



Investigating improvements in premature death in two rural, majority-minority counties in the south

Rodney Lyn^{a,*}, Erica Heath^a, Andrea Torres^b, Christine Andrews^a

^a School of Public Health, Georgia State University, Atlanta, GA, 30303, USA

^b ICF, Fairfax, VA, 22031, USA

ARTICLE INFO

Keywords:

Positive deviance
Premature mortality
Determinants of health
County health rankings
Qualitative research
Community health

ABSTRACT

This exploratory study investigates counties in the southeast United States with mortality outcomes that were better than might be expected given their sociodemographic profiles (i.e., positive deviance). This study seeks to understand the community characteristics with the potential to moderate the negative health outcomes typically associated with social, geographic, or economic disadvantages. This article describes the process used to identify positive deviants and reports on the findings from key informant interviews in positive deviant counties to identify community factors or practices that might contribute to positive deviance in the observed outcomes. County Health Rankings and Roadmaps 2015 data and mortality trends were examined to identify positive deviant counties. The inclusion criteria were median household incomes in the lowest tertile of their state, $\geq 33\%$ African American, and premature mortality rankings (as measured by Years of Potential Life Lost–YPLL) in the top quartile within their state. After benchmarking county rates against national figures and retaining counties with significant improvement trends, two counties emerged as positive deviants, Dooly County, Georgia and Washington County, North Carolina. Key informant interviews ($n = 11$) were conducted with community stakeholders in the study counties to better understand the community characteristics that could lead to the observed outcomes. Interview data were analyzed using qualitative methods. Key informant interviews revealed three emergent themes: 1. accessibility and availability of healthcare, 2. the provision of a robust EMS system, and 3. coordination of county-funded services targeting vulnerable populations. The positive deviance framework provides a foundation for the identification of community factors or practices with the potential to create a ‘culture of health’ in communities at the greatest risk for adverse health outcomes. Our findings suggest that healthcare supported by the coordination of non-emergency transportation and health and social services across numerous stakeholders may have contributed to observed outcomes in the study counties.

1. Introduction

Social determinants are powerful drivers of community health (Braveman & Gottlieb, 2014). They influence the context and conditions in which people live, work, and play and are influenced by factors such as geographic location, education, culture, economic conditions, social support, and availability of health resources (Braveman et al., 2011;). According to the World Health Organization (WHO), disparities related to social determinants are the primary cause of health inequities. (World Health Organization) Health inequities are defined as unfair and avoidable differences in health status experienced by certain populations. (World Health Organization) The social determinants associated with favorable health outcomes include higher socioeconomic

status, educational attainment, and access to health care resources while poverty, lack of health care access, and deficiencies in the physical and social environments are associated with poor health outcomes (Braveman & Gottlieb, 2014; World Health Organization, 2008).

Numerous studies have demonstrated a connection between social and economic disadvantage and health inequities (Anderson et al., 1997; Backlund et al., 1999; Daly et al., 2002). According to surveillance data, Black, Hispanic, and Asian-Pacific Islander communities typically have lower socioeconomic status, higher cost barriers to health care, and greater risks for chronic diseases compared with general populations living in the same county or state (Liao et al., 2011). Research shows that non-Hispanic Blacks in the United States (US) persistently experience health inequities across almost every metric of health examined (Centers

* Corresponding author. Georgia State University, School of Public Health, P.O. Box 3995, Atlanta, GA, 30302-3995, USA.
E-mail address: RLyn1@gsu.edu (R. Lyn).

<https://doi.org/10.1016/j.ssmph.2020.100618>

Received 17 October 2019; Received in revised form 17 June 2020; Accepted 17 June 2020

Available online 23 June 2020

2352-8273/© 2020 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

for Disease Control and Prevention, 2013). African Americans have the highest prevalence of chronic diseases, including obesity, diabetes, heart disease, and stroke (Centers for Disease Control and Prevention, 2013; Cunningham et al., 2017; Liao et al., 2011). Compared to non-Hispanic Whites, non-Hispanic Blacks are two times more likely to die of heart disease, are 50% more likely to have high blood pressure, and have the highest incidence and death rates for cancer (Centers for Disease Control and Prevention, 2013). The southeastern US experiences a disproportional burden of health disparities associated with race/ethnicity and socioeconomic status. As a result, states in the south are among the least healthy in the US, which disproportionately affects African Americans.

Despite the clear association between social and economic disadvantages and adverse health outcomes, data from the *County Health Rankings* (University of Wisconsin P, 2015a) revealed a paradox of sorts. In 2015, certain counties in the southeast US with low median household incomes and a high proportion of racial/ethnic minorities reflected county health rankings above the median in their respective states, and in some cases, were among the most favorable quartile for measures around premature death and quality of life. One possible explanation for this paradox is the concept of positive deviance. Positive deviance refers to the notion that certain individuals or groups (referred to as “positive deviants”) possess specific characteristics that enable them to achieve better outcomes compared to others with similar resources, socioeconomic profiles, and risk factors (Marsh et al., 2004). In this study, positive deviance refers to counties in the southeast US that were achieving favorable health outcome rankings in comparison to other counties in their respective states despite having demographic profiles that are typically associated with social and economic disadvantages. Identifying counties that display positive deviance may contribute to our understanding of community-level practices that hold promise for promoting population health and health equity.

The purpose of this exploratory study was two-fold—first, to describe the process used to identify counties in the southeast US displaying positive deviance, then to report on findings from interviews with community stakeholders in positive deviant counties to better understand the community context and factors that may have contributed to positive deviance for the selected counties. That is, what unique inputs

or characteristics may have contributed to the achievement of better than expected premature mortality outcomes for the counties studied, given social, geographic, and economic disadvantages?

2. Methods

2.1. County selection procedures

In this study, positive deviants were identified at the county level. This study utilized data from the *County Health Rankings and Roadmaps* (University of Wisconsin P, 2015a) developed by the University of Wisconsin Population Health Institute in collaboration with the Robert Wood Johnson Foundation. Specifically, data from the 2015 rankings were used to identify and profile positive deviant counties in the southeast US. Premature death was used as the outcome of interest because it is an objective measure that is available for every county in the study’s geographic area. Additionally, the measure captures quantifiable preventable death, which is potentially influenced by local circumstances. The *County Health Rankings* uses years of potential life lost before the age of 75 (YPLL) as its measure for premature death, and accordingly, this was the measure used in this study.

A systematic approach and purposeful sampling was used to identify and profile the counties of interest using the following steps:

- 1.) Ten states representing the Southeast US were included: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee (N = 875 counties).
- 2.) From these states, all the counties that met the following criteria were retained for further profiling: (a) median household income in the lowest tertile of the state’s median household income and (b) African American population of 33% or higher (N = 131 counties).
- 3.) Next, counties with a premature death rate (YPLL) ranking in the most favorable quartile (reflecting the lowest YPLL scores) within their corresponding state were selected and examined (n = 9).

Table 1

Ranking of counties by years of potential life lost.

