

THE UTAH WOMEN'S HEALTH REVIEW



The Center of Excellence in Women's Health

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Foreword

Executive Summary

The University of Utah's Center of Excellence in Women's Health, in collaboration with the Utah Department of Health and the Utah Women's Health Coalition, has prepared an interdisciplinary publication devoted to Women's Health in Utah-The Utah Women's Health Review. This review represents an overview of health situations and opportunities for improvement in community health in Utah.

The Utah Women's Health Review is an opportunity to highlight how far we have come in the last decade, since the Women's Health in Utah update was last published (<http://healthsciences.utah.edu/coe-womens-health/docs/coe-supplement-vol12.pdf>), and also to serve as a forum for updates. This review also sheds light on gender differences and the areas where gender disparities continue to exist, and brings to light new and unresolved health concerns that need to be addressed. In this publication we have thoughtfully considered the intersection of physical and reproductive health, social health, emotional health, occupational and financial health, environmental health, intellectual health and spiritual health.

The goal of this publication is to update knowledge surrounding women's health issues in our Utah community and beyond, as well as to create a tool that can be used to improve health for years to come and to serve as an open access home for publishing region-specific research. The Utah Women's Health Review also serves as a model for other Academic institutions and states to bring together interdisciplinary researchers, public health practitioners and women's health advocates to collaborate on a body of work that focuses on regional health issues.

The broad spectrum of articles highlights the reality that health is more than one dimension—and

that thinking of health in these multiple dimensions more accurately portrays the women's health challenges in public health.

Center of Excellence in Women's Health

The Center for Excellence in Women's Health (CoE) is a multidisciplinary group focused on enhancing overall health and wellness for women. We are founded on the 5 pillars of community outreach, clinical care, research, education and leadership development.

Our goal is to empower women of all ages with the knowledge to improve their health and the health of their families. The work of the CoE is based on:

- Respect, caring, compassion, and integrity
- Being non-competitive, non-hierarchical, and collaborative
- Evidence-based practices

We are supported in part by the Department of Obstetrics and Gynecology, the Office of the Vice President for Health Sciences, the Center for Clinical and Translational Science, the Office of Health Equity and Inclusion, DHHS Office on Women's Health, and the Office of Research on Women's Health. This review has been made possible in part by the Educational Resource Development Council at the University of Utah.

The 7 Domains of Women's Health

Everything we do is based on our philosophy that health is not just physical health, but also encompasses psychological/emotional, environmental, sociocultural, intellectual, economic, and spiritual – an approach we sum up as “The 7 Domains of Health”. We promote these domains through information, research, education, outreach programs and clinical care. The COE provides a great opportunity for people with a wide range of philosophies to network and share and develop innovative projects together.

HEALTHCARE COVERAGE AND ACCESS (ACA)

Rural-Urban Disparities in Health Outcomes and Access to Care among Women in Utah

**Matt McCullough/ Utah Department of Health
Office of Primary Care and Rural Health**

Abstract

Objectives: The aim of this research project is to enhance understanding of the current rural-urban disparities in health outcomes among women in Utah.

Methods: Percentages, confidence intervals and standard errors for fifteen health outcomes were calculated using age-adjusted data from the Utah Behavioral Risk Factor Surveillance System in order to compare rates for women in 63 rural, urban and frontier areas.

Results: Women in rural areas had lower (better) percentages in all eight of the outcomes relating to general physical and mental health, as well as chronic conditions. Women in rural areas had higher (worse) percentages in all seven of the outcomes representing access to care and preventive services. Frontier areas had higher (worse) percentages than both rural and urban areas in eleven of the fifteen outcomes; five of them were significantly higher.

Conclusion: Women in frontier areas in Utah have considerable challenges with both access to health care and preventive services, as well as general physical and mental health and chronic conditions. Women living in rural areas continue to struggle with access to care and preventive services, but have lower rates than urban areas in terms of a number of outcomes.

Introduction

The purpose of this research is to examine the rural-urban disparities in health outcomes among women in Utah. Urban, rural and frontier areas are considered in our analysis. Urban areas are classified as having a population of over one hundred people per square mile and make up only 5% of the land area in the State, although they contain approximately 75.5% of the total population. Rural areas are classified as having a population of six to ninety-nine people per square mile, make up 40% of the land area in the state of Utah and contain 21% of the population. Frontier areas have fewer than six people per square mile and cover 55% of the state but only contain 3.5% of the total population. A majority, 801,081 (80%), of women 18 and older reside in urban counties in Utah, while the remaining 206,426 women (20%) reside in the rural and frontier counties.

Health disparities are defined as the differences in care experienced by one population compared to another population (Agency for Healthcare Research and Quality, 2010). The reason dispar-

ities exist among populations are complex and may affect access, quality of care and outcomes (Egede & Bosworth, 2008; Institute of Medicine, 2002).

Comparisons between health outcomes and disparities among different genders, races, ethnicities, and socioeconomic situations are common in health assessments; however, disparities by geographic regions may also exist.

Poverty and access to care are two of the main reasons that disparities exist between women in rural and urban areas. Level of education, transportation challenges and adequate health insurance are also contributing factors. Lack of financial stability negatively affects access to health services and decreases health status. People who live in poverty often have a higher incidence of chronic diseases, including mental illnesses such as depression and anxiety. (Brown, 2015)

Understanding the disparities that women face is extremely important to society at large because poor health in women often translates into poor health for families, as women are often the ones

responsible for meeting the physical and emotional needs of family members (Cawthorne, 2008). In particular, obstetrics providers are in short supply in rural areas, and that lack of access has been linked with poorer health outcomes (Nesbitt et al., 1997). Due to the lack of supply of obstetrics providers, women in rural areas often rely upon family medicine physicians to provide this care (Cohen & Coco, 2009). Access to care in general has been linked with socioeconomic status (Dunlop et al., 2000) and geographic location (Glazier et al., 2004). Aday and Andersen argued that actual use of health services was determined by individual health needs, the predisposition to seek care, and a range of enabling or impeding factors (Aday & Andersen, 1974; Andersen, 1995). It has also been recognized that women live within complex and diverse social, economic, and environmental circumstances that influence options for health behavior and health care (Hankivsky & Christoffersen, 2008; Hankivsky et al., 2010). Disparities in health outcomes among women exist between racial and ethnic groups as well. Women of color fare worse than white women across a broad range of measures in almost every state, and in some states these disparities are quite stark (James et al., 2009). Preventive services such as breast cancer screening are lower in rural areas, and the result is that breast cancer in rural women is often diagnosed at a later stage compared to diagnoses in urban women (Rayman and Edwards, 2010). Lower screening rates may be attributable to lack of insurance, geographic maldistribution of screening facilities, and poor health literacy. Rural women are also less likely to receive preventive health screenings than urban women (Hageman et al., 2010). Disparities in mental health services have resulted in rural residents being far less likely than urban residents to receive mental health treatment (Hoge et al., 2007). A variety of barriers keeps people from seeking and receiving mental health care, including the cost of treatment, lack of awareness of mental illness, not believing that treatment is necessary, lack of time, not knowing where to go for services, and stigma surrounding mental illness (Mulder, 2012). Some of these barriers are am-

plified in rural and frontier communities due to the lack of anonymity in these communities (New Freedom Commission on Mental Health, 2004). The distance and time needed to access services, and the fact that rural residents are more likely to be uninsured and poorer than their urban counterparts, contribute to this disparity (Ziller et al., 2003). Conversely, some aspects of living in rural areas may help protect women's mental health. One study showed that women living on farms scored higher than average on mental health assessments (Hillemeier, 2008).

This analysis of the health outcomes among women in rural, urban and frontier areas in Utah addresses many of these disparities and the barriers that contribute to them. It also considers chronic conditions as well as access to care and preventive services and the impact of household income on each of these factors.

Methods

The Utah IBIS-PH Query System (Indicator-Based Information System for Public Health Data Resource) was used to evaluate age-adjusted aggregate data of small health areas from the Utah Behavioral Risk Factor Surveillance System (BRFSS) for fifteen different health outcomes. Data for 13 of the health outcomes that we analyzed were from 2012-2014. Cigarette smoking and physical inactivity data were from 2009 – 2014 due to the small number of survey responses in some areas. Age-adjusted rates, confidence intervals and standard errors for all fifteen health outcomes were calculated in order to compare rates for women in 63 urban, rural and frontier “small health areas.” Each small area contains a population ranging from approximately 20,000 to 60,000 persons. These geographic areas are particularly useful for public health assessment in Utah since the designation of each small area is based on specific criteria including population size, political boundaries of cities and towns, and economic similarity. In Utah, urban areas are classified as having more than one hundred people per square mile, rural areas are classified as having six to ninety-nine people per square mile, and frontier areas are

classified as having < 6 people per square mile. Since frontier areas typically are left out of health research, all three classifications are considered. We made the assumption that disparities would exist between rural and frontier areas, just as they do for rural versus urban areas. Seven of the outcomes address access to care and preventive services, while eight of the outcomes represent general physical and mental health including chronic conditions.

Age-adjusted rates are a weighted average, with each age-specific rate weighted by the proportion of people in that age group in the U.S. 2000 standard population. Age-adjusted rates control for age effects and allow for better comparability of rates across areas. These rates may also be used to control for age effects when making comparisons

across several years of data, as the age distribution of the population changes over time.

Confidence intervals were calculated for each of the health outcomes using the Utah IBIS-PH Query System. In this system the confidence factors are obtained by using SAS[®] software that requires specification of the percentage of the inverse gamma distribution to be excluded on either end of the distribution (2.5% for a 95% confidence interval), and the two parameters are associated with the distribution function: the mean and the variance. For this reason, it can be assumed that confidence intervals that do not overlap are highly likely to be considered statistically significant. Specific definitions of each health outcome used in the analysis are listed in Table 1.

Table 1. Data Definitions	
Health Outcome	Definition
Cost as a barrier to care	Unable to get needed care due to cost
Routine medical checkup	Not in the past 12 months
No personal doctor	No personal doctor or health care provider
Routine dental care	More than 1 year ago or never
Daily fruit consumption	Fewer than 2 servings
Cigarette smoking	Current smoker
Mammography screening	Mammography (Women 40+) More than 2 years ago or never
General health status	Fair or Poor health
Physical inactivity	No leisure time activity
Mental health	Past 30 days – 7 or more days not good
Depression	Ever been told by a doctor that you have a depressive disorder
Obesity	BMI 30+ (Overweight or obese)
Diabetes	Diabetes prevalence – Have diabetes
Cancer	Diagnosed with other cancer besides skin
Asthma	Asthma diagnosed by doctor

Adjusted linear regression was run using STATA[®] on each health outcome separately, in order to determine the association with household income (scaled per \$10,000). Poverty data were obtained from the Utah IBIS-PH Query System BRFSS data for 2015. This analysis is important since the lack of financial stability negatively affects both access to care and health status. People who live in poverty often suffer from higher rates of chronic disease and mental illness. Results of the adjusted linear regression are listed in Table 3.

Results

The results of the analysis document compelling evidence of the persistence of health disparities between urban, rural and frontier areas in Utah. Women in rural areas have lower (better) percentages in all eight of the outcomes relating to general physical, mental and chronic conditions. Conversely, women in rural areas have higher (worse) percentages in all seven of the outcomes representing access to care and preventive services. The only outcome that was statistically significantly lower in rural areas was obesity.

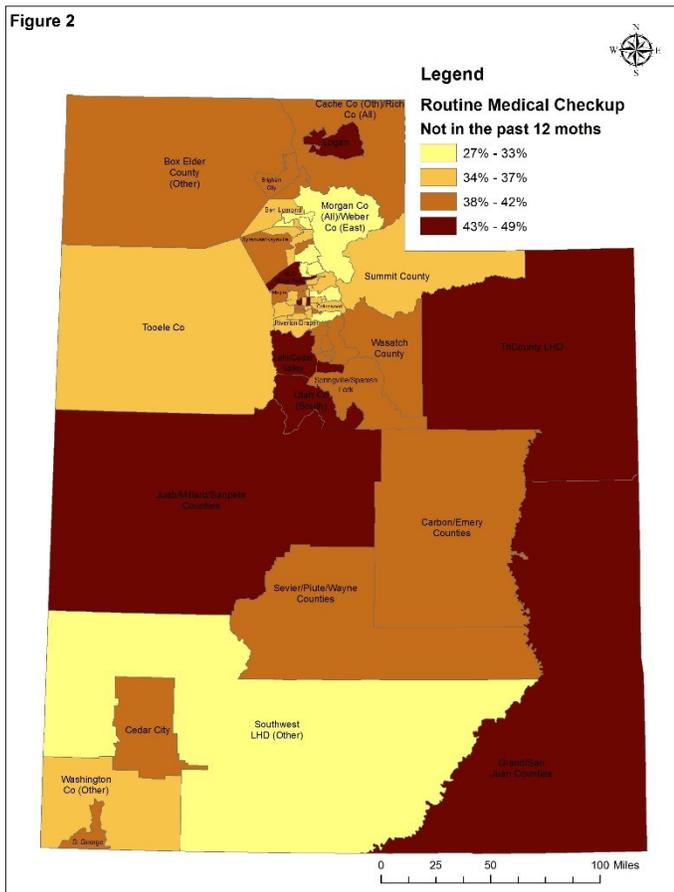
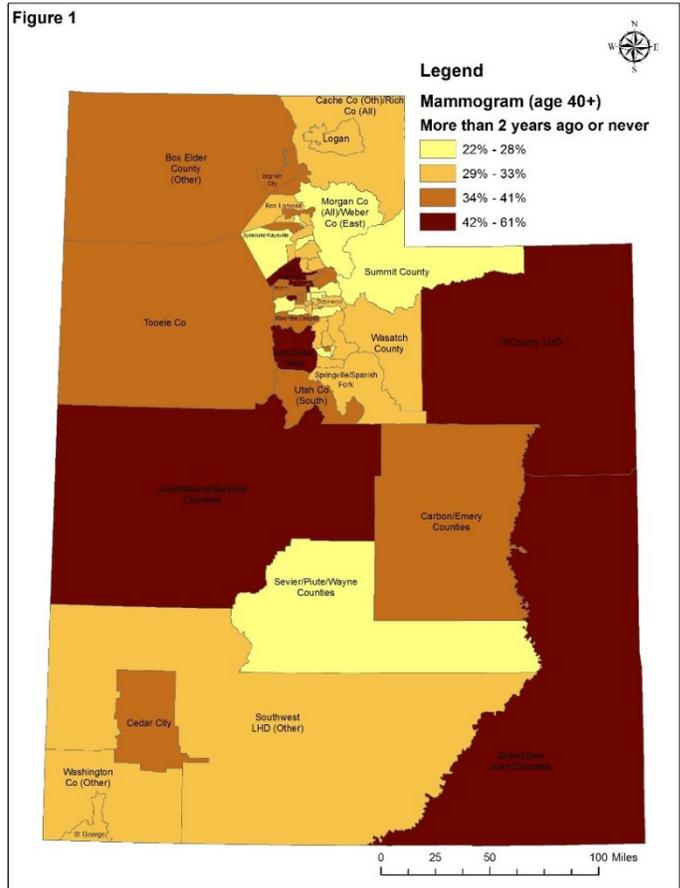
Depression and obesity percentages were both statistically significantly higher for urban areas than rural areas. Frontier areas had the highest percentages in eleven of the fifteen outcomes, and five of these differences were statistically significant. These five areas include routine medical checkup, daily fruit consumption, smoking, mammography screening and physical inactivity. Table 2 contains the percentages, confidence intervals and standard errors for each health outcome in rural, urban and frontier areas.

Health Outcome	Rural			Urban			Frontier		
	%	CI	Std Error	%	CI	Std Error	%	CI	Std Error
Cost as a barrier to care ¹	17.5	(15.9 – 19.1)	4.73	17.2	(16.4 – 18)	2.36	15.8	(13.8 – 18)	6.78
No routine medical checkup ¹	38.4	(36.4 – 40.5)	2.69	37.4	(36.5 – 38)	1.34	41.1*	(38.5 – 44.3)	3.57
No personal doctor ¹	20.1	(18.4 – 21.8)	4.34	19.5	(18.7 – 20)	2.14	15.1	(13 – 17.5)	7.48
Routine dental care ¹	28.6	(26.8 – 30.6)	3.41	27.8	(26.9 – 29)	1.7	30.1	(27.5 – 32.8)	1.7
Daily fruit consumption ¹	62.8	(60.5 – 65.1)	3.12	62	(60.6 – 63.1)	1.64	68.5*	(65.3 – 71.5)	5
Cigarette smoking ²	9.2	(8.4 – 10.1)	4.85	8.8	(8.4 – 9)	2.56	12.1*	(10.6 – 13.7)	6.5
No mammography screening ¹	33.8	(31.2 – 36.5)	4.01	33.5	(32 – 35)	2.23	40.4*	(36.7 – 44.2)	4.74
General health ¹	13.2	(11.9 – 14.7)	5.37	13.9	(13.3 – 15)	2.58	15.8	(13.7 – 18.1)	7.13
Physical inactivity ²	18.1	(16.6 – 19.6)	4.25	19.5	(18.6 – 20.3)	2.26	22.7*	(20.4 – 25.1)	5.3
Mental health ¹	18.6	(17 – 20.3)	4.47	19.4	(18.6 – 20.2)	2.13	21.3	(18.8 – 23.9)	6.06
Depression ¹	25	(23.3 – 26.8)	3.62	27.9*	(27 – 29)	1.63	26.9	(24.4 – 29.5)	4.84
Obesity ¹	22.6*	(20.9 – 24.3)	3.86	25.4*	(24.5 – 26)	1.88	26.5	(24 – 29.1)	4.95
Diabetes ¹	6.4	5.6 – 7.4)	7.06	7.3	(6.8 – 8)	3.38	7.5	(6.6 – 8.8)	7.78
Cancer ¹	6.7	(5.9 – 7.7)	6.74	6.8	(6.3 – 7)	3.48	6.9	(5.6 – 8.4)	10.24
Asthma ¹	9.7	(8.6 – 10.9)	6.21	11.1	(10.5 – 11.8)	3.01	10.4	(8.7 – 12.4)	9.15

¹ BRFSS: 2010-2014
² BRFSS: 2009-2014
* Statistically significant

Frontier areas had the lowest percentages for cost as a barrier to care and having no personal doctor. This seems to suggest that even though women living in frontier areas do not have as many routine medical checkups or mammography screenings, they are more likely to have a personal doctor and they do not consider cost as a barrier to care as often as women in rural and urban areas might. The percent of women who have had no mammography screening in the past two years or never was highest in frontier areas (40.4%) followed by rural (33.8%) and urban (33.5%). Figure 1 is a map of the percent of women over age 40 who have not had a mammogram in the last 2 years or never.

The percent of women who have not had a regular medical checkup in the past twelve months was also highest in frontier areas (41.1%) followed by rural (38.4%) and urban areas (37.4%). Figure 2 shows the percent of women who have not had a routine medical checkup in the past twelve months.



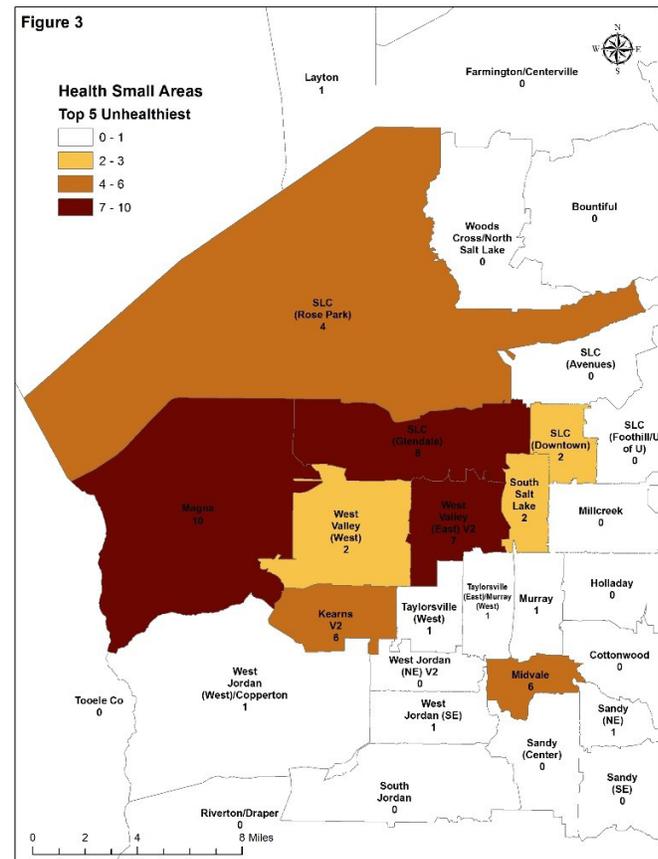
The percentage of women with poor mental health was highest in frontier areas (21.3%) followed by urban (19.4%) and rural (18.6%). On the other hand, depression was lowest in rural areas (25%) followed by frontier areas (26.9%) and then urban areas (27.9%).

The percentages of obesity, diabetes, cancer and asthma were higher in urban areas than in rural areas. Obesity, diabetes and cancer percentages were the highest in frontier areas but none of them are statistically significantly higher. The percentage of women who use cigarettes was the highest in frontier areas (12.1%), followed by rural areas (9.2%) and then urban areas (8.8%). The percentage of women who use cigarettes in frontier areas was so much higher than in rural areas that the difference was statistically significant.

The highest percentage of women with asthma was in urban areas (11.1%), followed by frontier (10.4%) and then rural (9.7%). The higher percentage of women with asthma in the frontier areas than rural areas may be linked to occupational and environ-

mental conditions such as dust and agriculture. One of the unexpected findings of the analysis revealed that five of the “small areas” were frequently ranked in the top five unhealthiest small areas in the state in each outcome analyzed. These five areas are all located in the Salt Lake Valley and include Magna, Glendale, West Valley (East), Kearns, and Midvale. Figure 3 is a map of the Salt Lake Valley and shows the locations of the five small areas that were most frequently in the top five unhealthiest areas for each health outcome. Magna is in the top five unhealthiest areas in 10 of the 15 outcomes, compared to Glendale (8), West Valley (East) (7), Midvale (6) and Kearns (6). These areas should be of particular concern due to the high number of poor outcomes facing women in these areas.

Adjusted linear regression was performed on each health outcome with household income, and the results are listed in Table 3. All of the health outcomes show statistically significant negative associations with household income except for cancer (P=0.469). Routine dental care had the highest beta value (-3.21) followed by general health status (-2.16), physical inactivity (-1.90), fruit consumption (-1.86) and no personal doctor (-1.85). The smallest beta values were cancer (-0.11), asthma



(-0.63), diabetes (-0.71), no routine medical checkup (-0.77) and mental health (-1.15). These values can be viewed as indicators of the strength of the association that household income has on these health outcomes.

Health Outcome	Beta (95% CI)	p-value	R-squared
Cost as a barrier to care	-1.79 (-1.16, -2.42)	<0.01	0.36
Routine medical checkup	-0.77 (-0.05, -1.49)	0.035*	0.07
No personal doctor	-1.85 (-0.98, -2.71)	<0.01	0.24
Routine dental care	-3.21 (-2.49, -3.92)	<0.01	0.39
Daily fruit consumption	-1.86 (-0.99, -2.74)	<0.01	0.19
Cigarette smoking	-1.52 (-1.02, -2.02)	<0.01	0.32
Mammography screening	-1.76 (-0.62, -2.90)	<0.01	0.14
General health status (Fair/Poor)	-2.16 (-1.57, -2.76)	<0.01	0.45
Physical inactivity	-1.90 (-1.22, -2.58)	<0.01	0.26
Mental health	-1.15 (-0.55, -1.74)	<0.01	0.21
Depression	-1.37 (-0.83, -1.91)	<0.01	0.21
Obesity	-2.45 (-1.63, -3.27)	<0.01	0.27
Diabetes	-0.71 (-0.39, -1.04)	<0.01	0.17
Cancer	-0.11 (-0.20, -0.44)	0.469	0.008
Asthma	-0.63 (-0.30, -0.97)	<0.01	0.15

Adjusted linear regression models were run for each outcome separately.

*p<0.05

The five areas that were most often included in the top five healthiest areas in Utah for each health outcome are Cottonwood Heights, Sandy (SE), SLC (Foothill/U of U), Orem (East), and Farmington/Centerville. All are located in the 1st quartile of household income, suggesting a strong association between good health and high income. Conversely, the five areas that were most often in the top five unhealthiest areas in Utah for each health outcome are Magna, Glendale, West Valley (East), Midvale, and Kearns; these areas are spread out between the 2nd, 3rd, and 4th quartiles. This finding suggests that poor health is also associated with lower income, but not as strongly as good health is with higher income. The variance may be due to environmental factors, race/ethnicity and culture, educational level, physical activity, and individual- and neighborhood-level social and behavioral factors.

Discussion/Implications

This study demonstrates that health disparities exist between women in urban, rural and frontier areas throughout Utah. The type and extent of disparity differ for each of the three demographic areas we examined. The greatest disparities exist in the frontier areas, where five out of the fifteen health outcomes examined are statistically significantly worse than in urban as well as rural areas. Moreover, five areas in the Salt Lake Valley have particularly high percentages of obesity, fair/poor general health, diabetes, physical inactivity and no routine dental care. The counties that make up the TriCounty Local Health Department are classified as rural areas and had particularly high percentages of smoking, no routine medical checkup, fewer than two servings of fruit per day and no mammogram in the last two years for women over age 40. Frontier areas facing particular challenges with poor health outcomes include Carbon/Emery Counties (smoking and cancer), Grand/San Juan Counties (routine medical checkup, no personal doctor, no mammogram) and Juab/Millard/Sanpete Counties (no routine medical checkup and no mammogram).

Among the six highest percentage areas in Utah for having no routine medical checkup in the past twelve months, two are frontier (Grand/San

Juan Counties and Juab/Millard/Sanpete Counties) and two are rural (TriCounty LHD and Utah County (South), while the two urban areas are Lehi/Cedar Valley and Provo (South).

The evidence that frontier and rural areas continue to struggle with access to care and preventive services is perhaps the most important aspect of this paper. Women living in frontier areas such as Grand, San Juan, Juab, Millard and Sanpete Counties have particularly high percentages of having no routine medical checkup in the past 12 months (45.5% – 49%) and no mammography screening in the last two years or never (46.44% - 60.88%).

The five areas with the highest percentage for having no leisure time physical activity were Magna, Rose Park, Glendale, Kearns and West Valley (East), four of which (Rose Park being excluded) are in the top five most unhealthy areas overall. This brings out a discussion point regarding access to physical activity opportunities in these areas, including walking/biking trails, gyms, parks, open space and outdoor recreation locations. The five areas with the lowest percentages of physical inactivity (Orem (east), SLC (Foothill/U of U), SLC (Avenues), Holladay and Cottonwood Heights) are all located along the foothills of the Wasatch Front and appear to have good access to trails, parks, gyms and open space, although a more in-depth analysis of this statement should be considered for future research.

We recommend further analysis regarding access to care and preventive services for women in frontier and rural areas. The Federal National Health Service Corps (NHSC) Loan Repayment, Scholarship, and NURSE Corps programs are critical for addressing the healthcare workforce shortage, in particular in rural areas. Currently there are 134 healthcare providers in Utah who are affiliated with the NHSC programs. The State of Utah also has a number of programs aimed at addressing healthcare workforce shortages. These programs are the State Primary Care Grants (SPCG), Rural Physician Loan Repayment Program (RPLRP), and the Healthcare Workforce Financial Assistance

Program (HWFAP). The combined effect of both Federal and State programs supply 127 healthcare providers to frontier and rural areas (58 frontier and 69 rural). These programs exist to offer financial and other support to primary care providers and healthcare facilities in medically underserved communities throughout Utah.

In conclusion, women living in frontier areas in Utah have significantly higher percentages of having no routine medical checkup in the past twelve months, consume fewer than two servings of fruit

per day, currently smoke cigarettes, have not had a mammogram in the past two years (if ever), and participate in no leisure time physical activity. On the other hand, women living in urban areas have significantly higher percentages of depression and obesity than women in rural areas. These disparities, which are likely to be caused by multiple factors, highlight some of the primary issues facing access to healthcare and health outcomes among women in Utah.

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Oral Health Care and Accessibility in Utah

Sydney K. Willis / University of Utah

Background

Nearly half of Americans are diagnosed with periodontal disease, of whom an estimated 40% suffer from moderate to severe periodontitis. (Eke et al., 2012) Periodontal disease is a broad term for conditions that cause inflammation and destruction of the gums and the structures surrounding the teeth, such as gingivitis and periodontitis. (Jared & Boggess, 2008) Periodontal diseases are caused by the invasion of bacteria from plaque. Periodontal disease has been associated with a host of adverse health outcomes including heart disease, increased risk for dementia, respiratory problems, and diabetes. (US Department of Health and Human Services, 2000)

Although periodontal diseases affect the adult population as a whole, pregnant women are especially vulnerable to oral health problems due to hormonal changes that occur in the body during pregnancy. (Wu, Chen, & Jiang, 2015) It has been shown that around 40% of women will develop new oral health problems during their pregnancies. (Jared & Boggess, 2008) Poor oral health during pregnancy has been associated with adverse birth outcomes, including preeclampsia, low birth weight, and preterm birth. (Jared & Boggess, 2008) Several researchers have hypothesized that inflammation in the mouth, such as gingivitis or periodontitis, may trigger an inflammatory response that may be the mechanism for various adverse pregnancy outcomes. (Wu et al., 2015) Some researchers have hypothesized that receiving dental care prior to conception may be more effective than receiving dental care during pregnancy in preventing adverse birth outcomes. (Boggess et al., 2005) In Utah, a study conducted using Pregnancy Risk Assessment Monitoring System (PRAMS) data found that individuals who did not receive a teeth cleaning in the 12 months prior to pregnancy had an increased prevalence of low birth weight babies. (Author, 2017, June 20)

Given the evidence to date regarding the link between poor preconception and pregnancy oral health and adverse pregnancy outcomes, it is critical that women have access to dental care resources, not only during pregnancy but also prior to pregnancy. Currently, Medicaid only covers dental care for pregnant women. While many women receive dental care during pregnancy, receiving care during this time period may be too late to prevent adverse pregnancy outcomes. Periodontitis and other oral hygiene issues are highly preventable. More comprehensive dental health care is needed, specifically for individuals with Medicaid or lack of insurance. Providing more comprehensive care and educating women about the importance of dental care throughout their reproductive years could potentially improve adverse birth outcomes. By educating and emphasizing lifetime dental care, these negative birth outcomes, as well as other adverse health outcomes due to oral health, could be easily and inexpensively prevented or resolved.

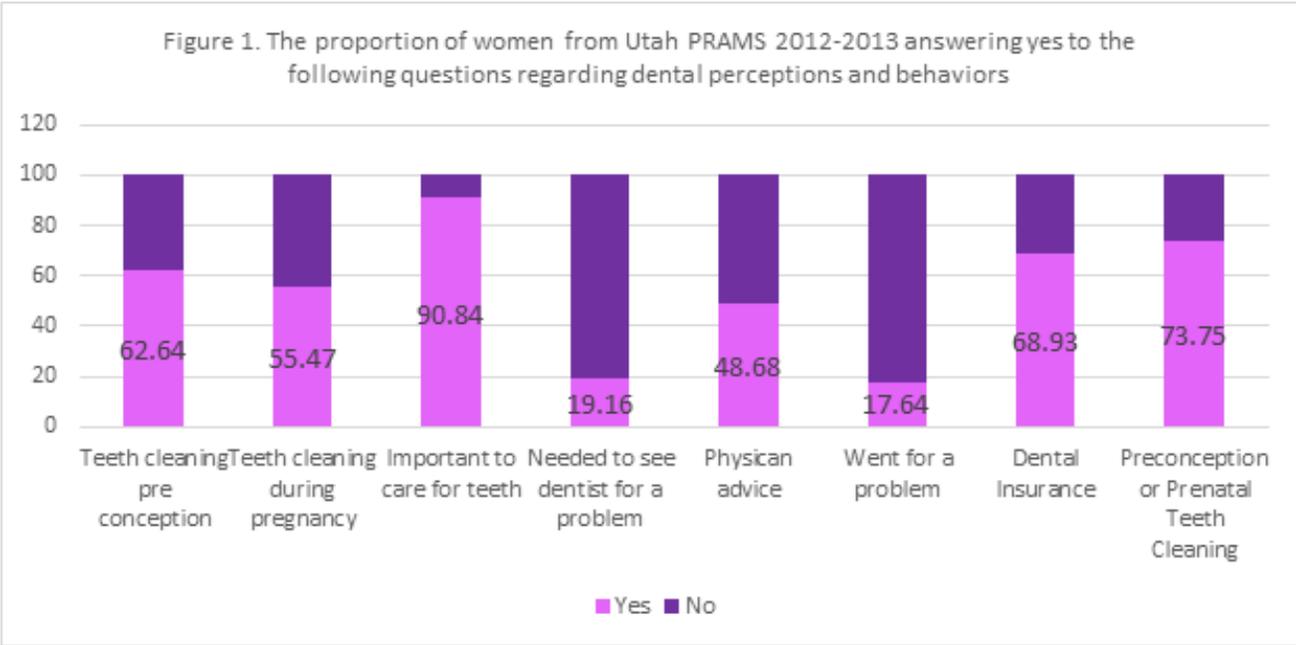
Data

Utahns are accessing dental care at a higher rate than the national average. Based on a self-report survey conducted by the Centers for Disease Control (CDC), 74% of Utahns reported they had received a dental exam compared to the national average of 70%. Additionally, women in Utah are better at receiving dental exams than males: 75% of females received a dental exam within the past year, compared to 71% of males. Although Utahns are doing better compared to the national average, approximately of 25% individuals in the state are not receiving annual dental exams. Based on the Behavioral Risk Factor Surveillance System and when observing access by race, Latinos, who make up 13.7% of Utah's population, have the highest rates of non-compliance, with just over half (58%) of this population receiving a dental exam in the last year.

When considering the unique needs of reproductive-age women, the PRAMS data in Utah has recently started tracking dental behaviors among this demographic. According to the PRAMS survey from 2012-2013 (see Figure 1), 63% of women received dental care prior to pregnancy and 55% received dental care during pregnancy. While 91% of women said that they thought it was important to care for their teeth, this did not always translate into actually receiving care. One factor that encouraged women to receive a dental exam was if a healthcare provider told them that they should go to the dentist, although it is unclear if individuals were told about dental care during their dental visit or at a different time. Of those women who talked to a provider about the importance of oral health during pregnancy, 77% received a teeth cleaning. Of those who were not directly told by a provider that oral health care was important, only 23% received this oral care during pregnancy. According to the PRAMS data, based on ethnicity, 42% of Hispanic women said that they had received a dental cleaning in the 12 months prior to pregnancy and 37% said they received a dental

cleaning during pregnancy. Non-Hispanic women had higher rates, with 66% of women receiving a dental cleaning before pregnancy and 59% receiving this oral care during pregnancy. There are distinct differences between individuals who had received a teeth cleaning within a year and those who had not. Women who were not Hispanic, had a higher socioeconomic status, and had dental insurance received dental care both prior to and during pregnancy at a higher rate than individuals without these characteristics. These differences point to a potential lack of access and affordability within the state.

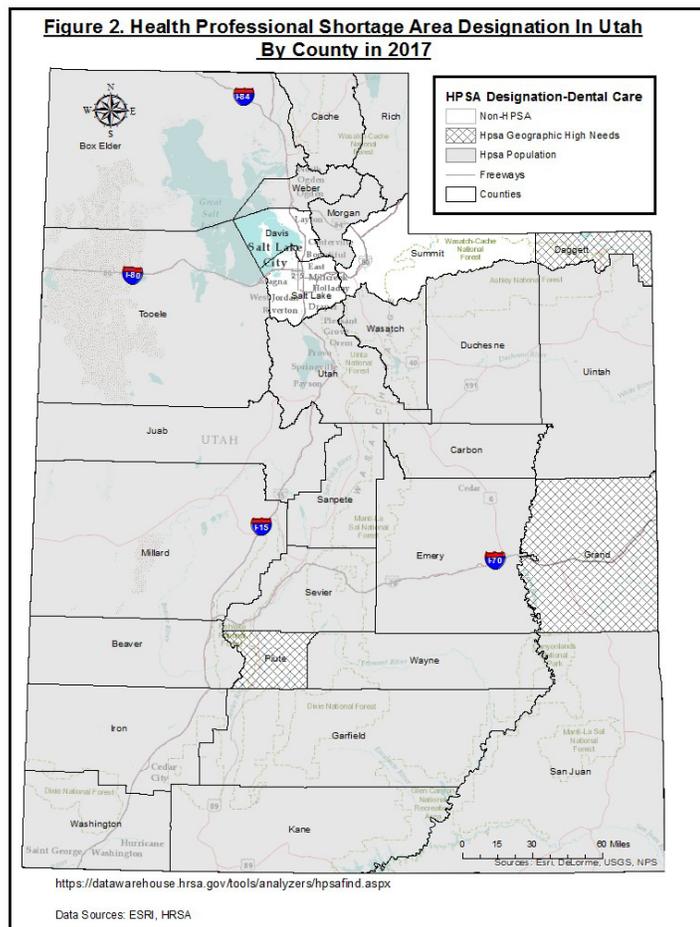
A vital factor in evaluating oral health care is having dental insurance. Nationwide, 66% of the population has insurance for dental health care. (National Association of Dental Plans, 2016) Of those with insurance, 32% of individuals receive it through public programs, such as Medicaid and Medicare. This number has increased from what it was in 2013. Based on the Utah PRAMS data from 2012-2013, among reproductive-aged women, 68.93% have dental insurance.



7 Domains of Health

Dental health is an integral part of a healthy lifestyle, primarily intersecting with the physical, financial, and environmental domains of health. Physically, individuals who do not receive regular dental care have an increased risk for multiple adverse health conditions. (US Department of Health and Human Services, 2000) Reproductive-aged women potentially have an increased risk for adverse birth outcomes and infertility. (US Department of Health and Human Services, 2000) Financially, many people feel that they cannot afford dental care. One study found that one out of five individuals were not able to afford dental care. (Brown, Finlayson, Fulton, & Jahedi, 2009) Even among those with insurance, around 41% of individuals pay out of pocket for dental care. (Wall & Guay, 2016) This serves as a significant barrier for many individuals because, in many circumstances,

dental care is lower than other needs on the financial priority list. Environmentally, lack of access is a common problem, specifically for low-income individuals and those on Medicaid. Many dentists either will not see Medicaid patients or have limited openings for new patients. A 2012 survey conducted by the Utah Medical Education Council found that 150 of the 1,006 (15%) practicing dentists in Utah treat Medicaid patients. Additionally, much of Utah is considered a Health Professional Shortage Area (HPSA) (Figure 2), which considers the provider-to-patient ratio, poverty level in the area, water fluoridation, and travel time needed to access care. Although Utah has a similar distribution of dentists as the United States, with 67 dentists per 100,000 individuals, (US Department of Health and Human Services, 2015) rural individuals often have lower accessibility, as seen in Figure 2.



