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THE RESILIENCE OF AMERICAN INDIAN AND ALASKA NATIVE OLDER ADULTS IN THE CONTEXT OF MAJOR HEALTH DISPARITIES IN CARDIOVASCULAR DISEASE, DIABETES, ASTHMA, AND ARTHRITIS: A NARRATIVE REVIEW

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THE RESILIENCE OF AMERICAN INDIAN AND ALASKA NATIVE OLDER ADULTS IN THE CONTEXT OF MAJOR HEALTH DISPARITIES IN CARDIOVASCULAR DISEASE, DIABETES, ASTHMA, AND ARTHRITIS: A NARRATIVE REVIEW

By

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Dedication and Acknowledgments

This work is dedicated to the memory of my mentors, Drs. Gyda Swaney and David Schuldberg. May the light you've instilled in others forever continue through the many you have inspired. I will always carry the knowledge and insights you have taught me as a clinician and researcher.

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The Resilience of American Indian and Alaska Native Older Adults in the Context of Major Health Disparities in Cardiovascular Disease, Diabetes, Asthma, and Arthritis: A Narrative Review

Chairperson: Duncan Campbell, Ph.D.

Background: Multiple major health disparities have been documented in Indian Country, including cardiovascular disease (Howard et al., 1999), diabetes (Acton et al., 2003), asthma (Mannino et al., 2002), and arthritis (Barbour et al., 2017). Prior research has shown that the prevalence rates of these conditions in American Indians and Alaska Natives (AI/ANs) are among the highest in the United States. Given these health disparities, aging older adults in Indian Country may be especially vulnerable to the development of concurrent negative mental health outcomes, particularly depression (Garrett et al., 2015). Nonetheless, AI/AN older adults continue to age successfully and exhibit substantial mental health resilience in the face of the major health disparities (Lewis, 2016; Schure et al., 2013).

Methods: The current study begins with a detailed overview of CVD, diabetes, arthritis, and asthma in Indian Country. The study transitions to a narrative review of resilience in American Indian, Alaska Native, and Canadian First Nations older adults (50 years and older). The goals of the narrative review are to: (a) examine the state of knowledge of resilience in these populations; (b) assess the degree to which the available resilience literature attends to CVD, diabetes, asthma, and arthritis; and (c) use the available literature to identify resilience strategies that can be used to enhance resilience in AI/AN/FN older adults with chronic health conditions.

Results: Based on systematic reviews of PsycINFO and PubMed, 14 individual articles and 6 literature reviews were identified. The individual studies included five quantitative studies, eight qualitative studies, and one mixed qualitative-quantitative design. The current state of knowledge on resilience in AI/AN/FN older adults is summarized, including seven common themes. Currently, research on the overlap between these four specific health disparities and resilience is essentially non-existent in these populations. Sources of resilience and resilience strategies in AI/AN/FN older adults are presented under four main themes: (a) *social support, connectedness, family, and community*; (b) *Indigenous culture and identity*; (c) *spiritual connection and strength*; and (d) *positive coping and personal healing*. The review concludes with a critical examination of the limitations of the current literature and outlines future research directions.

Contents

The Resilience of American Indian and Alaska Native Older Adults in the Context of Major Health Disparities in Cardiovascular Disease, Diabetes, Asthma, and Arthritis:

A Narrative Review

Despite progressively rising health disparities in Indian Country related to cardiovascular disease, diabetes, asthma, and arthritis (Acton et al., 2003; Barbour et al., 2017; Howard et al., 1999; Mannino et al., 2002), American Indian and Alaska Native (AI/AN) older adults are simultaneously being recognized as "exemplars of healthy aging" and prototypes for resilience in later life (Lewis, 2016, p. 279). Given the strong link between physical health comorbidity and depression in the general population (Stubbs et al., 2017), the major health disparities evident in Indian Country would be expected to present a heightened risk for the development of depression in AI/ANs as they grow older. However, even with the negative psychological burden associated with managing chronic and disabling illness (Cole & Dendukuri, 2003; Vink et al., 2008), AI/AN older adults continue to age successfully and remain resilient against depression (Ore et al., 2016; Schure et al., 2013). Although there is limited research regarding resilience in AI/ANs, the available research suggests that higher levels of resilience are protective against the development of depression in AI/AN older adults with chronic physical health conditions (Schure et al., 2013).

In the current study, this author seeks to extend the finding that resilience acts as a protective buffer against major health disparities among AI/AN older adults. The study begins with a review of CVD, diabetes, asthma, and arthritis in Indian Country. This is followed by a narrative review of the resilience literature on American Indian, Alaska Native, and Canadian First Nations older adults (50 years or older). The overarching goals of the review are to summarize the current state of knowledge and identify resilience strategies that can used to promote the resilience of AI/AN/FN older adults with CVD, diabetes, asthma, and arthritis.

Currently, there is limited research regarding resilience in relation to these four specific health conditions in AI/AN/FN older adults. Given the current paucity of findings, the narrative review was expanded towards a broader investigation of resilience processes in these populations.

The Larger Context of AI/AN Health Disparities

In the United States, there have been progressively expanding trends towards overall higher life expectancies (i.e., increased longevity) in the general population, with significant improvements in overall health enabling modern Americans to live considerably longer lives than all previous generations before them (U.S. Census Bureau, 2018). However, despite the major advancements in health science, medicine, and technology that have allowed for increased longevity within the general population, AI/ANs continue to die earlier on average than any other racial and/or ethnic group in the United States (Warne & Lajimodiere, 2015).

According to the U.S. Census Bureau (1999), Americans living in 1900 were only expected to live 47.3 years on average. However, by 2000, average life expectancy grew to 76.9 years (representing an astounding 29.6-year increase within the span of one century). By 2017, average life expectancy (at birth) was 78.6 years for the overall U.S. population (Department of Health and Human Services [U.S. DHHS], 2019). In comparison, average life expectancy for AI/ANs (73.0 years) is 5.6 years lower than all other U.S. racial groups (Indian Health Service [IHS], 2018). Between 2009 and 2011, AI/ANs had 30% higher average mortality rates (999.1 per 100,000) across all causes of death relative to the general population (747.0 per 100,000).

In a meta-analysis of all-cause mortality rates, Espey et al. (2014) found that AI/AN mortality rates during the past 20 years did not reflect the same level of declines observed in the general population. During the past century, AI/AN life expectancy had paralleled the rapid rise of life expectancy in the U.S. population. However, despite AI/AN mortality having declined in the 1980s, death rates soon began to plateau and/or worsen during the 1990s. Between 1999 and 2009, Espey et al. (2014) found that AI/AN's average all-cause mortality rate was 46% greater than White comparisons across all areas of the United States. For AI/AN men, death rates did not change over time, which contrasted with the 1.3% per year declines in death rates for White men. In comparison to White women, who had declines of 0.5% each year, mortality rates expanded by 0.5% each year for AI/AN women over the past decade. Further, AI/AN disparities were especially prominent in the youngest AI/AN age groups (0-24 years, *RR* = 2.23; 25-44 years, *RR* = 2.69). However, rate ratios also declined as a function of increased age in the older age groups (45-64 years, *RR* = 1.81; 65-85 years, *RR* = 1.38; 85 or older, *RR* = 1.09), suggesting that mortality rates appear to be disproportionately affecting younger cohorts of AI/AN older adults (relative to the most elderly).

Although there are multiple determinants underlying the exceptionality high mortality rates found in Indian Country (e.g., biological predispositions, environmental stressors, unequal access to healthcare, and poverty), disparities specifically related to chronic medical conditions have been identified as one of the major causes for AI/ANs living comparatively shorter lifespans than their contemporaries in the United States (Espey et al., 2014; Goins & Pilkerton, 2010; John et al., 2003; Sarche & Spicer, 2008; Sequist et al., 2011). While it is true that AI/ANs are living exceptionally longer lives than ever before, they are also developing chronic medical conditions at earlier ages in life and living with them for longer periods throughout their lifetimes (Goins and Pilkerton, 2010). In addition, previous studies (Chapleski et al., 1997; Goins & Pilkerton, 2010; John et al., 2003; Vaile, 2015) have observed disproportionately higher levels of physical health comorbidity (i.e., co-occurrence of medical conditions) in AI/ANs relative to the general population. Across these studies, the average number of health conditions for AI/ANs ranged from 3.5 to 5.8 conditions. Chapleski et al. (1997) found that rates of comorbidity were substantially high for AI/ANs (N = 309): 7.1% (0 conditions), 25.1% (1-2), 30.2% (3-4), and 37.6% (5+). John et al. (2003) found similarly high rates in their sample (N = 992): 12.5% (no conditions), 13.7% (1), 17% (2), 35.6% (3-5), and 21.2% (6+). Some AI/AN samples have shown extreme levels of physical comorbidity. When comorbidity was assessed using a 28-item checklist of common health conditions, Vaile (2015) found that 74.4% of the AI residents of a Northern U.S. reservation (*N* = 160) had 3 or more conditions and 25% had 7 or more.

Overview of Four Major Health Disparities in Indian Country

The following comprehensive summary of the literature examines four medical conditions (i.e., cardiovascular disease, diabetes, asthma, and arthritis) in detail to illustrate their prevalence among AI/ANs and how these conditions distinctly manifest in Indian Country. Information regarding these four conditions and their links to depression will be provided when available. The choice of these conditions follows the framework of Katon et al. (2007), who examined heart disease, diabetes, pulmonary disease, and arthritis to determine their link with depression in individuals with chronic medical illness.

Cardiovascular Disorders (CVD)

Cardiovascular disorders (CVDs) include any disorder of the heart and blood vessels. CVDs are the leading cause of death worldwide (World Health Organization [WHO], 2017a) and account for up to one-third of all global deaths annually. The WHO classifies CVDs into six general categories: coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, and deep vein thrombosis. Currently, coronary heart disease and stroke are the top causes of death worldwide (WHO, 2017b). Notably, these two conditions have remained the largest contributors to global mortality for almost two decades.

Based on the most recent data from the U.S. DHHS (2017), heart disease was the number one leading cause of death in the United States for 2015. Out of 2,712,630 deaths reported in the 2015 National Vital Statistics Report compiled by the Centers for Disease Control and Prevention (CDC), 23% (633,846) were attributable to heart disease alone (Murphy et al., 2017).

Cardiovascular Disease in Indian Country. In their summary of 18 disease patterns in North American Indians, Sievers and Fisher (1981) found notably low prevalence rates of coronary heart disease. Based on early research findings (Gilbert, 1955; Sievers, 1967), it was believed that cardiovascular diseases were uncommon in Indian Country. Furthermore, AI/ANs were also thought to have some form of natural protection against heart disease (Howard et al., 1999). Later studies of CVD in AI/ANs, most of which examined data from the 1980s and 1990s, continued to report that AI/ANs had generally lower rates of multiple cardiovascular diseases (e.g., IHS, 1998; Keppel et al., 2002; Welty & Coulehan, 1993; Welty et al., 1995) and lower mortality rates related to cardiovascular disease (e.g., Ayala et al., 2001; Becker et al., 1988; Cooper et al., 2000; Gillum, 1995; Kattapong & Becker, 1993; Nelson et al., 1990).

Overall, despite the low rates of CVD reported in the literature during this time period, a concerning paradox was observed in which lower prevalence rates coexisted with incompatibly high rises in CVD risk factors (e.g., diabetes) within Indian Country throughout the 20th century (Baines et al., 1990; Rhoades et al., 2000; Stern, 1998). It was not until the Strong Heart Study (SHS; Lee et al., 1990) was initiated in 1988 that this paradox would be resolved.[1] The seminal

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[1] The Strong Heart Study includes 13 tribal groups (ages 45-74) from three areas in the United States: (a) Phoenix, Arizona, (b), southwestern Oklahoma, and (c) North and South Dakota. The Strong Heart Study included three major components, including: (a) a cardiovascular mortality survey, (b) a heart attack and stroke morbidity survey, and (c) a clinical examination of cardiovascular disease and CVD risk factors in a group of 4,500+ tribal members. The SHS includes data from personal interviews, physical examinations, laboratory measurements, and DNA.

article from the SHS (Howard et al., 1999) was invaluable in revealing the true magnitude of heart disease in AI/ANs. Howard and colleagues showed that incidence rates of coronary heart disease (fatal and non-fatal) in AI men (16.1 per 1000) and women (7.5 per 1000) were nearly twice as high as their cohorts (White men: 9.5 per 1000; White women: 3.0 per 100) from the Atherosclerosis Risk in Communities Study (Chambless et al., 1997). In contrast to previously held notions that CVD was rare and less fatal in AI/ANs, other early studies from the SHS (e.g., CDC, 1996; Lee et al., 1998) were paramount in demonstrating that cases of heart disease were actually rising in Indian Country and were often deadlier than among non-Natives. In addition, the SHS helped identify key cardiovascular risk factors, with the high rates of diabetes emerging as the strongest risk factor underlying the elevated rates of CVD in AI/ANs (Howard, 1996; Howard et al., 1995; Howard et al., 1996; Welty et al., 1995). Taken together, this research backed the "rising tide of cardiovascular disease" observed by Howard et al. (1999, p. 2389).

In addition, it soon became recognized that national surveillance systems were clouding the true picture of CVD in Indian Country, primarily through the racial misclassification of AI/ANs (e.g., Ayala et al., 2002; Mensah et al., 2005; Stern, 1998). Rhoades (2005) reexamined CVD mortality data from IHS between 1989-1991 and 1996-1998. Notably, when misclassification was accounted for by linking National Death Index (NDI) data with IHS patient registration data, AI/ANs went from having the lowest CVD mortality rates to having higher rates (195.9 per 100,000) than both the US all-races (166.1 per 100,000) and white (159.1 per 100,000) estimates. After correction, rates of CVD in AI/ANs increased by 18% and CVD morality expanded by 16%. In addition, these corrections revealed that CVD mortality was actually increasing 0.4% per year for AI/ANs while it was decreasing by 1.8% for the all-races and white comparison groups. Other studies have begun using similar methods to correct misclassification errors and have found comparable results. Veazie et al. (2014) restricted their analyses to Contract Health Service Delivery Areas (CHSDA) and verified AI/AN heritage using death records from the National Center for Health Statistics (NCHS).[2] The authors predicted that the high prevalence of diabetes in AI/ANs might result in lower heart disease mortality estimates if the underlying cause of death was mistakenly attributed to diabetes instead of heart disease. With these considerations taken into account, it was found that AI/ANs had heart disease mortality rates that were 1.21 (with CVD as the primary underlying cause of death) to 1.30 (with CVD as one of multiple causes of death) times higher than Whites. Overall, these studies demonstrated that the previously reported paradox (i.e., low CVD mortality despite higher prevalence rates of CVD and CVD-risk factors) was an artifact of methodological errors.

Currently, the consensus in the literature is that Indian Country experiences the highest prevalence and mortality rates from cardiovascular disease in the United States (Mohammed & Udell, 2017). The 2010 REACH Risk Factor Survey (CDC, 2003) found that AI/ANs had the highest prevalence of CVD (16.4%) compared to the general population and all other races, including Black (9.9%), Hispanic (7.4%), and Asian Americans (7.5%). Behavioral Risk Factor Surveillance System (BRFSS) data from 2006 to 2010 (CDC, 2011) similarly found that AI/ANs (11.6%) had higher rates of coronary heart disease than either Black (6.5%), Hispanic (6.1%), White (5.8%), and Asian/Native Hawaiian/Pacific Islander (3.9%) comparison groups. More recently, in *Health, United States, 2015* (NCHS, 2016), self-reported heart disease was higher in AI/ANs than all other single race groups from 1997-1998 (18.6%), 1999-2000 (14.7%), and

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[2] CHSDA counties contain 64% of the entire AI/AN population and are used to determine IHS eligibility for indirect services (i.e., contract health). They include or are often adjacent to federally recognized AI/AN tribal land. They are useful for comparisons because they include non-AI/AN individuals who are living in the same geographic area.

2010-2011 (12.5%). However, between 2013 to 2014, AI/ANs only had the second highest rate (10.8%), but this was basically equivalent to the highest rate found in Whites (10.9%). The 2018 National Health Interview Survey (NHIS; Villarroel et al., 2019) reported that AI/ANs had the highest prevalence of all-types heart disease (14.6%) and coronary heart disease (8.6%), in addition to the second highest rates for hypertension (27.2%) and stroke (3.0%).

In terms of CVD mortality, recent trends of declining death rates in the general population have not been apparent in AI/AN populations (Casper et al., 2005). Similarly, Veazie et al. (2014) found that CVD mortality decreased in both AI/ANs and Whites in the two-decade period between 1990 and 2009. However, significant declines for AI/ANs were not observed until 2003. Heart disease as an underlying cause of death decreased by 2.0% per year from 1990 to 1998 and then by 3.7% per year between 1998 to 2009 for Whites. In AI/ANs, no significant differences were found between 1990 to 2003, but then rates began to decrease by 3.2% per year between 2003 to 2009. With heart disease as one of multiple causes of death, death rates remained flat for AI/ANs between 1990 to 2002. Although these rates began declining significantly by 1.4% per year from 2002 to 2009, the death rates of Whites decreased by 2.5% per year during this same time. Overall, these studies have revealed that declines in CVD mortality for AI/ANs have not kept at pace with national declines. As such, the prevalence and mortality associated with heart disease is still disproportionately higher in AI/ANs and signifies a clear adverse health disparity.

The Rise in Cardiovascular Risk Factors. Persistent and rising elevations in cardiovascular risk factors have been identified as the primary reason why cardiovascular health disparities continue to expand in Indian Country (Hutchinson et al., 2014; Rhoades et al., 2000; Rhoades et al., 2007). For example, in the SHS, Welty et al. (2002) found that reported rates of low high-density lipoprotein (HDL) cholesterol, systolic blood pressure, diabetes, hypertension, and albuminuria had all increased between the data collection points of 1989-1991 and 1993-1995. More recently, Jernigan et al. (2010) compared BRFSS data from 1995-1996 and 2005-2006 to assess how these risk-factors changed over time in AI/AN adults. While hypertension only increased by 5% (28.1% to 29.5%) during this ten-year period, diabetes increased by 26.9% (from 6.7% to 8.5%) and obesity increased by 25.3% (from 24.9% to 31.2%). Notably, there were no significant changes in smoking (2.0% decrease from 35.5% to 34.8%), physical inactivity (4.6% decrease from 30.2% to 28.8%), and low fruit/vegetable intake (0.1% increase from 76.6% to 76.7%). Regardless, the magnitude of these three risk factors was still substantially high and their lack of improvement over time demonstrates that they continue to present a substantial risk to the development of CVD in AI/ANs.

Notably, the co-occurrence of cardiovascular risk factors in AI/ANs is quite concerning, especially since each of these factors conveys their own independent risk for developing CVD. In the REACH 2010 Risk Factor Survey (CDC, 2003), AI adults were shown to have the highest prevalence of cardiovascular disease, current smoking, diabetes, and obesity. AI men also had the highest rates of hypertension and high cholesterol levels, with AI women having the second highest rates of these conditions. Out of 751 AI men surveyed, 11.7% had no risk factors and 26.1% had only one risk factor (i.e., cardiovascular diseases, current smoking, diabetes, high cholesterol, hypertension, and obesity). It was particularly concerning that 26.4% had two risk factors, and 35.7% had three or more risk factors. The data were equally alarming for AI women (*n* = 1,040), because 17.2% had no risk factors, 27.6% had one risk factor, 21.9% had two risk factors, and 33.3% had three or more risk factors. Notably, AIs had generally higher prevalence rates of two and three or more risk factors compared to Black, Hispanic and Asian participants.

In Jernigan et al. (2010), based on 2005-2006 data from the BRFSS, only 21% of the AI/ANs had no risk factors (i.e., diabetes, obesity, hypertension, smoking, physical inactivity, and low fruit/vegetable intake), while 46% endorsed having two or more, and 20% had three or more. Although the clustering of risk factors was not shown to increase over time, there were more absolute numbers of AI/ANs with three or more risk factors compared to ten years previously.

It is important to recognize that the impact of cardiovascular disease is felt throughout the entire lifespan of AI/ANs. The CVD health disparity in Indian Country has obvious roots beginning in childhood. It is concerning that the average age of onset for many cardiovascular risk factors has decreased for AI/ANs (Galloway, 2005), resulting in increased morbidity and a greater disease burden for AI/AN youth. Importantly, AI/AN youth who display multiple risk factors often show a higher degree of subclinical CVD and require more extensive intervention efforts, thus setting them up for a greater predisposition to developing CVD as adults (Deen et al., 2017; Hoelscher et al., 2013). With the predominance of CVD risk factors in AI/AN youth, the physiological damage associated with these risks begins earlier and is present for longer periods of time. As expected, premature mortality from CVD has been shown to be significantly higher in AI/ANs. In addition, it has been shown that CVD becomes the leading cause of death much earlier for AI/ANs. This transition tends to occur at age 45 for AI/ANs, much earlier than age 65, which is the transitional age for the general population (IHS, 1984; IHS, 2004). In 2001, 36% of all heart disease deaths among AI/ANs occurred prematurely (i.e., before age 65), which was much higher than the proportion of premature deaths (14.7%) found among Whites (CDC, 2004). These rates were also higher than Black (31.5%) and Asian/Pacific Islander (21.1%) rates.

Concerningly, premature deaths related to heart disease are not expected to decline anytime soon for AI/ANs. Best et al. (2018) estimated premature mortality rates and annual percent changes (APCs) for individuals between the ages of 25 and 64 for the time period of 2017 to 2030 using data from 1990 to 2016. For heart disease specifically, mortality is projected to decline among all non-Native racial groups in the United States. However, cardiac death rates are projected to grow by 1.41% per year for AI/AN men and 0.52% per year for AI/AN women. Deaths from heart disease occurred at a rate of 150.9/100,000 in 2015, but will expand to 175.9/100,000 by 2030. For AI/AN women, these rates will remain relatively stable from 2015 (64.4/100,000) to 2030 (62.8/100,000). If current trends persist, these estimates predict that 6,000 AI/AN women and 13,800 AI/AN men between 25 and 64 will die prematurely from heart disease between 2017 to 2030. However, if these trends continue to worsen as projected, then a substantially higher number of AI/ANs will die prematurely from heart disease for both AI/AN men (15,100) and women (8,400). These projected mortality rates correspond with 9% more excessive cardiac deaths in AI/AN men and 40% in AI/AN women.

Genetic Risks. It is believed that the frequency of high-risk alleles related to CVD is substantially higher in American Indians and Alaska Natives. North et al. (2003) investigated the heritability of five CVD risk factors in AIs, including high blood pressure, lipoproteins, diabetes, obesity, and clotting phenotypes. For blood pressure, systolic blood pressure and diastolic blood pressure were found to be 23% and 34% heritable, respectively. The heritability of lipoprotein phenotypes was substantial: lipoprotein a (51%), HDL cholesterol (50%), very low density lipoprotein cholesterol (45%), very low density lipoprotein triglycerides (41%), triglycerides (40%), total cholesterol (39%), LDL cholesterol (39%), apolipoprotein A-1 (39%), and apolipoprotein B (34%). Obesity phenotypes showed similarly high rates of heritability: waist/hip ratio (54%), fat-free mass (53%), body fat mass (52%), weight (51%), and BMI (44%).

Overall, North et al (2003) demonstrated that the most potent predictors of cardiovascular disease (i.e., total cholesterol, HDLs, LDLs, triglycerides, and BMI) were highly heritable for AIs, ranging between 39% to 50%. In addition to risk factors specifically linked to CVD, two markers for diabetes also had high rates of heritability, with genetics accounting for 29% of fasting glucose and 44% of fasting insulin levels. The heritability of diabetes is especially concerning because diabetes largely drives CVD health disparities, particularly among AI/ANs.

Diabetes. Diabetes in AI/ANs is reported to occur at rates that are between two and three times the rate of the general population (e.g., Acton et al., 2003; O'Connell et al., 2010). Over time, especially if left unmanaged, hyperglycemia damages the vascular and nervous tissue of the heart (CDC, 2020c). In addition, many cardiovascular risk factors (e.g., abnormal cholesterol, high triglycerides, hypertension, obesity, physical inactivity, and smoking) occur more frequently among people with diabetes. The strength and importance of the link between diabetes and the development of heart disease cannot be understated: individuals with diabetes are two to four times more likely to die from heart disease (American Heart Association [AHA], 2015).

The emergence of diabetes in younger AI/ANs has been shown to create significant changes in heart structure and functioning. Examination of echocardiographic data from 1,624 AI/AN adolescents and young adults from the Strong Heart Family Study (SHFS) revealed that diabetes was independently associated with an unfavorable cardiovascular phenotype (De Marco et al., 2011).[3] This high-risk cardiac profile was marked by increased left ventricular mass and

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[3] The SHFS is an extension of the original SHS. The SHFS recruited extended family members (*n* = 3,776) from the SHS cohort between 2001 to 2003. The aim of the SHFS was to investigate the genetic underpinnings of CVD.

hypertrophy, concentric geometry, and preclinical systolic and diastolic abnormalities. Of concern, these markers of heart damage occurred quite frequently in those with prediabetes.

Cholesterol. A healthy cholesterol profile typically involves higher “good cholesterol” (high-density lipoprotein; HDL), lower “bad cholesterol” (low density lipoprotein; LDL), lower total cholesterol, and lower triglycerides (CDC, 2019a; CDC, 2020d; National Heart, Lung, and Blood Institute [NHLBI], 2005). Although this is the generally accepted standard, research has shown that this profile may not be fully accurate for all racial groups, including AI/ANs. Tanamas et al. (2018) reviewed data between 1993 and 2011 from a previous longitudinal study of AIs (N = 2,125) from the Southwestern United States. Overall, CVD morality increased with higher levels of total, LDL, non-HDL cholesterol, and higher TG:HDL ratios. However, lower total cholesterol levels were not always beneficial. It was shown that total cholesterol followed a U-shaped distribution in individuals with diabetes, with higher rates of mortality occurring at both extremes of the distribution. These results demonstrate that the normative healthy profile of cholesterol is generally valid with AI/ANs. However, because of the higher rates of co-morbid diabetes, lower cholesterol in persons with diabetes may not always be a protective factor.

Albuminuria. Albuminuria refers to the albumin protein levels found in the blood. It is used as a marker for kidney dysfunction, as albumin does not normally pass into urine from the bloodstream (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2016). In relation to CVD, albuminuria is possibly caused by subclinical vascular damage in the kidneys and/or reflects systemic endothelial dysfunction that increases cardiovascular risk (Weir, 2007).

Lee et al. (2006) examined coronary heart disease using SHS data from 1989 to 2001. Albuminuria was calculated using the ratio of urinary albumin to creatine. Microalbuminuria was defined as a ratio greater than or equal to 30 but less than 300. Macroalbuminuria was defined as a ratio greater than or equal to 300. There were significant differences in microalbuminuria and macroalbuminuria prevalence rates between those with CHD and those without CHD in both AI men and women. For AI men with CHD, microalbuminuria prevalence was 21.9% and macroalbuminuria prevalence was 15.8%. These rates were significantly higher than the rates among AI men without CHD (17.1% and 7.8%, respectively). For AI women with CHD, microalbuminuria prevalence was 23.9% and macroalbuminuria prevalence was 27.0%. These rates were significantly higher than the rates among AI women with CHD (18.8% and 8.6% respectively). The incidence of CHD (in person-years) for AI men was 30.4/1000 for microalbuminuria and 52.7/1000 for macroalbuminuria. For AI women, CHD incidence was 18.3/1000 for microalbuminuria and 43.8/1000 for microalbuminuria. Finally, the hazard ratios for developing CHD were 1.39 for microalbuminuria and 2.11 for macroalbuminuria.

Obesity. In the United States, around 20% of all children and adolescents experience obesity (CDC, 2018). Compared to U.S. children overall, the prevalence of obesity is much higher in Indian Country.[4] For AI/AN youth between the ages of 2 and 19, the prevalence of overweight was 18.5% and obesity was 29.7% (Bullock et al., 2017). Rates of class II obesity and class III obesity were 12.0% and 4.3%, respectively. These rates were highest in 12- to 19-year-olds, with 19.7% being overweight and 33.8% having obesity. Notably, this age group also displayed the highest rates of severe obesity (16.1% for class II and 6.3% for class III obesity). However, obesity was readily apparent in even the youngest AI/AN youth who were 2 to 5 years old (overweight, 17.5%; obese, 20.7%; class II obesity, 4.3%; and class III obesity, 1.0%).

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[4] In this study, definitions of BMI categories were defined as the following: overweight (≤ 85th to 95th percentile), class I obesity (≤ 95th percentile), class II obesity (≤ 120% of 95th percentile or BMI ≤ 35), and class III obesity (≤ 140% of 95th percentile or BMI ≤ 40). These definitions allow for accurate comparisons across most other studies.

Although BMI increased linearly with age, the rates of obesity for AI/ANs made a substantial jump from the youngest children and those between the ages of 6 and 11, where 17.9% were overweight, 31.7% were obese, 13.0% had class II obesity, and 4.4% had class III obesity. Taken together, these results highlight that obesity for AI/ANs starts in early childhood, becomes much more pronounced in middle- and late-childhood, and then steadily worsens into adolescence.

Given that Bullock et al. (2017) examined data from the IHS National Data Warehouse, these estimates are likely to be more accurate than studies limited to specific regions or tribal groups. Overall, obesity prevalence was consistently higher in AI/ANs when compared to same-age children from the National Health and Nutrition Examination Survey (NHANES). Using NHANES data from 2013 to 2014, Skinner et al. (2016) reported that rates of obesity in U.S. children were 17.4% for obesity, 6.3% for class II obesity, and 2.4% for class III obesity. By comparison, AI/AN children and adolescents from the Bullock et al (2017) study had 58.6%, 52.5%, and 55.8% higher rates of these same conditions. Concerningly, AI/AN obesity rates declined in early childhood between 2006 and 2015, did not change during the same period across middle- and late-childhood, and continued increasing during adolescence (Bullock et al., 2017). This contrasted with U.S. children and adults, where obesity rates have begun to plateau after increasing for 30 years (Ogden et al., 2014; Skinner et al., 2016). Without the same clear declines in obesity rates for AI/ANs, current trends will only serve to maintain the current health disparity, including the increased prevalence of cardiovascular disease seen in AI/AN adults.

According to Bass and Eneli (2015), when obesity from childhood transitions into adult obesity, the consequences are more severe and there is higher associated risk for developing other health conditions that increase the probability for premature mortality (i.e., atherosclerosis, diabetes, hypertension, metabolic syndrome, and fatty liver disease). Based on the 2018 NHIS

(Villarroel et al., 2019), 48.1% of AI/ANs over 18 were classified as obese, and 33.1% were classified as overweight. The age-adjusted rate of obesity in AI/ANs (48.1%) was much higher than the one-race general rate (30.9%) and all other U.S. racial groups (Black: 38.0%, Hispanic: 34.9%, White: 31.0%, and Asian: 13.0%). Notably, the age-adjusted rates of overweight (33.1%) were comparable to the one-race general rate (34.2%) and lower than all other races (except Asian Americans). However, this is likely the result of more AI/ANs being classified as obese. Notably, health disparities in BMI for AI/ANs were even more apparent when examining healthy weight status. Only 17.9% of AI/ANs were at a healthy weight, which is much lower than the one-race general rate (33.2%) and the lowest out of all racial groups (Asian: 50.6%, White: 33.0%, Hispanic: 27.7%, and Black: 26.7%). In addition, the rates of obesity in AI/AN adults are rising (Nugent et al., 2016): the annualized age-adjusted percent distribution of obesity for AI/ANs between 2011 and 2014 was 42.5%. When compared with the current NHIS estimate (48.1%), obesity in AI/AN adults had increased by 5.6% from 2011-2014 to 2018.

***Physical Inactivity*.** Research has shown a clear inverse relationship between physical activity and the development of cardiovascular disease (Shiroma & Lee, 2010). Importantly, a lack of exercise has been shown to cause poor cardiovascular health, even in the absence of other CVD risk factors (CDC, 2019c). Furthermore, physical activity can act indirectly on heart disease by increasing the risks for diabetes, obesity, hypertension, and dyslipidemia. A 2008 meta-analysis by Nocon et al. found that physical activity reduced CVD mortality by 35%.

Overall, AI/ANs appear to have markedly higher rates of physical inactivity and sedentary lifestyles. Studies have suggested that the majority of AI/AN adults do not meet the minimum public health recommendations for physical activity (e.g., Storti et al., 2009). In addition, analysis of BRFSS data from 1997 to 2000 (Denny et al., 2003) indicated that AI/ANs

(32.5%) were more likely to have no leisure-time physical activity compared to other racial/ethnic groups (27.5%). Similar findings were reported by Steele et al. (2008) using BRFSS data from 2000 to 2006, where 31% of AI/ANs reported no leisure-time physical activity compared to 21.5% of non-Hispanic Whites. Importantly, the lack of physical activity outside of work-related activities may be partly due to the socio-environmental conditions imposed upon AI/ANs. A literature review by Coble and Rhodes (2006) found that poor infrastructure and poor or no access to appropriate facilities or exercise programs prevented leisure activities. In addition, safety concerns and bad weather were identified as barriers. Similar studies have been useful in highlighting the essential role of social support to physical activity. AI/AN women who saw other people in their neighborhood exercising or knew someone who exercised were 3.81 and 5.23 times more likely to engage in physical activity, respectively (Thompson et al., 2003).

Poor Diet. In addition to not including the full range of necessary minerals and vitamins, the diets of AI/ANs often exceed dietary guidelines related to overall fat intake, saturated fat, cholesterol, and sodium (Fialkowski et al., 2010). Typical AI/AN diets also comprise lower fruit and vegetable consumption, averaging only 3 out of 5 recommended servings per day (CDC, 2010). In addition, it has also been shown that AI/ANs have elevated rates of unhealthy eating behaviors that contribute to heart disease. For example, Trude et al. (2015) reported that high-fat food intake (OR = 6.0) and unhealthy snack consumption (OR = 3.6) were associated with increased cardiovascular disease in five AI communities.

Food insecurity, which refers to uncertainty or limitations related to the availability of nutritious and safe food (Campbell, 1991), may play a unique role in the higher prevalence of hypertension found in AI/AN populations. Clearly, poverty is a large contributing factor in determining the amount and nutritional value of food eaten (Bierman and Dunn, 2006; Quandt and Rao, 1999). However, research has clarified that food insecurity is an independent risk factor in predicting poor health outcomes in the general population (Alaimo et al., 2001; Seligman et al., 2010) and the independence of poverty-mediated food insecurity has been established for AI/ANs. Food insecurity was significantly associated with poor general health (*OR* = 2.77) after controlling for income in 187 AI households in the Northern Plains region (Brown et al., 2007). Gunderson (2008) reported that the food insecurity rate in all households with children was significantly higher in AI/ANs compared to non-AI/ANs (*RR* = 1.78). In households below 185% of the poverty line, the rate of food insecurity was about 20% higher in AI/ANs. The discrepancies between AI/ANs and non-AI/ANs increased substantially in households without children in both all household (*RR* = 2.09) and poverty line (*RR* = 1.60) comparisons. Moreover, when the endorsement of hunger was included, these rates increased further in both households with children (*RR* = 1.87, *RR* = 1.30) and households without children (*RR* = 2.84, *RR* = 2.23).

Furthermore, food insecurity prevalence is increasing among AI/ANs. Jernigan et al. (2017a) examined data from the Current Population Survey – Food Security Supplement (CPS-FSS) from 2000 to 2010. The authors found that a quarter (25%) of the AI/AN sample remained food insecure during this decade, with rates of food insecurity nearly 2.5 times the rate of Whites in 2000 and twice the rate of Whites in 2010. Overall, AI/ANs had 20% higher odds (*OR* = 1.2) of having food insecurity compared to Whites. Finally, in Jernigan et al. (2017b), inadequate food quantity and quality contributed significantly to the prevalence rates of diabetes, obesity, and hypertension among two tribal nations in Oklahoma. Overall, 56% of 513 participants reported experiencing inadequate food quantity, and 62% reported inadequate food quality. The unadjusted prevalence rates for hypertension were higher for those with inadequate food quantity (54.1%) versus those without (41.6%). In addition, hypertension prevalence was similarly higher in those with inadequate food quality (42.5% vs. 52.5%). Notably, food quality was found to be more important than food quantity; food quality alone remained significant after controlling for age, gender, education, and income. The prevalence ratio for food quality (*PR* = 1.25) indicated that AI/ANs without adequate food quality had a 25% higher chance of developing hypertension.

Cigarette Smoking. The physical consequences of smoking are numerous, especially when it comes to the heart. As noted by the U.S. DHHS (2010), smoking has an immediate impact on the heart by increasing heart rate and blood pressure; increases triglyceride levels and reduces protective HDL cholesterol levels; directly damages blood vessels; and increases atherosclerotic plaque buildup. In addition to narrowing and thickening blood vessels, smoking alters blood chemistry such that blood becomes more viscous and is more prone to clotting.

The 2018 NHIS (Villarroel et al., 2019) reported alarmingly high rates of cigarette smoking in AI/AN adults. AI/ANs had the lowest rates of non-smokers (59.0%) than the one-race general rate (65.3%) and all other racial groups (Asian: 79.6%, Hispanic: 74.7%, Black: 72.0%, White: 63.1%, and Native Hawaiian/Pacific Islander: 64.7%). As expected, every-day smokers and some-day smokers were most common among AI/ANs. The percentage of AI/ANs who reported being current smokers was 22.5%, with 13.8% being every-day smokers and 8.7% being some-day smokers. Notably, the high rate of current smoking in AI/ANs (22.5%) was drastically higher than the one-race general rate (13.7%). This rate was also higher than all other racial groups (Black: 14.2%, White: 14.2%, Hispanic: 9.6%, and Asian: 6.8%). In terms of former smokers, the rate for AI/ANs (18.4%) was lower than the one-race general rate (21.0%). Other than Whites (22.8%), AI/ANs had the second highest rates of former smokers. Additionally, AI/AN success rates for quitting were below the national quit rate. However, AI/ANs appeared to quit successfully more than all other racial groups aside from Whites.

When compared to previous smoking rates from the NHIS, the rate of current smoking among AI/ANs (22.5%) was higher than the 2011-2014 estimate (21.7%) reported by Clarke et al. (2016). Although it can be argued that cigarette smoking had risen slightly during this time, these rates were similar enough to assume no meaningful changes had occurred. These results contrast with a more recent study (Azagba et al., 2020) that had used Tobacco Use Supplement to the Current Population Survey (TUS-CPS) data from 1992 to 2015. The authors found that AI/AN smoking prevalence decreased from 39.1% in 1992-1993 to 20.9% in 2014-2015. This represented a 53.5% decrease over time. This trend was seen in AI/AN men (a decrease from 43.6% to 35.4%) and women (a decrease from 23.8% to 18.3%). Despite these contradictory findings, the fact remains that smoking rates for AI/ANs remain among the highest in the country. As long as smoking is left unchecked in Indian Country, smoking-related mortality will continue to keep rising (Mowery et al., 2015), including those cases attributed to heart disease.

Insomnia and Insufficient Sleep. Disturbances in sleep (including difficulty falling asleep, low sleep duration, and daytime sleepiness) have been linked to increased cardiovascular disease in older adults (e.g., Foley et al., 2004; Newman et al., 2000; Sabanayagam & Shankar, 2010; Suzuki et al., 2009). Sabanayagam et al. (2010) examined sleep complaints and self-reported CVD in AI/ANs using data (N = 449) from the Native Elder Care Study. The authors found that having difficulty falling asleep either often or always (OR = 3.39), sleeping fewer than 5 hours (OR = 3.51), and having more than 2 hours of daytime sleepiness (OR = 6.06) were positively associated with CVD. Notably, these associations were independent of age, sex, physical activity, BMI, diabetes, hypertension, depression, alcohol use, smoking, and pain.

More recently, Lombardero and colleagues (2019) provided a review of the available literature on insomnia (i.e., difficulty initiating or maintaining sleep) and insufficient sleep (i.e., sleeping fewer than 7 hours) in AI/ANs. The authors found that the prevalence of insomnia (range: 25% to 33.7%) and insufficient sleep (range: 15% to 40.4%) were often higher than the reference groups used in each study (e.g., Chapman et al., 2013; Liu et al., 2016). In addition, the observed ranges of insomnia and insufficient sleep in this review were as high, and at times higher, than general U.S. prevalence rates for these conditions (27% and 35%, respectively). Only insufficient sleep was associated with cardiovascular disease (Sabanayagam et al., 2010). However, inconsistent definitions of insomnia may have obscured any potential associations.