- 4.) In 2015, the US YPLL was 6997 (University of Wisconsin P, 2015a). The counties with YPLLs that fell below or in close proximity to the national YPLL were retained for further profiling (n = 6).
- 5.) Preliminary county profiles were created to examine mortality outcome rankings, morbidity rankings, and health factor rankings. Mortality trends were benchmarked and compared to US figures over a 10-year period (University of Wisconsin P, 2015a). Other mortality outcomes, including age-adjusted death rates, cancer mortality rates, and cardiovascular disease mortality rates, were examined to confirm mortality trends (United States Census Bureau, 2012). In addition, 2015 data were reviewed from the Centers for Disease Control and Prevention’s Community Health Status Indicators (CHSI), which groups counties based on demographics and geographic characteristics and ranks peer counties and numerous health outcomes (United States Department of Health and Human Services, 2015). The counties with consistently better rankings and improvement trends across YPLL, mortality outcomes, and CHSI indicators were included in this study (n = 2).
- 6.) County profiles were created and included the following information:
 - a. Geographical information: (1) County seat; (2) Major Highways.
 - b. Economic information: (1) Prevalent industries or businesses.
 - c. Socio-Demographics: (1) Population; (2) Racial makeup; (3) Income and housing (Prevalence of poverty, Median household income, Unemployment rate); (4) Education attainment (High school graduation); and (6) Health care (Uninsured).
 - d. Health Outcomes: (1) Female and male life expectancy (in years); (2) Mortality (Premature death, Cancer incidence, Cancer mortality, Heart disease mortality, All-cause mortality), (3) Quality of Life (Poor or fair health, Low birth rates).

County and State	YPLL	State YPLL	US YPLL
1. Wheeler County, Georgia	5378	7314	6997
2. Calhoun County, Georgia	5967		
3. Dooly County, Georgia	6699		
4. Lincoln County, Louisiana	6767	9131	
5. Webster County, Georgia	7061	7314	
6. Washington County, North Carolina	7107	7212	
7. Kemper County, Louisiana	8351	9131	
8. Barbour County, Alabama	8901	9508	
9. Clay County, Mississippi	9251	10,031	

The nine counties meeting the inclusion criteria are listed in Table 1.

2.2. Key informant interviews

To understand the community context and to identify factors that may contribute to the positive deviance in the study counties, interviews were conducted with community stakeholders who could provide insight on community factors with the greatest potential to impact premature mortality. Interviews were conducted as part of a site visit to each county. A purposeful sampling method was used to identify settings in the community that had the potential to impact health outcomes and individuals who were employed in those areas. This led to identification and participation of individuals serving in public health, health care, EMS, transportation, and county government and services. A total of eleven interviews (5–6 in each of the two counties) were conducted with community leaders representing different sectors, including city and county government, health care, public health, transportation, emergency medical services (EMS), and social services. A convenience sampling technique, with a focus on individuals who possess relevant knowledge, was used to identify community leaders and stakeholders. The local health department served as the point of contact for identifying key stakeholders that contributed to population health across the community. The total number of interviews was not predetermined or limited but, rather, was informed by the qualitative research principle of saturation – with participants independently reporting identical information. Further, other standardized methods of community-wide assessment have recommended as few as four stakeholder interviews. (16. Community Readiness).

2.2.1. Interview procedures

An interview guide was developed by the research team (see supplementary information) and informed by the literature on factors likely to impact community health outcomes, including premature mortality. Interview questions focused on county infrastructure, leadership and governance, funding, programs and services, and community partnerships and were tailored (i.e., different) for participants based on their role/sector of employment (e.g., the person representing the transportation service did not get the same list of questions as the EMS employee). Sixty-minute, semi-structured interviews were conducted with community stakeholders, with additional probing where

appropriate, to better understand the community context and explore areas with the greatest potential to impact premature mortality. Participants were asked to discuss factors that may positively and negatively impact the health of residents in the county, specifically for the period from 2000 to 2012 as this was the time period reflected in the 2015 County Health Rankings (University of Wisconsin P, 2015a). They were made aware that there were aspects of their county profile that were positive and others that were less favorable A signed informed consent form was collected from every respondent prior to their interview. The Georgia State University Institutional Review Board approved this study.

2.2.2. Interview analysis

Interviews were audio-recorded, transcribed, and analyzed using NVivo11 (International Pty Ltd, 2018). All interviews were conducted by the same interviewer. One pair of coders managed and analyzed all the data. Both interviewer and coders have training in qualitative research and have published many peer-reviewed articles using qualitative methods. Preliminary categories were based on the health determinants of interest (i.e. healthy behaviors, clinical care, social and economic factors, and the physical environment). Content analysis techniques were used to code interviews and identify community factors in the study counties that could potentially contribute to positive deviance. Transcripts were independently coded by one pair of researchers trained in qualitative data analysis. Discrepancies over the assignment of codes were discussed and reconciled between coders until consensus was reached. Codes were abstracted and grouped according to common characteristics. The results reflect a summary of the emergent community factors that were provided by community stakeholders and are supported by quotations.

3. Results

3.1. Positive deviant counties

Based on the described selection process, two counties emerged as displaying positive deviance for premature mortality (Dooly County in Georgia and Washington County in North Carolina). County profiles for Dooly County and Washington County were created. The selection of these two counties was due to their being the only two counties (among the 131 that met inclusion criteria) that displayed (a) favorable

Table 2
Sociodemographic characteristics and health outcomes for Dooly county, Georgia, and the US.

County Seat	City of Vienna		
Major Highways	Interstate 75, US Route 41, State Routes 7 and 90		
Industry (Dooly County Chamber of C)	Agriculture (Cotton, Peanuts); Poultry Processing; Lineage Services; and Manufacturing		
	Dooly County	GA	US
Population (Dooly County QuickFacts f, 2015)	14,304	9,992,167	318.9 million
Prevalence of Poverty (Institute for Health M, 2015)	32.0%	19.0%	16.0%
Uninsured (Dooly County QuickFacts f, 2015)	24.0%	21%	14.7%
Educational Attainment (University of Wisconsin P, 2015b)			
	HS Graduation	58.0%	70.0%
	Median Household Income	\$31,620	\$47,765
	Unemployment rate	13.1%	8.2%
Race (University of Wisconsin P, 2015b)			
	African American	48.8%	30.5%
	White	42.7%	54.8%
	Other	8.5%	14.7%
Life Expectancy (in years) (University of Wisconsin P, 2015b)			
	Female Life Expectancy	78	79
	Male Life Expectancy	73	75
Mortality (United States Census Bureau, 2012; University of Wisconsin P, 2015b; National Cancer Institute, 2015; United States Department of Health and Human Services)			
	Premature Death per 100,000 YPLL (2010–2012)	6699	7314
	Cancer Incidence per 100,000	339	456
	Cancer Mortality per 100,000	139	165
	Heart Disease Mortality per 100,000	92	179
	All-Cause Mortality	686	802
Quality of Life (University of Wisconsin P, 2015b)			
	Poor or Fair Health	16.0%	16.0%
	Low Birthweight	12.6%	9.5%
			8%

premature death data relative to state and national figures, (b) consistent improvement in premature death over time (2000–2012), and (c) favorable health outcomes data in comparison to peer counties nationally on a wide range of measures, including premature death.

3.1.1. Dooly County profile

Dooly County is located in south central Georgia (GA). County and sociodemographic information for Dooly County can be found in Table 2.

