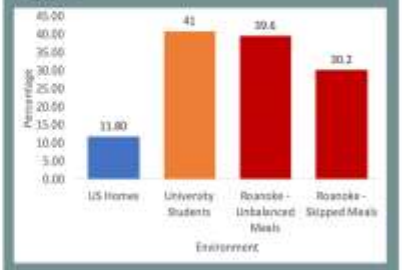

Figure 1: Comparison of Fall 2019 food insecurity rates between US homes, US university students, and students at Roanoke College in Salem, VA.

Results

- 39.2% of Fall 2019 surveyed Roanoke College Students reported eating unbalanced or unhealthy meals because of financial concerns (Figure 1).
- 30.2% reported cutting the size of their meals because of financial concerns (Figure 1).
- Juniors and seniors were most likely to be impacted (58.8% and 46.2%, respectively).
- 79.8% of food insecure respondents in Fall 2019 reported that they would prefer free meal swipes over a food pantry on campus, with similar results in Fall 2020 (Figure 2).
- In Fall 2020, 15% of students indicated that their family's ability to pay for food had changed.
- 29.5% of respondents said they would be more likely to seek food assistance now than before the COVID-19 pandemic.

Results

Figure 2: Comparison of Fall 2019 potential intervention preferences among food insecure students at Roanoke College in Salem, VA.

Discussion

- Food insecurity at small, private schools is frequently overlooked.
- This research shows that there is a need on Roanoke College's campus that is not being met.
- 29.5% of students indicated that they were more likely to use a food assistance program now than before the pandemic, indicating a new and urgent need.
- Students greatly prefer meal swipes to a food pantry (79.8% to 20.2%), likely because of reduced stigma and the appeal of the campus community found in dining halls.

Recommendations

- The concerns raised by this research show a clear need for intervention. Based on our findings, it is recommended that Roanoke College implement a meal swipe collective (i.e., Meals for Maroons) to reduce the prevalence of food insecurity among its students.

Contact and Acknowledgements

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Understanding undergraduate students' face mask use through the lens of the Theory of Planned Behavior

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Introduction

- Early March 2020, WHO had declared the COVID-19 pandemic world widely.
- CDC recommends social distancing and mask-wearing to slow the spread of the virus.
- Students at the University of Lynchburg are required to wear masks and keep social distancing while on campus.
- There are some difficulties in maintaining the mask-wearing behavior, issues of proper education, and ideological differences arose.

Purpose

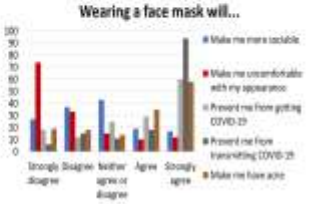
To understand student's feelings about mask-wearing through the lens of the Theory of Planned Behavior.

Methods

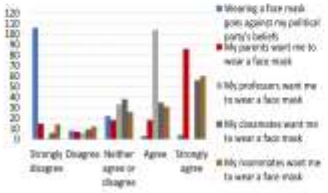
- An online survey of the University of Lynchburg students was employed
- The survey questions were limited only to students 18-25 years of age.
- Survey questions were purposefully designed using the Theory of Planned Behavior to ascertain students' perspective on mask-wearing.
- Data were analyzed using SPSS V. 27

Results – Theory of Planned Behavior

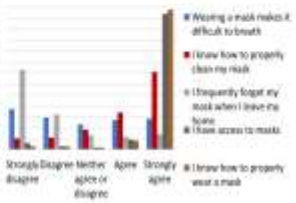
Attitudes Toward the Behavior



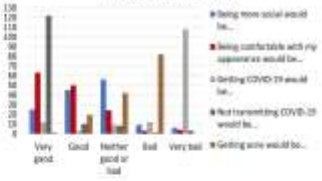
Subjective Norms



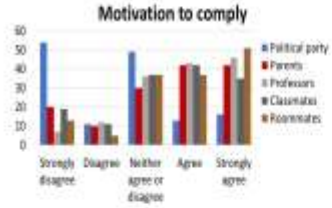
Perceived Behavioral Control



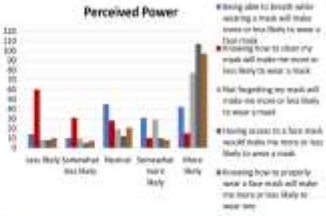
Outcome Evaluations



Motivation to comply



Perceived Power



Results - Demographics

- A total of 144 survey responses were included in the analysis
- 95.1% reported they always and almost always wear a face mask
- 73.6% women, 22.9% men
- 81.3% White, 5.6% Black, 13.1% other races
- 32.6% seniors, who had the highest participation rate
- 74.3% participants live on campus, 25.7% participants live off campus

Conclusion

- Subjective norms and control beliefs are conducive to mask-wearing
- Behavioral beliefs could be improved upon to increase mask wearing in this population
- It is important to note, that TBP can be used to better understand feeling about face mask, but should not be used to predict mask-wearing since it is mandated and therefore not strictly under volitional control

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Variations in Obesity Across the Lifespan: Why Zip Code Matters in the Roanoke Valley

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Background

- Due to the federal mandate included in a recent revision of the Patient Protection and Affordable Care Act, nonprofit hospitals are required to complete a Community Health Needs Assessment (CHNA) every three years[1], and the influence of "place" on health as begun to emerge from this data. Recently authors have found disparities in adult obesity rates between zip codes, and attribute this to differences in access to amenities that benefit one's health and socioeconomic status.[2] While this understanding is important for improving population health, it is limited because CHNAs focus solely on the adult population.
- To fully understand the impact of place on health, it is important to expand surveillance efforts to include all age groups. Moreover, understanding the impact of "place" on youth provides opportunities for communities to develop place-based strategies to prevent poor health outcomes in youth which is important for future health outcomes.

Purpose

- The aim of this study was to expand our current understanding of the influence of "place" on weight status in the Roanoke Valley by exploring the relationship between zip code and obesity outcomes in youth.

Methodology

- In a prior analysis, binomial logistic regression was applied to the 2015 Roanoke Valley CHNA[3] to explore the relationship between zip code and adult obesity across the city of Roanoke. Using zip code 24015 as the criterion zip code, the likelihood of obesity among adults was found to be lowest in 24015 (29%) and highest in 24012 (51%), 24017 (48%), and 24013 (43%; see Table 1).
- To explore the relationship between zip code and obesity in youth, data was derived from the 2017 Roanoke Valley Community Healthy Living Index (RVCHLI)[4]. The RVCHLI is a yearly citywide surveillance system that uses direct assessment of BMI-for-age to explore the relationship between city neighborhoods and health outcomes in youth. In the current study, binomial logistic regression was used to explore the relationship between zip code and youth obesity outcomes, and these findings were compared to themes observed in the 2015 Roanoke Valley CHNA[3] to look for patterns in weight status across zip codes.

Acknowledgement: This study was supported by the Center for Community Health Innovation at Roanoke College

References

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Table 1. Adult and child obesity prevalence by zip code

Zip Code	Adult Obesity (2015 CHNA)			Child Obesity (2017 RVCHLI)		
	n	Obesity Prevalence	Adj. Odds (95% CI) compared to 24103	n	Obesity Prevalence	Adj. Odds (95% CI) compared to 24103
24012	170	51%	0.95 (0.47, 1.94)	170	31%	0.96 (0.45, 2.05)
24013	156	43%	----	79	32%	----
24014	125	35%	0.60 (0.27, 1.33)	92	12%	0.29 (0.10, 0.83)
24015	123	29%	0.76 (0.36, 1.62)	139	15%	0.38 (0.16, 0.91)
24016	146	35%	0.85 (0.39, 1.81)	51	29%	0.90 (0.33, 0.46)
24017	248	48%	1.13 (0.55, 2.32)	148	25%	0.72 (0.33, 1.59)
Roanoke City	----	32%	----	----	25%	----
Virginia	----	27%	----	----	12%	----

*All odds ratio comparisons are made to zip code 24103 for consistency with the 2015 Roanoke Valley CHNA[3]

Figure 1: Zip codes with highest likelihood of adult and child obesity

Figure 2: Zip codes with lowest likelihood of adult and child obesity

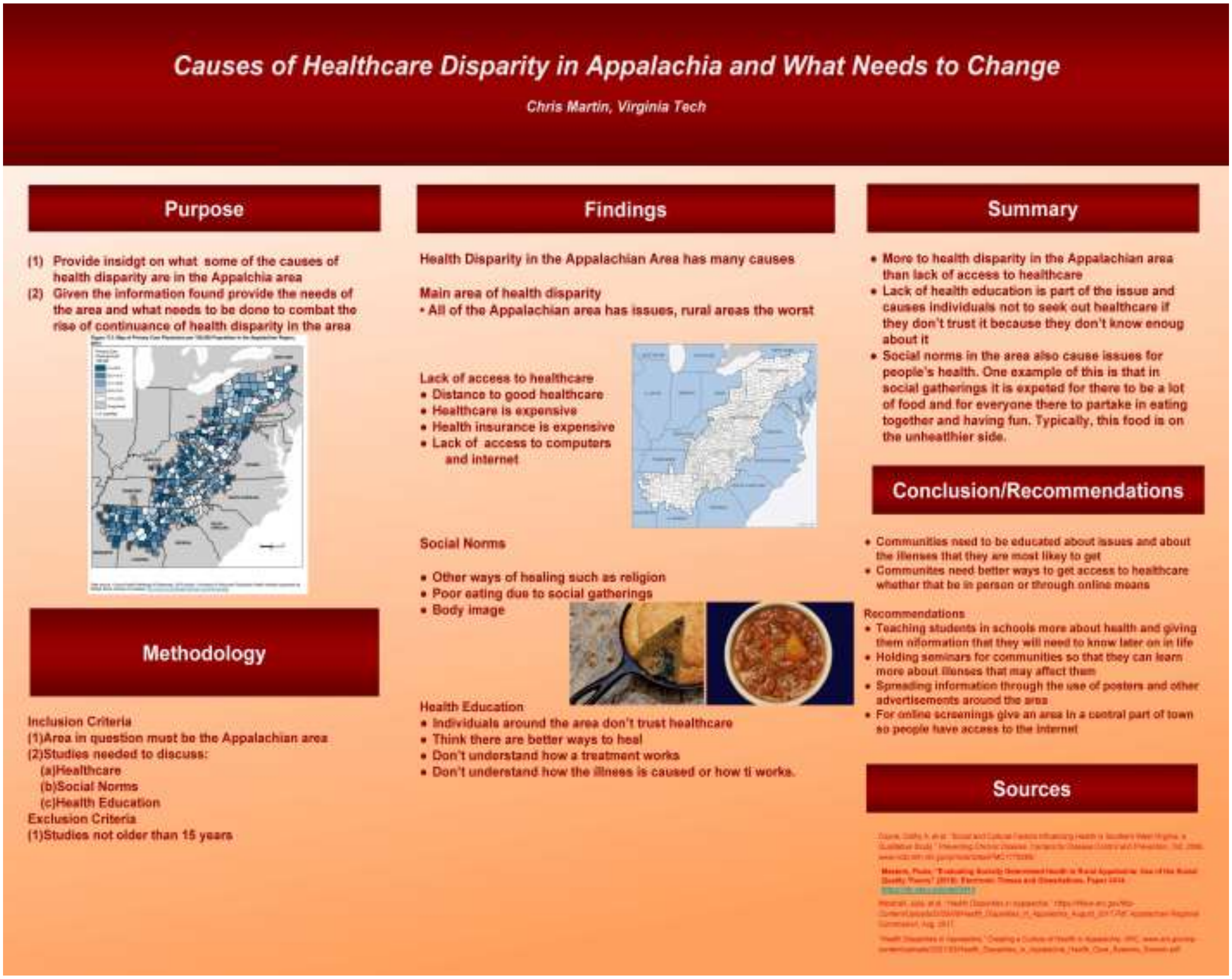
Results

- Logistic regression indicated that zip code does explain obesity prevalence in youth. Compared to other zip codes, obesity likelihood in youth was lowest in 24014 (12%) and 24105 (15%), and highest in 24013 (32%) and 24012 (31%; see Table 1).
- Our findings are consistent with the 2015 Roanoke Valley CHNA Zip Code Analysis[3] which found that adults residing in 24014 or 24015 had decreased likelihood and those residing in 24012, 24017, or 24013 had increased obesity likelihood.

Conclusions

- While zip code explained little variance in adult and child obesity, consistency in place-based patterns were evident.
- Across Roanoke city zip codes, more than half demonstrate adult obesity prevalence rates more than 1.5-times the state average for obesity, whereas two-thirds demonstrate childhood obesity prevalence more than two-times the state average for youth.
- Practitioners and policymakers should target their efforts to implement strategies to lessen the prevalence of obesity within 24102, 24107, and 24013 in order to reduce the prevalence of obesity among all residents.
- Future research should consider additional variables involving social determinants of health within a zip code to better understand community influences on childhood obesity.