Although the exact mechanism is unclear, it is believed that sleep disturbances contribute to CVD indirectly by increasing the likelihood for developing more direct-acting CVD risk factors (Sabanayagam et al., 2010). Specifically, metabolic syndrome and its individual components (high blood pressure, high blood sugar, low HDL cholesterol, high triglycerides, and obesity) have been identified as likely mediators between poor sleep and higher CVD rates (e.g., Troxel et al., 2010). Finally, it has also been shown that poor sleep disrupts key metabolic and endocrine processes (Spiegel et al., 1999; Van Cauter et al., 2007), with the consequences of these disruptions (i.e., increased sympathetic activity, blood pressure, glucose intolerance, and insulin resistance) eventually causing cardiovascular diseases to develop over time.

Summary of Cardiovascular Disease. Overall, as the leading cause of death in Indian Country, cardiovascular disease stands at the forefront of AI/AN health disparities. In the context of decreasing or stabilizing CVD prevalence and mortality rates in the general U.S. population, we find that cases of heart disease for AI/ANs continue to rise, and mortality declines are not up to par with the rest of the country. Without immediate and effective interventions, the health disparities for heart disease are only expected to widen. However, any discussion of CVD cannot occur without accounting for the multitude of risk factors that themselves are endemic in Indian

Country (e.g., obesity, physical inactivity, poor diet, smoking). Importantly, many of these risk factors can be linked to recent lifestyle changes that have occurred beginning in the 20th century when many tribal nations were forced to abandon their traditional lifestyles and assimilate to American culture. For many AI/ANs, this change interfered with the previous lifestyle they had before, with previous sources of physical activity and diet permanently disrupted. Unfortunately, due to the loss of traditional lifestyles, it cannot be determined if AI/ANs had any natural protection against heart disease related to the healthier lifestyle they lived prior to contact and assimilation with the United States. Regardless, even if a natural protection existed, it would be undoubtedly overridden by the disproportionate CVD risks faced by contemporary American Indians and Alaska Natives, especially the current diabetes epidemic. From this perspective, any examination of CVD among AI/ANs must be viewed from the larger sociohistorical perspective.

These findings are important in illustrating the genetic, environmental, and behavioral aspects underlying the adverse health disparity posed by CVD in Indian Country. Although a large portion of the cardiovascular risks are passed down through genes and cannot be changed, these results highlight that most risk factors associated with CVD can be directly targeted through behavioral and environmental change. By highlighting that heritability is a key component of the current health disparity, we can remove the tendency to “blame the victim” and attribute the poor cardiovascular health of AI/ANs entirely to themselves. However, although there is a clear genetic liability for AI/ANs, this recognition needs to be paired with an increased responsibility for taking care of ourselves in an environment that only serves to exacerbate our diathesis to poor health. Although the change away from traditional lifestyles was a clear precipitant to the current climate of heart disease, lifestyle changes are again going to be necessary and crucial in combatting the current health disparities in cardiovascular health.

Notably, the major risk factors for CVD also contribute to the other health disparities within this literature review. Among these risk factors, diabetes, hypertension, and obesity work together as a triad to cause multiple health disparities in Indian Country. Prioritization of these risk factors should be recognized in any future interventions aimed at disrupting the cardiovascular, diabetes, asthma, and arthritis health disparities in AI/ANs. Importantly, these risk factors have been shown to emerge in childhood and adolescence, and as such, they create physical damage in our bodies that set these conditions up for a lifetime. In many ways, current behavioral and environmental climates set the bodies of AI/ANs up for failure. Unfortunately, AI/ANs are ultimately damaging themselves by engaging in poor eating habits, sedentary lifestyles, smoking, and other modifiable behaviors that contribute to overall poor health.

Recent research has shown that changes in heart function and structure develop early in AI/ANs with diabetes. Concerningly, heart damage and abnormalities have been observed in younger AI/ANs who are only in the early stages of impaired glucose metabolism (i.e., prediabetes). Over time, it can be expected that these early cardiac abnormalities are likely to progress to major cardiovascular diseases in older adults. To the degree that diabetes increases in younger AI/ANs and begins earlier, then the associated risk for CVD will likewise increase. As such, the reduction of CVD-related morbidity and mortality in Indian Country cannot occur with targeted efforts towards reducing diabetes and the shared risk factors that link both conditions.

Diabetes

Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia (i.e., high blood sugar) related to dysfunctions in the body's ability to produce, regulate, or make efficient use of insulin (American Diabetes Association [ADA], 2020). Although there are other causes, diabetes usually results from the inability of the pancreas to produce sufficient insulin (i.e., type

1 diabetes) or from insulin resistance (i.e., type 2 diabetes). Type 1 diabetes is linked to auto-immune processes that affect the pancreas, whereas type 2 diabetes is caused by metabolic changes that stem from lifestyle factors such as unhealthy body weight and lack of physical activity. Type 2 diabetes is more common than type 1 diabetes. If not diagnosed early or left untreated, diabetes can have disastrous consequences on the body, including cardiovascular disease, kidney dysfunction, neuropathy, retinopathy, and non-traumatic amputations (WHO, 2020b). These consequences stem mostly from microvascular damage that emerges from chronic hyperglycemia. Fortunately, diabetes can be delayed and avoided all together with proper diet, physical activity, medication, proper screening, and treatment of complications. Moreover, these complex behavioral strategies can also support patients with the self-management of blood glucose, thus minimizing the development and impact of long-term health complications.

Diabetes in the General Population. Currently, we are in a global “diabetes epidemic” and cases of diabetes are projected to continue rising worldwide. According to the International Diabetes Federation (IDF, 2019), there are currently 374 million people (7.5% prevalence) between the ages of 20 and 70 years old currently living with diabetes. These numbers are expected to grow to 454 million (8.0% prevalence) by 2030 and 548 million (8.6% prevalence) by 2045. In addition, due to increasingly unhealthy lifestyles, the proportion of type 2 diabetes continues to rise, with 374 million people at an increased risk for developing type 2 diabetes.

In the United States, according to the *National Diabetes Statistics Report 2020* (CDC, 2020e), there were reportedly 34.1 million cases of diabetes in 2018, with 26.8 million diagnosed cases and 7.3 million undiagnosed cases. As of 2018, the prevalence of diabetes across all age groups was 10.5% and 13.0% in all U.S. adults. Much like the global diabetes epidemic, cases of diabetes in the U.S. are increasing and are expected to continue growing. Results from the 1999-

2016 National Health and Nutrition Examination Survey (Fang, 2018) revealed that diabetes prevalence in adults was 9.5% between 1999-2002 and had climbed to 12.0% during 2013-2016.

Diabetes in Indian Country. Diabetes in AI/ANs is reported to occur at rates that are between two and three times the rate of the general population (e.g., Acton et al., 2003; O'Connell et al., 2010). Between 2017 and 2018, the prevalence of diabetes was 21.8% for single-race AI/ANs (Villarroel et al., 2019). This was by far the highest prevalence rate among all U.S. racial groups (Black, 12.7%; Hispanic, 10.9%; White, 9.8%; Asian, 10.6%). Rates were similarly high for AI/ANs with White ancestry (14.8%). Based on previous NHIS data from 2013 (Blackwell et al., 2015), the prevalence of diabetes appears to have increased substantially from 14.5% in 2013 to 21.8% in 2018 for AI/ANs (single race). If correct, this represents an alarming 66.5% increase over five years. During this same time, diabetes prevalence in the general population had only increased 10.5% in five years from 9.5% in 2013 to 10.5% in 2018. Based on these data, it is obvious that the diabetes epidemic among adults in Indian Country is not only worsening, but is also growing at a much higher rate than that seen in the United States.

Similar to AI/AN adults, compared to their counterparts in the general population, AI/AN youth have the highest prevalence of diabetes out of all U.S. racial and ethnic groups (IHS, 2020). In addition, the prevalence of diabetes in younger AI/ANs also appears to be rising. Based on IHS data from 1990 to 1998, Acton et al. (2002) observed a 71% increase in diabetes among AI/AN children (< 15 years), adolescents (15 to 19 years), and young adults (20 to 34 years). This was substantially higher than the 14% increase seen in the in the general population (≤ 45). Overall, there was also a marked increase (46%) in prevalence from 6.4/1000 to 9.3/1000 for AI/AN youth. Although there was no change in prevalence rates for AI/AN children, diabetes increased by 68% in AI/ANs 15 to 19 years old (3.2/1000 to 5.4/1000), 47% in those 20 to 24 years old (7.8/1000 to 11.5/1000), and 50% in those 25 to 34 years old (18.0/1000 to 26.9/1000).

For AI/AN youth, there is concern that type 2 diabetes cases may be mistakenly classified as type 1 diabetes (Fagot-Campagna et al., 2000). Notably, both types may present with acute onset and require insulin treatment. However, their etiologies are vastly different. Although it is widely recognized that diabetes develops earlier in AI/ANs, the incidence of type 1 diabetes appears to be lower than all other racial groups in the U.S. (Dabelea et al., 2007). As such, the misdiagnosis of type 2 cases only serves to obscure the true picture of diabetes in AI/AN youth.

Given the early emergence and escalating rates of childhood diabetes among AI/ANs, it makes sense that AI/ANs with diabetes are considerably younger on average than the general diabetic population. Burrows et al. (2000) found that only 24% of AI/ANs with diabetes were older than 65 (45 to 64 years old: 49%; 20 to 44 years old: 25%). This contrasts greatly with the general population, where almost half (45%) of those with diabetes were 65 years or older.

Mortality. Diabetes ranked as the 7th leading cause of death in the United States general population in 2017 (Heron, 2019). For AI/ANs, diabetes was the 4th leading cause of death during that same time period. Despite diabetes accounting for only 2.5% of all total U.S. deaths, diabetes accounted for 5.8% of all deaths for AI/ANs. Although there were reported cases of deaths due to diabetes in younger age groups – with the earliest case being between 10 and 14 years old – diabetes begins to become a major cause of death for AI/ANs beginning around ages 35 to 44 (rank, 6th; total percent, 5.3%; rate: 22.8/100,000). These rates increase with age: 45 to 54 (rank, 5th; total percent, 5.9%; rate: 40.9/100,000) and 55 to 64 (rank, 5th; total percent, 6.9%%; rate: 75.7/100,000). However, death rates from diabetes make a significant jump for AI/ANs older than 65 (rank, 4th; total percent, 6.6%; rate: 213.6/100,000). Among those 65 and older, AI/AN death rates continued to rise while the total percent of deaths due to diabetes declined: 65-74 years of age (rank, 3rd; total percent, 7.8%; rate: 151.1/100,000), 75-84 years of age (rank, 4th; total percent, 7.0%; rate: 330.9/100,000), and 85 years and older (rank, 6th; total percent, 4.2%; rate: 381.4/100,000). This is likely because other causes of death account for more deaths with older age. Nonetheless, diabetes remains a major cause of death for AI/ANs.

Overall mortality related to diabetes has been declining since at least the 1990s. Using data between 1990 and 2009 from IHS Contract Health Service Delivery Areas, Cho et al. (2014) found that diabetes (as an underlying cause of death and multiple cause of death) had declined in both AI/ANs and Whites during this time. Regardless of these improvements, mortality rates from diabetes were still found to be at least 3 times higher for AI/ANs compared to Whites. As an underlying cause of death, the mortality rate for AI/ANs (100.9/100,000) was 3.62 times higher than Whites (27.8/100,000). Between 1990 and 1997 death rates grew by 5.2% per year and declined by 1.4% between 1997 and 2009. For Whites, death rates increased by 2.3% per year from 1990 to 2001, stabilized between 2002 to 2004, and then declined by 3.6% from 2005 to 2009. Interestingly, the decline in diabetes death rates among AI/ANs occurred a full eight years before Whites. When diabetes was considered as one of multiple causes of death, AI/AN mortality rates (249.2/100,000) were 2.63 times higher than Whites (94.7/100,000). These results are consistent with Espey et al. (2014), where mortality rates from 1990 and 2009 were 3.19 times higher in AI/AN men (75.5/100,000) than among White men (23.6/100,000). For AI/AN women (69.2/100,000), death rates from diabetes were 4.04 times higher than among White women (17.2/100,00). These results are extremely concerning for AI/ANs. Whereas diabetes mortality has declined, the lethality of diabetes in Indian Country remains incredibly potent.

Depression. A growing area in the research literature for AI/ANs with diabetes concerns the negative outcomes associated with comorbid depression. In fact, in addition to depression, diabetes creates a substantial mental health burden in Indian Country. This is demonstrated in the AI/AN literature where diabetes has been linked to a host of negative mental health outcomes, including alcohol abuse (Tann et al., 2007), apathy (Carlson et al., 2017), diabetes distress (Aronson et al., 2020), disturbed sleep (Lombardero et al., 2019; Nuyujukian et al., 2016), poor mental health status (Sahmoun et al., 2007), posttraumatic distress disorder (Aronson et al., 2016), psychological trauma (Goins et al., 2017; Jacob et al., 2013), serious psychological stress (Huyser et al., 2015), and stress exposure (Jiang et al., 2008; Walls et al., 2017).

For depression specifically, depression appears to occur more frequently in AI/ANs with diabetes. Jiang et al. (2007) reported that a lifetime diagnosis of a depressive disorder was associated with an 84% increased likelihood of being diagnosed with diabetes. In an examination of the SHS, Calhoun et al. (2010) found that depression occurred significantly more often in AI/ANs with diabetes than those without diabetes. Based on 2006 data from the BRFSS, Li et al. (2008) found that AI/AN adults had extremely high rates of self-reported depression compared to all other races. The authors reported that AI/ANs had a 27.8% prevalence of likely major depression compared to White (9.5%), Black (5.6%), Hispanic (5.4%) and Asian (1.1%) participants. Although AI/ANs with diabetes only had the fourth highest rate of minor depression (5.4%), they had the highest rates of depression when major and minor cases were combined (33.2%). These combined rates were again markedly higher than all other races: Hispanic, 18.4%; Black, 17.3%; White, 15.3%; and Asian (2.1%). In terms of undiagnosed depression in the 2006 BRFFS (Li et al., 2009), AI/ANs with diabetes had the second highest rate (10.3%) behind Hispanics (13.9%), but had higher rates than Blacks (11.1%) and Whites (7.1%).

Concerningly, comorbid depression has been shown to increase mortality in AI/ANs with diabetes (Goins et al., 2019), a finding that may reflect shared links with increased high-risk behaviors. For example, AI/ANs with diabetes and depression were found to have a 50% greater likelihood of smoking cigarettes (*OR* = 1.5) compared to those without depression (Knaster et al., 2015). Although AI/ANs with both conditions have increased risk factors that worsen health, the impact of depression on diabetes management may be a more direct route to higher mortality.

Depression and poorly controlled diabetes are clearly linked, although the directionality of this relationship is not known and most likely bidirectional in nature. In tribal members from the Gila River Indian Community (*N* = 2,902), glycosylated hemoglobin (HbA1c) levels were found to be significantly elevated in those with depression and diabetes compared to those who were not depressed (Sahota et al., 2008). Individuals with both conditions were also shown to have significantly worse lipid profiles. Notably, diabetes duration was positively associated with depression (i.e., greater duration was linked with greater depression). In Calhoun et al. (2010), it was observed that HbA1c levels were positively associated with depression severity; higher A1c levels were observed in participants with severe depression compared to those with moderate, mild, or no depression symptoms (based on CES-D scores). The authors found that for every one-unit increase in HbA1c, the odds of having severe depression were increased by 22% (*OR* = 1.22). These studies are consistent with Walls et al. (2014), where depression was associated with higher HbA1c levels, indicating a link between depression and unmanaged diabetes. Since HbA1c is used to assess the long-term control of diabetes by analyzing the amount of glucose bound to hemoglobin over three months, these results suggest that poor management of blood sugar presents an increased risk for developing depression. However, it is equally plausible that depression can lead to decreased treatment adherence, thereby increasing HbA1c levels.

Research has identified diabetes-linked emotional distress as a key mediator related to medication adherence (e.g., Aronson et al., 2020) and high HbA1c levels (Walls et al., 2017).

Considerations in the Treatment of Diabetes in AI/ANs. Within Indian Health Service, the treatment of diabetes accounts for a disproportionate amount of resources. O'Connell et al. (2012) examined IHS health utilization data from 2004 to 2005 for 32,052 AIs from central Arizona. Overall, diabetes care accounted for 37.0% of all funding directed towards adult treatment. In addition, 47.6% of hospital stay days were for persons with diabetes. AIs with diabetes also utilized more IHS services, including rates of emergency care, primary care, and specialty care that were 2 to 3 times higher than those without diabetes. The average annual treatment cost for an adult with diabetes was $7,682, with 4.7% of these patients requiring more than $25,000 per year to manage their condition. These costs are drastically higher than the per capita expenditure of $2,500 usually allocated to IHS patients. Furthermore, individuals with comorbid diabetes and cardiovascular disease used significantly more resources (an average of $13,346 per year). Although adults with diabetes only accounted for 10.9% of the IHS user population in this study, they utilized almost 40% of the available funding. This high price paid for treating diabetes likely reflects the high rates of long-term microvascular complications (e.g., renal failure, liver disease) and related comorbid medical conditions (e.g., CVD, hypertension, stroke) associated with diabetes management. As such, the money spent on diabetes is money that could be spent on other pressing health issues in an already underfunded healthcare system.

Although AI/ANs with diabetes consume significantly more resources within the IHS health care system, research has shown that contact and engagement with primary care services is critically important to managing diabetes. As such, IHS serves a necessary and protective role for a vulnerable population who may otherwise go without these services. King et al. (2018)

found that contact with a primary care provider in the year prior to hospital admission was significantly associated with 50% reduced mortality. Unfortunately, the authors also stressed that IHS has a significant shortage of healthcare providers, with a 25% vacancy rate for physicians and nurse practitioners (IHS, 2015). In addition, surveys have shown that 58% of IHS physicians and other midlevel practitioners had already planned to leave eventually and 47% planned on leaving within three years (likely before reaching retirement). In an already overtaxed health care system like IHS, which experiences high turnover rates and exceptionally long wait times for primary care visits (e.g., Kim, 2000), the health of AI/ANs with diabetes is in perpetual jeopardy.

Multiple barriers to healthcare have been identified in the research literature on diabetes in Indian Country. Racial discrimination and mistrust of the health care system have become identified as key barriers to engagement with medical services and optimal treatment of diabetes. In Gonzales et al. (2014), 67% of AI women (*N* = 200) reported experiencing health care discrimination that they attributed to being American Indian. Overall, perceived discrimination was associated with not successfully meeting target goals for HbA1c levels (*OR* = 1.47). In addition, perceived discrimination was associated with lower completion of blood pressure, creatinine, and total cholesterol checks, all of which are essential to diabetes management. In addition to racism in the healthcare system, microaggressions (i.e., subtle but everyday experiences of prejudice) also affect diabetes self-care. In a sample of 192 AIs from the Northern U.S. with diabetes, Sittner et al. (2018) found that microaggressions were associated with higher levels of diabetes distress, which were in turn associated with unhealthy diet and low exercise.

Finally, an understanding of cultural differences, the larger sociohistorical context of AI/AN health disparities, and the importance of integrating traditional belief systems are necessary components for optimizing health care in Indian Country. A qualitative study by

Henderson (2010) compared AI elders with diabetes who held either an indigenous model or mainstream model of diabetes. Elders who had an Indigenous model viewed U.S. health care systems (including IHS) as authoritarian. Non-adherence with medical advice was viewed as more socially acceptable to these elders. Due to racial discrimination and barriers to care experienced in the health care system, these individuals were more likely to postpone care-seeking until it was unavoidable, were less adherent to treatment, and had more distrust of White providers. In contrast, followers of the mainstream model of diabetes were more accepting of the current biomedical model of diabetes, had more trust in medical providers, and were more open to receiving diabetes education. Compared to those with an Indigenous model, these individuals valued early identification of symptoms, early engagement with providers, and had more successful diabetes self-care, including diet, exercise, medication use, and follow-up. These results highlight the importance of cultural sensitivity in medical providers of AI/ANs with diabetes. Recognition that medical providers may be viewed by AI/AN patients as extensions of colonization and white authority – including providers who are themselves AI/AN – can help them approach their client's diabetes care in a more culturally sensitive and effective manner.

Diabetes Prevention. Although most available literature tends to paint a negative picture, there have been considerable recent successes in improving the health of AI/ANs with diabetes. The Special Diabetes Program for Indians Diabetes Prevention (SDPI-DP), which was initiated by the U.S. Congress in 2006, has made significant progress in ameliorating the AI/AN diabetes epidemic since its inception. The SDPI-DP involves 36 health care programs that serve 80 tribal groups. Remarkably, the creation of the SDPI-DP was based on the recognition that AI/ANs had contributed significantly to the diabetes literature but failed to benefit from this research (Knowler & Ackermann, 2013). In order to assess the effectiveness of the SDPI-DP on diabetes outcomes, Wilson et al. (2005) reviewed data from 1995 to 2001 from the IHS Diabetes Care and Outcomes Audit. Overall, the authors found several positive changes that could be attributed to improved diabetes care and resource allocation related in part to the SDPI-DP. Compared to 1995, the year prior to implementation of the SDPI-DP, 2001 rates of adjusted mean HbA1c (8.9% vs. 7.9%), mean diastolic blood pressure (79 vs. 76 mm Hg), mean total cholesterol (208 vs. 193 mg/dL), and triglyceride levels (257 vs. 235 mg/dL) all demonstrated significant improvements. Compared to previous levels in 1999, HbA1c, diastolic blood pressure, total cholesterol, and triglyceride levels had improved by 12.7%, 3.9%, 7.8%, and 9.4%, respectively.

Further support for the success of the SDPI-DP in Indian Country has continued to accumulate. Jiang et al. (2013) evaluated the effectiveness of the Lifestyle Balance Curriculum from the SDPI-DP in a sample of 2,553 prediabetic AI/ANs. The incidence of diabetes among these participants was 4.0% per year. Notably, individuals who attended all classes had lower incidence rates (3.5%) compared to those who did not finish all classes (7.5%). Overall, significant improvements were evident immediately following the intervention and up to 3 years postintervention. These improvements included weight loss, lower blood pressure, and improved lipid levels. Following intervention, participants lost an average of 4.4% of their body weight, with subsequent losses of 5.6%, 3.1%, and 2.4% in the following three years. There were similar successes with exercise. Additional improvements were noted in fasting blood glucose, systolic BP, diastolic BP, increased HDL-C levels, reduced LDL-C levels, and lower triglyceride levels.

Finally, Jiang et al. (2018) found significant weight loss in participants (*N* = 8,652) who finished the Lifestyle Balance Curriculum. After the intervention, the incidence rate of diabetes was 3.5/100 person-years. Overall, 36% lost greater than 5% of their initial weight, 17% lost 3-5%, and 45% lost less than 3%. After a six-year follow-up, participants who lost more than 5%

had a 64% lower risk of developing diabetes compared to those who only lost less than 3%. Those who lost 3-5% of their initial weight had a 40% lower risk than those who lost the least weight loss. The results from the SDPI-DP are inspiring; they also demonstrate that effective interventions can be designed to produce tangible and group-level changes in Indian Country.

Summary of Diabetes. When compared to CVD, the risk factors associated with diabetes are essentially the same (i.e., obesity, physical inactivity, poor diet, and smoking). In fact, poor weight management and a lack of physical exercise are key characteristics in the etiology of type 2 diabetes, the predominant form of diabetes in Indian Country. Although it can be difficult to disentangle the intricate relationships between these risk factors and how they inform both CVD and diabetes, they also present multiple opportunities for intervention. As such, targeting diabetes, CVD, or any associated risk factors will ultimately have positive impacts on reducing the AI/AN health disparities. Instead of being discouraged, we can see this situation as one in which any intervention will be beneficial (i.e., a reverse Greek Hydra).

In the midst of the current global diabetes epidemic, AI/ANs are one of the most affected subgroups worldwide. This is not a badge of honor. Furthermore, the 2- to 3-fold prevalence found in Indian Country relative to the general U.S. population is simply unacceptable. In order to make effective changes in the diabetes epidemic, we need to start by targeting the increased risk factors that are firmly established in AI youth (e.g., obesity, lack of exercise, poor diet). It is known that type 1 diabetes is relatively rare in AI/ANs. This means that the growth of diabetes in AI/AN youth is largely attributable to behavioral choices and environmental circumstances. With this perspective, we can invest in changing these habits and providing an environment that is more conducive to positive health. Just as the diabetes epidemic starts early in Indian Country, we can make more of an impact in reducing disparities by starting early with our interventions. Investment in the health of AI/AN youth will be crucial to the long-term health of all AI/ANs.

Outside of childhood and adolescence, we also need to target the greater disease burden from diabetes in AI/AN young adults, beginning from the ages of 35 and with an increased emphasis on those who have yet to reach older adulthood (i.e., less than 65). The earlier rates of diabetes mortality also need to be reduced. Although recent declines in mortality for AI/ANs have been documented, we must not forget that the death rate from diabetes in Indian Country is still multiple times higher than all other racial groups in the United States. Nonetheless, at least for now, we should see declining trends in diabetes as a success. In fact, mortality declines began eight years earlier for AI/ANs in 1997. Interestingly, this corresponds to the implementation of the Special Diabetes Program for Indian Diabetes Prevention (SDPI-DP) initiative in 1996.

Next, the increased prevalence of comorbid depression in AI/AN persons with diabetes presents another challenge. AI/AN with diabetes have rates of depression that are almost three times higher than the general population (27.8% vs. 9.5%). Given that depression has been shown to increase mortality in AI/ANs, we need to invest more resources into understanding why this disparity continues to exist. Although the reasons are likely multifold, we need to begin targeting these underlying causes immediately. The presence of diabetes in Indian Country does not need to equate with depression. In fact, depression in individuals with diabetes deserves its own recognition and resources. Whether through reduced treatment compliance or increased disease burden, we need to work to reduce the weight felt by AI/ANs with diabetes and target those processes and/or risks that contribute to elevated rates of comorbid depression.

Since diabetes care consumes a disproportionate amount of Indian Health Service resources, we need to find more efficient means for managing diabetes and its associated complications. These funds could be redirected to equally pressing needs. More investment should be directed towards the recruitment and retention of physicians and midlevel health care providers at IHS, especially since increased contact with primary care providers is a protective factor for patients with diabetes. This will involve investing in the development of AI/AN physicians and other care providers who are more likely to remain in the IHS system. Overall, the larger question is whether the underfunded IHS system can continue to effectively manage the healthcare needs of AI/ANs with diabetes, especially given their more extensive needs.

Additionally, more training needs to be provided for IHS providers to ensure culturally-sensitive and responsive treatment. Racism, even if just perceived by AI/AN patients, has been shown to decrease engagement with healthcare systems and disrupt treatment adherence. This is particularly disheartening because IHS has particularly well-developed diabetes care programs. Racism and cultural insensitivity have no place in a healthcare setting that is already underused. As such, it will be vital for medical providers to step outside their own worldviews and begin to view healthcare from an indigenous perspective, including the unique sociohistorical context that surrounds health disparities in Indian Country. In order to step into the culture being treated, these providers will need to work to tread lightly as they establish themselves as safe and trusted community resources. This will involve losing defensive, accusatory, or judgmental attitudes.

Finally, although it is easy to lose sight of the successes in ameliorating the diabetes epidemic in Indian Country, we must recognize and embrace those areas and interventions that are producing demonstrable results in the everyday lives of AI/ANs with diabetes. The Special Diabetes Program for Indians should be used as a model towards producing equally effective interventions in local communities. Importantly, the SDPI-DP program demonstrates that progress can be made, especially when initiated from higher governmental systems. In addition, the SDPI-DP program shows that increased allocation of resources translates to real benefits.

Asthma

Asthma, a chronic inflammatory disorder of the lungs' airways, results in obstruction of normal airflow and hyperreactivity of the bronchi. This leads to the characteristic symptoms of wheezing, coughing, dyspnea, and chest tightness (Mancuso et al., 2001; NHLBI, 2020).

Asthma in the General Population. Based on 2002-2003 data from the World Health Survey (To et al., 2012), the global prevalence of physician-diagnosed asthma was estimated at 4.3% in a large sample (N = 178,215) of adults aged 18 to 45 years old from 70 countries. The 2015 Global Burden of Disease Study (Soriano et al., 2017) found asthma to be the most widespread chronic respiratory disease in the world with 358,190,000 cases, which was nearly twice as many as the 174,483,000 cases of chronic obstructive pulmonary disease (COPD). The 2016 GBD Study (Vos et al., 2017), which examined data from 195 countries and territories, found that approximately 339.4 million people in the world had asthma. This represented an incidence rate of 75.4 million cases and a 3.6% increase in age-standardized prevalence since data were last collected in 2006. Most recently, GBD data from 1990 to 2017 (Soriano et al., 2020) showed asthma prevalence had decreased overall from 3.91% to 3.57%, making it the second most prevalent respiratory disease behind COPD. Nonetheless, the global burden of asthma is undeniable. Asthma is the 16th leading cause of years lived with disability and the 28th leading cause of disease burden worldwide (Global Asthma Network, 2018; Hay et al., 2017).

The absolute growth in global asthma cases is also in line with the increasing asthma prevalence rates that were seen in children and adults in the United States over the past several decades (Akinbami et al., 2009, 2011, 2012; Akinbami & Schoendorf, 2002; Mannino et al., 2002; Moorman et al., 2012). In 2018, an estimated 24.8 million Americans had asthma (CDC, 2020b), representing a current national prevalence rate of 7.7% (adults: 77.7%; children: 22.3%).

Despite asthma primarily being diagnosed in childhood, asthma is known to develop in individuals at any point across the lifespan. In the 2018 Global Asthma Report (Global Asthma Network, 2018), a bimodal distribution was observed in which children and older adults were the two most negatively impacted age groups. Similarly, two distinct peaks were also observed in the BRFSS Asthma Call Back Study (Winer et al., 2012). In data from 2006 to 2008, children had an annual asthma incidence rate that was 3.3 times greater than adults (12.5/1000 vs. 3.8/1000). Among children, incidence decreased with increasing age: 0-4 (23.4/1000), 5-11 (11.1/1000), and 12-17 (4.4./1000). This initial peak was clearly separated by adults between the ages of 18 and 54 (18-34: 4.0/1000, 35-44: 4.0/1000, 45-54: 3.6/1000). The next peak occurred in the two oldest age groups, with adults between 55 and 64 having the highest incidence rate (4.6/1000) followed by those 65 or older (3.1/1000).

Overall, estimates suggest that between 3.6% and 13% of older adults have asthma (e.g., CDC, 2020b; de Roos et al., 2018; Gibson et al., 2010; Krauskopf et al., 2013). Furthermore, studies have shown that approximately 33% to 46.7% of older adults developed their asthma after the age of 40 (Baptist et al., 2018; de Roos et al., 2018; Kankaanranta et al., 2017; Sood et al., 2013). Taken together, these findings demonstrate that the diagnosis of asthma is clearly not limited to childhood and that late-onset asthma occurs regularly. However, compared to children, adult asthma tends to be underdiagnosed and is often not optimally treated (Enright et al., 1999). For example, nearly half of elderly adults with asthma remain undiagnosed (Enright et al., 1999). This is especially concerning given that asthma-related mortality has been shown to progressively increase with age (Kochanek et al., 2019). Furthermore, compared to early-onset asthma, late-onset asthma is generally considered more severe and more difficult to treat (Ulrik, 2017). In addition to facing normative declines in lung function that occur as a natural result of old age (Sharma & Goodwin, 2006), older persons with asthma must also deal with how the aging process influences the diagnosis, expression, and treatment of asthma. This leads to the disease burden worsening with age (Global Asthma Network, 2018). In the 2018 Global Asthma Report, adults between 30 and 34 years old had the lowest burden. Among younger age groups, those between 10-14 years had the highest amount of burden, albeit at levels that were far lower than older adults. Among older adults, disease burden begins rising around age 50, substantially increases between the ages of 60 and 74, and then peaks around age 75 to 79.

Importantly, research is beginning to show that asthma in middle-aged and older adults can be qualitatively different from asthma in children, which is evidenced by key differences in diagnosis, risk factors, prognosis, symptom frequency, environmental triggers, underlying mechanisms, comorbid illnesses, occurrence of poor outcomes, and treatment effectiveness (Baptist & Busse, 2018; de Roos et al., 2018; Gibson et al., 2010; Krauskopf, 2013; Westerhof et al., 2018). In addition to these age differences, there is further heterogeneity in how asthma presents among older adults. Baptist et al. (2018) observed four distinct phenotypes among a diverse population of older adults that were defined by (a) diagnosis of asthma after age 40 with the shortest duration of illness, (b) mildest asthma, lowest comorbidity burden, and highest quality of life, (c) earlier age of onset and longest duration of illness, and (d) most severe asthma, lowest quality of life, and highest comorbidity burden. As such, key differences between subgroups, including symptom profiles, levels of severity, onset, and treatment response, have clear implications for the identification and management of asthma in later life.

Older adults face numerous age-specific challenges related to asthma. For example, asthma symptoms may be mistakenly attributed to other medical conditions such as COPD, chronic bronchitis, emphysema, gastroesophageal reflux, or the long-term effects of smoking (Baptist & Busse, 2018; Quadrelli et al., 2001). Asthma COPD overlap (ACO), where both conditions occur simultaneously, becomes more established after age 65 (Gibson & Simpson, 2009; Woodruff et al., 2017). Additionally, older adults may not display the same symptoms as younger individuals and are more likely to report fatigue as a primary complaint (Baptist et al., 2010). Further masking the diagnosis of asthma, dyspnea may not be readily apparent to older adults because they may take active efforts to avoid physical exertion or attribute difficulty breathing to normal age-related declines in lung functioning (Battaglia et al., 2016). Objective measures of lung functioning like peak expiratory flow and spirometry are also affected by the aging process, as physical limitations or medication responsiveness can confound the accuracy of diagnostic readings (e.g., Bellia et al., 2000). Unfortunately, despite their obvious utility, these keystone diagnostic techniques are generally underused in older adults (Baptist & Busse, 2018).

Baptist and Busse (2018) described how older adults in general represent a “more-difficult-to-control phenotype” (p. 765). This is especially true if asthma develops in adulthood rather than childhood. Adult-onset asthma (i.e., after age 40) is characterized by more frequent attacks, more severe symptoms, and faster declines in lung function (de Nijs et al., 2013). Adult-onset asthma also tends to be non-atopic, meaning it is triggered by physical exertion rather than allergens. Atopic asthma has a more favorable prognosis as it decreases naturally with age and the removal of allergens (Baptist et al., 2013). Age-related physical and cognitive declines can further complicate the ability to effectively use asthma medications. It has been shown that good inhaler technique declines with age due to loss of fine motor skills, vision changes, and compromised respiratory functioning (Wieshammer & Dreyhaupt, 2008). It is recommended that elderly persons with asthma receive clear instructions or have direct supervision to ensure proper inhaler use (Rabell-Santacana et al., 2008), especially when concerns about patients' cognitive capacity are present (Allen et al., 2009). Additionally, side-effects from medications may not be tolerated as well in some and certain medications may be completely contraindicated due to other comorbid health conditions (Gillman & Douglass, 2012; Goeman & Douglass, 2005).

Finally, higher rates of comorbidity with other physical or mental health conditions are another key area in which asthma manifests differently in older adults. For example, Su et al. (2016) conducted a recent meta-analysis of 11 studies (*N* = 443,948) comparing individuals with and without asthma. The authors found that asthma was associated with significantly greater odds of the following physical health conditions: other respiratory conditions (*OR* = 5.60), stomach/urinary disease (*OR* = 1.91), cardiovascular disease (*OR* = 1.90), hypertension *(OR* = 1.66), metabolic/endocrine disease (*OR* = 1.60), obesity (*OR* = 1.51), cerebrovascular disease (*OR* = 1.44), diabetes *(OR* =1.25), and cancer (*OR* =1.17). Overall, those with asthma and other comorbid conditions are less likely to have their asthma under control, more likely to have a more diminished quality of life, have more activity limitations, and utilize more health care services; they are also more likely to have treatment of their asthma deprioritized in favor of the treatment of their other conditions (Baptist & Busse, 2018; Gershon et al., 2012). de Roos et al. (2018) observed how the negative impact of having comorbid health conditions accumulates over time and increases the overall disease burden of asthma. Undoubtedly, the higher the burden of asthma, the more likely there is to be negative repercussions for mental health. This is clearly reflected in the Su et al. (2016) meta-analysis where asthma was found to be associated with a 62% higher chance of having psychiatric comorbidities such as anxiety and depression.

Links Between Asthma and Depression. There appears to be a clear connection between having asthma and the development of mental health disorders. Historically, the link between psychological factors and asthma has long been recognized.[5] More contemporary research (e.g., Lehrer et al., 2002) has shown that emotional states can directly affect the stability of the lung's airways, thereby causing or aggravating asthma symptoms. Frequent mental distress (FMD), defined as 14 or more days of self-reported mental distress in the past month, is widespread among people with asthma. For example, Strine et al. (2004) reported that 18.8% of adults from the 2001 BRFSS had reported FMD. Compared to those without asthma, those with asthma had significantly more activity limitations (41.9% vs. 7.4%), higher physical distress (44.3% vs. 16.3%), and had a greater likelihood of reporting fair or poor health status (55.6% vs. 26.0%). FMD was also associated with greater odds of health risk behaviors or statuses, including physical inactivity (*OR* = 2.3), obesity (*OR* = 1.5), and smoking (*OR* = 2.3). Notably, those with FMD were more likely to engage in two or more of these adverse behaviors (*OR* = 1.9). Overall, given the link between general mental distress and asthma, it is not surprising that depression also occurs much more frequently in individuals with asthma.

In a large cross-national population-based survey (World Mental Health Survey) involving 85,088 participants across 17 countries, Scott et al. (2007) found that asthma was associated with significantly increased odds of developing depression (*OR* = 1.6), anxiety disorders (*OR* = 1.5), and alcohol use disorders (*OR* = 1.7). Likewise, in data from the 2002 World Health Survey (Loerbroks et al., 2012), the association between asthma or wheezing and

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[5] In the 1930s and 1950s, asthma was seen as one of the "holy seven" psychosomatic illnesses (Dunbar, 1947). It was believed to be psychological in origin and was treated through psychoanalysis (Opolski & Wilson, 2005).

major depressive episodes was observed to be much higher (*OR* = 2.37) in a sample of 245,727 adults from 57 countries. Similar results were seen in the United States with the 2006 BRFSS (Strine et al., 2008), which involved a large sample (*N* = 217,379) of adults surveyed from 41 U.S. states and territories. BRFSS participants with asthma evidenced greater odds of having either a lifetime diagnosis of depression (*OR* = 2.3) or anxiety (*OR* = 2.2). In addition, those with asthma had a 180% greater chance of having probable major depression (*OR* = 2.8) as assessed by the Patient Health Questionnaire (i.e., PHQ ≥ 10; Kroenke & Spitzer, 2002). Despite the strength of association varying by region and country, the link between asthma and depression remained consistent, demonstrating the increased likelihood for depression-asthma comorbidity.

Although studies have attempted to ascertain the incidence and prevalence of depression in individuals with asthma, there is variability between studies based on the population surveyed and the instruments used to measure depression. In a large case-control study of primary care patients in the UK (*N* =22,250), Walters et al. (2011) found a depression incidence rate of 22.5 per 1000 for patients with asthma (compared to 13.8 per 1000 for patients without asthma). This resulted in an incident rate ratio (RR) of 1.59. An examination of CES-D (Center for Epidemiologic Studies Depression Scale; Radloff, 1977) scores from 14,621 middle-aged and older adults from the Netherlands (de Roos et al., 2018) revealed a significant difference (*OR* = 2.23) in depression rates between participants with asthma (20.3%) and without asthma (9.5%). Krauskopf et al. (2013) examined inner-city outpatients 60 years or older (*N* = 317) and found that 17% of those with asthma had probable major depression (as indexed by the PHQ-9). Using the Quick Inventory of Depressive Symptomatology (QIDS; Rush et al., 2003), Akula et al. (2018) found that an asthma diagnosis was associated with an increased risk for current moderate or severe depressive symptoms (*OR* = 1.586). Finally, following a systematic review of the literature, Opolski and Wilson (2005) found that the rates of concurrent depression and asthma ranged as high as 45%. Despite the wide variability in prevalence rates between studies, asthma and depression clearly work synergistically to worsen both physical and mental health outcomes.