3.1.1.1. Health outcomes in Dooly County. Dooly County was ranked above the median in the state of Georgia for key health metrics and in some cases ranked among the top quartile among peer counties at the national level. The incidence rates for two major chronic diseases, cancer and heart disease, were lower in Dooly County compared with the state of Georgia and the US between 2008 and 2012 (University of Wisconsin P, 2015b; National Cancer Institute, 2015; United States Department of Health and Human Services). In addition, the age-adjusted incidence rate for all cancer sites, cancer mortality, and heart disease death (per 100,000 population) were lower in Dooly County compared with Georgia and the US. (United States Census Bureau, 2012) Refer to Table 2 for key health outcomes for Dooly County.

A clear improvement trend was observed in Dooly County for premature death. In the County Health Rankings, Dooly County ranked 20th out of 159 counties in Georgia in 2015 (2010–2012 data), 5th out of 159 counties in 2013 (2008–2010 data) and 2014 (2006–2008 data), and 106th out of 159 counties in 2012 (2005–2007 data) (University of Wisconsin P, 2015b). Premature death trends (YPLL) for Dooly County, Georgia, and the US are displayed in Fig. 1.

According to national surveillance data gathered by the CDC CHSI (2015), Dooly County had considerably better mortality outcomes in cancer, coronary heart disease, stroke, unintentionally injuries, and male life expectancy compared to peer counties during this same time period (United States Department of Health and Human Services, 2015). In 2015, Dooly County ranked 2nd among 58 peer counties for

age-adjusted cancer deaths, 5th among 57 peer counties for age-adjusted coronary heart disease deaths, 9th among 58 peer counties for male life expectancy, and 3rd among 54 peer counties for the age-adjusted unintentional injury (including motor vehicle) deaths (United States Department of Health and Human Services, 2015).

According to CHSI, Dooly County also performed well in several key morbidity indicators, including adult overall health status, cancer, and syphilis ranking compared with peer counties across the US. Dooly County ranked 5th among 49 peer counties for adult overall health status, 2nd among 56 peer counties for cancer incidence, and 4th among 58 peer counties for syphilis. In addition, Dooly County ranked well among peer counties for older adult preventable hospitalizations, ranking 6th out of 51 peer counties (United States Department of Health and Human Services, 2015). In contrast to the mortality rankings, key health factors (such as physical inactivity, limited access to healthy foods, access to exercise opportunities, and teen births) were not favorable (United States Department of Health and Human Services, 2015; University of Wisconsin P, 2015b).

3.1.2. Washington County profile

Washington County is located in northeastern North Carolina (NC). County and sociodemographic information for Washington County can be found in Table 3.

3.1.2.1. Washington County health outcomes. Data from the County Health Rankings and CHSI revealed favorable mortality outcomes for Washington County between 2010 and 2012, relative to the state of NC and peer county data (Table 3). (Centers for Disease Contr, 2015; University of Wisconsin P, 2015c) The mortality rates for cancer and heart disease were also lower in Washington County compared with North Carolina. (Washington County QuickFa).

Washington County experienced an improvement trend in premature mortality between 1997 and 2012 (refer to Fig. 1 for YPLL trends for Washington County, NC, and the US) according to County Health Rankings data (University of Wisconsin P, 2015c). The county remained

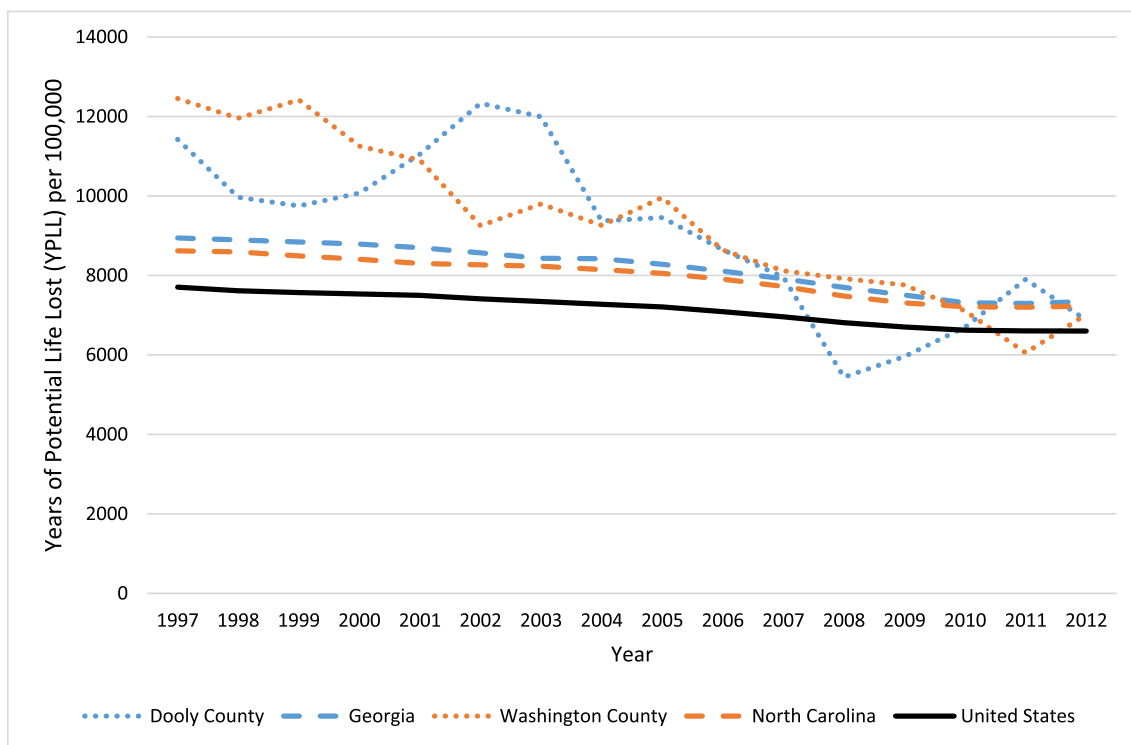


Fig. 1. Premature Death Trends in Dooly County, Georgia, Washington County, North Carolina, and the United States (Years of Potential Life Lost from 1997 to 2012). Adapted from: University of Wisconsin Population Health Institute and Robert Wood Johnson Foundation, 2015 (University of Wisconsin P, 2015a).

Table 3
Sociodemographic characteristics for Washington county, North Carolina, and the US.

County Seat	Plymouth		
Major Highways	US Route 64, State Route 32, 45, 94, 99, 308		
Industry (NC Commerce Labor and Economic Analysis Division, 2015)	Domtar Paper Company; education services; public administration; manufacturing; tourism		
Population (Washington County QuickFa)	Washington County	NC	US
Prevalence of Poverty (Institute for Health M, 2014)	12,722	9,848,060	318.9 million
Uninsured (University of Wisconsin P, 2015c)	27.0%	18.0%	16.0%
Educational Attainment (University of Wisconsin P, 2015c)	17.0%	19.0%	14.7%
	83.0%	81.0%	78.0%
	HS Graduation		
	Median Household Income	\$31,596	\$45,946
	Unemployment rate	9.8%	8.0%
			8.1%
Race (University of Wisconsin P, 2015c)			
	African American	48.5%	21.3%
	White	45.4%	64.4%
	Other	6.1%	14.3%
			10.0%
Life Expectancy (in years) (University of Wisconsin P, 2015c)			
	Female Life Expectancy	79.9	80.3
	Male Life Expectancy	73.3	75.5
			76.6
Mortality (National Cancer Institute, 2015; Washington County QuickFa; United States Census Bureau, 2012; United States Department of Health and Human Services, 2015; University of Wisconsin P, 2015c)			
	Premature Death per 100,000 (YPLL, 2008–2010)	7107	7212
	Cancer Incidence per 100,000	450	497
	Cancer Mortality per 100,000	165	169
	Heart Disease Mortality per 100,000	123	158
	All-Cause Mortality	870	775
	Poor or Fair Health	18.0%	18.0%
Quality of Life (University of Wisconsin P, 2015c)			
	Low Birthweight	10.5%	9.1%
			8%

above the median for mortality outcomes within NC since 2008 and was ranked in the first quartile (top 25% counties) for mortality outcomes in 2010–2012. The YPLL rate for Washington County in 2012 (7107) was lower than the state of NC (7,212) and only slightly higher than the US rate (6,981). (University of Wisconsin P, 2015c).