2021 Virginia Public Health Association Conference


Causes of Healthcare Disparity in Appalachia and What Needs to Change
Chris Martin, Virginia Tech
Purpose
(1) Provide insidgt on what some of the causes of health disparity are in the Appalchia area
(2) Given the information found provide the needs of the area and what needs to be done to combat the rise of continuance of health disparity in the area
Methodology
Inclusion Criteria
(1)Area in question must be the Appalachian area
(2)Studies needed to discuss:
(a)Healthcare
(b)Social Norms
(c)Health Education
Exclusion Criteria
(1)Studies not older than 15 years
Findings
Health Disparity in the Appalachian Area has many causes
Main area of health disparity
• All of the Appalachian area has issues, rural areas the worst
Lack of access to healthcare
• Distance to good healthcare
• Healthcare is expensive
• Health insurance is expensive
• Lack of access to computers and internet
Social Norms
• Other ways of healing such as religion
• Poor eating due to social gatherings
• Body image
Health Education
• Individuals around the area don't trust healthcare
• Think there are better ways to heal
• Don't understand how a treatment works
• Don't understand how the illness is caused or how ti works.
Summary
• More to health disparity in the Appalachian area than lack of access to healthcare
• Lack of health education is part of the issue and causes individuals not to seek out healthcare if they don't trust it because they don't know enoug about it
• Social norms in the area also cause issues for people's health. One example of this is that in social gatherings it is expeted for there to be a lot of food and for everyone there to partake in eating together and having fun. Typically, this food is on the unheatlhier side.
Conclusion/Recommendations
• Communities need to be educated about issues and about the illenses that they are most likey to get
• Communites need better ways to get access to healthcare whether that be in person or through online means
Recommendations
• Teaching students in schools more about health and giving them nformation that they will need to know later on in life
• Holding seminars for communities so that they can learn more about illenses that may affect them
• Spreading information through the use of posters and other advertisements around the area
• For online screenings give an area in a central part of town so people have access to the internet
Sources

Improving Health Equity with Community-Based Actions: A Literature Review

Talayha A. Gilliam, Masters of Public Health Candidate at the University of Virginia School of Medicine Department of Public Health Sciences

Introduction

Health equity is defined as valuing each other, addressing injustice, and reducing disparity in health and healthcare.[1] Researchers have have illustrated how the United States has failed to significantly improve health equity and health justice over the past decade.[2] The commitment to achieving health equity aims to reduce and eliminate health disparities that are influenced by social determinants of health (SDOH). SDOH are the primary driving forces of health disparities and health inequity. There are five key areas of SDOH: economic stability, education, social and community context, health and health care, and neighborhood and built environment.[3] There is an interplay between these key areas of SDOH affects health outcomes and resources on an individual and population level. The impacts of SDOH should be addressed to improve health equity by reducing health disparities.

Purpose

The purpose of this study is to explore how community public health organizations work to achieve health equity.

Methodology

Preliminary searchers were conducted to develop a strategy to capture publicly available reports and documents from state and local public health organizations in the United States. The researchers searched for reports and documents in Google using a combination of the following search terms Health Equity, Social Determinants of Health, Public Health, MAPP Assessment, Health Departments, and Community Health. Reports and documents were examined based on the programs that organization implemented to reduce health disparities and improve health equity. The codes and themes emerge from coding sessions and discussions of the reports and documents with my research advisor, Dr. Aaron Pannone.

Research Question

How are public health organizations working to achieve health equity with community-based actions?

Results

Three themes emerged from community actions to improve health equity

Summary

Public Health Organizations:

1. Provide direct services to their target population by offering resources to facilitate changes in health behaviors
2. Utilize their knowledge, experience, skills, and partnerships to assist their target population in developing programs that would reduce health disparities
3. Use their positions to amplify the communities' voices in local government to affect policy, community resources, and funding.

Conclusion

Community public health organizations improve health equity by implementing programs that address the SDOH in their target populations; however, the majority of the organizations did not provide data to support their progress towards achieving health equity. Collecting data on the program's effectiveness based on health improvements, amount of resources provided to the community, and/or perspectives of community members actively engaging with the program may help improve their efforts to decrease health disparities and improve health equity.

Recommendation

Future research must explore using data as evidence to support organizational in achieving health equity.

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Acknowledgement

I would like to thank Dr. Aaron Pannone for the mentorship and the guidance he provided me with for this projects.

Racial Disparities Among Early-Onset Colorectal Cancer Patients in the United States: A Review

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Background

Colorectal cancer (CRC) is the third most commonly diagnosed cancer in the United States in both men and women. According to recent studies, the incidence and mortality rates of early-onset CRC (EOCRC), defined as CRC diagnosed in individuals younger than age 50, is steadily rising in comparison to CRC in patients greater than 50 years of age. CRC routine screenings are usually conducted at the age of 50 and above; however, this excludes the younger population, leaving them susceptible to later staged diagnosis, more aggressive treatment strategies, adverse histologic features, and increased incidence and mortality rates[2]. Studies have shown an increase in EOCRC incidence; however, little is known about the racial disparities that persist in EOCRC populations.

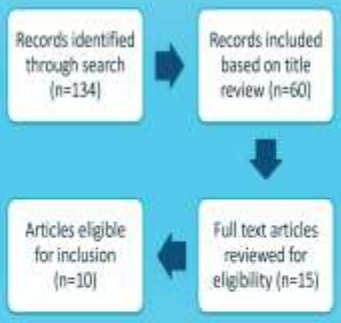
Purpose

To determine whether racial disparities related to health outcomes exist among early-onset colorectal cancer (EOCRC) patients.

Methods

- We conducted a search of studies published between January 2000 to January 2021.
- Three databases (MEDLINE, Cochrane Library, and PubMed) were searched for English language publications describing studies on EOCRC. The search terms used included colorectal cancer, young onset, early onset, and United States. A study was eligible for inclusion if it reported information on EOCRC and racial disparities.

Results



- **Ten** studies were included in this review.
- The results of the synthesized data show that African Americans (AA) are disproportionately affected by adverse EOCRC health outcomes.
- Compared to Non-Hispanic White (NHW), AA have worse survival rates (reported by 8 out of 10 studies), higher mortality rates (8 studies), and higher EOCRC incidence rates (7 studies).
- Many of the selected studies also showed that minority groups have more advanced stage EOCRC at diagnosis than NHW patients.
- One study determined that Hispanics and Asians/Pacific Islanders had significantly higher survival rates that NHW.
- The studies have not clearly documented the exact factors that contribute to EOCRC health disparities.

Conclusion

There is evidence to support the claim that there are racial disparities present within EOCRC populations. A few articles mentioned potential factors (access to CRC treatment, insurance coverage, environmental factors, and hereditary factors) that contribute to the racial disparities that persist. However, most of the articles mentioned that further research is necessary in order to determine the underlying causes of racial disparities and rising EOCRC incidence among minority groups.

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VIRGINIA COMMONWEALTH UNIVERSITY

VCU

Application of Whole Health Using the Donabedian Model During COVID-19 at Veteran Administration Facilities

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Abstract

Veterans Affairs is a specialized form of healthcare as it is dedicated to those who have provided military service and those affiliated with them. The aim of this project is to define three forms of healthcare administration; holistic health, person centered care, and whole health, and identify the practice at the VA. The Donabedian model will be used to analyze the application of the Veterans Affairs administration of health care (Whole Health). This project seeks to identify what stages of the Donabedian Model continued to be assessed at the flagship sites during Covid-19.

Introduction

Holism, termed by Christian Smutz, is the practice of viewing the body as a whole rather than as individual parts. Maintenance of the body is accessed in the form of a patient's physical, social, mental, and spiritual well-being because ill symptoms are the result of something being off balanced. Patient centered care, first introduced in the 1900's by Carl Rogers, serves the objective that the patient is the expert in their care and is given the power to choose what is right for them. The goal of patient centered care is that giving a patient the power to choose will increase patient compliance and therefore, increase the patient's quality of life. Finally, whole health began implementation in 2017 and embodies health in all areas- physical, social, emotional, and spiritual.

Methodology

This project seeks to identify what stages of the Donabedian Model continued to be implemented at the Veterans Affairs locations initially selected to implement Whole Health, termed flagship sites, during Covid-19. The Donabedian model provides a framework for examining health services and evaluating quality of health care through three measures; structure, process, and outcome. The structure measure is the process a facility will instrument to provide high quality-care and is the basis for the process measure (what will be done to implement high-quality care) and the outcome measure (the impact the care will have on the patient). A patient coming to the VA for care will be asked to complete a personal health inventory as means of assessing eight areas of self-care identified in the VA's Circle of Health depicted below. The process of identifying the patient's desires aligns with the Donabedian's structure measure.

Results/Discussion

A publication from The Comprehensive Addiction and Recovery Act (CARA) reported there was a correlation between opioid addiction and veterans. This finding stimulated the push for Veterans Affairs to provide more integrated care. Veterans Affairs designated various locations as design sites to develop what would embody a Whole Health model. Across the United States, there are 170 VA facilities. Eighteen of which were dedicated as "flag ship" sites to begin implementing Whole Health in 2017.

Conclusion

It is unclear how the VA will follow through with the patient's personal health inventory to achieve goals and facilitate a better quality of life during the COVID 19 pandemic. More research will need to be done to identify how the process and outcomes will be achieved.

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Comparing Age-Group Trends in COVID-19 Cases Across Virginia Heath Districts

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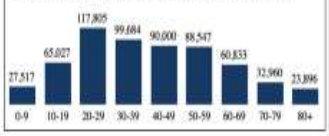
Background/Purpose

- COVID-19 transmission varies by population characteristics and region.
- Publicly available health department data can help the public understand transmission dynamics in real time to inform behaviors and public health responses to mitigate the spread.
- This work demonstrates how publicly available COVID-19 case data can be used to explore age-group specific trends within and across Virginia health districts.

Cumulative Cases by Age Group
Presented on the VHD COVID-19 Dashboard



Methods

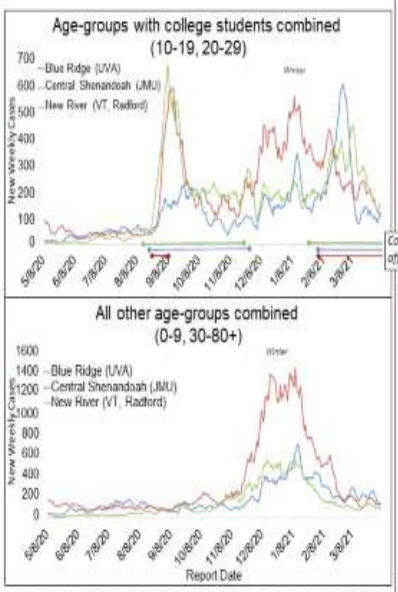
- Total COVID-19 cases by health district in 10-year age-group increments from 0 to 80 years are publicly available and updated daily on the Virginia Department of Health (VDH) website.[1]
- Calculated weekly total new reported cases by age-group and district.
- Developed an interactive Shiny App[2] to visualize and compare epidemic trends.
- Visualize new reported cases over time by health district, and combinations of health districts, and combinations of age-groups

Limitations

- Report date may not reflect infection or symptom onset date trends and could be impacted by variation in testing and reporting delays.
- Cases are assigned to location based on residence and may not reflect where transmission occurred.
- Age group was missing for 3% of total patients in VA.

Number of New Weekly Covid-19 Cases Reported for Select Health Districts

Districts with University Towns



- New reported cases in some less populated districts with large universities like New River (Virginia Tech, Radford Universities) & Central Shenandoah (James Madison University) abruptly increased only among 10-19- & 20-29-year age-groups in September, 2020.
- Trends did not correlate w/ large increases other age-groups in these districts, but may be some small increases in following weeks.
- Cases did not increase as dramatically in Blue Ridge (University of Virginia) or other districts without large state universities that re-opened in Fall, 2020.

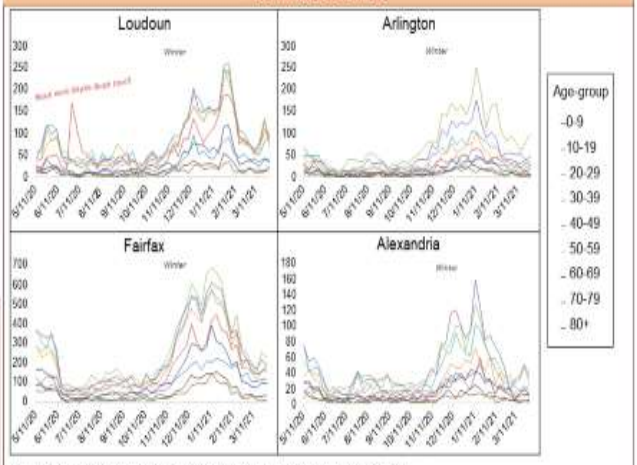
Summary

Heterogeneous transmission dynamics can be visualized & compared across age-groups & within districts using data updated daily.