Resources and Recommendations

Nationally, interventions have traditionally been aimed at improving dental care in children. Regular dental care is provided for children on Medicaid or on Utah's Children's Health Insurance Program (CHIP). In addition, the Utah Oral Health Program aims to promote use of fluoride and sealants, prevent tooth decay in children, and encourage dental visits for children and adults. As seen in the PRAMS data, in order to encourage dental visits, it may be useful to utilize primary care providers for suggesting and encouraging an annual dental exam. As previously mentioned, affordability and coverage are large barriers to receiving dental care. Aside from pregnant women, Medicaid only includes emergency dental coverage for adults in Utah. Through expanding dental

coverage to include annual exams and preventative care for Utah adults on Medicaid, health outcomes may improve. In addition to expanding coverage, dentists could be provided with financial incentives to treat low-income and Medicaid patients. Lastly, health literacy programs could be developed in order to educate individuals about the importance of good dental care in relation to overall physical health as well as oral health. Since many individuals do not understand the importance of dental care in relation to adverse health outcomes, education may motivate them to receive an annual exam. Women are often the gateway to a family's health, so by encouraging and empowering women to receive annual exams and maintain good oral health, providers and health care workers may be able to impact entire families.

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OCCUPATIONAL AND ECONOMIC HEALTH

Intergenerational Poverty, Women & Children's Health

Jessie Mandle / Voices for Utah Children

Background: Utah's Intergenerational Poverty Initiative and Public Health

Poverty is a key driver of poor population health outcomes. Families or individuals in poverty are more likely to experience chronic conditions, including asthma and diabetes, less likely to have access to healthy food and walkable neighborhoods, and more likely to have limited access to medical care. Women are at an even greater risk of poverty, due to social conditions. Because health is largely patterned along socioeconomic lines, eliminating or reducing poverty would lead to dramatically improved public health ¹.

In 2012, the State of Utah embarked on a major initiative to address poverty, passing the Intergenerational Poverty Mitigation Act to target families experiencing poverty in multiple generations. This Act is premised on the idea that not all poverty is the same. Some families experience 'situational' poverty, receiving public assistance for less than 12 months. For families in situational poverty, the public assistance system helps families move out of poverty. The State distinguishes a second group, those in 'entrenched' or cyclical poverty.

"Intergenerational Poverty is poverty in which two or more successive generations of family continue in the cycle of poverty, as measured through utilization of public assistance at least 12 months as an adult and at least 12 months as a child." -Utah Intergenerational Welfare Reform Commission, 2016 Report ².

The Intergenerational Poverty Mitigation Act's goal is to reduce the number of families caught in intergenerational poverty (IGP). The IGP Act and

subsequent IGP Initiative coordinates data across state public assistance agencies to better understand IGP families and develop programs and policy recommendations for Utah going forward.

Defining IGP Adults and Children

The focus of the IGP Mitigation Act is children, but the Act recognizes that to address the needs of children, programs and resources must also help parents. The IGP Mitigation Act identifies cohorts of IGP parents and children to target programs and data tracking: 1) IGP parents are defined as parents who received public assistance as a child; 2) IGP children are children whose parents received public assistance as a child; 3) non-IGP or 'at-risk' children are children who are currently on public assistance but whose parents either did not receive assistance, or there is no record of them receiving assistance. The different cohorts are based on public assistance usage data beginning in 1989 (when usage data became available).

Finally, several groups are not included in the IGP definitions and categories, which has implications for the data collection and subsequent programs and policy recommendations. Adults who grew up outside of Utah and adults who are non-citizens are not included in the definition of IGP adults. Therefore immigrants are largely excluded from IGP analysis, except in the at-risk child cohort. In addition, Native American families who received public assistance through tribal-based safety net programs were also excluded. Because of these definitions, it is estimated that the number of individuals experiencing poverty across generations is higher than the state's count ³.

1 <http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2009.166082>

2 <https://jobs.utah.gov/edo/intergenerational/igp16.pdf>

3 *ibid*

2015 IGP and Non-IGP Population

Adults on Public Assistance, non IGP	148,988
IGP Adults on Public Assistance	37,512
IGP children	57,602
Children on Public Assistance, non-IGP children	234,151

Utah Data Trends and Indicators: Intergenerational Poverty, Women and Children

Women experience higher levels of intergenerational poverty. Of the IGP adults, 68% are women. This is consistent with poverty across Utah, where women experience higher poverty rates than men. In Utah, 12.2% of women are living in poverty, lower than the U.S. average of 16% ⁴.

While Utah's rate of poverty is lower than the national average, the poverty rates look very different when disaggregated by race and ethnicity. Women of color are more likely to live in poverty than White women and their male counterparts. According to Census data, in Utah Latina or Hispanic women have a poverty rate of 25.9%, Black women have a poverty rate of 20.3%, and American Indian women have a poverty rate of 36.1%. Rural women also have higher poverty rates than urban women in Utah. Several rural counties in Utah have some of the highest rates of intergenerational poverty ⁵. Single, female-headed households are at the greatest risk of being in poverty among IGP and non-IGP women. Overall, in Utah, 28.9% of female-headed households are in poverty. Women with younger children have even higher rates of poverty; among female-headed households with children under the age of 18, 37.5% are in poverty; among female-headed households with children under the age 5, 46.9% are in poverty ⁶.

For children, the child poverty rate has declined slightly in Utah to 13%, compared to a national average of 21%. Similar to women in poverty, children of color and rural children experience higher rates of poverty in Utah ⁷.

⁴ https://www.uvu.edu/uwlp/docs/uws_poverty.pdf

⁵ *ibid*

⁶ *ibid*

Women and Children's Health

Utah's IGP initiative reveals several trends regarding poverty, women and children's health. In some areas, IGP women reflect the same trends seen among non-IGP women in poverty; in other areas, these two groups diverge.

Among IGP women and children, enrollment in public health coverage is higher than the non-IGP population. This is not surprising given that the IGP Act defines intergenerational poverty as public assistance usage. Medical assistance is one of the main types of public assistance used by the IGP cohort, following SNAP or food stamps.

In Utah 12% of parents do not have health coverage, which is consistent with the national average. For children, Utah has one of the highest rates of uninsured children in the nation, despite making progress in recent years. 7% of Utah children lack health insurance, compared to 5% nationally. Uninsured rates for children living in poverty are even higher ⁸.

Health care utilization is higher among the IGP population. 81% of IGP individuals had access to medical care compared to 78% of non-IGP individuals, defined as utilizing medical services at least once in the last year. IGP women also have higher rates of prenatal care, compared to non-IGP women.

Among new mothers, 5% of IGP children were born to teen mothers. Overall, the teen birth rate continues to decline nationwide and in Utah. In 2014, Utah was at a teen birth rate of 7.57, and in 2015 the rate is 6.94 ⁹.

⁷ <http://datacenter.kidscount.org/data#UT/2/0/char/0>

⁸ *ibid*

⁹ <https://jobs.utah.gov/edo/intergenerational/igp16.pdf>

Intergenerational Poverty and the 7 Domains of Health

Intergenerational poverty affects all aspects of physical and reproductive health, social health, emotional health, occupational and financial health, environmental health, intellectual health and spiritual health. Intergenerational poverty underscores how different social conditions and factors affect health outcomes and well-being. IGP children are at a greater risk for experiencing adverse childhood experiences (ACEs), which can affect their entire life course. Children who grow up in poverty are more likely to experience ACEs or poverty-induced trauma and stressors. Poverty-induced trauma can impact a child's healthy brain development and increase the likelihood of developmental delays, chronic health problems and poor physical health outcomes later in life ¹⁰. IGP children have higher rates of chronic school absenteeism, creating barriers to achieving optimal intellectual, occupational and financial health. Moreover, families in poverty often live in worse environmental conditions, such as apartment buildings with poor indoor air quality, or homes closer to industrial sites and pollutants. Poverty also imposes barriers to emotional and spiritual health; IGP families and children have more mental health diagnoses than the non-IGP cohort ¹¹. The IGP Initiative in Utah illustrates that there is not one single issue area for intervention. The impact of entrenched poverty on individuals and children affects all 7 domains of health.

Recommendations and Resources

The IGP initiative outlines many promising programs and policies to improve families' health outcomes and reduce poverty. In recent years, lawmakers have adopted several state policies specifically targeting children in the IGP cohort, including expanding access to high quality pre-school for IGP children.

Promising policies in the future should target parents and their children: access to medical care, increasing working family tax credits, and expanding evidence-based home visiting programs. Policies that would expand access to Medicaid coverage for parents, including family planning services and behavioral health care, would be an effective measure to support IGP parents. Not only would parents greatly benefit from expanded access to care, but when parents have health insurance they are more likely to make sure their children are connected with care and coverage. A state earned income tax credit or EITC is another important measure, providing a tax credit to low-income working families. Finally, expanding home visiting programs allow more mothers and children to receive support and care during pregnancy and the first years of a child's life. Home visiting programs are evidence-based and show improved outcomes for mothers and infants. Overall, programs that support both parents and children provide families with a stronger foundation for moving out of poverty.

Resources

Utah's Intergenerational Poverty Commission produces a thorough annual report on the state of intergenerational poverty in Utah. The IGP initiative's comprehensive data collection and sharing across public agencies has been a model for other state initiatives. The annual report gives detailed information about improvements and setbacks in Utah's efforts to reduce intergenerational poverty.

¹⁰ School Readiness Matters: The Campaign for Grade Level Reading: http://gradelevelreading.net/wp-content/uploads/2014/06/School-Readiness-Matters-Research-Confirms-and-Citations-r2_KC.pdf

¹¹ <https://jobs.utah.gov/edo/intergenerational/igp16.pdf>

ENVIRONMENTAL HEALTH (EH)

The Impact of Living at Altitude on Depression and Anti-depressant Function in Utah Women: The Need for Novel Antidepressants

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Abstract

Objectives: Utah has the highest rates of depression and suicide in the US, despite high rates of antidepressant prescriptions. People living at altitude are exposed to chronic hypobaric hypoxia, which may disrupt brain serotonin and bioenergetic function, to worsen depression and reduce selective serotonin reuptake inhibitor (SSRI) function. We therefore (1) used an animal model to study altitude-related depression, and (2) evaluated novel therapeutics in depressed Utah women.

Methods: We examined depression and SSRI function in rats housed at altitude. In treatment-resistant women, we tested antidepressant potential of compounds which correct hypoxia-induced brain deficits: creatine monohydrate (CrM) for bioenergetics or 5-hydroxytryptophan (5HTP) for serotonin deficit.

Results: At altitude, female rats exhibit increased depression and lack of antidepressant response to SSRIs (except sertraline). In treatment-resistant women, adjunctive CrM and 5HTP+CrM improves depression status and bioenergetic function.

Conclusions: With significantly lower basal brain serotonin levels than men, women are likely more susceptible to altitude-related depression. Targeted treatment may be required: sertraline, CrM or 5HTP+CrM show promise in improving mood and reducing suicidal ideation in women living at altitude or with hypoxic diseases.

Introduction

Major depressive disorder (MDD) affects over 16.5% of the US population, with lifetime prevalence of up to 12% in men and 25% in women (Trivedi, 2008). Depression affects women more severely than men, potentially due to several biological and psychosocial mechanisms (Dalla, 2010). MDD is linked to poor serotonergic neurotransmission, and healthy women exhibit 52% lower rates of brain serotonin synthesis than men (Nishizawa, 1997), reduced serotonin receptor binding and higher excretion of serotonin metabolites (Dalla, 2010). Poor basal serotonin transmission may contribute to greater vulnerability to MDD in women.

Living at altitude is demographically linked to heightened risk for MDD (DelMastro, 2011) and suicide (Brenner, 2011; Haws, 2009; Kim 2011),

the most negative outcome of unresolved depression. Living at altitude involves chronic exposure to hypobaric hypoxia (the low partial pressure of oxygen-ppO₂- at altitude). People with chronic hypoxic disorders (COPD, asthma, cardiovascular disease, smoking) similarly exhibit higher rates of MDD and suicide, vs. those with other chronic diseases (osteoporosis, diabetes) (Goodwin, 2003; Webb 2012). Chronic hypoxia may therefore worsen MDD status and suicidal behavior (Young, 2013), implying a role in treatment-resistant depression (TRD).

Living at altitude may be linked to a brain serotonin deficit. Rats exposed to extremes of altitude (1-14days, 20,000-25,000ft) show reduced brain serotonin levels (Kumar, 2011). Serotonin is synthesized in two steps: the rate-limiting first step requires tryptophan hydroxylase 2 (TPH2) and

molecular oxygen to convert tryptophan to 5-hydroxytryptophan (5HTP). 5HTP is then converted to serotonin in an oxygen-independent second step. Chronic hypobaric hypoxia decreases TPH2 activity, lowering levels of brain 5HTP and serotonin. Hypoxia may also compromise efficacy of selective serotonin reuptake inhibitors (SSRIs), the most widely prescribed of antidepressants (Preskorn, 1996). SSRIs improve depression status by blocking the serotonin transporter to increase synaptic serotonin concentrations. However, in animal models of low brain serotonin, SSRIs can lose antidepressant efficacy (Durkin, 2008; Kulikov, 2011). By reducing brain serotonin, hypobaric hypoxia may thus simultaneously impair depression status and exacerbate SSRI-treatment resistance.

Living at altitude is also linked to brain hypometabolism. ¹Hydrogen or ³¹Phosphorus-magnetic resonance spectroscopy (¹H-MRS or ³¹P-MRS) scans allow in vivo measurement of brain biomarkers for cellular energy production (Kondo, 2011a). ¹H-MRS neuroimaging of age- and gender-matched healthy residents living at moderate altitude (4,500 ft, Salt Lake City, UT) vs. those at sea level (Belmont, MA or Charleston, SC) identified a deficit in forebrain levels of the bioenergetic marker creatine (Cr) in those at altitude (Renshaw, 2012). A similar deficit in forebrain Cr was found in female rats after housing at an altitude of 10,000ft for a week, implying that hypobaric hypoxia can induce this deficit (Bogdanova 2014). Cr plays an important role in regulating energy metabolism, and low Cr is representative of cellular hypometabolism (Kondo, 2011a). A bioenergetic deficit is similarly seen in key depression-linked brain regions in MDD patients, which improves with effective treatment, but remains unchanged in non-responders (Iosifescu 2008). Living at altitude could thus increase vulnerability to MDD by causing brain deficits in serotonin and Cr levels.

Utah is representative of a high altitude state with significant burden of depression and suicidal behavior. Between 2000-2006, Utah exhibited the highest antidepressant prescription rates in the US: 18.4% vs. the US average of 10.8% (Cox, 2008). In Utah, 68% of antidepressants are prescribed for

women, and >80% are for SSRIs (Gaskill, 2010). Despite this, Utah showed the highest depression index in the US in 2007, based on four criteria: annual percentage of adults and adolescents reporting a major depressive episode, adults reporting serious psychological distress, and rates of suicide (Mark, 2007). Over 30-40% of MDD patients taking antidepressants do not respond adequately to treatment (Al-Harbi, 2012; Trivedi 2008), and treatment-resistance leads to unresolved depression, and increases suicidal ideation and suicide attempts. The Rocky Mountain States exhibit by far the highest rates of suicidal ideation (5.2% vs. 3.7%, CDC, 2011) and completed suicide (17.7 vs. 11.3 per 100,000) (Mark, 2007) in the US. Of particular relevance, the State of Utah had the highest annual prevalence of suicidal ideation in 2008-2009 (6.8%) – a rate that, incredibly, is more than three times that of Georgia, the US state with the lowest prevalence (2.1%) (CDC, 2011). Moreover, Utah women contend with significantly greater burden of suicidal thoughts than men: 8.1% vs 5.6%, vs. the US average of 3.8% (women) vs. 3.5% (men) (CDC, 2011). Similarly, high rates of suicidal ideation are noted in women in the high-altitude States of Idaho (7%), Nevada (9%) and New Mexico (6%). Suicidal risk factors include cultural and socioeconomic factors (eg., poverty, rural residence, population density) as well as biological ones (eg., age, sex, mental illness), but depression is almost always observed in those who think about and attempt suicide. The poor quality of life inherent in 8% of Utah women expressing suicidal thoughts suggests a critical need for targeted interventions for depression in this population. Here we first describe translational animal model studies of the impact of housing at altitude on depression-like behavior (DLB) and antidepressant function. Further, we describe clinical trials of non-traditional adjunctive treatments to correct hypoxia-linked neurochemical deficits in Utah women with TRD: with creatine monohydrate (CrM) to correct bioenergetics (Kondo 2016; Kondo, 2011) or with combination therapy of 5HTP+CrM to improve both serotonergic and bioenergetic deficits.

Methods

I. Animal Studies:

Animals:

Male and female Sprague Dawley (SD) rats were received from Charles River (Raleigh, NC). All procedures were approved by the Institutional Animal Care and Use Committees of the University of Utah and the Veterans Affairs Salt Lake City Health Care System, and were performed in accordance to the NIH Guide for Care and Use of Laboratory Animals.

Altitude Simulations:

The altitude groups consist of sea level (SL), 4,500ft (4.5K) and 10,000ft (10K), plus a 20,000ft (20K) group in Study 1. Animals were housed in barometric chambers used to alter the ambient pressure at our facility (4,500ft): the hyperbaric chamber mimicked SL conditions (21% ppO₂), and the hypobaric chamber mimicked 10K (15% ppO₂) and 20K (10% ppO₂), while the 4.5K group was housed at local conditions (18% ppO₂) adjacent to the altitude chambers.

Forced Swim Test (FST):

The FST is a well-established test for DLB and antidepressant function, widely used in pre-clinical antidepressant development (Bogdanova, 2013). After a week at altitude, rats were tested for DLB in the modified FST (Kanekar 2015). In the FST, a rat is placed in a clear tank (25cm diameter, 65cm tall) filled to 48cm deep water at 25°C (Detke, 1996), and behavior videotaped. The FST is conducted in 2 sessions: a conditioning pretest and 24hrs later, the test FST to assay for DLB.

Treatment:

In study 2, rats were injected with antidepressant or vehicle (C) at 1hr, 19hrs and 23hrs after the pretest FST (Detke 1996). Antidepressants were tested at optimal doses shown to be effective in the FST (Detke 1996): fluoxetine hydrochloride (Prozac®, 20mg/kg), paroxetine hydrochloride (Paxil®, 20mg/kg), escitalopram oxalate (Lexapro®, 20mg/kg), sertraline hydrochloride (Zoloft®, 10mg/kg), or the TCA desipramine hydrochloride (8mg/kg, positive control).

Data Analysis:

FST behavior is presented as percent time spent

swimming, climbing or immobile. Latency to immobility (LTI) is the time taken to achieve the first 10sec of immobility (Kanekar 2015). DLB in the FST is a measure of behavioral despair in response to the inescapable stress of forced swim (Bogdanova 2013). Increased immobility and a shorter LTI represent DLB in the FST, and antidepressants reduce immobility and increase LTI by $\geq 20\%$. Serotonergic antidepressants (SSRIs) improve DLB by increasing swimming, while noradrenergic/dopaminergic antidepressants (desipramine) increase climbing (Detke 1996).

Data was analyzed by two-way analysis of variance (ANOVA) to investigate effects of altitude and gender (Study 1), or altitude and treatment (Study 2). Data is presented as mean \pm standard error of the mean (M \pm SEM). Statistical significance was determined at $p < 0.05$, presented after Bonferroni corrections.

II. Clinical Trials

All studies were approved by the University of Utah Institutional Review Board.

Study 1. Dietary Cr in Treatment-Resistant Adolescent Females:

Inclusion Criteria:

Participants were women between 13-20yrs of age with a primary diagnosis of MDD, with fluoxetine (Prozac®, open-label study) (Kondo, 2011) or equivalent SSRI dose (placebo-controlled study) (Kondo 2016) treatment for ≥ 8 wks with ≥ 4 wks at a dose of ≥ 40 mg/day, and a Children's Depression Rating Scale-Revised (CDRS-R) raw score ≥ 40 at screening. Exclusion criteria included renal disease, psychotic symptoms or active problematic use of alcohol or illicit drugs. Complete blood count, metabolic panel, and urinalysis were obtained at baseline and at study conclusion.

Treatment and Outcome Analyses:

In the open-label study, MDD patients received Creapure® brand CrM (AlzChem AG, Trostberg, Germany), 4g oral daily for 8wks (Kondo, 2011). In the placebo-controlled study, participants were randomly assigned to 2g, 4g or 10g CrM or placebo daily for 8wks (Kondo 2016). Vital signs and adverse signs were recorded at each visit. Rating

scales administered were the CDRS-R, the Clinical Global Impressions scale-Severity (CGI-S) and the Columbia Suicide Severity Rating Scale (C-SSRS). The primary outcome was change in CDRS-R score from baseline. In vivo ³¹P-MRS neuroimaging was used to measure brain metabolites involved in cellular energy production, including Cr, phosphocreatine (PCr) and γ -nucleotide phosphates (measuring adenosine triphosphate or ATP), vs. a baseline of total phosphate resonance (TP). ³¹P-MRS scans were conducted on participants prior to and after treatment, and on age-matched healthy control adolescents.

Study 2. Dietary 5HTP+Cr in Treatment-Resistant Adult Women:

Inclusion Criteria:

Adult women were recruited with moderate-severe MDD at baseline as measured by Hamilton Depression Rating Scale (HAM-D) scores ≥ 16 , with ≥ 8 wks of treatment with an SSRI or serotonin norepinephrine reuptake inhibitor (SNRI) (Kious, 2017).

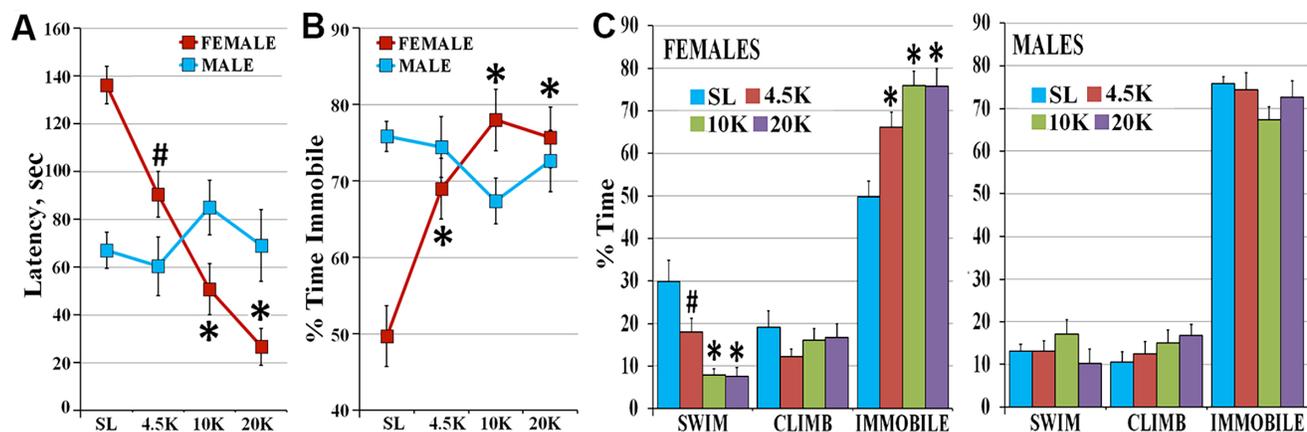
Results

I. Animal Studies

Study 1. Altitude and Depression:

Rats were tested for DLB in the FST after a week of housing at SL, 4.5K, 10K or 20K (Kanekar 2015). For LTI, two-way ANOVA showed no effect of gender, a strong effect of altitude ($p < 0.0001$) and of their interaction ($F(3,88) = 12.8$, $p < 0.0001$, Fig 1A, 1C). In females, LTI decreased significantly with altitude ($F(3,44) = 28$, $p < 0.0001$), but not in males. For immobility, a significant effect was seen of altitude ($p = 0.014$) and of the interaction between altitude and gender ($F(3,88) = 9.5$, $p < 0.0001$). Immobility increased significantly with altitude in females, but not males ($F(3,44) = 10.5$, $p < 0.0001$, Fig 1B, 1C).

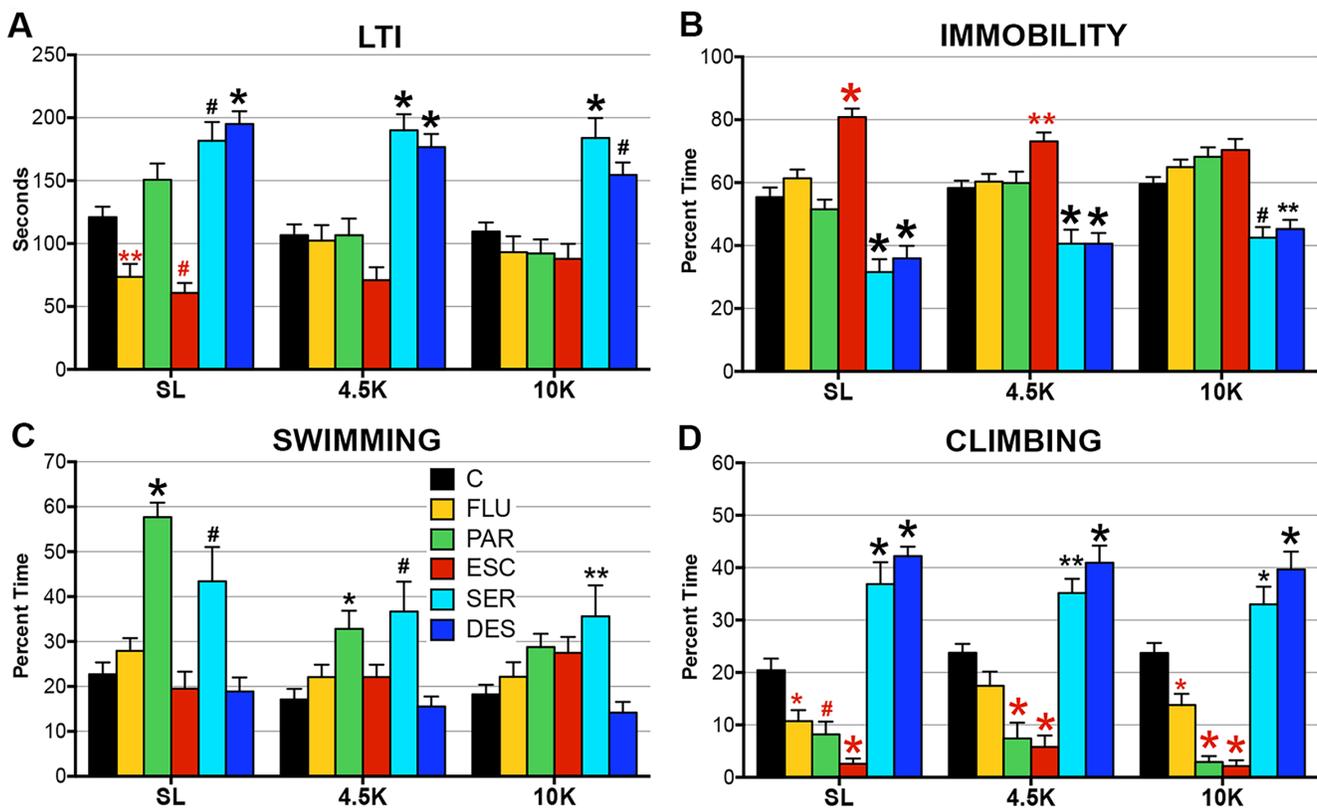
Open-label treatment consisted of dietary 5HT-P+CrM for 8wks, with visits at 1wk, 2wks, 4wks, 6wks and 8wks, and 2 post-treatment visits (10wks, 12wks). Participants received 5g of Creapure[®] and 100mg Fuller Enterprise's 5HTP (Fuller Enterprise Inc., Ontario, Canada) daily for 8wks, to supplement ongoing SSRI/SNRI treatment. Study outcomes were measured by HAM-D, Montgomery-Asberg Depression Rating Scale (MADRS), CGI-S, and Beck Anxiety Inventory (BAI) scales. C-SSRS and Young Mania Rating Scale (YMRS) identified adverse effects. Since 5HTP is linked to serotonin syndrome and/or eosinophilia myalgia syndrome (Turner, 2006), subjects were screened at each visit. Blood tests were conducted at screening and follow up. Primary outcome was a change from baseline HAM-D scores. HAM-D, MADRS and BAI scores were analyzed by repeated-measures linear mixed model, with Sidak correction for multiple comparisons. Statistical significance was defined as $p < 0.05$.



(Figure 1)

Study 2. Altitude and SSRI Function:

After housing for a week at SL, 4.5K or 10K, female rats were treated with the SSRIs fluoxetine, paroxetine, escitalopram or sertraline, or the TCA desipramine and tested for DLB in the FST (Fig 2) (Kanekar, 2018). For LTI, two-way ANOVA showed a main effect of treatment ($p < 0.0001$), none of altitude ($p = 0.3$) and a significant effect of their interaction ($F(10,266) = 2.4$, $p = 0.009$, Fig 2A). For immobility, significant effects were seen of antidepressant ($p < 0.0001$), altitude ($p = 0.01$) and their interaction ($F(10,267) = 1.97$, $p = 0.03$, Fig 2B). For swimming, significant effects were seen of treatment ($p < 0.0001$) and altitude ($p = 0.0006$), and of their interaction ($F(10,267) = 2.6$, $p = 0.004$, Fig 2C). For climbing, a significant effect was seen of antidepressant ($p < 0.0001$), but none of altitude or their interaction ($F(10,268) = 0.8$, $p = 0.67$, Fig 2D).



(Figure 2)

II. Clinical Trials

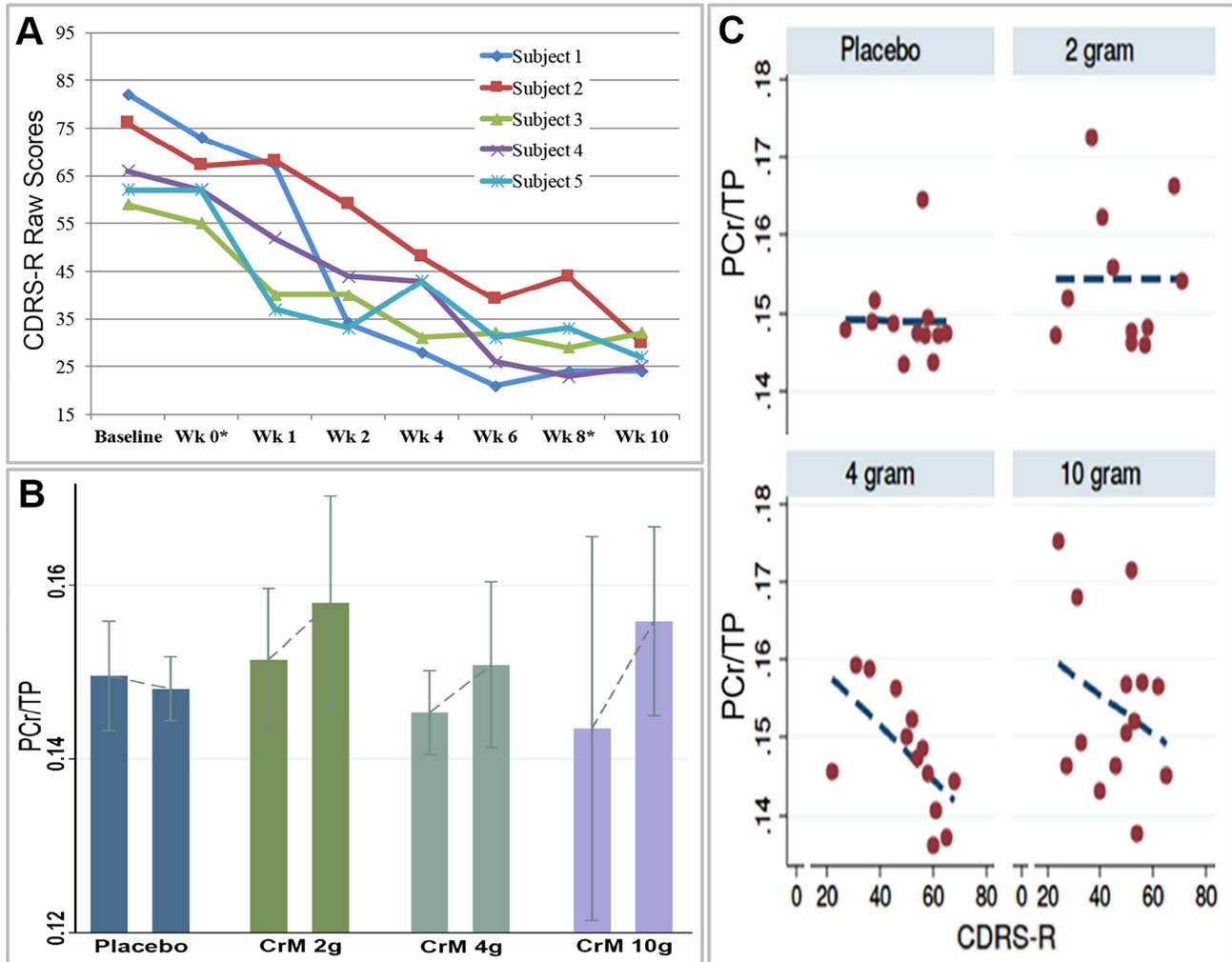
Study 1. Dietary CrM in Treatment-Resistant Adolescent Females:

Five patients completed 8wks of adjunctive CrM and ^{31}P -MRS scans in the open-label study, with no adverse effects seen in vital signs, laboratory tests or behavior (Kondo, 2011). Mean CDRS-R score decreased by an average of 56% from 69 ± 9 ($M \pm SD$) to 31 ± 8 after treatment (Fig. 3A). After 8wks treatment, depressed adolescents exhibit a significant increase in forebrain PCr/TP ($p = 0.02$,

paired t-test) vs. healthy controls. Participants' CDRS-R scores inversely correlated with the change in PCr/TP ($p < 0.04$). Four of 5 MDD patients endorsed a history of suicidality: 4 had suicidal ideation, and two attempted suicide prior to this study. During treatment, two reported no suicidal ideation, while suicidal ideation resolved during the study in others, and remained absent at the 10wk follow-up visit.

In the placebo-controlled dose-ranging study, participants were randomized to receive placebo or CrM at 2g, 4g or 10g daily for 8wks ($n = 6-$

8/treatment). A drop in CDRS-R scores was seen across treatment groups (Kondo 2016). Pre- and post-treatment 31P-MRS scans revealed higher frontal lobe PCr/TP levels after CrM treatment, but not in placebo controls (Fig 3B): PCr/TP increased by 4.6% at the 2g dose, 4.1% with 4g, and 9.1% with 10g, while the placebo group showed a 0.7% drop. Lower depression scores correlated to higher fore-brain PCr/TP ($p < 0.02$, Fig 3C).



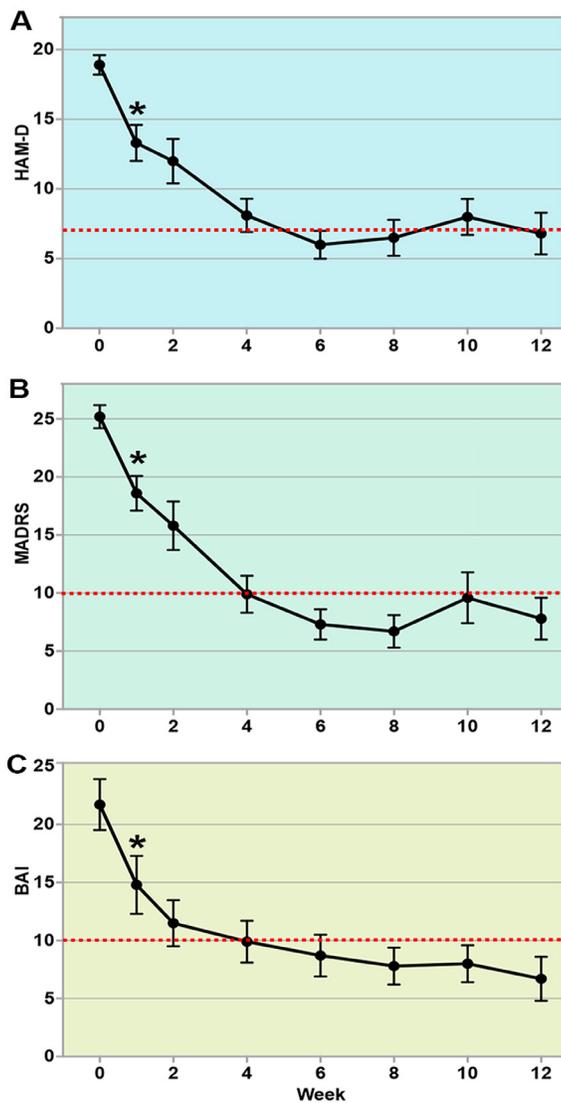
(Figure 3)

Study 2. Dietary 5HTP+CrM in Treatment-Resistant Adult Women:

Twelve women (average age of 34 ± 11 yrs) completed the study (Kious, 2017), 10 were on SSRIs and two were on SNRI. 5HTP+CrM was safe and well tolerated, with no evidence of serotonin syndrome, eosinophilia myalgia syndrome or other adverse effects. No treatment-emergent mania or hypomania (by YMRS scale) was seen, or nor was treatment-emergent suicidal ideation identified based on C-SSRS.

At baseline, participants exhibit moderate-severe MDD with mean HAM-D score of 19 ± 2 , MADRS score of 25 ± 4 and CGI-S score of 4 ± 0.3 . After 8wks treatment, HAM-D scores reduced by 60% to an average of 7.5 ± 4 (Fig 4A), with response criteria ($\geq 50\%$ reduction) met by 10 patients and remission criteria (score ≤ 7) met by 7 patients. Mean MADRS scores decreased by 65% to 9 ± 6 (Fig 4B), with 12 patients meeting response criteria and 8 patients meeting remission criteria (score < 10). Anxiety levels improved, with a 60%

drop in BAI scores from 22.7 ± 9 to 9.3 ± 6 (Fig 4C). Depression severity in the CGI-S improved from 4.1 ± 0.4 to 1.9 ± 1 . Significant improvements were seen within a week of treatment ($p < 0.00001$, Fig 4).



(Figure 4)

Conclusions: (1) CrM supplementation of SSRI-treated treatment-resistant adolescent women improved depression status and suicidal ideation over 8wks, paralleled with improved forebrain bioenergetics. (2) 5HTP+CrM augmentation of SSRI/SNRI-treated treatment-resistant adult women improved MDD and anxiety status, with a good safety profile.

Discussion

In our animal model, housing at altitude induced increased depression in female rats (Kanekar 2015). Female rats at altitude did not respond to the SSRIs fluoxetine, paroxetine and escitalopram (Kanekar, 2018), which are primarily serotonergic (Damsa et al., 2004). The SSRI sertraline functioned well at altitude, potentially due to its ability to enhance dopaminergic as well as serotonergic neurotransmission (Kanekar, 2018; Page 1999). In recent studies, rat brain serotonin levels decrease with housing at altitude, particularly in the striatum and prefrontal cortex, brain regions involved in mood regulation (C.S. Sheth, unpublished observations). We also find that anxiety and anhedonia (the inability to derive pleasure from pleasurable activity) increase in female rats at altitude (Sheth, 2018). These studies thus suggest that living at altitude or with chronic hypoxic diseases may decrease brain serotonin levels to worsen the status of depression and anxiety disorders, and may also render SSRIs ineffective. Since SSRIs form over 80% of the US market for antidepressants and anxiolytics, this likely worsens rates of unresolved mood disorders at altitude, and may be responsible for the heightened rates of suicidal ideation seen in women in the Rocky Mountain States. Given the significantly lower basal brain serotonin in women vs. men, women living at altitude or with chronic hypoxic disorders may be particularly vulnerable to worsened mood and SSRI treatment-resistance. Women in the high-altitude Rocky Mountain States, Utah included, may thus suffer from unresolved mood disorders despite attempts to medicate with antidepressant use, thus suggesting the need for novel non-traditional therapeutics for altitude-related mood disorders.