According to CHSI data, Washington County was among the top 25% of peer counties across the US, with better mortality outcomes in chronic lower respiratory disease (CLRD) deaths, unintentionally injury (including motor vehicle), and Alzheimer's disease deaths. Washington County ranked 5th out of 52 peer counties for CLRD, 1st out of 54 peer counties for age-adjusted unintentional injury (including motor vehicle) deaths, and 2nd among 33 per counties for Alzheimer's disease deaths (Centers for Disease Contr, 2015).

Similarly, Washington County ranked among the most favorable quartile in many morbidity indicators, including adult diabetes, adult overall health status, Alzheimer's diseases/dementia, older adult asthma, older adult depression, and syphilis. According to CHSI, Washington County also performed well compared with peer counties in measures for uninsured, on-time high school graduation, and living near highways (Centers for Disease Contr, 2015). In contrast to the mortality rankings, key health factors (such as physical inactivity, limited access to healthy foods, access to exercise opportunities, and teen births) were not favorable (United States Department of Health and Human Services, 2015; University of Wisconsin P, 2015c).

3.2. Key informant interview data

Key informants provided insight on the community factors with potential to impact health outcomes in Dooly County and Washington County. Respondents focused on the time period leading up to 2012 (i.e., 2000 to 2012) as this information corresponded with the 2015 *County Health Ranking* data (University of Wisconsin P, 2015a). Results reflect information gleaned from interviews with community leaders and stakeholders and are limited to three emergent categories, these include: 1.) Accessibility and availability of local health care, 2.) Provision of a robust EMS system, and 3.) Coordination of county-funded health services targeting vulnerable populations.

3.3. Accessibility and availability of local health care

Interviews with key stakeholders revealed a belief that accessibility

and availability of health care was a major driver for the positive health outcomes experienced in the study counties. Respondents indicated the central location, proximity to nearby hospitals, and the availability of low-cost primary care within the counties were vital in providing residents with options for primary, specialty, and tertiary care. Access to care was further supported by transportation, especially the presence of non-emergency transportation options within the counties. These transportation options provided no-cost to low-cost services to vulnerable populations, such as individuals who were elderly, disabled, and/or had low-income, so they were able to access medical appointments and health-related services.

3.3.1. Dooly County

In Dooly County, respondents suggested that the county had, "great access" to quality health care because it was, "centrally located and connected by a major highway [Interstate 75] to at least six large hospitals located in the surrounding counties." According to an internet search, Dooly County is close in proximity to six hospitals ranging in distance from 14 miles to 35 miles. Two of these hospitals are designated Trauma Centers (Crisp Regional Hospital, Level IV Trauma Center, 14 miles from Dooly; Taylor Regional Hospital, Level III Trauma Center, 31 miles from Dooly).

According to key informants, low-cost primary care is delivered through Dooly County Community Health Center, a Federally Qualified Health Center (FQHC). At the time of the interview, the FQHC provided preventive screenings, health care services for community residents and financial support for treatments for the uninsured. Informants reported that the FQHC was previously a rural health clinic owned by Crisp County Regional Hospital (a neighboring county), and "Several years ago, the Albany Area Primary Health care turned us into a Federally Qualified Health Center. This was an area with limited options ... There is only one provider that is here full time." According to respondents, "The Center has been essential in providing care to our residents for way less than what they would spend constantly going to the ER." Respondents asserted that the FQHC provided a much-needed medical home for many low-income residents in the county.

To facilitate county residents' ability to access care, Dooly County has a public transportation system called the Dooly-Crisp Unified Transportation System (DCUTS) which provides non-emergency, on-demand, and low-cost transportation to Dooly and Crisp Counties so that residents may attend doctor and medical appointments and pick up

medications and medical equipment. One respondent indicated, “There is a big demand for it. This is a service that the county residents definitely use a lot.” The cost is \$6 for seven miles for adults, \$2 for children, and Medicaid recipients ride for free. There is a sliding scale cost to ensure that vulnerable populations are able to afford the cost to ride.

3.3.2. Washington County

Similarly, in Washington County, the most commonly cited advantages were the options for health care. Washington County has a privately owned, Critical Access Hospital ([Centers for Medicare and, 2013](#)) located in the county. According to respondents, local care is, “Augmented by the Vidant Health network” and as a result, Washington County has many specialty facilities within a 49-mile radius. Vidant Health is a highly integrated health care network made up of, “Eight hospitals, physician practices, home health, hospice, wellness centers, and other health care services.” The network provides more than 350 primary and specialty care providers in more than 70 locations. There is only one designated Trauma Center (Vidant Medical Center, Level I Trauma Center, 49 miles from Washington).

One respondent proposed, “I think it all comes down to access ... I have to give credit to the county leaders that have been focused for a long, long time on health care, on having health care resources available in the county.” To help reduce the burdens associated with access to care, Washington County provides non-emergency medical transportation (NEMT) services through social services (via Riverlight Transit) and EMS. Riverlight Transit provides regional services at \$15 per trip (free for Medicaid recipients). According to respondents, “I think a lot of our clientele [in social services] rely on this transportation and we make sure that they know there is assistance to get them to their doctor appointments.” One respondent suggested, “We have established a wonderful relationship with the doctors in Greenville. They know we only go to Greenville three days a week so they work with us.” In addition, if residents need to access care outside of Riverlight’s service area, social services will coordinate with other groups to ensure transportation.

EMS also provides non-emergency transportation for, “transports to doctor visits, inter-facility transports from hospital to hospital, dialysis patients from home to dialysis or facility to dialysis.” According to respondents, “Non-emergency transport helps offset the EMS cost in the county ... We don’t compete with Riverlight. We refer back and forth—they cover wheelchairs and we cover stretchers—to make sure they [residents] are getting the right provider.”

Table 4
Commonalities across Dooly county and Washington county EMS systems.