Impact on Health-Related Quality of Life (HRQOL). One area in which asthma has been clearly shown to negatively impact those with asthma is through its impact on health-related quality of life. Ford et al. (2003) analyzed BRFSS data from 2000 (N = 163,773) and found that asthma was associated with negative outcomes on four indices of HRQOL. Compared to those without asthma, the authors found that participants with asthma had significantly higher odds of experiencing 14 or more days within the past 30 days with activity limitations (OR = 1.96), mentally unhealthy days (OR = 1.55), and physically unhealthy days (OR = 2.26). In addition, those with asthma also had greater odds of rating their health status as fair or poor (OR = 2.41). Notably, these results were consistent across all ages, sexes, and all racial ethnic groups.

In Sullivan et al. (2013), those with asthma not only had impaired HRQOL, but the effect on HRQOL was more pronounced for those who had an asthma attack in the past 12 months and/or used short-acting relief inhalers. This effect worsened with the use of additional inhalers. As such, more severe asthma appears especially detrimental to HRQOL. However, the link between asthma severity and quality of life does not appear to be a linear process, as even mild cases of asthma can significantly affect HRQOL (Juniper, 1999). In their review, Opolski and Wilson (2005) found that subjective perceptions of severity were more predictive of depression than objective measures of lung functioning. They reasoned that an individual’s perception of their symptom severity is more influential to the development of depression. Other studies (e.g., Lavoie et al., 2006; Mancuso et al., 2000; Mangold et al., 2018) suggest that asthma severity and depression may be indirectly mediated through asthma control. Yonas et al. (2013) proposed that the level of uncontrolled asthma and disease burden must reach a “threshold” before depression starts to develop. Nonetheless, research has shown that both severe and uncontrolled asthma represent distinct challenges and have important implications for treating comorbid depression.

Impact on Treatment Adherence and Effectiveness. The presence of comorbid depression is associated with a host of poor medical outcomes for asthma patients, including increased asthma severity, less asthma control, less allergen avoidance, inconsistent medication use, increased health care utilization, reduced asthma-specific knowledge, less asthma self-efficacy, less acceptance of asthma-related limitations, greater rates of hospitalizations, greater use of ER services, greater use of rescue medications, greater use of controller medications, inaccurate asthma symptom perception, more asthma exacerbations, poor asthma-specific quality of life, poorer physical health status, reduced ability to detect worsening symptoms, psychiatric comorbidities, unrealistic treatment expectations, and increased mortality (Baiardini et al., 2006; Eisner et al., 2005; Kullowatz et al., 2007; Lavoie et al., 2005, 2006; Lehrer et al., 2002; Mancuso et al., 2000, 2001, 2008; Mangold et al., 2018; Opolski & Wilson, 2005).

The capacity for depression to worsen asthma outcomes is particularly evident in its ability to disrupt self-management behaviors and compromise treatment adherence (Baptist & Busse, 2018; Patel et al., 2017; Ross et al., 2013). At the simplest level, depression can achieve this directly through its characteristic symptoms of low mood, anhedonia, fatigue, hopelessness, isolation, and diminished concentration or decision making (Opolski & Wilson, 2005). Importantly, the association of depression and asthma is not uniform and appears to impact specific symptoms more than others (Opolski & Wilson, 2005), especially dyspnea, nocturnal awakenings, and early morning symptoms (Goldney et al., 2003). Unfortunately, both dyspnea and night symptoms occur more often in elderly adults. Research has also shown that older adults are more vulnerable to the comorbidity of asthma and depression. In Patel et al. (2017), older adults with both conditions were found to be twice as likely to have more ER/urgent care visits, asthma episodes, activity limitations, and reduced HRQOL than those without depression.

Asthma in Indian Country. From an historical perspective, respiratory infections (e.g., tuberculosis and pneumonia) once accounted for the majority of respiratory-related deaths among American Indians (Jones, 2006; Rhoades, 1990). This is consistent with the large-scale depopulation observed in AI populations due to exposure to novel diseases that did not exist prior to pre-European contact (Cook, 2004). However, in the current era, chronic lung conditions are now coming to the forefront as key sources of morbidity and mortality for AI/ANs.

Prior to 1975, the research literature on asthma in AI/ANs was scarce and regularly concluded that asthma rarely occurred in Indian Country (Herxheimer, 1964; Mannino et al., 1998; Singleton et al., 2006; Slocum et al., 1975). However, as new research emerged in the 1980s and 1990s (e.g., Hisnanick et al., 1994; Kramer, 1992; Rhoades, 1990; Sly, 1988), asthma finally became recognized as a significant problem among AI/ANs. Nonetheless, these studies had determined that although asthma cases were rising in AI/AN communities, the prevalence of asthma for AI/ANs was still relatively lower than that of the general U.S. population.

More recently, in line with trends that have shown a progressive rise in child and adult asthma cases in the general U.S. population over the past several decades (Akinbami et al., 2009, 2012), asthma prevalence in Indian Country has steadily climbed over time and is now either worse or at least equal to the general prevalence in the United States (Gessner & Neeno, 2005; Mannino et al., 2002; Stout et al., 1999). When separated by race and ethnicity, the current CDC (2020b) estimate for asthma prevalence is 10.5% for AI/AN adults (18+) and 10.2% for AI/AN youth. This is much higher than the CDC (2020) national asthma prevalence rate (7.7%).

Comparatively, the AI/AN prevalence rate is among the highest out of all U.S. racial groups: Asian Americans (4.7%), Hispanics (6.0%), Whites (8.2%), and Blacks (9.6%).

Notwithstanding, the available data are still conflicting, with some studies reporting both lower and higher estimates of asthma for AI/ANs. For example, Dixon et al. (2007) performed secondary analyses on the third wave of the Strong Heart Study that were collected between 1996 and 1999. The authors found that in a large sample (*N* = 3,197) of AI adults over the age of 50, a diagnosis of asthma by a physician occurred in 6.3% of the cases, and at least 4% had "probable" asthma. In contrast, Law et al. (2011) examined the 2001-2009 NHIS for racial and ethnic group differences and found that 11.3% of AI/ANs had asthma. In fact, AI/ANs had higher prevalence rates than all other groups in that study (African Americans = 7.9%, Hispanics = 4.1%, and Asian Americans = 4.0%), with the exception of Puerto Ricans (13.4%). An even higher estimate was reported in Orell et al. (2011). In their analysis of data from the Education and Research Towards Health (EARTH) study (*N* = 3,828), the adjusted life prevalence rate for asthma in AI/ANs was 15.4% (compared to a general rate of 11.0%).

Gender disparities generally exist for women in terms of asthma incidence, prevalence, and severity (Fuseini & Newcomb, 2017; Zein & Erzurum, 2015). In the SHS (Dixon et al., 2007), gender differences occurred in both physician-diagnosed (women, 8.2%; men: 3.2%) and probable asthma (women, 5.2%; men, 2.9%) groups. In this study, disease severity was particularly high. Based on National Asthma Education and Prevention Program guidelines (NAEPP; National Institutes of Health [NIH], 1997) guidelines, 52% of the diagnosed and 21% of the probable groups had symptoms serious and persistent enough to be classified as severe. In addition to being higher than a comparative U.S. sample, Orell et al. (2011) reported that age-adjusted lifetime prevalence rates were higher in AI/AN women (19.2%) than men (11.0%).

Asthma Across the Lifespan. For AI/ANs, the increased risk for asthma originates in early childhood and continues throughout the lifespan. Remarkably, asthma disparities appear to emerge as early as infancy. It has been suggested that elevated rates of lower respiratory tract infections (LRTIs), bronchiolitis, and respiratory syncytial virus (RSV) account for the markedly higher asthma prevalence seen in AI/AN infants (Liu et al., 2000; Lowther et al., 2000; Peck et al., 2005; Singleton et al., 1995, 2003). In addition, estimates for the occurrence of early-onset asthma are consistently higher among AI/AN children. For example, Gossman (2008) examined data between 1997 to 2003 from the NHIS and found that AI/AN children had a 37% increased risk for developing asthma (*OR* = 1.37) compared to non-Hispanic whites. Similarly, Akinbami et al. (2012) reported a 9.4% prevalence rate of for AI/AN children (compared to 7.7% for a non-Hispanic white reference group). According to 2018 data from the National Center for Health Statistics (NCHS, 2018), 17.8% of AI/AN children were reported by their caregivers as ever having asthma. This was higher than the general U.S. population (11.6%) and most other single race populations (Hispanic: 12.5%, White: 10.1%, and Asian Americans: 8.2%), with the exception of African Americans (18.0%). Notably, among those endorsing two or more races, 26.5% of children who identified as both AI/AN and White were reported as having asthma.

Healthcare Management. The health disparity for asthma in Indian Country is reflected in hospitalization rates. Using Indian Health Service data from 2003 to 2011, Mehal et al. (2014) found that the highest rates of asthma-related hospitalizations for AI/ANs occurred in infants and children between the ages of one to four. In Singleton et al. (2006), the hospitalization rate for AI/AN children (i.e., 1-19 years old) was lower than the general U.S. population between 2000 to 2002. However, hospitalizations for AI/AN infants were higher than the general population during this same period and had increased by 28.2% between 1988-1990 and 2000-2002.

Notably, there is similar evidence from older AI/ANs showing that hospitalization rates are declining in general, even though prevalence rates are comparatively higher for older AI/ANs (Singleton et al., 2006). Historically, asthma hospitalization rates for AI/ANs began to decline in the 1980s alongside general declines that were observed in the U.S. population. Paradoxically, this reduction occurred despite asthma being more prevalent in AI/ANs. More recently, between 2003-2005 to 2009-2011, the age-adjusted hospitalization rate was much lower for AI/ANs (7.6 per 10,000) compared to the general U.S. population (13.2 per 10,000). In addition, the average annual hospitalization rate decreased significantly by 32% during this time span, which is a drastically greater reduction compared to the 11% reduction observed in the general population.

Concerningly, the extant research reveals a consistent trend in which AI/ANs with asthma, particularly younger AI/ANs, are not receiving or using standard treatment regimens for asthma. In Van Sickle and Wright (2001), despite bronchodilator use being reported in 97% of 22 Navajo families ($N = 29$), none of the participants were currently using oral steroids (although 34.5% had used these medications in the past). Among physician-diagnosed cases of asthma ($N = 3{,}197$) in the SHS (Dixon, et al., 2007), only 58% were using short-acting β-agonists (i.e., bronchodilators), either daily or as needed. Even more dramatically, only 3% reported the use of daily inhaled corticosteroids. In a north-central South Dakota AI community, Kinghorn et al. (2019) found low rates of medication use among 108 AI children with asthma. Although the majority (52.8%) used bronchodilators, only 13% used inhaled corticosteroids. Furthermore, a large proportion (23.2%) reported being non-adherent to treatment recommendations, either due to feeling the medication was not needed, was ineffective, and/or because of side effect concerns. Given the low utilization of these crucial medications, it is not unexpected that 47% had poorly controlled asthma (i.e., ACT less than 20). Overall, these findings are highly alarming, especially since these medications are frontline treatments for controlling asthma and have clear benefits such as reduced exacerbations, enhanced lung function, less reliance on rescue inhalers, and reduced use of medical care (e.g., Gessner & Neeno, 2005).

Thus, there are clear implications in urging parents and/or guardians to ensure that their children follow their prescribed treatment regimen. In one study (Van Sickle & Wright, 2001), 80% of AI children had assumed responsibility for their medications, which had a detrimental effect on compliance and increased negative outcomes (e.g., ER visits: 79%, hospital admissions: 57%). Furthermore, Van Sickle and Wright (2001) observed that many families prematurely stopped medications after symptoms initially improved, had tried to “wean” their children off asthma medications because they did not want them to become reliant on them, did not initiate medical treatment until their children presented to the ER, and mistakenly believed nebulizer treatments at the ER were the most effective treatment. As these examples illustrate, active parental involvement and reinforcement of treatment compliance are crucial in preventing suboptimal treatment. Based on the results of these studies, children should be supervised early on to help establish maximum compliance, and over time, can slowly be put in charge of their own treatment as they demonstrate increased responsibility and independence. Importantly, education regarding the chronic nature of asthma, importance of medications, and current best practices can ensure that parents will support and not mistakenly disrupt their child’s treatment.

Environmental Hazards. It is essential to understand the role that the environmental circumstances of American Indian communities play into the predisposition to, maintenance of, and exacerbation of asthma. In terms of asthma triggers, environmental factors such as mold, wood-burning stoves, and second-hand smoke were discussed frequently by community focus group participants in Rodehorst-Weber et al. (2009). Although these factors may not be limited to AI/AN groups, they may be more widespread in AI/AN communities due to associated environmental issues such as substandard housing and poor living conditions (Pacheco et al., 2015), overreliance on wood heat (Lewis et al., 2004; Ward et al., 2011), and the highest rates of smoking tobacco in the U.S. (Bloom et al., 2010). It appears that children are disproportionately impacted by environmental asthma risks, especially because their immune systems are still developing, they have a higher respiratory rate than adults, and their airways are narrower (Etzel, 2007; Lowe et al., 2018). Risk factors for AI/AN children were identified in a recent literature review and were separated into indoor air quality and outdoor exposures (Lowe et al., 2018). In terms of indoor risks, AI/AN children experience more exposure to smoke from wood burning, secondhand tobacco smoke, and indoor allergens such as mold, pest infestations, and domestic animals. Outdoor risk factors included diesel exhaust, coal-fired power plants, mining operations, other toxic air pollutants, dust storms, and wildfires. Although this study focused on risk factors for Navajo children, it is highly likely these risks can be found in other tribal groups.

The use of woodstoves appears to be especially problematic. Burning wood produces many toxins (Naeher et al., 2007), including carbon monoxide, nitrogen, organic carbons, and particulate matter (PM). In addition, the poor indoor air quality associated with wood stoves increases rates of lower respiratory tract infections (LRTIs), which are known to predispose and exacerbate cases of asthma (Mehal et al. 2014; Morris et al., 1990; Robin et al., 1996). In terms of indoor cooking, research has shown that the traditional role of women as housekeepers may place them at greater risk than men (Po et al., 2011). As such, their children may subsequently face greater exposure if cultural practices keep them in close proximity to their mothers. Overall, for AI/ANs, the negative effects of wood stoves are highly concerning given that electrical/gas heat may not be available, is cost prohibitive, or wood burning is necessitated due to poverty.

Non-Quantitative Research. Qualitative research has been essential in identifying AI/AN-specific aspects of asthma that are often overlooked through traditional quantitative studies. For example, thematic analysis in one instructive study was used to analyze focus group discussions with 22 health care professionals in 5 Mi’kmaq communities (Castleden et al., 2016). These focus groups were helpful in showing that there was a general lack of awareness among professionals and the general community that asthma is a health priority or that families need outside support and resources. This insight makes sense given that most community resources were invested in higher priority concerns (e.g., obesity, diabetes, suicide), often to the detriment of focusing on asthma. In addition, the participants were also able to learn that school policies may put some students at increased risk for worsening their symptoms, that some students were reluctant to disclose their condition, and that educating the entire student population was necessary in order to fully support students with asthma. In terms of health centers, focus group participants identified challenges to providing community-based support and education services and formulated innovative strategies to ensure greater success in the future (e.g., making them culturally-relevant, using hands-on activities, and providing transportation and childcare).

In another qualitative study, Van Sickle et al. (2003) examined the culturally-based etiologies of asthma, use of traditional medicine, and barriers to contemporary treatment approaches among the Navajo. The authors found that the Navajo believed diseases are more often defined by their causes and not their symptoms. In turn, by removing obstacles to health and engaging in corrective traditional ceremonies, the body is expected to heal itself naturally. The authors also found that practical restraints, availability of healers, exposure to traditional belief systems, ideological conflicts, concerns about effectiveness, and the underlying cause of asthma often determined if traditional practices were used. However, participants largely saw the use of both approaches as complementary, with each addressing different aspects of the disease. Biomedical approaches were seen as key to providing immediate relief for acute episodes, whereas traditional approaches were focused more on decreasing vulnerability to asthma by targeting underlying spiritual issues, enhancing well-being, and increasing quality-of-life. As these two studies demonstrate, novel approaches to researching asthma in Indian Country can lead to powerful insights that might otherwise go unnoticed. They can also facilitate seeing asthma from an Indigenous worldview and identify potentially novel areas for intervention.

Summary of Asthma. Although it is commonly believed that asthma originates in childhood and naturally resolves itself over time, the research literature has shown this is simply untrue. Given that asthma frequently occurs in later life, it is incorrect to conceptualize asthma as simply “persisting” past childhood. By looking at asthma across the entire lifespan, there will be a greater chance for treating asthma early on and preventing it from progressing to worse outcomes in adulthood. This is especially true for AI/ANs, who have a clear disadvantage in that asthma disparities emerge early on in infancy and childhood. The failure to correctly diagnose asthma in childhood has a cascading effect for AI/ANs throughout the course of their lifetimes, especially in later life. Much work needs to be done to make sure that AI/AN children receive proper medications and use them as directed. This should minimize negative impacts across the lifespan. For individuals who develop asthma in early adulthood or older age, the focus will be on preventing the worsening of their asthma, reinforcing treatment adherence, and ensuring their physical and mental quality of life remains intact despite the hardships of having asthma.

Although asthma cannot be prevented, it can be expected that with appropriate medical treatment and sufficient adherence, most individuals with asthma can remain symptom free and avoid negative outcomes such as ER visits and hospitalizations (CDC, 2019b). In other words, poor outcomes from asthma can be almost entirely prevented. This is a crucial point to highlight in psychoeducation as individuals who have greater control over their asthma can be expected to have more positive outcomes (Law et al., 2011). With proper education regarding the lifelong nature of asthma, and by emphasizing the importance of continued management over the course of their span, AI/ANs with asthma will be better prepared to manage their condition, engage with care providers, receive appropriate medical resources, and improve their overall health status.

The rurality of AI/AN reservations (Housing Assistance Council, 2010) can have a double-edged effect. Although there may be reduced access to asthma specialists, the presence of IHS hospitals and tribal health clinics can translate to easier access to routine screening, continuity of care with medical providers, and can offset the financial burden associated with ensuring access to asthma medications. Importantly, the detection of depression in those with asthma can be prevented or caught early through increased contact with primary care providers.

Walters et al., 2011). Despite the limitations of using IHS as a sole source of healthcare, many underprivileged individuals can at least have a foundation for asthma management. With IHS, an increased awareness of the unique challenges faced by AI/ANs with asthma (especially older adults) will be essential in ensuring a culturally sensitive and competent medical response.

Given the critical role in correcting identifying asthma cases in Indian Country, adapting and culturally-vetting commonly used assessment measures will help increase the effectiveness of detecting AI/ANs with significant symptoms that require further medical testing and/or treatment. For example, the Asthma Quality of Life Questionnaire – Marks (AQLQ-M; Marks et al., 1992) was used by Gupchup and colleagues (2001) as the foundation for constructing the Asthma-Specific Quality of Life Questionnaire for Native American Adults (AQLQ-NAA). In addition to ensuring cultural validity, the adaptation of mainstream measures lends itself towards developing key insights into the unique challenges of asthma in Indian Country. In the development of the AQLQ-NAA, the researchers observed that social, community, and cultural activities were highly valued and held more weight in determining quality of life when these activities were disrupted by asthma. This led the authors to develop a new domain called Community and Social Restrictions (CSR) in order to better capture the importance that the AI focus group had placed on community- and social-valued activities.

As research has shown, asthma in Indian Country occurs in the larger context of social inequalities, with the physical environments in which AI/ANs live often reflecting these imbalances. In addition to asthma being directly targeted through medical interventions, public health interventions can indirectly lead to positive benefits for those with asthma, especially children. The review by Lowe et al. (2018) has been especially helpful in providing insightful public health recommendations. In terms of lessening the negative impact related to woodburning, the authors suggest switching out older or damaged stoves with EPA-certified stoves through exchange programs and by promoting best burning practices (i.e., avoiding coal as a fuel source, not burning wet wood, and using wood that produces less smoke and burns more efficiently). Additionally, specifically targeting homes that do not have electricity can help lessen the reliance on wood burning for cooking and heat. Although not mentioned in the review, it makes sense that increasing local and federal funding for programs such as Low-Income Energy Assistance Program (LIEAP) will be beneficial. Additionally, LIEAP and similar programs are known for winterproofing homes, thereby making homes more heat efficient.

Similar interventions have been proposed (e.g., Lowe et al., 2018; Upton, 2018) to offset the hazards of other modifiable environmental risks such as diesel exposure, allergens, and tobacco use. These proposals include paving roads, investing in more fuel-efficient buses, limiting idling times by buses, building closer schools, providing air filtration units, renovating homes with poor living conditions, building new housing units, reducing secondhand smoke, reducing indoor allergens, removing mold from homes, and curtailing exposure to rodents to prevent hantavirus. Although these interventions are focused largely on modifiable risk factors, other environmental factors are going to take more resources and ingenuity to find solutions. For example, investment in solar and wind technologies can be used to phase out environmentally unsafe practices such as coal-burning plants and other sources of air pollution (Upton, 2018).

Larger-scale undertakings are going to require considerable infrastructure and financial support, most likely with extensive assistance and guidance from U.S. federal agencies. Nonetheless, local tribal governments can begin to initiate these projects on their own when feasible. Overall, as these proposals begin to take hold in AI/AN communities, there will be less opportunity for these environmental challenges to worsen current symptoms of asthma or cause novel cases of asthma in vulnerable individuals. Despite the necessity of directly targeting older individuals, it is only in addressing these root causes and environmental concerns that the burden of asthma can truly be reduced in Indian Country. Ultimately, to reduce the burden seen among AI/AN elders, we must prioritize our current resources towards making sure future cases of asthma are not allowed to keep rising. It is only by focusing on future generations that progress will be made in reducing the number of forthcoming AI/AN older adults with asthma.

Arthritis

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS, 2017) defines arthritis as any condition that affects the joints. Although arthritis typically refers to joint inflammation, NIAMS highlights that joint inflammation by itself is a symptom and not a specific diagnosis. Overall, the broad term arthritis includes a large collection of separate conditions, including (but not limited to) osteoarthritis, rheumatoid arthritis, juvenile arthritis, fibromyalgia, gout, reactive arthritis, psoriatic arthritis, and ankylosing spondylitis. For the purposes of the current review of literature, the primary focus will be on osteoarthritis and rheumatoid arthritis, although many studies often do not differentiate between these arthritides.

According to the CDC (2020a), osteoarthritis (OA), the most common form of arthritis, is caused by the breakdown of cartilage between bones and eventual changes in bone structure. Osteoarthritis is commonly referred to as degenerative joint disease, reflecting the fact that is typically caused by extensive wear and tear of joints or the result of previous injuries. OA tends to occur more often with advancing age. In contrast, rheumatoid arthritis (RA) is the result of inflammation caused by the body’s natural autoimmune response. Because RA involves a systematic process, more joints are affected in RA than OA, and it tends to cycle between acute flare ups interspersed with periods of remission. General arthritic symptoms include aches, heat, pain, redness, stiffness, swelling, and tenderness. However, RA more often involves deformity, fever, fatigue, weakness, and weight loss. Importantly, RA also begins earlier in life than OA, with an average onset between the ages of 20 and 40 (WHO, 2020a).

Arthritis in the General Population. Although arthritis is frequently assumed to begin developing at the end of one’s lifespan, approximately 3 out of 5 people with arthritis are under the age of 65 (Global RA Network, 2020). The World Health Organization (2020a) reported that among adults over the age of 60, approximately 18.0% of women and 9.6% of men have OA globally. RA prevalence was reported to vary between 0.3% and 1% of men and women. Notably, women are disproportionately affected by both OA and RA compared to men.

The 2004 Global Burden of Disease (WHO, 2004) estimated that 151.4 million people are affected by osteoarthritis globally and 23.7 million have rheumatoid arthritis. There were considerable regional differences in OA and RA prevalence. The highest numbers (in millions) of OA cases were found in the Western Pacific (45.0), Europe (40.2), East Asia (27.4), and the Americas (22.3). The lowest OA numbers occur in Africa (10.1) and the Eastern Mediterranean (6.0). For RA, the highest numbers of cases are found in Europe (6.2), Western Pacific (6.0), Americas (4.6), and East Asia (4.4). The lowest RA cases occur in the Eastern Mediterranean (1.3) and Africa (1.2) regions. Although these numbers do not account for relative population sizes, they demonstrate that arthritis is a considerable burden for many global residents.

In United States, between 2013 and 2015, there were 54.4 million cases of physician-diagnosed arthritis, with an estimated prevalence of 21.0% (Barbour et al., 2017). Notably, there is a significant gender difference, with arthritis being far more prevalent in U.S. women (23.5%) than men (18.1%). Broken down by age, 49.6% of arthritis cases were adults older than 65, 29.3% occurred in middle-aged adults (45 to 65), and 7.1% occurred in young adults (18 to 44). Overall, there is a clear upward trend in arthritis in the United States (Hootman et al., 2016), with an increase of 17.4% observed between 2004 (46 million) and 2014 (54 million). Alarmingly, arthritis is projected to continue rising, reaching approximately 62.7 million cases (24.1% prevalence rate) by 2020 and 78.4 million cases (25.9% prevalence rate) by 2045.

Recent NHIS data from 2013 to 2015 (Barbour et al., 2017) showed that a high proportion of U.S. adults with various health conditions were likely to have comorbid arthritis, including heart disease (49.3%), diabetes (47.1%), and obesity (30.6%). Correspondingly, individuals with arthritis were more likely to have higher rates of comorbid conditions than those without arthritis (heart disease: 36.4% vs. 19.1%; diabetes: 33.7% vs. 19.8%; and obesity: 27.7% vs. 18.1%). Strikingly, these numbers are even higher when not adjusted for age (heart disease: 49.3% vs. 19.2%, diabetes: 47.1% vs. 20.2%, and obesity: 30.6% vs. 19.5%).

Links Between Arthritis and Depression. Several recent meta-analyses have shed light on the depression risk associated with arthritis, especially among those with RA. Dickens et al. (2002) reviewed 12 studies (N = 2597) comparing healthy individuals to those with RA. The authors found that depression was more likely to occur in RA, with depression having a small to moderate effect size (r = .21, p < .0001). Stubbs et al. (2016) analyzed 49 studies (N = 15,855) comparing individuals with and without osteoarthritis. They found that those with OA had a 17% higher chance of having depression symptoms (RR = 1.17), with an overall pooled prevalence rate of 19.9%. Similarly, Matcham et al. (2013) examined the prevalence of depression in RA across 72 studies (N = 13,189). Altogether, the prevalence rates ranged from 0.04% to 66.3% between studies. However, using pooled estimates from studies that used clinical interviews, the authors found high prevalence rates for the DSM-IV diagnoses of major depression (16.8%) and dysthymic disorder (18.7%). Overall, a general estimate is that depression occurs at rates that are 2- to 3-fold higher in those with arthritis than those without (e.g., Lin, 2008; Shih et al., 2006).

Quality of Life and Disability. When depression co-occurs with arthritis, there is a clear additive effect on functioning and quality of life. Zhang et al. (2020) examined 7 studies (N = 1078) across multiple countries to determine how depression affects RA patients. Compared to those without depression, participants with both conditions had lower ratings of quality of life on all Short Form Health Survey (SF-36; Ware & Sherbourne, 1992) dimensions and higher ratings of disease activity in 28 joints. Joshi et al. (2015) examined data from the 2011 BRFSS to determine how comorbid depression negatively impacted the lives of persons with arthritis. Out of 167,068 respondents, 27.2% (n = 45,459) had depression. Overall, depression had a clear detrimental effect on physical functioning and quality of life. In addition to reporting more general activity limitations (OR = 2.35) and less engagement in physical activity (OR = 1.07), those with depression had greater social activity (*OR* = 1.65) and work-related (*OR* = 1.51) limitations. Comorbid depression was also associated with greater odds of reporting poor general health status (*OR* = 1.70), joint limitations (*OR* = 1.55), pain (*OR* = 1.44), and disability (*OR* = 1.41). Although the impact on physical HRQOL (*OR* = 1.59) was clear, the impact of depression was especially pronounced on mental HRQOL (*OR* = 6.23). This is consistent with previous studies showing that depression is the strongest predictor of mental HRQOL in persons with arthritis. For example, in Rupp et al. (2006), depression predicted mental HRQOL even more than disease activity, pain, and joint damage. Taken together, these findings show that depression is an especially potent predictor of HRQOL independent of the physical symptoms of arthritis.

Pain. One avenue by which depression manifests in arthritis is through pain. It has been shown that five years after the onset of RA, chronic pain was apparent in the vast majority (i.e., 80%) of patients (Andersson et al., 2013). In the Dickens et al. (2002) meta-analysis, the effect size of depression did not change significantly when controlling for age, sex, and socioeconomic status. However, this effect size changed linearly as a function of pain, suggesting that the increased depression seen in persons with arthritis is at least partially explained by the detrimental effects of pain. Although there is a clear link between depression and arthritis, in practice it can be difficult to tell when a person is depressed versus when their mood symptoms are a normal reaction to the painful symptoms of arthritis (Matcham et al. 2013). Additionally, somatic symptoms of depression such as appetite changes, sleep disturbance, and fatigue can be the direct effects of arthritis. In fact, the link between depression tends to be minimal in mild-to-moderate rheumatoid arthritis (Dickens et al., 2003), with the relationship between RA and psychological symptoms becoming more definitively established as arthritis severity increases (Mindham et al., 1981). Overall, it appears that depression is relatively independent of pain.

However, the influence of pain on the development of depression operates indirectly and is likely mediated through other processes such as fatigue and disability (Hawker et al., 2011).

Treatment Complications. The presence of comorbid depression is associated with multiple treatment complications and negative medical outcomes in those with arthritis. In addition to increased pain complaints and a higher need for pain medication, depression has been linked to poor adherence to medical treatment and taking medications as prescribed (e.g., Dickens et al., 2002; Sheehy et al., 2006; Taal et al., 1993). The increased burden of having both conditions also places a greater weight on the healthcare system, as these patients have more arthritis-related physician visits and more frequent hospitalizations (Sheehy et al., 2006). Importantly, depression appears to influence treatment primarily through its impact on patients' perceptions of their disease (e.g., Covic et al., 2006). Depressed persons with arthritis tend to view their conditions as more disabling, feel more hopeless about their conditions, and use more negative coping strategies (e.g., Murphy et al., 1999). As expected, these negative beliefs and expectations can lead to maladaptive coping, which in turn adversely influences health-seeking behaviors and leads to the underutilization of medical services (Dickens & Creed, 2001).

Inflammatory link. At a biological level, evidence has begun to accumulate showing that depression and RA are potentially linked by shared inflammatory processes (Howren et al., 2009). A meta-analysis by Liu et al. (2012) found significantly elevated levels of inflammatory cytokines in major depression patients, including tumor necrosis factor (TNF-α), interleukin (IL)-6, and soluble interleukin-2 receptors (sIL-2R). This hypothesis is further supported by studies demonstrating that treating inflammatory processes through pharmacological interventions is often accompanied by a corresponding decrease in depressive symptoms (e.g., Ma et al., 2016). Although this research is still in the early stages, a fuller understanding of the inflammatory processes underlying arthritis and depression can lead to novel approaches to understanding and treating both conditions. To the degree these processes are heritable, this line of inquiry may also help inform why arthritis is more prevalent in certain racial or ethnic groups.

Arthritis in Indian Country. Unlike other AI/ AN health disparities (e.g., diabetes, CVD), which are largely believed to the be the result of socio-politico-historical factors related to the transition from pre-contact to contemporary lifestyles, RA is largely considered to have originated in the "New World" (Rothschild et al., 1988, 1992; Rothschild & Woods, 1990).

Genetic Origins. This conclusion was based on paleontological evidence from 84 adult skeletons found in Alabama dated to around 3000-5000 years ago in the Late Archaic Period (Rothschild et al., 1988). Six of the skeletons had specific constellations of symmetrical bone erosion that are now known to be diagnostic of RA. Notably, most of these individuals had died between the ages of 30 to 45, which is consistent with the profile of RA. Given that there was no clear evidence of RA in Old World fossil records prior to 1785, the authors concluded that RA originated in the Americas and then became distributed worldwide. This contrasts with osteoarthritis, which had been found in Old and New World populations at least 4,000 years ago.

Further evidence to support this theory was produced by Rothschild and Woods (1990) using a sample of 129 remains from Kentucky that were dated from 4,300 to 4,050 years ago. In this case, seven cases exhibited the same "symmetrical, polyarticular, erosive arthritis" (p. 282). Interestingly, 8% of the females and 3% of the males had this pattern, which is consistent with the prevalence and gender rates found in contemporary RA among AI/ANs. In 1992, Rothschild et al. studied the geographic distribution of RA in Late Archaic North America. The authors found that RA first began in the original Alabama-Kentucky-Tennessee catchment area and only moved outside this area 1,100 to 800 years ago when it entered Ohio. It continued to progress outwards towards new areas, had clear boundaries associated with rivers and mountain ranges, and did not reach certain areas until modern times. Interestingly, the authors were able to relate the timing of these movements directly to contact with Dutch, English, French, and Spanish migrants. Notably, these groups did not reach the catchment area until the 18th century, which is also consistent with the emergence of RA in these groups based on Old World fossil records.

Consistent with the New World hypothesis, AI/ANs and other Indigenous groups have much higher rates of certain arthritic conditions. In Canada, members of First Nations have been shown to have higher than normal rates of inflammatory arthritis (Barnabe et al., 2008; Ng et al., 2010). In Barnabe et al. (2017), First Nation members in Alberta were found to have 3.2 times the rate of RA, 2.7 times the rate of ankylosing spondylitis, and 1.5 times the rate of psoriatic arthritis compared to the general population. In a systematic review of rheumatic conditions in Indigenous populations in Canada (McDougall et al., 2017), 6% to 22% had OA (Barnabe et al., 2008, 2015; Schmidt et al., 2014) and 0.65% to 1.9% had RA (e.g., Atkins et al., 1988; Barnabe et al., 2014; Coutts & Thommasen, 1998; Hitchon et al., 2014; Oen et al., 1986).

Similarly, arthritides in AI/ANs tend to occur at drastically higher rates than the general U.S. population. For example, Mauldin et al. (2004) examined rates of juvenile rheumatoid arthritis in individuals younger than 19 from medical records in three IHS service areas (Oklahoma City Area, 53 per 100,000; Billings Area, 115 per 100,000; and Aberdeen Area, 236 per 100,000). These estimates were between 2.5 to 16 times the rate of a comparative European sample (14.8 per 100,000). Similarly, the prevalence of spondyloarthropathies in AI/AN groups have been found to be among the highest rates in the world (McDougall et al., 2017; Peschken & Esdaile, 1999). In addition, AI/ANs are over twice (42.3/100,000 vs. 20.6/100,000) as likely to have systemic lupus erythematosus than the general population and have been shown to have significantly worse survival rates (Peschken & Esdaile, 2000; Peschken et al., 2014).

AI/ANs have the highest rates of general arthritis (i.e., not separated by specific diagnoses such as OA or RA) in the United States. For example, Bolen et al. (2010) analyzed NHIS data (*N* = 85,784) from 2002, 2003, and 2006. The authors reported the prevalence of physician-diagnosed arthritis was 25% in AI/ANs, which was higher than the annualized prevalence rate of 21% in the general population. Moulton et al. (2005) analyzed a large sample (*N* = 9,403) of AI/ANs from 171 tribal nations across 31 states and found that arthritis (47%) was the second highest chronic disease alongside hypertension (50%) and diabetes (38%). Similarly, in a survey of 14,632 AI/AN older adults (55 years or older), arthritis was found in 47.2% of the sample, much higher than the comparative rate of 31% of older adults in the U.S. (Adamsen et al., 2018). Furthermore, NHIS data from 2013 to 2015 was analyzed by Barbour et al. (2017), which revealed that AI/ANs had the second highest age-adjusted prevalence rate of physician-diagnosed arthritis (24.4%) out of all U.S. ethnic groups (African Americans, 22.2%; Whites, 22.6%; Hispanics, 15.4%; Asian Americans: 11.8%). Only multi-racial non-Hispanics (25.2%) had higher rates than AI/ANs. However, this group likely included individuals with AI/AN heritage. Hootman et al. (2006) reanalyzed NHIS data from 2002-2003 that had previously classified AI/ANs as “other” race. When the data were split, the authors found that AI/ANs had a 58% greater risk for developing arthritis compared to a White reference group.

Recent studies (e.g., Reid et al., 2010) have shown that differentiating OA from RA when describing arthritis is crucial as osteoarthritis may occur less frequently in AI/ANs. For rheumatoid arthritis specifically, exceptionally high rates have been documented in specific U.S. tribal groups in the research literature for decades, including the Chippewa (Harvey et al., 1981), Pima (Del Puente et al., 1989), Tlingit (Boyer et al., 1991), and Yakima (Palmer Beasley et al., 1973). More recently, a literature review by Ferucci et al. (2005) found that RA prevalence rates ranged from 1.4% to 7.1% among the various AI/AN tribes in their study. Moreover, there also appears to be regional differences in RA prevalence rates. In Ferucci et al. (2008), self-reported arthritis among AI/ANs from Alaska (26.1%) was higher than the general population estimate (21.5%), but considerably lower in the Southwest U.S. (16.5%). The authors suggested that regional variations may be accounted for by true differences in prevalence, variations in arthritis risk factors, cultural beliefs related to reporting, and/or discrepancies in arthritis awareness.

Overall, the disproportionate burden of arthritides (especially RA) in AI/ANs appears to be primarily caused by increased genetic susceptibility. A genetic etiology is further supported by the fact that RA in AI/ANs is often accompanied by a family history, tends to occur at a younger age, and manifests more severely in this population (Ferucci et al., 2005). In addition, when data from previous studies involving multiple tribal groups are combined, markers of erosion detected by radiographic examination (55-100%) and rheumatoid nodules (41-50%) are more common in AI/ANs. Rheumatoid nodules, which are subcutaneous lumps under the skin caused by inflammatory processes, are the most common extra-articular features (i.e., involving other organs besides joints) found in RA (Ruffing & Bingham, 2020). Finally, AI/ANs more frequently test positive for rheumatoid factor (67-97%) and antinuclear antibodies (57-75%).

A “shared epitope” hypothesis that focused on HLA (human leukocyte antigen) alleles was first proposed by Gregersen et al. (1987) to account for the differences in RA prevalence among different populations. Further research (Nepom & Nepom, 1992) specifically identified HLA DRB1 *410, *404, and *101 as high-risk alleles, with *404 conferring the highest risk. Although these alleles occur infrequently in White populations, they occur more frequently in

AI/ANs. Notably, two HLA alleles (i.e., HLA DRB*1402 and *1406) that are unique to AI/ANs were found in Yakima, Tlingit, and Pima populations (Nelson et al., 1992; Williams et al., 1995; Willkens et al., 1991). When the data from these tribes were combined (Williams et al.,1995), DRB1*1402 and several other alleles were significantly associated with the development of RA (*OR* = 2.63). Nonetheless, the role of HLA alleles only partially accounts for RA risk, with the actual process being polygenic in nature (Deighton et al., 1989; Wordsworth & Bell, 1991). Contemporary research (e.g., Tanner et al., 2019) is beginning to investigate the role of other inflammatory markers, including rheumatoid factor and anti-citrullinated protein antibodies.

Environmental Influences. Despite their increased genetic vulnerability, the majority of AI/ANs do not develop RA. It is thus likely that the development of RA results from combined genetic and environmental risk factors. Although the literature base is scarce, potential triggers include air pollution, environmental pollutants, caffeine, decaffeinated coffee, diet, tobacco use, female sex hormones, and infectious agents (Ferucci et al., 2005; McDougall et al., 2017). In contrast, antioxidants and omega-3 fatty acids have been shown to be protective against RA.