We therefore conducted clinical trials of compounds directed at improving altitude-related deficits in bioenergetics (CrM) and serotonin (5HTP). Supplementing CrM in SSRI-resistant adolescent women improved depression status and brain bioenergetics (Kondo 2011, 2016). Improving brain bioenergetics is proposed as a mechanism for enhancing antidepressant response (Iosifescu 2008), and dietary CrM was initially shown

to improve brain bioenergetics in healthy adults (Lyo, 2003). Also, CrM augmentation of escitalopram-treated women improved SSRI response vs. escitalopram+placebo (Lyo 2012). CrM treatment may thus enhance brain bioenergetics, to hasten antidepressant response and enhance clinical remission in depressed women. Our current study suggests that CrM improves response and remission criteria in TRD women. Additionally, CrM-linked enhancement in forebrain PCr/TP correlates with improved depression scores, suggesting a mechanism of action (Kondo 2016). A placebo-controlled study of 10g CrM for treatment-resistant adolescent women is currently in process.

Our study of 5HTP+CrM augmentation in depressed treatment-resistant adult women is the first trial of combination therapy simultaneously targeting bioenergetics and serotonin synthesis (Kious, 2017). The intermediate metabolite in serotonin synthesis, 5HTP is readily converted to serotonin (Turner 2006). In clinical trials, dietary 5HTP showed antidepressant efficacy in an average of 56% of MDD patients within 2-4wks (Turner 2006). Our clinical trial is a small scale open-label study without placebo control, yet it suggests that 5HTP+CrM therapy may be a feasible new approach to TRD in women. A placebo-controlled study of 5HTP+CrM is currently in progress in SSRI/SNRI-resistant adult women.

These clinical studies show that novel antidepressant therapeutics targeted to improving hypoxia-related brain deficits in bioenergetics and serotonin may serve as more effective antidepressants for those living at altitude or with chronic hypoxic diseases.

While the consequences of extreme high altitude exposure (>18,000ft) have been studied for decades with regards to mountaineering, only recently has living at moderate altitudes (2000ft-10,000ft) been suggested to impact human mood and quality of life (Brenner, 2011; Maa, 2010). The human brain consists of about 2% of our body weight, but utilizes 20% of the body's energy at rest. With the high basal oxygen needs of the brain, neurological symptoms including headaches, sleep disruption and mood disorders are prevalent in the chronic hypoxia ex-

perienced at altitude (Maa, 2010). As more people move to reside or vacation at moderate altitudes, addressing the physiological consequences of long-term altitude exposure becomes critical. The studies we describe here are an initial effort to understand the impact of living at moderate altitudes, such as in Utah, Colorado, and the other Rocky Mountain states, on brain physiology, mood status and antidepressant function.

Hypoxia exposure can alter brain neurochemistry to promote biomarkers for depression and suicidal behavior (Gould, 2017). In animal models, hypoxia disrupts neurotransmitter balance, increases inflammation and cell stress, and lowers metabolic function in key brain regions involved in mood disorders (Gould, 2017; Kumar, 2011). In animal models, hypoxia is linked to low brain serotonin levels. Low brain serotonin in humans is implicated in greater depression, anxiety, impulsivity, risk-taking behavior and aggression, each of which is also linked to suicidal behavior. Further studies with our animal model may thus be of high relevance in studying hypoxia-related brain and behavioral deficits which may alter susceptibility to suicidal behavior, and, combined with clinical trials, will help us critically evaluate novel potential therapeutics for MDD in chronic hypoxia.

Health Implications

Chronic hypoxia exposure may worsen MDD and impair antidepressant function. With greater vulnerability to hypoxia, women living at altitude or with chronic hypoxic diseases likely suffer from a greater burden of MDD-linked health issues, poor quality of life and suicidal ideation, suggesting a critical need for effective antidepressant interventions in this population. Targeted therapeutics may be required for depressed women at altitude: the current studies identify sertraline, adjunctive CrM or 5HTP+CrM as promising antidepressant therapeutics for women exposed to chronic hypoxia. Given the high rates of depression and suicidal behavior documented in women living in the high-altitude Rocky Mountain States, the success of these studies are likely to be of considerable beneficial impact.

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SEXUAL & REPRODUCTIVE HEALTH (SRH)

Sexual Violence in Utah: The Relationship between Sexual Education and Sexual Violence

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Background

In 2017, Utah Representative Brian King proposed a comprehensive sexual education bill. H.B. 215. This bill included an emphasis on teaching sexual consent, and permitted parents to choose abstinence-based, comprehensive, or no sexual education for their children. While Utah lawmakers admitted there was a need for sexual education reform, they ultimately rejected the bill (Wood, 2017).

This choice seems untimely as rates of sexual assault in Utah consistently rank higher than the national average (Public Health Indicator Based Information System [IBIS], 2018; Utah Department of Health, 2014). Sexual violence is a comprehensive term that includes various sexually related crimes. “Sexual assault is any unwanted sexual contact or attention resulting from force, threats, bribes, manipulation, pressure, or violence” (Utah Department of Health, 2014). Sexual assault includes, but is not limited to, rape, attempted rape, unwanted sexual touch or fondling, and childhood sexual abuse (CSA).

Supporters of H.B.215 implicated Utah’s abstinence-based sex education for the state’s alarming rate of sexual violence, claiming it fails to teach students about healthy sexual relationships and to how identify sexual assault (Wood, 2017). Evidence suggests a possible relationship between abstinence-based sexual education and rates of sexual violence. More specifically, research indicates that abstinence-based sexual education curricula, like that taught in Utah, fosters sexual violence by teaching gender stereotypes, placing the onus of sexual assault on victims, and neglecting to educate young people about consent and recognizing sexual assault (Edwards, Bradshaw, & Hinsz, 2014; Fava & Bay-Cheng, 2013; Lamb, Graling, & Lustig, 2011;

Lundgren & Amin, 2015; Schalet et al., 2014).

There are numerous examples of implicit and explicit gender stereotypes and gender biases in abstinence only curricula (Lamb et al., 2011). Schalet et al. even posits that many abstinence-based programs “...have taught gender stereotypes as facts” (2014). Curricula attribute specific, biologically-determined roles to males and females, presenting males as “unstoppable” hormonally driven sexual initiators, and females as passive sexual objects bereft of independent sexual desire (Lamb et al., 2011; Schalet et al., 2014). Researchers concur that gender stereotypes, gender inequalities, and the cultural attitudes that allow them to exist, are among the major risk factors for sexual violence (Fava & Bay-Cheng, 2013; Lamb et al., 2011; Lundgren & Amin, 2015; Schalet et al. 2014). Evidence links certain gender stereotypes, specifically relating to masculinity, with hostile attitudes towards women, intimate partner violence, and sexual aggression (Edwards et al., 2014; Lamb et al., 2011; Schalet et al., 2014). “Compared to other men,” reports Schalet et al. (2014), “men who report more traditional masculinity ideologies are more likely to report having perpetrated violence or sexual coercion.” The female stereotypes portrayed in abstinence-based curricula are equally harmful; traditional feminine gender roles are associated with reduced sexual autonomy and sexual negotiating power, and higher risk for sexual violence (Lamb et al., 2011; Lundgren & Amin, 2015; Schalet et al., 2014).

These attitudes regarding gender norms, along with moralistic tactics common in abstinence programs, are particularly inimical towards sexual assault victims and sexually active teens (Fava & Bay-Cheng, 2013). Presenting sexual experience as a type of moral failing can influence attitudes

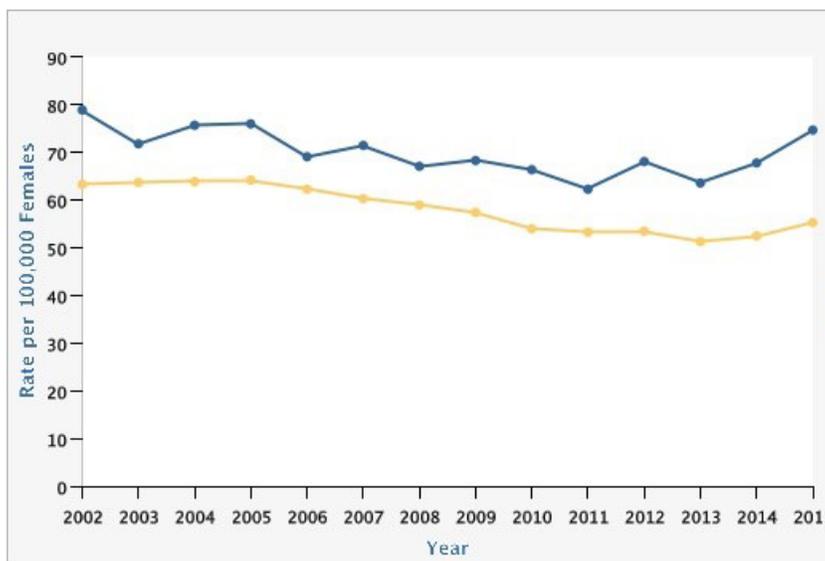
that view these groups as irreparably damaged and incapable of having healthy sexual relationships in the future (Fava & Bay-Cheng, 2013). Fava & Bay-Cheng (2013) report that “...negative sexual self-schemas (i.e. belief that one is sexually damaged, immoral, and dirty) [are] related to adolescent revictimisation experiences of sexual assault in young women with a history of CSA.” Additionally, in Lamb et al.’s analysis of abstinence curricula, they found “...messages [that] imply that women are partly responsible for their own victimization” (2011). Sexual assault victims already experience higher levels of shame, and victim blaming could potentially be retraumatizing (Fava & Bay-Cheng, 2013). In turn, victim blaming reinforces gender stereotypes (men are unable to control their desires and women are the gatekeepers of sexual activity) and obscures the concept of consent (Lamb et al., 2011, Schalet et al., 2014). Gender norms may also stigmatize male sexual assault victims, rendering them more reticent to report or disclose assault (Schalet et al., 2014).

Abstinence-based sexual education programs habitually teach “refusal tactics” in lieu of sexual consent (Lamb et al., 2011). This distinction is important because research on sexual aggression reveals that many individuals experience difficulty in identifying various forms of sexual assault (Edwards, et al., 2014). Edwards et al. found that

when participants were presented with behavioral descriptions of sexual assault, men were more likely to admit to past sexually violent behavior than if the behavior was explicitly labeled (i.e. “rape”), and more women “self report[ed] past victimization” (2014). Clear education regarding different forms of sexual assault is critical for men who may not otherwise perceive their sexually aggressive behavior as rape, and for women who may not recognize their experiences as assault (Edwards et al., 2014).
Data

National data suggest that as many as 1 in 5 women will be sexually assaulted in their lifetime (Edwards et al., 2014). In Utah, however, it is projected that 1 in 3 women will become victims of sexual assault (Utah Department of Health, 2014). In fact, Utah ranks 10th highest in number of reported rapes in the nation (Federal Bureau of Investigation, 2015). This is surprising as Utah’s rates of other violent crimes, such as homicide, aggravated assault, and robbery, historically have been significantly lower than the national average (IBIS, 2018). Rates of rape in Utah have been higher than the national average for over a decade (See Figure 1 and Table 1). In general, the national rate of rape is decreasing, but the rape rate in Utah is trending upwards (See Figure 1 and Table 1); between 2014 and 2017, Utah’s rape rate increased 10.7% (IBIS, 2018).

(Figure 1) Rape Rates in the Utah vs. the US



(Source: IBIS, 2017)

(Table 1)

Rape Rates in Utah vs. US (per 100,000)		
Year	US	Utah
2002	63.2	78.8
2003	63.6	71.7
2004	63.8	75.6
2005	64.1	75.9
2006	62.2	69
2007	60.2	71.4
2008	58.9	67
2009	57.3	68.2
2010	53.9	66.3
2011	53.2	62.2
2012	53.4	68
2013	51.2	63.5
2014	52.4	67.7
2015	55.2	74.6

(Source: IBIS, 2017)

7 Domains of Health

Sexual violence impacts the overall health and well being of girls and women in Utah. Approximately 13% of sexual assault victims seek medical treatment following the incident, leaving 87% of victims at risk of a sexually transmitted infection (STI) and/or pregnancy (IBIS, 2018; Utah Department of Health, 2014). Sexual violence can have long-term affects on physical health, chronic pain disorders, gastrointestinal disorders, premenstrual syndrome, chronic pelvic pain, sleep disturbances, sexual dysfunction, and generally poor health (IBIS, 2018).

Victims of sexual assault are at an increased risk for anxiety disorders, depression, substance abuse, and are “more likely to attempt or commit suicide” (IBIS, 2018). 15% of rape victims reported a diminished quality of life, and 34% expressed that they didn’t feel adequately emotionally or socially supported. Nearly 40% of rape victims disclosed they were “limited in activities because of physical, mental, or emotional problems” (IBIS, 2018). Women with histories of sexual violence are more likely to experience shame, guilt, and struggle with

In 2013, 9% of female and 6% of male high schoolers reported being raped (Utah Department of Health, 2014; IBIS, 2018) but other research suggests the rate of adolescents’ exposure to sexual violence may actually be higher (Lundgren & Amin, 2015). It is estimated that 88% of Utah rapes remain unreported, making it difficult to accurately assess the severity of the issue (Utah Department of Health, 2014).

In terms of sex education, Utah is one of the 24 states in the country that mandates sexual education. Utah is also one of only 13 states that require curricula to be medically accurate. However, education regarding contraceptives is not required in Utah schools, and abstinence-only-until-marriage ideology is stressed (Guttmacher Institute, 2017).

interpersonal relationships (Fava & Bay-Cheng, 2013).

The Utah Department of Health reports that sexual violence cost Utahns approximately \$5 billion dollars in 2011, and attributed the majority of the cost to “...the pain, suffering, and diminished quality of life that victims experience” (2014).

Recommendations

In 2001, Surgeon General David Satcher advocated for comprehensive sex education on the basis that youth “needed enough information about contraception to protect themselves from pregnancy and/or disease, that they needed to be protected from abuse, and they needed to be treated equally in a nondiscriminating way with regard to their sexual development” (Lamb et al., 2011). Other research certainly supports this appeal. Based on the data reviewed in this article, there are several key recommendations for sexual education reform in Utah that may ameliorate rates of sexual violence. First, sex education should be comprehensive and sex positive. Failing to educate youth about healthy sexual relationships, desire, and pleasure puts them, particularly girls, at risk

for exposure to sexual violence (Lamb, et al., 2011; Schalet et al., 2014). Second, considering the relationship between gender stereotypes and sexual violence (Edwards, et al., 2014; Lamb et al., 2011; Lundgren & Amin, 2015; Schalet et al., 2014), sex education needs to be “free from harmful gender beliefs—which may be explicit or implicit in the curricula—and include tools to help students address and challenge these beliefs” (Schalet et al., 2014). To more effectively combat stereotypes and damaging cultural attitudes, sexual education should also be LGBTQ+ inclusive, and considerate of racial and socioeconomic factors (Fava & Bay-Cheng, 2013; Schalet et al., 2014). Third, sexual education should be Trauma-Informed to

prevent victim blaming and retraumatization of students with histories of sexual assault (Fava & Bay-Cheng, 2013; Lamb et al., 2011; Lundgren & Amin, 2015). Finally, sex education needs to be consent centered. Consent education promotes sexual autonomy (Lamb et al., 2011; Schalet et al., 2014) and disambiguates various forms of sexual assault (Edwards et al., 2014). Implementing these concepts into sex education curricula will aid in addressing the attitudes, beliefs, and inequalities that influence sexual violence. More direct research is necessary in the future to further investigate the relationship between sex education and sexual violence.

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Cost of Sexual Violence in Utah

Megan Waters and Deanna Camell / University of Utah

Background:

In Utah, one in three women will experience some form of sexual violence (SV) during their lifetime, and one in eight women and one in 50 men will experience rape (Utah Department of Health, 2008). Utah ranks 10th in the nation for reported rape (U.S. Department of Justice, 2013). What makes this statistic particularly alarming is that “rape is the only violent crime in Utah that is higher than the national average” (U.S. Department of Justice, 2013). Other violent crimes, such as homicide, robbery or aggravated assault, are “historically half to three times lower than the national average”. The effects of SV can be physical, emotional, and/or psychological. SV affects the immediate quality of life and can have lasting consequences for survivors. When compared to individuals who are not raped, rape survivors have been found to have a significantly higher prevalence of reporting dissatisfaction with life (14.7% vs. 4.8%); not receiving the social and emotional support they need (33.8% vs. 13.2%); reporting fair or poor health (25.9% vs. 10.7%); and experiencing activity limitations because of physical, mental, or emotional problems (39.2% vs. 19.7%; Utah Department of Health, 2010).

Public health approaches SV through primary prevention, defined as preventing SV before it occurs. Public health personnel are concerned with approaches that can affect people and the communities where they live, learn, work, and play; and these approaches may include involving entire communities to prevent SV, as SV affects everyone directly or indirectly. In order to conduct primary prevention through all levels of our society, various sectors must be engaged, including policy makers.

Prevention strategies focus on policy, social norms, and increasing protective factors, as well as decreasing risk factors for SV. With this goal in mind,

the Utah Department of Health Violence and Injury Prevention Program, in partnership with the Utah Coalition Against Sexual Assault, put together a whitepaper called the Costs of Sexual Violence in Utah (Cowan, 2015). This report was designed to guide SV prevention resources throughout the state.

Methods:

In 2015, the Utah Department of Health, together with the Utah Coalition Against Sexual Assault, compiled data highlighting the economic burden of SV. The figures and data in this snapshot are from that report. The report looks at child (0-17 years) sexual assault and adult (18+ years) incidents of rape and sexual assault.

To estimate the cost of SV in Utah, existing data were used and methodology was adopted (Cowan, 2015). Cost categories factored in economic health, emotional health, physical health, and occupational/ financial health of the individuals. Furthermore, the report looked at Utah government spending for prevention, as well as government spending on survivors and on perpetrators (oversight and confinement).

Results:

In 2011, in Utah an estimated 3,609 children ages 0-17 were victims of sexual assault. That same year, there were 20,666 adult rape victims and 54,742 adult other sexual assault victims (Table 1). The majority of sexual assault and rape victims were female, including 63% of child sexual assault victims, 84% of adult rape victims, and 75% of adult other victims of other forms of sexual assault.

When all cost categories for the entire Utah population were aggregated, the 2011 direct and indirect costs of SV was \$4.9 billion. That breaks down to over \$800 million for child sexual assault and over

\$4 billion for adult rapes. The cost per SV incident in 2011 was an average of \$184,504 for children per incident. For adults, rape costs were \$154,598 per incident and other sexual assault costs were \$282 per incident. For adult rapes, the largest cost category, suffering and lost quality of life, came out to \$126,713 per adult rape incident.

Additionally, mental health care cost \$3,610 per adult rape incident, suicidal acts cost \$7,535 per incident, and substance abuse costs per adult rape are \$5,039 per incident. These costs are significant to both the individual and society.

Table 1: Estimated Number of Utah Victims of Sexual Violence, 2011

Sex	Child Sexual Assault Ages 0-17	Adult Rape Ages 18+	Adult Other Sexual Assaults Ages 18+
Female	2,281	17,364	41,194
Male	1,328	3,302	13,548
Total	3,609	20,666	54,742
% Female	63.2%	84.0%	75.3%

SOURCE: Cowan, 2015

In 2011, government spending in Utah related to SV totaled more than \$109 million (Table 2). Estimated spending on sexually violent offenders was higher than spending on victims who were raped or sexually assaulted for the one year. Utah spent over \$92 million (84.4%) on offenders, including costs of investigation, confinement, and the sex offender registry. It is important to note that the Rape, Abuse, & Incest National Network (www.rainn.org) estimates that the majority of rapes are

not reported to the police and only about 0.6% of rapists will be incarcerated, suggesting that the vast majority of perpetrators are not included in the offender cost category. That same year, Utah spent just under \$16.5 million (15.1%) on victims of SV, primarily on medical bills for victims on Medicaid, sexual assault examination payments, and child protective services. Finally, \$569,000, or just 0.5% of government funding, was spent on prevention programs (Cowan, 2015).

Table 2: Utah Government Spending on Sexual Violence by Type, 2011

	Cost (\$)	Percent (%)
Perpetrators		
Investigation / adjudication	\$9,726,284	8.9%
Confinement / treatment	\$82,057,390	75.1%
Sex offender registry	\$429,237	0.4%
Total (Perpetrators)	\$92,212,910	84.4%
Victims		
Medical care	\$13,718,950	12.6%
Victim services/ out of home placement	\$2,769,522	2.5%
Total (Victims)	\$16,488,472	15.1%
Overall total	\$109,270,382	

SOURCE: Cowan, 2015

Discussion:

As documented, there are substantial health and economic consequences of SV. Furthermore, connections can be made to SV across all domains of health. This impact can and should have policy implications, and may be addressed through policy change.

Physical & Reproductive Health - The very act of SV violates a person's agency over her or his own body and denies her or him the right to decide when and how to engage sexually, as well as potential for unwanted pregnancy, potential for sexually transmitted infections (STIs), injury to reproductive organs, and overall physical injury. The Adverse Childhood Experiences study associates SV victimization in childhood to higher rates of chronic disease and adverse health behaviors later in life (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002; Sommers, 2007).

Social Health - SV is shown to have impacts on victims' social health, including: strained relationships with family, friends, and intimate partners; diminished emotional support from and contact with friends and family; decreased likelihood of marriage; and isolation or ostracism from family or community (Jacqueline M. Golding, 2002; Krug et al., 2002).

Emotional Health - Emotional health consequences of SV result from other impacts on the domains of health, as seen in the Social Health section. For example, victims of SV can experience both immediate and chronic emotional/psychological health consequences, including but not limited to: anxiety; withdrawal; distrust of others; post-traumatic stress injury; depression; attempted or completed suicide; and low self-esteem/self-blame (Campbell & Dworkin, 2009; Goodman, Koss, & Russo, 1993; Yuan, Koss, & Stone, 2006).

Occupational and Financial Health - As a result of SV, victims often suffer occupational and financial

burdens, including time off from work without pay or loss of work, as well as overall lost productivity. The financial burden of SV victimization includes medical and mental health care costs, in addition to other related costs such as property damage, pregnancy (not to mention child rearing), and potentially housing or relocation issues.

Intellectual Health - Given that the majority of victims of SV experience first-time victimization before the age of 25, we know that the educational achievement, and therefore the intellectual health, of victims is at risk. This is due, in part, to the diminished opportunity to learn in a safe and equitable environment, and individuals who have experienced SV may miss school as a result of their victimization. The intellectual health and academic achievement of victims is gaining increased attention as educational institutions work to comply with the Title IX law.

Policy implications - Several implications that affect policy have been identified from the Costs of Sexual Violence Report (Cowan 2015).

- SV results in a large expense to society.

- There is a lack of priority placed on prevention in Utah. Funding prevention efforts has the potential to result in reduced costs for perpetrator and victim services incurred by the government, in addition to reducing the financial burden on society that inevitably picks up some of the remaining non-governmental spending costs and additional intangible costs.

- It should be noted during the 2016 and 2017 legislative sessions in Utah the Department of Health received appropriations from the federal Temporary Assistance for Needy Families Fund (<https://www.benefits.gov/benefit/613>) to allocate to local programs in order to implement SV primary prevention activities. Since these are one-year, one-time funds, a more sustainable approach to funding to address SV prevention in Utah is necessary.

By bringing to light the economic impact of SV on Utah communities, we hope to educate about strategies that would help reduce costs effectively, as well as help with the evaluation of SV prevention ap-

proaches to address these problems in the best way possible. For more information on SV, including SV prevention in Utah, please visit <http://health.utah.gov/vipp/topics/rape-sexual-assault/>.

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PERINATAL HEALTH (PH)

Data Snapshot: Postpartum Depression

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BACKGROUND

Postpartum depressive symptoms (PDS) can range from the “baby blues”—when for a short period of time after childbirth, a mother experiences mood swings, anxiety, sadness, and/or appetite/sleeping problems—to postpartum depression (PPD)—which involves similar signs and symptoms but is experienced more intensely and for a longer period of time, and may interfere with a mother’s ability to care for her baby and herself. Up to 80% of women in the United States may experience transient PDS, and up to 12% are estimated to experience PPD (Ko et al., 2017). If left untreated, moderate to severe PPD has been linked with lower rates of breastfeeding duration and initiation, impairment of mother-infant bonding, and delayed social and cognitive development of offspring (Ko et al., 2017).

Timing is the only aspect that distinguishes PDS or PPD from other types of depression. The American Psychiatric Association defines PPD as a major depressive episode with onset in pregnancy or within 4 weeks after delivery (American Psychiatric Association, 2015). A new mother who experiences three or more out of the following symptoms in the same period, in addition to depressed mood and loss of interest or pleasure, would be diagnosed with PPD:

- Change in weight or appetite. Weight: 5 percent change over 1 month;
- Insomnia or hypersomnia;
- Psychomotor retardation or agitation (observed);
- Loss of energy or fatigue;
- Feelings of worthlessness or guilt;
- Impaired concentration or indecisiveness;
- Recurrent thoughts of death or suicidal ideation or attempt.

Given the serious consequences of postpartum depression and its relatively high prevalence, a de-

velopmental Healthy People 2020 goal is to reduce the proportion of women who experience PDS after delivering a live birth. Healthy People 2020 defines this as a developmental objective since the condition lacks national baseline data. Consequently, no technical specifications for improvement are specified; however, a nationally representative data source that can provide a tracking point exists. Furthermore, it is acknowledged that this is an important concern deserving of monitoring for improvement (Office of Disease Prevention and Health Promotion,).

Given evidence supporting that PDS and PPD are treatable via pharmacologic therapy and/or behavioral interventions (Ko et al., 2012), the key to reducing morbidity and mortality associated with this maternal condition is proper screening, diagnosis, and treatment of at-risk mothers. Research conducted within the last decade indicates that nearly 60% of new mothers with depressive symptoms do not receive a clinical diagnosis and 50% of women with a clinical diagnosis do not receive any treatment (Ko et al., 2012). Consequently, several professional women’s health groups, including the American College of Obstetricians and Gynecologists, recommend that providers screen for depression at least once during pregnancy or postpartum. Some even advocate the need to screen pre-conceptionally, given that women with a history of depression have a two-fold increased risk of suffering from PPD (Gauthreaux et al., 2017).

Our objective in this data snapshot is to provide recent Utah statistics on prevalence of preconception and prenatal/postpartum depression screening and diagnosis, using the Pregnancy Risk Assessment Measurement’s Survey (PRAMS) for Utah. Additionally, we aim to compare current Utah statistics with those of the past and for the rest of the United States.

DATA

Utah Pregnancy Risk Assessment Monitoring System (UT-PRAMS) Methodology:

Participants contributing responses for this data snapshot were mothers who participated in the Utah Pregnancy Risk Assessment Monitoring System (UT-PRAMS) between 2012 and 2014. Two questions were specifically related to PDS: 1) “Since your new baby was born, how often have you felt down, depressed, or hopeless?”; and 2) “Since your new baby was born, how often have you had little interest or little pleasure in doing things?” For both questions, women were given options of “Always”, “Often”, “Sometimes”, “Rarely”, or “Never”. As per the Centers for Disease Control (CDC) PRAMS methodology, we classified any woman who answered “Always” or “Often” as having PDS. Sociodemographic, lifestyle, and health history questions also make up the PRAMS questionnaire, in addition to inquiries about past history of depression and whether any health care provider discussed with them what they should do if they felt any depressive symptoms during or after their baby was born.

Women who answered either question in regards to PDS were included in the analysis (n=4328/4378, 99%). Descriptive characteristics including socio-demographic, psychosocial, and health factors of Utah mothers by PDS status (yes/no) were calculated by chi square or t-tests as appropriate, taking into account the stratified random sampling in the analyses. Key risk factors for

Utah mothers were evaluated via adjusted Poisson regression to generate prevalence ratios (PR) and 95% confidence intervals. Analyses were completed using SAS version 9.4 (SAS Institute, Inc.).

Utah Pregnancy Risk Assessment Monitoring System (UT-PRAMS) Results:

Prevalence of PDS among Utah women, 2012–2014, was 12.0%. In regards to demographic and health characteristics, women who experienced PDS compared to those who did not were more likely to be younger (27.3 vs 28.2 years), lower income (34.9% vs 19.2% ≤ 100% of Federal Poverty Level [FPL]), higher body mass index (BMI) (26.1 vs 25.3), to report a prior-to-pregnancy diagnosis of hypertension (3.8% vs 1.9%) and depression (29.0% vs 7.3%), and to report a 3-months-prior-to-pregnancy history of asthma (10.3% vs 6.9%), anemia (12.4% vs 7.1%), and/or anxiety (32.7% vs 11.4%) (Table 1). In regards to psychosocial and lifestyle factors, women with versus without PDS were more likely to report partner abuse prior to and during pregnancy (3.9% vs 1.3% and 4.0% vs 1.1%, respectively), 3-months-prior-to-pregnancy smoking (15.8% vs 8.4%) or alcohol (29.4% vs 23.2%) exposure, and presence of higher partner (43.7% vs 18.5%), traumatic (22.5% vs 10.1%), financial (57.4% vs 47.4%), or emotional (35.9% vs 27.6%) life stressors. Finally, women with versus without PDS were more likely to have a current (11.3% vs 7.4%) or prior (14.7% vs 9.6%) preterm birth (PTB) and more likely to have an unintended pregnancy (34.0% vs 21.6%).

Table 1: Utah new mother characteristics by postpartum depressive symptom status (2012–2014)

Characteristic	Total (%)	PPD (%) n=604	No PPD (%) n=3686	<i>P</i>
Demographics				
Maternal Age	28.1 (0.09)	27.3 (0.25)	28.2 (0.10)	<0.001
Maternal Age Category				0.004
≤ 19	4.2	7.3	3.4	
19–24	17.4	20.5	17.0	
25–34	65.3	62.6	65.6	
≥35	13.1	9.6	13.6	
Mothers Race				0.16
White	84.7	82.7	85.3	
Non-White	15.3	17.3	14.7	
Mother's Ethnicity				0.46
Hispanic	15.0	16.2	14.8	
Non-Hispanic	85.0	83.9	85.2	
Poverty Level				<0.001
≤ 100% of FPL	21.1	34.9	19.2	
101-133% of FPL	9.9	10.4	9.8	
134-185% of FPL	14.7	13.1	14.9	
185+ % of FPL	54.3	41.6	56.1	
Maternal Education				<0.001
<12	10.1	13.5	9.7	
12	19.0	25.2	18.2	
>12	70.9	61.3	72.2	
Married	85.5	79.0	86.3	<0.001
Health				
BMI	25.4 (0.11)	26.1 (0.34)	25.3 (0.12)	0.03
BMI Category				0.10
Underweight	4.8	4.5	4.9	
Normal Weight	54.3	49.5	55.0	
Overweight	22.7	23.8	22.5	
Obese	18.2	22.2	17.6	
History of Diabetes	1.5	1.7	1.4	0.67
History of Hypertension	2.1	3.8	1.9	0.02
History of Depression	9.9	29.0	7.3	<0.001
History of Asthma	7.3	10.3	6.9	0.01
History of Anemia	7.8	12.4	7.1	<0.001

History of Heart Problems	1.6	2.2	1.6	0.39
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(Table 1, continued)

Characteristic	Total (%)	PPD (%) n=604	No PPD (%) n=3686	P
Health (continued)				
History of Epilepsy	0.9	0.9	1.0	0.80
History of Thyroid Problems	5.1	3.7	5.3	0.20
History of Anxiety	14.0	32.7	11.4	<0.001
Psycho-social/Lifestyle				
Partner abuse				
Prior to pregnancy	1.6	3.9	1.3	<0.001
During pregnancy	1.4	4.0	1.1	<0.001
Smoke				
3 months prior to pregnancy	9.3	15.8	8.4	<0.001
Last 3 months of pregnancy	4.4	8.2	3.8	<0.001
Alcohol				
3 months prior to pregnancy	23.9	29.4	23.2	0.01
Last 3 months of pregnancy	2.6	1.1	2.8	0.004
Life Stressors				
Partner	21.6	43.7	18.5	<0.001
Traumatic	11.7	22.5	10.1	<0.001
Financial	48.6	57.4	47.4	<0.001
Emotional	28.6	35.9	27.6	0.001
PNC Provider discussed Abuse	68.7	68.7	68.7	0.99
Reproductive History				
Prior PTB	10.2	14.7	9.6	0.01
Pregnancy Intendedness				
Now or sooner	65.5	48.7	67.8	<0.001
Later or never	23.1	34.0	21.6	
Unsure	11.4	17.3	10.6	
Current Multiple Birth	1.6	1.6	1.5	0.90
Current Preeclampsia	6.1	6.9	6.0	0.53
Current Preterm Labor	7.8	11.3	7.4	<0.001
Current SGA Birth	3.9	4.8	3.8	0.23

Prenatal Care Visits for Current Pregnancy	0.33			
≥ 0–9	11.0	13.2	10.7	
≥ 9–11	21.9	23.6	21.7	
≥ 11–13	35.9	33.4	36.2	
≥ 13	31.2	29.8	31.4	
PNC Provider discussed PPD	69.1	68.6	69.2	0.81

In the adjusted analyses, after taking into account mother’s age, race, ethnicity, and BMI, the statistically significant predictors of PDS included being ≤100% of federal poverty level (PR: 1.48 [95% CI: 1.21, 1.82]), having had a prior diagnosis of depression or anxiety (PR 2.09 [95% CI: 1.58, 2.77]; PR 1.60 [95% CI: 1.22, 2.1], respectively), experiencing partner-related or traumatic-related stress (PR 1.76 [95% CI: 1.41, 2.20]; PR 1.24 [95% CI: 0.98, 1.55], respectively), and having a preterm birth infant for the most recent pregnancy (i.e., 2–4 months prior) (PR:1.35 [95% CI: 1.08, 1.69]) (Figure 1). None of the other factors listed in Table 1, including mother’s age, race, ethnicity, and BMI, significantly predicted a woman’s risk of PDS.

Current State of PDS in Utah compared to the Past and to the Rest of the United States

In line with the majority of the US, which has witnessed a statistically significant decline in PDS from 2004 to 2012 among 13 states (with data for all periods), PDS in Utah has dropped from 14.8% in 2004 to 12.4% in 2008 to 11.3% in 2012 (P for trend = 0.01) (Ko et al., 2017). Among the 27 states participating in the 2012 PRAMS survey, Utah’s 11.3% PDS prevalence ranks 14th in the US (average: 11.5%; range 8.0 to 20.1). However, the 2013 to 2014 UT-PRAMS data do not support a continuing decline, with the prevalence going up to 12.5% in 2013 and 12.3% in 2014.

In terms of characteristics significantly associated with PDS, Utah was similar to the rest of the US, with PDS being higher in younger, unmarried, less educated, more highly stressed women who gave birth to a preterm infant. (Ko et al.,

2017) What our results show for the UT-PRAMS 2012–2014 data is that the risk factors that are most predictive of PDS in Utah, after taking into account maternal age and race/ethnicity include 1) living below 100% of the federal poverty level; 2) a prior depression or anxiety diagnosis; 3) experiencing partner- or traumatic-related stress; and 4) having a preterm infant.

CONCLUSION

Our findings from the UT-PRAMS 2012–2014 survey highlight that approaching PDS truly requires a multidisciplinary approach, particularly in the domains of social, emotional, and financial support. The CDC points to several factors that may be linked to the reduced prevalence of PDS in the US from 2004 to 2012, including reduction in teen births, preterm births, and self-reported stressful life events as well as an increase in antidepressant prescriptions for pregnant women (Ko et al., 2017).

Our findings from UT-PRAMS 2012–2014 indicate that new mothers who have a prior history of depression and anxiety are at significant increased risk for PDS and thus should be a subgroup who receive extra attention by healthcare providers in terms of appropriate screening, referral, and treatment (Practice, 2015) (Earls et al., 2010). Utah women who have experienced partner or traumatic-related stressors or who are in the lowest income brackets are also at high risk for PDS and deserve special consideration.

Finally, it is important to note that ~30% of women reported that their prenatal doctor, nurse, or other health care worker never talked with them during

one of their prenatal care visits about what to do if they felt depressed or suffered from physical abuse during or after their pregnancy. While we found no difference in PDS risk by having or not having these discussions, professional women's health organizations have come up with new strategies that may make these discussions more effective. Strategies include using validated screening tools (American College of Obstetricians and Gynecologists, 2015) and extending maternal mental health screening to postpartum period during well-baby

and/or primary care visits (Earls et al., 2010; Ko et al., 2017; Practice, 2015). Another useful resource for both health professionals and mothers/families is the Utah Maternal Health Collaborative, a state chapter of Postpartum Support International. Founded in September 2014, this is an all-volunteer organization made up of several hundred community members including survivors of maternal depression as well as healthcare providers (<http://www.utahmmhc.org>).

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Breastfeeding and Mothers Own Milk is Best for Babies

Ellen Lechtenberg MPH RD IBCLC / Primary Children's Hospital

Most mothers know that breastfeeding and providing expressed mothers milk is best for babies and is the normal standard for infant feeding and nutrition. According to the American Academy of Pediatrics (AAP) Breastfeeding and the Use of Human Milk Policy Statement, the committee states that “breastfeeding should be considered a public health issue and not only a lifestyle choice” (AAP 2012). The reason for this statement is the documented short- and long-term health and cognitive positive outcomes of breastfeeding. The AAP recommends exclusive breastfeeding for about 6 months and then continued breastfeeding once complementary foods are introduced for 1 year or longer (2012). The Healthy People 2020 Breastfeeding Objectives mirror this recommendation and believe that breastfeeding and/or providing expressed mothers milk is a key public health strategy. One reason for this increase is the awareness of the impact of hospital practices and routines that support initiation and duration of breastfeeding. The Ten Steps to Successful Breastfeeding devel-

oped by WHO and UNICEF when implemented by hospitals has been shown improve breastfeeding rates. Breastfeeding rates are increasing nationally but still fail to reach any of the Healthy People 2020 Breastfeeding objectives.

Mothers’ milk provides more than the perfect nutrition at the right times in a newborn and infants life. It also provides non-nutritional benefits beginning with colostrum and continues for as long as the infant/child received mothers’ milk including after cessation of breastfeeding into adulthood. There are over 200 compounds found in mothers’ milk all working together to provide the necessary nutrition and immunologic protection while the infant’s immune system is maturing. Mothers milk has many roles; it transports nutrients, affects biochemical systems, enhances immunity and destroys pathogens. This is why benefits are seen with any breastfeeding and the longer the breastfeeding duration the more significant health risks are reduced producing (see table 1).