Dooly EMS	Washington EMS
County-based, 100% funded by the County	County-based, 100% funded by the County, non-emergency transportation helps offset costs
Paramedic-level service. EMS is a priority for County officials to compensate for county hospital’s closure	Paramedic-level service. EMS is a priority for County officials to compensate for county hospital struggles
Highly trained, progressive, and experienced Medical Director; high level of trust and collaboration with part-time Medical Director	Highly trained, progressive, and experienced Medical Director high level of trust and collaboration with part-time Medical Director
Employs standing orders.	Employs standing orders.
Definitive transport	Strategic destination plan
Staffing: 12 Full-time staff, 5 part-time staff	Staffing: 28 Full-time staff, 25 part-time staff
Fully staffed ACLS (Advanced Cardiac Life Support) trucks; two fully-equipped trucks daily; very-well-equipped trucks with new equipment. Back-up trucks in case of additional need. 12-lead capability	Fully staffed ACLS (Advanced Cardiac Life Support) trucks; two fully-equipped trucks daily; very-well-equipped trucks new equipment; 2 quick response vehicles (provide first aid while the ambulance gets to the scene). Back-up trucks in case of additional need. 12-lead capability
2 Strategically located stations to improve coverage in county	3 Strategically located stations across 2 counties to improve coverage
Advanced 911 call center; Emergency Medical Dispatch (provides systematized pre-arrival instructions, including Dispatch Life Support (DLS), which gives phone instruction to aid the patient until help arrives and other information to the caller	WS County 911 Center: The PSAP partnership between Washington County and its townships of Plymouth, Roper and Creswell answers 911 calls from citizens located inside Washington County Advanced call center utilizes “Active 911” gives address, maps it out

3.4. Provision of a robust emergency medical services system

Respondents in the study counties indicated that the EMS system played a major role in providing both acute and chronic medical care and transportation. According to respondents, both counties deliver high quality, paramedic-level of care. Paramedics are advanced providers of emergency medical care and have at least two years of training and have successfully completed an approved EMT course and a Paramedic Course (approximately 1500 h). They are trained in all of the Basic Life Support skills and manual defibrillation, transcutaneous cardiac pacing, 12-lead ECGs, and advanced airway management. They can also administer medications. Paramedic-level EMS is the highest level of EMS available. One prominent commonality across the two counties was that the EMS systems were a vital part of the health care delivery system. EMS covered some of the gaps in primary care, provided non-emergency transportation to county residents so they could access specialty care appointments, and employed destination plans that allowed patients to quickly receive the most appropriate care for their conditions. In addition, both counties utilized standing orders, which are defined as, “Instructions preapproved by the medical advisory committee directing EMS crews to perform specific advanced life support measures before contacting a medical control physician. These orders are implemented in cases in which a delay in treatment could harm the patient (e.g., cardiac arrest).” ([EMS standing orders, 2009](#)) Refer to [Table 4](#) for other EMS commonalities across the study counties.

3.4.1. Dooly County

The EMS system in Dooly County was considered by respondents to be extremely unique in comparison to other rural counties in the area. Key informants believed that Dooly County adheres to the same level of care dictated by states with strict EMS regulations (like NC). Dooly County is one of the few places that provided, “definitive care transport.” One respondent described definitive transport as:

If you’re having a heart attack, you’re going to go to a cath [cardiac catheterization] center. If you’re having a stroke, you’re going to go to a stroke center. If you’re having a traumatic injury, then you’re going to go to a trauma center. Definitive care and treatment is one of our major things ... I mean, I think that it’s making a difference. I think in the time to come, the numbers –the improvements are going to be outstanding [for Dooly County].

3.4.2. Washington County

In NC, EMS must adhere to strict state credentialing and compliance regulations. The Office of Emergency Medical Services in NC provides

legal recognition for NC EMS credentials to ensure that all residents have access to quality emergency medical care. To meet these standards, Washington County EMS provides a systematic approach through a paramedic-level of care. The EMS system provides coverage to two counties, Washington and Tyrrell County. According to respondents, investment in EMS has grown in recent years. One respondent stated, "There has been a push from [state] leaders to adopt a paramedic-level of service across the state. All the counties are catching up. It is not a mandate yet, but they [state leaders] are pushing it. They [state leaders] want to see all the counties go paramedic." Another respondent shared, "Here in Washington [County] they [local leaders] saw the need to spread their stations out throughout the two counties that we cover to help cut down on response time which I think helps the mortality rate because we're getting there quicker." One respondent suggested that, "Having a medical director that understands and supports EMS is a tremendous advantage that this system has over others that may have more financial capacity." One respondent shared, "We have a very high-functioning system, mostly because we have a progressive medical director in place ... That is the missing link that I think a lot of people do not see in systems that are paramedic-level." They added, "Having a supportive medical director allows the paramedics to actually do their jobs."

3.5. Coordination of county-funded health services and programs

Key informant interviews identified the coordination of county-funded health services and programs as a potential driver for connecting vulnerable populations to the needed care and services. Respondents suggested that the collaboration across multiple providers of care (such as social services, Health Department, EMS, and FQHC/rural health clinics) was vital in improving and supporting health care access, public health, and overall community well-being. In the study counties, health services, coordinated by the local health departments, were active with a reportedly high level of operational capacity, according to respondents. Key informants suggested that leaders recognized the challenges associated with rural health care (i.e. facility and physician shortages, challenges with accessing care, and financial burdens) and have dedicated numerous county resources to target and address the needs of the most vulnerable residents in their communities. These resources include supporting rural health clinics or FQHC, low-cost medical transit, and additional health-promoting initiatives through the health department and social services.

3.5.1. Dooly County

In Dooly County, the coordination of health-related services plays an important role in supporting residents' ability to access health-related resources and care. Social services provide Family Support, Foster Care, process intakes for food stamps, Medicaid, Child Welfare, Adult Protection Services, and any other assistance (e.g. utility or rent pay assistance). According to respondents, these services target Medicaid/Medicare recipients, low-income individuals who do not qualify for Medicaid/Medicare, and the elderly. Respondents shared that social services were working to collaborate with local groups to provide services to the residents with the greatest needs. One respondent stated, "I can tell you this ... We have adults, or single parents, or people that have been laid off of work, that come in and need stuff like their medicines paid, or eyeglasses or something like that. If we have the money in the fund, we will help support them ... or we will work with groups like Salvation Army." Another respondent indicated, "We provide another option for health care. We can help pay for prescriptions, we can support them [clients]. We get their food for them. Diabetics and people that have high blood pressure type things need certain types of food. We have those funds to help." In addition, social services helped connect and refer their clients to other services in the county, including transportation and the FQHC. Likewise, the Health Department played an important role in coordinating services in the county. Dooly is a, "very strong faith-based

community." The Health Department works with local churches to host health fairs to increase the community's awareness of health issues and resources available within the county. "We believe this has built some support and solidarity in the county by us joining efforts to help community members in need."

3.5.2. Washington County

Respondents informed us that the Health Department in Washington County offered low-cost primary care to county residents from 2008 to 2014. This care provided much needed chronic disease management and was widely utilized by county residents. One respondent indicated, "The County really benefitted from the Health Department providing primary care because we would only charge patients \$22." In addition, Washington County has social services, child support services, and senior health services that connects care options to vulnerable populations, including children, Medicaid/Medicare recipients, and other at-risk populations. Social services provided important services to residents with Medicaid, including the Community Alternative Program for Disabled Adults (CAP/DA), which is an in-home service for disabled adults that, "Assists with activities of daily living for homebound individuals." Another service provided by social services was the Special Assistance in Home (SA/IH) which provided, "a cash supplement and support to low-income individuals who are at risk of entering a residential facility for medical care." Social services also provided additional services including emergency assistance (for bills), medication/prescription coverage, and non-emergency transportation ([EMS standing orders, 2009](#)). According to respondents, these services were essential in reaching residents who would otherwise not go to the doctor and provided services to help them navigate the health care system.