Recommendation

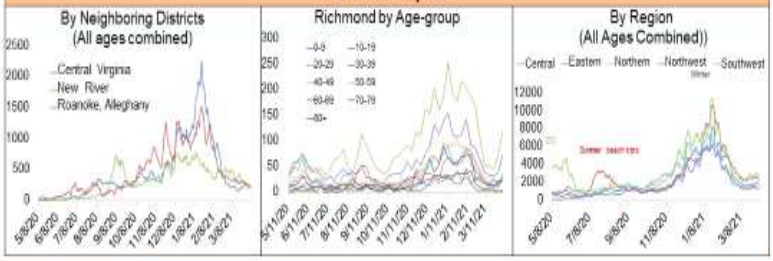
Data made publicly available by other age & demographic groups that reflect locality-specific variation in contact patterns would assist in the public's real-time understanding of local transmission dynamics.

DC Area Districts



- DC area districts show similar trends in reported cases for all age-groups.
- Variation in age-groups with the most cases: 40-49 in Loudoun, 20-29 in Arlington & Fairfax, 30-39 in Alexandria.

Other Examples



Interactive Web Application: https://wrightrc.shinyapps.io/VDH-COVID-data/

Next Steps

- Add additional user interface features for additional flexibility.
- Develop similar tools for: Rates, Race/Ethnicity, Vaccine Coverage.
- Can be used to evaluate policies and compare impact between locations.
- Can be used to inform public health response.

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Acknowledgements:
Thank you to Dr. R. Clay Wright for assistance developing the Shiny App.
We thank VDH for providing updated COVID-19 data on their website.

For further information, please contact Dr. Silverman at rsilverman@vt.edu

EVMS
MASTER OF PUBLIC HEALTH

COVID-19 Trends & their Impact on Populations in Portsmouth, VA

Arnell Jackson Jr.

PORTSMOUTH Health Department
Charting a Course for Good Health

Abstract

The COVID-19 pandemic has significantly impacted the daily activities, health, security and general well-being worldwide. The Portsmouth health district has placed emphasis on identification of occurrences of health disparities within the city's population.

Introduction & Purpose

The Portsmouth Health Department (PHD) is a compilation of various community initiatives designated to deliver advocacy, health education, and services to its residents. The goal of this project was to identify COVID-19 trends of the residents of Portsmouth, in comparison with other Hampton Roads health districts, and create a health communications plan.

Methods

- Quantitative comparison of Portsmouth and Hampton Roads COVID-19 trend comparisons utilizing the VDH public database by age, sex, race, and vaccine status.

Results

Health District	Total Positivity %
Portsmouth	12.57
Chesapeake	11.22
Va. Beach	8.82
Norfolk	8.60
Western Tidewater	10.51
Peninsula	7.87
Hampton	9.67

	Completed Vaccination
By Ethnicity	White (5,135) Black (4,281) Latino (252) N. Am (16)
By Sex	Female (8,542) Male (5,417)

	Age (Grp)	Sex	Ethnicity
Cases	20-29 (1,408)	Females (4,085)	Black (3,703)
Hospitalizations	70-79 (129)	Females (311)	Black (388)
Deaths	80+ (44)	Males (73)	Black (85)

Discussion

The purpose of the project was to determine potential populations facing health disparities due to the COVID-19 pandemic. The PHD plan targeted future COVID-19 interventions and how to best serve the populations at greatest risk. Findings were utilized to tailor the development of a health communication plan and help obtain a grant opportunity that would provide funds to put the plan into action. The health communication plan was developed to increase health literacy concerning the COVID-19 vaccination to counteract larger levels of misconceptions and mistrust of the vaccine. It important to note that the data does not reflect current COVID-19 trends.

Potential IPE

Direct interactions with other professional did not occur due to COVID-19 impact. All interactions were via email correspondence. The health communications plan could potentially be utilized by community/outreach workers to distribute and disseminate the importance on receiving COVID-19 vaccinations.

Acknowledgements

Thank you Anne Dumadag, MPH, Population Health Planning and Improvement Coordinator, for your guidance and assistance through these trying times and to Dr. Kim Baskette, Ph.D., CHES for a push in the right direction.

VIRGINIA COMMONWEALTH UNIVERSITY

Effects of the Pandemic on Nursing Schools in Virginia

Benjamin Gersbach, Dr. Christine Booker
Virginia Commonwealth University

Abstract

•**Purpose**: This study aims to discover whether students are choosing to apply to nursing school in the face of the uncertainty the pandemic has brought, and how those numbers might compare to the pre-pandemic numbers in the state of Virginia.

•**Methods**: Every public, private, and for-profit Baccalaureate nursing Programs in Virginia were contacted and asked the following questions: 1. Have the number of nursing applicants changed from 2019 to 2020? 2. Have there been any changes to your admissions process from 2019-2020. Responses were received from a total of 21 from a total of 23 BSN programs from across the state.

•**Results**: The results are that 2/23 or 9% chose not to respond. Of the 21 schools that responded, 15/21 or 71% schools saw an increase in applicants. 6/21 or 29% schools saw no change to applicants. 1/21 or 4% schools saw a decrease in applicants.

•**Findings**: An increase in applications seem to align with increased interest in the field due to their stories being highlighted during the pandemic.

•**Conclusion**: With this increased interest, it is speculated that this will also increase the competition in Baccalaureate Nursing programs, especially when considering the limited experiences of the senior applicants due to the lack of volunteer and internship opportunities in 2020 because of COVID-19.

Introduction

- The Coronavirus Pandemic has completely disrupted the lives and routines of everyone, most of all: frontline workers. In doing so, guidelines have been rewritten and countless procedures have been changed to accommodate this pandemic. It has also shined a light on several problems the healthcare industry has been staring down for years such as the Nursing shortage and Telehealth disparities. The need to address these problems will only continue to exponentially increase and may lead to radical changes in medicine (Wang, Bhatt, 2020). One report found that traditionally, in times of recession with high unemployment, college enrollment surges. However, in the state of Washington enrollment have in fact fallen almost 13% overall (Kwaiye, Kibert-Crocker, Lundgren, Paison, 2021, 5-6). In contrast, by looking at medical school admissions, some research suggests that virtual interviews lowered requirements may make programs some more accessible for applicants (Bhatt, Bhatt 2020,1-2). Based on the available research, there is a need to address the shortages in nursing school admissions as well. The purpose of this study is to see what effect the pandemic has had on Nursing school applicants in the state of Virginia.

Methodology

- Using a mixed Methods approach, the primary method of gathering information was through two dichotomous questions. Over the course of several weeks, every admissions department of each Nursing Program currently offering a baccalaureate degree in Virginia were surveyed and asked the two research questions. This was done either directly over the phone or via email when necessary, as many departments are now either working at home or temporarily furloughed. Depending on the answer to research question two, subsequent qualitive data was collected.

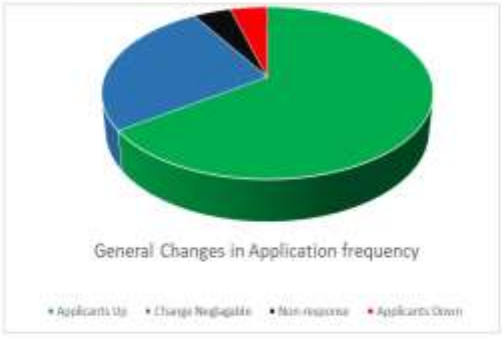
Results/Discussion

- When Responding to RQ1, of the 23 Nursing BS programs sampled, 13/23 or 65.2% saw an increase, 6/23 or 26.1% saw no change, 1/23 or 4.3% saw a decrease, and 1/23 or 4.3% Chose Not to respond.
- When Responding to RQ2, of the 23 Nursing BS programs sampled. 9/23 or 39.1% changed their process on some Level, 11/23 or 48% made No changes, and 3/23 or 13% Chose Not to respond.
- Of the 9 schools that had made changes the responses were as follows, 4 waived testing requirements, 3 made simple electronic formatting changes 1 had a major overhaul of tech done, 1 offered completely remote TEAS testing services, and 1 lowered GPA entry requirements.

Research Questions

1. Have the number of Nursing applicants changed from 2019 to 2020? (yes or no)

2. Have there been any changes to your admissions process from 2019-2020?



Conclusion

- One would think that in the middle of such economic hardship, College and Nursing School admissions would stagger or fall significantly, my findings however, have indicated otherwise for the state of Virginia. With the job market suddenly being flooded with experienced unemployed or furloughed applicants, data suggests more and more students are considering extra schooling. This has a few critical implications for future and currently applying students. Though a significant percentage of programs have relaxed requirements, this is likely to serve only to make these programs even more competitive and increase the value of whatever limited skills the applicants may have gained through prior experiences.
- This approach had several Limitations, therefore, this is a pilot study. Small Sample size being the first at a low of just 23. Due to the relatively small timeline of this study, a quantitative approach was used to record responses. In addition, several of the universities were not able to provide many extraneous details beyond the question itself. In many cases a change was able to be confirmed, however the exact quantity of change remains mostly unknown. Overall, the quantity and quality of responses exceeded expectations.
- This conclusion is reinforced by the fact many of these schools easily fill their programs with qualified students, turning away almost as many qualified applicants as they admit. In the future, it would be interesting to compare this data to the entire East Coast, or the country. Considering a different lens, when it comes to fighting the spread of Covid-19, Virginia did relatively better than some states such as Florida, Texas and California and it would be interesting to see what the admissions rates were in those states to see whether the responses seen response was a direct result of COVID-19 itself, or a rippling economic effect of statewide structural changes due to the lockdown, etc. It is likely that the answer is a mix of both.

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Evaluating the Effects of the COVID-19 Pandemic and Telehealth on University Student Access of Mental Health Resources

University of Virginia
School of Medicine

Grace Duncan
Graduate Program in Public Health, University of Virginia

Background

- The onset of the COVID-19 pandemic and resulting change in lifestyle elicited many concerns about mental health and provision of mental health services.
- In Spring of 2020, most colleges shifted students entirely online and removed in-person services, including university mental health services.
- Early surveys conducted by universities reported significantly higher incidence of anxiety, depression, and other mental health issues among college students.
- Prior to the COVID-19 pandemic, telemedicine had been gaining traction as a solution to numerous health system issues including cost, physical barriers, and provider shortages.
- However, disparities in access were quickly identified, primarily geriatric patients, those with poor internet access, and those in need of more intensive treatment.

Objective

To examine key changes in student and appointment demographics at a large public state university's Student Health Counseling and Psychological Services program during the COVID-19 pandemic as many students returned home and all appointments transitioned to telehealth.

Methods

Data

The University Student Health and Wellness Center (SHW) is a fully accredited healthcare facility and the primary outpatient medical clinic for the university student population.

- Counseling and Psychological Services (CAPS) is a subsection of SHW and provides counseling, psychiatry, care management, crisis support, and mental health outreach services to students.
- Student health data was linked and de-identified using the IRB-approved Student Health Research Database
- Health data (ICD-10 classification for reason visit, date of visit, provider seen, etc.), student demographics (e.g. age, race, citizenship, tax dependency), and academic information (year, academic program, etc.) were provided in a de-identified dataset.

Analysis

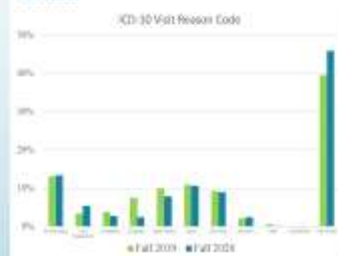
- Chi squared and two sample t-tests were performed in SAS to evaluate the change in health, demographic, and academic attributes CAPS utilizers before and during the pandemic shift to virtual visits.