In their review of rheumatic disease in Indigenous populations from Australia, Canada, New Zealand, and the United States, McDougall et al. (2017) concluded that high rates of rheumatism in these groups are partially related to having “similar socio-political contexts and [experiencing] disparities in social determinants of health as a legacy of colonial practices” (p. 684). In addition to exposure to environmental contaminants such as smoking and pollution, the role of social inequalities and disparities in healthcare has taken on an increased focus in the RA literature. For example, Reading and Wien (2009) examined social determinants of health from proximal (e.g., education, employment, health behaviors, physical environments), intermediate (e.g., health care, education, community capacities, cultural continuity), and distal (e.g., colonization, racism) perspectives. Taken together, the combined effects of genetics, environmental triggers, and the larger socio-historical context are the best explanation for the high rates of arthritides in AI/ANs.

Differences in Pain Expression and Perception. A literature review by Jimenez et al. (2011) revealed that AI/ANs have comparatively higher prevalence rates of pain symptoms and conditions than the general U.S. population. However, AI/ANs are often held to a cultural stereotype of being stoic and highly constrained in external emotional expression (Meek, 2006). Although the roots of this stereotype are often based on racist and misplaced ideals (e.g., the “silent savage”), there do appear to be legitimate cultural differences in communication and emotional expression that inform these characterizations of AI/ANs. For arthritis specifically, Kramer et al. (2002a) analyzed in-depth interviews regarding arthritis beliefs and self-care strategies among a sample of urban American Indians (*n* = 56). Through these interviews, the authors observed that “Americans Indians do not readily ask for help, discuss pain, or disclose the intensity of a painful episode” (p. 592). The tendency to minimize pain complaints was attributed to cultural factors, including shyness, discomfort with talking about themselves, not wanting people to know their pain, being independent and not wanting to seek outside help, a fear of being needy, and a general belief that “Indians don’t complain” (p. 592).

Outside of the cultural factors related to help seeking and disclosure of pain, there also appear to be cultural differences in how pain is described that can potentially lead to the underdiagnosis and/or mismanagement of arthritis symptoms among AI/ANs. Kramer et al. (2002b) examined American Indian participants’ verbal descriptions of the pain associated with their arthritis conditions. Although joint pain tended to be described in overlapping vague and disease-specific terms, two distinct groups of descriptors were found to distinguish between inflammatory (e.g., “numb,” “sore,” “swollen,” “sharp,” “throbbing”) and non-inflammatory (e.g., "annoying," "pulling," "tiring") arthritic conditions. An additional group of 14 vague descriptors did not have any discriminative utility because they were used to describe pain along the entire continuum of pain severity. The authors urged caution in interpreting these vague terms because they may not fully communicate the true pain experience of AI/ANs. For example, the terms "ache," "discomfort," "pain," and "uncomfortable" were used to describe pain from mild to severe intensity. The use of these commonly used terms by AI/ANs may ultimately cause medical providers to underestimate or fail to appreciate the negative impact that arthritis-related pain is causing them. In order to counteract this cultural difference in pain descriptors, it was recommended that use of general terms by AI/ANs should be followed up with further evaluation in order to capture the true intensity of arthritic pain and guarantee optimal treatment.

From the same study, Kramer et al. (2002b) found that when given a preference on how they wanted to rate their pain, most respondents chose a 5-point pain visual analog scale (VAS) with word and color anchors (in contrast to 10-point scales and those with only word or color anchors). Notably, none of the participants utilized a facial expressions scale. This is concerning because these scales may be used frequently, if not exclusively, in Indian Health Service settings. Other studies (e.g., Pelusi & Krebs, 2005) have continued to show that AI/ANs have difficulty reducing their pain to a number or accurately capturing it with forced choice descriptors. Taken together with cultural norms around disclosure and pain minimization, the inability of AI/ANs to effectively communicate the intensity of their pain through standard measures and procedures creates a critical need for culturally relevant pain assessment tools (Jimenez et al., 2011).

In addition to cultural aspects of pain expression, evidence has emerged showing that AI/ANs may experience and process pain differently than other ethnic groups. Palit et al. (2013) compared healthy American Indians (*n* = 22) and non-Hispanic whites (*n* = 20) using physiological measures of pain threshold and tolerance. AIs had more diminished pain perception and signaling on several measures (i.e., higher ischemia pain tolerance, higher electric pain tolerance, and lower nociceptive flexion reflex threshold). The NFR results in particular suggest that this dampening effect may occur at the spinal level and result from hyperreactivity of descending pain pathways that normally inhibit pain perception. Further supporting a biological underpinning, these results were not explained by differences in pain coping. Overall, this reduced pain perception contrasts with prior research that found augmented pain perception in Blacks and Hispanics relative to Whites (e.g., Rahim-Williams et al., 2007), indicating that pain may be uniquely experienced by AI/ANs relative to other U.S. ethnic groups.

Counterintuitively, a higher pain tolerance places AI/ANs at a greater risk for chronic pain. For example, lower pain sensitivity can cause delayed recognition of tissue damage, with further damage more likely to occur because of the failure to take protective and/or preventative actions (Donaldson et al., 2003; Palit et al., 2013). Although potentially adaptive, this process ultimately creates a cascading effect in which long-term damage ensues and new sources of pain emerge, which over time will counteract the individual’s natural ability to handle pain. Given this potential detrimental effect, the dampened pain processes of AI/ANs have clear implications for altering current chronic pain treatments to better fit the needs of this population. Even though most cognitive interventions for pain aim to decrease pain awareness through strategies like distraction, Palit et al. (2013) suggested they would be more effective if they first increased the individual’s focus towards pain and then took the necessary steps to reduce discomfort/distress.

Impact on Quality of Life. Based on the earlier onset and greater severity of symptoms in this population (Ferucci et al., 2005), AI/ANs are expected to live with arthritis for relatively longer portions of their lifespans. This will undoubtedly lead to a higher level of cumulative stress being placed on these individuals' quality of life over time (Poole et al., 2007).

Overall, the few studies that examined pain-related quality of life in AI/ANs have focused primarily on AI/AN women. Like the general population, arthritis is disproportionately higher in AI/AN women compared to AI/AN men. For example, age-adjusted osteoarthritis prevalence rates in AIs aged 35 years or older from Southern California (Reid et al., 2010; *N* = 6,299) were lower in AI men (11.5%) than women (16.5%). In addition, these discrepancies increased with age, but the gender differences persisted: 55-64 years old (men, 17.1%; women, 23.6%) and 65 years or older (men, 22.0%; women, 29.2). As described in Ferucci et al. (2005), the sex differences in arthritis prevalence rates for AI/AN females are related in part to the effect of female sex hormones. This is consistent with past research in the general population, where female sex hormones were shown to influence the onset and course of arthritis (Harris, 2001).

Nonetheless, the biological risks associated with being female are only one aspect of the increased risk for AI/AN women. In their examination of QOL differences, Poole et al. (2007) found no QOL differences between AI women and White women with RA. The authors concluded that arthritis had a direct impact on QOL, but ethnicity did not. However, there were several notable observations: AI women had the most arthritis-related limitations (i.e., joint mobility and hand function) and the lowest scores for community integration. The authors discussed how maintaining independence is an important QOL component for Whites, but not for AIs. Given the importance of maintaining family, friends, and other community relationships in AI/AN culture, being reliant on others for help does not carry the same negative connotations for AI women, thus potentially protecting QOL. Finally, there were no differences between the two groups in terms of disease duration, which conflicts with the earlier onset of arthritis seen in

AI/ANs and may explain the lack of results. A later study by Poole et al. (2010) suggests that comorbidity with other chronic health conditions might be another factor influencing QOL in AI/AN women. In their study, AI women with RA alone and RA with diabetes had generally lower QOL than women with diabetes alone and healthy controls. They also had more pain, physical impairments, and activity limitations. In addition, there was a comorbidity effect in which women with both conditions had significantly lower ratings of future QOL and higher rates of participation restrictions. Since arthritis cooccurs with other chronic health conditions at higher rates in Indian Country, it can be assumed that the higher comorbidity burden is likely to have a more pronounced effect on quality of life for both AI/AN men and women with arthritis.

More recently, a qualitative study by Conte et al. (2016) offered valuable insights into the beliefs older American Indians with arthritis held regarding health and physical activity. Although not explicitly noted, the key understandings from this study can help inform how quality of life is defined and what barriers exist to maintaining it. These interviews revealed that health was viewed holistically and was centered around physical, mental, spiritual, and social components. “Being active” and “moving” were central to staying healthy, with walking being the most frequently endorsed physical activity. Pain and poor health often made it hard for individuals to stay active. Many did not realize that working through the pain was necessary and ultimately helpful in ameliorating arthritis pain. Although motivation was seen as crucial, many recognized that their motivation waxed and waned. However, many were able to use their family to stay motivated and used negative experiences their family members or friends had with arthritis as reasons to stay motivated. In terms of environmental constraints, participants felt there were limited opportunities for physical activity in their community due to unsafe walking locations and the lack of affordable exercise facilities. Overall, the authors noted that many of the CDC-recommended programs for arthritis would be unsuitable for AI/AN communities, as many of these programs require specialized facilities and may be cost prohibitive (at both the individual and community levels). In addition, participants may be off put by the group setting and the need for regular meetings. It was proposed that telephone-based peer-to-peer programs may be more effective and offer more flexibility. In relation to the concern that there is less social interaction with youth, efforts to engage younger individuals alongside older adults would help establish connections and relationships where teachings about health can be passed down. Finally, in terms of a holistic health perspective, the authors highlighted that programs that only focused on physical health were too limited and likely to fail in AI/AN communities.

Summary of Arthritis. Overall, based on current prevalence rates, it can be expected that at least 25% of all AI/ANs will experience arthritis at some point in their life. In light of the earlier onset of arthritis in AI/ANs, targeted efforts need to be directed towards individuals who are developing osteoarthritis or rheumatoid arthritis at relatively younger ages. Given that these individuals are expected to live a longer portion of their life with arthritis-related pain, limitations, and disability, an explicit focus must be made on ensuring that these individuals have the personal and medical resources needed to maintain productive and fulfilling lives.

At the level of early identification, examination of family history can help identify those who are at greater risk for developing arthritis. In addition, since the course and prognosis of these conditions is markedly different, differentiating those with OA from those with RA will be an effective strategy for channeling the appropriate prevention and treatment strategies. Although earlier cases are possible (especially with the heighted rates of juvenile RA in AI/ANs), RA usually tends to develop as early as 30. This can be a clear indication that an inflammatory process is at the heart of their symptoms. This can be confirmed with additional diagnostic tests and the identification of associated biomarkers such as rheumatoid factor and antinuclear antibodies. In terms of osteoarthritis, examination of lifestyle factors that contribute to the “wear and tear” of joints (including previous traumatic injuries) can help identify specific joints that are likely to be eventually affected by arthritis. In this regard, behavioral changes and physical therapy can be established early on to prevent the worsening of tissue damage and preserve functioning. In either case, the ultimate goal is to maintain physical functioning to the highest degree possible. This in turn will lessen the mental health burden that can lead to depression.

Given the combined cultural and physiological differences related to pain processing and expression in AI/ANs, health care providers should be aware of these nuances and work with an acute understanding that moderate to severe pain may be minimized and potentially overlooked. This is especially important during the initial diagnosis of arthritis because AI/ANs may not readily disclose symptoms unless they are under considerable distress. Kramer et al. (2002a) highlighted that even presenting for medical treatment is a vital indicator that more serious pain may be present, especially since AI/ANs with arthritis do not seek medical help until the disease has progressed to multiple joints and/or their normal self-care strategies no longer suffice on their own. Importantly, AI/ANs may not repeat their concerns to a medical provider if they felt their complaints were not adequately addressed when initially disclosed (Kramer et al., 2002a).

It is imperative for providers to be hypervigilant to underreported pain, subtle cultural differences in verbal descriptors of pain, and to be proactive in maintaining trusting and open communication with their AI/AN patients. This is especially crucial since mistrust may lie at the heart of AI/ANs reluctance to discuss pain in a healthcare setting. Undoubtedly, there exists a perception among AI/ANs that medical providers are indifferent towards their pain or do not take their complaints seriously (Jimenez et al., 2011). In addition, AIs believe providers are quick to dismiss their pain complaints if they ask for pain medication. Ironically, Miner et al. (2006) found that emergency room physicians rated AIs (compared with Whites, Blacks, Hispanics, and Asians) as the most likely ethnic group to exaggerate their symptoms. As expected, these biases affected the physicians' behaviors towards AI/ANs and lead to suboptimal pain treatment. Given the health needs of AI/AN populations, there is no room for racism in the management of pain.

Considering these results, medical providers clearly act as "gate keepers" to the provision of proper medical treatment. In a population that is reluctant to voice pain complaints, and which tends to downplay the severity of their actual pain level, any complaint of chronic joint pain should be considered genuine and referrals to rheumatologists for follow-up should be the first course of action. AI/ANs have a cultural tendency to endure their pain in silence and frequently rely on active pain management strategies such as distraction, prayer, staying busy, and being active (Kramer et al., 2002a). These proactive efforts on the part of AI/ANs can make it easy for medical providers to assume these individuals are effectively managing their own arthritis. However, just because AI/ANs are actively working on their own, they are not without the need for outside help. Kramer concluded that AI/ANs "may appear stoic, enduring or ignoring pain, but many would welcome information about arthritis, disease management, and effective pain relief strategies" (p. 593). Instead of marginalizing them or creating unnecessary barriers to care, medical providers can instead elevate AI/ANs with arthritis to a greater level of well-being.

Through continued contact with primary care providers, likely through the IHS healthcare system, ongoing monitoring can be performed, documented, and revisited at each contact. Patients can be taught to recognize when their pain is normal versus when their pain may be a warning sign that their arthritis is progressing. Given the established link between arthritis and depression, continual monitoring for depression should become routine practice at each visit.

This is important because depression has been shown to be the single greatest predictor of poor health-related quality of life in those with arthritis, even more than pain and disease progression. In addition, the mental health burden associated with arthritis should be treated in the larger context of other comorbid health conditions such as diabetes, heart disease, and obesity. Treating these conditions simultaneously will be challenging, but getting these conditions under control will help reduce the cumulative burden these conditions place on the mental health of AI/ANs with arthritis. Since social functioning and relationships are highly valued in AI/AN culture, treatment efforts need to make sure those with arthritis are receiving the social support, social involvement, and maintenance of important social roles required for positive mental health.

Overall, there is still much to learn about how arthritis manifests differently in AI/ANs. Although the increased genetic susceptibility to arthritic conditions is well-established in AI/ANs, not enough has been investigated regarding what behaviors or other risk factors are modifiable. The development of arthritis is not purely genetic, and more effort needs to be directed at understanding how environmental influences contribute to the elevated rates of arthritis in Indian Country and why these conditions tend to be more harmful for AI/ANs. Finally, we need to move beyond a simple paradigm of what to avoid (e.g., caffeine, tobacco) and what to engage (e.g., physical activity, improved diet). We need to investigate arthritis in the larger context of sociohistorical influences and learn how social inequalities continue to perpetuate the health disparities seen in AI/ANs with arthritis. In addition, this should lead directly towards culturally-tailored interventions that take into consideration the day-to-day realities of poverty, lack of community resources, limited healthcare options, and multiple mental health stressors that characterize the lives of many AI/ANs. In addition to appreciating the active coping and adaptation strategies currently being used by AI/AN to manage arthritis, continued efforts are needed to safeguard the continued resilience of AI/AN older adults.

Moving From a Narrative of Adversity Towards a Paradigm of Resilience

Up to this point, I have reviewed the abundant evidence that identifies cardiovascular disease, diabetes, asthma, and arthritis as major health disparities with clear detrimental impacts on the physical and mental health of AI/ANs. Throughout this work, a focus on the inherent strength and resilience of AI/ANs is strikingly absent. Instead, the narrative portrayed by most research is one of adversity and risk. To avoid further pathologizing those who are impacted by the drastic health imbalance seen in Indian Country, these major health disparities must be understood in their own cultural contexts and in concert with a focus on resilience possessed by individuals, families, and communities.

In the setting of AI/AN older adults, the negative effects of living with disproportionately high rates these four physical health conditions are likely to create an increased susceptibility for negative mental health outcomes such as depression. Although most older adults can learn to effectively cope with or adapt to medical illness (Katon, 2003), adverse outcomes emerge once their threshold for functioning is exceeded (Katon & Cichanowski, 2002). This is especially relevant for AI/AN older adults, whose threshold for functioning may be further taxed by having multiple comorbid health conditions (Goins & Pilkerton, 2010; John et al., 2003). Similar to older adults in general (Luppa et al., 2012), AI/ANs older adults demonstrate higher rates of depression (Garrett et al., 2015), which have been linked to poor physical health, increased mental health challenges, and disability (Schure & Goins, 2016). Importantly, despite their higher vulnerability, it should be recognized that most AI/AN older adults do not develop depression. For example, in the Native Elder Care Study (Schure & Goins, 2016), 84.7% of the total participants (*N* = 505) screened negative for the presence of depression.

For older adults in general, and AI/AN older adults in particular, it is crucial to recognize that there is no direct causal link between age and depression. Instead, the high rates of depression symptoms reported by older adults primarily result from the increased presence of depression risk factors that become more frequent with age (Beekman et al., 1999; Blazer et al., 1991; Roberts et al., 1997; van't Veer-Tazelaar et al., 2008). Nonetheless, these risk factors often reinforce the misperception that older age is a time of life marked by depression and poor health. In previous research (Vaile, 2015), I highlighted that (a) depression is not an inevitable outcome of old age for AI/AN older adults and that (b) active steps can be taken to offset adversity and enhance resilience. Remarkably, despite the risks associated with major health disparities and the subsequent risk for negative mental health outcomes, AI/AN older adults are becoming increasingly recognized in the research literature as a case in point for investigating resiliency processes in later life (e.g., Ore et al., 2016; Teufel-Shone et al., 2018). In addition, Lewis (2016) discussed how AI/AN elders can be used as "exemplars of healthy aging" (p. 279) to guide the development of resiliency-based models for defining successful aging in later life.

Given that resilience is a complex and multi-faceted construct, multiple definitions of resilience currently exist. Recently, a review by Stainton et al. (2018) identified three core elements of resilience: (a) the presence of adversity or risk for mental illness; (b) the influence of protective factors to counteract this risk; and (c) a more positive outcome than would be expected. The authors described resilience as a "dynamic process by which individuals utilize protective factors and resources to their benefit" that is represented by "good functional outcomes in the context of diagnosable illness" (p. 725). Consistent with this framework, this author will investigate resilience in AI/AN older adults using a narrative review with the goal of understanding resilience in the context of the previously described four major health disparities.

Method

This dissertation was originally intended to extend this author's previous work (Vaile, 2015). The initial plan was to conduct secondary analyses of archival data (Wallace & Swaney, 2007) that investigated resilience among 160 American Indian older adults (50 years and older) who resided on an AI reservation in the Northern United States.[6] This author had initially proposed a two-part study based on additional analyses of the archival dataset. The first component involved a series of hierarchical regression models to examine the differential impacts of cardiovascular disease, diabetes, asthma, and arthritis on depression. The second component was based on a modified Medicine Wheel framework (see Dapice, 2006) to determine if higher functioning across physical, psychological, social, and spiritual domains of resilience corresponded with lower depression scores in the presence of these chronic illness conditions. However, in the process of obtaining community consent, this author was unable to secure approval from a crucial community stakeholder. In line with CBPR principles of respecting tribal autonomy and control of the data, the proposed project was withdrawn.

After consulting with this author's mentor, the design of the project was transitioned to a narrative literature review focusing on the resilience of AI/AN older adults with cardiovascular disease, diabetes, asthma, and arthritis. During the initial scoping stages of the review, it was observed that there was limited published literature that examined resilience in the context of any of the four major health disparities. In response, the focus of the narrative review shifted toward

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[6] To protect community confidentiality, the tribal community is not identified beyond a general descriptor.

a broader investigation of resilience in AI/AN older adults. Ultimately, the project had the goal of synthesizing and extrapolating from the available research to aid identification of strengths-based strategies that could be used to enhance resilience in AI/AN older adults with chronic health conditions, specifically cardiovascular disease, diabetes, asthma, and arthritis.

Narrative Review

This narrative review was conducted in accordance with best practice guidelines for systematic reviews developed by Siddaway et al. (2019). Overall, the narrative review was designed to investigate mental health resiliency processes, strategies, and outcomes in AI/AN older adults as they specifically relate to cardiovascular disease, diabetes, asthma, and arthritis.

The focus of the review was on studies pertaining to American Indian and Alaska Native populations. However, this author also decided to include Canadian First Nations given their broad cultural similarities, shared Indigenous identity, and shared histories of colonization with AI/ANs. Although AI/ANs also share parallels with Native Hawaiians, the author ultimately decided to exclude Native Hawaiian populations to facilitate generalization of the findings. In addition to being geographically separated from the mainland United States, Native Hawaiians have unique genetic backgrounds (Kim et al., 2012). Furthermore, Native Hawaiians also have their own distinct history, language, worldviews, cultural practices, spiritual beliefs, social norms, and histories of colonization with the U.S. government (McCubbin & Marsella, 2009).

For the purposes of the current review, older adults were defined as individuals 50 years of age or older. Previous research on older adults has traditionally focused on individuals who are 65 or older. Not only is this age boundary commonly used in the literature, but it also corresponds to societal definitions of old age related to retirement (Kydd et al., 2020). However, as described in this author’s previous work (Vaile, 2015), a more inclusive age range was selected to offset the negative impact of the high morbidity, mortality, and premature death rates previously documented in Indian Country (e.g., Goins & Pilkerton, 2010; John et al., 2003).

Resilience processes and strategies were the chief focus of the narrative review. Although similar terms (e.g., successful aging, flourishing, hardiness) exist in the research literature and have been linked with resilience or share conceptual overlap, they were not included in the current review. This decision was made to maintain conceptual clarity, move towards a synthesis of information that extends beyond the simple identification of individual protective factors, and to assist in the development of targeted recommendations that help promote resilience.

Research Questions

The narrative review was guided by three general research questions:

1. What is the current state of knowledge for resilience in AI/AN/FN older adults?
2. To what extent does the available literature attend to AI/AN/FN older adult resilience specifically in the context of major cardiovascular disease, diabetes, arthritis, and asthma health disparities, and further, what does this literature demonstrate regarding resilience in this context?
3. How might existing research be used to inform specific strategies that can be used to enhance resilience in AI/AN/FN older adults who have these health conditions?

Source of Data

The current review searched articles available in two literature databases: PsycINFO and PubMed.[7] PsycINFO is a database produced by the American Psychological Association that

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[7] The author first searched PsycINFO. However, to meet best practices guidelines as recommended by Siddaway et al. (2019), the author performed a subsequent second database search of PubMed to include biomedical literature that may not be indexed in PsycINFO. Consistent with the PsycINFO search, the PubMed review searched records

indexes scholarly journals, books, theses, and dissertations related to psychology and other related disciplines in the behavioral and social sciences. PubMed is a database of biomedical literature from MEDLINE, life science journals, and online books. PubMed contains information related to biomedicine, bioengineering, life science, chemical science, and behavioral science.

The author focused on peer-reviewed articles in scholarly journals written in English that were published between January 1, 2000 to April 12, 2022. Dissertations and theses were not included in the review. The primary focus of the review was on the identification of individual empirical studies with explicit sample information utilizing quantitative, qualitative, and mixed-methods designs. For this reason, the current review excluded papers that proposed theoretical models, editorials, books, opinions, and other articles that did not present original research or sample data. All relevant literature reviews were identified and collected for additional review. However, to maintain the ability to draw independent conclusions from the individual empirical studies, the literature reviews were not considered in the synthesis of findings, are only briefly summarized in the results section, and were also not included in the narrative review tables.

A preliminary search by the author indicated a minimal number of articles associated with resilience in AI/AN/FN populations in the context of either cardiovascular disease, diabetes, arthritis, or asthma. As a result, this author decided to instead focus on identifying all available research pertaining to resilience processes in AI/AN/FN older adults with the goal of synthesizing and extrapolating this information as it applies to the four specified health conditions. The following search phrases were used to identify relevant articles in both

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published between January 01, 2000 to April 12, 2022. Although conducted separately, results from the PubMed search were merged with the results from PsycINFO.

PsycINFO and PubMed: (American Indians OR Native Americans OR Alaska Natives OR First Nations) AND (resilience OR resiliency). No further search criteria were required for PsycINFO. In PubMed, the article types searched included documents, clinical trials, meta-analyses, randomized controlled trials, reviews, and systematic reviews.

Inclusion and Exclusion Criteria

Following the removal of duplicate articles from the initial PsycINFO and PubMed searches, all remaining articles were screened for relevance to filter out artifacts from the search process. Articles were considered non-relevant if they did not contain information related to AI/AN/FN populations, did not include older adult populations as defined above, or did not examine resiliency. Following this initial process, the abstracts of all remaining articles were reviewed to determine if they met study inclusion. If not enough information was available in the abstract, the author reviewed the full articles to determine if they met all inclusion criteria.

Overall, articles were removed based on the following exclusion criteria: (a) non-native population, (b) non-older adult focus, and (c) non-resilience focus. Studies met inclusion for the population criteria if they included (a) American Indians, Native Americans, Alaska Natives, First Nations, or (b) specific individual tribal groups within these populations (e.g., Diné, Inuit, Cree). Studies met inclusion for the age criterion if they (a) specifically focused on older adults aged 50 years or older, (b) provided age-banded data if they contained multiple age cohorts, and (c) results for the target age group could be discerned with clarity from the findings. Studies were excluded based on the age criterion if no age data were provided, if the sample mean was substantially outside the specified age range, if the data were not age-banded, and if the results were generalized across all age groups. Studies met inclusion for the resilience criterion if they (a) focused extensively on resilience and (b) presented a definition of resilience that guided the particular study's conceptualization. Studies that used a specific measure of resilience were included if they extensively focused on resilience and presented a guiding resilience definition. However, studies were not required to use a resilience measure. Studies were excluded if they did not provide a clear definition of resilience or if they only cursorily mentioned resilience.

Finally, literature reviews were assessed for inclusion based on minimally different criteria. Literature reviews were included if they met the following criteria: (a) they focused on American Indian, Native American, Alaska Native, or First Nations populations, (b) they included at least several individual studies that focused on older adult populations as defined above, and (c) the purpose of the literature review was to examine resilience processes or discussed explicit implications for resilience.

Reference Search

After all articles from the primary literature search were assessed for eligibility, the references of the identified articles were examined for potential inclusion into the narrative review. In addition, all references from the identified literature reviews were similarly assessed for inclusion. Due to the large number of references, duplicates were not removed. Each reference was assessed using the following criteria: (1) they met criteria for relevance, (2) they examined AI/AN/FN populations, (3) they were peer-reviewed, (4) they were published between the specified date range, (5) they were not previously identified in the PsycINFO/PubMed searches, (6) they included older adult populations, and (7) they discussed resilience in detail.

Results

The PsycINFO search resulted in 277 articles and the PubMed search resulted in 119 articles. A total of 10 duplicate articles were removed before screening, resulting in 386 total records identified for screening. A total of 115 records were excluded prior to retrieval due to non-relevance, including 39 records from PsycINFO and 76 from PubMed. This resulted in 271 articles being retrieved for further review from both literature databases. All 271 articles were assessed for eligibility. Based on further review of the articles, 254 articles were excluded because they did not meet all three criteria for study inclusion: 51 articles did not examine American Indian, Alaska Native, or First Nations populations, 197 articles did not meet age criteria, and 6 studies did not examine resilience. A total of 11 individual studies from PsycINFO and PubMed met study inclusion. In addition, 6 literature reviews were identified, with 4 literature reviews identified from PsycINFO and 2 literature reviews identified from PubMed.

The references of the 11 individual studies and 6 literature reviews identified in PsycINFO and PubMed were examined to identify additional articles for potential inclusion into the narrative review. A total of 1,226 references were sought for screening (including duplicate references). 617 references were removed due to non-relevance, resulting in 609 references assessed for eligibility. Of these, a total of 606 references were excluded: 143 were not from peer-reviewed journal articles, 52 were published before the date parameters, 33 were previously identified through PsycINFO and PubMed, 306 did not meet age criteria, and 72 did not examine resilience or were only minimally focused on resilience. Overall, the reference search resulted in the identification of 3 additional individual studies not previously identified by either PsycINFO or PubMed. No additional literature reviews were identified through the reference search.

The entire narrative review process is presented in a standard PRISMA flow diagram (see Figure 1). In total, the literature search for the narrative review resulted in 14 individual articles and 6 literature reviews. Of the identified individual studies, 5 articles were quantitative studies, 8 were qualitative studies, and 1 study used a mixed-methods (qualitative-quantitative) design.

One individual study consisted of a literature review and a qualitative analysis. The qualitative component was included in the narrative review, with the literature review discussed elsewhere.

Studies Using Quantitative Methodology (Table 1)

All five quantitative studies used cross-sectional designs. Two studies used hierarchical regression analyses, one study used hierarchical linear regression analyses, and one study used a combination of logistic regression, ordered logistic regression, and Poisson regression analyses. The fifth study compared psychometric properties of two resilience measures. Notably, all five studies were based on American Indian/Native American samples from the United States: no quantitative studies examined Alaska Native or First Nations samples. Only two studies used non-AI/AN comparison groups (Bailey et al., 2019; Burnette et al., 2017). Two studies (Goins et al., 2013; Schure et al., 2013) used data previously collected from the Native Elder Care Study (Goins et al., 2011). Two studies (Burnette et al., 2017; Roh et al., 2015) also utilized the same dataset, although Burnette et al. (2017) included additional data from a White comparison sample. Although all five studies provided conceptual frameworks for resilience, only three studies used direct measures of resilience. Goins et al. (2013) examined the Conner Davidson Resilience Scale (CD-RISC; Conner & Davidson, 2003) and an abbreviated version (Campbell-Sills & Stein, 2007). Schure et al. (2013) also utilized the abbreviated CD-RISC. Bailey et al. (2019) measured resilience using the Resilience Scale (Wagnild & Young, 1993). The majority of the quantitative studies primarily examined individual resilience. However, Bailey et al. (2019) broadened their conceptualization to include both family and ecosystemic resilience.

Psychometric Properties of the Conner-Davidson Resilience Scale with Older American Indians: The Native Elder Care Study

Goins et al. (2013) compared the psychometric properties of the 25-item Conner Davidson Resilience Scale (CD-RISC; Conner & Davidson, 2003) with an abbreviated 10-item version of the CD-RISC (Campbell-Sills & Stein, 2007) in a sample of 160 American Indian older adults (55 years or older) from a federally-recognized Southeastern tribe. The authors examined individual resilience, which they defined as "a person's ability to successfully adapt to adversity" (p. 123). Internal consistency was measured using Cronbach's α and item-total correlations. Convergent validity was evaluated by examining correlations with the Centers for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), General Self-Efficacy Scale (GSE; Jerusalem & Schwarzer, 1992), Personal Mastery Scale (PMS; Pearlin & Schooler, 1978), and Medical Outcomes Study Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991). Discriminant validity evidence was evaluated through correlations with handgrip strength and body mass index. Factor structure was assessed using a series of confirmatory factor analyses.

Overall, both versions of the CD-RISC were found to have adequate internal consistency, convergent validity, and discriminant validity. The internal consistency of the full version (α = .93) was comparable to the abbreviated version (α = .88). Item-total correlations ranged from .32 to .77 for the full version and from .51 to .70 for the abbreviated version. Convergent validity for both measures was supported by negative correlations with the CES-D (full: $r = -.51$, $p \leq .001$; abbreviated: $r = -.51$, $p \leq .001$) and positive correlations with the GSE (full: $r = .47$, $p \leq .001$; abbreviated: $r = .45$, $p \leq .001$), PMS (full: $r = .29$, $p \leq .001$; abbreviated: $r = .31$, $p \leq .001$), and MOS-SSS (full: $r = .27$, $p \leq .001$; abbreviated: $r = .21$, $p \leq .01$). Discriminant validity for both versions was supported by weak and/or non-significant correlations with hand grip strength (full: $p \leq .05$; abbreviated: p = ns) and body mass index (full: p = ns; abbreviated: p = ns). Notably, the full and abbreviated CD-RISC were most strongly correlated with the CES-D than any other measure, indicating that higher resilience was linked with lower levels of depression.

Notably, the original five-factor structure for the CD-RISC proposed by Conner and Davidson (2003) was not replicated in the AI older adult sample. The first CFA model tested the five-factor solution and found suboptimal fit with high intercorrelations between factors. A second CFA model was tested with the five latent factors loading onto a single higher-order factor. The second CFA model had a similarly poor fit, indicating that the five factors did not represent a single construct that was consistent with resilience. A third CFA model was tested with the 10 items from the abbreviated CD-RISC loading on a single factor. All items had significant factor loadings with the latent construct ranging from .54 to .75. This model provided the best fit for the data, had a meaningful factor structure, and satisfied most a prior criteria including χ^2, SRMR, CFI, and RMSEA.

Despite having relatively comparable reliability and validity, the abbreviated CD-RISC was found to have several advantages over the full CD-RISC, including enhanced parsimony and a more stable factor structure. In addition, all 10 items mapped onto a single, higher-order construct that was consistent with resilience. As such, the authors recommended the abbreviated CD-RISC be used when assessing resilience in older AI populations. Notably, prior to their study, no other measure of resilience had been validated for use with AI older adults.

The Association of Resilience with Mental and Physical Health Among Older American Indians: The Native Elder Care Study

Schure et al. (2013) examined the association of resilience with measures of physical and mental health in a sample of 185 American Indian older adults (55 years or older) from a federally-recognized Southeastern tribe. Resilience was measured using the short form 10-item version of the CD-RISC (Campbell-Sills & Stein, 2007). Mental health measures included the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) and the mental health section of the SF-8 Health Survey (MCS-8; Ware et al., 2001). Physical health measures included the physical health section of the SF-8 Health Survey (PCS-8; Ware et al., 2001) and the Chronic Pain Grade Scale (CPGS; Von Korff et al., 1992). Chi-square tests and Kruskal Wallis tests were used to determine low, medium, and high resilience scores for categorical and continuous variables, respectively. The authors examined bivariate associations using a series of nested regression models utilizing logistic regression models for the CES-D, ordered logistic regression models for the CPGS, and Poisson regression models for the MCS-8 and the PCS-8.

CD-RISC scores indicated that 34% of the participants had high resilience, 41% had medium resilience, and 25% had low resilience. Resilience did not significantly differ by age, gender, or marital status. Notably, the vast majority of participants (87%) did not score above the CES-D cutoff score (i.e., ≤ 16) for depression. Overall, low levels of resilience were significantly associated with clinically-significant levels of depression on the CES-D ($p < .001$), lower MCS-8 scores ($p < .001$), lower PCS-8 scores ($p < .01$), and higher chronic pain grades ($p < .01$).

In an unadjusted regression model (Model 1), all four physical and mental health measures were significantly associated with resilience scores. After controlling for demographic characteristics (Model 2), all measures remained significantly associated with resilience. After controlling for physical health measures (Model 3), resilience remained significantly associated with the CES-D ($OR = 0.87$, $p < .01$) and MCS-8 ($\beta = 0.01$, $p < .01$). However, the PCS-8 and chronic pain grades were no longer significantly associated with resilience scores. Finally, in a fully-adjusted model (Model 4), which controlled for demographics, physical health measures, and mental health measures, only CES-D scores ($OR = 0.88$, $p < .05$) remained significantly associated with resilience scores. The final model indicated that participants with higher levels of resilience had significantly decreased odds of having clinically-significant depression symptoms.

Consistent with previous research, higher levels of resilience were significantly associated with lower levels of depression symptoms in AI older adults. The authors described one possible mechanism, where individuals with higher resilience were more likely to experience positive emotions and could better regulate negative emotions. The authors also found weak evidence supporting a link between resilience and physical health. Specifically, chronic pain was significantly correlated with the MCS-8, but not the CES-D. The authors suggested that negative emotion, rather than depressive symptoms, may inform chronic pain-induced stress. The authors concluded that further research was required to determine if resilience is dependent upon the presence of positive emotions. Further research was also needed to determine if resilience operates as a moderator of mental health outcomes in older adults with more severe disability.

Risk and Protective Factors for Depressive Symptoms Among American Indian Older Adults: Adverse Childhood Experiences and Social Support

Roh et al. (2015) examined risk and protective factors for depression in a sample of 233 self-identified American Indian older adults (50 years or older) who lived in rural, off-reservation areas of South Dakota and Minnesota. The authors used hierarchical multivariate regression analysis to investigate the role of adverse childhood experiences (ACEs) and perceived social support on depressive symptoms. Depression symptoms were measured using the Geriatric Depression Scale-Short Form (GDS-SF; Sheikh & Yesavage, 1986). Childhood abuse, childhood neglect, and childhood household dysfunction were measured using the three subscales of the ACE Questionnaire (Felitti et al., 1998). Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). Control variables included age, gender, marital status, education, living alone, and perceived health. Perceived health was measured dichotomously as either “poor or fair” or “good or excellent.”

On average, AI older adults reported experiencing 2.6 adverse childhood experiences on the ACE questionnaire. Most participants (75.6%) reported being exposed to at least one ACE, with 24.4% reporting no ACE exposures and 31.8% reporting four or more ACE exposures. The average GDS-SF score was 2.28. Based on the standard GDS-SF cut-off (i.e., ≥ 5), 89.3% of the participants were classified into the normal range for depression. In total, only 8.4% of AI older adults were classified as mildly depressed (i.e., 6-10), with 2.3% classified as moderately or severely depressed (i.e., 11 or above). All three ACE subscales had significant positive correlations with the GDS-SF: childhood neglect ($\beta = 0.33$, $p \leq .001$), childhood household dysfunction ($\beta = 0.29$, $p \leq .001$), and childhood abuse ($\beta = 0.24$, $p \leq .001$). As expected, social support had a significant negative correlation with the GDS-SF ($\beta = -0.35$, $p \leq .001$).

In the first step of the hierarchical regression model, demographic and control variables explained 17.2% of the variance (R^2) in depression symptoms. The inclusion of the ACE subscales in the second step explained an additional 10.7% of the variance, with the combined first and second steps accounting for 27.9% of the total variance. In the third step, the inclusion of social support added an additional 5.7% variance explained; the full model accounted for 33.6% of the variance in GDS-SF scores. In the final model, childhood neglect ($\beta = 0.28$, $p \leq .05$) and childhood household dysfunction ($\beta = 0.12$, $p \leq .05$) were significantly associated with higher depression symptoms, while childhood abuse was not ($\beta = 0.51$, $p = .07$). Both higher perceived social support ($\beta = -0.038$, $p \leq .05$) and better perceived health status ($\beta = -0.242$, $p \leq .01$) were significantly associated with lower depression symptoms. Notably, in addition to the effects observed for social support, living alone ($\beta = 0.368$, $p \leq .05$) was shown to be a significant predictor of depression; those living alone reported higher depression symptoms.

Overall, the results from Roh et al. (2015) indicated that adverse experiences in childhood continue to impact AIs into older age. Although childhood neglect and childhood household dysfunction were associated with increased depression, the authors hypothesized that childhood abuse may not predict depression because of the strong connectedness within AI/AN families. As such, a negative family environment may have detrimental effects beyond direct abuse, further underlining the importance of the prevention of adverse childhood experiences for this population. Remarkably, considering the relatively high rates of ACEs reported by the participants (2.6), most individuals were still classified in the normal range of depression.[8] The authors highlighted this finding as evidence of resilience, suggesting that AI older adults may be more resistant to depressive symptoms. Additionally, the authors observed that AI participants had higher MSPSS scores compared to those of non-AI/AN racial groups previously documented in the literature. The authors posited that because of the importance of family and community in AI and AN cultures, social support may be “especially protective for AI older adults” (p. 377), particularly as it relates to social connectedness.

A Comparison of Risk and Protective Factors Related to Depressive Symptoms Among American Indian and Caucasian Older Adults

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[8] Roh et al. (2015) did not provide comparison data when describing the average ACE scores of their AI participants as “relatively high.” However, a study from the same group of authors (Moon et al., 2019), reported mean ACE scores of 0.95 for White older adults and 2.58 for AI older adults, supporting their original description.