4. Discussion

This study found that counties in the South with median household incomes in the lowest tertile in their state and African American populations of at least 33% do not have favorable outcomes for premature death, with the exception of the two study counties. The fact that out of 131 counties examined, only two counties displayed premature death figures below their respective states' figures and near or below national figures with consistent improvement over time adds weight to the evidence base indicating that social and economic disadvantages create a context that impedes health and well-being.

It has been established that the context in which people live has an impact on their health ([World Health Organization; Thomson et al., 2018](#)). Health policies have been shown to influence health outcomes ([Thomson et al., 2018](#)). The positive deviance framework has been applied across a variety of public health topics to identify positive deviants and examine their potential drivers ([Baxter et al., 2019; Foster et al., 2018; Klaiman et al., 2016; Stuckey et al., 2011](#)). Identifying and investigating positive deviance at the county level may help to illuminate community assets, factors, and practices that can be replicated in other communities with similar social, demographic, and economic profiles ([Marsh et al., 2004](#)). The review of data from the *County Health Rankings* ([University of Wisconsin P, 2015a](#)) provided a starting point for profiling communities with favorable health outcomes. Interview data with community stakeholders provided insight on the community context and local assets that may contribute to more favorable rankings on premature death, including the accessibility and availability of affordable health care, a robust EMS system, local and affordable transportation options, and coordination across multiple county-based health and social service providers.

Findings suggest that the counties examined were centrally located with respect to primary and specialized health care facilities. Access to care was further supported through the provision of low-cost non-emergency medical transportation (NEMT). According to Grant et al. (2016), millions of Americans are considered to be "transportation disadvantaged," which disproportionately impacts children, the elderly,

poor, mobility-impaired, and minorities (Grant et al., 2016). Each year, approximately 3.6 million people in the US miss or delay health care screenings and services because of transportation. Access to low-cost NEMT can reduce ER visits and medical expenditures and allow vulnerable populations to receive regular care (American Hospital Associa, 2017; Rochlin et al., 2019; Ziller & Coburn, 2018). In addition, research indicates that access to care, especially primary care, helps prevent chronic disease and death, and is associated with a more equitable distribution of health care in social or economically disadvantaged populations (Rochlin et al., 2019). Research also shows that rural health care is often plagued by a shortage of low-cost health care facilities, less access to screening services, and greater distances to specialty and tertiary care services (Rochlin et al., 2019; Ziller & Coburn, 2018). As a result, many low-income and uninsured adults' health care needs go unmet, leading to worse health outcomes and increased health care costs (Ziller & Coburn, 2018; Rural Health Information). In contrast, the study counties were characterized as having multiple options for low-cost health care and agencies, like social services and EMS, that coordinated community services (e.g. NEMT) and connected residents to the most appropriate type of care. It may be that the central locations of Dooly and Washington County, with respect to a variety of high-quality health care, contribute to residents' ability to access health care when needed. The fact that Dooly County does not have a hospital located in the county may also increase the chances that a patient is taken to the most specialized hospital according to his/her needs. Early death from conditions that are amenable to efficacious medical treatments is potentially avoidable if barriers to health care are removed. Such conditions include cardiovascular diseases, diabetes, hypertension, certain cancers, and some infectious diseases (e.g., pneumonia, influenza, tuberculosis). (Drake et al., 2019; Minnesota Department of H, 2019; Vergara-Duarte et al., 2018),

In rural communities, EMS systems are often over-utilized to deliver care normally provided by primary care physicians or other specialty providers. (The Joint Committee on Ru) According to the National Center for Health Statistics, individuals who lack a primary care provider and a medical home are more likely to use EMS and the emergency room for their primary care needs (Gindi et al., 2016). Although respondents indicated that EMS was utilized more often by low-income residents within these counties, investments were made to increase the capacity of the EMS systems to cover unmet health care needs. Key informants reported that leaders in their counties purposefully invested in these services understanding the challenges of their rural health care systems. In both counties, EMS personnel employed efficient triage while also providing in-depth intervention protocols to patients prior to hospital arrival. It may be that this model of EMS contributed to increasing the chances that a resident is taken to the most specialized hospital according to their medical needs.

Our findings also suggest that the coordination of services across EMS, the health department, social services, and other local public health agencies is central in identifying and covering gaps in care and in promoting overall well-being. According to Derose et al. (2011), public health agencies can play a central role in helping to reduce disparities in health care by identifying the community health needs, map health care resources, and highlighting gaps in services (Derose et al., 2011). We found that the county-based organizations in the study counties made up a collaborative network (including local hospitals, FQHC, rural health clinic, specialty providers, EMS, and the health department), that often referred residents to one another. This collaborative partnership helped to reduce barriers and increase access for vulnerable residents. Research implies that public health agencies can reduce health care burdens by partnering with other community organizations to facilitate coordination of services across multiple stakeholders similar to what we found in the study counties (Derose et al., 2011). According to Berenson et al. (2012), uninsured low-income adults typically do not receive preventive services or screenings as often as insured higher-income individuals because of financial barriers, lower quality of care, transportation issues,

and health insurance status (Berenson et al., 2012). When low-income adults had greater access to care, they were more likely to receive care as well as the recommended preventive screenings. These findings are consistent with what was suggested in our study. The benefits associated with collaborative networks, whether formal or informal, focused on community health and social welfare needs in the study communities raises the possibility that such structures may hold promise for supporting community members' health and well-being. Further research is needed to better understand such structures and whether they can have an impact on community health.

While the interviews provided insight into community factors that may have contributed to the observed health outcomes, the data did not explore the social climates or culture within the study counties, particularly information on social capital. The concept of social capital has been identified by researchers as one possible explanation for the positive health outcomes in communities experiencing social and economic disadvantages (Kawachi et al., 1997, 1999; Putnam, 1995; Shiell et al., 2018; Vyncke et al., 2013). According to Putnam (1995), social capital is defined as, "features of social organizations such as networks, norms, social trust that facilitate coordination and cooperation for mutual benefit." (Putnam, 1995) Social capital can be thought of in terms of its potential to produce a stronger social fabric because it builds bonds based on trust, which nurtures solidarity between people (Kreuter et al., 2002). Studies conducted by Mohan et al. and Wen et al. revealed a protective association of certain social capital constructs (i.e. community engagement and efficacy) on mortality (Putnam, 1995; Shiell et al., 2018). Social capital has also been linked to improved mental health, self-reported physical health, and positive changes in numerous health behaviors (Mohan et al., 2005; Putnam, 1995; Wen & Christakis, 2005).

Research indicates that it is important to distinguish between "bonding" and "bridging" social capital (Putnam, 1995; Wen & Christakis, 2005). While bonding social capital refers to the social cohesion within a group, bridging social capital occurs when different groups or organizations in a community interact with one another to voice concerns or promote collective action to promote health. Thus, the collective action of the community to create a "culture of health" would be a manifestation of bridging social capital. It has also been linked to positive changes in numerous health-related behaviors (Rodgers et al., 2019). In addition, a review of the literature concluded that social capital might play an important role in the health gradient for children who reside in deprived neighborhoods (Kreuter et al., 2002). Future research efforts should investigate social capital as having a potentially protective association on health in positive deviant communities.