Descriptive Statistics

Student Characteristics	Fall 2019 (n=1840)	Fall 2020 (n = 1231)	Test Statistic and P-value for test of difference
Age (mean,sd)	21.9669, 4.02	22.2616, 4.16	T = -2.00 (p = 0.045)
Student Status			χ^2 = 7.23 (p = 0.007)
Graduate	31.39% (572)	35.58% (438)	
Undergraduate	68.61% (1263)	63.69% (784)	
Gender			χ^2 = 6.77 (p = 0.009)
Male	35.09% (645)	30.54% (376)	
Female	64.70% (1192)	69.29% (853)	
Citizenship Status			χ^2 = 8.74 (p = 0.013)
Native	86.79% (1598)	90.81% (1118)	
Non-U.S. citizen	12.80% (236)	9.14% (113)	
Unknown	0.43% (8)	0.42% (5)	
Number of Appointments per student (mean,sd)	4.0195, 4.2186	4.4419, 3.94	T = -2.86 (p = 0.005)
Ethnicity			χ^2 = 16.97 (p = 0.009)
American Indian or Alaska	0.16% (3)	0.08% (1)	
Asian	12.01% (221)	12.02% (148)	
Black or African American	8.59% (158)	7.15% (88)	
Hispanic	6.74% (124)	8.04% (99)	
Multi-Race	5.67% (104)	5.69% (70)	
Non-Resident Alien	10.54% (194)	6.98% (85)	
White	52.61% (968)	55.40% (682)	
Unknown	3.70% (68)	4.71% (58)	
Appointment Characteristics	**Fall 2019 (n=7296)**	**Fall 2020 (n = 5468)**	
Group Appointment Status			χ^2 = 28.75 (p < 0.0001)
Yes	10.08% (735)	7.33% (402)	
No	89.92% (6560)	92.67% (5066)	
Reason			χ^2 = 234.99 (p < 0.0001)
Brief Screening/Triage	13.38% (980)	13.39% (732)	
Care Management	3.35% (244)	5.39% (295)	
Consultation	3.69% (270)	2.82% (154)	
Emergency Consultation/Crisis	7.49% (554)	2.40% (131)	
Group Therapy	9.85% (720)	7.90% (433)	
Intake	15.95% (1165)	10.55% (577)	
Med Check	9.29% (680)	8.94% (489)	
Med Eval	2.54% (151)	2.49% (136)	
Other	0.46% (34)	0.22% (12)	
Referral/Intake	0.04% (3)	0.05% (3)	
Talk Therapy	38.55% (2824)	45.96% (2515)	

Results

Results

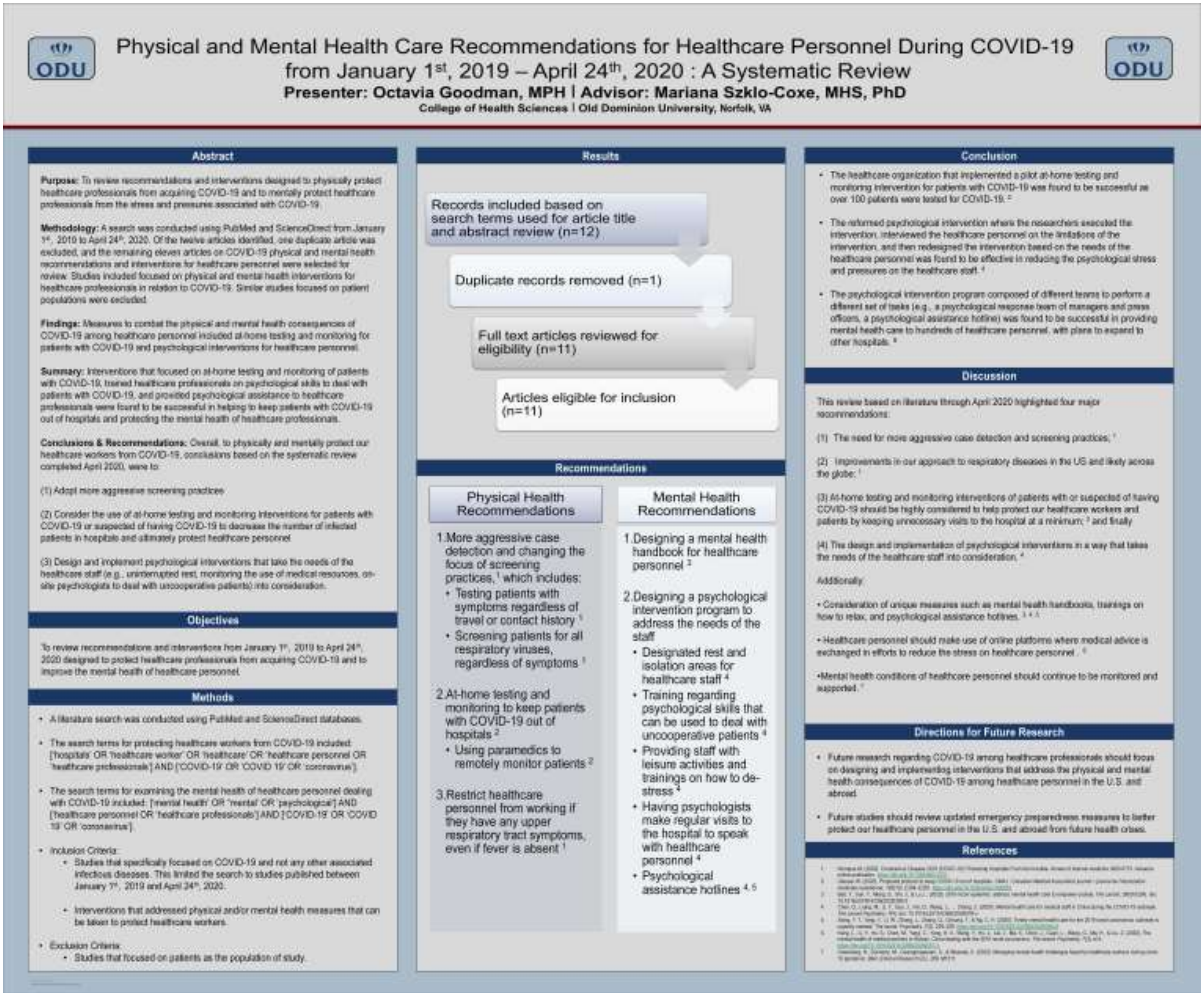


Conclusion and Recommendations

- CAPS has continued to serve a large student population throughout the pandemic after a shift to solely virtual mental health appointments.
- Early analysis of appointment data indicates that there may be benefits to a virtual appointment model including improved access, ease of attending appointments, and more appointments dedicated to talk therapy.
- However, they also bring up concerns that some groups are not adequately reached by services that are only provided virtually. Men, younger students, some minority groups, and those in crisis situations are among those groups who saw significant decreases in the proportion of visits during the shift to telehealth.
- In continuing telemedicine offering during and after social distancing guidelines are relaxed, efforts should be made to ensure equitable coverage.
- Limitations include concerns about the accuracy of the population reached by student health in the Fall 2020 semester given restrictions on virtual visits across state lines and inconsistency between providers inputting reason codes.

Acknowledgements

Thank you to the University of Virginia Elson Student Health Center team, specifically Dr. Christopher Holstege, Kamal Tanahe, and Samantha Rege without whom this project would not have been possible.


Physical and Mental Health Care Recommendations for Healthcare Personnel During COVID-19 from January 1st, 2019 – April 24th, 2020 : A Systematic Review
Presenter: Octavia Goodman, MPH | Advisor: Mariana Szklo-Coxe, MHS, PhD
College of Health Sciences | Old Dominion University, Norfolk, VA
ODU
ODU
Abstract
Purpose: To review recommendations and interventions designed to physically protect healthcare professionals from acquiring COVID-19 and to mentally protect healthcare professionals from the stress and pressures associated with COVID-19.
Methodology: A search was conducted using PubMed and ScienceDirect from January 1st, 2019 to April 24th, 2020. Of the twelve articles identified, one duplicate article was excluded, and the remaining eleven articles on COVID-19 physical and mental health recommendations and interventions for healthcare personnel were selected for review. Studies included focused on physical and mental health interventions for healthcare professionals in relation to COVID-19. Similar studies focused on patient populations were excluded.
Findings: Measures to combat the physical and mental health consequences of COVID-19 among healthcare personnel included at-home testing and monitoring for patients with COVID-19 and psychological interventions for healthcare personnel.
Summary: Interventions that focused on at-home testing and monitoring of patients with COVID-19, trained healthcare professionals on psychological skills to deal with patients with COVID-19, and provided psychological assistance to healthcare professionals were found to be successful in helping to keep patients with COVID-19 out of hospitals and protecting the mental health of healthcare professionals.
Conclusions & Recommendations: Overall, to physically and mentally protect our healthcare workers from COVID-19, conclusions based on the systematic review completed April 2020, were to:
(1) Adopt more aggressive screening practices
(2) Consider the use of at-home testing and monitoring interventions for patients with COVID-19 or suspected of having COVID-19 to decrease the number of infected patients in hospitals and ultimately protect healthcare personnel
(3) Design and implement psychological interventions that take the needs of the healthcare staff (e.g., uninterrupted rest, monitoring the use of medical resources, on-site psychologists to deal with uncooperative patients) into consideration.
Objectives
To review recommendations and interventions from January 1st, 2019 to April 24th, 2020 designed to protect healthcare professionals from acquiring COVID-19 and to improve the mental health of healthcare personnel.
Methods
• A literature search was conducted using PubMed and ScienceDirect databases.
• The search terms for protecting healthcare workers from COVID-19 included: ['hospitals' OR 'healthcare worker' OR 'healthcare' OR 'healthcare personnel OR 'healthcare professionals'] AND ['COVID-19' OR 'COVID 19' OR 'coronavirus'].
• The search terms for examining the mental health of healthcare personnel dealing with COVID-19 included: ['mental health' OR 'mental' OR 'psychological'] AND ['healthcare personnel OR 'healthcare professionals'] AND ['COVID-19' OR 'COVID 19' OR 'coronavirus'].
• Inclusion Criteria:
• Studies that specifically focused on COVID-19 and not any other associated infectious diseases. This limited the search to studies published between January 1st, 2019 and April 24th, 2020.
• Interventions that addressed physical and/or mental health measures that can be taken to protect healthcare workers.
• Exclusion Criteria:
• Studies that focused on patients as the population of study.
Results
Records included based on search terms used for article title and abstract review (n=12)
Duplicate records removed (n=1)
Full text articles reviewed for eligibility (n=11)
Articles eligible for inclusion (n=11)
Recommendations
Physical Health Recommendations
1. More aggressive case detection and changing the focus of screening practices,[1] which includes:
• Testing patients with symptoms regardless of travel or contact history [1]
• Screening patients for all respiratory viruses, regardless of symptoms [1]
2. At-home testing and monitoring to keep patients with COVID-19 out of hospitals [2]
• Using paramedics to remotely monitor patients [2]
3. Restrict healthcare personnel from working if they have any upper respiratory tract symptoms, even if fever is absent [1]
Mental Health Recommendations
1. Designing a mental health handbook for healthcare personnel [3]
2. Designing a psychological intervention program to address the needs of the staff
• Designated rest and isolation areas for healthcare staff [4]
• Training regarding psychological skills that can be used to deal with uncooperative patients [4]
• Providing staff with leisure activities and trainings on how to de-stress [4]
• Having psychologists make regular visits to the hospital to speak with healthcare personnel [4]
• Psychological assistance hotlines [4, 5]
Conclusion
• The healthcare organization that implemented a pilot at-home testing and monitoring intervention for patients with COVID-19 was found to be successful as over 100 patients were tested for COVID-19. [2]
• The reformed psychological intervention where the researchers executed the intervention, interviewed the healthcare personnel on the limitations of the intervention, and then redesigned the intervention based on the needs of the healthcare personnel was found to be effective in reducing the psychological stress and pressures on the healthcare staff. [4]
• The psychological intervention program composed of different teams to perform a different set of tasks (e.g., a psychological response team of managers and press officers, a psychological assistance hotline) was found to be successful in providing mental health care to hundreds of healthcare personnel, with plans to expand to other hospitals. [5]
Discussion
This review based on literature through April 2020 highlighted four major recommendations:
(1) The need for more aggressive case detection and screening practices; [1]
(2) Improvements in our approach to respiratory diseases in the US and likely across the globe; [1]
(3) At-home testing and monitoring interventions of patients with or suspected of having COVID-19 should be highly considered to help protect our healthcare workers and patients by keeping unnecessary visits to the hospital at a minimum; [2] and finally
(4) The design and implementation of psychological interventions in a way that takes the needs of the healthcare staff into consideration. [4]
Additionally:
• Consideration of unique measures such as mental health handbooks, trainings on how to relax, and psychological assistance hotlines. [3, 4, 5]
• Healthcare personnel should make use of online platforms where medical advice is exchanged in efforts to reduce the stress on healthcare personnel . [6]
• Mental health conditions of healthcare personnel should continue to be monitored and supported. [7]
Directions for Future Research
• Future research regarding COVID-19 among healthcare professionals should focus on designing and implementing interventions that address the physical and mental health consequences of COVID-19 among healthcare personnel in the U.S. and abroad.
• Future studies should review updated emergency preparedness measures to better protect our healthcare personnel in the U.S. and abroad from future health crises.
References

Shifting from In-Person to Virtual Program Delivery: Lessons Learned from the COVID-19 Pandemic

Cara Tonn (MPH student), Mya Achike, MPH, Michele Kekeh, Ph.D., Muge Akpinar-Elci, MD, MPH
Old Dominion University, Center for Global Health

Introduction

The Global Health Heroes program:

- Beginning in 2016, to teach children positive health behaviors with the intention that the kids will use these new skills and share them with their family and friends.
- The program design is an interactive on-site experience that includes information and activities highlighting the importance of good nutrition, recycling, and hygiene. Program facilitators measure pre-existing knowledge with a pre-test and information comprehension with a post-test.
- On-site implementation is the responsibility of a Center for Global Health representative with assistance from ODU interns and on-site employees.