Burnette et al. (2017) examined similarities and differences in risk and protective factors for depression between AI/AN and White older adults (50 years or older) who lived in rural areas in the Midwestern United States. The authors used the same AI sample and measures from Roh et al. (2015) but also included additional data from a non-AI comparison group. There was a total of 479 participants (231 AI/AN older adults and 248 White older adults). In addition to evaluating group differences on the demographic and main scale variables using chi-square tests and t-test methods, the authors used multivariate hierarchical regression analyses to investigate comparative differences in depression scores related to adverse child experiences (ACEs) and perceived social support. The GDS-SF (Sheikh & Yesavage, 1986) was used to assess depression. The ACE Questionnaire (Felitti et al., 1998) measured childhood adversity, including childhood abuse, childhood neglect, and childhood household dysfunction. The MSPSS (Zimet et al., 1988) was used to assess social support. Demographic variables included age, gender, education level, employment, income, living alone, and self-rated mental health.

AI/AN participants reported an average of 2.55 adverse childhood experiences on the ACE Questionnaire. In comparison, White older adults had an average ACE score of 0.83. In addition, mean scores on all subscales of the ACE Questionnaire were significantly higher for AI/ANs relative to the comparison group: childhood abuse (0.68 vs. 0.27), childhood neglect (0.32 vs. 0.14), and childhood household dysfunction (1.59 vs. 0.42). AI/ANs participants did not differ substantially from White participants in reports of social support (38.71 vs. 39.90) and depression symptoms (2.26 vs. 2.16).

The authors conducted separate hierarchical regression analyses for the AI/AN (Model 1) and White (Model 2) subgroups. Each model included three-steps, with the first step examining demographic variables alone, the second step adding the subscales of the ACE Questionnaire, and the third step adding social support scores from the MSPSS. Results from the final models indicated differences in risk and protective factors for depression between the two groups. In terms of demographic variables, higher levels of self-rated health were significantly associated with lower depressive symptoms for both AI/AN and White older adults. However, living alone was found to be a significant predictor of higher depression only for AI/AN older adults, indicating a culturally-specific outcome relative to Whites. For AI/AN older adults, higher levels of depression were also significantly associated with higher levels of childhood abuse ($\beta = .275$, $p \leq .05$) and childhood household dysfunction ($\beta = .232$, $p \leq .05$). In contrast, only higher levels of childhood household dysfunction ($\beta = .280$, $p \leq .05$) were associated with greater depressive symptoms for White older adults. Notably, childhood neglect was not significantly associated with depression for either group. No racial differences were found for either social support or self-rated mental health. Higher social support was associated with lower levels of depressive symptoms for both AI/AN ($\beta = -.030$, $p \leq .01$) and White older adults ($\beta = -.026$, $p \leq .01$). Similarly, higher self-rated mental health was associated with less depressive symptoms for both AI/AN ($\beta = -.410$, $p \leq .001$) and White ($\beta = -.253$, $p \leq .001$) older adults. Lastly, living alone was only found to be a significant predictor of depression for AI older adults ($\beta = .368$, $p \leq .05$), indicating a culturally-specific outcome that differed from White older adults.

Burnette et al. (2017) noted that contrary to their expectations, AI/ANs did not have higher levels of depressive symptoms relative to the comparison group. Interestingly, despite having elevated levels of ACEs, AI/AN participants had relatively equivalent rates of depression and social support. The authors described this finding as suggesting “a noteworthy resilience to ACEs among AI/AN older adults” (p. 21). In light of the higher rates of childhood abuse reported among AI/ANs, the authors posited that the accumulation of risk factors may be more predictive of depression than the presence of specific individual risk factors. Furthermore, in relation to the observation that separate dimensions of ACEs differentially affected the two subgroups, the authors suggested this finding reflected "… the presence of culturally distinct risk and protective factors [for depression]" (p. 21). Similarly, a culturally-specific finding was found for living alone. Although social support was hypothesized to be equally protective for both subgroups, living alone was a significant predictor of depression only for AI/AN older adults. The authors suggested that although AI/ANs in their sample were significantly less likely to live alone than Whites (25.8% vs. 46.2%), the increased risk of depression related to living alone appeared to have a greater negative impact on AI/AN older adults.

Rural Native and European American Custodial Grandparents: Stressors, Resources, and Resilience

Bailey et al. (2019) examined ecosystemic factors that contribute to or correlate with resilience among Native American (self-identified) and European American custodial grandparents residing on reservations and in rural communities in Montana. According to the authors, an ecosystemic framework places individuals in context and recognizes how social-structural forces interact with individual and family functioning. There was a total of 112 participants (49 NA older adults and 63 EA older adults). The authors examined the sample and study variables as a function of race, examined bivariate correlations, tested interactions using simple slopes, and conducted a four-step hierarchical linear regression analysis. Their conceptual framework encompassed individual, family, and ecosystemic resilience. In their study, ecosystemic resilience was defined as "the product of transactions within and between multiple systemic levels over time [to promote or hinder resilience pathways]" (Waller, 2001, p. 294).

Resilience was assessed using the Resilience Scale (Wagnild & Young, 1993). Depression was assessed using the CES-D (Radloff, 1977). Stress management behaviors were measured using the Health-Promoting Lifestyle Profile II (HPLP-II; Walker et al., 1995). Economic stress was measured using the InCharge Financial Distress/Financial Well-being Scale (Prawitz et al., 2006). Social support was measured ordinally based on the summation of four items developed by the authors for the study. Rurality was based on Rural-Urban Continuum Codes. Government assistance was self-reported and measured as a dichotomous variable.

Overall, NA grandparents were significantly more likely than EA grandparents to be single, employed, and living in highly rural communities. They also scored significantly higher on the CES-D compared to EA grandparents, with 67.9% (vs. 43.8%) scoring at or above the standard CES-D cut-off score. However, on the Resilience Scale, NA grandparents (total score = 148.9) were classified as having moderately-high to high resilience scores, with 65.4% scoring at or above the standard cut-off.[9] This contrasted with 46.0% of EA grandparents (total score = 138.7), who only displayed moderately-low to moderate scores on the same measure.

The first step of the hierarchical linear regression analysis included demographic variables (race, gender, and rurality). The second step added economic stress, depression, government assistance, social support, and stress management. The third step included interaction terms for economic stress with government assistance, social support, and stress management. The fourth step included interaction terms for depression with government assistance, social support, and stress management. Overall, with Resilience Scale scores as the

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[9] The Resilience Scale consists of 25 items rated on a 7-point Likert Scale. Total scores range from 25 to 175. According to Wagnild (2009), scores below 120 indicate “low” resilience, scores between 125-145 indicate “moderately low to moderate” resilience, and scores above 145 indicate “moderately high to high” resilience.

dependent variable, two significant main effects were found between (a) resilience and economic stress ($\beta = -.55$, $p < .05$) and (b) resilience and stress management ($\beta = .30$, $p < .05$). However, these two main effects for resilience were qualified by two significant interaction effects: economic stress × government assistance and economic stress × stress management.

Economic stress was significantly associated with lower resilience among those who did not receive government assistance ($\beta = -.34$, $p < .05$). However, this association did not hold for those who received assistance. The authors posited that government assistance acts as a buffer against the negative impact of economic stress on resilience. Similarly, economic stress was found to be associated with lower resilience among individuals who engaged in low ($\beta = -.32$, $p < .01$) or average ($\beta = -.20$, $p < .05$) levels of stress management. This relationship was not significant for those who engaged in high levels of stress management. The authors suggested that active efforts to manage stress may offset the negative influence of economic stress.

In their discussion, Bailey et al. (2019) noted that a large portion of the overall sample (48%) reported experiencing significant depression symptoms. However, despite reporting higher rates of depressive symptoms than EA grandparents, NA grandparents had significantly higher resilience scores. The authors posited that these results could be explained in the context of a Native American worldview and the lived experiences of these individuals. To elucidate this view, the authors stated the following: "Native American custodial grandparents experience familial struggle and sadness in the present, but place their experiences in historical, spiritual, and cultural context, where they connect with current realities while also drawing upon past histories of strength and post-trauma growth" (p. 144). In contrast, the authors suggested that the European American cultural values of independence and individualism may "…render these grandparents as less able to situate their families in non-deficit spaces and readily ‘bounce back’ from their family adversity” (p. 144).

Studies Using Qualitative Methodology (Table 2)

The majority of the qualitative studies examined either American Indian or Native American populations: two studies (Lewis, 2014b; Wexler, 2014) focused on Alaska Native populations and one study examined older adults from a First Nations tribe (Hatala et al., 2016). Two sets of qualitative studies utilized data from the same sample. Grandbois and Sanders (2009, 2012) analyzed interviews from 8 Native American older adults. Kahn et al. (2016) and Reinschmidt et al. (2016) analyzed interviews from 13 American Indian older adults residing in Arizona. Of the eight studies, two (Kahn et al., 2016; Wexler, 2014) primarily examined individual resilience. The remaining studies conceptualized resilience at the individual, family, and community levels. Grandbois and Sanders (2009, 2012) included cultural resilience, which they linked to the development of a strong cultural identity that is derived from a Native American worldview in the context of supportive families and communities. The remaining articles (Goodkind et al., 2012; Hatala et al., 2016; Lewis, 2014b; Reinschmidt et al., 2016) incorporated various definitions of community resilience into their conceptual frameworks.

The majority of studies included older adults exclusively. Two studies (Goodkind et al., 2012; Wexler, 2014) examined intergenerational cohorts that included youth, adults, and older adults. Notably, two studies (Hatala et al., 2016; Lewis, 2014b) examined cultural “Elders” or “elders.” Although these groups generally consist of older adults, their cultural role in their communities makes them qualitatively distinct participants. Hatala et al. (2016) defined Elders as individuals with “demonstrated abilities and reputations to serve their communities” (p. 1915). Lewis (2014b) defined elders as “individuals who have demonstrated a lifetime commitment to cultural activities, participate in community and family activities, and are willing to share their experiences and wisdom to teach the future generations" (p. 79).

Notably, four studies (Goodkind et al., 2012; Lewis et al., 2014b; Reinschmidt et al., 2016; Wexler, 2014) were explicitly guided by a Community-Based Participatory Research (CBPR) framework. In particular, Wexler (2014) used Intergenerational Dialogue Exchange and Action (IDEA), a CBPR approach previously developed in her previous research (Wexler, 2011). Aside from three studies (Grandbois & Sanders, 2009, 2012; Hatala et al., 2016), the majority of the qualitative studies used qualitative data analysis (QDA) computer software packages in their data analysis for various purposes. Of these studies, four used NVivo and one used ATLAS.ti.

Overall, the eight qualitative studies used a wide variety of qualitative data analysis methods.[10] All studies used some level of thematic analysis (i.e., evaluating patterns of meaning), with two studies using thematic analysis on its own (i.e., Kahn et al., 2016; Wexler, 2014). Two studies (Grandbois & Sanders, 2009, 2012) also incorporated narrative analysis (i.e., analyzing the meaning behind stories) in the context of traditional Native American storytelling traditions. Reinschmidt et al. (2016) used consensus analysis in addition to thematic analysis. Lewis (2014b) was the only study to explicitly use grounded theory (GT). However, Goodkind et al. (2012) used some elements of GT in their analysis (e.g., node connections). Hatala et al.'s (2016) work was notable for the use of syntactical and semantic analysis to identify predominant themes, which would be classified as a form of content analysis (i.e., evaluating patterns in content). Based on the six major qualitative methodologies identified by Warren (2020), no

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[10] The categorization of qualitative methodologies was guided by definitions provided by Warren (2020). The "Big 6" qualitative data analysis methods identified by the author included (a) content analysis, (b) narrative analysis, (c) discourse analysis, (d) thematic analysis, (e) Grounded theory, and (f) interpretive phenomenological analysis.

studies explicitly used discourse analysis or interpretive phenomenological analysis (IPA). More detailed information about the qualitative methodology of each study can be found in Table 2.

The Resilience of Native American Elders

Grandbois and Sanders (2009) interviewed 8 enrolled or self-identified Native American older adults (age 55 years or older) to identify major themes related to how the elders experienced resilience in the context of adversity and challenges within their lifetimes. The authors used a basic interpretive approach in conjunction with the use of traditional Native storytelling. Consistent with a holistic Native worldview, they used a theoretical framework that incorporated ecological systems theory (Bronfenbrenner, 1979) to account for resilience at the individual, microsystem, mesosystem, exosystem, and macrosystem levels. Their framework examined both individual resilience and cultural resilience. The authors noted that cultural resilience "…derived from the strength in family support systems, caring communities, strong identities, spirituality, cultural values, worldview, ceremonies, and traditions" (p. 569).

Overall, five major themes emerged: (a) resilience must be studied and understood within the context of the Native American worldview; (b) resilience is embedded within Native American cultures; (c) Native elders attain their strength and resilience from each other, their families, relatives, and tribal communities; (d) resilience comes from the Oneness they feel with all Creation; and (e) resilience comes from a legacy of survival passed down by ancient ones.

Regarding the first theme, the elders discussed how understanding resilience requires understanding a Native worldview, which is holistic in nature and views everything as interconnected and interdependent. The elders added that Native Americans have a shared history of survival related to assimilation that is embedded in their experience and, thus, shapes their worldview. The elders discussed how their worldview often conflicts with the worldview of the dominant culture, which results in Native Americans having to “live in two worlds” (p. 573).

In relation to the second theme, the elder’s discussed how resilience is evident in the survival of Native people despite substantial historical efforts to destroy their culture through colonization and assimilation. This has resulted in Native Americans working to ensure the survival of their people and culture for future generations. It is also reflected in individuals feeling an obligation to honor their ancestor’s experiences, hardships, and sacrifices.

The third theme reflected the intra- and interdependent nature of a Native worldview. The elders highlighted that Native Americans find strength and resilience through their connections with each other, family, and their communities. The elders emphasized how connections with others provide a source of strength that facilitates positive coping. The elders discussed how resilience is also promoted through strong bonds and identification with the larger community.

The fourth theme captured the belief that a Native holistic and spiritual worldview creates strong connections with nature, the Earth, and all of creation. This contrasts with the dominant worldview, where humans are separate from nature and not all of creation is created equal. As Grandbois and Sanders (2009) observed, in a Native worldview, the universe is alive and contains aspects that cannot be seen or fully understood by humans. According to the elders, this worldview provides a source of personal strength, which is found through ceremonies, storytelling, and other traditional practices.

In the fifth theme, the elders discussed how Native ancestors continue to provide wisdom and guidance for the current generations. The elders described how the ability to cope with life can be found through prayer, non-judgment, spirituality, and traditional healing practices.

In summary, the elders' narratives revealed that resilience is embedded in Native American cultures, expressed in their worldviews, intricately linked to identity, and passed down through oral storytelling traditions. Grandbois and Sanders (2009) discussed how understanding resilience from an AI worldview requires a multifaceted, contextualized, and interpersonal approach. The authors proposed an extension of Bronfenbrenner's (1979) ecological model to include the cosmosystem, an element reflecting the deep interconnections with nature and creation underlying Indigenous spirituality. The cosmosystem provides an environmental context that considers all aspects of life that cannot be directly accessed through empirical means. The authors also discussed how a relational worldview leads to the adoption of a communal identity rather than an individual identity. The authors highlighted that "in contrast with the nuclear family system in the dominant culture, resilience is linked to inter and intra-dependence and connection to family, community, and tribal cultures, rather than as an individual trait" (p. 577). The authors added that this finding is consistent with current definitions of cultural resilience, where interpersonal relationships are seen as sources of strength that buffer against adversity.

"We're Still in a Struggle": Diné Resilience, Survival, Historical Trauma, and Healing

Goodkind et al. (2012) used community-based participatory research (CBPR) to explore intergenerational perspectives on mental health, historical trauma, current structural stressors, coping, and spirituality to guide improvements for a local family program supporting the mental health and well-being of local tribal youth. In their study, they analyzed themes from 74 ethnographic interviews with 37 Diné youth, parents/guardians, and grandparents/elders. Their conceptual framework examined both individual and community resilience. Their conceptualization of community resilience was based on an ecological perspective that viewed the "… system itself (family or community) [as] responsible for achieving balance in response to changing contexts" (Kirmayer et al., 2009, p. 71). Overall, two predominant themes emerged: (a) historical trauma and (b) healing, survival, and resilience. In the results, these themes were discussed separately for youth, parent/guardian, and grandparent/elder participants.

In relation to historical trauma, youth generally had limited perspectives on history. Most youth did not feel historical trauma negatively impacted their lives or their community. However, several of the youth were able to link struggles in their current lives to historically traumatic events. They identified multiple negative effects, including loss of culture and tradition, sadness, behavioral issues in children, and mistrust of White people. Similar to the youth, the majority of parents did not feel they or their families were impacted by historical events. Instead, they identified current trauma and violence in their communities as more salient issues. Some parents saw the connection between historical events and current difficulties but denied being directly affected by historical trauma themselves. Some believed these events impacted older generations more than younger generations. The negative impacts of historical impact identified by parents included sadness, anger, loss of language, and alcohol use.

Grandparents were more likely to connect current struggles to historical events. Indeed, they linked historical trauma to alcoholism, substance abuse, violence, physical diseases, premature death, and overall poor health. They believed interaction with White people eroded traditional healthy ways of living, especially through exposure to alcohol and drugs. Many elders expressed sadness about the loss of culture and traditions within their lifetimes and discussed the loss of cultural knowledge, language, and ceremonies among the youth. They identified generational rifts with the youth and expressed concern about the survival of the culture. Notably, elders discussed the traditional Diné belief that difficult times from the past should be left in the past. They believed talking about negativity or disharmony could lead to sickness.

In relation to the second theme of healing and resilience, Goodkind et al. (2012) reported that youth described limited strategies for dealing with stress. Their primary coping method was turning to friends and family for support. Youth were less likely to identify with spirituality as a coping strategy and source of support. Most youth did not know much about traditional Diné practices, with only one fourth having participated in a traditional ceremony. Nearly half of the youth reported not being taught about traditional beliefs from their parents or grandparents. The youth believed they were not exposed to these beliefs because their parents were not taught by their parents or because their families' Christian upbringing prohibited them from participating in traditional practices. For some parents, traditional spiritual beliefs were identified as a source of coping against daily struggles. However, several also noted there was an intergenerational disruption in the transmission of traditional knowledge. They added that it was often difficult to access traditional healing due to the lack of available medicine people. Prayer was cited as the most common coping strategy used by parents (80%). Other strategies used by parents included distraction (e.g., keeping busy), avoidance strategies, positive cognitive restructuring (e.g., staying optimistic, not focusing on the negative), and actively confronting problems.

Less than half of the grandparents and elders identified traditional beliefs and practices that helped them cope or heal. Several of the elders discussed Christianity as a source of strength. They noted that Christianity helped them find sobriety from alcohol, improved communication with family, relieved stress, enabled them to cope during difficult times, and provided a source of material and social support. Elders were the most likely to reflect on the past and how it affected those in the present day. Several elders discussed the role of community resilience, viewing their ancestors' strength as a source of strength for themselves and others.

Overall, the study revealed that historical consciousness, albeit selective, was more apparent among the elders while limited among parents and youth. Notably, the traditional Diné belief that warns against discussing past traumatic events may have impacted the elder's reluctance to discuss the past. In addition, for youth and parents, this cultural belief may underlie their limited knowledge about the past or impact their ability to link historical trauma with more salient problems that currently affect their lives, families, and/or communities. Despite wide variability within and between the age groups, family support was the primary coping strategy used by the participants. Family support provided material, social, and emotional support.

Resilience and Stereotyping: The Experiences of Native American Elders

Grandbois and Sanders (2012) examined Native American elders' stories of resilience related to the negative effects of racial stereotyping. The authors used interviews from the 8 enrolled or self-identified Native American older adults (age 55 years or older) used in their 2009 study. Like the prior study, they used a basic interpretive approach to build upon traditional Native storytelling. Their theoretical framework included individual and cultural resilience.

Five major themes emerged from their analysis of the interviews: (a) having ability to successfully bridge cultures fostered resilience and self-confidence; (b) a strong sense of identity was a core element of resilience; (c) being responsible and accountable inspired a sense of pride; (d) educational attainment and employment fostered resilience; and (e) cultural resilience.

In relation to the first theme, the Native elders described being successfully able to maintain their traditional culture, while simultaneously acculturating to the dominant culture. They were able to lead successful lives despite navigating the different cultural beliefs, values, behaviors, and expectations associated with both cultures. Cultural differences at times brought conflict and challenges, but the elders worked hard to be successful in the dominant culture.

As it related to the second theme, the elders emphasized that knowing who they were as Native Americans was crucial in determining the path they ultimately decided to take in life. Cultural heritage, history, and traditional knowledge served as sources of strength for them. The third theme was represented in the elders' continual struggles with maintaining their traditional identity and culture. The elders noted this process was made easier by having a deep sense of pride and responsibility that connected them with their cultural heritage. This pride was instilled by their parents. In addition, Native ancestors were believed to have passed on a "legacy of survival" that allowed the elders to stay resilient in the face of contemporary challenges.

The fourth theme was reflected in the elders' shared belief that knowledge was power. This belief helped facilitate their acculturation to the dominant culture. The elders strived to improve their lives through higher education and better employment opportunities. In this process, the elders' parents and grandparents provided inspiration and acted as positive role models. The fifth theme of cultural resilience was evident in the elders' identification of their families and communities as their primary support systems. The elders drew strength from the support, closeness, solidarity, and unity they had with others. Cultural resilience linked all five themes and came from the elders "…being proud of who they were as a people" (p. 394).

Overall, the results from the elders' stories demonstrated their ability to find acceptance in both the dominant society and their own culture. In order to be successful in both societies, the elders had to balance enculturation and acculturation. This included ignoring or navigating negative racial stereotypes and not internalizing negative messages about themselves. Possessing a strong cultural identity allowed the elders to have a firm understanding of their identities and capabilities, which allowed them to counter negative stereotypes and acculturation stress.

What Successful Aging Means to Alaska Natives: Exploring the Reciprocal Relationship Between the Health and Well-being of Alaska Native Elders

Lewis (2014b) interviewed 36 older adults from five Alaska Native villages in Southwest Alaska. The participants were considered cultural Elders given their commitment to cultural activities, participation in the community, and willingness to teach future generations. The study explored: (a) how family and community support facilitate healthy aging in AN Elders; and (b) how AN Elders promote healthy and resilient communities. The interviews were analyzed using a grounded theory framework. The study's theoretical framework included individual and community resilience. Community resilience was defined as "the ability of a community to establish, maintain, or regain an 'expected' or 'satisfactory' level of community capacity in the face of adversity and positive challenge" (Bowen, 1998, p. 14, as cited in Lewis, 2014b).

Two aspects of successful aging were identified through the Elders' interviews: personal well-being (i.e., how well their family supported them and included them in activities) and community well-being (i.e., feeling supported and engaged in their community). The Elders noted that both aspects of successful aging contributed to feeling needed and having purpose. Family and community acted as key sources of support for the Elders. Furthermore, most of the Elders identified family and community as important aspects of their own identity and culture.

Family support gave the Elders an important and meaningful role in their families and communities as leaders, caretakers, role models, and bearers of cultural knowledge. They reported feeling involved, needed, and respected. This family role contributed to a sense of well-being and optimism. Elders discussed the importance of having a reciprocal relationship of both providing and receiving support from others. The support of immediate and extended family members allowed the Elders to live independently, remain active members of their communities, and helped them age in place in their home communities despite having to manage poor health.

Community involvement provided the Elders with opportunities to engage in meaningful activities, which led to a sense of engagement and support outside their immediate families. The Elders discussed the importance of having a reciprocal relationship with their communities, with their communities needing to provide activities and opportunities for engagement. Importantly, community members provided support that helped them continue living independently. Elders based part of their identities on their communities. They discussed having a sense of generativity related to passing down their knowledge to the community's youth. In turn, the ability to give back and educate the youth contributed to their own personal health and overall well-being.

Lewis (2014b) discussed how AN Elders are essential in passing down traditional knowledge to future generations. The ability to share their traditional knowledge was seen as an important aspect of successful aging for the Elders and provided them with positive feelings towards themselves, their families, and their communities. He added that having this "role in the family and community positively impacts their health and cognitive functioning, enabling the Elders to remain active in their homes and communities and contributes to their optimistic attitude toward life" (p. 84). Importantly, the study also highlighted the bidirectional nature of resilience for Elders and their communities. Lewis noted that the "Elders contributed to the community's sustainability and sense of community; they could be viewed as the foundation, or backbone, of the community and were the keepers of its history, culture, traditional wisdom, stories, and direction; all of [which] contributed to the health and well-being of the community" (p. 84). As such, AN Elders ultimately promote the health and resilience of AN communities.

Concerningly, as noted by Lewis (2014b), many AN Elders faced the prospect of having to leave their communities due to poor health, lack of family support, or inadequate health care. In the context of their preference to age in place, leaving their home communities contributes to poor health for the Elders. As a consequence, the loss of these Elders negatively impacts the overall health and resilience of their communities.

Looking Across Three Generations of Alaska Natives to Explore How Culture Fosters Indigenous Resilience

Wexler (2014) examined the connection between Indigenous culture and resilience through the analysis of narratives across three generations of Alaska Natives who experienced different levels of cultural suppression within their lifetimes. The intergenerational cohort was composed of 25 Inupiaq youth, adults, and elders. Wexler used community-based participatory research (CBPR) methods and thematic analysis of find major themes across the interviews. The theoretical framework of the study primarily focused on individual resilience.

The youth attended school in their home community and spent the least amount of time – relative to adults and elders – in subsistence activities. They identified multiple contemporary struggles, including suicide, alcohol use, violence, and being removed from their homes. Notably, most youth did not link current problems with historical trauma. They instead saw community issues as personal struggles such as family dysfunction, depression, and addiction. They were aware of historical policies that created adversity for previous generations but did not link them to problems faced by themselves, their families, or the community. They felt their culture was slipping away but did not relate this to cultural oppression. Instead, the viewed cultural loss as a function of individual apathy or time constraints. Overall, the youth had a generally constricted notion of culture that did not transcend time and space. Instead, it was limited to a discrete set of traditional activities. However, they reported having a vague sense of support from their culture that they could not identify (e.g., “feeling better” after hearing Inupiaq stories, eating traditional foods, or spending time with friends and family on the land). Notably, the youth did not identity engaging in family and cultural traditions as sources of strength.

The adults grew up in permanent village settlements with primarily non-Native teachers, physicians, and nurses. They discussed how their parents’ experiences with colonialism led to negative consequences in their own lives. Many of the adults were not allowed to speak their language or engage in traditional activities. The adults linked historical trauma to contemporary problems; they linked their parents’ historical trauma with alcohol use, neglect, and suicide. They identified specific individual and collective strategies for responding to historical trauma. This often involved asserting their Inupiaq culture and actively rejecting colonialism. In response to their cultural loss, the adults worked actively to regain what they lost. Many adults saw awareness of injustice, including subtle forms of cultural oppression, as the first step in healing. The adults shared beliefs that having a strong sense of identity rooted in their culture was crucial for their well-being. In addition to providing a sense of pride and connection, this viewpoint directed them to take action and work towards the future. Many adults felt individual and cultural strength were informed by strong cultural identity and resistance to colonization. The adults went beyond simply wanting to fit into the dominant culture and wanted instead to impact society such that Inupiaq culture was better appreciated, respected, and honored by outsiders.

The elders spent their childhood attending local primary and distant boarding schools where they were forbidden from expressing their culture. All elders described growing up with overt racism, with many being punished for speaking their Native language. The elders believed that historical trauma became internalized, which resulted in personal and social problems such as alcohol use, smoking, irresponsibility, and violence. All the elders discussed the difficulty of moving away from home for schooling, employment, military service, or medical care. The elders felt culture linked them to family, home, tradition, and a feeling of being part of something bigger than themselves. This connection allowed the elders to transfer their values, perspectives, and strength from home into new contexts. The elders' parents and grandparents taught them discipline and values that served as a moral compass. The elders reinterpreted and applied these teachings to new situations they faced in the dominant culture. The elders did not directly confront racism and inequality directly. Instead, they were encouraged to succeed despite facing discrimination. They experienced conflict between the dominant culture and their Indigenous culture but learned to balance these competing demands to become successful.

As noted by Wexler (2014), the elders' interviews revealed that culture was critical for maintaining resilience. Culture provided a sense of inner strength and connectedness, which allowed them to gain the skills from Western culture they needed to be successful. For both elders and adults, culture was described as transcending time, space, and discrete cultural activities: this perspective allowed them to situate their adversity as part of a collective experience and to draw strength from previous generations. Both elders and adults felt grounded in their culture, which provided emotional grounding in early adulthood and helped direct their response to cultural oppression. This contrasted with the youth, whose limited understanding of culture did not lead to flexible sources of resilience or the ability to draw upon the strength, resources, and skills of previous generations. As a result, Wexler (2014) observed that they often felt overwhelmed by their struggles and did not have the same sense of belonging or support associated with their culture. As such, they could not contextualize contemporary struggles and access cultural resources that were otherwise available. Overall, these intergenerational differences highlighted how culture acts as a protective mechanism. Wexler (2014) noted that understanding culture, especially in the context of historical trauma, provides mutual affinity, shared meaning making, self-worth, social belonging, and a sense of purpose.

American Indian Elders' Resilience: Sources of Strength for Building a Healthy Future for Youth

Kahn et al. (2016) examined the narratives of 13 self-identified American Indian older adults (age 55 years or older) who lived in an urban area of Arizona. The purpose of the study was to identify elders' perceptions of resilience and resilience strategies that could be used to inform resilience education for urban AI youth. The narratives were coded using thematic analysis. The authors' theoretical framework primarily focused on individual resilience. Notably, the study also included a literature review that examined the resilience strategies of AI, AN, and Native Hawaiian elders. However, for the purpose of the current narrative review, the results from the literature review component are discussed elsewhere. Overall, three major themes emerged from the elders' narratives: (a) culture, (b) youth activities, and (c) education.

Each theme included several patterns. Five patterns were observed under culture: (a) know tribal roots and history, (b) value intergenerational relationships, (c) engage in cultural activities, (d) draw personal strength from cultural teachings and values, and (e) build character traits from cultural teachings. Youth activities included: (a) traditional and (b) contemporary activities. Education comprised four patterns: (a) support for education, (b) take responsibility for own education, (c) value parental involvement, and (d) enhance motivation for education.

As described by Kahn et al. (2016), the elders defined culture as "…teachings and values centered on knowing one's tribal roots and history, understanding intergenerational relationships, and engaging in cultural activities" (p. 124). Cultural values and teachings were seen as sources of resilience that helped develop strength and important character traits (e.g., sharing, responsibility, good work ethic, having a voice, standing up for oneself, self-respect, and respect for others). The elders stated that it was important to teach the youth about their cultural history and historical trauma so that they could honor the past, be proud of their heritage, and build their identity for the future. The elders highlighted the importance of intergenerational relationships, which could be used to strengthen family networks. Connecting elders with youth was seen as essential for transmitting cultural beliefs, language, and traditional roles. Engaging in cultural activities was important for teaching the youth about their roles in life and connecting them with nature. Possessing personal strength to overcome challenges was seen as a fundamental characteristic, which could be obtained through prayer and connection with a higher power. The elders added that personal strength could be found from knowing "…that good is at the end of hardship, that experiencing hardship is necessary to become strong, and that their ancestors overcame hardship" (Kahn et al., 2016, p. 125).

In terms of youth activities, the elders identified engagement in both traditional and contemporary activities as resilience strategies. They offered several recommendations such as including traditional activities in school curricula, teaching youth about traditional subsistence activities, and forming clubs for urban AI youth. The elders discussed implementing potential activities such as youth coalitions, summer camps, educational programs, sports activities, community service, volunteer work, and mental health programs.

As Kahn et al. (2016) highlighted, the elders felt education beyond high school or vocation training was required for to be successful. They discussed the importance of working hard, persevering despite challenges, and taking responsibility for one's education. Parental involvement was seen as crucial for helping youth meet their educational goals, as the elders discussed the importance of engaging with schools and setting high expectations for their children. The elders discussed the importance of enhancing motivation towards higher education (e.g., motivating youth to use their education to make a good living and to help AI communities).

In their discussion, Kahn et al. (2016) discussed how the resilience perspectives and strategies identified by the elders could be used to support resilience in youth. In terms of culture-based resilience strategies, the elders highlighted the importance of having a strong cultural identity and drawing personal strength from Indigenous culture. The elders discussed the importance of having a strong sense of connection by maintaining relationships with elders, families, and communities. In terms of activity-based resilience strategies, the elders identified traditional cultural activities as sources of resilience, resulting in improved mental and physical health. In terms of education-based resilience strategies, the elders identified achievement of educational and employment goals as an important avenue towards building resilience.

Shaping A Stories of Resilience Model from Urban American Indian Elders' Narratives of Historical Trauma and Resilience

In Reinschmidt et al. (2016), the authors described analysis of interviews of 13 self-identified American Indian older adults (55 years or older) who resided in an urban area in Arizona. The authors used community-based participatory research (CBPR) methods to investigate the resilience strategies used by the elders to cope with life stressors in the context of historical trauma. The authors used thematic and consensus analysis. In their theoretical framework, the authors examined individual and community resilience. Community resilience was noted to "[entail] relational and collective processes where individuals, family units, communities, and the larger environment are interconnected, yielding protective factors to counter adversities" (p. 65). Overall, historical trauma and resilience emerged as two broad themes. Subthemes under historical trauma included indigenous concepts, sense of loss, and contemporary adversities. Subthemes under resilience included indigenous concepts, individual resilience, family resilience, and community resilience.

As reported by Reinschmidt et al. (2016), the historical trauma subtheme of indigenous concepts was reflected in the elders' definitions of historical trauma in their own words (e.g., "historical culture shock" and "soul loneliness"). They discussed ancestors and specific relatives who lived through difficult times. Notably, these stories were naturally followed by stories of resilience, with the elders admiring their ancestors and relatives for their strength, skills, and ability to survive. The elders felt that the younger generations did not understand historical trauma and felt teaching them about it could disrupt the intergenerational transmission of trauma.

In relation to the second subtheme, the elders shared a sense of loss related to culture, traditions, beliefs, values, language, and family life. Boarding schools were identified as a key source of disruption to the transmission of traditional culture. They expressed a yearning for the past, including wanting to live a more traditional lifestyle like their ancestors, wanting to know more about their culture and language, and wanting to pass this knowledge to their children.

In the third historical trauma subtheme identified by Reinschmidt et al. (2016), the elders saw contemporary struggles as continuations of past adversities. They believed many current problems were rooted in history, resulting in health and social consequences. Chronic disease, substance use, violence, and loss of relatives were identified as key contemporary problems. They believed the disruption of family systems resulted in the loss of culture and traditional knowledge. They discussed a generational gap, with younger generations unable to understand the historical context underlying present struggles. The elders disapproved of the youth having lost traditional knowledge, not having an appreciation for history, and having lost the value of respect. Some elders acknowledged, however, this situation was related to history not being taught, the elders' own reluctance to discuss difficult experiences, the loss of language, and the intergenerational impact of boarding schools.

In relation to indigenous concepts, the elders interviewed by Reinschmidt et al. (2016) described resilient individuals as those who have gone through hardship but continue to be "strong," "bounce back," "better themselves," and "continue on." Other definitions included "not getting stuck," "not feeling sorry for yourself," and "not giving up." Importantly, resilience was seen as an individual responsibility that occurred in the larger context of history, family, community, and spirituality. Key resilience strategies included learning from the past, being a strong person, having a good outlook on life, being grateful, being connected to the community, being involved in cultural activities, and learning the language. Notably, one elder commented about the importance of becoming "healing families" rather than "broken families."

In the second subtheme, the elders spoke about individual resilience as a personal strength informed by identity, spirituality, and connectedness. Identity and individual strength were tied to family and community strength, with individuals gaining strength by being part of a supportive family or participating in the community. In urban settings, elders described receiving support from non-AI communities. Spirituality was emphasized as a core component of resilience, but it was not directly tied to religion. Individuals were encouraged to attend church, traditional ceremonies, pray, ask for help, and take responsibly for themselves. Although seen as a personal characteristic, resilience was deeply intertwined with being interpersonally connected.

Across interviews, family was noted to provide a key source of support and identity. Strong families were characterized by having positive relationships, safety, cooperation, togetherness, practical support, and emotional support. Relying on family was seen as a strategy for overcoming adversity. Family encompassed more than nuclear relatives and was essential for transmitting history, cultural knowledge, practical skills, and traditional values. The elders saw family members as role models, and they served as role models for younger family members.

Community resilience was also identified as a key component of resilience. Community provided mutual support and created long-lasting relationships. Community also served to maintain a connection to traditional language, culture, and traditions. In urban settings, where family might not be available, the elders noted it was important to find individuals they could trust and with whom they could build supportive relationships. Community also provided access to resources, such as social services, educational resources, and local nationally-based resources.

Overall, although Reinschmidt et al. (2016) asked separate questions regarding historical trauma and resilience, the elders' narratives revealed that the two concepts were deeply interconnected. Historical trauma provided important context for the elders' stories. In turn, their stories of resilience identified useful strategies at the individual, family, and community levels. Individual resilience (i.e., personal responsibility and strength) was the primary focus of the elder's narratives, but it was situated in the context of history, family, and community. At the family level, the family environment was crucial in providing support, connection, and identity development. At the community level, Indigenous identity was supported through storytelling, cultural knowledge, traditional practices, and spirituality. Reinschmidt et al. (2016) observed that the elders' narratives were consistent with contemporary conceptualizations of resilience, especially the social ecological model (Ungar, 2008). Through their narratives, resilience was ultimately described as a process in which individuals responded to adversity by utilizing relational and cultural resources that were available to them. This was especially true in the urban setting, where family and community connectedness may not be readily available.

Reframing Narratives of Aboriginal Health Inequity: Exploring Cree Elder Resilience and Well-Being in Contexts of Historical Trauma

Hatala et al. (2016) used thematic and semantic analysis to examine interviews from 4 older adult Canadian Creek tribal members who were identified as cultural "elders" in their local communities. The purpose of the study was to explore how interpersonal responses to historical traumas and contemporary distress are interconnected with strategies for resilience. The theoretical framework included individual resilience and a broader definition that viewed resilience as "a characteristic of individuals, families, communities, or larger social groups [that are] manifested as positive outcomes in the face of historical and current stresses" (Kirmayer et al., 2011, p. 85, as cited in Hatala et al., 2016). Furthermore, the authors used a social constructionist framework with resilience being defined as "a condition of the individual's family, community and culture to provide [health sustaining] resources and experiences in culturally meaningful ways" (Ungar, 2008, p. 225, as cited in Hatala et al., 2016). Overall, three major themes related to resilience were identified: (a) resistance and survival, (b) negotiating between worlds, and (c) the continuity and spirit of the story.

Consistent with the theme of resistance and survival, the elder's narratives discussed the unequal power balance between the Canadian government and Aboriginal people. Despite this power imbalance, the elders continued to perceive Aboriginal people as having agency and power over themselves and their cultural practices. In relation to their experiences in residential schools, the elders described subtle moments of resistance or disobedience and noted that these experiences helped them restore and maintain a sense of agency in their lives. These acts of resistance gave the elders a sense of control, provided meaning, served as sources of achievement, reaffirmed social bonds, created solidarity, supported their Aboriginal identities, and acted as a form of cultural resistance.

In relation to the second theme, Hatala et al. (2016) noted that the elders described the tensions of navigating between traditional culture and the dominant culture, especially in relation to traditional spiritual beliefs and Christianity. The elders' attitudes towards non-traditional systems ranged from conflict, anger, confusion, and resistance to balance and openness. Some elders felt Christian teachings were aligned with, rather than opposed to, traditional teachings. They described creating a bridge between the two spiritual worlds as a means of finding strength, well-being, and resilience. This strategy allowed them to maintain cultural unity and continuity, rather than abandoning traditional culture or completely rejecting the dominant culture. Another strategy involved "working hard" within the dominant system and finding aspects of unity within both systems. The ability to "walk between worlds" supported the elders' psychological and emotional health, preserved their sense of self, and mitigated feelings of being different.