Beyond social capital, researchers have identified other potential community characteristics that may have impacted health outcomes, such as community diversity, community capacity, and the presence of networks and collaborative structures (Minkler, 2012). Study counties were unique in their racial composition, with both having a racial/ethnic balance that left African-Americans in the majority (i.e., 48.8% African-American versus 42.7% White in Dooly County and 48.5% African-American versus 45.4% White in Washington County). Such a balance is uncommon and it could lead to increased communication, political representation, and recognition of the social needs of all residents. The rich racial diversity of the study counties may facilitate near equal representation among the community leadership (e.g., county commissioners) which may allow leaders to meet the needs of all residents, including vulnerable populations. It may be that the racial composition of study counties, in combination with social and political progress that has occurred over the past 50 years, may have facilitated the bridging of social capital and its accompanying benefits. Promoting and bridging equity in health should remain a top priority among public health professionals working to support community health for all residents.

Additional research is needed to investigate and validate the community characteristics and practices that may have contributed to the observed health outcomes in the study counties. While the methods used

in this study to identify and select the two study counties included comparisons of data from many peer counties – and hence their status as positive deviants – there is a need to examine the findings that emerged from stakeholder interviews in relation to a set of peer comparison counties. To our knowledge, there are not readily available sources of data that would facilitate the comparison of interview data across a large number of comparison counties. Additional research will be required and should examine whether or not the findings from the study counties are unique and, thus, serve as effective mitigators against poor health and premature death in communities experiencing social and economic disadvantages.

The primary limitations of this study are that, first, the findings were limited to the insight and perceptions of key informants, as elicited by our questioning and investigation. Interviews could have missed other factors that contribute to favorable mortality outcomes. Second, while study interviews provided data on the community context and possible factors that contributed to observed outcomes for premature death, in the absence of comparison data from peer counties on these factors, additional research is needed to determine whether reported county activities are unique relative to peers. Third, the small population sizes of the study counties could lead to greater variation in the outcomes used to rank counties. However, it should be noted that county-level data were examined at numerous time points over a 12-year period to ensure a consistent downward trend in YPLL. It is also worth noting that although people may have been living longer in these counties, this does not necessarily indicate that county residents were enjoying healthier lives or a higher quality of life. While the study counties experienced lower premature death rates, their rankings on quality of life and health factors were not equally favorable, likely due to the high prevalence of co-morbidities.

5. Conclusions

Many community-level factors—social, economic, and environmental—can influence population health (Chan et al., 2014). Findings from this study shed light on two counties in the southeast US with sociodemographic profiles typically associated with less favorable health outcomes that experienced better than expected rankings for premature death. Findings from this exploratory study suggest that the accessibility and availability of health care supported by the provision of a robust EMS system and the coordination of health and social services across numerous local stakeholders are common contextual elements that may have contributed to the reductions in premature death in study communities. Additional research is needed to examine the impact of these elements on population health and premature death.

Ethics approval

The Georgia State University Institutional Review Board approved this study.

Declaration of competing interest

None.

Acknowledgment:

This work was supported by the Robert Wood Johnson Foundation [grant number 336423].

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2020.100618>.

References

- American Hospital Association. (2017). *Transportation and the role of hospitals. Social determinants of health series: Transportation*. <http://www.hpo.org/resources/ahah-ret-guides/3078>.
- Anderson, R. T., Sorlie, P., Backlund, E., Johnson, N., & Kaplan, G. A. (1997). Mortality effects of community socioeconomic status. *Epidemiology*, 8(1), 42–47.
- Backlund, E., Sorlie, P. D., & Johnson, N. J. (1999). A comparison of the relationships of education and income with mortality: The national longitudinal mortality study. *Social Science & Medicine*, 49(10), 1373–1384.
- Baxter, R., Taylor, N., Kellar, L., & Lawton, R. (2019). A qualitative positive deviance study to explore exceptionally safe care on medical wards for older people. *BMJ Quality & Safety*, 28(8), 618–626.
- Berenson, J., Doty, M. M., Abrams, M. K., & Shih, A. (2012). *Achieving better quality of care for low-income populations: The role of health insurance and the medical home for reducing health inequities*. The Commonwealth Fund. Accessible at: <http://www.commonwealthfund.org/publications/issue-briefs/2012/may/achieving-better-quality-of-care-for-low-income-populations>.
- Braveman, P., Egerter, S., & Williams, D. R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health*, 32, 381–398.
- Braveman, P., & Gottlieb, L. (2014). *The social determinants of health: it's time to consider the causes of the causes*. *Public health reports (Washington, D.C.: 1974)*, 129 Suppl 219–31.
- Centers for Disease Control and Prevention. (2015). *Community health status indicators (CHSI)*. <http://www.cdc.gov/CommunityHealth/profile/currentprofile/NC/Washington/>.
- Centers for Medicare and Medicaid Services. (2013). Critical access hospitals definition. Available at: <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandCompliance/CAHs.html>.
- Centers for Disease Control and Prevention. (2013). CDC health disparities and inequalities report—United States, 2013 *Morbidity and Mortality Weekly Report*, 62 (Suppl 3), 3–186.
- Chan, K., Roberts, E., McCleary, R., Buttorff, C., & Gaskin, D. (2014). Community characteristics and mortality: The relative strength of association of different community characteristics. *American Journal of Public Health*, 104(9), 1751–1758.
16. Community Readiness Community readiness.
- Cunningham, T. J., Croft, J. B., Liu, Y., Lu, H., Eke, P. I., & Giles, W. H. (2017). Vital signs: Racial disparities in age-specific mortality among Blacks or african Americans — United States, 1999–2015. *MMWR Morb Mortal Wkly Rep*, 66, 444–456.
- Daly, M., Duncan, G., McDonough, P., & Williams, D. (2002). Optimal indicators of socioeconomic status for health research. *American Journal of Public Health*, 92(7), 1151–1157.
- Derose, K. P., Gresenz, C. R., & Ringel, J. S. (2011). Understanding disparities in health care access—and reducing them—through a focus on public health. *Health Affairs*, 30(10), 1844–1851.
- Dooley county chamber of commerce. Accessible at: <http://www.doylechamber.com/>.
- Dooley County QuickFacts from the US Census Bureau. (2015). <http://www.census.gov/quickfacts/table/PST045215/13093>.
- Drake, S., Yang, Y., Wolf, D., Reynolds, T., Harper, S., et al. (2019). Individual and community characteristics associated with premature natural and drug-related deaths in 25–59 year old decedents. *PLoS One*, 14(2), Article e0212026.
- Ems standing orders. (2009). *Medical dictionary* (n.d.). Retrieved December 16, 2018 from <http://medical-dictionary.thefreedictionary.com/EMS+standing+orders>.
- Foster, B. A., Aquino, C. A., Mejia, S., Turner, B. J., & Singhal, A. (2018). Identification and characterization of families that are positively deviant for childhood obesity in a latino population: A case-control study. *Journal of Obesity*, 1–11.
- Gindi, R. M., Black, L. L., & Cohen, R. A. (2016). *Reasons for emergency room use among U. S. adults aged 18–64: National Health Interview Survey, 2013 and 2014*. *National health statistics reports; no 90*. Hyattsville, MD: National Center for Health Statistics.
- Grant, R., Goldsmith, G., Gracy, D., & Johnson, D. (2016). Better transportation to health care will improve child health and lower costs. *Advances in Pediatrics*, 63(1), 389–401.
- The Joint committee on rural emergency care of and for the national association of state EMS officials and the national organization of state offices of rural health. Improving access to EMS and health care in rural communities: A strategic plan.*(2010□b). Available at: <https://www.nasemso.org/Projects/RuralEMS/documents/FinalApprovedbyNASEMSO-NOSORH.pdf>.
- Kawachi, I., Kennedy, B., & Glass, M. (1999). Social capital and self-rated health: A contextual analysis. *American Journal of Public Health*, 89(8), 1187–1193.
- Kawachi, I., Kennedy, B., Lochner, K., et al. (1997). Social capital, income inequality, and mortality. *American Journal of Public Health*, 87(9), 1491–1498.
- Klaiman, T., Pantazis, A., Chainani, A., & Bekemeier, B. (2016). Using a positive deviance framework to identify local health departments in communities with exceptional maternal and child health outcomes: A cross sectional study. *BMC Public Health*, 16, 602.
- Kreuter, M., & Lezin, N. (2002). Social capital theory: Implications for community-based health promotion. In R. J. DiClemente, & R. A. Crosby (Eds.), *Kegler MC. Emerging theories in health promotion practice and research*. San Francisco: Jossey-Bass.
- Liao, Y., Bang, D., Cosgrove, S., et al. (2011). Surveillance of health status in minority communities—racial and ethnic approaches to community health across the US (REACH US) risk factor survey, United States, 2009. *MMWR Surveill Summ*, 60, 1–44.
- Marsh, D., Schroeder, D., Dearden, K., Stermin, J., & Stermin, M. (2004). The power of positive deviance. *BMJ*, 329(7475), 1177–1179.
- Minkler, M. (2012). *Community organizing and community building for health and welfare* (3rd ed.). New Brunswick, New Jersey: Rutgers University Press.