Table 1 Health Benefits of Mothers Milk

	Any Breastfeeding	Exclusive Breastfeeding
Less than 3 months	<ul style="list-style-type: none"> ↓23% otitis media ↓ 65% gastrointestinal tract infections ↓58% necrotizing enterocolitis (NEC) ↓36-50% risk of sudden infant death (SIDS) ↓15-30% risk in adolescent and adult obesity rates 	<ul style="list-style-type: none"> ↓77% necrotizing enterocolitis (NEC)
3 to 6 months	<ul style="list-style-type: none"> ↓52% risk of developing celiac disease ↓31% risk childhood inflammatory bowel disease ↓30% type 1 diabetes ↓40% type 2 diabetes ↓64% episodes vomiting ↓53% diarrhea related hospitalizations 	<ul style="list-style-type: none"> ↓74% hospitalization/severity RSV ↓50% risk otitis media ↓27% - 42% asthma/atopic dermatitis/eczema in both low-risk and high-risk populations ↓12% risk ALL Leukemia ↓10% risk AML Leukemia ↑cognition
More than 6 months		<ul style="list-style-type: none"> ↓ 63% risk serious colds/ear & throat infections ↓20% risk ALL Leukemia ↓15% risk AML Leukemia ↓20% risk ALL Leukemia ↓15% risk AML Leukemia ↑cognition and behavior

AAP 2012

The health benefits and outcomes listed in table 1 are just the beginning. Breastfeeding and receiving mothers' milk has been associated with a positive risk reduction of non-communicable diseases (NCD) into adulthood. Kelishadi and Farajian (2014) reported the reduction and prevention of the NCD's as a public health issue as 63% of all-cause mortality are related to NCD's. Kelishadi and Farajian (2014) report evidence is growing to support the role of breastfeeding in infancy to reduce risk and prevalence of hypertension, obesity, type 2 diabetes mellitus, hypercholesterolemia, and cardiovascular disease. Duration of breastfeeding is also associated with more protection later in life. The authors conclude the need for more longitudinal studies in these areas as some studies are conflicting with confounding factors and do not show a clear association. Despite this need for more research on NCD's, the authors stress clear short- and long-term health benefits and reduction in risk with breastfeeding.

The health benefits associated with breastfeeding are significant. Recommendations are to exclusively breastfeed for 6 months and continue as mutually desired for at least one year. There are a few medical reasons a mother is not able to breastfeed her baby including a metabolic disorder and a few specific maternal infections. All mothers are encouraged to speak up and discuss concerns they have with an International Board Certified Lactation Consultant (IBCLC).

Recent studies have published the impact of sub-optimal breastfeeding. Bartick et al. (2017) studied the costs associated with suboptimal breastfeeding. They report excess deaths in infants associated with suboptimal breastfeeding mostly due to Sudden Infant Death Syndrome (SIDS) with 492 deaths annually and with 92 deaths annually from necrotizing enterocolitis in the United States. Bartick et al. also reported 0.8 women need to breastfeed to prevent infant gastrointestinal infection, 3 women to breastfeed to prevent acute otitis media, and 95 to prevent hospitalization for lower respiratory infection. The authors conclude that "for every 597 women who breastfeed, one maternal or child death is prevented" (Bartick et al. 2017). Bartick and Reinhold in 2010 reported a cost savings of 13 billion dollars in the United States and 911 deaths prevented if 90% of mothers could breastfeed exclusively for 6 months. They also reported a cost savings of 10.5 billion and 741 lives saved if there was 80% compliance with the AAP and Healthy People breastfeeding recommendations. Utah is one of only 10 states meeting all five Healthy People 2020 objectives in the 2016 CDC Breastfeeding report card (see Table 2). According to the CDC Breastfeeding Report Card, Utah has the highest initiation of breastfeeding in the country and the highest breastfeeding rates of breastfeeding at 6 months. Costs of suboptimal breastfeeding are much lower in Utah because of increased compliance with the AAP and Healthy People Guidelines.

Table 2 Healthy People 2020 Breastfeeding objectives

Healthy People 2020 Objective	Target	National Rate	Utah Current Rate
Ever Breastfeed	81.9%	81.1%	94.4%
Breastfeeding at 6 months	60.6%	51.8%	70.4%
Breastfeeding at 12 months	34.1%	30.7%	42.6%
Exclusive breastfeeding at 3 months	46.2%	44.4%	50.7%
Exclusive breastfeeding at 6 months	25.5%	22.3%	27.0%

Source: CDC Breastfeeding Report Card 2016

Despite the high initiation and duration rates in Utah, work still needs to be done to improve exclusive breastfeeding rates at 3 and 6 months. According to the 2016 CDC Breastfeeding report card, 73% of infants in the state of Utah are not being exclusively breastfed at 6 months despite initiation of 94.4%. Providing education to mothers and families on these benefits has a significant

impact on initiation and duration. Wallenborn, Perera and Masho (2017) report mothers who had knowledge of breastfeeding benefits were 5.6 times more likely to have longer duration of breastfeeding compared to women who did not have a greater knowledge of these benefits. Ongoing efforts are needed to continue to provide education and ongoing support for breastfeeding mothers.

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Breastfeeding Protects Mothers

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The HealthyPeople initiatives use science-based objectives with the aim to improve health of Americans and disease prevention through awareness and improved understanding. The CDC Breastfeeding Report Card tracks progress of the HealthyPeople 2020 breastfeeding objectives nationally and by each state (Table 1). Breastfeeding and providing the mother’s own milk is well known to protect and improve health for infants with any breastfeeding; short and long-term breastfeeding and exclusive breastfeeding duration have long-term health outcomes that last through childhood into adult life. These health benefits are dose related and correlate with the HealthyPeople breastfeeding objectives. Breastfeeding and/or providing the mother’s own breastmilk protects

mothers short-term and long-term, with improved health outcomes related to duration of breastfeeding or pumping. Dermer et al. reports that these breastfeeding benefits to mothers are a well-kept secret that is often unknown or not emphasized in education. Nationally, breastfeeding initiation rates are rising, with 29 states meeting the initiation objective. Duration rates are also increasing nationally; however, only 12 states met the 6-month objective for breastfeeding at 6 months. Utah has the highest initiation of breastfeeding in the country and the highest rates of breastfeeding at 6 months. Utah is one of only 10 states meeting all five HealthyPeople 2020 objectives in the 2016 CDC Breastfeeding report card (see Table 1).

Table 1 HealthyPeople 2020 Breastfeeding Objectives

Healthy People 2020 Objective	Target	National Rate	Utah Current Rate
Ever Breastfeed	81.9%	81.1%	94.4%
Breastfeeding at 6 months	60.6%	51.8%	70.4%
Breastfeeding at 12 months	34.1%	30.7%	42.6%
Exclusive breastfeeding at 3 months	46.2%	44.4%	50.7%
Exclusive breastfeeding at 6 months	25.5%	22.3%	27.0%

Source: CDC Breastfeeding Report Card 2016

Benefits that mothers obtain when they breastfeed are often understated and underemphasized. Maternal health is negatively impacted when mothers do not breastfeed or wean prematurely. Documented health outcomes studied in the literature include reduction of risk for breast cancer, ovarian cancer, type 2 diabetes mellitus, metabolic syndrome, obesity, hypertension, cardiovascular

disease and postpartum depression. Many of these diseases are chronic non-communicable diseases (NCD) in adulthood and are attributed as major causes of mortality (Kelishadi and Faraijan, 2014). According to the World Health Organization (WHO) June 2017 Fact Sheet, NCD’s are responsible for 70% of all deaths globally, amounting to 40 million people. Cardiovascular disease is respon-

sible for the most deaths from NCD's followed by cancers, respiratory diseases, and diabetes (WHO 2017). Risk factors include being overweight/obese, hypertension, hyperglycemia and hyperlipidemia. All of these factors are associated with long-term risk reduction in mothers who breastfeed. The longer a mother breastfeeds, the larger the reduction risk of developing many of these NCDs (Peters et al. 2017).

Schwarz and Nothnagle (2015) reported that breast and ovarian cancers are more common among mothers who did not breastfeed. According to their 2015 article, written following a meta-analysis of 47 studies, invasive breast cancer risk is reduced by at least 4%. The authors also reported that mothers with the BRCA1 mutation have a 37% reduction in breast cancer risk if they breastfeed for at least one year. Ovarian cancer is 32% more likely in mothers who did not breastfeed (Schwarz and Nothnagle, 2015). In 2016, Victoria et al. reported a reduction in invasive breast cancers by 4.3% for each 12-month increase in lifetime breastfeeding. The American Academy of Pediatrics (AAP) reported similar percentages of breast cancer reduction for each year of breastfeeding. They also reported cumulative breastfeeding duration of greater than 12 months being associated with a 28% decrease in breast and ovarian cancer. Following a meta-analysis review, Victoria et al. reported that longer periods of breastfeeding were associated with a 30% reduction in ovarian cancer. These authors estimated that 20,000 maternal deaths are prevented annually at the current rate of breastfeeding, and another 20,000 breast cancer deaths could be prevented annually by improving breastfeeding practices.

There is a growing body of evidence supporting improved metabolic health later in life in women who breastfeed. Schwarz and Nothnagle (2015) reported a significant reduction of risk of developing diabetes later in life for mothers who breastfed for at least one month. The authors also report a reduced risk of maternal obesity later in life. Mothers without a history of gestational diabetes showed a 4-12% reduced risk of developing type 2 diabetes mellitus, for each year of breastfeeding

(AAP 2012).

According to data from the Women's Health Initiative, cardiovascular disease risk was reduced by 28% after the first delivery in mothers who breastfed for seven to twelve months, compared to mothers who did not breastfeed. The Nurses' Health Study looked at combined time of breastfeeding and documented that women who breastfed for a total of two or more years decreased their coronary heart disease risk by 23%, compared to mothers who did not breastfeed (Schwarz and Nothnagle 2015). Aortic calcification was significantly reduced in mothers who breastfed all of their children for at least 3 months. Mothers who did not breastfeed were five times more likely to develop aortic calcification compared to these mothers. The AAP Breastfeeding Policy Statement reports on the Women's Health Initiative Study results, which included a significant reduction in hypertension, hyperlipidemia, and cardiovascular disease associated with cumulative breastfeeding of 12-23 months.

Maternal depression is clearly associated with a reduced prevalence in breastfeeding women. Women who do not breastfeed or who wean early have been observed to have higher rates of postpartum depression compared to breastfeeding mothers (AAP 2012). However, studies are not clear on whether breastfeeding reduces maternal depression or maternal depression impacts breastfeeding initiation and duration (Victoria et al. 2016).

Breastfeeding significantly decreases mortality from NCDs and all causes. Schwarz and Nothnagle reported that if 90% of mothers breastfed for one year, an estimated 14,000 heart attacks would be prevented and hypertension treatment would be avoided for 54,000 women. This could save the United States billions of dollars annually and prevent premature deaths in 4000 women (Schwarz and Nothnagle 2015). Heart disease is the number one killer in Utah according to the American Heart Association (2015). Bartick et al. also reported on a cost analysis of maternal disease associated with suboptimal breastfeeding rates in 2012, and they determined annual maternal deaths in the United States as follows; 986 due to myocardial infarction,

838 due to breast cancer and 473 due to diabetes. The authors also indicated maternal medical costs of 2.37 billion dollars associated with suboptimal breastfeeding duration and 11.2 billion dollars associated with premature deaths. One last statistic from Bartick et al estimates was that for every 597 women who optimally breastfed for one year, one maternal or child death was prevented. Review of Utah's Public Health Data Resource consistently shows statistics of NCD prevalence in the state, where Utah is below the national average.

Using CDC Breastfeeding Report Card data, in 2917 Wallenborn, Perera and Masho reported that 51.8% of mothers across the United States breastfed to 6 months. In Utah that number was 70.4%. The authors reported that mothers who had knowledge of breastfeeding benefits were 11.2 times more likely

to initiate breastfeeding and 5.6 times more likely to have longer duration of breastfeeding compared to women who did not have knowledge of these benefits. The authors concluded that breastfeeding as a behavior to reduce risk and possibly prevent illness is a dependent factor. Education to mothers on benefits to their baby is important; however, mothers also need to be provided education on short and long-term benefits for themselves as a method to improve breastfeeding duration. This can be done prenatally and in hospitals and physician offices following delivery. Practices that support breastfeeding are essential for mothers and babies. As Bartick et al reported, "Breastfeeding has a larger impact on women's health than previously appreciated" (Bartick et al. 2017).

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Milk Banking

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Milk banking has been around for over one hundred years. The first human milk bank opened in 1909 in Vienna, Austria. The first milk bank in the United States opened in 1919 in Boston, Massachusetts. The Human Milk Banking Association of North America (HMBANA) was organized in 1985 to establish guidelines for milk banking in North America and to work with the medical community and non-profit donor milk banks. The mission of HMBANA is to “promote the health of babies and mothers through the provision of safe pasteurized donor milk and support of breastfeeding” (HMBANA: about-us). 27 non-profit milk banks in the United States and Canada are currently in operation. In Utah, the Mountain West Mothers' Milk Bank (MWMMB, <https://www.giveyourmilk.org/>) is a developing milk bank.

The MWMMB has partnered with Colorado's Rocky Mountain Children's Health Foundation Mothers' Milk Bank (<https://rmchildren.org/mothers-milk-bank/>). As part of an effort to be an operating non-profit human milk bank, human milk donor donation sites have been set up in Utah and Idaho. There are currently a number of human milk donation sites in operation throughout Utah and Idaho with several more upcoming developing human milk donation sites. At this time, operations as a fully operational human milk donor bank have not started, as collected milk must be sent to Denver for processing.

Utah has one of the highest breastfeeding rates in the nation, with 89.7 percent of babies being breastfed at some point according to the 2018 Center for Disease Control Breastfeeding Report Card (<https://www.cdc.gov/breastfeeding/data/reportcard.htm>). However, only 49.7 percent of these infants are exclusively breastfeeding at three months and 27.8 percent are exclusively breastfeeding at six months. Some mothers who had planned

to breastfeed or provide exclusive human milk are unable to do so. Supplementation of the mother's own milk with donor pasteurized human milk (PHM) can be beneficial to all infants. Very low birth weight infants (less than 1500 grams) whose mothers are unable to produce enough milk are a high-risk group who receive several health and cognitive benefits from donor PHM. Human milk banks following the HMBANA guidelines provide a safe alternative. The 2016 American Academy of Pediatrics (AAP) policy statement on donor PHM for the high risk infant recommends mothers' own milk for this population. When mothers' own milk is unavailable or the mother cannot provide enough milk, the AAP recommends use of donor PHM, with priority to be given for infants less than 1500 grams. Many Utah hospitals have policies to provide donor PHM for infants with low birth weights, as well as for infants with other medical conditions such as intestinal diseases. Studies of these high risk infants have shown improved feeding tolerance when fed donor PHM (AAP 2017). More recent studies are showing improved growth outcomes in this population.

The pasteurization process does impact human milk. Lactoferrin, lysozyme, and secretory IgA and immunoglobulin proteins are significantly decreased in PHM. According to Landers and Hartmann (2013), these concentrations are reduced by 50-80 percent. Some of the anti-inflammatory factors, cells, and other immunoactive factors are also destroyed during the Holder pasteurization according to the AAP (2017) and Landers and Hartmann (2013). Other nutrients, along with macro and micronutrients, are not significantly decreased as a result of the pasteurization process. Despite reductions in these constituents, the AAP reports positive clinical outcomes including improved feeding tolerance. These positive outcomes support use of donor PHM.

Landers and Hartmann (2013) report the consensus among neonatologists regarding use and efficacy of donor PHM is the greatest barrier to its use in the NBICU. Another barrier to use of donor PHM in the NBICU is the cost of purchasing the milk. Availability of donor PHM has also been a concern and a barrier to its use. Another barrier is the perceived risks and safety of the milk. According to Landers and Hartmann (2013), risks from infectious disease are believed to be very low, negligible in fact as no reported cases have been reported of infection or viral transmission from donor PHM feedings. Additional concerns regarding donor PHM include risks associated with infectious and noninfectious bacteria and other viruses that may be found in human milk. Human milk banks following HMBANA guidelines screen incoming milk and also run bacteriologic cultures on a routine basis. The Holder pasteurization process has been shown to remove and destroy a wide variety of bacteria and viruses including cytomegalovirus (CMV).

The mother's own milk is the best and first option for all infants, as it provides both short- and long-term benefits into childhood and adult life. This protective benefit of mother's milk is dose-related; however, many health improvements have been documented with any breastfeeding. The AAP Policy Statement on Breastfeeding and Use of Human Milk (2012) discusses these benefits and improved health outcomes. Picaud and Buffin (2017) attribute these benefits to the unique bioactive substances in mother's milk and report mother's milk as essential to the newborn, who naturally is born with an immature digestive and immune system. Multiple studies and review articles which discuss the risks of infant formula and the benefits of human milk (both mother's own and donor PHM) have been published. Risk reduction in many diseases and improved health outcomes is well documented, such as documentation of a significant reduction in necrotizing enterocolitis (NEC), retinopathy of prematurity, and late-onset sepsis. Studies have shown that PHM retains protective abilities to inhibit bacterial growth despite

reductions in immunological properties from pasteurization, making donor PHM absolutely essential for this high-risk group (Picaud & Buffin 2017).

Nationally and in the state of Utah, significant differences exist between hospitals regarding use of donor PHM and policies supporting its use in high-risk infants. The use of donor PHM as a bridge for all infants also varies between hospital systems in Utah, as some hospitals use it as their standard of care while others do not even have donor PHM in their facilities.

Providing and using donor PHM intersects between the physical health domain and the emotional health domain. In Lois Arnold's 2006 article about global health policies, she quotes the United Nations Universal Declaration of Human Rights, article 25 "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family including food, clothing, housing and medical care..." (Arnold 2006, <https://www.ohchr.org/EN/Issues/Health/Pages/InternationalStandards.aspx>). She also states that the same protections should be provided to all children regardless of health status and risk, whether they are term births, premature, or sick with congenital anomalies or other illnesses. According to Arnold, all children should have the same opportunities for the best possible health outcomes. For the infant whose mother cannot produce enough milk to meet her infant's needs, or the mother who is unable to provide milk for her newborn, banked donor PHM provides a safe and essential option to promote optimal health for these infants.

To ensure that the rights of women, children and infants are protected; Arnold (2006) stresses the importance of protecting and supporting breastfeeding mothers in the hospital setting and after discharge. The University of Utah is the only hospital in the state with the Baby-Friendly Hospital designation (CDC 2016). The Baby-Friendly Hospital Initiative (BFHI) is a global program recognizing hospitals for successful implementation of the WHO/UNICEF Ten Steps to Successful Breastfeeding. The Utah Department of Health

Maternal and Infant Health Program is currently promoting Stepping UP for Utah Babies a collaborative working with Utah hospitals to support breastfeeding in their facilities. This program has a toolkit for hospitals to implement the Ten Steps to Successful Breastfeeding (<https://www.unicef.org/newsline/tensteps.htm>). Research has shown that hospitals implementing the Ten Steps to Successful Breastfeeding positively impact initiation and duration of breastfeeding. Leadership organizations and health care professionals in Utah communities and at state and national levels are needed to in-

crease donations of mother's milk, and to increase the number of donors who provide donor milk to those in need. The Mountain West Mothers' Milk Bank has started to serve as a community donor milk bank, thereby providing leadership opportunities to increase donations of mothers' milk. Communities benefit from donor milk banks, as their presence increases awareness of the importance of donor milk to high-risk infants and to infants whose mother is unable to provide this valuable resource.

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ADOLESCENT HEALTH (AH)

Data Snapshot: Adolescent Pregnancy

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Background

Adolescent pregnancy and births are at historic lows in both Utah and the U.S. While the efforts of local and national programs that have worked to achieve this rate decrease should be celebrated, efforts to reduce unwanted pregnancies among teens and support young women cannot become complacent. Adolescent pregnancy continues to be associated with long-term difficulties for the mother, her child, and communities at large.

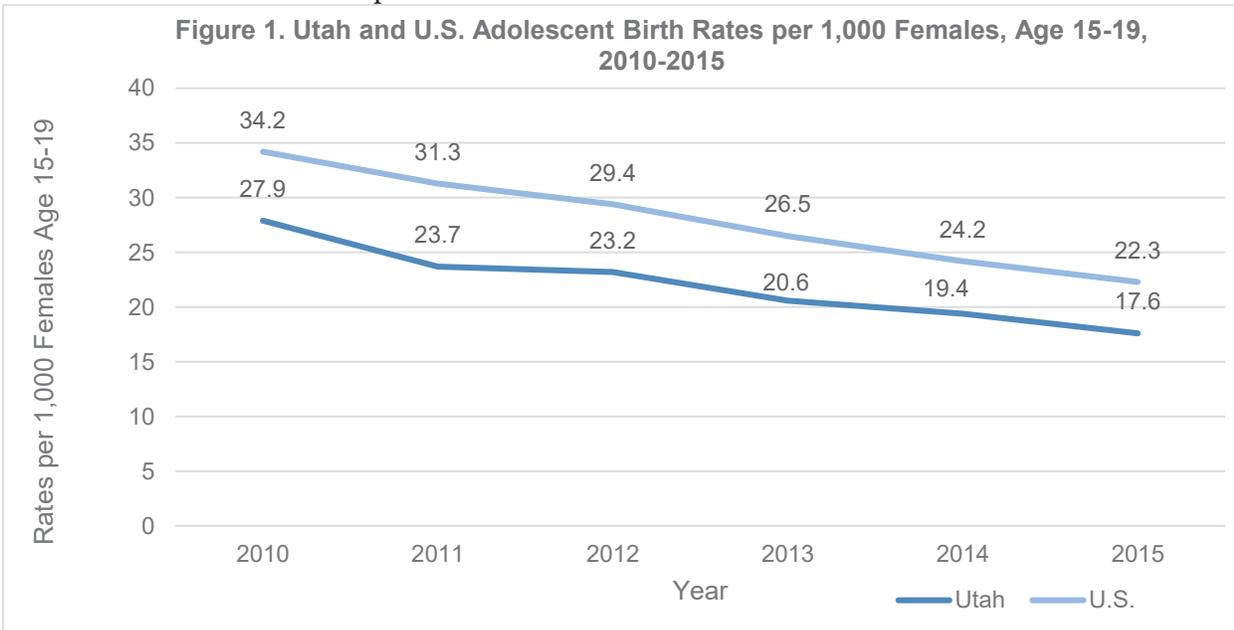
Adolescent pregnancy overlaps with every domain of health and results in negative risks for both mothers and their babies. “For the mothers, giving birth during adolescence is associated with limited educational attainment, which in turn can reduce future employment prospects and earning potential” (UDOH, 2016). Just 40% of adolescent mothers who have a child before the age of 18 receive their high school diploma (TNC, 2019). Adolescent mothers are also at higher risk for postpartum depression and other mental health conditions (PRAMS, 2016).

When considering the health of infants, babies born to adolescent mothers “are at higher risk of low birth weight and infant mortality” compared to babies born to older mothers (UDOH, 2019). “These babies are also more likely to grow up in homes that offer lower levels of emotional support and cognitive stimulation”, and consequently the babies themselves “are less likely to earn a high school diploma” (UDOH, 2019). Children born to adolescent mothers are also at a higher risk of becoming an adolescent parent themselves (TNC, 2019).

Nearly all adolescent pregnancies are unplanned (TNC, 2019). Because of this, many view adolescent child-bearing as only a reproductive health issue. However, since adolescent pregnancy is closely linked to a host of other critical social issues – poverty, overall child well-being, responsible fatherhood, health issues, education, and a variety of risky behaviors – communities cannot ignore the substantial public costs associated with unwanted or mistimed teen pregnancy and parenthood (TNC, 2019). Supporting adolescents’ reproductive goals of delaying first birth should be viewed not only as a reproductive health issue, but also as one that works to improve multiple domains of health for both mothers and their babies.

Data

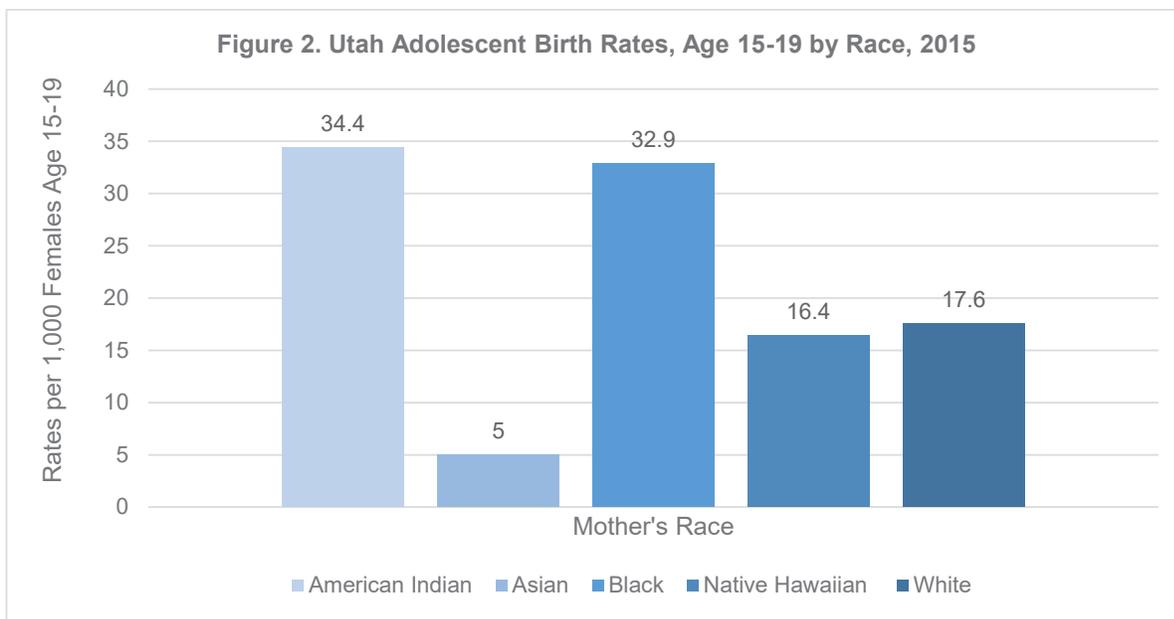
The Utah adolescent birth rate (per 1,000 females age 15-19) continues to be lower than the U.S. (See Figure 1). Currently, Utah ranks 13th in the nation for overall teen birth rate and fourth for teen pregnancy rate (TNC, 2017). However, Utah ranks 24th for the decline in adolescent birth rate, suggesting that improved efforts are needed to address disparities.



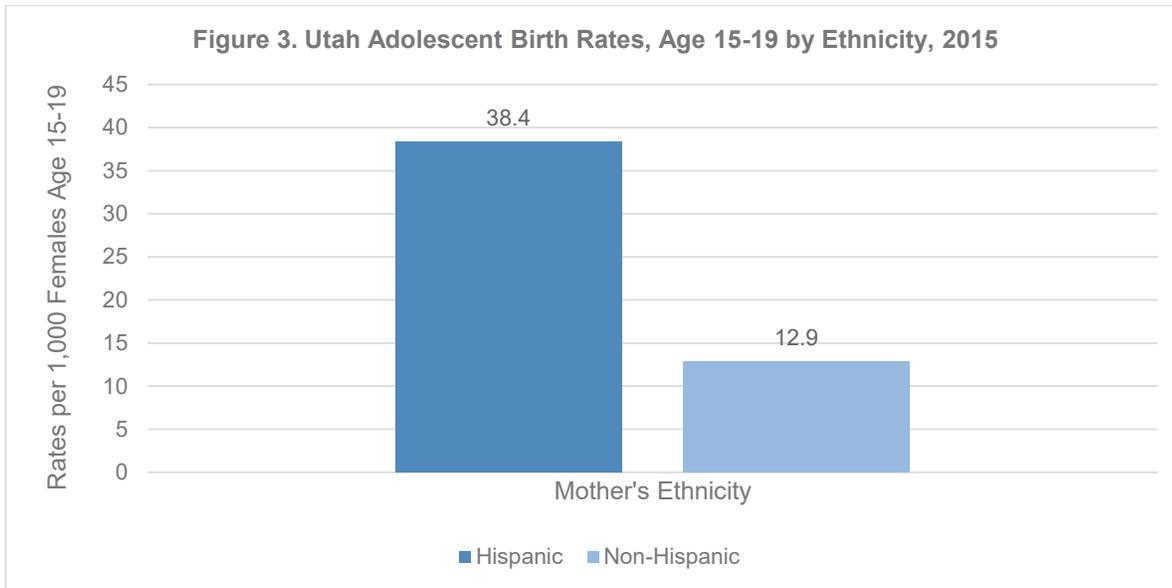
SOURCES: Utah Department of Health, Office of Vital Records and Statistics; CDC, U.S. Department of Health and Human Services National Center for Health Statistics, *Births: Final Data for 2010*. Vol. 61, No. 1, August 28, 2012; *Births: Final Data for 2011*. Vol. 62 No. 1, June 28, 2013; *Births: Final Data for 2012*. Vol. 62. No. 9, December 30, 2013; *Births: Final Data for 2013*. Vol. 64 No. 1, January 15, 2015. *Births: Final Data for 2014*. Vol. 64, No. 2, December 23, 2015; *Births: Final Data for 2015*. Vol. 66 No. 31 January 5, 2017.

In Utah, there are substantial racial and ethnic disparities in the adolescent birth rate. American Indian and Black populations are almost twice as likely to have an adolescent birth compared to the

White population, and Hispanic populations are nearly three times as likely to have an adolescent birth compared to non-Hispanic populations (See Figures 2 and 3).



SOURCE: Utah Department of Health, Office of Vital Records and Statistics.



SOURCE: Utah Department of Health, Office of Vital Records and Statistics.

Geographic disparities also persist in Utah, particularly in rural areas of the state. In four local health districts (San Juan, Southeast, TriCounty, and Weber-Morgan), the adolescent birth rate is higher than both the state and national average

(See Table 1). Though the adolescent birth rate continues to decline, efforts to focus on these disparities in Utah will help improve our rank when compared to the nation, as well as the overall health of all our communities.

LOCATION	RATE PER 1,000 FEMALES
San Juan	28.7
Southeast	28.6
TriCounty	28.2
Weber-Morgan	24.1
U.S.	22.3
Salt Lake County	20.4
Tooele	20.1
Southwest	19.8
Central	19.8
State of Utah	17.6
Bear River	16.9
Wasatch	13.3
Davis County	13.2
Utah County	11.5
Summit	9.8

SOURCES: Utah Department of Health, Office of Vital Records and Statistics; CDC, U.S. Department of Health and Human Services National Center for Health Statistics, Births: Final Data for 2015. Vol. 66 No. 31 January 5, 2017.

Available Resources

For many years, the Utah Department of Health (UDOH) has received federal funding to address the issue of teen pregnancy through the Title V Abstinence Education grant. This funding is sub-granted to local health departments to implement nationally developed evidence-based programs for youth ages 10-16. Traditionally, these adolescent pregnancy prevention programs have focused primarily on providing sexuality education to youth in public schools. However, four noteworthy programs discussed below, including an additional federal funding opportunity—the Personal Responsibility Education Program (PREP)—illustrate a wider range of possibilities for adolescent pregnancy prevention interventions. In October of 2016, the TriCounty Health Department received Title V Abstinence Education funding to implement the Wyman Teen Outreach Program® (TOP®), an after-school youth development program designed and evaluated by the Wyman Center in St. Louis. The program is widely used across the U.S., reaching 25,000 teens annually. Evaluation conducted by Wyman shows that 98% of youth participating in the program nationally avoid teen parenthood (Wyman, 2017).

TOP® not only equips teens with the skills to avoid risky behaviors, like early sexual initiation, but also empowers them to become powerful and visionary leaders in their community. For example, TriCounty's program participants for the 2016-2017 school year have completed nearly 50 hours of community service. Youth across the Uintah Basin now have increased skills and opportunities to engage in meaningful community service, take on leadership roles, and participate in civic engagement.

Beginning in 2010, UDOH began receiving additional teen pregnancy prevention funding for the Personal Responsibility Education Program (PREP). Like the Title V Abstinence Education Program, the funding is sub-contracted to local health departments to implement nationally developed, evidence-based programs. However, the program is intended for an older population of youth (aged 14-19) and provides a wider focus than traditional educational interventions. Four local health departments (Bear River, Tooele, Salt Lake, and Weber-Morgan), and the Urban Indian Center of Salt Lake, are currently

receiving funding to implement community-based programming that provides education on a variety of adult preparation subjects, such as parent-child communication, healthy relationships, education and career success, and financial literacy, in addition to traditional sexuality-related material. The goal of the program is not only to prevent adolescent pregnancy, but also to provide all youth with the skills they need to become productive and successful adults and citizens in their community.

A third noteworthy intervention being implemented through Title V Abstinence Education and PREP funding in several Utah communities is Families Talking Together. The program was developed by the Center for Latino Adolescent and Family Health at New York University School of Social Work, and is based upon the philosophy that parents are the primary sexuality educators of their children. Evaluations of the program have shown that the intervention delays sexual initiation and promotes abstinence (HHS, 2017). Through two intensive one-on-one or small group sessions, parents learn specific skills and strategies to enable them to engage in conversations with their teens and effectively take on the role of a sexuality educator for their family.

Another unique community program focuses specifically on reducing repeat births to adolescents. The Teen Success program, one of the many programs implemented by the Education Department at Planned Parenthood Association of Utah, was established in 2011. Its primary goal is to help mothers aged 13-19 in Salt Lake County maintain their current family size until they complete their high school education and feel ready for another child. This goal is achieved through a unique, mixed method program model of providing a safe and supportive group counseling environment that also implements an educational curriculum focused on personal health and self-esteem, parenting, healthy relationships and college and career preparation. Over the past five years, this program has helped more than 100 young mothers achieve their goals and become empowered parents. The program has a 98% success rate at preventing a repeat birth during the adolescent years; and for the past three years, 100% of the high school seniors participating in the program have graduated with their high school diploma.

Recommendations

Effective interventions include a wide range of activities, including youth development programs, adult preparation education, and programs tailored to specific sub-populations, such as teen mothers. Regardless of the specific program or implementation setting, there are common themes for success. These include creating a safe,

supportive environment for program participants; involving parents; and moving beyond a prevention focus to a more holistic adolescent development and engagement approach. Ultimately, when government and communities are willing to invest resources in programs for young people, the return in social capital is tremendous.

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Potential Anorexia among Adolescent Girls in Utah

Michael Friedrichs MS, Megan Waters BS, Deanna Camell, MPH
/ Utah Department of Health

Background:

Eating disorders, which include anorexia nervosa, bulimia nervosa, and binge-eating disorder, are psychological disorders where people experience abnormal or disturbed eating habits. People who have anorexia nervosa typically view themselves as overweight, but they are actually dangerously underweight. Anorexia nervosa may lead to several medical complications including abnormally slow heart rate, low blood pressure, scoliosis, osteoporosis and/or severe dehydration, and women may experience amenorrhea, or an absence of period. People of any age, race, gender, and social-economic status can be affected by anorexia. The disorder most frequently begins during adolescence, but children and adults can be diagnosed as well. Hudson, Hiripi, Jr, & Kessler (2008) found the lifetime prevalence estimate of anorexia nervosa to be 0.9% among women and 0.3% among men in the United States. A 2011 meta-analysis found that mortality rates among those with anorexia nervosa are higher than the general population, and higher than mortality in patients with other eating disorders (including bulimia nervosa and eating disorder not otherwise specified; Arcelus, Mitchell, & Wales, 2017).

While there is a growing body of research on treatment for anorexia nervosa, the research on the prevention of anorexia is limited. Some research has suggested that individuals who have anorexia are more likely to experience adverse health risks, compared to their peers without eating disorders. This data snapshot further explores some of those adverse health risks among adolescent girls in Utah.

Methods:

To better understand the magnitude of eating disorder behaviors on the adolescent population, Youth Risk Behavior Surveillance System (YRBSS) data from 2011 and 2013 were used. YRBS is a collaboration between

the Centers for Disease Control and Prevention and the Utah Department of Health (<https://www.cdc.gov/healthyyouth/data/yrbs/index.htm>). The YRBSS surveys students in grades 9-12, across Utah every two years. The questionnaire includes sections for chronic disease prevalence, alcohol, tobacco and drug use, safety, violence-related behaviors, physical activity and nutrition, depression, and suicide ideation.

To look at health risks due to potential anorexia among the adolescent population in Utah, we used two constructs - Body Mass Index (BMI) based on age and sex growth charts, in addition to diagnosis of an eating disorder behavior. To determine if an adolescent had potential anorexia, we identified students below the 15th percentile BMI and those who had one or more of the following eating disorder behaviors: (1) trying to lose weight; (2) fasting for 24 hours or more to lose weight during the past 30 days; (3) taking diet pills to lose weight during the past 30 days; and (4) vomiting or using laxatives to lose weight during the past 30 days.

To understand the magnitude and consequences of eating disorder behaviors among underweight adolescents, we looked at rates of various health risks for adolescents with potential anorexia compared to those without potential anorexia. These findings highlight the burden of anorexia and associated health risks on the female adolescent population in Utah.

Findings:

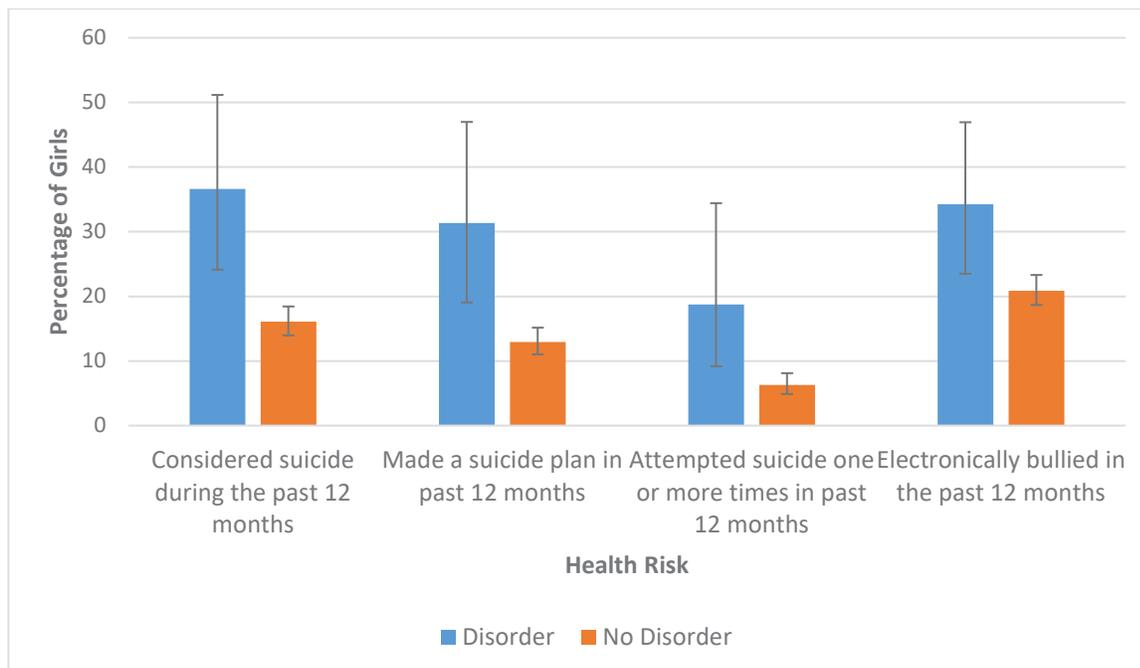
In 2011 and 2013, 3.9% of female students and 1.4% of male students met the BMI and eating disorder behavior criteria for potential anorexia. For girls, the most commonly reported eating disorder behavior for those with potential anorexia was trying to lose weight (22.8%), followed by fasting to lose weight (11.8%), vomiting to lose weight (7.0%), and taking pills to lose weight (4.8%). Overall, these percentages estimated that nearly 3,000 girls and more than 1,000 boys were potentially anorexic in Utah. For females, this number was approximately equal to the number of female student who currently smoke cigarettes during the same time period.