Starting in September 2020, the Center began adapting the Global Health Heroes program in response to the changes in daily routines brought on by the COVID-19 pandemic.

- In December 2020, the Center for Global Health successfully launched its first-ever virtual Global Health Heroes program, via Zoom piloted with 20 students from the Rosemont Unit Boys and Girls Club.
- The virtual program's objective is to promote healthy habits that reduce the spread of germs by reinforcing the importance of social distancing, wearing a mask, and hand hygiene.
- To enhance the virtual session's theme, an e-book, accessible on the Center's website, is available to promote individual learning and increase accessibility.

Process

The Center used this opportunity to reinforce the Centers for Disease Control guidance on reducing COVID-19 spread. The virtual lesson consists of:

- A discussion on the meaning and importance of Global Health.
- Engagement with the children on reducing the spread of germs to gauge existing knowledge.
- Slide series with videos.
- A choice of activity explaining to friends and family the importance of not spreading germs, social distancing, or wearing a mask. Such as
  - storyboard, mind map, poster
  - poem, song, or a social media post.
- Opportunities for children to present a completed project and receive feedback from the facilitators.
- Wrap-up - the opportunity to reinforce lesson themes and to answer questions.
- Issuance of a certificate of completion and receipt of healthy snacks.

Global Health Heroes Certificate of Achievement

Global Health Heroes Slide Series Content

Global Health Heroes E-book Content

Perspective

The Center for Global Health piloted the virtual program with 20 students from the Boys and Girls Club. While the program's implementation was a success, the Center learned valuable lessons to create robust, dynamic, and interactive future presentations.

- Compared to the previous face-to-face program format, spontaneous teachable moments are absent.
- The virtual program benefits from an on-site facilitator to assist in the lesson's flow and provide direction.
- Engagement and buy-in from community partners are essential to have a successful virtual program. It is the driving force for site participation and program information dissemination to their customers.
- Facilitators and developers will need to continue to develop skills to utilize advancing technology to provide a more interactive, engaging experience for the children.
  - Additional presentation software (Prezi and Visme)
  - Gamification apps
  - Book widgets
  - Polling software

Conclusion

The Global Health Heroes program's purpose is to promote healthy behaviors and educate children on the positive outcomes associated with those behaviors, not just for themselves but also for their friends, loved ones, and the community. The transition of the Global Health Heroes program to an online platform during the COVID-19 pandemic reflects the Center's mission and vision of positively impacting health and well-being by using its members' unique strengths to address community needs. Utilizing the information and lessons learned with the pilot program's implementation, the Center is motivated to continue to develop the virtual Global Health Heroes program.

VIRGINIA COMMONWEALTH UNIVERSITY

VCU

The Impact of COVID-19 on the Graduate Admissions for Master of Health Administration and Master of Business Administration Degree Programs in the United States

By Diana Shoja & Christine Booker, PhD
College of Humanities and Sciences
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Abstract

COVID-19 has affected the way university admission across the country are considering prospective applicants. The graduate admissions process for Master of Health Administration and Master of Business Administration degrees has altered their requirements for standardized testing and the admission interview. This project seeks to assess the number of programs that do not require standardized test scores for application to their programs. Data is collected by using a quantitative approach based on the given information. A total of 150 MHA and MBA programs are analyzed by collecting data regarding curriculum and admission from the program website. Thirty percent of programs expect to conduct an admissions interview and less than half of the programs have changed the administration of the interview. Prior to COVID-19, 75% of programs required standardized testing as a part of their admission criteria. As the pandemic continues, the requirement has decreased to 45%. Requirements vary per university guidelines.

Introduction

University admissions across the country have altered their application criteria due to the on-going COVID-19 pandemic. One field of study, amongst many, that has been impacted by this change would be the healthcare administration field. Addressing the needs of the healthcare field means the changes to the admissions criteria have led to more qualified professionals in a shorter time to fill the gaps in the industry. Since Covid-19, modifications have been made to the university admissions interview process and the standardized testing requirements. The graduate record examination (GRE) and/or graduate management admissions test (GMAT) scores are a common way for university admission committees to qualify an applicant for graduate health administration programs. Due to lack of face-to-face recruiting in the admissions process, universities are developing new ways to assess applicants based on the required criteria.

Methodology

In this research, an online quantitative analysis approach is used to develop and propose research solutions. Specifically, record keeping, this method is used when gathering and collecting relevant information or data from existing reliable reference materials as a data source. The research question is: "What changes have been made to the graduate admission process due to COVID-19?"

The research question is explored by analyzing each university's graduate program guidelines and admission requirements while the data is collected directly off the program website. The data is then entered by creating a spreadsheet of the collected information. Each program is divided into columns and includes the required criteria per curriculum and admissions. The following includes what data was collected regarding admission requirements: preferred undergraduate GPA, essay or letter of intent, letters of recommendation, work experience, admission interview, prerequisites, resume or curriculum vitae, and official transcripts. Admission requirements may vary per university. Once the data was gathered and collected, the information was analyzed to compare the changes from before and after COVID-19.

Results/Discussion

Conclusion

This project was aimed to find the number of programs who do not require any form of standardized test as a part of their admission requirements. Based on the 150 programs in which data was collected from, 75% of graduate programs required applicants to submit their testing scores prior to COVID-19. A significant number of programs, roughly 45%, have remained to keep standardized testing as a part of the admissions criteria. In addition to standardized testing, 30% of university graduate programs require applicants to conduct an interview with the admissions committee. Admissions interviews are put in place to understand an applicant's goals and to get an idea as to why they would like to pursue a degree in healthcare administration. Due to the nature of the pandemic, it is difficult to have a face-to-face interview. Around 35% of university programs have changed their in-person interview to be conducted virtually.

Universities have altered their admission criteria to better adjust around the pandemic. Programs have changed their standardized testing and interview process due to the lack of flexibility. These alterations help the applicant to work around the pandemic by enabling an applicant to pursue a graduate degree. The pandemic has affected the way admission committees are reviewing potential graduate applicants. Moving forward from the pandemic, admission requirements will forever be altered as committees are finding new ways to assess applicants that were not in place prior to the pandemic. The most significant changes made to the 2021-2022 application cycle are the requirements for standardized testing and admission interviews.

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I would like to express my special thanks of gratitude to Dr Christine Brooks who gave me the opportunity of this research project on the changes made to the 2021-2022 graduate admission process. I came to know about so many different subjects and I am thankful for her mentorship.

Utilizing Community Health Worker Learning Modules to Increase Preventive Services During the COVID-19 Pandemic

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Rebecca Sutter DNP, FNP-BC
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BACKGROUND

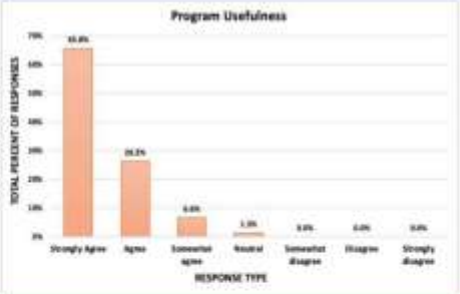
- The beginning of the COVID-19 Pandemic led to a 60% decrease in ambulatory services
- The drop in ambulatory and preventive services may lead to future adverse health outcomes, particularly in vulnerable populations
- Literature shows that vulnerable populations have increased rates of DM/CVD and mental health disorders after disasters and increased community support leads to better health outcomes

PROJECT PURPOSE

- Reduce the burden of disease resulting from the COVID-19 Pandemic by increasing social support and access to preventive services in the community
- Utilize targeted learning modules to educate community health workers (CHWs) on topics relevant to health concerns during the pandemic
- Increase community support through CHW education

METHODOLOGY

- Four evidence-based learning modules: diabetes and cardiovascular disease, mental health, community resources, and COVID-19
- Disseminated to VA CHWs through the Institute for Public Health Innovation and the Virginia Certification Board
- Completion survey with modified USE Questionnaire and three qualitative questions. Data collected over four weeks, n=19 respondents



RESULTS

- 100% responded positively that the program increased their knowledge and helped respondents be more effective in their work
- COVID-19 and community resource modules were the most useful
- Respondent comments: "Great program, user friendly, informative, and easy to follow," "CHWs can benefit from more of this training program." "Make all trainings this easy to do"
- Respondents would like more links to resources and applicable educational resources

RECOMMENDATIONS

- Educational interventions during COVID-19 should be targeted and succinct
- Provide resources for CHWs regarding community resources and COVID-19
- Consider utilizing a similar format for additional trainings in the future
- Consider utilizing evidence from previous natural disasters when addressing challenges during the COVID-19 Pandemic

ACKNOWLEDGEMENTS

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REFERENCES

University of Lynchburg

Association Between Mold and Asthma in Minority Children in the Urban Setting

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Master of Public Health Candidate, University of Lynchburg, Lynchburg, VA

Introduction

Asthma Risk

Asthma can affect individuals of an age, but the onset of asthma is most typical in childhood. The prevalence of asthma is highest in minorities, especially Puerto Ricans and African Americans. The risk is also elevated when living in an urban setting due to substandard outdoor and indoor air quality, poverty conditions and poor access to health care (Asthma and Allergy Foundation, n.d.; Bryant-Stephens, 2009; Kercsmar, et al., 2006).

Indoor Mold

Building dampness and mold can increase the risk of asthma and other related respiratory illnesses by 30 to 50%. Approximately 21% of all asthma cases are attributable to housing dampness and mold which leads to an annual cost $3.5 billion dollars (Mendell et al., 2011).

Purpose

This literature review will examine mold exposure in urban children in order to determine if mold leads to the increased risk of asthma, especially in children of minority renter households in urban settings.

Methods: EPA Process

EPA Risk Assessment Process

This literature revise followed the EPA process for conducting a human health risk assessment as shown to the right (EPA, n.d.).

The 4 Step Risk Assessment Process

Literature Search Parameters

Google Scholar was searched for studies published in English after 2000 using the keywords: mold, dampness, asthma, risk, triggers, minority, children, urban, tenant, landlord, remediation, public health. A total of 20 articles were reviewed.

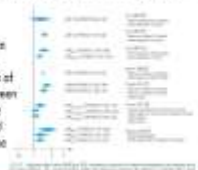
Hazard Identification

Fungal Species and Growth Conditions

Fungal genera most associated with the development and exacerbation of asthma include: *Aspergillus, Penicillium, Alternaria, Stachybotrys*, and *Cladosporium*. Mold may grow inside houses and rental properties when warm, moist conditions exist (Caillaud et al., 2018; Mendell et al., 2011).

Mold as a Risk Factor for Asthma

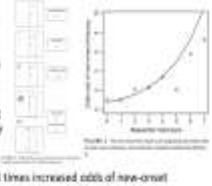
The risk for asthma due to mold is documented in numerous evidence-based studies. Caillaud and colleagues (2018) conducted a systematic search of peer-reviewed asthma literature published between 2006 and 2017 and concluded that the collective data support a causal relationship between mold and asthma in children. A graphic depiction of the adjusted odds ratios from the various studies examined are shown to the right.



Dose-Response Assessment

Mold Dose-Response

A case-control study by Shorter and colleagues (2017) was conducted in 150 children (ages 1 – 7 years) with new-onset wheeze. Each child was matched to two control children with no history of wheezing. Visible mold and mold odor were associated with new-onset wheezing in a dose-dependent manner when observed by researchers, an independent building assessor and parents. The strongest mold odor and highest levels of mold were associated with ~14 times increased odds of new-onset wheezing compared to homes with no mold or odor. Key results are shown above.



Other Mold & Asthma Relationships

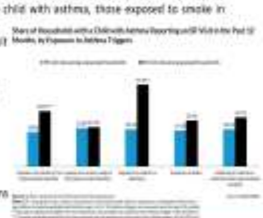
Accumulation of Asthma Triggers - Cumulative risk for asthma is higher in minority children in the urban setting due to elevated environmental triggers such as mold, tobacco smoke, rodents and cockroaches. Elevated triggers may lead to more hospitalizations / ER visits and missed school days (Ganesh et al., 2015).

Health Care for Asthmatic Children - Cumulative effect of risk factors is reflected in the ER visits of minority children with asthma. Prevalence of asthma and ER-related asthma visits is going up for all children; however, ER visitation rate is 4x greater in Black vs White children. This health disparity is worsened by the fact that White asthmatic children use primary care physicians 150% more often than Black asthmatic children (Basch, 2011).