As it related to the third theme, the elders discussed the importance of storytelling for Aboriginal people and the role stories played in their lives. They linked stories with their own health and well-being. The elders also saw stories as the core mechanisms for transferring Aboriginal culture and knowledge to future generations. They believed stories transmitted spiritual values, virtues, morals, and life lessons that help guide people through difficult times. Although stories may exist in new forms in new contexts, the essence of these stories provided individuals with a sense of internal stability and identity that was less likely to be affected by influences from the dominant culture. As the elders who were interviewed by Hatala et al. (2016) noted, stories act as a source of continuity for Aboriginal culture and spirituality. In response to this observation, the authors noted "the stories, then, are one way for and a means by which individuals maintain a sense of continuity in the midst of the many changes they face, serving as a source of cultural strength and resilience assisting people to endure historical processes of social and personal distress, suffering, or hardship" (p. 1921).

In their discussion, Hatala et al. (2016) suggested that the narrative of Aboriginal health should be reframed to better capture the interplay between historical trauma and resilience. The authors noted that "health research with Aboriginal populations must be sensitive to the complex and idiosyncratic ways in which individuals navigate and negotiate toward health resources and improved well-being in the context of trauma, and that these processes necessarily involve a dialectic between historical and contemporary traumas as well as resilience, strength, and self-empowerment" (p. 1922). The authors added that this approach prevents the overpathologizing of Aboriginal people while allowing for the exploration of individual and community strengths.

Studies Using Mixed Methodology (Table 3)

Only one study (Rivkin et al., 2019) used a qualitative-quantitative methodology. This study examined Alaska Native adults living in Southwest Alaska. The study did not use a non-Native comparison group. The authors provided a unique conceptualization of resilience (see below) that differed from any of the quantitative or qualitive studies in the narrative review. The study used a Community-Based Participatory Research (CBPR) framework and identified themes using grounded theory. The study did not use any measures of resilience but employed an advanced social network analysis program to determine interrelationships between themes.

Cultural Values, Coping, and Hope in Yup'ik Communities Facing Rapid Cultural Change

Rivkin et al. (2019) interviewed 60 adults from two rural Yup'ik communities to examine how the participants, their families, and their communities coped with various life stressors. The sample was separated by age cohorts, including young adults (18 to 30 years old), middle-aged adults (31 to 50 years old), and older adults (51 years or older). The authors were specifically interested in identifying (a) coping strategies, (b) cultural practices and values, and (c) sources of hope, strength, and peace. The theoretical conceptualization of resilience focused on the role of narratives in trauma and resilience. The authors noted that "[community] narratives that emphasize persistence, hope and survival in the face of loss can promote resilience, community transformation, and cultural revitalization… [which can] facilitate a strong cultural identity, resulting in greater psychological wellbeing" (p. 612). In the qualitative component of the study, the authors used thematic analysis of the interviews. The quantitative component comprised (a) chi-square likelihood tests to assess gender and age differences in coping and (b) social network analysis. Following the initial qualitative analysis, the most frequently endorsed themes were imported into a social network analysis program (i.e., ORA-NetScenes). This provided a two-dimensional network visualization that showed inter-relationships between themes. Higher-level groups were then ascertained using Newman's clustering algorithm for symmetric networks. The authors used metrics of centrality to quantify the importance of a theme within the networks.

Overall, 28 coping themes were identified by at least 20% of the participants. Notably, significant gender differences were found regarding coping and sources of support. Women were more likely to *turn to family* for support (83% vs. 57%) and identify their *kids and parenting* roles (77% vs. 47%) as sources of strength. In contrast, men were more likely to identify *subsistence activities* (37% vs. 10%) and *being alone* (33% vs. 7%) as key coping strategies. Significant age differences were also found regarding coping strategies. Older adults (71%) and middle-aged adults (63%) were more likely than young adults (29%) to identify *spirituality* as a coping strategy or source of hope. Middle-aged adults were more likely to endorse *learning from past experiences* (58%) and *letting* go (63%) compared to older adults (21% and 17%, respectively) and younger adults (18% and 29%, respectively). Middle-aged adults (58%) were also more likely to utilize *staying busy* (58%) relative to older adults (17%). Compared to older adults (42%), middle-aged (74%) and young (77%) adults identified *kids and parenting* as sources of strength. Young adults (94%) were more likely to cope by *turning to family* for support relative to older adults (50%).

As described by Rivkin et al. (2019), the social network analysis indicated that no coping strategy was used independently of the others. Of the 28 themes, the following showed the greatest total-degree centrality (i.e., number of connections with other themes): *talking with others, turning to family, getting/having support, helping others, cultural traditions, kids and parenting, turning to Elders, letting their emotions out*, and *staying busy*. Additionally, Rivkin et al. (2019) noted that three higher-order groupings emerged: *Ilaliurucaraq* (be welcoming), *Yuuyaraq* (Yup'ik way of life), and *Assircaarturluni Yuuyaraq* (try to live a better life). Group 1 (*Ilaliurucaraq)* consisted of 10 themes, including *acceptance, family, get counseling, get/have support, helping others, learning from past experiences, let it go, let it out, personal growth and healing, spirituality and religion*, and *talking to others*. Group 2 (*Yuuyaraq)* consisted of 11 themes, including *culture, Elders, role models, nature, subsistence, stay busy, education or training, community coping, be positive, be alone*, and *avoidance*. Group 3 (*Assircaarturluni Yuuyaraq*) entailed 6 themes, including *alcohol or drugs, avoid alcohol or drugs, avoiding more trouble, be strong, kids and parenting*, and *leave the situation*.

In their discussion, Rivkin et al. (2019) observed that the gender differences in coping (e.g., women turned to family relationships whereas men engaged in subsistence activities) were consistent with traditional Yup'ik gender roles. In relation to age differences, older adults were the most likely age group to cope and find hope through spirituality. The authors noted that this finding echoed the importance of spirituality in Yup'ik culture and was consistent with prior research documenting natural age-related increases in religiosity. In addition to using spirituality more than younger adults, middle-aged adults were shown to have a broader and more flexible coping repertoire than older adults. Younger adults primarily turned to family members.

Importantly, the authors discussed how the network analyses results revealed that the coping strategies identified by the Yup'ik adults were not independent of each other. Instead, they were used interdependently and collectively to facilitate hope, healing, and resilience. This finding was consistent with resilience being a dynamic, fluid, and flexible process. Notably, social connectedness was a central aspect underlying most of the original 28 coping themes. This was also illustrated within the higher-order grouping of *Ilaliurucaraq* (be welcoming), which the authors described as informed by Yup'ik cultural values such as openness, compassion, awareness of one's impact on others, the importance of family and social connections, and the spirit of the universe (*Ellam Yua*). The second theme of *Yuuyaraq* (the Yup'ik way of life) was reflective of how traditional cultural values and practices confer positive mental health benefits that lead to the development of resilience. Conversely, the negative repercussions from historical trauma were reflected in *Assircaarturluni Yuuyaraq* (try to live a better life). In response to cultural loss and change, the Yup'ik placed high value on healing, family wellness, and sobriety. Individuals faced turning points in their lives, which led, in turn, to personal growth and healthier families. The finding was consistent with literature demonstrating the positive impact of finding meaning and purpose in adversity (e.g., Afflect & Tennen, 1996; Aspinwall, 2004).

Literature Reviews

A total of six systematic literature reviews were identified through PsycINFO and PubMed. In addition, one individual study – discussed previously in the narrative review –

conducted a brief literature review (i.e., Kahn et al., 2016). The results from the literature reviews are briefly described below.

American Indian Elders' Resilience: Sources of Strength for Building a Healthy Future for Youth

In addition to examining the narratives of urban AI elders, Kahn et al. (2016) conducted a review of English-language peer-reviewed articles related to resilience in Indigenous elders. Articles included in the study were published between January 1, 1980 to December 31, 2013. The authors searched three databases: Medline/PubMed, Web of Science, and Education Resource Information Center. Articles that were eligible for the review: (a) identified U.S.-based Indigenous elders as the primary target population; (b) described non-clinical-based studies; and (c) referenced culture, intergenerational, community, resilience or sociocultural characteristics linked to resilience. Overall, the authors identified six articles. Of these, four (Grandbois & Sanders, 2009, 2012; Schure et al., 2013; Wexler, 2014) were already identified in this author's initial PsycINFO/PubMed search. The remaining articles did not meet inclusion criteria for the current narrative review: one article examined Native Hawaiian elders (Browne et al., 2009) and the other was a pilot study description that generalized results across age groups (Wexler, 2011).

In their literature review, Kahn et al. (2016) briefly summarized the six articles. The authors did not identify common themes across studies, aside from noting that the articles focused on "intergenerational and interpersonal relationships and/or cultural strengths" (p. 120).

American Indian and Alaska Native Resilience Along the Life Course and Across Generations: A Literature Review

Ore et al. (2016) examined resilience in AI/AN populations across the lifespan using a life course framework guided by Elder (1998). According to the authors, a life course framework examines “social, cultural, economic, and political factors that impact human development and health” (p. 3). This framework includes key constructs such as lives embedded in historical context, timing of life transitions, linked lives, and human agency.[11] This framework focused on individual, community, and cultural resilience. In their review, the authors examined peer-reviewed articles written in English that were published between January 1, 1970 to December 31, 2015. Articles were required to: (a) identify AIs and/or ANs as the focus group; (b) use the life course as an approach, perspective, theory, framework, or life history; (c) discuss historical or current sociocultural and political determinants of health; and (d) use the term resilience or reference asset-based factors. Ore et al. (2016) searched four databases, including ERIC, JSTOR, Ovid, and PubMed. Out of 231 articles retrieved, 8 articles met full inclusion criteria: five examined intergenerational cohorts, one examined adults, and two examined elders. Of the two articles examining older adults, both failed to meet inclusion for this writer’s current narrative review: one (Weibel-Orlando, 1988) was published before the date parameters, and the other (Jackson and Chapleski, 2000) did not explicitly examine resilience. Aside from Wexler (2014), the remaining five articles did not meet criteria for inclusion into the current narrative review.

Based on their content analysis of different AI/AN age cohorts, Ore et al. (2016) identified three themes related to AI/AN resilience: (a) it is an ongoing, dynamic process that responds to a changing environment; (b) it is evident within the life course framework through

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[11] Elder (1998) provided the following definitions: *lives in time and place* (“the life course of individuals is embedded in and shaped by the historical times and places they experience over their lifetime,” p. 51), *the timing of lives* (“the developmental impact of a life transition or event is contingent on when it occurs in a person’s life,” p. 51), *linked lives* (“lives are lived interdependently [and] social and historical influences are expressed through this network of shared relationships,” p. 51), and *human agency* (“individuals construct their own life course through the choices and actions they take within the constraints and opportunities of history and social circumstances,” p.52).

lives embedded in historical context, linked lives, and timing of life transitions; and (c) it is accessed through culture. In their discussion, the authors highlighted that: (a) AI/AN resilience is relative to age and sociocultural context; (b) AI/AN resilience is collective and intergenerational; (c) AI/AN resilience is derived from worldviews, beliefs, values, and practices; and (d) narrative and storytelling act as important mechanisms and strategies for AI/AN resilience.

Expanding the Circle of Knowledge: Reconceptualizing Successful Aging Among North American Older Indigenous Peoples

Pace and Grenier (2017) examined successful aging among Indigenous older adults from North America. Although resilience did not explicitly guide their search criteria, resilience was identified in several of the studies and discussed in the author's findings. Articles were required to (a) address perspectives of "success" and "well-being" among older Indigenous peoples of North America; and (b) focus on elements of successful aging. The authors searched Web of Science, AgeLine, and Bibliography of Native North Americans (BNNA). The search was conducted in March 2016, but the authors did not provide information on their date parameters. Given their focus on the subjective experience of Indigenous people, the authors only examined qualitative articles. Their search identified 11 qualitative articles relevant to their search criteria. Of these articles, only three articles were relevant to resilience. Of these studies, none met inclusion criteria for the current narrative review: one study (Brass, 2004) was an unpublished thesis and the other two articles (Lewis, 2011; 2013) only cursorily discussed resilience.

Based on the articles identified in their review, Pace and Grenier (2017) identified four dimensions of successful aging as conceptualized by Indigenous peoples: (a) health and wellness; (b) empowerment and resilience; (c) engagement and behavior; and (d) connectedness. In this context, resilience was primarily viewed as an attitudinal or emotional component of successful aging. Strategies for resilience included: (a) maintaining a positive outlook and stable mental state; (b) using humor to cope with challenges; (c) maintaining and restoring Indigenous cultural values; (d) empowerment of older adults; and (e) engagement in meaningful roles. In their discussion of “resilient aging,” Pace and Grenier (2017) called for the inclusion of resilience into successful aging models. They also identified optimism, humor, spirituality, and connectedness as key culturally-grounded mechanisms underlying Indigenous resilience.

Suicide, Resilience, and Connectedness Across the Lifespan

Rao et al. (2017) examined the research literature on suicide in AI/AN communities, with a focus on explaining the lower rates of suicide found in elders. The authors searched publications and peer-reviewed articles that were written in English from Academic One File, Academic Search Premier, Academic Search Complete, PsycINFO, PubMed, and CINAHL Complete. In addition, they also searched publications from national and state governmental agencies. The authors did not specify date parameters for their search. Inclusion criteria included (a) publications examining suicide with AI/ANs or those specific to AI/ANs 65 years or older; (b) articles that examined AI/AN traditional, religious, or cultural practices to prevent, treat, or address suicide and/or promote increased resilience, and/or connectedness; (c) published materials on suicide that compared data from different ethnic populations and/or different age groups; (d) publications that provided evidence on the effect of connectedness or resilience in relationship to suicide; (e) publications that explained changing rates of suicide across the lifespan and/or those that described protective and risk factors, and (f) experimental, quasi-experimental, and descriptive studies on suicide. Notably, the authors did not explicitly outline the number of identified studies in their search. Instead, based on their findings, the authors (a) provided a summary of protective and risk factors against suicide and (b) proposed an explanatory framework centered around connectedness and increased resilience to explain reduced suicidality in AI/AN elders. Based on the inclusion and exclusion criteria for the current narrative review, only one article from their references was identified (i.e., Hatala et al., 2016).

Rao et al. (2017) did not explicitly identify themes related to resilience in their review. Instead, they proposed a two-part model that consisted of (a) building connectedness and resilience; and (b) a continuum of connectedness across the lifespan.[12] In the first model, the authors identified intrinsic and extrinsic protective factors that "… contribute to an overall connectedness that is holistic, thereby mirroring the cultural emphasis on interrelationships, that leads to increased resilience and that ultimately culminates in the improved outcomes of reduced rates of suicide" (p. 351). The four extrinsic factors included (a) interpersonal relationships; (b) physical/geographic proximity to others; (c) involvement in ritual and ceremony, including opportunity availability and direct engagement; and (d) having an appointed role in society. The four intrinsic factors included (a) sense of belonging and sense of responsibility for self and others; (b) belief in role within the broader spiritual world and/or physical world; (c) sense of identity; and (d) reflection and learning from and perseverance through trauma and adversity.

In developing the second component of their model, Rao et al. (2017) proposed an extension of a conception of connectedness developed by Lucero (2010, 2014). In Lucero's conception, AI/AN persons move through four stages that end in the late-20s to mid-30s. In contrast, Rao et al. (2017) highlighted the importance of grandparents in tribal communities and

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[12] Rao et al. (2017) used the following definition of resilience from Gordon Rouse et al. (1998, p. 297): "[A] multi-faceted phenomenon that encompasses personal and environmental factors that interact in a synergistic fashion to produce competence despite diversity. Resilience is the ability to thrive, mature, and increase competence in the face of adverse circumstances."

posited that connectedness continues to increase beyond the mid-30s. In their model, connectedness moves through four developmental stages, with lower stages reflecting lower connectedness: Stage 1 (AI/AN identity may contribute to a limited commonality with others and a sense of differentness), Stage 2 (Events and/or life experience begin the process of connectedness to identity, role, and purpose), Stage 3 (Individuals redefine and reclaim their identity, role, and purpose), and Stage 4 (Individuals integrate identity, role, and purpose into everyday life). The authors described this process as a protective factor for building resilience and reducing suicide.

Resilience in American Indian and Alaska Native Public Health: An Underexplored Framework

Teufel-Shone et al. (2018) conducted a literature review to investigate resilience across the lifespan in the context of AI/AN health promotion. The authors reviewed peer-reviewed studies written in English that were published between January 1, 1980 to July 31, 2015. Studies included in the review (a) identified the target population as predominantly AI/ANs; (b) described a nonclinical intervention or original research; (c) identified resilience as an outcome measure or a resource to guide intervention design or research; and (d) discussed resilience as it related to cultural, social, and/or collective strengths. The authors searched nine literature databases, including BioMed Central, Encyclopedia of Social Measurement, Medline/PubMed, EMBASE, Web of Science, EBSCO, Ovid, Cochrane Central Register of Controlled Trials, and the Campbell Library of Campbell Collaboration. Out of 60 articles assessed, nine articles met the full inclusion criteria: three examined adolescent samples, two examined college samples, two involved intergenerational cohorts, and two studies focused on elders. Both intergenerational studies (Goodkind et al., 2012; Wexler, 2014) and both studies using elder samples (Grandbois

& Sanders, 2009, 2012) were identified previously for inclusion in the present study through the initial PsycINFO/PubMed search.

In their review of articles across multiple age groups, Teufel-Shone et al. (2018) made several important observations regarding the state of the literature: (a) resilience research in AI/AN populations is limited to the identification of attributes and pilot interventions focused on individual resilience; (b) collective resilience is not explored; and (c) resilience models are not used to guide health promotion programming. Although none of the articles directly addressed cultural resilience, several indirectly explored cultural resilience through the examination of cultural (e.g., shared identity) and social (e.g., peer, family, and community relationships) assets. In addition to these findings, the authors identified two key attributes of AI/AN resilience: (a) social support and (b) cultural engagement. All 9 articles in their review identified social support as an important component of resilience. However, the authors noted that "the specific form and level of this support varied across the lifespan" (p. 276). In terms of cultural engagement, the authors identified several elements, including: (a) enculturation/strong cultural identity; (b) engagement in cultural activities and hearing stories; (c) spiritual and traditional beliefs; (d) holistic worldview; (e) ability to navigate different cultures; and (f) cultural values help avert assuming a victim identity. Like social support, these elements differed across the age groups.

"With Age Comes Wisdom:" A Qualitative Review of Elder Perspectives on Healthy Aging in the Circumpolar North

Howell and Peterson (2020) investigated definitions of healthy aging common to older adults (50 years or older) from the Circumpolar North (i.e., the northern lands of the world's northernmost countries including the United States, Canada, Finland, Denmark, Iceland, Norway, Russia, and Sweden). The authors searched qualitative studies that were written in

English and published between January 1, 2000 to December 31, 2018. Studies met inclusion criteria if they (a) included individuals over age 50 as interviewees or key informants; (b) included community-dwelling samples; and (c) were related to successful or healthy aging. The authors searched nine databases, including Google Scholar, PubMed, MEDLINE, CINAHL, Academic Search Premier, PsycARTICLES, Psychology & Behavioral Sciences Collection, Web of Science, and Arctic Health. A total of 23 articles were included in the review: six from the U.S. (Alaska), five from Sweden, four from Canada, two from Denmark, two from Norway, one from the Faroe Islands, and one study from a multi-site population (Sweden and Finland). Of the articles relevant to the current narrative review, only one study (Lewis, 2014b) met full inclusion criteria. The remaining five studies (Hopkins et al., 2007; Lewis, 2011, 2013, 2014a; Lewis & Allen, 2014) were either not focused on resilience or only minimally discussed resilience.

Howell and Peterson (2020) provided a detailed concept map outlining four core elements of successful aging identified by the older adults in their literature review, including: (a) biomedical factors, (b) psychosocial aspects, (c) social components, and (d) relationship to the natural environment. In addition, the authors identified three common themes across the studies: (a) respecting the wisdom of elders, (b) maintaining a relationship to the natural environment, and (c) developing psychosocial resilience. In their concept map, psychosocial resilience was subsumed under psychosocial aspects and consisted of optimism, emotional regulation, and living in harmony with others. Many participants in these studies described the importance of “living a harmonious and balanced life” (p.123). The participants also identified several resilience strategies that increased their adaptability to change and stress, including (a) maintaining positive relationships with others, (b) effectively managing difficult emotions during times of hardship, (c) avoiding negative thoughts and actions from when they were younger, and (d) recognizing their abilities and making adjustments based on current limitations.

Understanding Historical Trauma for the Holistic Care of Indigenous Populations

Joo-Castro and Emerson (2021) conducted a scoping review of historical trauma related to Indigenous peoples' health. Although resilience was not explicitly integrated into the search process, the study had notable results and implications related to resilience. The authors searched peer-reviewed journal articles written in English that were published before September 2020. They searched the following databases: CINAHL, PubMed, and Ovid. Identified articles included primary and secondary data analysis of content focused on (a) Indigenous populations and (b) historical trauma related to mental or physical health. Out of 222 articles assessed for eligibility, 75 studies met criteria for inclusion. Of these studies, 44 included Indigenous populations from the U.S., 27 from Canada, and four included both U.S. and Canada populations. Further, 19 focused on youth, and two focused on elders. Of eight studies that examined resilience, three articles (Goodkind et al., 2012; Reinschmidt et al., 2016; Wexler, 2014) were previously identified for inclusion in the present study through PsycINFO/PubMed. The remaining five articles (Burnette et al., 2019; Cloud Ramirez & Hammack, 2014; Fuller-Thomson et al., 2020; Lys et al., 2018; Walls et al., 2016) did not examine AI/AN/FN older adult populations, did not provide age data, or otherwise did not meet the current narrative review's inclusion criteria related to older adult populations.

In their review, Joo-Castro and Emerson (2021) identified five major themes related to historical trauma and the health of Indigenous peoples: (a) challenges of defining and measuring intergenerational transmission in historical trauma; (b) differentiating historical trauma from contemporary trauma; (c) role of racism, discrimination, and microaggression; (d) questing for resilience through enculturation, acculturation, and assimilation; and (e) addressing historical trauma through interventions and programs. As it related to the fourth theme of resilience, the authors discussed efforts towards the prevention and reversal of historical trauma, including the use of enculturation, acculturation, and assimilation as strategies for building resilience.[13] Notably, the authors observed that enculturation had mixed results. In most studies, traditional connections served as sources of healing that protected against the effects of historical trauma and fostered resilience. However, for others, enculturation was predictive of historical trauma and risky health behaviors such as smoking and alcohol use. As it related to acculturation and assimilation, the authors observed that individuals who were more acculturated were often less aware of historical losses, which offered protection against the effects of historical trauma.

Discussion

The Current State of Knowledge of Resilience in AI/AN/FN Older Adults

Overall, the published literature on resilience in AI/AN/FN older adults is relatively limited. What is available in the literature, however, provides meaningful information that greatly shapes our understanding of this important concept in a group recognized for its resilience. Across the 14 studies summarized in the current narrative review, resilience is currently being investigated with an array of approaches, including quantitative, qualitative, and mixed quantitative-qualitative methodologies. This multi-method approach has facilitated exploration of multiple avenues of resilience, with each method offering its own scope, insights, strengths, and limitations.

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[13] Joo-Castro and Emerson (2021, p. 295) provided the following definitions of these three key constructs: enculturation ("identifies with Indigenous cultural identity"), acculturation ("raised enculturated but adopts mainstream cultural behaviors"), and assimilation ("identifies with mainstream cultural identity").

Summary of Quantitative Studies

Currently, the five quantitative studies on resilience in this age group are limited to cross-sectional examinations of American Indian populations. The studies in this domain of research are primarily focused on investigating: (a) risk and protective factors linked to depression; (b) associations of resilience with physical and mental health; (c) comparisons of resilience between AI and non-AI custodial grandparents; and (d) the psychometric analysis of resilience measures. Future research in this area can be advanced by investigating Alaska Native and First Nations samples. There is also limited use of comparison groups, which precludes the ability to compare and contrast findings regarding resilience in AIs with the general population or other racial-ethnic minority groups. In addition, several of these quantitative studies investigated resilience using low scores on the Geriatric Depression Scale (GDS-SF) as a proxy for resilience. As an aside, it is important to note that the experience of depressed mood is not necessarily indicative of someone who is not resilient. Future research in this area will benefit from directly examining the predictive validity of established measures of resilience among AI persons, especially since there is limited information on the validity of commonly-used depression measures with AI populations. As a case in point, Goins et al. (2013) noted that there is currently only one measure of resilience that has been validated for use with AI older adults. Future research will need to examine the validity of additional resilience measures to determine if they are culturally-appropriate and consistent with AI/AN/FN older adult conceptualizations of resilience.

Summary of Qualitative and Quantitative-Qualitative Studies

The nine qualitative-based studies published in the literature are cross-sectional investigations primarily focused on American Indian older adults, with only four studies examining Alaska Native or First Nations samples. Future studies in this area will benefit from expanding qualitative studies with these two groups, especially underrepresented First Nations older adults. In contrast to the qualitative studies, which primarily focused on individual resilience, the qualitative studies use broader conceptualizations of resilience, including family, community, and cultural resilience. Across these studies, thematic analysis ranked as the primary method of identifying themes, although other forms of data analysis such as narrative analysis, content analysis, and grounded theory were also used. Finally, the use of Community-Based Participatory Research (CBPR) methods and principles were evident in many of these studies, a fact that demonstrated these authors commitments to providing collaborative, equitable, empowering, relevant, and strength-focused research in partnership with tribal communities.

The qualitative studies were primarily focused on the following: (a) identifying major themes underlying resilience processes in AI/AN/FN older adults; (b) exploring how Indigenous culture and its associated worldview fosters resilience in AI/AN/FN older adults; (c) identifying aspects of resilience that allow AI/AN/FN older adults to overcome life challenges and adversity; (d) exploring the interconnection between historical trauma and resilience; (e) determining intergenerational differences in historical trauma and resilience; (f) identifying AI older adults' perceptions of resilience and resilience strategies that can be used to inform resilience education for youth; (g) defining successful aging in AN cultural Elders and its relationship with resilience; (h) exploring the reciprocal relationship between the wellness of AN cultural Elders and how they contribute to community resilience; and (i) identifying culturally-informed practices, values, and coping strategies that are linked to resilience in Yup'ik adults.

Although most studies identified in the narrative review used qualitative frameworks, Rivkin et al.'s (2019) innovative mixed methodology can be used to guide future research beyond simple qualitative analysis of interviews. In addition to identifying the most frequently reported coping strategies, the authors used a social network analysis program (i.e., ORA-NetScenes) to visualize and assess interrelationships between themes. This program also allowed the authors to identify several higher-order themes, which were connected in turn with culturally-specific concepts and values that provided unique insight into Yup'ik resilience.

Common Themes of Resilience in AI/AN/FN Older Adults

Resilience is supported through a holistic, relational, and spiritual worldview. The Indigenous worldview held by AI/AN/FN cultures is qualitatively distinct from the worldview of the dominant culture (Grandbois & Sanders, 2009). AI/AN/FNs hold a collectivistic worldview that often conflicts with individualistic orientations (Triandis et al., 1988; Vandello & Cohen, 1999; Walsh-Buhi, 2017; Yamauchi, 1998). This worldview guides the thoughts and behaviors of individuals throughout their lifetimes. It provides a sense of personal strength that can be drawn upon by accessing cultural resources that are not available to non-Indigenous peoples, such as storytelling, ceremonies, and other traditional practices (Grandbois & Sanders, 2009). These resources are linked to a strong sense of culture that transcends time and place, one that situates individuals' current difficulties in a larger collective experience and draws from the collective strength, resources, and resilience of previous generations (Wexler, 2014).

Resilience is an individual responsibility framed in a larger historical context. Resilience is not only a personal characteristic of individuals, but it is also an individual responsibly directedly tied to past historical trauma and colonization (Reinschmidt et al., 2016). The "legacy of survival" left by AI/AN/FN ancestors is embedded in the Indigenous worldview (Grandbois & Sanders, 2009). AI/AN/FN older adults often feel a sense of responsibility and obligation to honor the hardships and sacrifices of Indigenous ancestors, spurring many to work to ensure continued survival of their culture for future generations. Further, the wisdom and guidance of ancestors can be directly accessed through prayer, spirituality, and traditional healing (Grandbois & Sanders, 2009). This legacy of survival and continued connection to ancestors serves as a reminder of their resilience and a source of motivation. At the same time, it also provides a moral responsibility for current generations to remain resilient. This finding is further supported through the narratives of AI/AN/FM older adults, which revealed that the concepts of historical trauma and resilience are deeply intertwined for these individuals (Goodkind et al., 2012; Hatala et al., 2016; Reinschmidt et al., 2016; Wexler, 2014).

Resilience is supported through strong cultural and collective identities. A strong cultural identity was seen as an essential aspect of resilience across several studies (e.g., Grandbois & Sanders, 2012; Kahn et al., 2016; Wexler, 2014). Strong cultural identities were linked to: (a) knowing cultural heritage, history, and traditional knowledge; (b) drawing personal strength from Indigenous culture, (c) having a firm understanding of one's capabilities; (d) providing a sense of purpose and direction in life; (e) directing individuals towards the future; (f) overcoming acculturation stress and discrimination; and (g) allowing individuals to succeed in the dominant culture through improved education and employment opportunities. Strong cultural identities were believed to result from early interactions with parents and grandparents through the transmission of important cultural values and teachings. These early experiences resulted in a strong emotional grounding and the development of culturally-valued personality characteristics (Kahn et al., 2016). In addition to providing a strong moral compass and touchstones to navigate life, these lessons were used by older adults to transfer their cultural values, perspectives, and strengths into new situations, allowing them to get through difficult times (Wexler, 2014).

Related to having strong cultural identities, resilience was also linked with having collective identities through identification with the larger community, resulting in an increased sense of connectedness and the development of strong social bonds. As noted by Grandbois and Sanders (2009), "in contrast with the nuclear family system in the dominant culture, resilience is linked to inter and intra-dependence and connection to family, community, and tribal cultures, rather than as a single trait" (p. 577). In this sense, individual identity was directly tied to family and community strength, with individuals gaining personal strength from being part of supportive families and communities (Grandbois & Sanders, 2012; Reinschmidt et al. 2016).

Social support is an essential component of resilience. In the qualitative studies, social support was identified as a protective factor against depression (Burnette et al., 2017; Roh et al., 2015) and demonstrated a significant positive correlation with higher resilience (Goins et al., 2013). Although social support was clearly protective, there were inconsistent conclusions indicating whether social support is "equally protective" (i.e., Burnette et al., 2017) or "especially protective" (i.e., Roh et al., 2015) for AI older adults relative to the general population. Based on these findings, additional research is needed to determine if there are cross-cultural differences in the protectiveness of social support.

Similarly, in the qualitative studies, social support was identified as an important source of resilience among AI/AN/FN older adults. The centrality of social support in maintaining the resilience of AI/AN/FN older adults is supported by the following: (a) they identify their families and communities as their primary support systems; (b) they attain resilience from each other, their families, and their communities; (c) they draw strength from the support, closeness, solidarity, and unity they have with others; (d) they view their families and communities as important aspects of their own identities; (e) they gain strength from helping others and actively participating in their communities; (f) family and community provide important roles that contribute to their well-being; and (g) community serves to maintain connections to traditional language, culture, and traditions (Goodkind et al., 2012; Grandbois & Sanders, 2009, 2012; Kahn et al., 2016; Lewis, 2014b; Reinschmidt et al., 2016; Rivkin et al., 2019). Although resilience was primarily seen as an individual characteristic, it was deeply intertwined with maintaining interpersonal connections and community involvement (Reinschmidt et al., 2016). Importantly, these family and community connections appear to be reciprocal in nature (Lewis, 2014b). In addition to receiving support from their families and communities, AI/AN/FN older adults also benefit from providing support to others and contributing to the resilience of their communities.

Overall, these studies demonstrate the importance of social support in facilitating resilience in AI/AN/FN older adults. At the same time, spending time alone may also be protective (Rivkin et al., 2019). Although this finding does not necessarily contradict findings regarding the protective nature of social support, further research is needed to determine if being alone is a strategy for resilience.

In previous research, social support and connectedness have been identified as sources of resilience for AI/ANs against the development of depression (Hill, 2009; Mohatt et al., 2011). Among the various forms of available social support for AI/ANs, family relationships and connections with the community may be especially salient (Goins et al., 2017; Kelley & Small, 2016). In the general population, social support has long been recognized as a protective factor for physical and psychological health (Ozbay et al., 2007). Importantly, a consistent finding in the literature is that the functional dimension of social support is more important to maintaining health and resilience than the structural dimension (Charney, 2004; Southwick et al., 2005), with the quality of relationships being more important than one's quantity of relationships. Similarly, the perception of available social support tends to be more protective against depression than the actual use of these relationships (Bisschop et al., 2004; Karel, 1997; Shmuely et al., 2001).

Extending from the findings of the current literature review and literature in the general population, additional research is needed to determine if social support operates differently in determining the resilience of AI/AN/FN older adults, especially as it relates to the management of chronic health conditions. Importantly, social support appears to be particularly important as individuals grow older. Age-related losses in social networks (e.g., living alone, death of family and friends, less time spent with loved ones, and reduced engagement in community activities) can cause loneliness and the subsequent development of depression (Blazer, 2003; Djernes, 2006; Mazzella et al., 2010; Singh & Misra, 2009). An added burden exists for older adults with chronic illness, as these conditions negatively impact an individual's ability to engage with and maintain social connections due to health-related functional limitations (Bisschop et al., 2004).

Spirituality is an essential component of resilience. None of the quantitative studies in the narrative review examined spirituality as a source of resilience. However, many of the qualitative studies discussed the strength AI/AN/FN older adults derived from spirituality (Goodkind et al., 2012; Grandbois & Sanders, 2009; Hatala et al., 2016; Reinschmidt et al., 2016; Rivkin et al., 2019). In Grandbois and Sanders (2009), elders described how the ability to cope with life can be found through prayer, spirituality, and traditional healing practices. According to these elders, spirituality is deeply embedded in an Indigenous worldview, leading these elders to feel a deep sense of connectedness with nature, the Earth, and all creation.

In Reinschmidt et al. (2016), resilience was viewed as an individual responsibility that occurred in the larger context of history, family, community, and spirituality. Spirituality was found to support Indigenous identity at the community level, in combination with storytelling, cultural knowledge, and traditional practices. Although spirituality was a core aspect of resilience, it was not directly tied to a specific religion. Spirituality could be assessed through prayer, traditional ceremonies, and attending church. This echoes findings of Goodkind et al. (2012), who noted older adults used a combination of traditional and Christian practices. In Hatala et al. (2016), the cultural Elders discussed the conflict they had between traditional spiritual beliefs and Christianity. Some Elders reported an ability to successfully bridge these spiritual worlds by focusing on commonalities between the two belief systems, often finding their teachings were aligned with each other. The ability to balance these two worldviews provided sources of strength, well-being, and resilience. Notably, the Elders identified traditional stories as sources of continuity for Aboriginal culture and spirituality. This sense of continuity promoted resilience in the face of personal and social challenges.

Importantly, there were notable age differences related to spirituality in intergenerational studies of resilience. In Rivkin et al. (2019), older adults and middle-aged adults were more likely to use spirituality compared to young adults. Similarly, compared to parents and elders, youth were less likely to view spirituality as a coping strategy and source of support in Goodkind et al. (2016). This finding is consistent with previous research that found that older AI/ANs are more receptive than younger AI/ANs to viewing spirituality as a relevant coping resource for managing depression (Avey et al., 2018). Importantly, these age-related differences in spirituality may reflect the intergenerational disruption in the transmission of cultural knowledge. Prior to the American Indian Religious Freedom Act (AIRFA, 1978; P.L. 95-341), AI/ANs were prohibited from practicing their religious or spiritual traditions. Although the First Amendment to the U.S. Constitution established freedom of religion as an essential right for Americans in 1791, this fundamental right was denied to AI/AN persons for 200 years, and only 40 years have passed since AI/ANs could openly observe and practice their religious and spiritual traditions.

Literature reviews have demonstrated that spirituality is associated with improved mental health outcomes among the general population (AbdAleati et al., 2016; Bonelli & Koenig, 2013). Within AI/AN cultures, spiritual balance is recognized as an essential component of physical and mental wellness (Hodge et al., 2009; Hodge & Nandy, 2011; Hodge & Wolosin, 2015; Running Bear et al., 2018; Smyer & Stenvig, 2007; Yurkovich et al., 2011). Importantly, AI/AN spiritual coping and traditional healing practices are important contributors to positive mental health and include resources exclusively available to AI/ANs, including smudging, sweat lodge ceremonies, pipe ceremonies, and sun dance ceremonies (Kading et al., 2015; Portman & Garrett, 2006). Furthermore, AI/AN spiritual practices may differ enough from mainstream conceptualizations that they warrant expanded definitions of spirituality (U.S. DHHS, 2001). Relatedly, it has been suggested that spirituality measures may better predict depression when they are meaningful to AI/AN conceptualizations of spirituality (Running Bear et al., 2018).

Finally, it has been suggested that the centrality of spirituality to AI/AN culture "may be one of the most important differences underlying the cultural beliefs and expectations of [an] American Indian seeking health care" (Randall & Muneta, 2000, p. 26). Although no studies have examined CVD, asthma, or arthritis, spirituality has been identified as an important resource for managing diabetes in AI/ANs (Dill et al., 2015; Shaw et al., 2013). In Shaw et al. (2013), AI/ANs with diabetes saw spirituality as a guide to healthy behavior, a source of emotional support, a source of hope during difficult times, and a coping resource when diabetes management becomes challenging. Notably, one participant added that spirituality can act as a reliable source of support when this support cannot be obtained from social relationships.

Overall, based on the findings of the current narrative review and other research demonstrating the importance of spirituality in the physical and mental health of AI/ANs, additional research is needed to determine how spirituality distinctly manifests in AI/AN/FNs. Likewise, it is important for future work to examine how these differences can be harnessed to enhance the resilience of these populations.

"Walking in two worlds" presents challenges to the maintenance of resilience. Many of the qualitative studies described how resilience was supported through the balancing of enculturation and acculturation processes. This process was described as "living in two worlds," "walking in two worlds," and "negotiating between two worlds."[14] Across studies, the narratives of many AI/AN/FN older adults described the continual tensions of navigating the dominant culture while simultaneously maintaining traditional beliefs, values, practices, and expectations (Grandbois & Sanders 2012; Hatala et al., 2016; Wexler, 2014). In Grandbois and Sanders (2012), interviews from AI older adults indicated that the ability to successfully bridge these two cultures resulted in enhanced self-confidence and resilience. These older adults believed this process was facilitated by having a strong sense of pride in their culture that was instilled by their parents. These findings were similar to Wexler (2014), where culture provided a sense of inner strength and connectedness that allowed AN older adults to balance the competing demands of both cultures in order to be successful. In Hatala et al. (2016), FN cultural Elders described the difficulties of negotiating between these two worlds, especially in terms of their spiritual beliefs. Notably, several of the Elders approached the dominant culture with openness instead of resistance. According to Hatala et al. (2016), these Elders used strategies that "transcend the division between worlds by creating equivalences" by "focusing on their similarities, rather than their differences" (p. 1919). This balance led to the maintenance of

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[14] These descriptions are paraphrased from Grandbois and Sanders (2012) and Hatala et al. (2016).

cultural unity and continuity, with these Elders neither abandoning traditional culture nor completely rejecting the dominant culture. These Elders linked their ability to successfully bridge these two distinct cultural worlds to a preserved sense of self and improved psychological and emotional health.

Overall, these studies demonstrated how resilience is supported through the balancing of enculturation with traditional culture and acculturation to the norms of the dominant society. However, a recent literature review by Joo-Castro and Emerson (2021) indicated that these processes may not be straightforward with Indigenous populations. In their review, these authors found that enculturation, acculturation, and assimilation served as strategies for building resilience and reversing the impact of historical trauma. However, although enculturation was linked to increased resilience in most studies, other studies found that enculturation predicted historical trauma. Surprisingly, these authors also found that acculturation could be protective against historical trauma, as more acculturated individuals were less aware of historical losses. Given these mixed findings, additional research is required to explore under what circumstances these three processes contribute to or possibly counteract resilience in AI/AN/FN older adults.