Additionally, we applied these two criteria for potential anorexia to 2013 national YRBSS data. We found that rates of potential anorexia among all adolescents (2.6% and 1.5%) and rates of po-

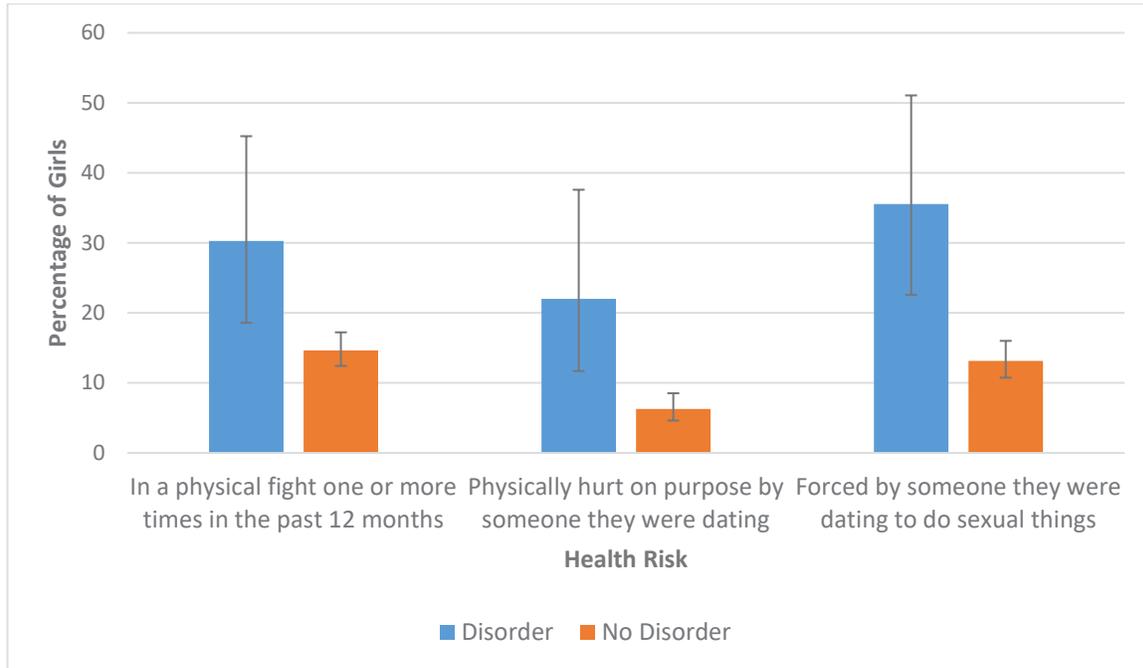
tential anorexia among girls (3.9% and 2.1%) are statistically higher in Utah compared to the U.S. adolescent population. This further magnifies the severity of these findings and demonstrates the magnitude of the issue within Utah.

Anorexia has been shown to be associated with numerous adverse health risks. The prevalence of potential anorexia among girls was associated with higher rates of the health risks shown on Graph 1 and Graph 2. Compared to those with no potential anorexia, girls with potential anorexia had statistically higher rates of: suicide ideation (36.6% vs. 16.1%); making a suicide plan (31.4% vs. 13.0%); attempting suicide (18.7% vs. 6.3%); electronic bullying (34.3% vs. 21.0%); being in a physical fight (30.3% vs. 14.7%); and intimate partner violence (physically hurt 22.0% vs. 6.3%; forced to do sexual activities 35.5% vs. 13.2%).

Graph 1: Suicide and Bullying Among Adolescents with and without Potential Anorexia, Utah Girls, 2011, 2013



Graph 2: Physical Fights and Intimate Partner Violence Among Girls with and without Potential Anorexia, Utah Girls, 2011, 2013



Data source: YRBSS

Discussion: Domains of Health, Girls, Potential Anorexia, and Health Risks

Physical & Reproductive Health - Anorexia nervosa, while a mental health condition, also manifests itself physically. Individuals who have anorexia nervosa can be at risk for numerous consequences, including death due to the development of arrhythmias (abnormal heart rhythms) or electrolyte imbalance. Anorexia has the highest mortality of any mental illness. Physical symptoms of anorexia include extreme weight loss, bluish discoloration of fingers, thinning hair, lanugo (soft, downy hair covering the body for warmth), and dehydration. Physical complications as a result of some of the aforementioned symptoms of anorexia include anemia, bone loss, gastrointestinal problems, and kidney problems. Additionally, females may experience amenorrhea (absence of a period) and men may experience a decrease in testosterone. Despite menstrual irregularities, women with anorexia nervosa are getting pregnant at similar rates to those

found in the general population. The demands of pregnancy on a person with anorexia nervosa may present additional challenges and considerations, but for mothers with adequate gestational weight gain, the occurrence of delivery complications and rate of birth defects was no different from that of the general population (Hoffman, Zerwas, & Bulik, 2011). In addition, potential anorexia in young people was associated with other adverse risk behaviors, including physical and sexual assault. Occupational and Financial Health - Higher health-care costs and treatment costs present financial burden for individuals with anorexia. One study demonstrated nearly \$2,000 higher annual health-care costs among individuals with eating disorders compared to the general population (Samnaliev, Noh, Sonnevill, & Austin, 2015).

Emotional Health – Eating disorders are a disorder of the mind and body. They are not a fad, diet, or lifestyle choice. Those with anorexia nervosa maintain a starvation diet despite being significantly

underweight. Often, the individuals feel a sense of control when engaging in abnormal eating habits and losing weight. Once they are at an unhealthy body weight, they still see themselves as overweight and refuse to regain healthy weight. Eating disorders, including anorexia nervosa, must be recognized as a mental health issue and must be treated as such. It is common for eating disorders to co-occur with other psychiatric disorders. This makes diagnosis, treatment, and recovery even more difficult. The earlier a person seeks treatment, the greater are the chances of emotional and physical recovery.

Recommendations:

Our results demonstrate the lack of attention and resources anorexia has received compared to other health conditions with a similar burden among the same population. Based on the findings of this analysis, recommendations include a deeper

dive to better understand the problem, as well as development and implementation of prevention strategies and interventions for adolescents with potential anorexia. Current efforts by healthcare providers to screen for eating disorders, as well as current efforts to prevent interpersonal violence and suicide in youth, should be evaluated. School nurses or school counselors may play an important role in screening for or identifying eating disorders, violence, mental health, and other associated health risks, and providing support for affected youth. Prevention resources and partnerships should be aligned to incorporate these findings. The magnitude of potential anorexia among adolescent girls in Utah, and the association with multiple health risks, demonstrate the need to recognize and address eating disorders as a part of adolescent health. Awareness of these issues is critical, among school staff and providers as well as parents and all youth.

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A Complex Web: Exposure to Domestic Violence, Aggressive Behaviors and Suicidality in Utah Adolescents

Zoë Diener and Annabel Sheinberg, MM / Planned Parenthood Association of Utah

Background

Utah has a notably high rate of sexual and domestic violence: 32% vs 29% nationally⁵. Female and male adults are not the only victims of this behavior. Adolescents exposed to domestic and sexual violence are at increased risk of acting aggressively towards their peers in the form of bullying and harassment². These adolescents and all adolescents exposed to bullying in any capacity experience greater rates of suicidal ideation and behavior¹. To improve adolescent health, it is imperative that the complex interplay between these three types of violence are further explored and prevention efforts are developed in order to break this cycle and optimize youth health and resiliency.

This data snapshot will explore population data and propose some approaches to build youth resilience and improve health outcomes for adolescents. Adolescents who are exposed to domestic violence are at increased risk of perpetrating aggressive behaviors in the form of fighting, dating violence, and bullying^{2, 8}. Typically, they are more accepting of aggressive behaviors, experience higher rates of adolescent depression and more feelings of anger, and tend to demonstrate impaired regulation of anger¹. Students exposed to domestic violence have poorer conflict management skills and poorer emotional regulation than those not exposed². A 2014 meta-analysis found that involvement in bullying in any capacity (whether as a victim or perpetrator) is associated with suicidal ideation and behavior¹. Notably, a 2006 Utah study found that adult victims of domestic violence are considerably more likely than non-victims to have

witnessed domestic violence as a child (34%) or to have been abused by their parents (36%)³. Utah ranks 7th in the nation for suicide among 10 to 17-year-olds⁷ (Figure 1) and has some of the higher aggression rates in the country (Figure 2). Those who are exposed to domestic violence are at higher risk for perpetrating adolescent aggression, having suicidal ideations, and committing suicide^{1, 2}.

The high rates of suicide, adolescent aggression, and adolescent suicide are especially noteworthy because bullying, assault, and suicide ideations are under-reported problems. Data on individuals who attempt suicide are limited. Such problems disproportionately affect minorities and low socioeconomic populations. For example, Hispanic female adolescents experience sexual dating violence at 16.0 percent, compared to 14.6 percent among white adolescent females³, LGBTQ teens have a suicide rate between 1.5 and 3 times higher than heterosexual teens¹², and low-income areas such as South Salt Lake have remarkably poorer mental health overall.

Because of the overlapping nature of these three phenomena, this research snapshot focuses on three key areas:

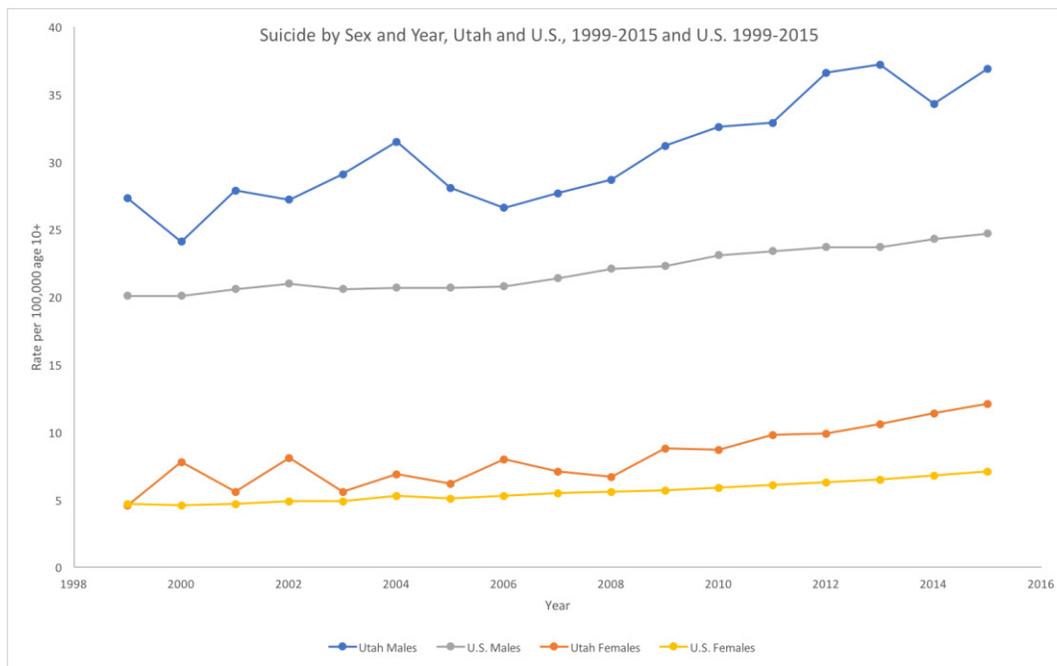
- 1) The impacts of domestic violence on aggression in adolescents
- 2) The correlation between bullying and aggression on youth suicide rates
- 3) The high rate of suicide in Utah, notably in adolescents.

Data

Self-reported Utah data from the 2013 Youth Risk Behavior Survey indicate that 7% of Utah students have been a victim of physical dating violence, 22% have been bullied on school property, and 11% percent have been victims of sexual dating violence³. Among children who have been exposed to domestic violence, nationally, 9% reported perpetrating physical violence, 44%

reported bullying others during the current school term, and 16% reported having sexually harassed a peer in the last school year². These high rates are especially salient in small areas within key populations, like South Salt Lake where the poverty rate is 28.5%, and 26% of children were victims of abuse⁶.

Figure 1: Rate of suicide per 100,000 ages 10+



Adolescent deaths from suicide are more prevalent among males, although attempts are far more evenly distributed, with females having significantly higher rates of hospitalization than males across age groups¹¹. Overall, on mental health, Utah ranks 40th in the nation, having a high prevalence

of mental illness and low rates of access to care¹⁰. In Utah, the rates of adolescent aggression are higher, if only slightly, than the national average. It stands to reason that the three phenomena are linked, especially in light of their strong correlation with socioeconomic status and education.

Figure 2: Frequency of Adolescent Aggression in Utah and Nationally by sex³. In order of increasing incidence from left to right.

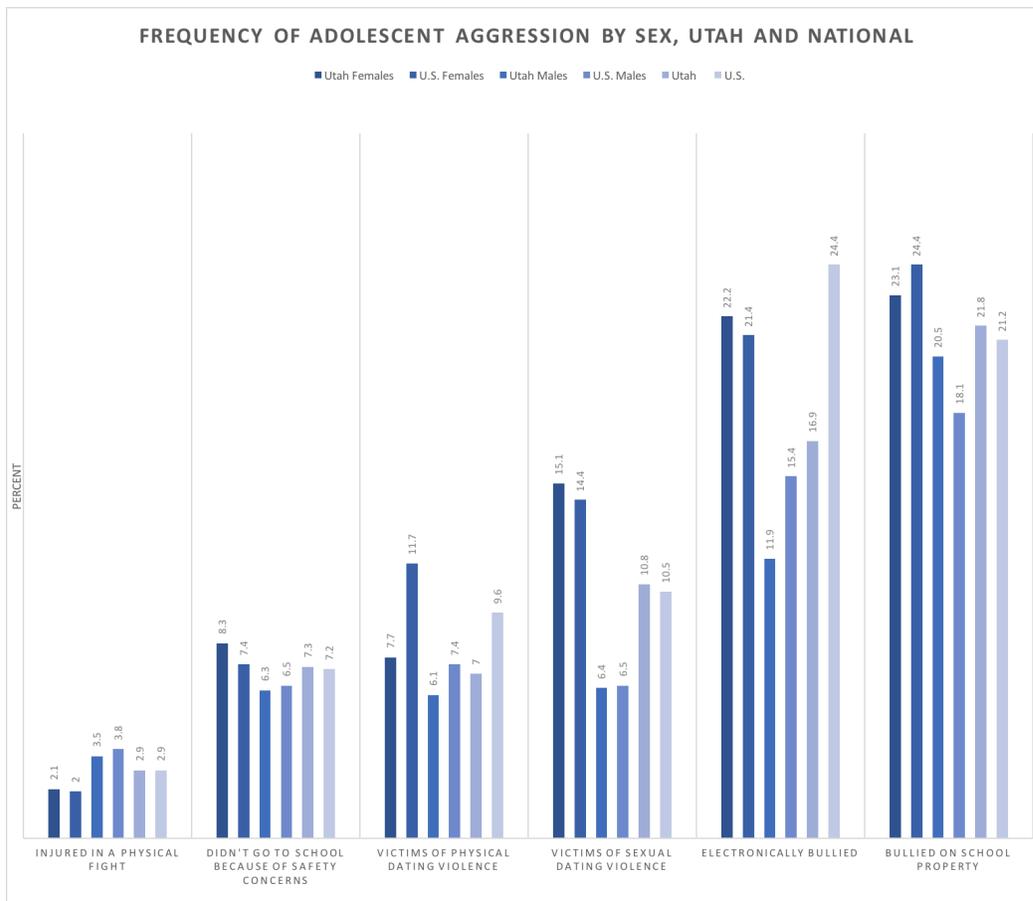
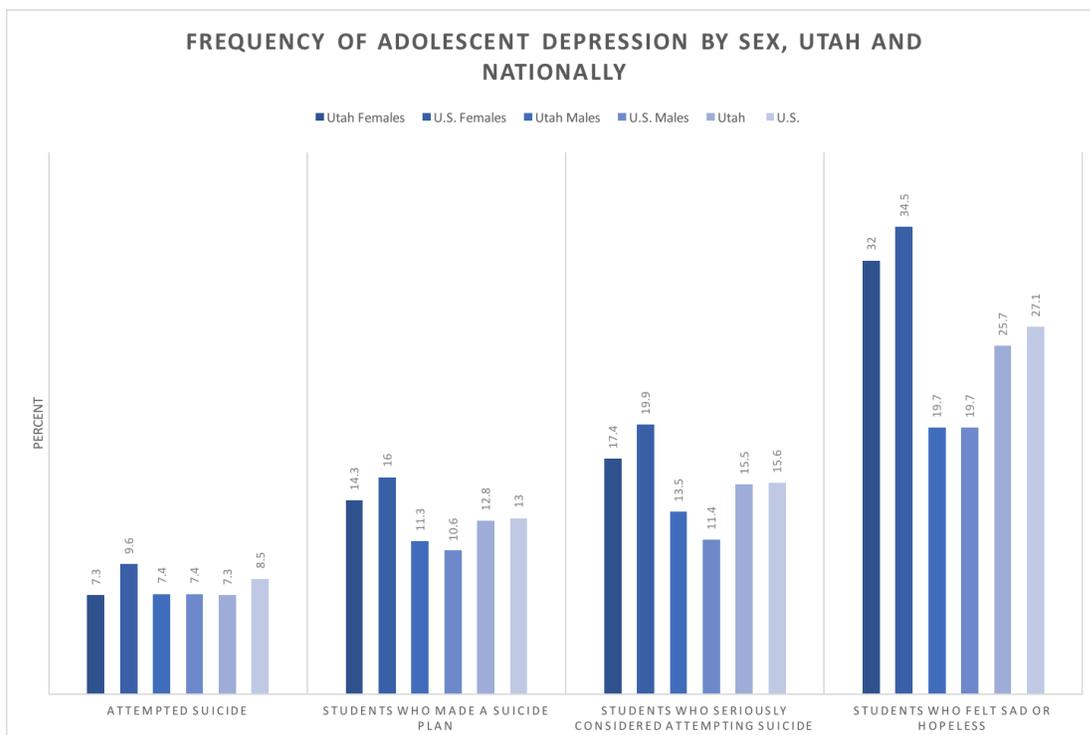


Figure 3: Frequency of Adolescent Depression in Utah and Nationally by sex³. In order of increasing incidence from left to right.



Available Resources and Conclusion

Suicide, domestic violence, and bullying are complex public health issues where discussion may be stigmatized and the victims may be blamed. As such, these topics are not openly discussed, making it difficult to collect valid data and potentially difficult to establish meaningful prevention measures. One approach to this complex web is to expand evidence-based violence prevention work offered to children and youth who are known to have been exposed to domestic violence. A second approach is to implement bystander prevention strategies that empower peers to intervene in the moment where they see situations brewing. Programs that provide teachers and other adults who work with youth with skills to intervene in bullying/harassment, to be a safe, nurturing person to talk with, and to create safer spaces for learning is known to improve safety for LBGTQ youth, youth who have had adverse childhood experiences including

exposure to domestic violence. The literature suggests that programs that target nearly all forms of adolescent aggression at their core can be created, using a social - emotional approach to teach communication skills, decision making, and the qualities of healthy and unhealthy relationships^{2,7}. Late adolescents living in poverty are almost twice as likely to have suicidal inclinations⁹. Because of the drastically higher rates of violence in areas like South Salt Lake, more research needs to be done in order to determine if this is a statewide problem, or one that is disproportionately affecting low-income families in areas like South Salt Lake. Further research can aid efforts to ameliorate the effects of exposure to domestic violence. Because exposure to domestic violence is linked to suicide, bullying, and other adverse behaviors, we need to continue to support youth who have been exposed and work to target aggressive behaviors across Utah.

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SCREENING AND DISEASE (SD)

Arthritis in Utah: Significant Differences for Women

Stephanie George / Utah Department of Health

Background

Arthritis includes over 100 different rheumatic diseases (Hardin, Crow, & Diamond, 2012). Although the causes and symptoms vary, they all share symptoms of pain, swelling, stiffness, and tenderness in one or more joints (Hardin et al., 2012). Arthritis may lead to decreased mobility, and over time joints may lose their normal shape (Hardin et al., 2012). Osteoarthritis (OA), the most common form of arthritis, is a degenerative joint disease (Centers for Disease Control and Prevention, 2017c). OA develops over a long time and is the result of long-term wear, tear, and break-down of joint cartilage (Centers for Disease Control and Prevention, 2017c). Rheumatoid arthritis (RA), the second most common form of arthritis, is an autoimmune disease that attacks joints and can affect multiple systems, tissues, and organs throughout the body (Centers for Disease Control and Prevention, 2017e). Lupus, fibromyalgia, and gout are other common forms of arthritis (Centers for Disease Control and Prevention, 2017b).

Arthritis is the most common cause of disability in the US (Utah Department of Health, 2015b). In 2017, the prevalence of arthritis among adults ages 18 and older in Utah was 19.3% (Utah Department of Health, 2015b). This represents approximately 419,800 individuals based on the estimated Utah population 18 years and older for 2017 (Utah Department of Health, 2015c). Women are significantly more likely to suffer from arthritis than men, according to the Utah Department of Health (UDOH): 26% of adult women in Utah versus 19% of men had arthritis (Utah Department of Health, 2015b). Women are also more likely to have lupus, which is a type of arthritis with distinct differences

(Hardin et al., 2012). New cases of RA are about two to three times higher in women than in men (Centers for Disease Control and Prevention, 2017e), and women of childbearing years (15-44 years) are the most likely to develop lupus (Centers for Disease Control and Prevention, 2017d).

Biology, genetics, hormones and environmental factors all contribute to these differences (Hardin et al., 2012). For example, women are two to five times more likely than men to sustain an anterior cruciate ligament (ACL) injury, a risk factor for developing knee OA; this may be due to differences in the shape of their knee bones (Hardin et al., 2012). Specific genes are also associated with a higher risk of certain types of arthritis (Hardin et al., 2012). Other risk factors include obesity, smoking, joint injuries, infection, and occupations that involve repetitive knee bending and squatting (Centers for Disease Control and Prevention, 2017e; Hardin et al., 2012).

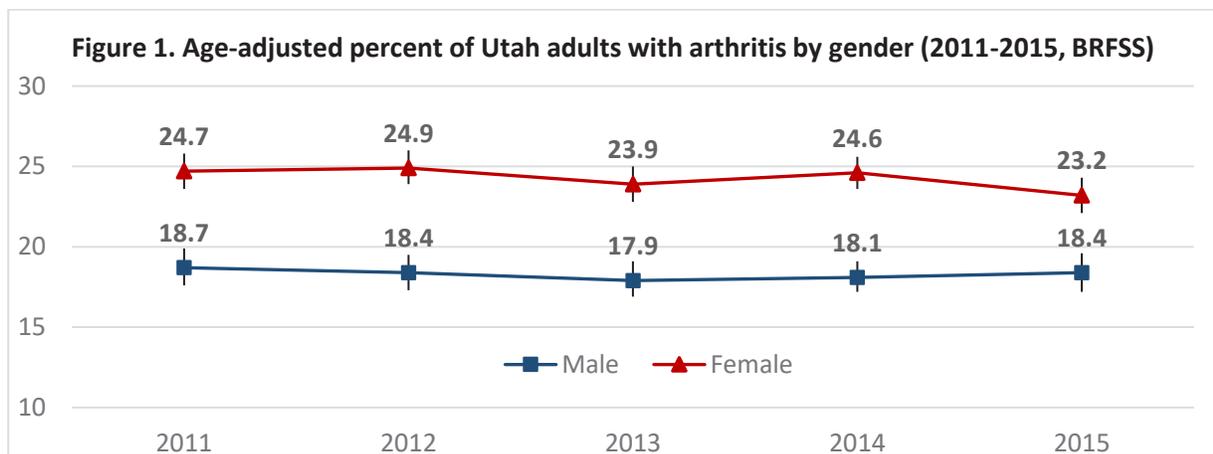
The effects of arthritis are wide-ranging. Arthritis is a leading cause of disability and a major cause of severe joint pain (Centers for Disease Control and Prevention, 2017a). In Utah, over half (56.2%) of adults with arthritis are taking prescribed pain medications, which is significantly greater than those without arthritis (25.8%) (Utah Department of Health, 2015b). Many types of arthritis, especially RA, are “associated with an increased risk of heart disease and even early death” (Hardin et al., 2012). In Utah, 53% of adults with heart disease and 47% of adults with diabetes also have arthritis (Utah Department of Health, 2015b). Arthritis limits many of their normal activities making it harder

to manage their heart disease, diabetes, or other chronic conditions (Centers for Disease Control and Prevention, 2017a).

Adults with arthritis are also more likely to report an injury related to a fall, have substantial activity limitation, work disability, and reduced quality of life (Centers for Disease Control and Prevention, 2017a). Women tend to experience many of the negative effects of arthritis to a greater degree than men. Women have greater pain, greater reductions in knee function, and greater reductions in their overall quality of life than men (Hardin et al., 2012).

Data

The prevalence of arthritis in Utah consistently stayed around 21% from 2011-2015 with the prevalence staying around 24% for women and 18% for men (see Figure 1). In 2014, 24.1% of U.S. adults had arthritis (Division of Behavioral Science, CDC Office of Surveillance, Epidemiology, and Laboratory Services, 2015). This is significantly higher than the 2014 prevalence in Utah of 21.4% (Utah Department of Health, 2014).



Arthritis is increasingly more common as people age, although people of all ages can be affected by the disease. In Utah, 85% of people with arthritis in 2015 were younger than 65 (Utah Department of Health, 2015b). Arthritis is significantly more common for women than men in every age group (Utah Department of Health, 2015a) (see Figure 2).

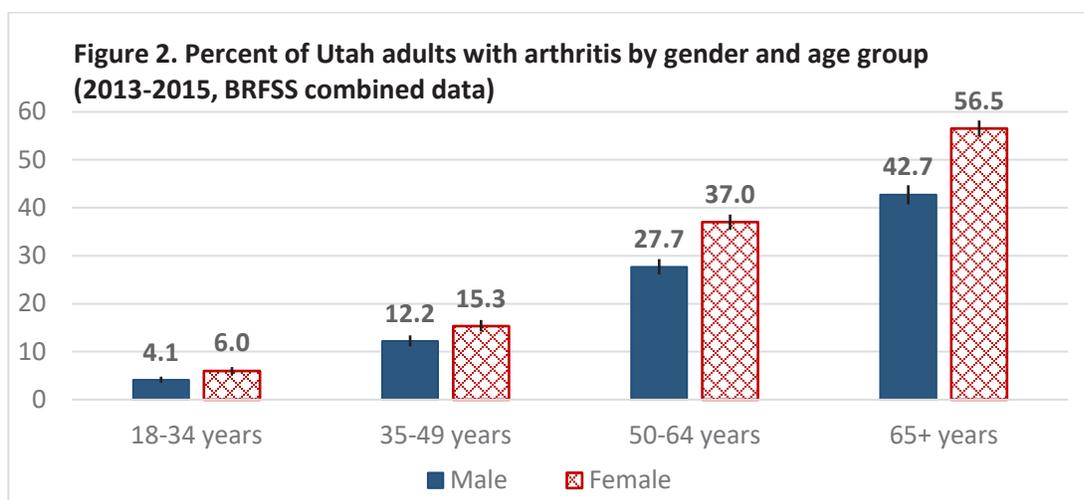
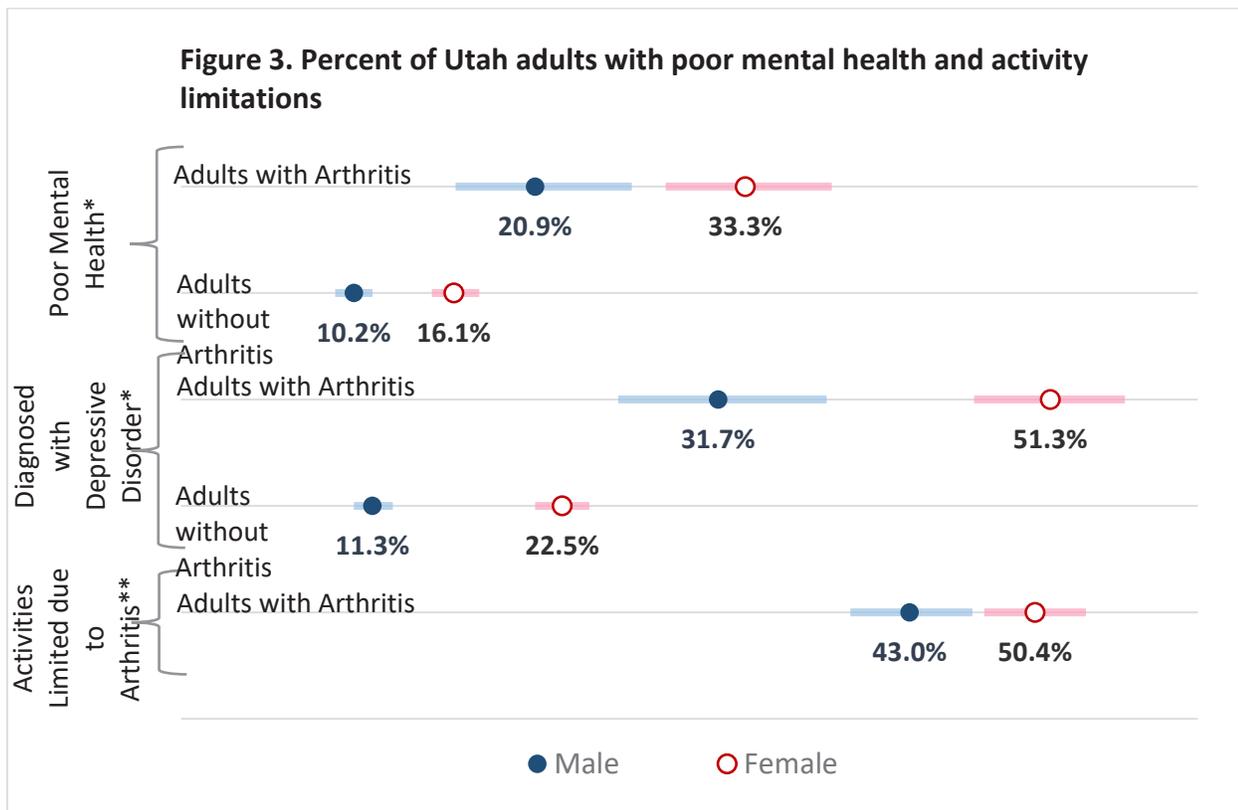


Figure three shows additional differences by sex and arthritis status. Women with arthritis are more likely than men with arthritis to have been diagnosed with depressive disorder, report 7 days or more of poor mental health within the past 30 days (Utah Department of Health, 2015b), and to report that they were limited in any of their usual activities due to their arthritis (Utah Department of Health, 2015a). Even though women, regardless of arthritis status, are more likely than men to report more poor mental health and to be diagnosed

with depressive disorder, women with arthritis are also significantly more likely than women without arthritis to report these conditions (see Figure 3). The exact reasons for the difference in mental health between men and women are not known as they arise from complex interactions of genetics, environmental factors, and psychology. However, it is apparent that women with arthritis have a higher burden of poor mental health and activity limitations than men with or without arthritis, and than women without arthritis.



Impact on other domains of health

Arthritis also impacts social and occupational domains of health. Arthritis lessens the ability of affected individuals to participate in social activities such as shopping, going to the movies, or going to religious or social gatherings. Again, women are more likely to report social participation restriction than men due to their arthritis (18% of women, 13% of men) (Utah Department of Health, 2015b). Limitations in ability to work or to do certain types of work are also reported by 34% of working-age women and 32% of working-age men due to their arthritis (Utah Department of Health, 2015b). The

physical, social, and work limitations experienced by people with arthritis likely contribute to their reduced quality of life and greater number of days with poor mental health.

Current Efforts, Resources, and Recommendations
According to the CDC, “physical activity can decrease pain and improve physical function by about 40%” and may reduce annual healthcare costs by approximately \$1,000 per person, yet one in three adults with arthritis are physically inactive (Centers for Disease Control and Prevention, 2017a). Adults with arthritis can also reduce their symptoms by participating in a disease self-management educa-

tion program (SMEP) (Centers for Disease Control and Prevention, 2017a).

While over half of adults with arthritis are using prescribed pain medications (56.2%), only 16.6% have ever attended a SMEP (Utah Department of Health, 2015b). The Utah Arthritis Program (UAP) works with organizations statewide to offer evidence-based SMEPs and exercise programs, such as EnhanceFitness and the Arthritis Foundation Exercise Program (AFEP), for people with arthritis. Living Well with Chronic Conditions, Utah's main SMEP for people with arthritis, helps participants learn about and improve their use of medications, exercise and nutrition, communication with providers and loved ones, and symptom management (Lorig et al., 2001). The class mitigates the

negative effects of arthritis. Participants report significant improvements in general health, fatigue, disability, and social activity limitations (Lorig et al., 2001).

“Adults with arthritis are significantly more likely to attend an education program when recommended by a provider” (Centers for Disease Control and Prevention, 2017a). The Utah Arthritis Program developed a referral website (<https://arthritis.health.utah.gov/>) for people with chronic conditions, including arthritis, to find self-management and exercise programs near them or for physicians to register patients directly into a workshop. Current classes and schedules can be found at livingwell.utah.gov.

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SUBSTANCE USE & MISUSE (SUM)

Select Alcohol-Attributable Emergency Department Visits and Inpatient Hospitalizations for Women 18-64 Years of Age

Anna Buckner / Utah Department of Health

Background

An estimated 530 deaths occur each year in Utah from alcohol attributable causes. There are consistent gender disparities in alcohol-attributable deaths in Utah. Men are disproportionately among the alcohol fatalities, while women account for 150 (28%) of these deaths (Centers for Disease Control [CDC], 2010). In Utah, a lower prevalence of adult women (18 and older) report binge drinking (7.5 percent) compared to the national average for women (11.1 percent) (CDC, 2019). However, alcohol-attributable harms, such as alcohol-attributable emergency department (ED) visits and inpatient hospitalizations, have increased at a higher rate for both genders in the past decade relative to national trends (Talwakar and Ahmad, 2013).

Consistent monitoring of alcohol-attributable harms may be useful in supporting the development and implementation of evidence-based prevention strategies recommended by the Community Preventive Services Task Force. These strategies to reduce excessive drinking and related harms include increasing taxes on alcohol purchases, regulating the density of alcohol outlets, and having and enforcing commercial host liability laws (The Community Guide, 2015).

Binge drinking is defined as consumption four or more drinks on a single occasion for a woman or five or more drinks for a man (National Institute of Alcohol Abuse and Alcoholism, 2004). Most people who binge drink are not alcohol dependent or alcoholics (Esser et al., 2014). However, binge drinking is the most common form of excessive alcohol use and can have both immediate and long-term effects on women's health.

A few of the short-term effects associated with excessive drinking include injuries from motor vehicle crashes or falls, violence in the form of sexual assault or suicide, alcohol poisoning, risky sexual behaviors, and miscarriage and stillbirth among pregnant women (CDC, 2015).

Several of the long-term effects of excessive alcohol use include increased risk of high blood pressure, various cancers, learning and memory problems, mental health problems like depression and anxiety, social and family problems, and alcohol dependence (CDC, 2015).

This report describes alcohol-attributable emergency department (ED) visits and inpatient hospitalizations for women 18-64 years of age between 2004 and 2014.

Data

Data include ED visits and hospitalizations with a primary, 100 percent alcohol-attributable diagnosis (CDC, 2010). Diagnoses that are not always attributed to alcohol use (e.g., falls and motor vehicle crashes) are not included. Therefore, calculated numbers may underestimate the true impact of alcohol use.

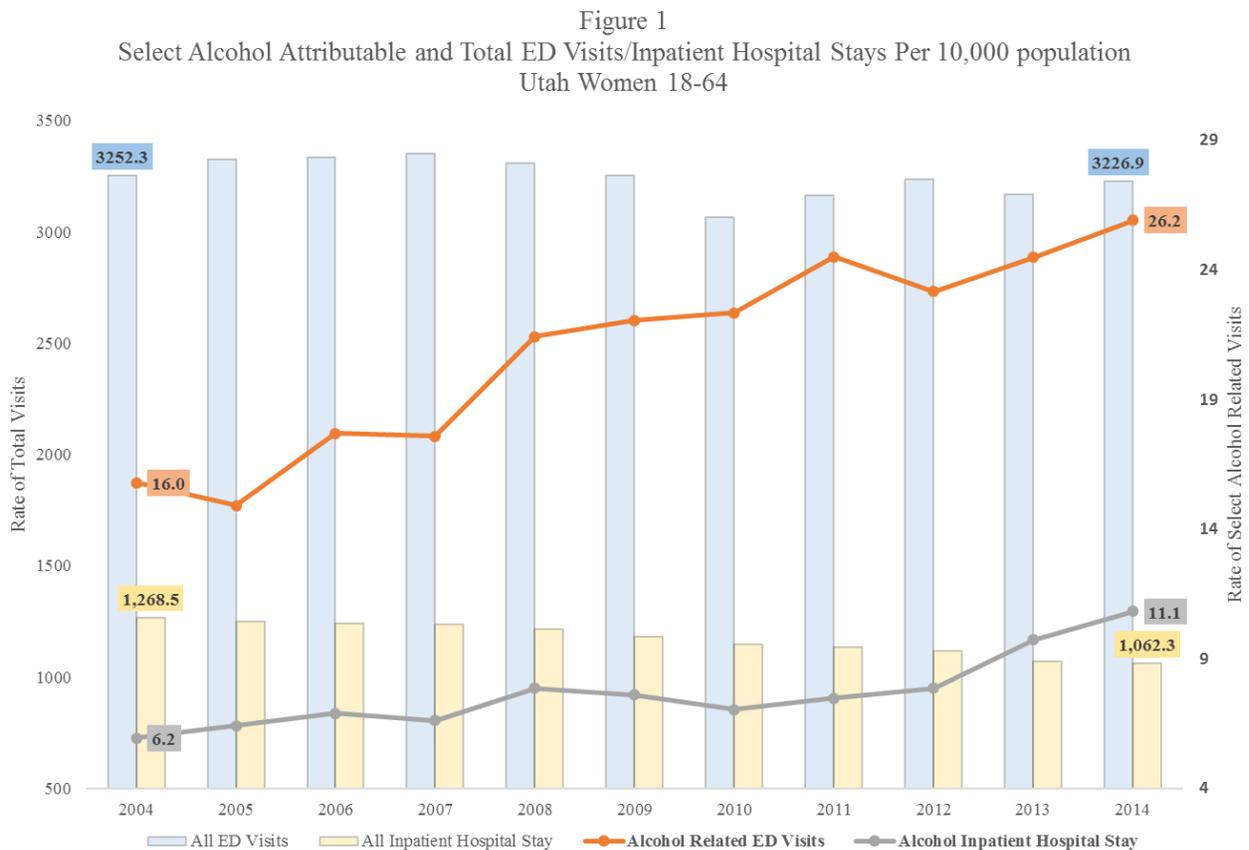
In 2014, 2,263 ED visits were alcohol-attributable for Utah women aged 18-64, up from 1,150 in 2004. In 2014, the rate of alcohol-attributable ED visits per 10,000 population was 26.2 compared to 16.0 in 2004, a 63.1 percent increase. In contrast, the overall rate per 10,000 population of total ED visits for women aged 18-64 decreased slightly from 3,252.3 in 2004 to 3,226.9 in 2014 (Figure 1) (Utah Emergency Department Encounter Database, 2015; Utah Inpatient Hospital Discharge Data, 2015).