Exposure Assessment

Renters in the Urban Setting

Dampness and mold may be a greater concern in urban areas where the households have an increased percentage of renters and minorities. When looking specifically at renting versus owning, renters were much more likely to have asthma triggers (smoke, musty odors, leaks, mold, pests) in their households than individuals that owned their residence. After examining the 2015 American Housing Survey, Skopec, 2017 noted that "renter-occupied households with school-age children with asthma were more than twice as likely as owner-occupied households to be exposed to smoke, musty smells, and evidence of cockroaches or rodents at least monthly over the past year. Among households with a school-age child with asthma, those exposed to smoke in the home at least monthly were more likely to report an ER or urgent care visit for their youngest child with asthma (30.1 vs 18.8 percent), as were those exposed to mold in a bedroom during the past year (44.4 vs 20.2 percent)". Key results are shown to the right.



Children spend significant time in their rooms and asthma can be particularly troublesome at night, so documenting mold in their bedrooms demonstrates elevated exposure risk (Basch, 2011; Ganesh et al., 2015).

Risk Characterization

Overall Statement of Risk

Mold and dampness are known risk factors for childhood asthma that is backed by evidence from multiple epidemiologic studies (Caillaud et al., 2018; Ganesh et al., 2015; Mendell, et al., 2011; Skopec, 2017). The association between indoor mold and childhood asthma cannot be overlooked.

Risks for Minority Children in Urban Areas

Renters are vulnerable to the overlooked risks of mold, dampness and smoke in the urban households. According to the 2015 American Housing Survey, renters with children are more likely to have asthma triggers in their homes than owners and are more likely to have at least one child with asthma (Ganesh, et al., 2015). The elevated prevalence of asthma in the urban setting may impact educational outcomes. Poorly controlled asthma results in inferior sleep quality which may alter the ability to concentrate and learn, may make children less likely to attend extracurricular activities and may lead to an increase in absences from school. This results in poor test scores, less of a connection to school activities and less of time in the academic setting. This poor academic performance may have life-long impacts on future employment and financial prospects (Basch, 2011).

Risk Management & Recommendations

Prevention and Remediation of Mold

Homeowners, landlords and tenants must do all they can to reduce dampness as it is a critical step in reducing indoor mold and other dampness related issues.

Homeowners & Landlords Advice - 1) eliminate all leaks, 2) remove & replace building materials damaged by dampness and mold, 3) maintain gutters properly, 4) vent bathroom fans, stoves and dryers, 5) properly maintain heating & cooling systems, and 6) provide dehumidifiers or require tenants purchase one.

Tenants Advice - 1) report all leaks, mold growths or musty odors, 2) use indoor bathroom and stove fans, 3) use a dehumidifier, and 4) throw out old books and newspapers (Kercsmar, et al., 2006; Mahoney and Spear, 2009).

Public Health Recommendations

Until technology can rapidly identify mold, a team approach of scientists, doctors, epidemiologists, and engineers should assist public health officials in providing guidance to homeowners, landlords, and tenants about the dangers of mold and how to deal with contamination to reduce the risk of asthma in urban setting.

References

Comparing Source-Specific $PM_{2.5}$ Between Rush Hour vs. Sporadic Commuters

Charlotte Joannidis, Jenna R. Krall, Karlin D. Moore – Department of Global and Community Health – George Mason University

tr-$PM_{2.5}$

- traffic-related fine particulate matter = tr-$PM_{2.5}$
- Fine particulate matter ($PM_{2.5}$) = any particle that is less than 2.5 micrometers in diameter (Figure 1)
- $PM_{2.5}$ is traffic-related when sourced from traffic (including particles from brake/tire wear, road dust, and tailpipe emissions)

Figure 1. $PM_{2.5}$ Image (source epa.gov)

Introduction

- tr-$PM_{2.5}$ has been associated with adverse health outcomes such as cardiopulmonary morbidity and mortality
- In-vehicle tr-$PM_{2.5}$ exposure contributes to total personal pollution exposure
- Trip characteristics, such as time of day, day of the week, and traffic congestion, are associated with increased in-vehicle $PM_{2.5}$ exposures
- Previous studies have identified commute characteristics associated with pollution
- Previous studies have used K-means clustering approaches to analyze commute data
- It was hypothesized that commuter characteristics, such as whether commuters travel during rush hour, would also be associated with increased tr-$PM_{2.5}$ exposures.

Objectives & Methods

Objectives: to cluster commuters by type and to identify associations with increased tr-$PM_{2.5}$ exposure

Methods:

- Commute data consisted of unscripted personal vehicle trips of 46 commuters in the Washington, D.C. metro area over 48-hours, with a total of 320 trips
- Commuter types were identified using sparse K-means clustering
- Source-specific $PM_{2.5}$ was estimated using Positive Matrix Factorization
- Linear regression was used to estimate differences in source-specific $PM_{2.5}$ by commute cluster

Figures

Figure 2. Average minutes spent in-vehicle for each hour of day per participant, with participants grouped by cluster.

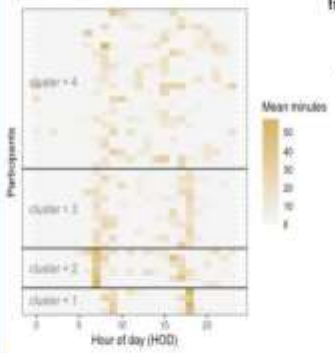
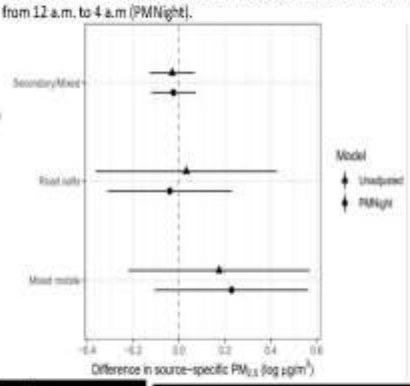


Figure 3. Difference in source-specific $PM_{2.5}$ in log $\mu g/m^3$ (95% confidence intervals) between rush hour and sporadic commuters using linear models without adjustment (Unadjusted) as well as adjusted for residential $PM_{2.5}$ from 12 a.m. to 4 a.m (PMNight).



Results

- **Clusters 1-3 were combined to create two commuter clusters:** rush hour commuters (primarily travelled during rush hour) and sporadic commuters (travelled throughout the day) **(Figure 2)**
- Integrated Black carbon (BC) was higher for rush hour commuters (median = 3.1 $\mu g/m^3$ (IQR = 1.5)) compared to sporadic commuters (2.0 $\mu g/m^3$ (IQR = 1.9))
- Mixed mobile $PM_{2.5}$, consisting primarily of tailpipe emissions and brake/tire wear, was higher for rush hour commuters (2.9 $\mu g/m^3$ (IQR = 1.6)) compared to sporadic commuters (2.1 $\mu g/m^3$ (IQR = 2.4)), though this difference was not statistically significant (Figure 3)

Discussion/Conclusions

- This study is unique as it identifies the association of commuter characteristics with pollution through clustering commuter types with sparse K-means.
- Mixed mobile $PM_{2.5}$ and integrated BC were higher for rush hour commuters compared to short trip commuters.
- Further research may elucidate whether commuter characteristics are an efficient way to identify individuals with highest tr-$PM_{2.5}$ exposures associated with commuting
- The time of vehicle commute is a modifiable behavior
- If the type of commuter with the highest exposure can be identified and these commuter characteristics are modifiable, more effective air pollution exposure mitigation strategies can be developed.

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Exploration of the Spatial Relationships between Lead and Pesticide Exposures and Neurodegenerative Disease Age-Adjusted Mortality Risk in North Carolina

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RADFORD UNIVERSITY

Introduction & Data

Neurodegenerative diseases, Parkinson's disease, Alzheimer's disease, & Amyotrophic Lateral Sclerosis (ALS), are progressive disorders that affect the motor neurons of the brain and spinal cord. Genetics accounts for a small to moderate portion of causal factors, but the rest is left to be explained by environmental toxins.

(1) Combine the three neurodegenerative diseases to look for clusters.
(2) What is the strength of the relationship between all three diseases and exposure to lead and paraquat?

Data is provided by CDC Wonder, NC Vital statistics, US Census Bureau, State Center for Health Statistics Childhood Lead Poisoning Prevention Program, and Pesticide National Synthesis Project.

Neurodegenerative Diseases

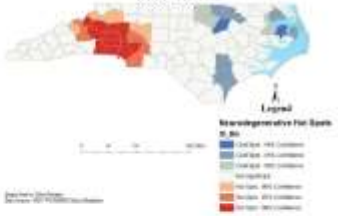
Spatial autocorrelation is confirmed with a Moran's I value of 0.418 at 0.0 sig. level, meaning the pattern within the data is not random.

North Carolina
Neurodegenerative Age-Adjusted Mortality Risk
2008-2017

Neurodegenerative Disease Clustering

The bright red area indicates neurodegenerative disease clustering, warranting further investigation.

North Carolina
Neurodegenerative Hot Spots
2008-2017



Lead Exposure

Children are exposed by ingesting lead paint from a home or from a parent due to an occupational hazard. Exposure to pesticides, in conjunction with lead, led to a severe increase in risk for neurodegenerative disease development by at least 50 percent (Gunnarsson & Bodin, 2019).

North Carolina
Childhood Blood Lead Surveillance Data
2013-2017

The researcher considers occupational, chronic lead exposure in adults, but needs original data from the CDC ABLES Program to add to the analysis.

Pesticide Exposure

Pesticides are chemicals used on plants or crops to kill insects, weeds, rodents, bacteria, or fungi. The herbicide paraquat is used by farmers.

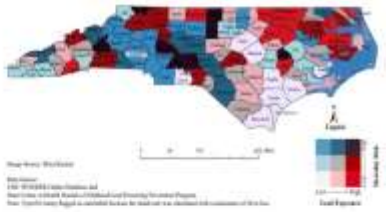
North Carolina
Paraquat Use Low Estimates
2008-2017

Gunnarsson, L., & Bodin, L. (2019). Occupational exposures and neurodegenerative diseases—A systematic literature review and meta-analyses. *International Journal of Environmental Research and Public Health, 16*(3), 337. doi:10.3390/ijerph16030337

Funding Supported by the Office of Undergraduate Research and Scholarship

Results & Conclusions

North Carolina
Neurodegenerative Age-Adjusted Mortality Risk 2008-2017
And
Child Blood Lead Levels 2013-2017



Linear Regression Analysis - Lead
Adjusted R Squared: 0.045 at 0.018 sig. level ($p<0.5$)

Order Least squares Regression - Lead and Paraquat
Adjusted R Squared: 0.054 at .026 sig. level ($p<0.5$)

The results successfully explained 5.4% of the variation in neurodegenerative disease age-adjusted mortality risk by exposure to lead and paraquat.

Evaluating the Impact of Work Environments on ADHD Presentation in Adults

University of Lynchburg

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University of Lynchburg

Introduction

Four out of every one-hundred American adults live with Attention-Deficit/Hyperactivity Disorder, or ADHD.[1] ADHD is a neurodevelopmental disorder characterized by continuous, disruptive patterns of inattention and/or hyperactivity.[2] Compared to those in children, ADHD symptoms in adults present differently, as restlessness and impulsivity are often internalized.[2,3] Even so, ADHD negatively affects work and educational outcomes, as well as personal life decisions.[1] *Total Worker Health* (TWH) initiatives are policies and programs that advocate for worker health by protecting from work hazards and promoting illness and injury prevention. TWH recognizes that work is a social determinant of health and that any positive change in work environments or conditions can improve overall health.[4] The purpose of this study was to determine how vocational settings impact the mentality and behavior of workers with ADHD, in order to improve their overall health and success.

Methodology

A risk assessment was conducted following the Environmental Protection Agency's (EPA) human health risk assessment process. This method is depicted in Figure 1.[5] Information and data utilized in the risk assessment was obtained through a review of existing literature. Articles and studies were found by searching "adhd adults," "occupational environment," and "manifestation of adhd" in Google Scholar and the National Institute of Health's PubMed database. Searches were restricted to sources from 2000 – 2020. Sources were restricted to free-access and subscriptions obtained through the University of Lynchburg.