AI/AN/FN cultural Elders serve as a unique subpopulation for exploring resilience. The unique resilience of cultural Elders was examined in two studies. Lewis (2014b) examined how family support and community involvement contributed to the successful aging of AN cultural Elders. Importantly, these Elders had several notable differences from other older adults that likely contributed to their resilience: (a) meaningful cultural roles in their families and communities related to being leaders, caretakers, role models, and bearers of cultural knowledge; (b) engagement in meaningful activities outside their immediate families; (c) increased opportunities for activities and engagement related to their cultural roles; and (d) a sense of generativity related to passing their knowledge down to future generations. Importantly, these unique cultural roles had positive impacts on their overall mental and physical well-being. Notably, these Elders were also found to enhance the resilience of their communities. In Hatala et al. (2016), cultural Elders discussed the importance of storytelling to their own health and well-being. In addition to transferring Aboriginal knowledge and culture to future generations, these stories were believed by the elders to transmit spiritual values, virtues, moral, and life lessons that could be used to guide individuals through challenging times in their lives.

In many ways, cultural Elders may serve as exemplars of resilience among AI/AN/FN older adults. Further research is required to determine: (a) the differences between Elders and non-Elder older adults that contribute to their enhanced resilience; (b) if these differences can be used to enhance the resilience of non-Elder older adults; and (c) how to increase the resilience of non-Elder older adults who do not have access to these cultural roles in their communities.

The Overlap of AI/AN/FN Resilience and Health Disparities

Based on the inclusion criteria of the current narrative review, there does not appear to be any research currently directed towards this important area of research. For instance, none of the 14 studies reviewed above examined resilience in the context of cardiovascular disease, diabetes, asthma, or arthritis. At most, Goins et al. (2013) collected demographic information on physician-diagnosed cardiovascular disease and diabetes in their examination of 160 AI older adults (55 years or older). However, they did not examine whether there were significant differences between those with and without these conditions on the two resilience measures evaluated in their study. Further demonstrating the general lack of attendance to physical health conditions in these studies, none of the other works in the narrative review reported the health characteristics of their samples. This observation is highly concerning given the demonstrated link between chronic health conditions and the development of depression, which can potentially disrupt resilience processes. Taken together, these findings demonstrate a clear research gap in the AI/AN/FN older adult literature regarding resilience and these four major health disparities.

In fact, upon further review, there appears to be a near absence of studies examining the overlap of resilience and these four specific health conditions within the general AI/AN/FN population. As a follow-up, this author conducted a brief scoping literature search using PsycINFO that was not limited to older adult populations.[15] In studies examining resilience in AI/AN/FN populations, one study examined CVD, four studies examined diabetes, and no studies examined asthma or arthritis. Notably, most of these studies were doctoral dissertations, with only one peer-reviewed journal article. Scarton et al. (2021) examined the association of psychosocial factors with health-related quality of life (HRQoL) among Cherokee adults (18 years or older) with and without type 2 diabetes. Although the authors explicitly examined resilience using the Brief Resilience Scale (BRS; Smith et al., 2008), the authors generalized their findings across all three age cohorts (i.e., 18-34 years, 35-54 years, and 55 years or older), which prevented findings related to the older adult age cohort from being discerned with clarity. Similarly, all four doctoral dissertations had limited applicability to older adult populations: Nelson-Majewski (2017) examined the association between resilience and CVD in adults (18 years or older) from the Cowlitz Indian Tribe in Washington; Carpenter-Iyengar (2020) examined resilience and diabetes risk in a rural Native American population from New Mexico;

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[15] The follow-up scoping literature search was based on four separate searches for each health condition. Each search used the same general search phrase used in the current narrative review: (American Indians OR Native Americans OR Alaska Natives OR First Nations) AND (resilience OR resiliency). However, for more specificity, this phrase was combined with “AND cardiovascular disease,” “AND diabetes,” “AND asthma,” “AND arthritis.”

Gomez Cardona et al. (2021) examined resilience in the context of evaluating the cultural appropriateness of depression and protective factor assessment measures using focus groups from the Mohawk and Inuit peoples of Quebec, Canada; and Kading (2017) identified themes related to resilience and coping in their examination of positive mental health among Anishinaabe adults (18 years older) with type 2 diabetes from two reservation communities.

Even without the confines of the inclusion criteria of the current narrative review, there is an obvious disconnect in the research literature between the risk represented by these four health conditions and how they function in the face of resilience among AI/AN/FN older adults. This glaring gap in the literature is highly concerning considering the disproportionate level of these health conditions these populations are expected to experience in their lifetimes. Mending the disconnection between these two bodies of research will be an important step moving forward, especially since gaps in knowledge may ultimately translate into gaps in services for AI/AN/FN older adults.

Summary of AI/AN/FN Sources of Resilience and Resilience Strategies

Based on the 14 individual articles in the narrative review, the following sources of resilience and resilience strategies were either (a) directly identified by AI/AN/FN older adult participants or (b) were extrapolated by this author from the articles' results and discussions. Notably, these aspects of resilience were collected from a broad range of samples, and as such they are not intended to represent universal aspects of resilience that apply to all AI/AN older adults. In addition, they are not presented in any specific order related to endorsement or utility. They are grouped into four major themes: (a) social support, connectedness, family, and community; (b) Indigenous culture and identity; (c) spiritual connection and strength; and (d) positive coping and personal healing.

Social Support, Connectedness, Family, and Community

- Using available social support and improving existing social support networks
- Maintaining connections with family, friends, and other community members
- Having feelings of worth and respect towards self, family, and community
- Providing and receiving help from others, including practical and emotional support
- Relying on family to overcome adversity and maintaining strong families
- Valuing intergenerational relationships and strengthening family relationships
- Engaging in traditional family roles such as parenting and grandparenting
- Remaining active and engaged in the community through meaningful activities
- Having a sense of shared purpose and commitment to “the people”
- Finding opportunities to give back to the community and youth
- Receiving family and community support to continue living independently
- Living with others, especially for individuals at risk of living alone

Indigenous Culture, Worldview, and Identity

- Drawing strength from the resilience of Indigenous ancestors
- Honoring the legacy of survival inherited from Indigenous ancestors
- Viewing the world from a holistic and relational Indigenous worldview
- Placing current personal challenges in a historical, cultural, and spiritual context
- Developing and maintaining a strong cultural identity
- Integrating a collective identity based on family and community connections
- Drawing on community resilience for personal strength
- Holding a sense of culture that transcends time, place, and discrete cultural activities

- Finding strength from ceremonies, storytelling, and other traditional practices
- Possessing important character traits and morals based on traditional values
- Using traditional values, morals, and practices as touchstones to navigate life
- Transferring cultural knowledge and teachings to new situations and challenges
- Using cultural grounding to get through difficult times
- Maintaining traditional values and traditions in the face of acculturation
- Not internalizing discrimination or negative cultural stereotypes
- Having the ability successfully bridge cultures ("walking in two worlds")
- Turning to cultural Elders for wisdom, guidance, and cultural knowledge
- Obtaining meaning and purpose through community roles as cultural Elders
- Maintaining a sense of generativity that benefits future generations
- Keeping tradition and history alive by passing knowledge down to youth

Spiritual Connection and Strength

- Finding time to be alone and reflect
- Drawing strength from prayer and connection with a higher power
- Connecting with nature and having a sense of oneness with all creation
- Turning to spirituality for the strength to endure difficult experiences
- Finding meaning in adversity and working towards acceptance
- Engaging in traditional healing practices and attending ceremonies
- Using Christian practices including reading the bible and attending church

Positive Coping and Personal Healing

- Maintaining a positive and optimistic outlook on life

- Maintaining a sense of agency in situations with limited control
- Dealing with the present instead of being focused on the past
- Avoid making situations worse, including avoiding and leaving certain situations
- Learning from past experiences and the past experiences of others
- Letting go of negative emotions, past stressors, or painful experiences
- Healing from past childhood trauma and household dysfunction
- Not allowing yourself to give up, get stuck, or feel sorry for yourself
- Reaching out for help and asking for advice
- Talking with others and letting emotions out, including professional therapy
- Focusing on personal growth and healing
- Reflecting on your own actions and their impact on others
- Engaging in adequate levels of stress management
- Staying busy by engaging in in work, chores, hobbies, or other activities
- Finding success in life through higher education and better employment

Limitations

Individual Study Limitations

As with all systematic literature reviews, one of the primary limitations of the current project is the inherent limitations associated with the individual studies. Most notably, all the quantitative, qualitative, and mixed methods studies used cross-sectional designs (i.e., investigating resilience at a single point in time). Additionally, small sample sizes, response biases, sampling and selection biases, limited generalizability, and the absence of Indigenous methodologies were identified as potential limitations across many of the studies in the review.

Cross-sectional designs. According to Wang and Cheng (2020), the use of cross-sectional designs has several limitations, including: (a) associations are difficult to interpret, (b) temporal relationships between variables cannot be investigated, and (c) causal inference cannot be determined. In this context, the lack of longitudinal studies in this area can possibly lead to an incomplete or faulty understanding of resilience. As discussed in Schure et al. (2013), the inability to determine the direction of causality through cross-sectional designs leaves open the possibilities that (a) adverse mental or physical health conditions lead to higher resilience and (b) these processes are occurring synchronistically. By following individuals over time through longitudinal studies, serial cross-sectional designs, or repeated interviews in qualitative studies, future research can hopefully clarify the directionality of resilience and lead to a clearer understanding of resilience in AI/AN/FN older adults. This approach may be particularly useful when investigating health disparities and resilience, where changes are likely to occur over time.

Sample size. Small sample sizes were particularly evident in the qualitative studies, where samples ranged from 4 to 37 AI/AN/FN participants. However, this is consistent with the nature of qualitative research, which emphasizes depth of information and where sample sizes cannot be determined a priori (Vasileiou et al., 2018). In addition, theoretical saturation (i.e., the point in the data collection and analysis process where no new themes emerge) is often used as the gold standard in qualitative research instead of sample size (Fusch & Ness, 2015). Although previous guidelines recommend using at least 12 interviews to reach saturation (Guest et al., 2006), Vasileiou et al. (2018) instead suggested that “qualitative health researchers be more transparent about evaluations of their sample size sufficiency, situating these within broader and more encompassing assessments of ‘*data adequacy*’” (p. 1). Based on these considerations, the critique of insufficient sample size may not apply to the studies included in the narrative review.

In contrast, the samples from the quantitative studies ranged from 112 to 233 AI/AN participants. Although these sample sizes may be considered small, they likely reflect the relatively small population size of AI/ANs, who are one of the smallest U.S. ethnic groups and only compromise between 1.1 to 2.9% of the total population (U.S. Census Bureau, 2021). Although determining minimum sample size is an essential step in quantitative research, the lack of existing effect sizes in the literature for resilience in these populations likely limited the researchers' ability to calculate a priori sample sizes. However, given the descriptive and exploratory nature of these studies, the sample sizes used in these studies are likely sufficient.

Response and information bias.[16] Given the nature of the construct being examined, quantitative studies of resilience may be influenced by demand characteristics (i.e., participants being aware of the purpose of the research and responding accordingly) and social desirability bias (i.e., responding in a socially acceptable that does not represent the person's true experience). Since many of the quantitative studies used self-administered surveys, the possibility exists that the respondents' answers may not accurately reflect the true nature of AI/AN/FN resilience processes. However, although these response biases can negatively impact the validity or reliability of survey findings, they are not unique to the studies in the review and can never be fully eliminated.

The use of open-ended interviews to investigate resilience may be prone to two types of information bias: interviewer bias (i.e., the tendency of the interviewer to obtain answers that support preconceived notions) and observer bias (i.e., prior knowledge leads the interviewer to ask questions differently or shape the course of the interview). However, to offset these potential

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[16] The bias definitions used here are provided by Johnson (2019) and Wang and Cheng (2020).

biases, many studies used semi-structured interviews, used multiple interviewers, developed interview guides, did not explicitly define resilience, used non-leading prompts, used follow-up probes to elicit additional information, and allowed the participants to review their transcripts. In the data analysis process, most studies safeguarded validity by using team consensus, assessing inter-coder reliability, and contacting the participants for further clarification or verification.

Notably, the responses of the participants may have been shaped by a general reluctance to disclose sensitive information. In the recent past, several high-profile studies were conducted unethically in Indian Country, leading to unjustifiable harm to Native populations and the erosion of trust in researchers (Christopher et al., 2008). In addition, past research has been criticized by AI/ANs as being disrespectful, misrepresenting Native culture, perpetuating cultural stereotypes, emphasizing deficits and problems, stigmatizing Native communities, exploiting Native populations to advance research careers, and for failing to give back or benefit the communities being researched (Native American Center for Excellence [NACE], 2010). In response, multiple efforts have been developed to guide ethical and collaborative research with Native communities (Beans et al., 2019; Woodbury et al., 2019; Yuan et al., 2014). Notably, the studies included in the current narrative review used many of these recommendations, including use of community-based participatory research (CBPR) methods, community engagement, embracing strengths-based perspectives, respecting privacy and transparency, the use of tribal liaisons, employing community-level protections, and sharing results with community members.

Sample and selection bias. As noted by Wang and Cheng (2020), cross-sectional designs are more susceptible to selection biases. In terms of sampling bias, several studies used non-probability convenience sampling strategies (e.g., community flyers, newspapers, online recruitment, recruitment at cultural celebrations, and the use of third-party organizations to develop lists of potential participants), which increase the possibility these samples are not representative of the overall AI/AN/FN population. In addition, several studies used snowball sampling (e.g., youth participants identified elder participants) and purposive sampling (i.e., researcher-identified participants). However, other studies used more stringent sampling procedures (e.g., age-stratified random samples based on tribal enrollment records). Regardless of the limitations associated with these sampling strategies and their associated threats to external validity, these procedures are often necessary when conducting research in Indian Country. In addition to addressing pragmatic concerns and engaging hard-to-recruit samples, these sampling methods are useful for generating hypotheses in emerging fields of research.

Additionally, selection biases may act as potential confounds when examining resilience in AI/AN/FN populations. Specifically, nonresponse bias (i.e., respondents may be categorically different from non-respondents) and self-selection bias (i.e., resilient individuals may be more likely to participate in research studies compared to non-resilient individuals) can lead to biased samples with limited generalizability. This may be particularly true in studies examining "cultural elders" (e.g., Hatala et al., 2016; Lewis, 2014b), who by definition, hold many qualities of resilience, are socially engaged, hold revered roles in their communities, and often want to give back to future generations. Although there is utility in examining highly resilient individuals, a more complete understanding of resilience processes should include a focus on individuals who manifest different degrees of resilience. Notably, all the studies in the current narrative review were limited to cognitively-intact, non-institutionalized, community-dwelling AI/AN/FN older adults.

Finally, these studies may suffer from a unique type of attrition bias related to the disproportionately high rates of mortality and premature death rates seen in Indian Country.

When researching resilience in older age, many AI/ANs may simply not have lived long enough to be participants in these studies. The loss of these individuals through health disparities may ultimately skew or limit our understanding of resilience in AI/AN/FN populations. In response, many studies are now beginning to use more inclusive age criteria and frequently demarcate the emergence of older adulthood at age 50 when investigating older adults in these populations.

Limited generalizability. As of 2022, there are currently 574 federally-recognized AI/AN tribes in the United States (U.S. DHHS, 2023), not including 63 state-recognized tribes and approximately 400 unrecognized tribes (National Conference of State Legislators, 2016; U.S. Government Accountability Office, 2012). Even without accounting for intra-tribal and inter-tribal cultural differences, AI/AN populations are a vastly heterogenous population. This fact has been a long-standing challenge and inherent limitation when conducting research with AI/ANs (Ericksen, 1997), especially as it relates to the generalizability of findings. Given that diversity is often the norm in Indian Country, Walters et al. (2019) highlighted that "[what] works in one tribe might or might not work with another, culturally distinct, community" (p. 5). Considering the current 9.7 million individuals who identify as AI/AN (U.S. Census Bureau, 2021), it can be argued no one study will completely generalize to the entire AI/AN population.

Regardless, despite active efforts from researchers to obtain representative samples, threats to external validity remained a persistent concern. Limited generalizability was discussed in all 14 individual studies of the narrative review, particularly the inability to generalize findings from one tribal group to another with high confidence. Notably, in the qualitative studies, several studies used large multi-tribal samples across multiple states. However, these authors still characterized their samples as geographically-constrained and questioned the relevance of their findings with tribes from different regions of the country. In addition, generalizability concerns were frequently noted in the qualitative studies, which relied by design on small sample sizes to generate theories for processes believed to be universal in AI/ANs. However, some researchers have recently begun to deemphasize generalizability when evaluating the rigor of qualitative research, instead focusing on meaning and providing in-depth explanations (Carminati, 2018).

Overall, the 14 studies were generally limited to cognitively-intact, non-institutionalized, community-dwelling AI/AN older adult samples. The degree these findings will generalize inter-tribally and to AI/AN subpopulations is a matter of debate punctuated by many nuances. Outside of the diverse cultural differences within and between AI/AN tribal groups, there are several unique distinctions among AI/ANs that may further lead to non-representative samples with limited generalizability: (a) AI vs. AN populations; (b) self-identified vs. tribally-enrolled participants; (c) reservation-based vs. urban samples; and (d) older adults vs. cultural Elders.[17]

Of the 574 federally-recognized tribes, 227 of these tribes reside in Alaska (Bureau of Indian Affairs [BIA], 2022). Despite ANs and AIs sharing many core values, Lewis (2014b) cautioned against the generalization of results from ANs to other Indigenous groups, including AIs. Although equating ANs with AIs makes conceptual sense given broad cultural similarities and their shared Indigenous identity, researchers may be employing faulty assumptions when extrapolating findings from ANs to AIs, or vice versa (Douglas, 2021; Duran, 2002). In addition to being geographically separated from AIs, ANs have unique genetic backgrounds and histories of colonization that are markedly different from AIs (Alaska Federation of Natives [AFN], 2021; Ritter, 2020). ANs also have their own distinct histories, oral traditions, knowledge systems,

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[17] To prevent confusion, the capitalized form of Elder will be used when referring to AI/AN cultural elders.

traditional values, healing practices, spiritual beliefs, family structures, and social norms related to reciprocity and collective responsibility (Bassett et al., 2012; Langdon, 2013; van Doren et al., 2023). Overall, these differences may limit the ability to draw parallels between ANs and AIs. In the context of resilience, van Doren et al. (2023) highlighted that "These Alaska Native cultural characteristics help illustrate the fact that resilience is strongly tied to culture and place; therefore, observations of resilience in one population are not necessarily transferable to others" (p. 2).

Another consideration when assessing the generalizability of AI/AN research relates to the unique federal trust responsibility with tribal nations that was established through the U.S. constitution and at least 370 treaties (National Congress of American Indians [NCAI], 2020).[18] In addition to protecting tribal sovereignty, the trust doctrine reflects the obligation of the U.S. government to "protect tribal lands, assets, resources, and treaty rights" (NCAI, 2020, p. 23). Notably, as a consequence of federal recognition, AI/ANs are the only racial-ethnic group legally required to prove their own identity and enroll to be a member of their own ethnicity. In the recent past, this was established by the federal government through the quantification of AI/AN ancestry using blood quantum. As expected, use of blood quantum leads to progressive declines in tribal enrollment numbers.[19] As it relates to the generalizability of AI/AN research, blood

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[18] Many of these formal treaties contained promises of federally-provided health care, education, housing, economic development, and other assistance to protect tribal self-government. Importantly, in light of common misconceptions of treaty rights within the lay public (i.e., "free money and benefits"), it should be highlighted that these rights do not expire and were granted *in exchange* for guarantees of peace and the formal ceding of land. As such, they represent "an exchange and acknowledgement of certain rights, not a grant of rights" (NCAI, 2020, p. 18).

[19] In the current "self-determination era" of federal-tribal relations, tribes can now establish their own enrollment requirements. Although alternative strategies have been established (e.g., direct descendancy and open enrollment),

quantum policies have created a fragmentation of Native identity, specifically as it relates to the distinction between “enrolled,” “descendent,” and “self-identified” tribal members (Schmidt, 2011). Given that tribal enrollment is required to access important resources such as healthcare through Indian Health Service, enrolled members of federally-recognized tribes may have certain advantages over non-enrolled members. Research has also shown significant differences in key health characteristics between these subpopulations. Small-Rodriguez and Akee (2021) found significant differences in the incidence and prevalence rates of chronic diseases and health-risk factors between tribally-enrolled and non-tribally enrolled AI/ANs, including heart disease, diabetes, and obesity. In the context of health disparities research, generalizations made from tribally-enrolled samples may not be applicable across all individuals with AI/AN heritage.

According to the U.S Census Bureau (2020), only 13.2% of AI/ANs (alone and in combination other races) reside within tribal statistical areas (i.e., American Indian Areas and Alaska Native Village Statistical Areas). Out of the 86.8% of AI/ANs who live outside these areas, approximately 60% live in metropolitan areas (National Council on Aging, 2023). Although a larger proportion of AI/ANs (alone) live within tribal statistical areas (26.1%), it is apparent that a greater preponderance of AI/ANs do not live on tribal lands including federal- and state-recognized reservations. In this sense, the ability to generalize research findings from AI/ANs who reside on reservations to urban AI/AN populations appears questionable. Further, James et al. (2018) highlighted that urban AI/ANs experience significant barriers to healthcare not faced by reservation AI/ANs, including the lack of IHS facilities within close proximately

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many tribes still rely on blood quantum. Concerningly, the continued use of blood quantum represents an existential threat to tribal sovereignty, which may result in AI/ANs “being defined out of existence” (Schmidt, 2011, p. 6).

and reliance on underfunded Urban Indian Health Programs (UIHPs). Similar to their reservation counterparts, research has shown that urban AI/ANs experience disproportionately high rates of medical illness including cardiovascular disease, diabetes, and arthritis (Castor et al., 2006; Jacobs-Wingo et al., 2016; Mannix et al., 2018; Marshall et al., 1992). Although research is limited in this area, Blue Bird Jernigan et al. (2015) suggested that "The urban AI/AN population experiences health disparities that are as significant as those faced by rural and reservation AI/ANs" (p. S378). Overall, despite urban populations representing the majority of AI/ANs, there are unique challenges experienced by this subpopulation that complicate generalizability, such as cultural disconnection, cultural identity conflicts, acculturation stress, discrimination, and limited family and community support (Brown et al., 2016; James et al., 2018). Taken together with the combination of high levels of medical illness and limited healthcare, these differences from reservation communities may particularly limit generalizability in AI/AN health research.

The final concern regarding generalizability within the individual studies of the current narrative review relates to the distinction between older adults and cultural Elders. Among AI/ANs, elder status does not directly correspond with older age, as not all Elders are older adults and not all AI/AN older adults are considered Elders. Lewis (2020, para. 17) characterized Elders as "the foundation of their community and the keepers of its meaning, collective wisdom, traditional stories and knowledge, and [who] provide direction and mentorship for younger generations." Elders are believed to possess multiple characteristics that have beneficial impacts on their physical and mental health (Hatala et al., 2016; Lewis, 2020, 2014b). Indigenous cultural generativity, defined as "any act of an older adult where they pass on traditional values, subsistence practices, language, beliefs, and any other activity that preserves and passes on the culture of the family and community" (Lewis & Allen, 2017, p. 218), has been identified as a protective factor for successful aging (Lewis, 2020). In the general population, generativity has been linked to feelings of mastery, life satisfaction, improved cognitive functioning, greater physical functioning, reduced morbidity, and decreased mortality (Lewis, 2020). Although further research is needed to understand the positive effects associated with the various cultural assets possessed by AI/AN Elders, it is clear that Elders represent a distinct subpopulation. Given that Elder status is an earned cultural role and responsibility, generalizations from research on AI/AN Elders may not be warranted when applied to AI/AN older adults, or vice versa.

Indigenous methodologies. None of the studies in the current narrative review explicitly used Indigenous methodologies. Although many studies used methodologies (e.g., CBPR and grounded theory) that are more appropriate for research in Indian Country, these methods are still grounded in Western assumptions and knowledge systems. Based on the distinction made by Kovach (2021), these approaches are better classified as *Indigenous research*, which covers a broad range of methodologies that typically aim to conduct respectful and ethical research with Indigenous people and communities. In contrast, *Indigenous methodologies* are methodologies that “are anchored in Indigenous epistemology, theory, ethics, story, and community” (p. 42). This distinction is similar to observations from Wilson (2008), who noted that *Indigenous research paradigms* are rooted in Indigenous ontology (i.e., theory of the nature of reality), epistemology (i.e., theory of how we know we come to have knowledge), axiology (i.e., theory of ethics or morals that guide the search for knowledge), and methodology (i.e., theory of how knowledge is gained).

Indigenous methodologies have many advantages to investigating Indigenous concepts. Indigenous methodologies benefit the community being researched by promoting cultural protocols, recentering marginalized knowledge, and operating in accordance with Indigenous ethics (Getty, 2010). Furthermore, Indigenous methodologies privilege Indigenous voices, empower Indigenous people, critically decolonize and reframe research, integrate Indigenous worldviews and knowledge systems, recognize and represent diversity of experiences, and focus on matters of importance to Indigenous peoples (Russell-Mundine, 2012). This stands in contrast to Western methodologies, which reflect Western agendas and have at times been viewed by Indigenous people as extensions of colonization (Bartlett et al., 2007; Smith, 2012). Although Indigenous methodologies (e.g., Chilisa, 2019; Kovach, 2021; Wilson, 2008) have primarily been used to inform qualitative research, they are now being applied to quantitative research. For example, Walter and Anderson (2013) developed a framework for Indigenous statistics.

Narrative Review Limitations

The narrative review process and methodology also had some important limitations. Most notably, the process was conducted by a single reviewer. According to Siddaway et al. (2019), best practice guidelines recommend the use of at least two separate reviewers, especially in the searching and identification stages of the systematic review. The use of one reviewer in the current study presents several challenges to maintaining an unbiased review, especially during critical decision points (e.g., planning, development of inclusion/exclusion criteria, decisions regarding borderline cases, the presentation of results, and the identification of themes). In addition, inter-rater reliability cannot be assessed. Despite these limitations, Siddaway et al. (2019) highlighted that the use of multiple reviewers is not always feasible. They furthered this statement by affirming that "[it] is possible that a single reviewer could correctly conduct an extremely high-quality and publishable systematic review" (p. 761).

In terms of the search parameters used to identify relevant research articles, there are inherent complications related to the nomenclature used to identify the target population.[20] In addition to “American Indian” and “Alaska Native,” the terms “Native American” and “First Nations” were used to maximize the return of potentially relevant articles. The terms “Indian” and “Indigenous” were not used as they may have inflated the search results by pulling studies from Asian Indian populations and all Indigenous populations across the globe. In terms of the current narrative review, the imperfect terminology used to describe AI/AN/FN populations may have limited the results obtained from the literature databases.[21] Furthermore, several studies in the narrative review directly referenced specific tribes or bands (e.g., Cree, Dine, and Yup’ik). Concerningly, given the extensive number of individual AI/AN/FN tribes and bands, PsycINFO and PubMed may have potentially missed relevant articles if more general descriptors were not also used in their title or abstracts. Although not conclusive evidence, 10 out of the 11 studies identified through PsycINFO and PubMed used the general terms “American Indian,” “Alaska Native,” “Native American,” or “Native” in their titles. In contrast, two of the three studies (i.e., Goodkind et al., 2012; Hatala et al., 2016) that were identified through reference searches and literature reviews had used the more specific terms Diné and Cree in their titles, respectively.

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[20] According to the National Congress of American Indians (2020), the term “Indian” is commonly used within tribal communities but may be offensive when used by non-AI/ANs. Additionally, the terms “Native” and “Native American” are problematic, as they refer to all Indigenous peoples in the U.S. and its trust territories, including Native Hawaiians and American Samoans. These terms may also encompass “[all] persons from Canadian First Nations and Indigenous communities in Mexico and Central and South America who are U.S. residents” (p. 11).

[21] In the current narrative review, the most accurate term to describe the target population is “the descendants of the original Indigenous people of *northern* North America” (i.e., American Indians, Alaska Natives, and First Nations).

Relatedly, during the development of the inclusion and exclusion criteria for the narrative review, Canadian First Nations older adults were added to the target population to increase access to resilience research that may be relevant to AI/AN older adults. This decision was based on the broad cultural similarities, shared Indigenous identity, and shared histories of colonization between AI/ANs and FNs. However, there are likely significant differences between these groups that may limit generalizations from the FN older adult resilience literature to AI/ANs. As noted with ANs, cultural characteristics related to resilience are strongly tied to culture and place (van Doren et al., 2023). As such, to the degree that these cultural characteristics (e.g., traditional values, healing practices, spiritual beliefs, family structures, and social norms) differ from AI/ANs, it may be overly simplistic to assume resilience operates equivalently in FNs. In addition, although FNs have also experienced colonization, there are unique differences in their history and relationship with the Canadian government. In many ways, FNs have significantly less practical sovereignty relative to AI/ANs (Cornell et al., 2002). Although FNs experience significant health disparities relative to the non-Aboriginal population (Wilson & Rosenberg, 2002), it cannot be assumed that the social determinants of health for FNs operate identically to AI/ANs. Furthermore, access to healthcare services through the First Nations and Inuit Health Branch (FNIHB) is limited (Mashford-Pringle, 2011). In the context of health disparities and resilience, these key differences may preclude straightforward comparisons with AI/ANs.

In determining the scope of the current narrative review, this author decided to focus exclusively on peer-reviewed journal articles published over the past two decades. This author did not include studies from graduate theses/dissertations, unpublished work, or gray literature.[22] As such, the comprehensiveness of the narrative review is potentially limited and subject to publication bias. Importantly, the exclusion of dissertations may be especially relevant when examining the overlap between health disparities and resilience in AI/AN/FN older adults. As noted previously, initial searches of the research literature indicated minimal overlap between these two constructs. In studies examining resilience in AI/AN/FN populations, one study examined CVD, four studies examined diabetes, and no studies examined asthma or arthritis. Notably, the study on CVD and three of the studies on diabetes were doctoral dissertations. Although inclusion of these studies may have been informative, a more detailed examination of these studies indicated that they would not have been included in the current narrative review because they were not focused on older adults or otherwise did not meet the age criterion.

Although in essence a narrative review, the current review is conceptually similar to a meta-synthesis, which is designed to "…synthesize qualitative studies on a topic in order to locate key themes, concepts, or theories that provide novel or more powerful explanations for the phenomenon under review" (Siddaway et al., 2019, p. 756). In addition, the current review shares many elements with mixed methods reviews, which combine the results from qualitative and quantitative studies to arrive at a more holistic understanding of the research landscape (Grant & Booth, 2009). However, unlike these methods, the current review does not directly assess quality assessment of the qualitative studies through generic appraisal instruments or appraisal process checklists. Furthermore, review of the quantitative studies did not examine

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[22] Gray literature is defined as electronic and print materials that are not produced by commercial or academic publishers (Siddaway et al., 2019). Examples include dissertations, conference proceedings, working papers, and research or technical reports from governmental agencies, scientific research groups, or private companies.

effect size metrics commonly used in meta-analyses such as *z*-transformed correlation coefficients and standardized mean differences (Hansen et al., 2022). Notably, effect size indicators, such as Pearson's *r* and Cohen's *d,* were not routinely used or reported in the five quantitative studies of the narrative review. In addition, most of these studies did not use comparison groups or report standard deviations, limiting the ability to calculate Cohen's *d*. However, many studies provided standardized regression coefficients (β) and coefficients of determination (R^2), which can be used to calculate Cohen's *f*-squared, an indicator of effect size in multiple regression analyses.[23] Although these metrics provide useful data, the primary aim of the current literature review was to provide a qualitative synthesis of the quantitative studies.

Relatedly, although the current narrative review was guided by Siddaway et al.'s (2019) best practice guidelines for systematic reviews, there is a persistent view among researchers that "systematic reviews are generally placed above narrative reviews in an assumed hierarchy of secondary research evidence" (Greenhalgh et al., 2018, p.2). In this sense, compared to narrative reviews, systematic reviews are believed to be more focused, more methodologically explicit, and less likely to be biased. However, in their discussion of the under-acknowledged limitations of systematic reviews and potential to skew the research landscape, Greenhalgh et al. (2018) posited that "… the narrative review is not a poor cousin of the systematic review but a different and potentially complementary form of scholarship" (p. 4). In many ways, the current review attempts to offset many of the existing critiques of narrative reviews, including methodological reproducibility, transparency, and limiting bias in the selection and interpretation of evidence. In contrast to research questions that simply require summarizing data, the research questions posed

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[23] Cohen (2013) suggests $f^2 = .02$, $f^2 =.15$, and $f^2 = .35$ indicate small, medium, and large effects, respectively.

in the current study require a more interpretive synthesis of the existing literature that focuses on clarification and insight (Greenhalgh et al., 2018). This point is further supported by Siddaway et al. (2019) in their statement that "[narrative reviews] can also be conducted and reported using the same replicable, rigorous, and transparent methodology and presentation" (p. 755).

Finally, the inclusion of literature reviews into the current narrative review was relatively limited in scope. This was guided by this author's active efforts to prevent the overarching themes identified in the literature reviews from biasing the analysis, interpretation, and synthesis of information across the 14 individual studies. For the purposes of the current narrative review, the literature reviews did not add much additional information beyond identifying two studies not indexed by PsycINFO and PubMed. In addition, most studies identified in the current narrative review were previously used in many of the relevant literature reviews. In many ways, this created a certain level of redundancy in findings, with certain studies overly shaping our understanding of resilience. Notably, the generalizability of the literature reviews is inherently constrained through the inclusion of non-Indigenous populations and intergenerational cohorts. Particularly, themes generated from multiple age cohorts may reflect resilience across the lifespan but may fail to capture the risks and stressors unique to older adulthood. It can be argued that (a) the presence of cardiovascular disease, diabetes, arthritis, and asthma; (b) the development of negative mental health outcomes associated with these conditions; and (c) the challenges of maintaining resilience in the face of major health disparities may distinctively frame resilience in a context that is not experienced by younger individuals. As such, resilience in AI/AN older adults may be a qualitatively distinct process. Furthermore, resilience strategies identified in the literature reviews may not be helpful, practical, or available for most older adults, especially in the context of the physical limitations associated with medical illness.

Research Recommendations and Future Research Directions

Based on the results of the current narrative review, research on the overlap between health disparities and resilience in AI/AN/FN older adults is practically non-existent. In addition, there have been minimal efforts to examine resilience in the context of the risk factors underlying the major health disparities found in Indian Country. For example, Zamora-Kappor et al. (2019) conducted a systematic review of obesity risk factors in AI/ANs in which the authors observed minimal information regarding resilience in this body of literature. At a minimum, future studies within the general area of AI/AN/FN older adult resilience should routinely collect, analyze, and report sample data regarding health conditions and health-risk behaviors. In examining the overlap between health disparities and resilience, future studies should move away from the overreliance on cross-sectional studies. Longitudinal quantitative and qualitative studies may be especially crucial to understanding the complex interactions between chronic health conditions and their impact on resilience as individuals face new age-related challenges.

Currently, the available literature on resilience in AI/AN/FN older adults is based on multiple varying definitions of resilience, including individual, family, community, and cultural resilience. To be more effective moving forward, future research in this area should work towards establishing a consistent, comprehensive, and culturally-informed definition of resilience as it applies to both AI/AN/FNs and AI/AN/FN older adults. Similar to efforts to adapt and develop culturally-appropriate measures of resilience with AI/ANs (e.g., Haroz et al., 2022), researchers will need to balance the competing dialectic between generalizability (i.e., the ability to identify universal aspects of resilience in AI/AN/FN communities) and specificity (i.e., limited relevance outside the specific community and cultural setting in which it was developed).

Relatedly, a consistent resilience definition can be used to direct the development of resilience measures for use with AI/AN/FN older adults. To date, only one measure of resilience has been validated with American Indian older adults: the abbreviated CD-RISC (Campbell-Sills & Stein, 2007). Although other resilience measures (e.g., Resilience Scale and Brief Resilience Scale) have been used to assess resilience in AI/AN/FNs, they have not been directly evaluated for use in these populations. In addition to evaluating the validity and cultural-appropriateness of these measures, future research should be directed towards the development of culturally-specific measures of resilience, especially those informed by AI/AN/FN conceptualizations of resilience. Complicating this process, many measures that are used to evaluate the validity of these measures have themselves not been evaluated for use with AI/AN/FN older adult populations.

Importantly, out of the many potential research directions moving forward, the adaptation and cultural-vetting of current resilience training programs established within the general population may provide the most immediate benefit to AI/AN/FN older adults. In addition to general psychosocial resilience training interventions (see Joyce et al., 2018), future research can assess the cultural-appropriateness of resilience interventions specifically designed for managing and coping with chronic health conditions. For example, Bradshaw et al. (2007) assessed the efficacy of a resiliency training approach for diabetes (RTAD) in adults with type 2 diabetes.[24] In this study, individuals who received the intervention had significantly higher levels of resilience related to "knowing positive ways of coping with diabetes-related stress, knowing enough about

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[24] The RTAD used in Bradshaw et al. (2007) consisted of a 10-module, 15-hour educational/experiential intervention designed "to assist people with type 2 diabetes to initiate and develop self-directed behavior change" (p. 652). This intervention (a) reinforced the American Diabetes Association's educational curriculum; (b) sequentially built on the concept of resiliency with each module; (c) explored skills to enhance mind, body, and spirit; and (d) enhanced the psychosocial enrichment of the individual and their supportive relationship with their environment.

themselves to make right diabetes choices, having fun in life, eating healthier, and increasing physical activity" (p. 650). Similar programs have been explored with cardiovascular disease (e.g., Burton et al., 2009) and asthma (e.g., Simonian, 1998). Although these interventions offer useful starting points, researchers may ultimately need to develop novel resilience training programs specifically designed for use within Indian Country. In addition to using culturally-informed conceptualizations of resilience, these interventions may need to be specifically tailored to address those health conditions that disproportionately affect AI/AN/FN older adults.

Future research examining resilience in the context of health disparities among AI/AN/FN older adults should be directed towards the following areas of inquiry: (a) assessing the associations between resilience and various physical health such as CVD, diabetes, asthma, and arthritis; (b) investigating potential synergistic effects related to having specific combinations of health conditions and their potential impact on resilience; (c) identifying the most relevant predictors of resilience in older adults with significant health problems; (d) identifying cultural characteristics of AI/AN/FNs that contribute to resilience and serve as protective factors against health disparities; (e) identifying barriers to maintaining resilience that are specific to certain chronic health conditions and normal age-related declines in functioning; (f) identifying characteristics of the most high-risk populations within AI/AN/FN older adults; (g) exploring which aspects of resilience involve passive versus active processes in order to determine the most modifiable aspects of resilience to guide resilience-based interventions; (h) exploring differences in resilience between AI/AN/FN older adults with significant health problems and younger age cohorts who also experience significant health problems; and (i) examining potential differences in the relationship between health disparities and resilience in underrepresented AI/AN subpopulations such as urban and non-enrolled tribal members.

In terms of informing policy and practice, future research in this area can investigate the following: (a) examining the degree to which resilience programming is incorporated into current biomedical and behavioral health services available to AI/AN older adults through IHS, UHOPs, and local tribal health programs; (b) determining if the available resources directed towards resilience are sufficient to meet the current needs of AI/AN older adults with health difficulties; and (c) investigating the sustainability of resilience programming within Indian Country.

Additional recommendations collected from the individual studies of the narrative review are provided in Table 1, Table 2, and Table 3. These recommendations are primarily directed towards the development of public health interventions, culturally-responsive biomedical services, culturally-relevant mental health services, and resilience-informed interventions.

Concluding Thoughts

Overall, the current systemic narrative review seeks to meet many of the goals for systematic reviews outlined by Siddaway et al. (2019): it attempts to be focused, methodical, comprehensive, transparent, replicable, unbiased, and critical. In addition, through this work, this author was able to (a) summarize and synthesize the extant research on resilience in AI/AN/FN older adults; (b) identify a significant literature gap regarding resilience in relation to specific and prevalent health disparities, and (c) develop a set of resilience strategies that can inform and guide efforts to maintain and enhance resilience.