Alcohol-attributable hospitalizations for women 18-64 years old increased from 444 (6.2 per 10,000 population) in 2004 to 958 (11.1 per 10,000 population) in 2014, a 78.8 percent increase. In contrast, the overall rate of hospitalizations per 10,000 for this population decreased from 1,268.5 in 2004 to 1,062.3 in 2014, a 16.3 percent decrease (Figure 1). By age group, the rate of alcohol-attributable ED visits and hospitalizations varied. Women aged 18-34 years had an 83.6 percent increase (12.4 in 2004 to 22.7 in 2014) in alcohol-attributable ED visits and a 154.4 percent (2.6 to 6.6) increase in alcohol-attributable hospitalizations. Women aged 35-49 years had a 42.5 percent increase (23.5 to 33.4) in alcohol-attributable ED visits and a 35.9 percent increase (12.0 to 16.3) in alcohol-attributable hospitalizations. Women aged 50-64 years had a 71.2 percent increase in alcohol-attributable ED visits (13.7 to 23.5) and a 111.2 percent (6.0 to 12.6) increase in alcohol-attributable hospitalizations. The rate of alcohol-attributable ED visits and hospitalizations varied across the twelve local health

districts (LHD). In 2004, ED rates per 10,000 population for women 18-64 years old ranged between 7.7 and 22.9, and increased by 8.1 percent to 148.7 percent in 2014, to a range of 13.8 to 48.1. Results from one LHD were not included in 2004 due to the data not meeting Utah Department of Health (UDOH) standards for publication.

In 2004, hospitalizations by LHD, for women aged 18-64 years, were between 2.2 and 11.4 per 10,000 population, and increased by 20.4 percent to 157.0 percent in 2014 to a range of 5.2 to 29.4. Results from four LHDs were not included in 2004 and three in 2014 due to the data not meeting UDOH standards for publication.

Nationally, from 2001-2002 to 2009-2010, the rate of alcohol-attributable ED visits for all adult women increased 38 percent (26 to 36 per 10,000 population) (Talwakar and Ahmad, 2013). Utah has lower overall rates of alcohol-attributable ED visits compared to these national statistics; however, Utah rates have increased more steeply.

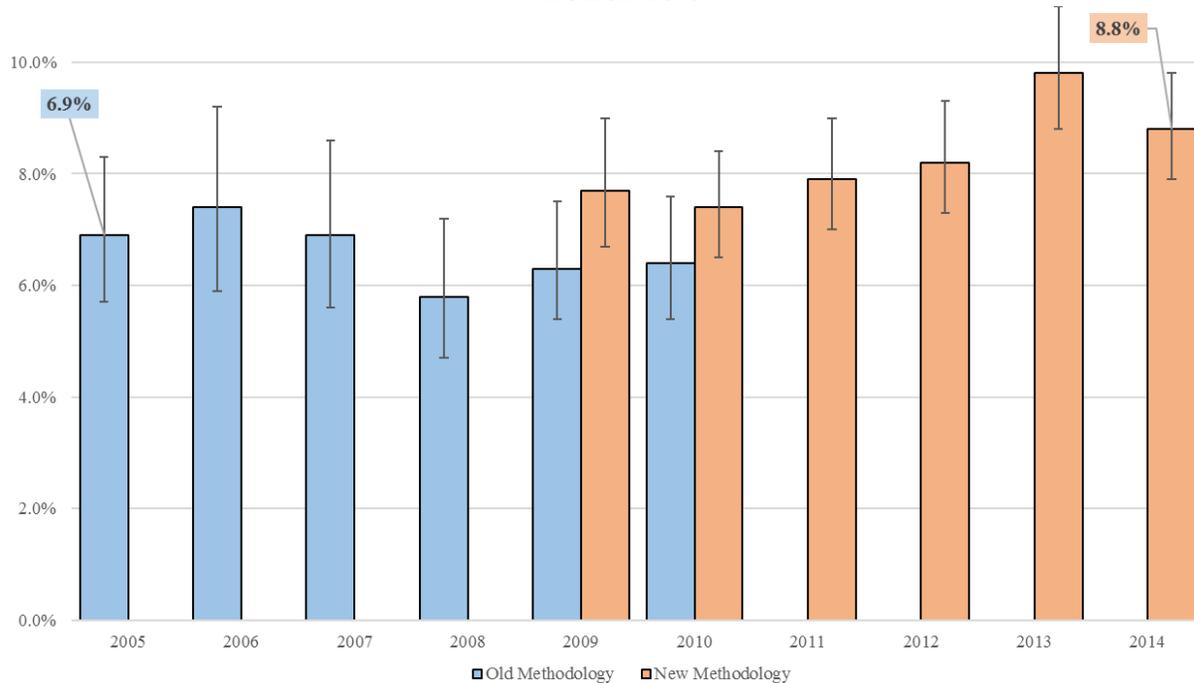


Source: Utah Inpatient Hospital Discharge Data, Office of Health Care Statistics. (2014), Utah Emergency Department Encounter Database, Bureau of Emergency Medical Services. (2014). Retrieved from Utah Department of Health, Center for Health Data and Informatics, Indicator-Based Information System for Public Health website: <http://ibis.health.utah.gov/>

The prevalence of binge drinking for Utah women aged 18-64 was 6.9 percent in 2005 and 8.8 percent in 2014 (Figure 2) (Behavioral Risk Factor Surveillance System [BRFSS],2014). A change in BRFSS

survey methodology and the confidence intervals shown suggest that this difference may not be significant.

Figure 2
Utah Binge Drinking Prevalence*
Women 18-64



Source: Behavioral Risk Factor Surveillance System (BRFSS). (2014). Retrieved from Utah Department of Health, Center for Health Data and Informatics, Indicator-Based Information System for Public Health website: <http://ibis.health.utah.gov/>

*Data Notes: To reduce bias and more accurately represent population data, the BRFSS survey methodology changed. In 2009, the survey began including respondents on cellular phones in addition to landline phones and a new weighting methodology, known as "iterative proportional fitting" (raking) was implemented. Because of these changes, differences in binge drinking rates across methodologies should be interpreted with caution.

Domains of Health

Excessive alcohol use is relevant to many of the domains of health and increases the risk of both chronic diseases and acute outcomes. Because of differences between women and men in body structure and chemistry, women who drink excessively are at increased risk for some health conditions compared to men, such as the following (CDC, 2015):

- Cirrhosis and other alcohol-attributable liver diseases
- Brain damage

- Damage to the heart muscle. Alcohol use also increases the risk of cancer of the mouth, throat, esophagus, liver, colon, and breast among women. Increased risk to reproductive health is a special concern. Excessive drinking may increase both the risk of infertility and a pregnant woman's risk of miscarriage, stillbirth, and premature delivery. Women who drink alcohol while pregnant increase the risk of having a baby with Fetal Alcohol Spectrum Disorders (FASD) and are more likely to have a baby die from Sudden Infant Death Syndrome (SIDS) (CDC, 2015).

Available Resources and Recommendations

While the prevalence of binge drinking may be increasing among women in Utah, further research could examine whether a change in binge drinking is associated with an increase in alcohol-attributable ED visits and hospitalizations. Collecting additional data, such as surveys or follow-up questions to survey respondents, may be useful in understanding excessive alcohol use and related harms.

In addition to assessing the prevalence of binge drinking, binge drinking intensity (i.e., the number of drinks per binge drinking episode) and frequency (i.e., the number of binge drinking occasions in the past month) are also informative data. In 2014, binge drinking intensity in Utah for all adults was

8.1 drinks per binge occasion while it was 7.6 binge drinks per occasion nationally (BRFSS, 2014).

While our preliminary analyses did not show much change in binge drinking intensity and frequency for women aged 18-64 from 2005 to 2014, future studies could examine whether high-intensity and frequent binge drinking are associated with increased risk of alcohol-attributable ED visits and hospitalizations among women in Utah.

The Utah Department of Health employs an alcohol epidemiologist to conduct monitoring and surveillance of excessive alcohol use and related harms. The alcohol epidemiologist educates stakeholders about evidenced-based prevention strategies for reducing excessive alcohol use and related harms, such as those recommended by the Community Preventive Services Task Force (The Community Guide, 2015).

Disclaimer

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HEALTH DISPARITIES IN SPECIAL POPULATIONS (HDSP)

Women with Disabilities: An Important Health Disparity Population

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/ **University of Utah College of Nursing**

BACKGROUND

Americans with disabilities are an often overlooked population experiencing health disparities, with women facing greater disability-related health disparities than men.[1-3] Although the presence of disparities between individuals with disability and those without disability is clear, inconsistent definitions of disability across research studies and government agencies have hampered progress towards a fuller understanding of the factors underlying these disparities, and how to best address them to promote health equality in this population.[2]

In 2003 the Interagency Committee on Disability Research found the United States government had 67 different definitions of disability.[4] Most disability definitions fall into one of three conceptual categories: medical (based on medical diagnoses), social (defines disability as a predominantly social construct arising from environmental barriers) and functional (defines disability as the inability to complete certain life tasks).[2] Each of the definitions has utility for specific research projects, but the lack of a standard definition makes it impossible to compare data across studies. Additionally, studies which use the functional definition are often too broad to identify health issues unique to groups with specific medical diagnoses, whereas medical definitions may miss individuals with significant impairments who lack a medical diagnosis. The Centers for Disease Control and Prevention (CDC), as well as the World Health Organization, have adopted the functional definition of disability. The CDC utilizes the Behavioral Risk Surveillance System (BRFSS) as their primary source of data on disability, estimating that 1 in 5 Americans experience disability, with mobility and cognitive disabilities as the most common.[5] Racial and

ethnic minorities, as well as those unemployed or living in poverty, have higher rates of disability.

[1] Nationwide women are more likely than men to experience disability at all ages, with 24.4% of women reporting a functional disability compared to 19.8% of men.[5]

Among women, those with disabilities are less likely to receive routine preventive health care such as cervical cancer screening, mammography and dental care.[1, 6] While women with and without disability are equally likely to desire pregnancy, once pregnant, women with disabilities may experience barriers to accessing health care, may be less likely to receive adequate prenatal care, and may face criticism and judgement from those who disapprove of their pregnancy. [7, 8] Pregnant women with disability may be at risk for stillbirth, preterm birth, low birthweight babies, fetal growth restriction, and cesarean delivery, although risks vary by type of disability.[9]

DATA

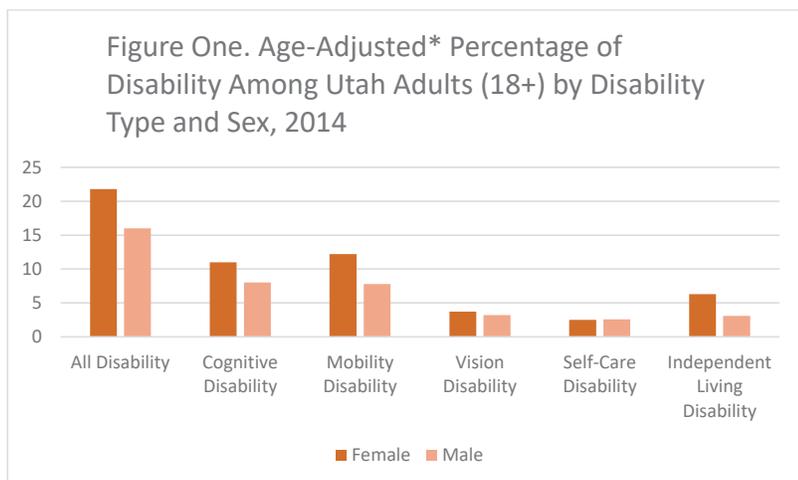
Three national surveys include questions about disabilities: BRFSS, the American Community Survey, and the National Health Interview Survey. All three surveys use a functional definition; however, the methodology and number of questions vary by survey. Despite standardized questions in each of the three surveys, disability prevalence in 2013 varied by survey.[10] The 2013-2015 BRFSS survey, which we utilized in this data snapshot, contained questions on five categories of disability: cognitive, mobility, vision, self-care and independent living (see appendix for the list of questions). BRFSS data was utilized because information about health care utilization and outcomes were also available in this dataset. The statistics reported below are compiled from BRFSS data using the Disability and Health Data System.

Utah has lower rates of overall disability compared to the United States (19.0% vs 22.5%), as well as lower levels of disability in each of the five categories.[11] County-level data for Utah shows the highest rates of disability (for people of all ages and genders) in Carbon, Emery, San Juan and Piute counties.[12] According to 2006 data (the most current year of publicly-available expenditures data) Utah spent less on disability-associated health-care than any other state; the per person expenditure for Utah was estimated at \$1,443 compared to \$2,190 for the nation.[13]

As in the rest of the United States, mobility disabilities were the most common type in Utah, with a prevalence of 10.1% (compared to 13.1% nationally). Disability rates for all reported racial and ethnic minorities in Utah were higher than for whites. Most strikingly, disability was 17.9% among whites compared to 32.2% among American Indian/Alaskan Natives. Utah veterans also had higher rates of disabilities than non-veterans (22.8% vs. 18.8%). [11]

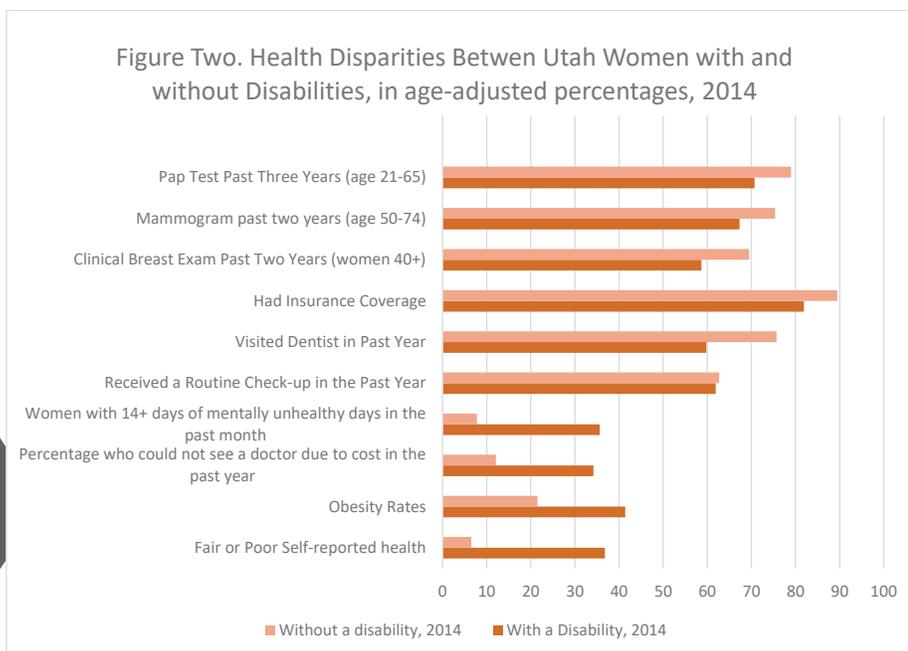
Women in Utah have higher rates of disability overall (21.8%) compared to men (16.0%).

Figure one shows the breakdown of disability by category for Utah women and men.



*Percentages are age-adjusted to 2000 U.S. standard population. Data compiled by DHDS from 2014 BRFSS survey, compiled by DHDS.[11]

There are pronounced disparities in health care utilization and health outcomes for women with disabilities in Utah (Figure Two). The largest difference is in the proportion of women with Self-Reported Fair or Poor Health; only 6.5% of women without disabilities fit this category compared to 36.8% percent of women with disabilities. Between 2013 and 2014, most of the factors displayed in Figure Two were stable. However, although there were minimal changes in the proportion of women without disability who were obese between 2013 and 2014, the percentage of women with disability who were obese increased from 33.5% in 2013 to 41.4% in 2014. This increase highlights a unique risk factor for Utah women with disabilities, and presents a possible key point for future public health interventions.



SEVEN DOMAINS OF HEALTH

Creating an environment in the state of Utah which is supportive of women with disabilities is a crucial aspect of addressing the multi-faceted model of wellness. As shown in Figure Two, Utah women with disabilities are experiencing markedly lower levels of physical wellness than their counterparts, but the disparities do not end with their physical well-being. Studies have shown that people with any type of disability are 1.7 times as likely to report inadequate emotional support than those without a disability[14] and as borne out in the Utah data, women with disabilities are almost five times as likely to have 14+ days of poor mental health than women without disabilities. Some women with disabilities may face discrimination and stigma because of their impairment[1], which leads to difficulties in creating the robust social network needed for optimal health and can also impact a woman's spiritual health. The financial well-being of women with disabilities is another area of concern for overall health, as people with

disabilities are much more likely to live in poverty and be unemployed.[1] People with disabilities are less than half as likely to attend college, which can impact their intellectual health.[1] Many of the disparities in these domains of health are not the consequence of the person's impairment alone, but are exacerbated by deficiencies in the individual's environment. Despite government actions to require physical accommodations, many areas of public life are still not accessible to those with physical limitations. One recent survey of 2400 health care facilities in California found only a small fraction of offices were accessible— only 3.6% of offices had a scale that could accommodate those with physical disabilities, and only 8.4% had exam tables with adjustable heights.[15] For individuals with intellectual disabilities, they can find themselves in a healthcare environment where their provider excludes them from decisions on their care, or does not properly understand how to share health information with them.[1]

ACTIONS, RESOURCES AND RECOMMENDATIONS

There are many changes Utah could make to improve the health of people with disabilities. Two key areas, which are promoted by Healthy People 2020, are: 1) Increase the quality of disability health data, and 2) increase the use of evidence-based health/wellness programs for people with disabilities.[16]

In addition to continuing to collect population-level data on functional disability, Utah should promote the exploration of how functional disability and medical conditions overlap to produce disparities, particularly for women and racial/ethnic minorities. The Utah Population Database (UPDB) is uniquely suited to fill this research gap. The UPDB condition-specific data would be particularly useful to women's health providers in Utah, as pregnancy in women with disability is understudied.

Utah could also expand the use of evidence-based health and wellness programs for women with disabilities, particularly those suffering from obesity. Utah currently has a wide-range of services available for people with disabilities available through the Utah Department of Human Services. Unfortunately, these services only reach a small proportion of those who need them. In 2016, 5,559 people with disabilities received services, with an additional 2,510 individuals on a wait list due to limited state funding. On average, those who received services waited 5.73 years. [17] Despite having a higher prevalence of disability, women were less likely to receive services than men, with only 38.6% of state-funded services going to women. Attention to the unique needs of women, as well as additional state funding, are needed to promote health equality for Utah women with disability.

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APPENDIX

The five BRFSS questions on disability which were included in the 2013, 2014 and 2015 surveys are as follows:

1. Cognitive: Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions?
2. Mobility: Do you have serious difficulty walking or climbing stairs?
3. Vision: Are you blind, or do you have serious difficulty seeing, even when wearing glasses?
4. Self-care Do you have difficulty dressing or bathing?
5. Independent living: Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?

Women's Health in Utah's Homeless Population

Ashley Benson, MD and Lori Gawron, MD / University of Utah

The U.S. Department of Housing and Urban Development defines "Homeless" as "individuals and families who lack a fixed, regular, and adequate nighttime residence" and those "who are fleeing, or are attempting to flee, domestic violence...or other dangerous or life-threatening conditions that relate to violence against the individual or a family member." (State of Homelessness Executive Committee, 2015) A person is deemed chronically homeless if she or he remains homeless longer than one year or has four episodes of homelessness in a three-year time period, and if she or he has a disabling condition. (HUD, 2007) Women and families are the fastest-growing segment of the homeless population, as calculated with a Point-In-Time (PIT) count. (ACOG, 2013) Risk factors for women becoming homeless include: extreme poverty, affordable housing shortage, inadequate social support, substance abuse, mental illness, and history of violence. (Comprehensive Report on Homelessness State of Utah, 2016) In fact, domestic and sexual violence is the leading cause of homelessness for women and families, and over 92% of homeless mothers "have experienced severe physical and/or sexual abuse" in their life. (The Characteristics and Needs of Families Experiencing Homelessness, 2011) 73% of homeless persons have unmet health needs; and women, in particular, lack preventative care such as prenatal care, mammograms and Pap smears. (Baggett, O'Connell, Singer, & Rigotti, 2010) Partly due to this lack of access, 30% of the care provided by homeless clinics to women is for chronic diseases. (ACOG, 2013) This results in lower prioritization of reproductive planning; and although most homeless women have access

to contraception, often they are provided methods with high-failure rates, putting them at high risk for unintended pregnancy and poorer obstetric outcomes.

In the mid 1980s, Salt Lake revitalized their downtown by demolishing and redeveloping many Single-Room Occupancy Hotels (SROs). The SROs were home to the city's lowest-income residents who often worked within walking distance. When the SROs were destroyed in the early 2000's, about 1,000 residents were left homeless and jobless. Prior to this, Utah homelessness was temporary; however, now it can be permanent and often intergenerational. (<http://fourthstreetclinic.org/history/>) As of 2016, 2,807 individuals remained homeless in Utah at a given point-in-time. (Comprehensive Report on Homelessness State of Utah, 2016)

Since 2009, Utah has received national recognition for its reduction in homelessness. Unfortunately, some of this decline is secondary to changing definitions of what constitutes homelessness and how rates of homelessness are reported. From 2007 to 2016, the total number of homeless individuals in Utah decreased by 6.8%, compared to a national 15% reduction; and from 2011 to 2016, the number of homeless individuals in families decreased by 8%, compared to a national decrease of 16% (see figure 1). (PIT and HIC Data Since 2007, 2018) Yet between 2011 and 2016 there was been a significant reduction in the number of individuals in Utah affected by chronic homelessness compared to national reductions, particularly those individuals that are unsheltered (see Figure 2).

Figure 1. Utah's trends in select homeless populations from 2007-2016. Source: 2007-2016 PIT Counts by State. U.S. Department of Housing and Urban Development, Homeless Point-in-Time Count Data

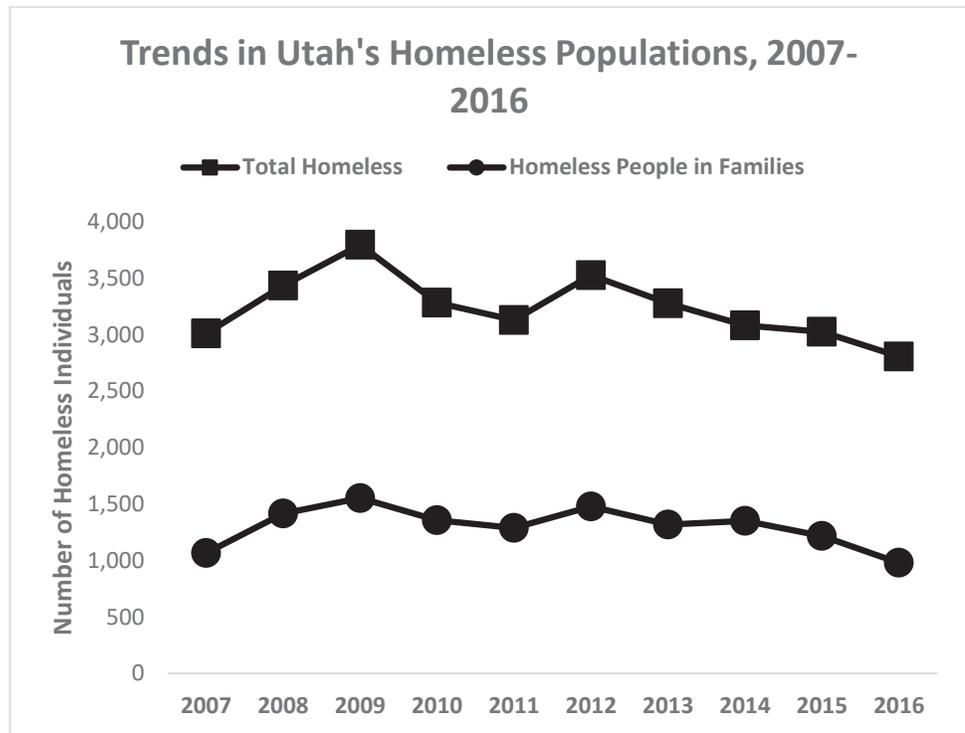
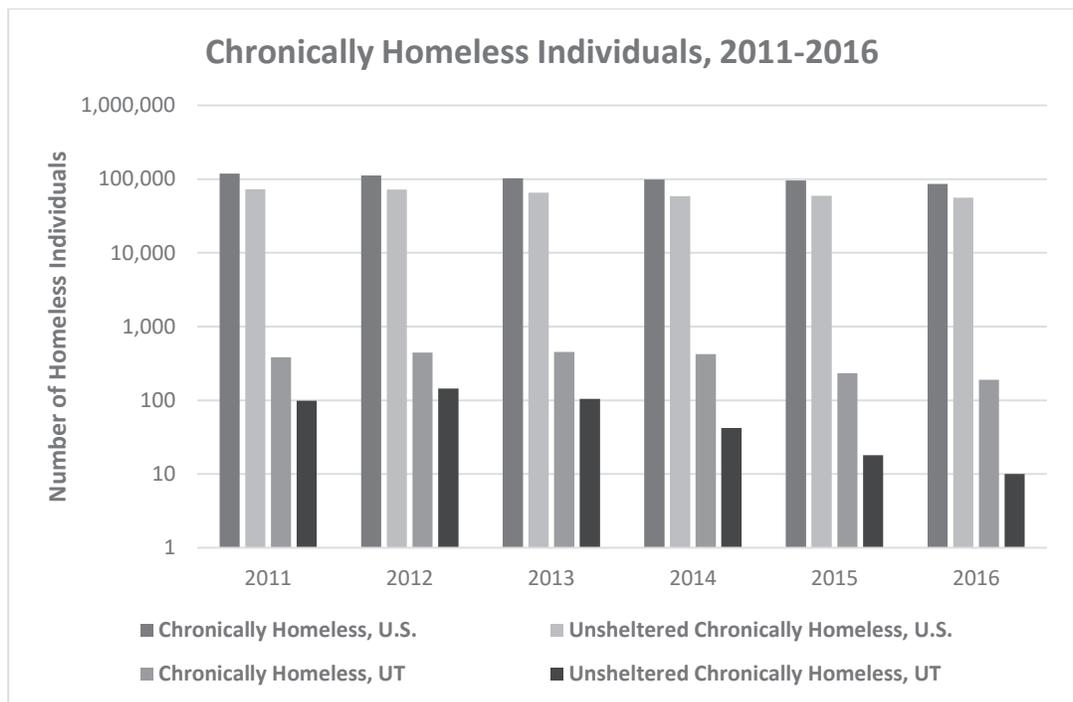


Figure 2. Utah's reductions in chronic homelessness compared to the national trends between 2011 and 2016. Source: 2007-2016 PIT Counts by State. U.S. Department of Housing and Urban Development, Homeless Point-in-Time Count Data



This reduction in chronic homelessness was largely attributable to the rapid re-housing programs and provision of permanent supportive housing for select individuals. The majority of these services are provided by the Road Home, Utah's largest homeless shelter. Demonstrating ongoing commitment to maintaining these services, in 2016, the Housing and Homeless Reform Initiative (H.B. 436) was passed, appropriating \$27 million over three years to focus on the needs of homeless subpopulations such as families and victims of domestic violence. (Comprehensive Report on Homelessness State of Utah, 2016)

In addition to rapid re-housing, Utah's homeless population has increasing access to primary care. The Fourth Street Clinic, in downtown Salt Lake City, serves over 5,000 homeless patients annually. (<http://fourthstreetclinic.org/history/>) In 2017, there were over 25,000 visits and 35% of the patient population was female. In 2015, the University of Utah Department of Obstetrics and Gynecology began staffing a women's health clinic within the Fourth Street Clinic. This clin-

ic provides essential women's healthcare needs, including treatment for cervical dysplasia, urinary incontinence and contraceptive counseling and provision. By increasing homeless Utahns' access to primary care, Fourth Street is a major contributor to ending homelessness, promoting community health, and achieving health care savings.

While homelessness is decreasing, largely due to improving homeless assistance, this system cannot fix the affordable housing crisis. Housing is still unaffordable to a large number of Americans, and this lack of affordable housing is the leading cause of homelessness among families with children. (The Characteristics and Needs of Families Experiencing Homelessness, 2011; State of Homelessness Executive Committee, 2015) The housing crisis continues to worsen, and assistance programs need to help maintain housing stability when possible. Most important, policy makers in Utah need to prioritize investment in affordable housing, while continuing to provide rapid re-housing and access to primary care for homeless Utahns.

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Sexual Minority Women's Health in Utah

Claudia Geist, Bethany Everett / University of Utah

Background

In 2011, the Institute of Medicine completed a landmark report on the health of lesbian, gay, bisexual, and transgender (LGBT) persons in the US. This report documented that across numerous health-related domains, including health risk behaviors and both mental and physical health, sexual minorities were at a distinct disadvantage compared to their heterosexual peers (IOM, 2011). As a result of this report, more federal surveys began to include measures of sexual orientation. In 2012, the Utah Behavioral Risk Factor Surveillance Survey (BRFSS) began to include indicators of sexual orientation in its data collection. This paper presents the first snapshot of sexual orientation disparities across multiple indicators of health in Utah, including alcohol use behaviors, asthma and cardiovascular health, and mental health.

Sexual minority women are more likely to report a variety of negative health-related outcomes (IOM 2011). These disparities in health are largely attributed to increased exposure to “minority stress”, broadly defined as the increased exposure to victimization, discrimination, and stress due to the excess stigma associated with non-heterosexual identities and behavior (Meyer, 2003). As a result of these negative exposures, sexual minority women have been found to have higher levels of depression (Marshall et al., 2011), negative coping behaviors such as alcohol use and misuse (Hughes, 2011), and poorer physical health outcomes including increased risk for cardiovascular and respiratory diseases (Blosnich, Lee, Bossarte, & Silenzio, 2013).

Previous research suggests that sexual minority health can vary across contexts. In particular studies have examined the extent to which health can vary depending on the cultural climate within a state. For example, studies have linked chang-

es in LGBT-specific policies, such as the passing of same-sex marriage bans or the legalization of same-sex relationships to changes in the health of sexual minority women (Hatzenbuehler, 2014). Generally, a politically conservative climate has been shown to have negative effects on the health and well-being of sexual minorities (Everett B, 2013).

To our knowledge, no research has examined the health of sexual minority women in the state of Utah. Sexual minorities in Utah may have a health disadvantage similar to what has been observed in national data. While same-sex marriage became permanently legal in 2014, other challenges that are related to a larger religious and politically conservative climate persist.

Data

Data came from the 2012-2015 Utah Behavioral Risk Factor Surveillance System (BRFSS) data set. In 2012, the BRFSS began including data on sexual orientation identity in addition to a wide-ranging set of other health-related outcomes. We focused on several important domains of women's health including general perceived health, physical limitations, asthma, diabetes, alcohol use, and depression. Previously, these health indicators have been linked to sexual orientation disparities in national data sets. Our sample was restricted to women who answered the sexual identity measure questions, as well as all of our health-indicator items. Our final sample size was 19343 women, 260 of whom identified themselves as gay or lesbian, 156 as bisexual, and 156 as “other.” Individuals who indicated “don't know” or did not answer were excluded.

Health indicators were derived from survey items that asked respondents if they had ever been diagnosed with diabetes or pre-diabetes (yes=1, no=0), or asthma (yes=1, no=0) by a medical provider. We also assessed whether or not respondents reported being “limited in any way in any activities because of physical, mental, or emotional problems” (yes=1, no=0). Self-rated health was measured using an item that asked participants, “Would you say that in general your health is:” with possible answers from “excellent” (1) to “poor” (5). We constructed a measure of alcohol use based on the question: “During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?” Based on the responses, we calculated how many of the past 30 days a respondent had consumed any alcohol. We also included a binge drinking indicator, which measured whether or not the respondent had consumed 5 or more alcoholic drinks on a single occasion during the past month.

Finally, we included two mental health indicators: 1) whether a health provider had ever told the respondents that they had a depressive disorder (including depression, major depression, dysthymia, or minor depression); and 2) a count of the days in the past month during which respondents experienced mental health problems, derived from the survey item: “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?”

We compiled descriptive statistics and performed bivariate tests to examine differences by sexual identity in the prevalence of the assessed health conditions in the state of Utah. We compared means between non-sexual minority (heterosexual) and sexual minority women (bisexual, gay/

lesbian, other). We also compared each sexual minority identity group to heterosexual women to capture variability within the sexual minority group. To assess whether differences were statistically significant we estimated F-tests that took our complex survey design into account. All statistics were weighted to produce population estimates and adjusted for year of the survey using the “svy” commands in Stata 14.

Results

Table 1 summarizes our results, which showed that sexual minority women were at a health disadvantage for many but not all of the outcomes we evaluated. Looking at our physical/general health outcomes, we observed no differences by sexual orientation for having “any” health limitation, or for having diabetes or pre-diabetes. However, we did see that sexual minority women report a higher prevalence of asthma (17%) compared to heterosexual women (12%). This difference was most pronounced between heterosexual and lesbian women: 20% of lesbians reported being diagnosed with asthma compared to 12% of heterosexual women. Turning to self-rated health, on average, sexual minority women reported higher scores indicating perceptions of their health that were worse than perceptions reported by heterosexual women. These disparities were largest when we compared women who identified their sexuality as “other” to heterosexual women.

Turning to alcohol use, the results showed that sexual minority women reported more days of drinking and a higher prevalence of binge drinking than their heterosexual peers. Table 1, Panel B illustrates that the disparity was largest between lesbian and heterosexual women: 68% of lesbians compared to 35% of heterosexual women reported binge drinking.

Table 1: Health Outcomes by Sexual Identity from 2012-2015 BRFSS data (n=19343).

	Ever diagnosed with..			Any limits due physical, mental, or emotional issues ^a	General Health ^b	# of days consumed alcohol ^a	Binged ^{a,c}	Ever diagnosed with depression	# of days with poor mental health ^a
	diabetes	pre-diabetes	asthma						
Panel A									
Straight/Heterosexual	7.4%	8.3%	11.7%	16.2%	2.3	3.4	34.9%	15.0%	2.7
Sexual Minority	6.5%	8.8%	16.9%	17.7%	2.4	4.3	55.2%	29.6%	5.1
Panel B									
Straight/Heterosexual	7.4%	8.3%	11.7%	16.2%	2.3	3.4	34.9%	15.0%	2.7
Lesbian	6.3%	8.9%	20.3%	17.3%	2.4	5.3	67.8%	33.9%	5.5
Bisexual	5.0%	5.5%	16.7%	16.2%	2.4	3.8	53.2%	29.9%	5.9
"Other" Sexual Identity	8.7%	12.6%	10.3%	20.2%	2.6	2.6	32.2%	20.9%	3.4

Note: Bold numbers indicate that group differences are statistically significant at the p<.05-level based on F-tests adjusted for complex survey design.

^a in the past month ^bGeneral Health is rated by respondents on a scale from 1 (excellent) to 5 (poor), ^c 5+ drinks in one sitting

Looking at mental health outcomes, sexual minority women reported a higher prevalence of depression (30%) and almost double the number of days they were limited by poor mental health (m=5.1), compared to heterosexuals (15%, m=2.7). Rates of depression and number of days limited by mental health were similar between bisexual and lesbian women. Mental health disparities were even larger among sexual minority women ages 18-24, 50% of whom reported depression compared to 14% of heterosexual women in the same age group.

Discussion

Our results are in line with other research that has found sexual minority women to report poorer health outcomes and engage in increased risk behaviors compared to heterosexual women. While we did not examine all seven domains of health, our results show disadvantages in both emotional and physical health for sexual minority women. Due to data limitations, we were unable to demonstrate disadvantages in other health domains.

However, the mental health disparities we observed are particularly striking given the high rates of suicide in Utah, especially among youth (https://ibis.health.utah.gov/indicator/complete_profile/SuicDth.html). It is possible that this increase in suicide rates may be due to the marginalization of sexual minority individuals within Utah's dominant religion, coupled with the policies, which often are perceived as discriminatory, and which are related to sexual minority status in the dominant religion in Utah. Religious leaders of both Utah's dominant religion and other religious groups have begun efforts to deal with this marginalization and policies; some of these efforts have been more successful than others.

We also saw higher rates of alcohol use among sexual minority women, particularly lesbian-identified women. This difference may reflect engagement in negative coping behaviors related to stressors and depression. It may also reflect that this group of women may be less connected to religious institutions in Utah that prohibit drinking; thus,

disparities between the groups may be easier to detect. Regardless, the high rates of binge drinking among lesbian women in Utah (68%) suggest a need to reduce engagement in this and other health risk behaviors.

More encouraging, our results showed no differences in physical limitations or diabetes. However, we did find that sexual minority women are more likely to report having been diagnosed with asthma. This finding is in line with other work that has found disparities in asthma among persons in same-sex relationships compared to those in opposite-sex relationships.

Recommendations

We recommend policies and practices that remove stigma, as well as an increase of mental health and support services for sexual minority women to minimize the impact of health issues on domains of health. This has the potential to curb binge drinking in sexual minority populations. Future analyses will show whether changes in policies (for example, the recent legalization of same sex marriage) will be reflected in diminishing health disparities over time.