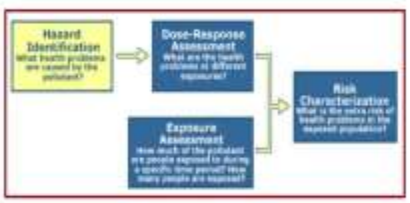

Figure 1. EPA's Human Health Risk Assessment Process

Findings

Environments that feed symptoms of inattention, restlessness, impulsivity, and distractibility pose a unique hazard to ADHD-burdened workers. These symptoms manifest in many ways, as depicted in **Figure 2.**[6]

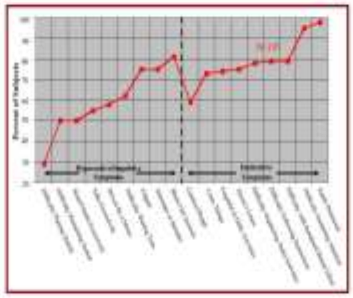

Figure 2. Symptoms and Respective Prevalence in Adults with ADHD

Based on TWH principles, four work environment hazards were identified as threats to workers with ADHD through the Health Risk Assessment Process:[7]

Sedentation
- Sedentary behavior is characterized by duration, pattern of behavior, and context of behavior.[8]

High-Demand Tasks
- Includes time pressure, number of tasks, work overload, and emotional demands.[9]

Work Environment
- The principle of "heterarchy" suggests that aspects of one's environment are linked to a person's whole dynamic.[10]

Distractions
- Contributors include lack of meaning, mental underload, constriction of personal behavior, and monotonous jobs.[9]

Risk Characterization

ADHD adult workers may be at increased risk of experiencing negative health effects from some occupational environments. Sedentation increases restlessness in ADHD adults, which can lead to poor work performance and/or job loss.[7] Long-term sedentary behavior can contribute to the development of mental illness, many of which ADHD individuals are predisposed to.[11] Workers with ADHD have a difficult time attending to key details and completing routine tasks under timed conditions. Difficulty accomplishing these tasks puts these workers at risk for burnout.[3] Work environments impact psychosocial health and work engagement. Work engagement is directly related to productivity.[12] Distractions, attributed to boredom and inattentiveness, decrease mood and increase irritability. This can lead to personal distress, substance abuse, and occupational accidents.[9]

Risk Management & Recommendations

Sedentary behavior should be interrupted every 20-30 minutes by switching tasks or moving to a standing position.[8] Giving workers more control over their job can reduce stress and burnout.[12] Counselors can teach workers better organizational techniques and habits to counter their ADHD symptoms.[13] Headphones and optimizing workspaces can reduce distractions and improve mental stimulation.[10] Finally, *Total Worker Health* policies should be implemented in all workplaces to improve worker health, safety, and productivity.

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University of Lynchburg

Outdoor Air Pollution and Cancer in African American Men

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Introduction & Purpose

African American men have the highest death rate and the lowest survival rate for most cancers (Desantis et al., 2019). Some of the highest cancer death rates in the US are found in Louisiana. Outdoor air pollution and particulate matter is considered carcinogenic to humans and has been linked to lung, bladder, and kidney cancer (Turner et al., 2017). The purpose of this literature review was to investigate the relationship between outdoor air pollution and increased incidence of cancer in African American men.

Methodology

A literature review was conducted using Pubmed and Google Scholar to search for peer reviewed articles. Key terms were: Residential Segregation, Discrimination, African American Men, Cancer, Outdoor Air Pollution. A total of 14 articles were reviewed using the EPA's Risk Assessment Process.

Figure. 1. EPA Risk Assessment Process. (EPA, 2017)

Findings: Hazard Identification

Industrial factories are located near low income and minority communities, which may lead to disproportionate health effects for residents due to air toxins (James et al., 2012). The communities in these areas are also predominantly African American (Terrell & James, 2020). High cancer rates among African American men in Louisiana may be connected to the industrial belt referred to as "Cancer Alley". This is an area along the Mississippi River between Baton Rouge and New Orleans, which contains numerous industrial plants near predominately Black communities.

Fig. 2. Map of Louisiana's industrial belt. (Wildgen, 1998)

Findings: Dose-Response Assessment

Outdoor particulate matter can come from many different primary and secondary sources such as industrial processes, vehicles and coal-fired power plants. Factors such as exposure duration and individuals' susceptibilities to other diseases determine how harmful outdoor air pollution will be. Studies have shown that there is a 9% increase in risk for lung cancer per 10 ug/m3 increase in PM2.5 concentrations in the outdoor air and an 8% increase in risk for lung cancer per 10 ug/m3 increase in PM10 in the outdoor air (Turner et al., 2020). Studies have also shown that chronic exposure to air pollution is associated with increased CVD risk and mortality (Erqou et al., 2018).

Findings: Exposure Assessment

A study conducted by Kravitz-Wirtz et al. (2016) found that Black and Latino neighborhoods had concentrations of PM2.5 and PM10 that were between 7% and 32% higher than in White neighborhoods. A study by Erqou et al. (2018) found that African Americans had significantly higher exposures to air pollutants in a community-based cohort of adults in Western Pennsylvania. African Americans tend to live in areas with greater exposure to air pollution due to decades of residential segregation (American Lung Association, 2020).

Table 1. This table presents descriptive statistics, by race/ethnicity, for all the variables in the analysis. (Kravitz-Wirtz et al., 2016)

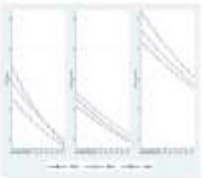

Fig. 3. Block-level exposure to NO_2, $PM_{2.5}$, and PM_{10}, respectively, by race/ethnicity and time. (Kravitz-Wirtz et al., 2016)

Conclusion & Risk Characterization

Black communities and African American men are disproportionately affected by outdoor air pollution and cancer and is linked to residential segregation and increased risk for exposures from industrial plants and factories. According to Baurick et al. (2019), new industrial plants are being planned for the industrial belt in the Baton Rouge area of Louisiana. Many companies locate their plants and factories in disadvantaged areas because the residents do not have the political power to oppose their placement. Since these residents lack political power, they lack advocates or lobbyists representing them at the national level (James et al., 2012). Predominantly black and poor communities also deal with other social issues such as crime, drugs, and poverty. Because of this, the community residents aren't likely as focused on environmental issues. Residents of these communities cannot easily relocate due to economic, educational, and social barriers (James et al., 2012); thus, continuing their exposure to outdoor air pollution and increased risk for cancer.

Risk Management & Recommendations

- Prevent industrial factories from being built in the industrial belt of Louisiana and near other predominately Black communities
- Create stricter air pollution standards for industrial factories
- Encourage residents to limit time outdoors when pollution levels are elevated (Laumbach, 2010)
- Encourage citizen involvement in environmental policy
- Create more mixed income communities (Rice et al., 2014).

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Particulate Matter Concentration Around Lamberts Point & Railroad, Norfolk, VA

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Introduction

Particulate Matter (PM) is a mixture of microscopic solid or liquid particles suspended in the atmosphere. According to Norfolk Southern, the Lamberts Point coal terminal located on the eastern shore of Elizabeth river has an annual capacity of up to 48 million tons of coal transloading. Continuous blending, dumping, and ship-loading of thousands of tons of coal occur from trains to ships at this location. This process leads to the emission coal dust in the environment. These fine coal dust particles in the atmosphere can be inhaled during respiration and impact respiratory health.

The main objective of air sampling in these sites was to monitor the PM concentration in the community around the coal terminal and find if PM concentration levels were within the EPA regulations.

Sampling Instruments & Procedures

Devices Used: GRIMM Spectrometer and The TSI model 3007 condensation Particulate Counter used to measure total PM count, a lab notebook and a laptop.

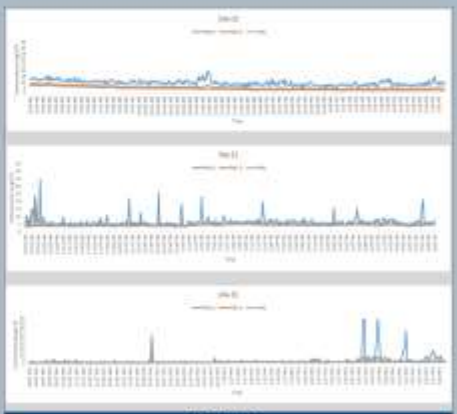
- 5 sampling sites were selected within the community and in close proximity to the coal loading area (to monitor coal dust emissions in the surroundings).
- Study Duration: 4 months (June- October, 2018)
- Sampling: Continuous measurements-one site per day.
- Data collection: Between 8.00 am-8.30 pm, 4 hours or 8 hours shift.
- Each site was monitored at least twice for data accuracy.

Table 1: Location

S. No.	Site	PoAction Source	Location	Latitude	Longitude
1	A1	community	624 Maryland Ave, 23508	36.883500	-76.290740
2	A2	community	624 Maryland Ave, 23508	36.883500	-76.290740
3	B1	Traffic	4608 Hampton Blvd, 23529	36.885890	-76.302050
4	B2	Traffic	4608 Hampton Blvd, 23529	36.885890	-76.302050
5	C1	Traffic	Child study center, 23508	36.886780	-76.296400
6	C2	Traffic	Child study center, 23508	36.886780	-76.296400
7	D1	Traffic	4803 Powhatan Ave, 23508	36.886890	-76.313000
8	D2	Traffic	4803 Powhatan Ave, 23508	36.886890	-76.313000
9	E1	Community	2616W 28th Street, 23508	36.877209	-76.305748
10	E2	Community	2616W 28th Street, 23508	36.877209	-76.305748

Community map with sampling sites

Results: PM_{10}, $PM_{2.5}$ & PM_1 concentration in community sites



Conclusion

- EPA's 24-hour average regulation levels for PM_{10} and $PM_{2.5}$ weren't exceeded by any of the above sites.
- PM_{10} ranged from (6.50-19.30) µg/m³, $PM_{2.5}$ ranged from (2.90-14.03) µg/m³ and PM_1 ranged from (1.26-12.26) µg/m³.
- Site B showed increase in PM concentration during traffic rush hours in Hampton Blvd.
- Site E showed continuous changes in the PM_{10} concentration. This site is within 25 feet of railroad track. The fluctuation in PM_{10} concentration throughout the day shows need for regular air quality monitoring along with the track of movement of the coal trains around the location.

Table 2: EPA National Air Quality Standards for Particulate Matter

Particulate matter Type	Primary or Secondary	Averaging time	Level	Form
PM_{10}	Primary and Secondary	24 hours	35µg/m³	98th percentile averaged over 3 years
$PM_{2.5}$	Primary and Secondary	24 hours	150µg/m³	Not to be exceeded more than once per year on average over 3 years

Further Suggestions

- Increase number of sampling sites.
- Monitor throughout the year for annual average PM concentration and effect of weather on PM concentration.
- Record keeping of the coal transportation time and PM concentration analysis is suggested to determine the association between coal transportation and PM concentration near railroad track and coal storage location.

Acknowledgements

I would like to thank my faculty advisor Dr. Anna Jeng, for my practicum project and air sampling devices. This project would not be complete without the help of Pat, Kim, and community members who supported my project by providing access to the sampling site within and around their properties.

The Utility of Perceived Neighborhood Environments as a Predictor of Childhood Obesity

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Center for Community Health Innovation · Roanoke College, Salem VA

Background

- Past research has shown that individual neighborhood environments play a role in youth weight status.
- Both food environments and physical activity environments have been considered to understand caloric balance in youth.
- Saelens et al. (2012) demonstrated that food and physical activity environments played a role in youth weight status, but the study only considered objective measures of the environment. These included GIS audits of neighborhood proximity to parks and other recreational facilities and to supermarkets and fast-food restaurants.
- By only researching objective measures of access to healthy resources, there is the potential to miss the influence of social determinants of health on youth weight status.
- Carroll-Scott et al. (2013) proposed that the utilization of ***perceived*** access to resources supporting healthy living allowed for insight into the impact of social determinants of health on youth weight status, but nutritional environments were not considered.

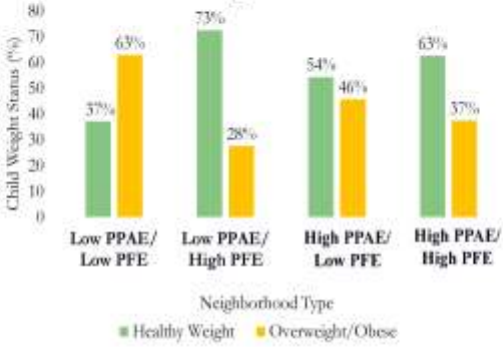
Purpose

The purpose of this study was to explore the relationship between perceived neighborhood physical activity environments (PPAE) and perceived food environments (PFE) on weight status in youth.

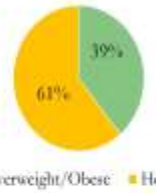
Methodology

- Perceptions of neighborhood access to physical activity and food resources, along with objective measures of BMI-for-age, were gathered from the 2017 Roanoke Valley Community Healthy Living Index.
- Responses to prompts such as "Food stores offering healthy foods are in walking/biking distance from home or are easy to get to by bus" and "Parks and other areas are available for people of all ages to be active in the neighborhood" were used to thematically code neighborhood PPAE and PFE as low or high.
- Chi-square analysis was used to analyze the relationship between joint PPAE/PFE environments and youth BMI-for-age.

Child Overweight/Obesity Status by Perceived Neighborhood Access



Weight Distribution Amongst Youth



Perceived Access to Neighborhood Resources

Results

- Complete data was available for 574 students (age = 7.27 ± 1.77 years).
- Children who perceive they live in a low food/physical activity environment are more likely to be overweight or obese than children who perceive they live in environments with high levels of access to both resources, or some combination of high/low access (X^2 (3, N = 574) = 12.933, p = .005, Cramer's V = .15).