Although the current narrative review has limitations, it has many notable strengths. It follows from a thorough review of four major health disparities in Indian Country that threaten to disrupt the resilience pathways of a population recognized for their resilience. It moves beyond a simple summarization and synthesizes the available literature to inform an area of research that is currently not being adequately addressed. The narrative review is guided by adaptability to the constraints of the available literature, while also being transparent in these unexpected modifications to ensure replicability. It balances presenting an unbiased examination of the current literature with a critical examination of key methodological issues and limitations. Finally, the review is guided by the goal of providing culturally-relevant and practical strategies for enhancing resilience that are understandable and immediately useful for AI/AN older adults.

Overall, there are multiple limitations to generalizability in AI/AN/FN research, many of which were reflected in the individual studies of the current narrative review. In many ways, simply noting limited generalizability as a study limitation has become almost cliché, precluding a deeper and more complex discussion that provides direction for researchers of Indian Country. In their critical examination of AI/AN health science research, Walters et al. (2019) outlined several considerations for researchers: (a) generalizability should not be conflated with significance; (b) studies seeking to expose newfound information within AI/AN communities and cultures are significant; (c) AI/AN history, traditions, worldviews, and resilience may have analogues across cultures; (d) the overall significance of a project should be balanced with contributions to advancing science; (e) generalizability concerns should be balanced with the potential benefit to a population that suffers disproportionately from health disparities; and (f) considerations of generalizability may be outweighed by the use of locally-specific and culturally-meaningful operationalization to identify culturally-specific risk or protective factors.

Based on the considerations of Walters et al. (2019), this author believes the current narrative review demonstrates meaningful significance at a level that outweighs potential concerns regarding limited generalizability.[25] The review is designed to synthesize information

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[25] In Walters et al. (2019), evaluations of significance are based on the following: (a) the degree to which the research is informed by community perspectives regarding health concerns that they prioritize or deem significant;

in a relatively new and emerging field of research. The results from the review are used to inform our understanding of resilience processes in several older adult populations that are currently understudied. The review focuses on two areas of importance to the health of AI/AN/FN communities: health disparities and resilience. The review contributes to the advancement of science by identifying a significant gap in research between health disparities and resilience in AI/AN/FN older adults. The review also advances directions for future research to narrow this research gap. The identification of resilience strategies used by AI/AN/FN older adults can be used to benefit these populations by informing resilience-based interventions, especially as they relate to the management of health conditions that disproportionately affect AI/AN/FN older adults. Finally, the review identified culturally-specific conceptualizations of resilience that can be used to improve current assessment and intervention practices with AI/AN/FN older adults.

Overall, given the centrality of an Indigenous worldview in understanding resilience in AI/AN older adults, future research in this area will undeniably benefit from the inclusion of Indigenous methodologies, whether in place of or in combination with Western-based methods. In reflection, it has been this author’s observation that the greatest potential limitation is not one based on Western methodologies, but instead, one which concerns the loss of meaning through the translation of Indigenous stories through a Western lens. Taking a step back and appreciating the larger context of the current narrative review, this entire process can be described as one in which Indigenous knowledge is taken from Indigenous voices, filtered through Western knowledge, collected again with other Indigenous voices using a Western methodology, and then

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(b) the degree to which scientific knowledge, technical capability, and/or clinical practice are improved; and (c) the degree to which concepts, methods, technologies, treatments, services, or preventative interventions are improved.

given back to Indigenous people in a form potentially void of its original meaning and context. As an Indigenous researcher, this thought is unbearable, recalling to mind every Indigenous researcher's greatest fear: bringing the knowledge back home, only to be met by the community with the anticlimactic response of "we've already known this" or "this isn't new to us." In many ways, the ultimate gauge of rigor for research with Indigenous communities is not significance, nor generalizability, but rather, *reciprocity*. This is an extension of the Indigenous value and obligation of giving back. Although one goal of the narrative review was to open non-Indigenous eyes, this author hopes this work ultimately serves the purpose of improving Indigenous lives.

As a final thought, in contrast with other forms of systematic reviews grounded in Western methodology (e.g., meta-analysis and meta-syntheses), the use of narrative review in the current study appears to resemble and parallel many aspects of the Indigenous worldview it is investigating, including the reverence placed on storytelling. In many ways, prior to the narrative review, the individual studies identified here were a collection of stories left untold. In this sense, the narrative review captured these stories through a focused search based on questions currently unanswered. In this process, this author let the individual stories speak for themselves, while also listening for underlying meanings and lessons that could be brought together to form a "story of stories." While bringing together the larger narrative, this new storyteller worked to fill in unspoken dialogue, eventually directing the emerging chronicle towards a focused conclusion, one that held the story of the resilience of the Indigenous elders of northern North America. Hopefully, through the completion of this review, this "story of stories" will be embraced and continued by others, becoming one that finds renewed purpose and meaning as it unravels into novel and unexplored contexts, and which hopefully, gravitates back home to these elders, reaffirming their resilience and offering new sources of strength in the face of health disparities.

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Table 1

Identified Studies Using Quantitative Methodologies

Study and Methodology	Sample Description	Resilience Framework	Study Purpose, Measures, and Key Results	Author Recommendations and Study Limitations
Goins et al. (2013) • quantitative methodology • cross-sectional design *Statistical analyses*: • internal consistency • item-total correlations • convergent validity • discriminant validity • confirmatory factor analysis (CFA)	*N* = 160 American Indian tribal members • 55 years or older • rural sample • tribally-enrolled members of a Southeastern U.S. tribe • data obtained from the Native Elder Care Study (Goins et al., 2011) *Mean age*: • 67.9 ± 9.9 years *Age groups*: • 55-64 years (*n* = 73, 45.6%) • 65-74 years (*n* = 50, 31.3%) • ≥ 75 years (*n* = 37, 23.1%) *Health conditions*: • diabetes (35.6%) • cardiovascular disease (31.3%)	*Resilience*: "a person's ability to successfully adapt to adversity" (Goins et al., 2013, p. 123)	*Purpose*: To compare the psychometric properties of a full and abbreviated resilience measure. *Measures:* • Conner Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003), abbreviated CD-RISC (Campbell-Sills & Stein, 2007), Centers for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), General Self-Efficacy Scale (GSE; Jerusalem & Schwarzer, 1992), Personal Mastery Scale (PMS; Pearlin & Schooler, 1978), Medical Outcomes Study Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991), handgrip strength, and body mass index. *Results*: • Both the full and abbreviated CD-RISC had adequate levels of internal consistency, convergent validity, and discriminant validity. • Both versions correlated highest with the CES-D, indicating that higher levels of resilience were linked with lower levels of depression. • The five-factor structure of the original CD-RISC was not replicated in the current AI sample. • A one-factor solution using all 10 items from the abbreviated CD-RISC provided the best fit. • Despite comparable reliability and validity, the abbreviated version had several advantages over the full CD-RISC, including having greater parsimony and a more stable factor structure.	*Recommendations*: • Results demonstrated greater support for the abbreviated CD-RISC with AI older adults. • The abbreviated CD-RISC has clinical utility in identifying those with low and high resilience. • In those with low resilience, brief resilience training can be used to help promote effective health behaviors and positive health-related outcomes. • In those with high resilience, the CD-RISC can be used to identity individual strengths that promote successful aging in AI older adults. *Limitations*: • Results were drawn from a single AI tribe, potentially limiting generalizability to other groups • Results may not be applicable to other age groups or older adults who live in institutional settings • Aside from the CES-D, all other psychometric measures have not been validated in AI populations • Relatively small sample size for conducting CFA analyses

Schure et al. (2013) • quantitative methodology • cross-sectional design Statistical analyses: • chi-square likelihood tests • Kruskal Wallis tests • logistic regression analysis • ordered logistic regression analysis • Poisson regression analyses	*N* = 185 enrolled American Indian older adults • 55 years or older • rural sample • tribally-enrolled members of a Southeastern U.S. tribe • data obtained from the Native Elder Care Study (Goins et al., 2011) *Mean age*: • 68.7 ± 10.4 years *Age groups*: • 55-64 years (*n* = 80, 43.2%) • 65-74 years (*n* = 54, 29.2%) • ≥ 75 years (*n* = 51, 27.6%)	*Resilience*: the ability to adapt in the face of adversity (Ong et al., 2006) *Resilience*: “a set of psychosocial behavioral qualities that enable one to thrive in spite of stressful events” (Schure et al., 2013, p. 27)	*Purpose*: To examine the association of resilience with measures of physical and mental health. *Measures:* • Abbreviated version of the Conner Davidson Resilience Scale (CD-RISC; Campbell-Sills & Stein, 2007), Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), mental health section of the SF-8 Health Survey (MCS-8; Ware et al., 2001), physical health section of the SF-8 (PCS-8; Ware et al., 2001) and the Chronic Pain Grade Scale (CPGS; Von Korff et al., 1992). *Results*: • Overall, 34% had high resilience, 41% had medium resilience, and 25% had low resilience. • Lower resilience scores were associated with higher CES-D scores, lower MCS-8 scores, lower PCS-8 scores, and higher chronic pain grades. • Notably, most participants (87%) did not score above the CES-D cutoff for depression. • In Model 1, resilience scores were associated with the CES-D, MCS-8, PCS-8, and chronic pain. • After controlling for demographics (Model 2), all variables remained associated with resilience. • After controlling for physical health (Model 3), only the associations of resilience with the CES-D and MCS-8 remained statistically significant. • In the fully-adjusted model (Model 4), only CES-D scores were significantly associated with resilience scores. When compared to participants with low resilience, participants with higher resilience had significantly reduced odds of having clinically-significant depressive symptoms.	*Recommendations*: • Research on resilience can be advanced by taking a biopsychosocial approach that examines biological, psychological, and social elements of resilience. This approach encompasses both family and community resilience. • A biopsychosocial approach may be especially relevant to AI populations, where community-level resources may be as important or more important than individual-level resources. • Resilience research with older AIs can be used to inform health promotion and disease prevention interventions (e.g., resilience training for diabetes; Bradshaw et al., 2007). *Limitations*: • Potential limited generalizability • The direction of causality for resilience cannot be determined • Resilience was measured primarily from a psychological perspective that did not examine biological or socio-environmental components • The authors did not assess other psychosocial measures/concepts previously shown to support resilience (e.g., social support)

Roh et al. (2015) • quantitative methodology • cross-sectional design Statistical analyses: • bivariate correlations • hierarchical multivariate regression analysis	*N* = 233 American Indian older adults • 50 years or older • rural sample • self-identified AIs who lived off-reservation • from two Midwestern U.S. states (South Dakota and Minnesota) *Mean age:* • 60.7 ± 8.4 years *Age range*: • 50 to 95 years	*Resilience*: classification of participants into the "normal" range of depressive scores based on the Geriatric Depression Scale-Short Form (GDS-SF; Sheikh & Yesavage, 1986)	*Purpose*: To examine risk and protective factors related to depression. *Measures*: • Geriatric Depression Scale-Short Form (GDS-SF), ACE Questionnaire (Felitti et al., 1998), and the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). Control variables included age, gender, education, living alone, and perceived health. *Results*: • The average participant ACE score was 2.6. • The average GDS-SF score was 2.28: 89.3% were classified in the normal range, 8.4% were classified as mildly depressed, and 2.3% were classified as moderate or severely depressed. • All three subscales of the ACE questionnaire were positively correlated with GDS-SF scores. Conversely, perceived social support was negatively correlated with GDS-SF scores. • Overall, demographics, ACE scores, and perceived social support accounted for 33.6% of the total variance in depressive symptoms. • In the final regression model, higher social support and better perceived health were associated with lower depressive symptoms. • In the final regression model, living alone was associated with higher depressive symptoms. Higher levels of childhood neglect and childhood household dysfunction were also associated with higher depression symptoms. Childhood abuse was not significantly associated with depression.	*Recommendations*: • Promoting healthy families and preventing childhood abuse/neglect may ultimately help prevent behavioral health problems for AI older adults. • AI older adults will benefit from improving their existing social networks and support received. This is especially important for those with functional limitations or who live in institutionalized settings that might interfere with social support. *Limitations*: • Potential limited generalizability to urban, homebound, and institutionalized AI populations • Information regarding tribal membership was not collected • Self-report responses may have been affected by socially desirability or reluctance to disclose sensitive information • The authors model did not include other common risk factors for depression (e.g., chronic health problems) • All psychometric measures used in the study have not been validated in AI populations • Cross-cultural differences in how depression is perceived or expressed might not have been captured by the GDS-SF

Burnette et al. (2017) • quantitative methodology • cross-sectional design Statistical analyses: • chi-square likelihood tests • t-test comparisons • hierarchical multivariate regression analyses	*N* = 479 American Indian/Alaska Native (*n* = 231) and Caucasian (*n* = 248) older adults • 50 years or older • rural sample • AI/ANs were self-identified • all participants resided in the Midwestern U.S. *Mean age*: • AI/ANs: 60.6 years • Caucasian: 74.0 years	*Resilience*: the ability to cope with adversity and bounce back from its negative effects (Greene, 2009)	*Purpose*: To examine racial differences in risk and protective factors for depression. *Measures*: • Geriatric Depression Scale-Short Form (GDS-SF; Sheikh & Yesavage, 1986), ACE Questionnaire (Felitti et al., 1998), and Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). Demographic variables included age, gender, education level, employment, income, living alone, and self-rated mental health. *Results*: • AI/AN older adults reported an average of 2.55 ACE exposures compared to Caucasians (0.83). • Mean scores on all three subscales of the ACE Questionnaire were higher for AI/ANs. • Notably, no significant differences were found between AI/AN and Caucasians in terms of either perceived social support or depression. • In the regression analysis, higher levels of childhood abuse and childhood household dysfunction were associated with greater depression for AI/AN older adults. In contrast, only childhood household dysfunction predicted depressive symptoms in Caucasian older adults. Childhood neglect was not significantly associated with depression for either group. • Higher levels of social support and self-rated health were associated with lower depressive symptoms. No racial differences were found for either social support or self-rated mental health. • Living alone was significantly associated with depression only for AI/AN older adults, representing a culturally-distinct outcome.	*Recommendations*: • The increased risks for depression and suicide among AI/ANs can be enhanced through treatments designed to (a) enhance social support networks and (b) support healing from past childhood trauma and household dysfunction. • AI/AN older adults, especially those at risk of living alone, may benefit from living with others. • Culturally-relevant AI/AN mental health services should be coupled with cultural, social, and spiritual elements. • These services should be aimed towards the building of social support and connectedness, while also addressing historical oppression and systemic inequality towards AI/ANs. *Limitations*: • The cross-sectional design and geographically-constrained sample present limits to causal inference and generalizability • All measures may have been affected by self-report biases • The authors model did not include other common risk and protective factors for depression • All psychometric measures used in the study have not been validated in AI/AN populations

Bailey et al. (2019) • quantitative methodology • cross-sectional design Statistical analyses: • bivariate correlations • tests of simple slopes • hierarchical linear regression analysis	*N* = 112 Native American (*n* = 49) and European American (*n* = 63) custodial grandparents • NAs were self-identified • all participants resided in Montana • participants were affiliated with the Montana Grandparents Raising Grandparents Project *Mean age*: • NA: 58.7 ± 7.6 years • EA: 59.6 ± 9.3 years	*Resilience*: "the ability to bounce back from adversity" (Bailey et al., 2019, p. 132) *Resilience (family and ecological)*: Resilience can be promoted or disrupted through the interaction of social-structural forces with individual and family functioning (Ungar, 2011) *Ecosystemic resilience*: "the product of transactions within and between multiple systemic levels over time (Waller, 2001, p. 294)	*Purpose*: To examine ecosystemic factors that contribute to or correlate with resilience among custodial grandparents from two racial groups. *Measures*: • Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), Resilience Scale (Wagnild & Young, 1993), Health-Promoting Lifestyle Profile II (HPLP-II; Walker et al., 1995), InCharge Financial Distress/Financial Well-Being Scale (IFDFW; Prawitz et al., 2006), social support (ordinal), rurality, and government assistance. *Results*: • NA grandparents were more likely to be single, employed, and living in rural communities. • NA grandparents scored significantly higher on the CES-D relative to EA grandparents. However, NAs had significantly higher resilience scores. • NA grandparents displayed moderately-high to high resilience scores, while EA grandparents only had moderately-low to moderate scores. • Main effects for resilience were found with economic stress and stress management. • A significant interaction was found between economic stress and government assistance. Economic stress was only associated with lower resilience among those not receiving assistance. • A significant interaction effect was found between economic stress and stress management. Economic stress was associated with lower resilience only among individuals who engaged in low or average levels of stress management.	*Recommendations*: • The resilience of NA custodial grandparents should be viewed within a larger ecosystemic context, including individual stressors, structural stressors, social support, government resources, and coping behaviors. • When building culturally-responsive interventions, the responsibility for change should not be placed exclusively on the individual or family, as social-structural forces often disrupt pathways towards resilience. • One-size-fits-all policies and interventions in rural communities and reservations may not account for the unique needs or circumstances of NA custodial grandparents. *Limitations*: • The convenience sample strategy may have resulted in limited generalizability • Potential sample bias (i.e., results may have differed for grandparents not affiliated with the Montana GRG Project) • Results may have been affected by self-report biases or response bias related to individual differences in family experiences (e.g., age, employment, rurality)

Table 2

Identified Studies Using Qualitative Methodologies

Study and Methodology	Sample Description	Resilience Framework	Study Purpose and Key Results	Author Recommendations and Study Limitations
Grandbois & Sanders, 2009 • qualitative methodology *Research design*: • traditional storytelling • basic interpretive analysis of life story interviews • identification of themes through use of category headings and reanalysis of data • verification of results with participants	*N* = 8 Native American older adults • 55 years or older • tribally-enrolled or self-identified as NA • from four unidentified tribal groups across four Midwestern U.S. states • maintained ties with their families and tribal communities • verbally indicated positive feelings about life • able to reflect and narrate their experiences *Age range*: • 57 to 83 years	*Resilience*: successful adaptation to life despite risk and adversity (Masten, 1994) *Cultural resilience*: "derived from the strength in family support systems, caring communities, strong identities, spirituality, cultural values, worldview, ceremonies and traditions" (Grandbois & Sanders, 2009, p. 569; HeavyRunner & Morris, 1997)	*Purpose*: To examine resilience in the context of adversity and life challenges. *Results*: 5 major themes emerged from the analysis: • *Resilience must be studied and understood within the context of the Native American worldview*. A Native worldview is holistic in nature. Native Americans have a shared history of survival that is embedded in their history and worldview. • *Resilience is embedded within Native American cultures*. Resilience is evident in NAs working to ensure the survival of their people and culture for future generations. They feel obligation to honor their ancestor's hardships and sacrifices. • *Native elders attain their strength and resilience from each other, their families, relatives, and tribal communities*. Resilience is embedded within a relational Native worldview and promoted through identification with the larger community. • *Resilience comes from the Oneness they feel with all creation*. The Native worldview is spiritual in nature and provides strength through ceremonies, storytelling, and other traditional practices. • *Resilience comes from a legacy of survival passed down by the ancient ones*. Native ancestors continue to provide wisdom and guidance for current generations. The ability to cope with life can be found through prayer, spirituality, and traditional healing practices.	*Recommendations*: • Strength-based approaches to building resiliency can be incorporated into physical and mental health services with NA older adults, including assessment and treatment. • The acceptability and effectiveness of these services can be improved by developing services in close partnership with Native American communities. • Services can be improved by using community members as cultural consultants to guide non-Native providers. • Communities will be best served by training their own tribal members in key fields. *Limitations*: • Results may have limited generalizability for (a) other tribal groups and (b) individuals with different acculturation processes or personal histories • Cross-cultural comparisons are needed to assess the external validity of the elders' conceptualization of resilience

Goodkind et al. (2012) • qualitative methodology *Research design*: • Community-Based Participatory Research (CBPR) framework • thematic analysis of individual ethnographic interviews • NVivo software • analytical memo writing, node analysis, and team consensus • clarification and verification with a tribal community advisory council	*N* = 37 Diné (Navajo) tribal members including youth, parents, and grandparents living on a reservation community *Age cohorts*: • youth $n = 14$, $\bar{x} = 13.8$ years, 12-17 years • parents/guardians $n = 15$, $\bar{x} = 40.4$ years, 24-49 years • grandparents $n = 8$, $\bar{x} = 68.5$ years, 54-90 years	*Resilience*: an outcome resulting from the use of developmentally linked regulatory processes such as coping skills and social support that help promote positive adaptation in situations involving either adversity or normal stress (Layne et al., 2017) *Community resilience*: “the ongoing maintenance of balance. The system itself (family or community) is responsible for achieving balance in response to changing contexts (Kirmayer et al., 2009, p. 71)	*Purpose:* To explore intergenerational perspectives on mental health, historical trauma, structural stressors, coping, and spirituality. *Results*: Two overarching themes emerged: (a) historical trauma and (b) healing, survival, and resilience. • *Historical trauma and youth*. Most youth did not feel directly impacted by historical trauma. • *Historical trauma and parents/guardians*. Most parents understood historical trauma but denied being directly affected themselves. • *Historical trauma and grandparents/elders*. Many elders expressed sadness about the loss of culture and traditions within their lifetimes. • *Resilience and youth*. Youth had limited active strategies for dealing with stress. They coped by turning to friends and family for support. Youth were less likely to identify with spirituality. • *Resilience and parents/guardians*. Prayer was the most common coping strategy used by parents. Other strategies included distraction, avoidance strategies, positive cognitive restructuring, and actively confronting problems. • *Resilience and grandparents/elders*. Notably, less than half the elders identified traditional practices that helped them cope. Several elders discussed the role of community resilience, viewing their ancestor’s survival and resilience as a source of strength for themselves and others. • *Summary*. Healing often involved multiple modalities and multiple levels of healers. Talking to family was the most frequently used strategy.	*Recommendations*: • Eurocentric notions of individual trauma and healing should not be imposed on problems rooted in social and structural injustice. • Interventions should be intergenerational and tailored to the needs, resources, and coping strategies of specific age groups. • An intergenerational approach can bridge the generational gap, leading to the strengthening of traditional coping mechanisms. • AI communities already have established healing modalities that can be used to support healing. Although there is wide variability in which strategies are employed, individuals ultimately benefit from having multiple and concurrent belief systems that promote individual resilience and collective healing. *Limitations*: • Potential limited generalizability • The Diné cultural belief that cautions against discussing difficult times from the past may have impacted the elders’ understanding or willingness to discuss historical trauma • It may be impossible to separate the intergenerational effects of historical trauma from current trauma, poverty, and oppression

Grandbois & Sanders (2012) • qualitative methodology *Research design*: • traditional storytelling • basic interpretive analysis of life story interviews • identification of themes through use of category headings and reanalysis of data • verification of results with participants	*N* = 8 Native American older adults • 55 years or older • tribally-enrolled or self-identified as NA • from four unidentified tribal groups across four Midwestern U.S. states • maintained ties with their families and tribal communities • verbally indicated positive feelings about life • able to reflect and narrate their experiences *Age range*: • 57 to 83 years	*Resilience*: personal attributes and environmental factors that result in lower rates of psychopathology later in life (Hoge et al., 2007) *Resilience*: "the ability to thrive, mature, and increase competence in the face of adverse circumstances" (Gordon Rouse, 1998, p. 1) *Cultural resilience*: Strong cultural identity that develops through traditional values, beliefs, teachings, and spirituality (American Indian Families Project [AIFP], 2005)	*Purpose*: To examine stories of resilience related to the negative effects of racial stereotyping. *Results*: 5 major themes emerged from the analysis: • *Having ability to successfully bridges cultures fostered resilience and self-confidence*. The elders were able to lead successful lives despite having to navigate the conflicting cultural beliefs, values, behaviors, and expectations of both their Indigenous culture and the dominant culture. • *A strong sense of identity was a core element of resilience*. Cultural identity, heritage, history, and traditional knowledge served as sources of strength that guided the elders throughout life. • *Being responsible and accountable inspired a sense of pride*. A "legacy of survival" allowed the elders to stay resilient in the face of contemporary adversity. The continual challenges of maintaining their traditional identity and culture were made easier by the elders having a deep sense of pride instilled in them when they were younger. • *Educational attainment and employment fostered resilience*. Elders often strived to improve their lives by seeking out opportunities for higher education and better employment. Their parents and grandparents served as positive role models. • *Cultural resilience*. Cultural resilience connected all the previous themes. The elders identified their families and communities as their primary support systems. These relationships provided support and were marked by closeness. Cultural resilience came from the elders "being proud of who they were as a people" (p. 394).	*Recommendations*: • Physical and mental health disparities among AI/ANs can be more effectively addressed by building on the unique conceptualization of resilience identified by the NA elders. • Health disparities in AI/AN communities can be better addressed by utilizing an ecological model of resilience. This involves fostering resilience at the individual, community, and cultural levels. *Limitations*: • Results may have limited generalizability for (a) other tribal groups and (b) individuals with different acculturation processes or personal histories • Results may also have limited generalizability for individuals with different educational levels and roles in their communities • Inter-tribal and cross-cultural comparisons are needed to assess the external validity of the elders' conceptualization of resilience

Lewis (2014b) • qualitative methodology *Research design*: • Community-Based Participatory Research (CBPR) framework • ATLAS.ti software • Grounded Theory analysis of individual interviews to identify major themes • use of kappa statistic for inter-coder reliability • follow-up focus groups to discuss results and obtain participant feedback	*N* = 36 Alaska Native older adults • all participants were cultural “Elders” in their communities • Athabascan, Aleut, and Yup’ik • from five villages in Southwest Alaska • data previously collected from Lewis (2011) Age range: • 61 to 93 years Elders were defined as “individuals who have demonstrated a lifetime commitment to cultural activities, participate in community and family activities, and are willing to share their experiences and wisdom to teach the future generations” (Lewis, 2014b, p. 79)	*Resilience*: “the ability to bounce back or overcome adversity” (McCubbin, 2001, p.2) *Community resilience*: “the ability of a community to establish, maintain, or regain an ’expected’ or ‘satisfactory’ level of community capacity in the face of adversity and positive challenge” (Bowen, 1998, p. 14)	*Purpose*: To explore (a) how family and community support facilitates healthy aging in AN Elders and (b) how AN Elders promote healthy and resilient communities. *Results*: • The majority of Elders identified their families and communities as key sources of support and important aspects of their identity and culture. • *Family Support*. Family assisted the Elders in maintaining the important and meaningful cultural role they held within their families and communities. This role contributed to their well-being and optimism. Elders felt involved, needed, and respected. Support was seen as reciprocal in nature. Immediate and extended family members provided support that allowed them to live independently, remain active members of their community, and permitted them to age in place in their home communities despite poor health. • *Community Support*. Community involvement provided the Elders with opportunities to engage in meaningful activities. It also led to a sense of engagement and support outside their immediate families. The relationship with their community was reciprocal in nature, with their community providing activities and opportunities. Members of the community provided support that helped the Elders continue living independently. They had a sense of generativity and based part of their identities on their community. The ability to give back and educate the youth in turn contributed to their own personal health and well-being.	*Recommendations*: • AN Elders benefit from aging in place, where they can fulfill their cultural roles and continue to obtain the necessary family and community support that is essential for their health and well-being. AN Elders similarly promote the health and resilience of their communities. • Elders can benefit from being included in community activities such as teaching in classrooms, leading workshops on traditional activities, and through the inclusion of traditional knowledge in schools. *Limitations*: • Potential limited generalizability to other AN groups with distinct traditional practices or who live in different environments • Potential limited generalizability to other Indigenous groups • The sample size was relatively small and did not assess successful aging in urban ANs • Potential age and gender differences were not analyzed

Wexler (2014) • qualitative methodology *Research design*: • Community-Based Participatory Research (CBPR) framework • Intergenerational Dialogue Exchange and Action (IDEA) method • focus groups • individual narrative interviews • NVivo7 sotware • code patterns and themes identified through research team meetings • article shared with tribal collaborators	Intergenerational cohort (*N* = 25) of self-identified Alaska Native (Inupiaq) youth, adults, and elders *Age cohorts*: • youth *n* = 11, 14-21 years • adults *n* = 7, 35-50 years • elders *n* = 7, 60+ years	*Resilience:* "the process by which people overcome acute and ongoing challenges" (Wexler, 2014, p. 73) *Resilience*: a process characterized by good outcomes despite the presence of adversity or threats to development (Luthar & Zigler, 1991; Ungar et al., 2005) *Resilience*: positive or unchanged behavioral and/or health outcomes despite acute hardship and/or sustained stress (Luthar & Zigler, 1991; Olsson et al., 2003)	*Purpose*: To examine the connection between indigenous culture and resilience across three generations of Alaska Natives who experienced different types and levels of cultural oppression. *Results*: • *Elders*. All the elders grew up with overt racism. Elders believed historical trauma led to personal and societal problems. Elders believed that culture linked them to their family, home, and traditions. This connection allowed the elders to transfer their values, perspectives, and strength into new contexts. Parents and grandparents taught the elders discipline and values that served as a moral compass. They reinterpreted and applied these old teachings to new situations they confronted. Elders learned to balance the conflicting and competing demands of the dominant society and Indigenous culture. • *Adults*. Similar to the elders, the adults linked historical trauma with contemporary problems. However, they also identified different strategies for responding to historical trauma such as becoming aware of injustice, asserting their Inupiaq culture, actively rejecting colonialism, working actively to regain what was lost, taking action, and working towards the future. • *Youth*. Youth often viewed community issues as personal struggles and generally did not link historical trauma to current problems. Youth had a constricted notion of culture that was limited to a discrete set of traditional activities. In contrast to elders and adults, youth did not identity family and cultural traditions as sources of strength.	*Recommendations*: • The resilience of younger generations can be fostered by educating them about the effects of historical trauma and how culture can be a source of resilience through adversity. • This will allow them to transfer their cultural knowledge to new and challenging situations as they grow into adulthood and older age. *Limitations*: • Potential limited generalizability to other AN groups and/or other Indigenous groups • The snowball sampling procedure (i.e., youth identified the elder participants) may have created sample bias and shaped the interpretation of resilience • Unlike the youth and elder cohorts, there were no focus groups for adults, which may affected data collection

Kahn et al. (2016) • qualitative methodology *Research design*: • literature review of resilience in Indigenous elders • individual narrative interviews • NVivo software • identification of pattern and thematic codes through four interviews • codes applied to all interviews by two researchers • intercoder-reliability measured in NVivo • research team and participants provided feedback of resulting thematic analysis	*N* = 13 American Indian older adults • 55 years or older • urban sample • self-identified AI • resided in Tucson, Arizona • were affiliated with the Tucson Indian Center (TIC)	*Resilience*: adaptation in the face of risk or adversity (Masten, 1994)	*Purpose*: To identify urban AI elders' perceptions of resilience and resilience strategies to inform resilience education for urban AI youth. *Results*: Three themes emerged from the narratives: • *Culture*. Five patterns were found under the theme of culture: (a) know tribal roots and history, (b) value intergenerational relationships, (c) engage in cultural activities, (d) draw personal strength from cultural teachings and values, and (e) build character traits from cultural teachings. Cultural values and teachings were sources of resilience that led to individual strength and the development of important character traits. Elders felt youth should honor the past, be proud of their heritage, and build their identity for the future. Connecting elders with youth was crucial for transmitting cultural beliefs, language, and traditional roles. Engaging in cultural activities taught the youth about their roles in life. Personal strength could be obtained through prayer and connection with a higher power. • *Youth activities*. This theme consisted of two patterns: (a) traditional activities and (b) contemporary activities. These activities were seen as strategies for fostering youth resilience. • *Education*. This theme consisted of four patterns: (a) support for education, (b) take responsibility for own education, (c) value parental involvement, and (d) enhance motivation for education. Elders felt education beyond high school or vocation training was required to be successful. Parents were essential to success. Youth were encouraged to use their education to make a good living and help AI communities.	*Recommendations*: • The resilience perspectives and strategies identified by the elders can be used to support resilience in AI youth. • Public health interventions should include the following components of resilience: promoting cultural knowledge and strengths, facilitating intergenerational relationships between elders and youth, increasing opportunities for participating in traditional cultural activities, promoting contemporary youth activities, and supporting education. • Youth resilience will be particularly enhanced through direct interactions with Elders who can share their own personal stories, cultural knowledge, and the resilience strategies they used to cope with adversity in their lives. *Limitations*: • Potential limited generalizability • All participants were affiliated with the TIC and mostly female, potentially causing sample bias • Most participants grew up on reservations or outside Tucson, thus projecting their early life experiences onto urban AI youth

Reinschmidt et al. (2016) • qualitative methodology *Research design*: • Community-Based Participatory Research (CBPR) framework • Combined consensus and thematic analysis of individual interviews • NVivo software • Deductive and inductive codes identified through consensus analysis • Codes were then applied through thematic analysis • Feedback solicited from research team and community advisory board	*N* = 13 American Indian older adults • 55 years or older • self-identified AI • urban sample • resided in Tucson, Arizona • received services from the Tucson Indian Center (TIC)	*Resilience*: "the capacity of individuals to navigate their way to health-sustaining resources … and a condition of the individual's family, community and culture to provide these health resources and experiences in culturally meaningful ways" (Ungar, 2008, p. 225) *Community resilience*: "relational and collective processes where individuals … and the larger environment are interconnected, yielding protective factors to counter adversities" (Reinschmidt et al., 2016, p. 65)	*Purpose*: To document urban American Indian elders' resilience strategies for coping with life stressors in the context of historical trauma. *Results:* Several subthemes emerged under two broad categories: historical trauma (HT) and resilience (R). • *Indigenous concepts (HT)*. Elders defined historical trauma in their own words, which were often linked with stories of resilience. • *Sense of loss (HT).* Elders felt a sense of loss related to the disruption of Indigenous traditions, language, beliefs, values, and family life. • *Contemporary adversities (HT)*. Elders felt the disruption of family systems resulted in a generation gap that led to the loss of culture. • *Indigenous concepts (R)*. Resilience is an individual responsibility that occurs in the context of history, family, community, and spirituality. • *Individual resilience (R)*. Elders saw resilience as a personal strength that was informed by identity, spirituality, and connectedness. • *Family resilience (R)*. Immediate and extended family members provide support, identity, role models, and cultural knowledge. Relying on family is a key strategy for overcoming adversity. • *Community resilience (R)*. Community helps facilitate long-lasting relationships based on mutual support and trust. Community also serves as a connection with traditional culture. Finally, community provides important resources, which may be limited or missing in urban settings. • A "Stories of Resilience Model," a strength-based model linking narratives of resilience with historical trauma, was developed by the authors.	*Recommendations*: • Resilience interventions should be targeted towards the well-being of individuals, families, and communities. They should be grounded in local knowledge, values, and practices. • Community resilience strategies can include traditional cultural ceremonies and culturally-based community resilience interventions. These efforts should involve close collaboration and coordination with local community members. • Resilience strategies utilized by earlier generations may be useful for current generations but may require adaptations due to differences in how each generation experienced historical trauma and resilience. *Limitations*: • Potential limited generalizability • The elders' narratives were not analyzed in the context of specific tribal affiliations, which limited the ability to find tribally-specific experiences or strategies • The analysis used Western-based qualitative methods instead of Indigenous methodologies, which may have provided different results

Hatala et al. (2016) • qualitative methodology *Research design*: • life history interviews and follow-up narrative interviews • the syntactical stage of analysis constructed and analyzed the overall sequence and syntactical structure of the interview data • the semantic stage of analysis identified predominant themes and reconstructed semantic networks • this resulted in a global semantic structure that identified key narrative themes and their interrelationships	*N* = 4 Canadian Creek older adults • tribal members • identified as cultural "elders" in their local communities • resided in central Saskatchewan, Canada *Age range*: • 53 to 83 years Elders were defined as individuals with "demonstrated abilities and reputations to serve their communities" (Hatala et al., 2016, p. 1915)	*Resilience*: "a characteristic of individuals, families, communities, or larger social groups and is manifested as positive outcomes in the face of historical and current stresses" (Kirmayer et al., 2011, p. 85) *Resilience*: "the capacity of individuals to navigate their way to health-sustaining resources … and a condition of the individual's family, community and culture to provide these health resources and experiences in culturally meaningful ways (Ungar, 2008, p. 225)	*Purpose*: To examine from a social constructionist lens how interpersonal responses to historical traumas and contemporary distress are interconnected with strategies for resilience. *Results*: Three processes related to resilience emerged: • *Resistance and survival*. Elders discussed the unequal power balance for Indigenous people. In the context of residential schools, subtle moments of resistance or disobedience gave them a sense of control, provided meaning, served as source of achievement, created solidarity, supported their Indigenous identity, and acted as a form of cultural resistance. • *Negotiating between worlds and cultural alignment*. Elders described the tensions of navigating between traditional culture and the dominant culture. The ability to "live in two worlds" preserved their overall sense of self, maintained cultural continuity, and supported their overall psychological and emotional health. • *The continuity and spirit of the story*. The elders discussed the importance of storytelling for Indigenous people and the role stories played in their own lives. They linked stories with their health and well-being. They viewed stories as the core mechanisms for transferring Indigenous culture and knowledge to future generations. They believed stories transmitted spiritual values, virtues, morals, and life lessons that helped guide people through difficult times. Stories provided continuity for Indigenous culture and spirituality.	*Recommendations*: • Given the intricate link between historical trauma and resilience, Aboriginal health should strive to examine both processes simultaneously when possible • Clinical or medical professionals should not treat historical trauma and resilience as uniform processes. • Cultural competence can be improved through the use of localized and patient-centered approaches that account for the idiosyncratic ways in which individuals seek health and well-being in the context of historical and contemporary struggles. • This approach can challenges beliefs that Indigenous people are passive agents, that all individuals are similarly impacted by historical trauma, or that there is one pathway to resilience. *Limitations*: • Potential limited generalizability with other First Nations groups • Potential limited generalizability with AI/AN populations • Small sample size • Potential sample bias (i.e., the participants were identified and recruited by the lead researcher)

Table 3

Identified Studies Using Mixed Quantitative-Qualitative Methodologies

Study and Methodology	Sample Description	Resilience Framework	Study Purpose and Key Results	Author Recommendations and Study Limitations
Rivkin et al. (2019) • quantitative-qualitative methodology *Qualitative analysis*: • individual interviews • ATLAS.ti software • ground theory was used to identify, develop, and inter-relate themes • inter-rater reliability assessed *Quantitative analyses*: • chi-square likelihood tests • social network analysis using ORA-NetScenes network analysis software	*N* = 60 Alaska Native adults • self-identified • from two rural Yup'ik communities in Southwest Alaska *Mean age*: • 45 ± 18 years *Age range*: • 18 to 84 years *Age cohorts*: • young adults (18-30 years) • middle-aged adults (31-50 years) • older adults (51-84 years)	*Resilience*: "community narratives that emphasize persistence, hope and survival in the face of loss can promote resilience, community transformation, and cultural revitalization… [which can] facilitate a strong cultural identity, resulting in greater psychological well-being" (Rivkin et al., 2019, p. 612)	*Purpose*: To examine coping strategies, cultural practices and values, and sources of hope, strength, and peace in relation to how Yup'ik adults, families, and communities coped with various life stressors. *Results*: • 28 coping themes were identified by at least 20% of the participants. All identified themes were used interdependently with the others. • Significant gender differences were found. Women were more likely to *turn to family* for support and identify their *kids and parenting* as sources of strength. In contrast, men were more likely to identify *subsistence activities* and *being alone* as important coping strategies. • Significant age differences were also found. Older and middle-aged adults were most likely to identify *spirituality* as a coping strategy. Middle-aged adults were most likely to endorse *learning from past experiences*, *letting go*, and *staying busy*. Compared to older adults, middle-aged and young adults more often identified *kids and parenting* as sources of strength. Young adults most frequently coped by *turning to family*. • Three groupings of the themes emerged from the social network analysis: *Ilaliurucaraq* (be welcoming), *Yuuyaraq* (Yup'ik way of life), and *Assircaarturluni Yuuyaraq* (try to live a better life).	*Recommendations*: • The coping strategies identified by the Yup'ik elders can be used to inform culturally-adapted mental health interventions. • These endeavors should be guided by local community members, support tribal self-determination, focus on program sustainability, and utilize tribal-specific cultural values and resources. • Programs should help support flexible and diverse coping repertoires. • Intervention planning should account for gender and age differences in coping. *Limitations*: • Potential self-selection bias • Results may have limited generalizability to other groups • Many elder interviews were conducted in Yup'ik, with potential non-equivalent concepts or loss of meaning when translated into English

Figure 1

PRISMA Flow Diagram