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GENERAL ARTICLES (GA)

Food Insecurity & 5 Fruits and Vegetables

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Background

In Utah, 11.9% of households are considered food insecure.(Coleman-Jensen, Rabbitt, Gregory, & Singh, 2016) Food security is determined when “individuals have physical, social, and economic access to sufficient, safe, and nutritious food to meet dietary needs and food preferences for an active and healthy lifestyle.”(US Department of Agriculture, 2016) The United States Department of Agriculture (USDA) has set a range of food security standards categorized as high, marginal, low, and very low food security. Food access, which is another component of food security, takes residential location into account. Low food access occurs when a significant number (at least 33%) of individuals in a census tract live more than ½ urban miles or 10 rural miles from a supermarket.(US Department of Agriculture, 2017) Many households experience short periods of food insecurity that repeat periodically, due to a shortage of adequate personal finances or resources. In addition to sufficient and safe food, access to nutritious food is a central criterion of food security. The USDA has recommended that individuals eat at least 5 servings of fruits and vegetables a day to maintain a healthy diet. Food insecurity and not meeting the USDA fruit and vegetable recommendations are also correlated. Food insecurity has been associated with developmental delays, nutritional inadequacy, depression, obesity, diabetes, and many other adverse health outcomes.(Ivers & Cullen, 2011) Food insecurity disproportionately affects women. (Mallick & Rafi, 2010) Women are more vulnerable to food insecurity because of increased vulnerability to poverty due to the gender wage gap, job segregation, gender-based violence, disproportionate caregiver responsibilities, and economic

pregnancy costs.(Ivers & Cullen, 2011) Nationally, single female-headed households (women without a partner and with children) have the highest rates of food insecurity, with 30.3% of households being food insecure in comparison to 22.4% of single male-headed households (men without a partner and with children).(Coleman-Jensen et al., 2016) Even within partnered households, women bear the brunt of food insecurity consequences. Among all food-insecure individuals, the risk of obesity is higher in women than in men.(Ivers & Cullen, 2011) Additionally, the risk of depression and anxiety is higher in food-insecure women than in men. (Ivers & Cullen, 2011) These consequences are not isolated to the low and very low food-secure families. Existing literature has reported that marginally food-insecure families are more similar to low and very low food-insecure families than to high food-secure families, as was traditionally thought. (Franklin et al., 2012)

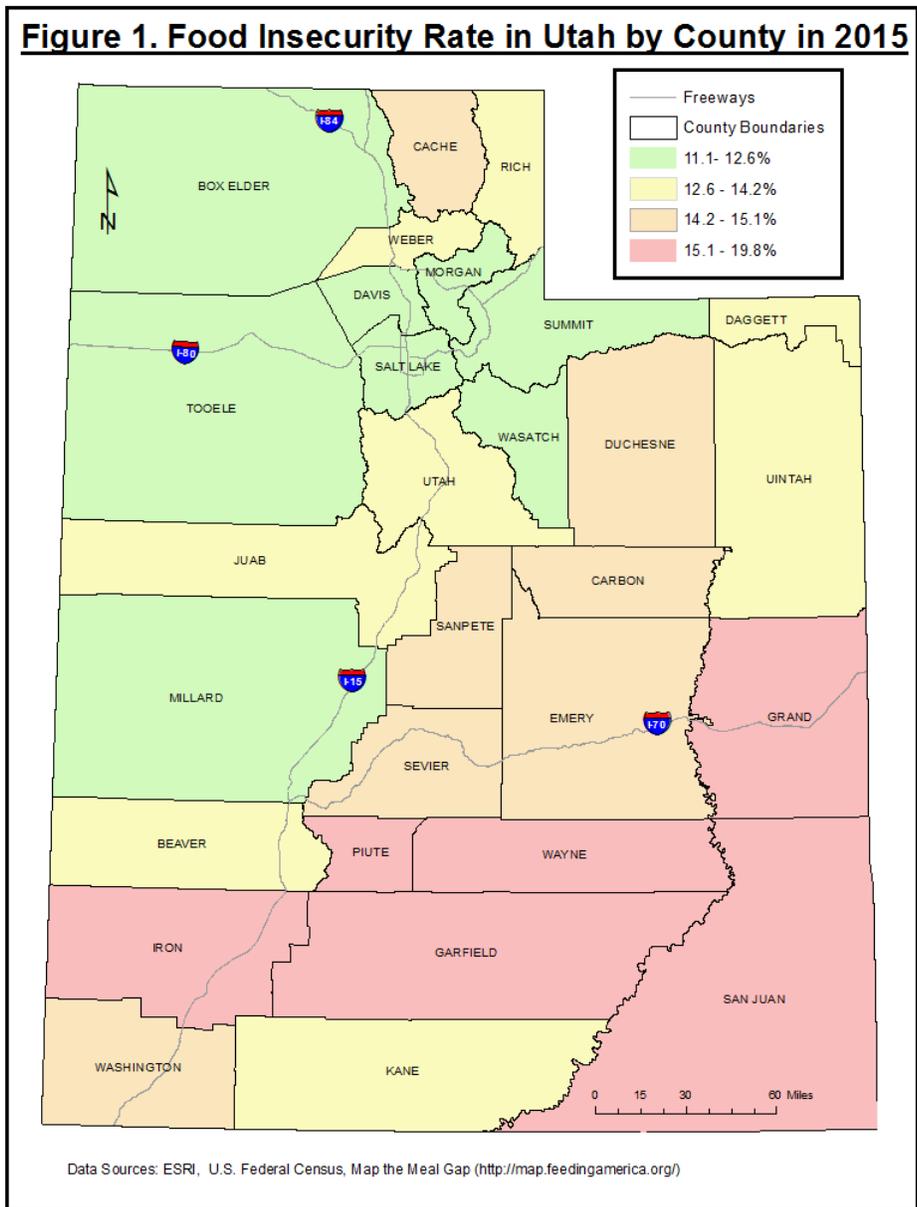
Utah is uniquely affected by food insecurity due to the geographic and ethnic composition of the state’s residents. Food insecurity disproportionately impacts individuals living in rural regions of the state as well as individuals who are of Hispanic and Latino/a ethnicity. According to the U.S. Census, 13.7% of the Utah population is Latino. Nationally, it is estimated that approximately 1 in 5 Latino households are food insecure.(Coleman-Jensen et al., 2016). Additionally, Utah has a significant rural population that is susceptible to food insecurity. According to the 2010 U.S. Census, 9.4% of Utah’s population live in rural areas and it is estimated that 15% of rural households are food insecure. (Coleman-Jensen et al., 2016) By utilizing available resources and the encouragement of local infrastructure to promote food security, communities can improve self-sufficiency and prevent adverse health outcomes.

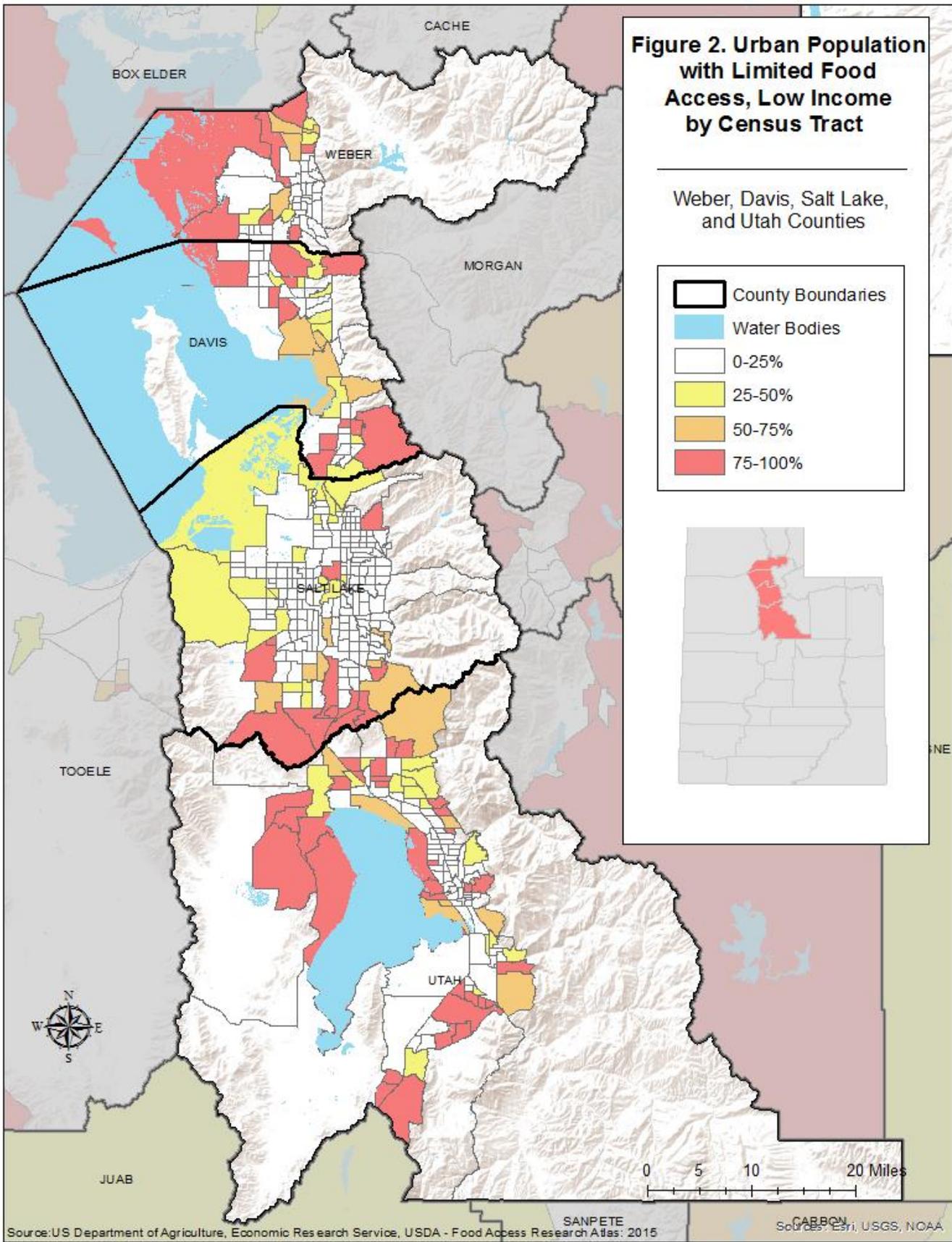
Data

As of 2015, food insecurity in Utah is close to the national average of 12.7%, which is an improvement compared to past years. (Coleman-Jensen et al., 2016) According to a 2014 Feed America survey, within the state, the areas with the highest food insecurity prevalence are in southern Utah, with San Juan County having the highest prevalence (19.07%) of food-insecure families (Figure 1). Although Utah has similar food insecurity rates to those observed in the rest of the US, in low income areas with low food access, Utahns are doing worse

than the national average. Based on USDA 2015 data, 22.89% of the Utah population is low income and have low food access, while nationwide, 18.94% of the population is low income and have low food access. Over 50% of the population in several counties, specifically San Juan, Piute, Garfield and Daggett, have low income and low food access. Although these data document that rural areas are faring particularly poorly in Utah, this information is typically collected at the county level. Within the urban environment, specific

areas of Salt Lake, Provo, and Ogden have populations in which over 50% are low income and have low food access. An example of Utah urban neighborhoods with low food access and low income is shown in Figure 2. On the county level, Utah's urban counties fare well in food security rates, but at the census tract level some urban neighborhoods have up to 90% of the population struggling with low income and low food access.





Fruit and vegetable consumption is one way to measure overall food insecurity. Studies have found that food insecurity is associated with a lower intake of fruits and vegetables. (Mello et al., 2010) In considering the average food security in Utah, the fruit and vegetable consumption is similar to the national average. Based on the Indicator Based Information Systems, 17.3% of Utah adults consume at least 3 servings of fruits and vegetables per day compared to 16.8% of all Americans. Based on data from the Centers for Disease Control, between 37.2 and 39.7% of Utah adults consume fruit less than once per day and 19.4-22.1 consume vegetables less than once per day. These figures are worse than reported measures in Utah in 2011.

In Utah, a community-based participatory research project that involved 396 members of many minority groups focused on food insecurity from a woman's perspective. (Author et al., 2016) As a measure of food insecurity within this study, 36% of participants said that they were concerned about having enough food within the past month. This study exhibited how women are the doorway to influencing a community's health. After a 12-month evidence-based community wellness coaching program, 64% of children and 59% of spouses/partners had an increased fruit intake and 60% of children and 59% of spouses/partners had increased vegetable intake. Households where women had the primary responsibility for making food decisions were more likely to report increased fruit and vegetable intake ($p=0.01$). While there were 396 women directly participating in the study, 2499 family members were impacted because they lived with the women involved.

7 Domains of Health

Both food insecurity and fruit and vegetable intake are closely tied with many aspects of the 7 Domains of Health, specifically regarding environmental, physical, and emotional health. Food security and access to nutritious food are important aspects of physical health. Having access to nutritious food, and incorporating fruits and vegetables as a part of a diet, provides individuals with essential vitamins, minerals and fiber, all of which help

prevent adverse health outcomes. Through a nutritious diet, including fruits and vegetables, individuals are at a decreased risk for many adverse health outcomes including obesity, diabetes mellitus, and high cholesterol. (Ivers & Cullen, 2011) Individuals with low food security, particularly women, are more likely to have poor physical health than individuals with high food security. (Ivers & Cullen, 2011) Having a safe environment in which to easily obtain healthy food is connected to individual health outcomes. It is crucial for individuals to have access to locations that provide affordable and nutritious food so that cost and transportation logistical challenges do not prevent individuals from obtaining these foods. Food security is also connected to emotional health, specifically for women. Women who are food insecure, even marginally, have higher rates of depression and anxiety than women with high food security and men with any level of food security. (Ivers & Cullen, 2011)

Resources and Recommendations

Throughout Utah, there are many programs that are being implemented to try to reduce food insecurity and increase access to fruits and vegetables. During the 2017 season, 23 farmer's markets accepted food stamp benefits. Additionally, some of those markets have created a program that matches funds spent on produce (<http://www.doubleupfoodbucks.org/>). To increase access to fresh produce, there is a growing group of community gardens in the urbanized areas of the state. To get children involved and to ensure that their needs are met, 30 out of 80 districts in Utah participate in farm-to-school programs which utilize local produce for school breakfast, lunch, snack, and summer programs. While these programs are slowly gaining traction, Utah ranks 50th in school breakfast program participation. (Hewins, 2016) Because of this, the Utah Department of Health and Utahns against Hunger have partnered with Partners for Breakfast in the Classroom (<http://breakfastintheclassroom.org/>), a program that provides assistance and grants to schools to increase breakfast participation. Schools are being encouraged to apply for the Healthy School programs, which helps schools

create policies and environments to encourage healthy eating and an active lifestyle. Lastly, as seen within the Utah-based study, it is crucial to recognize the role that mothers and other women

play regarding healthy eating. Through targeting women and ensuring that women's health nutrition literacy and access is up to standard, entire families can be impacted.

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Secondary data analysis of non-communicable diseases among adult female refugees arriving in Utah between 01/01/2012 and 12/31/2015

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Background

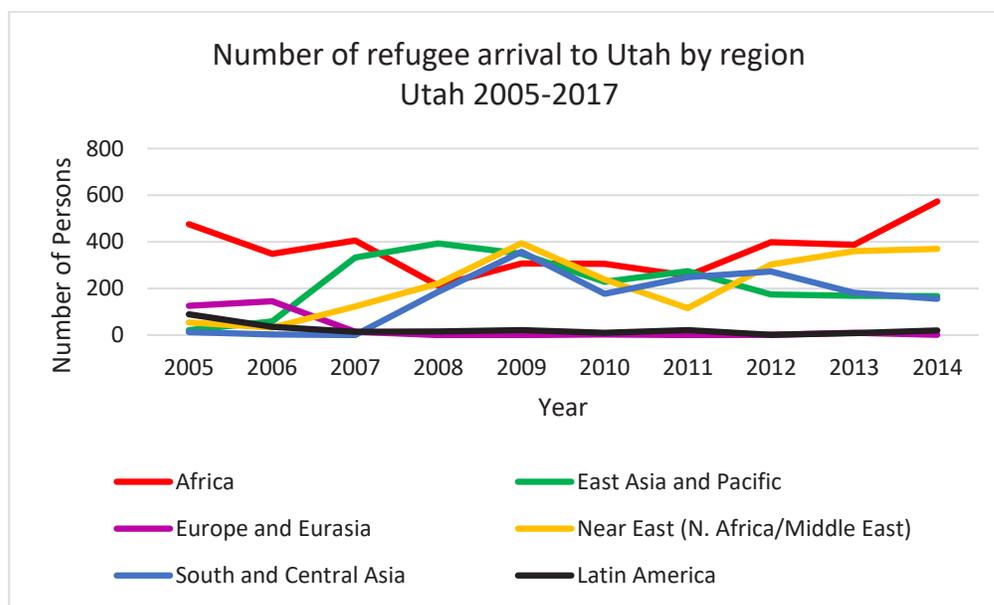
By the end of 2015, there were 21.3 million refugees worldwide (UNHCR, 2016), with around 50 percent women and girls.(UNHCR, 2017b) Since the Federal Refugee Act of 1980, more than two million refugees have arrived in the US; this is almost two-thirds of the three million refugees who have been resettled in high-income countries. (Amnesty-International, 2015; IBIS-PH, 2015) Utah hosts a relatively small number of refugees: in 2014, Utah received 1,085 of 69,986, or 1.55% refugees arriving in the US.(USDHHS, 2015) Between 1998 and 2014, 16,273 refugees from different regions of the world have resettled in Utah, with an average of 1,183 persons per year during 2012-2014.(IBIS-PH, 2015) According to the UN definition, refugees have been forced to flee their country of birth “because of persecution, war or violence”. Furthermore, refugees have “a well-founded fear of persecution for reasons of race, religion, nationality, political opinion or membership in a particular social group”. (UNHCR, 2017a) The ethnicity of refugees arriving Utah is dependent on world and/or regional turbulence and varies over time. Thus, periodic adjustment of health policies for the mandatory health screening programs and further follow-ups within the first two years of arrival, based on refugees’ land of origin and interim location(s), seems beneficial. Currently, the number of refugees from Africa and the Near East (including North Africa and Middle East) is increasing, while the number of refugees from South, Central and East Asia, and the Pacific is decreasing. Since 2007, hardly any

refugees from Europe, Eurasia or Latin America have arrived in Utah (Graph 1).(IBIS-PH, 2015) While the latter groups might have more cultural similarity with the US host community, currently arriving refugees often have cultural values that are in sharp contrast with local culture. For example, despite achieved progress towards women’s empowerment and gender equality in recent years, there are still failures in addressing gender-based disparities that may limit female refugees’ access to health care(UN, 2017), particularly in regions with war conflicts. Female refugees’ exposure to discrimination and violence during pre-migration and migration often requires immediate attention, upon resettlement, to their physical, mental, and emotional health. This, in turn, may affect a variety of other domains related both to health and successful resettlement.(Frost et al., 2013) Currently, refugee resettlement in the US includes overseas screening administered by the International Organization for Migration (IOM) – typically days to weeks prior to departure – and domestic medical screening overseen by receiving agencies and/or state and local health departments within 30-90 days post-arrival. Communicable diseases of public health significance, such as malaria and intestinal parasites and their presumptive treatments pre-departure, and tuberculosis during the initial health screening in the US are the main concerns. (CDC, 2013) Additionally, in the domestic health screening, refugees are assessed for hearing and visual acuity, and chronic conditions such as diabetes or hypertension(IBIS-PH, 2015), for which referral for care is provided if needed. In the long term, refugees’ impaired health conditions may affect their

quality of life and impose a heavy burden on public resources. In Utah, refugees are eligible to apply for Medicaid for a period of eight months.(UDOH, 2017) Then, they may continue their Medicare coverage (for certain conditions), or they may have to move to some other source for healthcare coverage. Most of the currently available epidemiological assessments have mainly concentrated on the infec-

tious diseases and mental health issues of resettled refugees. In this cross-sectional study, we assessed the prevalence of referral for non-communicable health conditions of adult female refugees who arrived in Utah between 2012 and 2015. The primary study purpose was to understand how to better concentrate future efforts on adult female refugees' health.

Graph1: Number of refugee arrival to Utah by region (IBIS-PH, 2015)



Methods

To assess the prevalence of non-communicable diseases among adult female refugees, we used the domestic health screening conducted upon arrival in Utah, obtained from the Utah Department of Health (UDOH). This dataset originally included 2,213 female refugees, irrespective of age, who arrived in Utah between 1/1/2012 and 12/31/2015. After excluding 1,006 female refugees age 18 or younger and 172 adult refugees without a medical referral, the final dataset included 1,035 (83.68% of adult female refugees), who at the initial domestic medical screening in Utah were referred for at least one medical condition.

The original dataset included 66 variables indicating a health condition these variables can be divided into 6 subgroups: 1) body systems, such as gastrointestinal; 2) medical specialties, such as cardiology; 3) subjective symptoms based on

women's self-reports, such as dysmenorrhea; 4) laboratory findings, such as eosinophilia; 5) clinical signs, such as murmur; and 6) diagnosis, such as arthritis. As the purpose of this data snapshot was to assess the frequency of referrals for individual non-communicable diseases, as well as identify variation in referrals by ethnicity, we took steps to avoid duplicative counts – if any of the referrals was related to a particular body system, we counted only one referral for that system. For example, if the data indicated that the woman was referred to ophthalmology for a corneal cavity or vision issue or other ophthalmology issue, we counted it as one referral, even if the three variables were identified. There were 112 women with referrals described as a comment rather than in a coded data field. These comments were coded into the six subgroups described above, and are briefly discussed further in this report.

Results

Table 1 summarizes the limited available demographic information and the refugees' medical referrals. According to this table, 83.56% of the final adult study population with at least one medical referral were in their reproductive ages (18-49 years). The mean age of adult women with a referral was 36.2 years (STD 13.2 years). These women were from diverse backgrounds, representing 40 different countries or ethnicities, and almost 60 percent were from three countries: Iraq (n=270, 26.8%), Somalia (n=181, 18.0%), and Bhutan (n=150, 14.9%).

Based on the coding methods described above, the five highest referrals were related to mental health (53.4%), vision (26.1%), musculoskeletal (23.6%), gastrointestinal (21.7%), and obstetrics/gynecology issues (20.3%). Adding medical conditions coded from the comment section of the records of 112 women changed the percentages slightly but did not substantially alter the percentage or relative position of the referral categories. Although referral for primary care services was not among the variables in the database, our coding of the comment section identified that 57 women (5.64% of all women with at least one referral, and 50.9% of women with a comment on the screening form) were referred for preventive care. According to the data comment section, due to the stigma attached to the mental health issues in some cultures, some women declined further mental screening.

Graph 2 summarizes the number of referrals per participant by country of origin/ethnicity as reported on the screening form. The average number of referrals for the entire population was 2.8 (STD: 1.7), with a minimum of one and a maximum of 10 referrals.

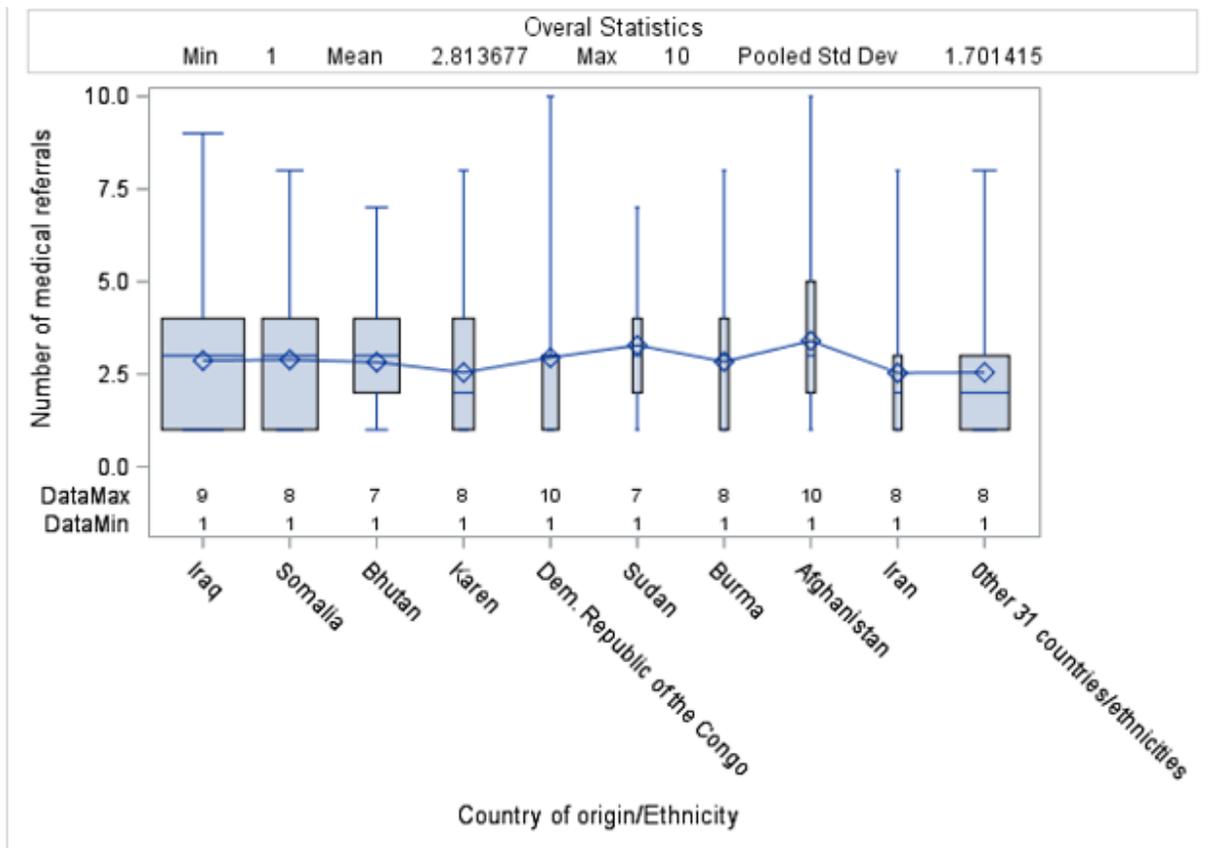
Acknowledgment

We would like to thank the Refugee Health Program at the Utah Department of Health for sharing dataset information.

Table 1: Demographic characteristics and medical referral status of 1,010 female refugees arriving in Utah between 2012 and 2015, with at least one medical referral at initial domestic health screening

Demographic Characters	No (%)
40 Country/Ethnicity (Total 1,009 -1 missing)	
• Iraq	270 (26.76%)
• Somalia	181 (17.94%)
• Bhutan	150 (14.87%)
• Karen	70 (6.94%)
• Dem Republic of the Congo	54 (5.35%)
• Sudan	32 (3.17%)
• Burma	31 (3.07%)
• Afghanistan	30 (2.97%)
• Iran	30 (2.97%)
• Other nativity (31)	161 (15.96%)
Age, years (Total 1,010)	
Mean 36.2(STD 13.2), Median 33.0, Range 19.0-88.0, Lower Quartile 26.0, Upper Quartile 43.0	
• 19<age=<29	348 (36.90%)
• 29<age=<39	266 (28.21%)
• 39<age=<49	174 (18.45%)
• 49<age=<59	93 (9.86%)
• 59<age=<69	38 (4.03%)
• 69<age	24 (2.55%)
Referred Specialty* (Total 1,010 women)	
Mental Health	539 (53.37%)
Ophthalmology	264 (26.14%)
Musculoskeletal disorders	238 (23.56%)
Gastrointestinal disorders	219 (21.68%)
Obstetrics & Gynecology	205 (20.30%)
Neuropathy	191 (18.91%)
Cardiology	167 (16.53%)
Ear, Nose and Throat	133 (13.17%)
Endocrinology	126 (12.48%)
Hematology	107 (10.59%)
Dermatology	104 (10.30%)
Genitourinary	87 (8.61%)
Dental	83 (8.22%)
Nutrition	70 (6.93%)
Pulmonology	58 (5.74%)

*Excluding conditions mentioned in the comments



Graph 2: Distribution of average number of referrals by country of origin is sorted by sub-population size, with the larger box sizes representing larger sub-populations – these have been sorted in descending order, exclusive of the last category, which combines 31 countries/ethnicities with smaller numbers of refugees per country/ethnic-

ity. Overall, summary numbers are provided at the top of the graph. Country/ethnicity-specific mean (diamonds), median (horizontal bar within each box), and minimum and maximum referrals (numbers below the boxes) are also provided. Utah, 2012-2015

Discussion

More than half of the female adult refugees (53.4%) arriving in Utah between 2012 and 2015 had a referral for mental health at initial domestic screening. Irrespective of mental health condition, 104 women (10.3% of total study population) were victims of torture and violence, and 96 women (9.5% of total study population) suffered depression, which is lower than the prevalence of female adult depression in the US (16.8%-18.1%) and Utah (20.7%-21.7%) between 2012-2015. (IBIS-PH, 2016)

When considering a holistic approach with multiple domains of health (Frost et al., 2013), it

becomes apparent that in addition to the physical, mental, and emotional disorders relating to pre-migration and migration hardships, post-migration resettlement in Utah – or any other developed host community – exposes refugees to new cultures, systems, religions, and technologies. These may adversely affect refugees’ spiritual and social domains of health. Language barriers and discounting refugees’ employment qualifications and experience, due to their different educational and training systems and labor market, may affect refugees’ intellectual and financial domains of health, which in turn, can negatively

affect their mental and physical health. Any intervention to bridge refugees' disrupted sociocultural connection, and to improve their intellectual and financial health, can positively influence all their domains of health.

With regard to physical health, referral data lacked information on referral for screening tests, such as mammography or Pap smear, which are needed for early diagnosis and treatment of breast and cervical cancer, two of the most prevalent cancers affecting women.(WHO, 2017) According to our analysis, only 57 female refugees (5.64% of study population, but nearly 51% of women with a comment on the domestic screening form) were referred for primary care. Therefore, it is very likely that the domestic screening form does not adequately capture referrals to establish primary care. However, the dataset lacks information on the referral centers; and number of referrals for preventive care may be more than what is stated here. Not only can establishing primary care be beneficial to the young female refugees who will spend the majority of their life in their new community;

but also, from a public health point of view, this introduces a cost-effective method for spending public resources.

While the most common immediate referral for refugee women in Utah is for mental health services, consideration of the demographic characteristics of adult female refugees in Utah suggests that emphasis should also be placed on reproductive health, family planning, maternal health, and workshops or trainings on adopting healthy lifestyles. Promoting a healthy lifestyle, such as physical activity and healthy eating, can positively affect all domains of health, including physical and mental health. Among the most common physical health referral categories from our study were musculoskeletal (low back pain, arthritis, musculoskeletal pain), and gastrointestinal (constipation and diarrhea) complaints, all of which can be positively impacted by adopting a healthy lifestyle. Further, empowering women through improving their intellectual, social and financial health can have a positive impact on the mental and physical health of refugee women.

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GENERAL STATE HEALTH (GSH)

Voting and Civic Engagement Among Utah Women

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Voting and Civic Engagement Among Utah Women

Utah has a strong history of women's political and civic involvement. The state was an early leader in giving women the vote, was home to the first female state senator in the nation (MacKay, 2005), and, as recently as 1996, had the strongest women's voter participation in the United States (Davidson, 1996). However, these factors do not give the full picture; and in 2015 the Institute for Women's Policy Research (2015) ranked Utah dead last in the area of political participation. Much of this ranking was due to the lack of women running for and serving in public office, but Utah women's voter ranking and some aspects of civic involvement also were found to have room for improvement. As engagement in the community can be a key indicator of social health, while also providing opportunities for emotional and intellectual growth, these issues deserve attention. This research snapshot focuses on three key areas:

1. Utah women's voting participation rates and national ranking when it comes to voter turnout,
2. Utah women's policy priorities, compared with those of Utah women and men nationwide, and
3. Utah women's levels of civic and community engagement, focusing on volunteer work but also exploring other ways in which Utah women are involved in their communities.

Women Voters in Utah

In Utah, although women's voter registration and turnout rates are slightly higher than those of Utah men, they are currently lower than women's rates in the nation as a whole. In the 2012 presidential election, voter turnout among all women in Utah (not just eligible voters) was approximately 54%, compared to 58.5% for women nationally (Hess & Williams, 2014).

Utah women have not always lagged in voter turnout. In the late 20th century, for three consecutive presidential elections (1988, 1992, and 1996), 76% of eligible women in Utah voted (Davidson, 1996). At that point, Utah had the highest women's turnout of any state in the United States, where the national average for women voters was 63.8%. The following presidential election year, 2000, only 59.3% of eligible Utah women voted, a big drop from 1996 but still above the national average for women, which was 56.2% that year (United States Census Bureau, 2002). In 2012, only 54.0% of eligible Utah women voted, compared to the national percentage, 58.5% (United States Census Bureau, 2013). That year, Utah women's voting participation ranking dropped to 46 of 51 states (including Washington, D.C.) for registered women voters nationally (United State Census Bureau, 2013). In the 16 years from 1996 to 2012, Utah's ranking for the percentage of women voting dropped 45 spots. This drastic decline was highlighted in a 2015 ranking of Utah women's political participation, wherein Utah was ranked 43 of 50 states for the

percentage of women registered to vote, and 46 out of 50 for women who actually voted (Institute for Women's Policy Research, 2015).

Nationally, voter turnout is highest in presidential years (e.g., the elections highlighted above) (DeSilver, 2014); and Utah voters, like all Americans, tend to cast ballots in much smaller numbers during midterm elections. Perhaps, Utah's decreased voter turnout is even more pronounced because Utah is one of only nine states that elects its governor during presidential election years. This turnout decline holds for women; for example, in 2014, only eight states had a lower turnout than Utah among their women voters. Three of those states also choose their governors during presidential election years (Davidson, 2014). Only 37.6% of Utah's eligible women voters came to the polls in 2014, versus 43% of women nationally (United States Census Bureau, 2015). Over the past 30 years, Utah women's voting participation has been steadily decreasing, and the ranking versus women nationally is also on the decline.

Utah Women's Policy Priorities

According to a 2016 survey by the Utah Foundation, women in Utah are most concerned about social issues such as homelessness, poverty, crime, and the environment. Specifically, the top ten policy issues for Utah women voters are as follows:

1. K-12 education
2. Healthcare
3. Air quality
4. State taxes and government spending
5. Crime
6. Homelessness and poverty
7. Water supply and quality
8. Jobs and the economy
9. The environment
10. Partisan politics

In contrast to Utah men who are, as a group, more likely to be concerned about property and sovereignty issues, Utah women's focus on social issues is more closely aligned with Utahns' priori-

ties as a whole (Utah Foundation, 2016). Additionally, Utah women share several concerns with U.S. women in general; one recent study showed that women list (1) equal pay, (2) public school funding, (3) lower taxes, (4) paid sick leave, and (5) campaign reform as their top five issues (Greenberg Quinlan Rosner Research, 2016).

Civic Engagement

Utah women are heavily involved in volunteer work; Utah ranks first in the United States (by a large margin) for percentage of residents who regularly volunteer (Frohlich & Lieberman, 2015). While we were unable to locate data that specifically reports on Utah women's volunteering, we know that across the nation, women's volunteer rates are 6% percentage points higher than men's (27.8% vs. 21.8%) (Bureau of Labor Statistics, 2016).

While specific data for Utah women's volunteer rates (as distinct from rates of all Utahns) are unavailable, volunteer rates for all residents of Utah are highest in the nation, at 43.2%—almost 10% higher than the second-ranked state. According to the Corporation for National and Community Service, Utah volunteers give 75.6 hours of their time annually per capita. The report states that a large majority of Utahns' volunteer service is given through religious organization (65.4%), followed by education (15.2%) and social service (6.8%) organizations. However, this high number for "religious" service does not necessarily mean that all the service given is religious in nature. Some of the main volunteer activities in which Utahns participate are teaching/tutoring (48.3%), mentoring youth (30.6%), collecting and distributing food (20.3%), and general labor (18.3%) (Corporation for National and Community Service, 2014).

Finally, in addition to their volunteering efforts, women in Utah are well-represented on non-profit boards (holding 45.8% of available seats) (Madsen, Backus, Jones, & Fischer, 2014), but less so on government boards and commissions where the rate is around 30% (Madsen & Goryunova, 2016). Utah women's involvement in

their communities, both through political activity (including voting) and through civic engagement such as volunteering and serving on boards, can improve aspects of their social, emotional, and intellectual health. Overall, finding ways to support women in such efforts will strengthen the positive impact of women in communities and the state as a whole.

The following list provides additional resources or information about women's voter participation and civic engagement:

- Real Women Run
- United Ways in Utah
- Utah Commission on Service and Volunteerism
- Utah Foundation Reports
- Utah League of Women Voters
- Utah Women & Leadership Project Reports
- Utah Women's Networks and Groups
- YWCA Utah

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Utah Women and STEM

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Employment opportunities in Science, Technology, Engineering, and Math (STEM) sectors in Utah are estimated to reach 101,000 by 2018 (Carnevale, Smith, & Melton, 2011). These jobs are recognized nationwide as being well-compensated and generally recession-proof. Yet Utah women continue to hold a lower percentage of STEM-sector jobs than women nationally; in fact, Utah is ranked last in the United States in terms of the percent of women employed in STEM. In addition, Utah women work in STEM occupations at a rate that is less than half that of Utah men (Institute for Women's Policy Research (IWPR), 2013). Recognizing the role women must play as an integral part of a strong statewide workforce, Utah educational and civic leaders are working to increase opportunities and pathways for more Utah women to enter and thrive in STEM fields. Such efforts, including educational support and labor force incentives, will allow women to have greater success in their intellectual and financial health and overall well-being. This research report reviews three key areas:

1. Current STEM employment data in Utah and nationwide,
2. Possible explanations for the persistent gender gap in STEM, and
3. A discussion of ongoing efforts in Utah to increase female participation and success in STEM fields.

Employment Data

The U.S. Bureau of Labor Statistics has projected that, between 2014 and 2024, total employment in science and engineering will increase (Fayer et al, 2017). While Utah currently boasts a 3.1% unemployment rate (compared with a 4.0% unemployment rate in the United States) (Lee, 2019), STEM occupations have accounted for only 4.56% of Utah's workforce, slightly below the 4.58% national average (Prosperity Through Education, 2015). More recently, the National Science Foundation has documented higher rates in Utah for science and engineering occupations as a percentage of all occupations (National Science Foundation, 2018). Yet, Utah women are not necessarily part of this growth, as they may be lagging behind men in STEM participation. A 2011 study by the Georgetown University Center on Education and the Workforce highlighted the persisting lack of gender diversity across the nation within both STEM education and the STEM occupations that are acknowledged as being among the most influential and high-paying sectors (Carnevale et al., 2011).

Nationally, a 2015 report by the U.S. Bureau of Labor Statistics illustrated marginalization of women within STEM, both in management (from 0% for natural sciences, 7.6% for engineering, to 26.7% for information technology) and in professional occupations (15.4% for engineering and 25.6% for computers and math) (Bureau of Labor Statistics, 2015). This situation is likely even worse in Utah, as is shown by a report from the Institute

for Women's Policy Research that estimates that women comprise only 23.5% of all STEM-sector workers in Utah, compared to 28.8% for women nationwide. That amounts to only 5.2% of Utah women being employed in STEM occupations, compared to 13.2% of men. Utah is ranked 51st out of 50 states and D.C. in this category (IWPR, 2019).

Possible Explanations for the Gender Gap

The U.S. Department of Commerce recognizes STEM education as the clear pathway to STEM-sector jobs (U.S. Department of Commerce, 2011), yet educational statistics demonstrate an inadequate supply of talent in the STEM jobs pipeline among workers both in Utah and nationwide. In 2012–2013, 16.6% of bachelor's degrees conferred by Utah's post-secondary institutions were in STEM disciplines, a sliver above the national average of 16.5% (National Center for Education Statistics, 2014). Overall, STEM career progression is frequently referred to as a "leaky pipeline" because of a diminishing interest in science and math as students move through the educational system (Prosperity Through Education, 2015). However, the decline is particularly true of female students, as gender stereotypes and a scarcity of female STEM role models continue to affect decisions made by girls and women in regards to their education and future career (Carnevale et al., 2011).

In the United States, only 12% of women with bachelor's degrees choose STEM majors, compared to 28% of men (Hill, Corbett, & St. Rose, 2010). A recent survey of high school students showed that males expressed much higher interest in pursuing careers in STEM. The Utah graduating class of 2017 showed the highest gap compared to previous years between male and female aspirations to enter STEM careers, at almost 30%—38.8% male vs. 12.6% female (Alliance for Science and Technology Research in America, 2018). In 2012, women in Utah received only 20% of the total number of degrees or certificates awarded in seven STEM fields across the public colleges and universities in

the state. The fields that had the lowest percentage of female graduates were engineering tech (11% female), engineering (12%), and computer/information sciences (13%). The STEM fields with the highest percentage of female graduates were math and statistics (36%), biological/biomedical (38%), and science technicians (39%) (Hanewicz & Thackeray, 2013). In addition, the graduation rate in certain STEM fields is increasing rapidly among young men in Utah but is increasing only modestly among young women. For example, between 2010 and 2015, the number of computing degrees and certificates earned by men in Utah more than tripled, from 1,027 to 3,413. In contrast, the number of degrees women earned increased at a much slower rate, from 321 to 431, during the same time period (Change the Equation, 2015).

Finally, even when women graduate and begin to work in STEM fields, they tend to divert from STEM sectors at a higher rate than men do, and for different reasons. For instance, in the nation, 22% of women (vs. 7% of men) decide to leave STEM positions for family-related reasons, and only 15% (vs. 31% of men) leave based on pay or promotional opportunities, which can often be greater outside of STEM occupations as a career progresses (Carnevale et al., 2011). Consequently, focused measures are needed, at both national and state levels, to attract, retain, and support the integration and success of students, particularly females, in STEM education and employment.