- Minnesota Department of Health. (2019). *Issue brief: Disparities in premature death amenable to health care, 2011 to 2015: The roles of geography, poverty, and race and ethnicity*. MDOH Health Economics Program. Available at: <https://www.health.state.mn.us/data/economics/docs/coverage/mortality.pdf>.
- Mohan, J., Twigg, L., Barnard, S., & Jones, K. (2005). Social capital, geography and health: A small-area analysis for England. *Social Science & Medicine*, 60(6), 1267–1283.
- National Cancer Institute. (2015). State cancer profiles: Incidence. Available at: <https://statecancerprofiles.cancer.gov/incidencrates/index.php?stateFIPS=13&cancer=001&race=00&sex=0&age=001&type=incd&sortVariableName=rate&sortOrder=asc#notes>.
- Nc Commerce, Labor and Economic Analysis Division. (2015). *Census of employment and wages (QCEW) largest employers*. <http://d4.nccommerce.com/QCEWLargestEmployers.aspx>.
- Putnam, R. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6(1), 65–78.
- QSR International Pty Ltd. (2018). NVivo qualitative data analysis software. QSR International Pty Ltd. Version 12. Available at: <http://www.qsrinternational.com>.
- Rochlin, D., ChuanMei, L., Scheuter, C., Milstein, A., & Kaplan, R. (2019). Economic benefit of “modern” nonemergency medical transportation that utilizes digital transportation networks. *American Journal of Public Health*, 109(3), 472–474.
- Rodgers, J., Valuev, A., Hswen, Y., & Subramanian, S. (2019). Social capital and physical health: An updated review of the literature for 2007–2018. *Social Science & Medicine*, 236.
- Rural Health Information Hub. Healthcare access in rural communities. Available at: <https://www.ruralhealthinfo.org/topics/healthcare-access>.
- Shiell, A., Hawe, P., & Kavanagh, S. (2018). Evidence suggests a need to rethink social capital and social capital interventions. *Social Science & Medicine*. <https://doi.org/10.1016/j.socscimed.2018.09.006>.
- Stuckey, H. L., Boan, J., Kraschnewski, J. L., Miller-Day, M., Lehman, E. B., & Sciamanna, C. N. (2011). Using positive deviance for determining successful weight-control practices. *Qualitative Health Research*, 21(4), 563–579.
- Thomson, K., Hillier-Brown, F., Todd, A., McNamara, C., Huijts, T., & Bamba, C. (2018). The effects of public health policies on health inequalities in high-income countries: An umbrella review. *BMC Public Health*, 18(1), 869. <https://doi.org/10.1186/s12889-018-5677-1>.
- United States Census Bureau. (2012). *American community survey, 2008-2012*. Washington DC. Available at: <http://www.census.gov/2010census/>.
- United States Department of Health and Human Services. Health resource comparison tool. Health resources and services administration. Available at: <http://ahrh.hrsa.gov/arfdashboard/HRCT.aspx>.
- United States Department of Health and Human Services. (2015). *Community health status indicators (CHSI)*. U.S. Dept. Of health & human services. Health Resources and Services Administration. Online Web Application. Available at: <https://www.cdc.gov/communityhealth>.
- University of Wisconsin Population Health Institute and Robert Wood Johnson Foundation. (2015a). *County health rankings*. Accessible at www.countyhealthrankings.org.
- University of Wisconsin Population Health Institute and Robert Wood Johnson Foundation. (2015c). Washington County, NC: County Health Rankings. <http://www.countyhealthrankings.org/app/north-carolina/2015/rankings/washington/county/outcomes/overall/snapshot>.
- University of Wisconsin Population Health Institute and Robert Wood Johnson Foundation, Dooly County, GA, County Health Rankings. (2015b). <http://www.countyhealthrankings.org/app/georgia/2015/rankings/dooly/county/outcomes/overall/snapshot>.
- US Institute for Health Metrics and Evaluation. (2014). *Prevalence of poverty: Washington county*. North Carolina. <http://vizhub.healthdata.org/us-health-map/>.
- US Institute for Health Metrics and Evaluation. (2015). *Prevalence of poverty: Dooly county*. Georgia, 2014 <http://vizhub.healthdata.org/us-health-map/>.
- Vergara-Duarte, M., Borrell, C., Pérez, G., et al. (2018). Sentinel amenable mortality: A new way to assess the quality of healthcare by examining causes of premature death for which highly efficacious medical interventions are available. *BioMed Research International*, 5456074, 2018.
- Vyncke, V., De Clercq, B., Stevens, V., et al. (2013). Does neighborhood social capital aid in leveling the social gradient in the health and well-being of children and adolescents? A literature review. *BMC Public Health*, 13, 65.
- Washington County QuickFacts from the US Census Bureau. <http://www.census.gov/quickfacts/table/PST045215/37187.37>.
- Washington County, North Carolina. Department of social services overview. Accessible at: http://www.washconc.org/center_for_human_services.aspx.
- Wen, M., & Christakis, N. (2005). Neighborhood effects on posthospitalization mortality: A population-based cohort study of the elderly in Chicago. *Health Services Research*, 40(4), 1108–1127.
- World Health Organization. Social determinants of health. Available at: http://www.who.int/social_determinants/sdh_definition/en/index.html.
- World Health Organization. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health*. Geneva, Switzerland: Commission on Social Determinants of Health. Available at: http://www.who.int/social_determinants/thecommission/finalreport/en/.
- Ziller, E., & Coburn, A. (2018). Health equity challenges in rural America. *Human Rights*, 43(3), 10–12.