Conclusions

- Students that perceived that they had higher access to resources supporting physical activity and healthy eating tended to have a lower BMI-for-age.
- The magnitude of difference in obesity rates between Low PPAE/Low PFE and High PPAE/High PFE was 26%; Saelens et al. (2012) found an 8% difference between objectively measured high and low physical activity and food environments.
- Variability in the magnitude of difference could indicate that studying perceived access to resources supporting healthy living may play a better role in understanding the impact of social determinants of health on youth weight status.

Future Directions

- Our data suggests that utilizing perceived access to neighborhood healthy-living resources may provide a more robust understanding of the impact of social determinants of health on youth weight status.
- These findings indicate the usefulness of studying perceived neighborhood environments and may be used to guide localized policies to reduce youth overweight and obesity.

Conducting Research as a First-Year Medical Student

Siri Tummala, Gary Kesling

Background

During the past twelve months, in response to COVID-19, there has been evolving societal expectations and values, including some transformations in academic health sciences education and training to ensure that those graduating from medical school will be better equipped to deal with the demands of modern medicine and further education. The TCU and UNTHSC School of Medicine has immersed its students in research early to develop physicians who are life-long learners capable of critical inquiry and in medical information literacy to produce physicians suited for patient-centric care. Through self-directed discovery, students develop skills needed to understand and use evidence-based approaches for basic and clinical research.

Methodology

- Identify a Core Topic
- Select a Mentor
- Research Current Literature on the Topic
- Create a Work Plan
- Partner with Local Organizations to Fit Community Needs
- Find Sponsors to Fund Idea

Discussion

The study (The *Impact of COVID-19 Restrictions on Caregivers of Individuals with Dementia*) used qualitative methods comprising of structured interview questions. The findings show that, despite a world-wide pandemic and the demands of beginning the first year of one's medical education, it is possible to effectively engage in scholarly evidence-based research. Medical schools need to ensure that students are provided with early exposure to environments that allow for the exploration of meaningful interactions by increasing opportunities to 'stand in' to the role of a researcher, even as students.

Acknowledgements

We would like to express our sincere gratitude to the faculty at the TCU and UNTHSC School of Medicine.

Establishing a Research Lab in Public Health: Opportunities and Challenges from a Faculty and Student Led Collaboration

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Introduction

In September 2019, Old Dominion University (ODU) faculty and doctoral students began conceptualizing a Health Sciences research laboratory. The REACH (Research, Education, and data Analysis for Community Health) Lab was created and serves as a multidisciplinary research laboratory housed in the Center for Global Health in the College of Health Sciences at ODU. The Lab enables faculty, researchers, community partners, and students to conduct research for the advancement of health and wellness in Hampton Roads, the Commonwealth of Virginia, the nation, and the world.

The Lab also recognizes the importance of combining expertise and capacities of multiple institutions, disciplines and professions in addressing complex health problems. The Lab seeks to create a productive and friendly environment in which it can educate and train future generations of public health researchers and provide a vehicle for unique public health research and programs that do not fit more traditional academic structures.

Process

The REACH Lab was piloted in January 2020 with 3 faculty members and 2 Health Services Research PhD students. By-laws and a Code of Ethics were drafted and approved and have been in place to guide lab operations. Since Fall 2020, the Lab has grown with additional collaboration from two doctoral students. The Lab, from the beginning, has committed itself to convening biweekly to discuss research collaboration, support, and progress and to identify areas of potential research collaboration. Detailed notes are taken during each meeting and shared afterwards.

The Roles/Responsibilities of Each Current Member Include:

Faculty members
- Mentor students and identifying areas for student involvement
- Provide opportunities for student to participate in research
- Write joint grants (RFAs, RFPs, etc.) with other Lab members
- Co-advise students with other Lab members
- Co-author grant proposals and journal articles with other Lab members

Master and Undergraduate Student
- Perform literature reviews
- Co-author grant proposals and/or journal articles with/under the guidance of other Lab members
- Commitment to sharing resources

PhD Students
- Mentor master or undergraduate students
- Perform literature reviews and other supportive services for the Lab
- Co-author grant proposals and/or journal articles with other Lab members
- Commitment to sharing resources

Community partners
- Identify projects for collaboration
- Mentor students when possible
- Serve as liaison between REACH Lab members and community members
- Commitment to sharing resources

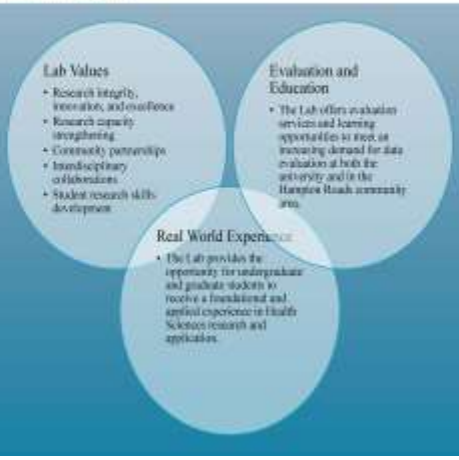
Challenges and Opportunities

The Lab provides many opportunities for students, faculty members, and community partners. To date, the Lab has provided:
- Research methodology and data evaluation support for graduate students
- Research support for faculty members
- Data evaluation assistance to community partners

While several accomplishments have been achieved thus far, there are several challenges that will need to be addressed in order to fulfill the Lab's mission and vision. These include:
- Leveraging different research interests to maximize collaboration
- Managing conflicting priorities and schedules to meet the demands of ever-changing research demands
- Including community member participation at all stages of Lab operations through robust outreach and capacity building, as needed.

Quick Facts

The REACH Lab:
- Has a mission to use a public health lens to conduct research related to social justice, economic, human resource and environmental issues of interest, educate and mentor students in their development as future researchers, and to use data and evaluation to solve problems that affect our communities.
- Has a vision to be the preeminent community health services laboratory tasked with advancing scholarly and community-based research through interdisciplinary collaborations.
- Is co-facilitated by both faculty and Health Services Research PhD students.



Conclusion/Next Steps

While establishing the REACH Lab has shown some success, the team has learned valuable lessons to foster more intentional collaborations to meet the needs of all members, including community partners. Moving forward, to successfully work towards meeting its mission, the Lab will be focusing on the following:
- Engagement and buy-in from community partners
- Outreach to more PhD and undergraduate students, including those from other disciplines
- Setting up research interest groups/tracks to streamline collaboration
- Increasing Lab presence on campus
- Publishing and presenting research activities to larger audiences.

Expressions of Power and the Political Dimensions of Health in Global Pharmaceutical Pricing

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2021 Virtual Conference

Prospectus of Forthcoming Dissertation, *Power and Politics in National Pharmaceutical Pricing Policy* (August 2021)

BACKGROUND

The "practice of medicine" is fast becoming the prescribing of medicine. Pharmaceuticals, from vaccines to treatments to cures, have become a first line of defense against disease and illness, particularly those ranking high in terms of global health priorities. Reliance on pharmaceutical innovations, however, comes at a cost. With medicines fast becoming a growing component of total health spending, and health spending a fast-growing line item of national budgets, greater and, potentially unsustainable, public spending on pharmaceuticals can invite harmful policy trade-offs for health and other public priorities. But are fiscal and policy woes the maxim of our worries, or the tip of the spear? The who-gets-what in the making of national pharmaceutical policy, which are expressly power-driven decisions, reflects complex political relationships and imparts global consequences, including for health equity.

OBJECTIVE & RELEVANCE

Emerging evidence suggests that when researchers overlook the practice of power, they can misattribute reasons why policy decisions and policy implementation obtain certain outcomes. Power disparities, generally accepted as the root cause of health inequity, have deepened under globalization, resulting in non-state concentrations of power bent towards the advancement and preservation of economic interests, and global social norms oriented to the exclusive role of the individual in health and illness. But these power disparities are amenable to, as well as dependent on, political action.

PREMISES

- **Health is political** because power is exercised over it (Bambra, Fox, and Scott-Samuel, 2005)
- **Power is relative, relational, and manifests at different levels unequally** (Gore and Parker, 2019)
- **The "special economics of health care"** make market-based policies inefficient and more likely to result in imbalances and inequities (Mankiw, 2017)
- **Global market integration continues to shrink the national policy space**, which cause health to be subordinated to, or co-opted by, other public policy priorities (Labonté and Schrecker, 2007)

RESEARCH QUESTIONS

- What are the political dimensions of health capable of driving normative shifts?
- Are such shifts restricted to a certain level of action (global, regional, national) or can they be bidirectional?

METHODOLOGY

Research Design: Employs IVivo to classify actors involved in select pharmaceutical pricing policies' development, negotiation, and implementation according to interests, preferences, and interactions with other actors, with acute attention to actor type and typology of power expressed consistent with the Campos and Reich (2019) and Arts (2003) constructs.

Case Studies: External reference pricing of pharmaceuticals in Brazil, Canada, France, Jordan, and South Africa are examined, as are **health technology assessment pricing** policies as advanced by Australia, Germany, Japan, and the United States.

PRELIMINARY FINDINGS

- Positive and negative externalities of health to society are transferable, indivisible, and non-excludable; therefore, health is a public good
- Markets under-produce public goods relative to what may be socially optimal. State actors traditionally provide public goods, though neoliberal economic policies favor outsourcing
- Public goods theory acknowledges that achieving an ethical and equitable optimum is impossible within purely economy frameworks; political dimensions and determinant are necessary
- The prevalence and reach of neoliberal economic policies through globalization commodifies health, individualizes disease and illness, and globalizes disease—even for non-communicable diseases
- Normative ambition is a mechanism for centering ethics, equity, and values in International Political Economy, allowing research on distributional considerations for public matters like health
- Powerful actors in health policy and systems, whose interests are primarily motivated by economic, fiscal, and budgetary considerations, shape policymaking to protect those interests

Select References: Clare Bambra, Debbie Fox, and Alex Scott-Samuel, "Towards a Politics of Health," Health Promotion International 20, no. 2 (June 2005): 187–93; Radhika Gore and Richard Parker, "Analyzing Power and Politics in Health Policies and Systems," Global Public Health 14, no. 4 (April 2, 2019): 481–98; and N. Gregory Mankiw, The Economics of Healthcare, 2017.

Virginia Journal of Public Health Submission Guidelines

The Virginia Journal of Public Health (VJPH) is published twice yearly, fall and spring by the Virginia Public Health Association. The VJPH welcomes research articles, professional articles and literature reviews for consideration for publication (Please see the specific formats for each type of manuscript listed below).

Deadline for Manuscript Submissions:

Fall Issue: August 15th

Spring Issue: February 15th

Journal manuscripts should be sent to **Dr. Kim Baskette, Editor (kbaskett@vtc.vt.edu)** as a WORD document, email attachment. In the cover letter or email, the corresponding author needs to affirm that the article has not been published elsewhere.

Manuscript Guidelines:

1. Follow the form of the Publication Manual of the American Psychological Association (APA), 7th edition (http://www.apastyle.org).
2. Typed and submitted as a Word document; **double spaced, 12 pt. font (font style should be in alignment with new APA guidelines in 7th ed), 1" margins.**
3. Include a title page with the names and addresses of each author to include professional affiliation.
4. Include a title page without author identification (will be used for blind review).
5. Include a pdf copy of the Institutional Review Board approval if appropriate.
6. Include references at the end of the manuscript in **APA format.**
7. Have any figures or tables embedded in the manuscript; do not include at the end of the manuscript. Tables and figures should be **formatted in APA format only.**
8. Include an abstract containing 200 words or less with appropriate delineated sections.

Organization of Manuscripts

- Research Articles
  - Abstract (200 words): Purpose, Methods, Results, Findings, Conclusion.
  - Text: Purpose, Methods, Results, Discussion, Summary, Conclusions Recommendations, References.

- Professional Articles (position papers, public health policy, program descriptions)
  - Text: Purpose, Methodology (if applicable), Discussion, Summary Recommendations (if applicable), References (if applicable)

- Literature Reviews
    - Abstract (200 words): Purpose, Methodology (Data Sources, Inclusion and Exclusion criteria), Findings (Data Synthesis), Summary, Conclusions, Recommendations
    - Text: Purpose, Methodology (Data Sources, Inclusion and Exclusion criteria), Findings (Data Synthesis), Summary, Conclusions, Recommendations, References

Review Process

Manuscripts submitted will be sent to three members of the VJPHA Editorial Board for review. Reviewers will recommend (1) Acceptance, (2) Acceptance with Revisions, (3) Revise and Resubmit, or (4) Reject. The Editor makes the final decision and will notify the corresponding author of the manuscript disposition.

Questions: Contact Dr. Kim Baskette at kbaskett@vtc.vt.edu