Efforts to Increase Participation

In order to ensure a sufficient local supply of qualified employees to fill future STEM jobs, Utah stakeholders are focusing increased efforts in promoting STEM fields (specifically to women in STEM) at all levels, including K–12, higher education, and professional employment. To that end, in 2013 the Utah legislature appropriated \$10M for the creation of a STEM Action Center (Utah State Legislature, 2013) to promote science, technology, engineering, and math through best practices in K–12 education. The Center's goal is to "produce

a STEM-competitive workforce to ensure Utah's continued economic success in the global marketplace" (STEM Action Center, n.d.). Additionally, in 2015 the Utah legislature approved \$4.5M for an engineering initiative (Salt Lake Chamber, 2015), as well as a one-time appropriation of \$280,000 for each of two schools in support of the Southern Utah STEM Initiative at Southern Utah University and of Dixie State University, as both target underserved and disadvantaged rural communities (Burt, 2015; Salt Lake Chamber, 2015). These state-appropriated funds could be utilized, directly or indirectly, to develop initiatives steering female students towards STEM education, and to support women in STEM occupations. For instance, Dixie State University was selected to host one of only 22 "Tech-Savvy" conference pilot programs nationwide; the conference features a day-long STEM event for girls (Applegate, 2016).

Overall, Utah is taking positive steps and investing heavily in raising support and awareness for STEM education as a gateway to high-paying job opportunities, and many of these efforts are aimed specifically at overcoming STEM-gender challenges. For instance, Utah is one of 19 states to participate in the National Alliance for Partnerships in Equity (NAPE) STEM Equity Pipeline Project, which is a collaborative effort between higher education institutions and Utah school districts to increase female participation in STEM. This is a research-based program with specific quantitative goals that allows stakeholders to measure increased involvement among Utah girls (see <http://www.napequity.org/stem/stem-equity-project/> for more information on this national project). In addition, the STEM Action Center now offers a dedicated STEM-girls webpage that features links to women-led scientific and engineering projects nationwide. The Center also hosts "girls only" events, which can allow girls to explore and learn in a comfortable environment (see <http://stem.utah.gov/stem-girls/>). Likewise, many institutions in the Utah System of Higher Education organize K-12 girls-only STEM summer camps to encour-

age higher participation in STEM fields. See, for example, SheTech (various locations), eSMART camp (Dixie State University), Girls Go Digital (various locations), and Hi-Gear (University of Utah) (Utah System of Higher Education, 2015).

In addition to university outreach programs aimed at K-12 students, the major universities and colleges in the state offer numerous programs and organizations for post-secondary female students in STEM. These groups provide mentoring, networking, competitions, community outreach, training, and other support. For example, the Society for Women Engineers, a national organization, has chapters at Weber State University, Utah State University, the University of Utah, Brigham Young University and Neumont University, as well as a Greater Salt Lake chapter which encompasses all of Utah. In 2001, only Utah State University had a chapter of the Association for Computing Machinery—Women, a national organization; in 2016, Dixie State University, Snow College, the University of Utah, Brigham Young University, and Southern Utah University formed chapters. Other groups include Women in Engineering and Technology at Brigham Young University and the ACCESS Program for Women in Science and Mathematics at the University of Utah, among many others. Interested female students at any Utah post-secondary institution can consult STEM departments or check the programs' websites in order to locate and participate in these programs.

Finally, at the professional level, various statewide associations for women, including the American Association of University Women—Utah, Utah Women in Higher Education Network, and the Women Tech Council, offer visibility (such as the annual Women Tech Awards), networking, and mentoring on various issues of personal and professional growth both for career professionals in the STEM sector and for women in technology occupations in other industry sectors. In addition to supporting women individually, these organizations can also advocate for improved corporate culture among STEM companies and in career

paths. Industries and their various pipelines will have to continue to make significant changes to better recruit, develop, and retain women in STEM fields, as women currently hold such a small percentage of these jobs. For more details about these organizations, please refer to the Utah Women & Leadership Project's extensive list of Utah Women's

Networks and Groups (<http://www.uvu.edu/uwlp/resources/groups.html>), which includes many associations and chapters for women in STEM. In addition, see the list of STEM programs and offerings through Utah school districts, schools, colleges, networks, associations, and beyond (http://www.uvu.edu/uwlp/education/programs_support.html).

Conclusion

Mirroring national trends, the growing number of employment opportunities in Utah's STEM sector requires both more STEM talent overall and more equitable gender representation within the sector. Accordingly, Utah needs to continue its significant investments into programs that encourage and mentor Utah girls and women to pursue STEM education and careers, and industries must continue to improve corporate climate to attract and retain top women in STEM fields. STEM careers can provide solid opportunities for increased knowledge and intellectual growth, secure employment, and financial stability—all key areas to a woman's overall health and well-being. Successful efforts to increase female participation in STEM fields will strengthen the positive impact of women in the state of Utah.

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The Status of Women in Utah Politics: Congress, Statewide Executive Offices, and the State Legislature

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A host of national reports and media (e.g., Chu & Posner, 2013) in the past decade have ranked Utah last or near last in terms of women being in positions of decision making and leadership, and women in Utah politics is foundational to this issue. Raising awareness of the reasons why this is the case is critical to social change efforts focused on improving the representation of women in political roles within the state. Women serving in public office within the state of Utah have positive implications for women's health. Research shows that when more women are involved in decision-making roles related to public policy, families and societies benefit (Madsen, 2015). Female legislators tend to extend greater support than their male counterparts toward legislation focused on health, education, and social programs that tend to positively impact families and society. This report compares current Utah data to national trends in terms of women in Utah politics, with a specific focus on Congress, state executive offices, and state legislatures. Tracking progress through updated status reports is an important way to help decision makers and other influencers clarify what is working and to determine and refine best steps moving forward.

Congress

National : The most current 2019 data show that, at the national level, women hold 23.7% of seats (127 of 535) in the 116th U.S. Congress (House and Senate) (Center for American Women and Politics [CAWP], 2019), which is an increase from the 113th U.S. Congress (CAWP, 2012). With 25% of U.S. Senate seats held by women, the total number of women serving in the chamber is at a record high (25 of 100) (CAWP, 2019). Of the 25 female Senators, eight are Republican. In addition, 23.4% (102 of 435) of the seats in the U.S. House of Representatives—up from 79 seats reported in 2014 (Madsen & Backus, 2014)—are now held by women, with 87.2% of them being Democrat (89 D, 13 R) (CAWP, 2019). It is interesting to note that of the 83 women who served in the House in 2017, two defeated incumbents in their district, eight won open seats, and 73 were re-elected as incumbents (CAWP, 2016d).

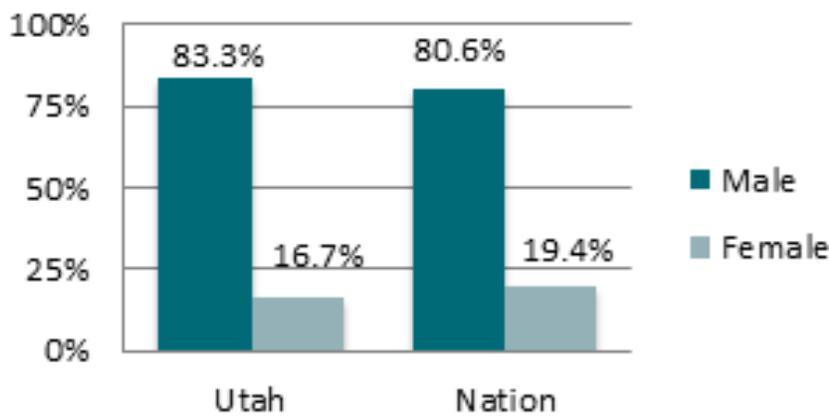
Four women non-voting delegates (2D, 2R) represent American Samoa, the District of Columbia, Puerto Rico and the Virgin Islands in the United States House of Representatives. (CAWP, 2019). New Hampshire, Washington, Nevada, and California continue to have both of their Senate seats filled by women. Vermont is the only state that has yet to elect a woman to serve in; Mississippi recently dropped from the list, electing its first female senator in 2018. In addition, the 116th

Congress has the highest count of women of color in United States history, with 36 Democrats and three Republicans, a total of 39 seats (CAWP, 2019a). In addition, Washington elected the first Indian American Woman to the Congress in 2016.

Historically, the first woman in the House, Jeannette Rankin, a Montana Republican, was elected in 1917. However, it was not until 1978 that a woman, Nancy Landon Kassebaum (R-KS), was elected to the Senate without having previously filled an unexpired term (CAWP, 2016a). Nancy Pelosi (D-CA) became the first female Speaker of the House in 2007.

Utah: Utah has six seats in its national delegation (two senators and four representatives). Congresswoman Mia Love was elected to the U.S. House of Representatives in 2014, taking office in 2015, which put Utah at 16.7% (1 of 6) of its congressional delegation as female. Love, who was the first Utah woman elected to Congress since 1995, was not re-elected in 2018, so at this time there are no women in Utah’s national delegation. Figure 1 compares Utah with the national average in terms of congressional seats by gender as of 2016.

Figure 1: U.S. Congress by Gender (Utah vs. Nation)



Prior to Congresswoman Love’s victory, only three Utah women had served in Congress since its statehood: Rep. Reva Z. Beck Bosone (1949–1953), Rep. Karen Shepherd (1993–1995), and Rep. Enid Greene Waldholtz Mickelsen (1995–1997) (CAWP, n.d.). Two of the three served one two-year term. Utah has never elected a woman to serve in the U.S. Senate; in 2018, Jenny Wilson ran as the Democratic candidate but was not elected. However, in electing former Rep. Love to its congressional delegation, the state has made some progress since the 2014 Utah Women & Leadership Research & Policy Brief (Madsen, & Backus, 2014).

Statewide Executive Offices

National

At the national level, 2019 data show that women now hold 27.6% (86 of 312) of the statewide elective executive offices (SEO) (46 D, 38 R) (CAWP, 2016e), having picked up additional seats since 2014 (Madsen & Backus, 2014). The six most

often discussed SEOs include the positions of governor, lieutenant governor, secretary of state, state treasurer, attorney general, and state auditor. As of May 2019, 44 women (26 D, 18 R) have served as governors in 30 states (CAWP, 2016c). Of these female governors, 30 were elected in their own right, three replaced their husbands, and 11 became governor by constitutional succession, with

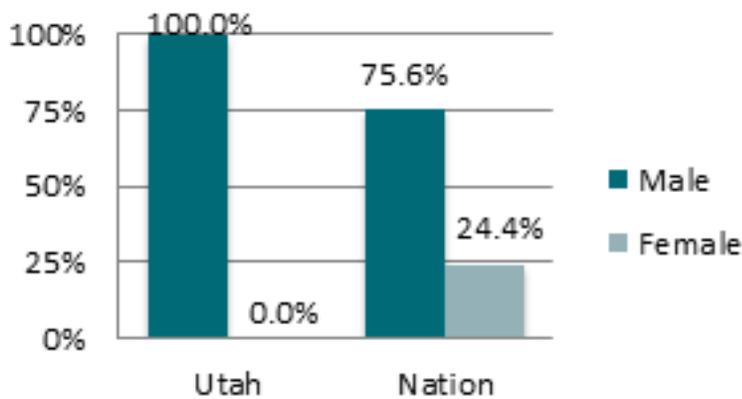
six of them subsequently winning a full term. The largest number of women serving as governors at the same time is nine, which occurred in 2004 and 2007 and has occurred again in 2019. In 2019, nine states have female governors (Oregon, New Mexico, Alabama, Iowa, Kansas, Maine, Michigan, South Dakota, and Rhode Island), six Democrats and three Republicans (Fairygodboss), while 15 states have females serving as lieutenant governors (9 D, 6 R) (CAWP, 2016e). As of May 2019, seven of the 50 (14%) state attorney general seats in the nation were held by women (5 D, 2 R) (CAWP, 2016e). Finally, 11 (22%) secretary of state seats,

ten (20%) state treasurer seats, and ten (20%) state auditor seats in the country currently are held by women (CAWP, 2016e). All of these numbers reflect increases from the national findings reported in 2014 (Madsen & Backus, 2014).

Utah

There are currently no women serving in Utah statewide executive offices (SEO) (CAWP, 2016f). Figure 2 compares Utah with the national average in terms of SEO by gender (national data as of 2016).

Figure 2: Statewide Executive Office Seats by Gender (Utah vs. Nation)



Throughout its history, Utah has never elected a woman to serve as governor. However, Utah has had one female governor and lieutenant governor. Olene Walker served as lieutenant governor to Mike Leavitt from 1993–2003, when he was nominated by the Bush Administration to serve as the Secretary of the U.S. Department of Health & Human Services. Walker was then appointed as governor to serve until the end of Leavitt’s term from 2003–2005. She sought re-election but did not win the Republican nomination at

convention. The only other woman to serve in a Utah statewide officer role was Jan Graham (D), who was attorney general from 1993–2001 (CAWP, n.d.).

State Legislatures

National : According to the National Conference of State Legislatures, 1,875 women are serving in state legislatures in 2019 (25.4%) (NCSL, 2019). Overall, the percentage of women in state legislatures has increased through the years as follows:

- 1971: 4.5%
- 1981: 12.1%
- 1991: 18.3%
- 2001: 22.4%
- 2011: 23.7%
- 2013: 24.2%
- 2015: 24.5 % (CAWP, 2016h)
- 2017: 24.8% (CAWP, 2016b)
- 2018: 25.4% (NCSL)

In 2016, Arizona and Vermont set the national highs for women in their legislatures (40.0% and 39.4%, respectively), followed by Nevada (38.1%), Colorado (38.0%), Washington (37.4%), Illinois (35.0%), Maine (33.9), Maryland (33.5%), Oregon (33.3%), and Rhode Island (31.9%). In the past, Utah was among the ten states with the lowest percentages, but with 24.0% women in the legislature, this no longer is the case. (CAWP, n.d.).

It is also interesting to note that, nationally, Democrats make up 62.0% of the total women elected in legislatures, with elected Republican women making up 37.3% and the remaining 1% of seats being held by independents, non-partisans, and other parties.

According to a CAWP report from 10 years ago (Sanbonmatsu, Carroll, & Walsh, 2009), as well as more recent CAWP data, the numbers of Democratic women legislators has continued to increase, while the numbers of female Republican legislators declined since 1981.

Utah

Table 1 (CAWP, n.d.) illustrates the Utah state legislature numbers and percentages since 1971 by party and gender. It is interesting to note that in 1971, 8.2% of Utah state legislators were women, while at the national level only 4.5% of seats were held by women. By 1981 Utah had slipped below the national average. In Utah, data also show that female legislators are more likely to be Democrat than Republican.

Table 1: Female Utah State Legislators

Year	Democrat	Republican	Total	%	Rank
1971	7	1	8	8.2	-
1981	4	4	8	7.7	36
1991	6	6	12	11.5	40
2001	12	11	23	22.1	26
2011	12	6	18	17.3	43
2013	11	6	17	16.3	46
2015	10	6	16	15.4	44
2017	12	9	20	20.2	35
2019	16	9	25	24.0	36

The total number of women serving in Utah’s state legislature had actually been decreasing since 2009, until 2017. The percentage of women serving in the legislature increased by 3.8% between the 2016 and 2017 legislative sessions (see Figure 4 for a comparison of this national versus Utah trend).

In 2014, six states had women serving as Speakers of their House of Representatives, with Utah’s own late Becky Lockhart accounting for one of them (Madsen & Backus, 2014). In 2019, that number has increased to seven (CAWP, 2019b). In terms of 2019 legislative leadership in Utah, of the

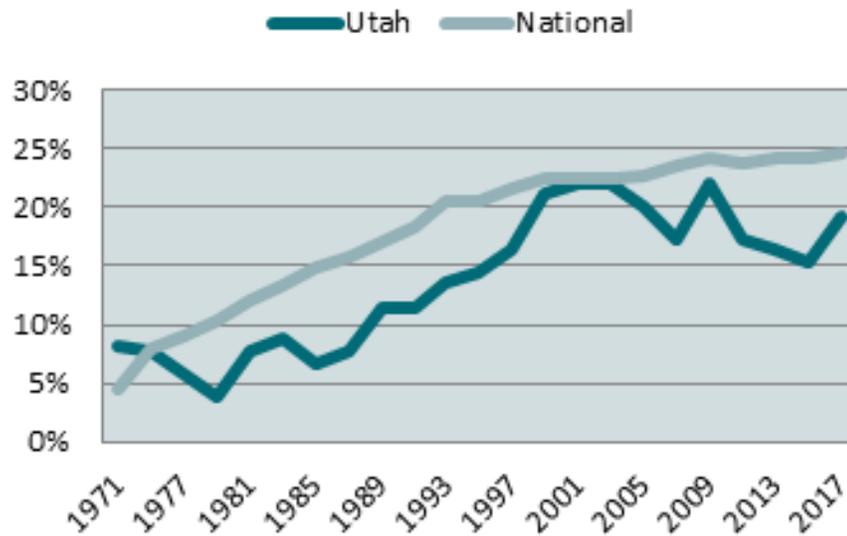
12 leadership positions in the House of Representatives, three are held by women, all Democrats: Minority Whip Carol Spackman Moss, Minority Assistant Whip Angela Romero and Minority Caucus Manager Karen Kwan (Utah House of Representatives, 2019). The Senate has 11 leadership positions, four of which are held by women: Assistant Majority Whip Ann Millner (R), Minority Leader Karen Mayne (D), Minority Whip Luz Escamilla, and Assistant Minority Whip Jani Iwamoto (Utah Senate, 2019).

Implications

These data support the notion that we do need more women to run for office at the highest levels in state and national government. Understanding why women do not run is critical to this conversation and can help leaders design more effective interventions to increase the percentage of women serving in these important public roles. We offer a few explanations. First, societal attitudes about electing women are not as much a deterrent as they were in past years, but research tells us that gender socialization still plays a substantial role in whether individuals “self-identify with politics and express ambition to seek elected office” (Lawless & Fox, 2004). Role socialization starts during childhood and extends into adolescence and adulthood.

Second, women’s aspirations and motivations for public office are typically lower than those of men. However, research from the past decade continues to confirm that women are as effective and successful in leadership positions as men (Zenger Folkman, 2012). Yet, studies (e.g., Madsen, 2008a; Madsen, 2008b) have found that women are more likely than men to struggle with envisioning themselves as leaders (leadership identity). If women do not see themselves as leaders and/or do not believe they can be leaders, they will not step forward to do so. Even though men and women often have the same qualifications, one study (Lawless & Fox, 2005) reported that women are significantly less likely than men to view themselves as qualified to run for office. Women often have different motivations to lead as well (leadership purpose).

Figure 4: Female State Legislature Trends



They focus, to a larger extent, on their desires to help the community, to be a voice for those who cannot speak, and to make a difference in people’s lives. If they do not see a leadership role as giving them an opportunity to do these things (or do not understand that a particular role may offer these opportunities), they most likely will not step forward to run.

Third, research continues to confirm that more women will run for office if others suggest they do so and provide support and encouragement. In 2008, the Center for American Women and Politics conducted a national study (Sanbonmatsu et al., 2009), attempting to understand the reasons women decided to run for public office. Researchers found that women and men seek state legislative office for somewhat different reasons. They asked, “Other than your desire to serve the public, what was the single most important reason that you decided to seek the office you now hold?” Of the six primary replies, women responded significantly higher than men to the following: 1) “a party leader or an elected official asked me to run or serve”; and 2) “my concern about one or more specific political issues.” Men responded significantly higher to

the following two reasons: 1) “my longstanding desire to be involved in politics”; and 2) “my desire to change the way government works.”

One study (Lawless & Fox, 2005) found that a key factor in explaining the gender gap was that women were far less likely than men to be encouraged to run for office. Interestingly, other researchers (Sanbonmatsu et al., 2009) discovered that women were actually more likely than men to run for their first elected office because they were recruited. This was the primary response in one survey where participants were asked about their decisions to seek office. The bottom line is this: women are encouraged less often to run for office, but when they are encouraged and/or recruited, they are more likely to step forward.

Fourth, gender socialization is typically unconscious, and girls and women are often socialized toward an “imposter syndrome” mentality, in which women do not feel they are qualified even when they may actually have more knowledge, skills, and abilities than their male counterparts (Guenzburg, 2016). In addition, studies have found that women face a “double-bind”—they are expected to be compassionate, kind, competent, and strong (not tough), but when people believe leaders need to be “tough” to “do the job,” then women do not “fit” a leader role (Phillips, 2016). Women struggle with feeling and being “authentic” within political environments because of pervasive social norms (Ngunjiri & Madsen, 2015).

Fifth, there are differences, both perceived and literal, in female candidates’ treatment. Researchers (e.g., Guenzburg, 2016) have found that women candidates experience widespread bias and are scrutinized for appearance and questioned about family responsibilities when men are not.

Sixth, national research shows that the “Good Old Boys Network” continues to have a stronghold in party politics, and Utah is no exception. Both conscious and unconscious biases continue to influence decision makers toward traditional practices, policies, and processes that keep women from running, networking, and succeeding if they do run. Yet, the evidence is clear (Madsen, 2015): Utah residents, groups, organizations, and communities will benefit from having both men and women serve together in elected public offices. Extensive research has found that the “tipping point” is 30%, which means that to obtain the benefits outlined in Madsen (2015), a leadership team, board, or political body, for example, needs to have at least 30% female representation. These are only six of many reasons that help answer the question related to why more women do not run for public office.

Although there has been some progress in the last few years, we encourage Utah leaders and residents to do more to implement and support these efforts. We also call upon the Utah women to step forward and better serve our communities by adding their important voices to govern and lead Utah and its municipalities and counties. In her introduction of the 1993 book, *Women Legislators of Utah, 1896–1993*, former Utah Representative Beverly White provided the following advice to Utah women: “We won’t be hypocritical and say it will be easy. It won’t. It takes time, energy, funds and determination to be elected to any political office but if you have resources to give either in education or experience, you should be willing to share them and give to the office you choose your loyalty and dedication. The rewards are further education for you and a satisfaction only you can understand and appreciate and a public that will be well served by the devotion of women who are giving of their time and talents to make this a better world in which to live” (Abbott & White, 1993, p. 3).

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The Status of Women in Utah Politics: Counties, Mayors, City Councils, and Boards of Education

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Several national reports earlier in the past decade ranked Utah last or near last in terms of women being in positions of decision making and leadership, including a 2013 Center for American Progress report titled “The State of Women in America: A 50-State Analysis of How Women Are Faring Across the Nation” (Chu & Posner, 2013). These and other rankings most often use the following four criteria: 1) gender wage gap, 2) educational attainment, 3) women in management roles, and 4) women serving in state legislatures. Research released through the Utah Women & Leadership Project and the Utah Women & Education Initiative has also confirmed that Utah has been below the national average in these areas (see <http://www.uvu.edu/uwlp/research/briefs.html>), although more recently, some improvement has been seen (McCann, 2019).

The lack of women serving in public office in the state of Utah has been troublesome for many reasons, including the negative affect it has had on decision making at all levels of municipality, county, and state governance. Not having equal representation of men and women in elected positions means that our residents are not receiving the representation needed for all voices to be heard. In addition, Utah does not and will not receive the hundreds of benefits research has uncovered related to more diverse and inclusive leadership teams and governance boards (Madsen, 2015). Decisions

by local and state elected leaders impact the physical, social, emotional, intellectual, environmental, financial, and even spiritual health of individuals and families who live in Utah.

Because of this, it is important to understand the current status of women in Utah politics, and this report specifically highlights gender data on counties, mayors, city councils, and boards of education. Tracking progress through updated status reports is an important way to help decision makers and other influencers clarify what is working and to determine and refine best steps moving forward. The following sections report on the areas previously outlined by highlighting national data and then comparing it with Utah data. The research methods related to collecting the data have been integrated into each section below.

Counties

Nation: Despite often being overlooked, county government plays an important role in the lives of individuals and the governing of counties within the state. The National Associations of Counties (NACo) points out that county leadership does in fact matter as counties deal heavily with transportation and infrastructure, community health, criminal justice, and public safety (National Association of Counties, 2015). In addition, county leaders deal with important community issues such as agricul-

ture, workforce development, energy, land use, and education (National Association of Counties, 2019). Working with NACo’s research team, we collected data from a gender study they conducted of county elected officials in 2015. According to NACo, women made up roughly 12.7% of county boards and just 7.8% of county executives. Interestingly, women held 38.2% of elected county row officer seats (e.g., clerk, auditor, treasurer, recorder, assessor, sheriff, controller, district attorney, register of wills, coroner). Overall, in 2015 women made up 24.8% of elected county positions nationally (National Association of Counties, n.d.).

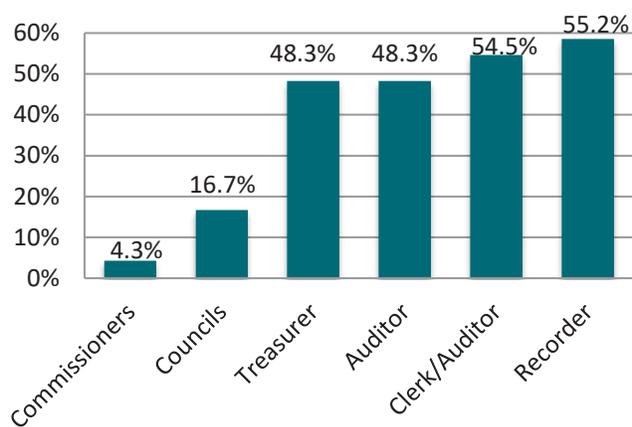
Utah: For Utah, we collected 2016 county data from links listed on the Utah Association of Counties website. We then compared the 2016 database with the lieutenant governor’s online election results site to determine the number of county officials elected in 2016. These results were then verified through contacting county clerks’ offices. Of the 29 counties in the Utah, 23 have elected commissioners, while just six have elected county councils (Cache, Grand, Morgan, Salt Lake, Summit, and Wasatch). In addition, each county elects a clerk/auditor, treasurer, recorder, and assessor. In 2017, of the 69 county commissioners in Utah, 66 (95.7%) were men and three (4.3%) are women, serving in the counties of Beaver, San Juan, and Sanpete. Of the six county councils with a total of

42 seats, 35 (83.3%) council members were men, while seven (16.7%) were women. It is also interesting to note that of the 42 elected county council positions, eight of them are “at-large” positions, representing the entire county; seven (87.5%) of these were held by men, and just one (12.5%) was held by a woman (Salt Lake County).

Additional elected county positions for 2017 revealed that, of the 33 county clerk/auditor seats, 18 (54.5%) were held by women, and 15 (45.5%) by men. There were more than 29 positions, as some counties split the position of clerk and auditor, while most combined the two into one position. The position of county treasurer was split fairly evenly, with 48.3% of seats held by women and 51.7% held by men. Women held 16 of 29 (55.2%) county recorder seats. The position of county auditor was held by 15 men (51.7%) and 14 women (48.3%). We were able to collect county data from both 2016 and 2017 and reviewed the election results to see how many seats were gained and lost. Five seats held by women in 2016 were filled by men in 2017.

Overall, the legislative bodies of county commissions and councils in Utah were overwhelming held by men (91%), while 52.5% of the predominantly full-time elected positions of clerk/auditor, treasurer, recorder, and assessor were held by women. See Figure 1 for a summary of county offices held by Utah women in 2017.

Figure 1: County Seats Held by Utah Women, 2017



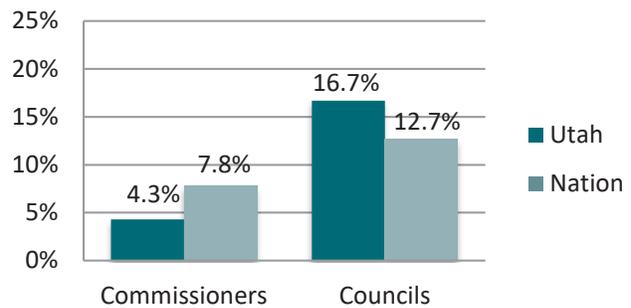
Compared with the 2015 national data, it may appear that in 2017, Utah was slightly ahead of the national trend, with 31.2% of all county elected official positions held by women, compared to the nation at 27%. However, it is important to note that our data did not include many of the male-dominated positions (e.g., sheriff, attorney), and that most counties in Utah do not have the more male-dominated county row officer seats that are often included in counties across the United States. Hence, it is difficult to compare Utah to the nation accurately.

In 2017, of the 29 counties, only three had exclusively male county elected officials from top to bottom (Davis, Utah, Washington). Twenty-two of the 29 counties had two or more females serving in county elected positions. Yet, of the 23 counties that elect commissioners, just three counties had a female commissioner, and all represented rural areas. Of the six county councils, five had at least one female county council member (Cache, Grand, Morgan, Salt Lake, and Summit), while the Wasatch County Council was all male.

Mayors

Nation: According to the National Foundation for Women Legislators (n.d.), the number of women serving as mayors, on city councils, and as county commissioners is slightly on the rise. In 2019, the percentage of female mayors of cities with a population of at least 30,000 (1,412) increased to 20.9%, an increase since 2016 (when there were 1,391 women mayors) (Center for American Women and Politics [CAWP], 2016 and 2019). Three Utah mayors were included on the 2016 list: Paula Larsen (Kearns), JoAnn B. Seghini (Midvale), and Jackie Biskupski (Salt Lake City). In 2019, 6 Utah mayors are women: incumbents Biskupski and Larsen, along with Michelle Kaufusi (Provo), Dawn Ramsey (South Jordan), Kristie Steadman Overson (Taylorsville), and Debbie Winn (Tooele) (former Mayor Seghini retired in 2018 after more than 30 years in Utah politics). Among the 100 largest cities in the United States, 20 had women mayors (20%) in 2016, which is a slight increase from the number we listed in our

Figure 2: County Seats Held by Women (Utah vs. Nation)



2014 report. It appears that 52 (21.8%) of the 238 U.S. cities with a population over 100,000 had women mayors in 2016 (The United States Conference of Mayors, n.d.). As of March 2019, per the U.S. Conference of Mayors, of the 288 mayors of the U.S. cities with populations 100,000 and over, 59, or 20.5%, were women (CAWP, 2019a).

Utah: In 2016, the Utah League of Cities and Towns (NLC) listed 242 municipalities in the state. All but about 30 had websites with mayor information, and calls were made or emails sent to the remaining city or town offices. Of the 242 municipalities studied, 22 had women as mayors (9.1%), reflecting an increase from the 7% we reported in 2014 (Madsen & Backus, 2014). Of those 22 mayors, three represented cities with populations of 30,000 or more; in Utah, 29 cities have populations of that size, which means that 10.3% of mayors of those cities as of 2016 were women. Most female mayors in Utah serve cities with populations of 10,000 or less. See Table 1 with details regarding female mayors by municipality population.

Table 1: Women Mayors in Utah by Municipality Population, 2016

Municipality Population	No. of Female Mayors	Total No. of Mayors	% of Female Mayors
100,000+	1	4	25%
30,000–99,999	2	25	8%
20,000–29,999	1	8	12.5%
10,000–19,999	1	21	4.8%
5,000–9,999	3	27	11.1%
Less than 5,000	14	157	8.9%
Total	22	242	9.1%

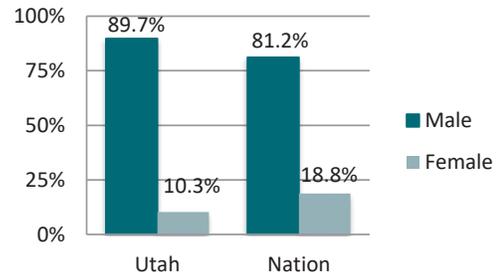
Available national data track the gender of mayors only in cities with populations of 30,000 or more, so Figure 3 represents a national average comparison with Utah in terms of mayoral seats in municipalities with that populace.

City Councils

Nation: Unfortunately, the National League of Cities (NLC) no longer tracks gender data and has not done so for quite some time. However, we were able to find data on the gender balance of city councils of the 15 largest cities in the country for 2016. According to Next City, “men [were] in the majority on all councils studied, though by a relatively small margin in D.C. (where the council is 46 percent female) and in San Diego, Pittsburgh and Detroit (all 44 percent)” (Kinney, para. 8, 2016). Los Angeles had the worst gender imbalance by far with only 7% female members, with San Jose as the second worst at 18% female membership. This article noted that the loss or gain of one female member makes a big difference in percentage. The author found that the overall share of women city council members in these specific cities declined from 33% in 2010 to 30% in 2016 (Kinney, 2016).

In terms of more national historical data on city councils, the NLC reported that representa-

Figure 3: Mayor Seats by Gender with Populations of 30,000 or More (Utah vs. Nation, 2016)



tion of women on U.S. city councils increased between 1989 and 2001. They found that the “proportion of women grew from 21 to 25 percent in small cities, 25 to 36 percent in medium-sized cities, and 33 to 36 percent in large cities” (National League of Cities, n.d.). However, between 1979 and 1989, there was actually a drop in gender diversity on city councils from 32% to 26% (NLC, n.d.).

Utah: For Utah, we collected data from every municipality in the state that had a council (N=241). We gathered information from websites, and then emails and calls were made to obtain the data that were not available online. In Utah, 24.1% of city/town council seats were held by women in 2016 (see Table 2 for council member numbers and percentages by municipality population). The four largest cities in Utah had the fewest women represented (11.5%), while all other population ranges had between 21.2% and 27.5% females serving in elected positions.

Table 2: Women Council Members in Utah by Municipality Population

Municipality Population	No. of Females	Total No. of Seats	% of Females
100,000+	3	26	11.5%
30,000–99,999	34	126	27.0%
20,000–29,999	11	40	27.5%
10,000–19,999	28	102	27.5%
5,000–9,999	28	132	21.2%
Less than 5,000	164	685	23.9%
Total	268	1111	24.1%

Our analysis showed that as of 2016, there were 58 councils with no women; yet, and there were no clear patterns in terms of population size. One of those councils, West Jordan, is one of the four largest cities in Utah (hence 25% of these municipalities had no women), while four of 25 cities with populations of 30,000–99,999 had no women (16% of them). Two of eight cities (25%) with populations of 20,000–29,999, four of 21 (19%) cities with populations of 10,000–19,999, nine of 27 (33.3%) with populations from 5,000–9,000, and 38 of 156 (24.4%) with less than 5,000 people had councils with no women. It appears that 112 councils in Utah had one woman serving in 2016, while 58 had two women, 12 had three, and only one—Marysvale—had all four seats held by women. Overall, as of 2016 24.1% of all council members in Utah municipalities were female, which put Utah below the national average of data gathered historically in 1979 (32%), 1989 (26%), 2001 (25–36%), and 2016 (30–33%).

Only one town or city in Utah's history has had an all-female mayor and city council. According to Southern Utah News (2012), "Kanab made history in 1912, when its newly-elected mayor and city council took the oath of office making it the first time in the history of the United States where the town board and mayor were entirely comprised of women."

Boards of Education

Nation: In January 2014, the National Association of State Boards of Education (2014) provided a list of each state's board of education membership by gender. It appears that, in 2014, 48.6% of state board members across the country were female. The states with the highest percentages of females at that time were Colorado (85%), South Dakota (78%), Alabama and Nebraska (75%), and Louisiana (72%). The states with the lowest percentages of females on boards of education were Missouri (16.7%), Mississippi (22.2%), and Oklahoma and West Virginia (25%).

Only two sources of national data have reported the gender of school district board members

historically. First, a 2002 report (Hess, 2002) stated that 38.9% of board seats nationally were held by women at that time, with larger districts having higher percentages than smaller districts. However, a more recent 2010 National School Boards Association study (Hess & Meeks, 2010) reported that 44% of school district board seats across the United States are now held by women. Although a more recent report has not been published, this number has most likely increased since 2010; indeed, as of 2019, the NSBA still reports this percentage (NASB, 2019). The Hess & Meek study also found that male board members dominated in small districts, where men constituted nearly two-thirds of board members, but they made up just under half in large- and medium-sized districts.

Utah: In Utah, eight of 15 (53.3%) State Board of Education elected seats in 2016 were held by women; however, from 2017 to the present, that number has increase to 11 of 15 (73.3%). This is a significant increase from past years and puts Utah as one of the highest states nationally for the percentage of women on a state school board. Currently the Utah State Charter School Board of Education has five of seven (71.4%) seats held by women, but these positions are appointed, not elected.

Utah has 41 school districts throughout the state, and each district has an elected board of education, typically with either five or seven seats. We collected data about these boards via websites, emails, calls, and then followed up by checking the lieutenant governor's election results website after the 2016 elections (Utah Lieutenant Governor's Office, n.d.). The 2016 data reflect that, of the 234 total district board of education elected seats in Utah, women held 112 (47.9%). For 2017, the number of women decreased, but only by one (N=111, 47.4%). As of 2019, the Utah school district school boards that have the highest percentages of women include the following: Logan City (100%), Salt Lake City (71.4%), Emery (80%), Grand (80%), Murray (80%), Davis (62.5%), and Granite (71.4%). It does appear that the larger districts have more women, and the districts that

have no women are rural; yet, some rural districts do have a strong percentage of women serving, so no pattern emerged.

Overall, Utah is above the national average in terms of the percentage of women serving on the state board of education (73.3% vs. about 50%) and is at least average, if not slightly above, for women holding district board seats.

Moving the Needle

National statistics have shown that women win elections at the same rate as men, but that fewer actually run (Real Women Run, n.d.). The bottom line is that women will not get elected unless they run for office—if their names are not on the ballot, they cannot get votes. Dr. Jennifer Lawless, Director of the American University's Women and Politics Institute, stated in a USA Today article that “the issue isn't that [women] don't have the credentials or the background anymore. The issue is that that's not sufficient to get them to run for office” (Moore, 2013, para. 10). She explained that, according to studies, there are still just not enough women running for office. This phenomenon was confirmed again in a 2016 article published in The New York Times, titled, “The Problem for Women Is Not Winning. It's Deciding to Run” (Miller, 2016). This is true both nationally and in Utah; it remains one of many key challenges related to why Utah does not have more women serving in elected public office.

The section that follows will first focus on what Utahns can do to prepare more girls and young women to run for office later in life and then provide ideas for more immediate solutions. In terms of what Utahans can do to prepare more girls and young women to run for office, we have three suggestions. First, all children and youth can be taught to be involved in their communities, and they can learn that it is a civic responsibility to serve in the community in various ways, including running for public office. The importance of community and civic engagement can be discussed and modeled

in various settings throughout a person's lifespan. Second, we must help girls and women understand the importance of running for office, provide them with experiences that will increase their aspirations to do so, offer quality networking and mentorships, and create developmental opportunities that will help them see themselves as being able to positively influence people and policy. Finally, girls, teens, and women can attend events and gatherings around the state (see, for example, <http://www.uvu.edu/uwlp> for statewide listings and leadership summer camps for girls) that help them become aware of the issues and that can also help strengthen the confidence, aspirations, ambitions, and motivations to lead. In addition, those in positions of influence (e.g., parents and relatives; school teachers, counselors, and administrators; political, business, and religious leaders; and college and university administrators, faculty, and staff) are encouraged to attend events as well so that they can more effectively encourage, develop, and strengthen girls and women toward leadership.

Initial findings and national studies have shown that certain types of shorter-term efforts can also result in more women running for elected office and winning these elections. First, Utah women can be actively engaged in their local precincts by attending their caucus meetings and running for delegate positions. Both major parties in the state operate on a caucus system, and even with the passage of SB 54 (enabling candidates to go the petition route), running as a state delegate can provide women with opportunities to participate in the local, state, and national levels of politics. This may provide them with opportunities to interact with other like-minded individuals, run on a lower scale for an elected position, and network with influential elected leaders in the state. Caucus dates and times are posted on both the Republican and Democratic State Party websites. In addition, women can also determine the issues and causes they are most passionate about. Becoming an advocate for these issues can build leadership and networking, and it can also compel women to do more.

Second, Utah women—whether they are interested in running for office or not—can attend Real Women Run (RWR) trainings and events to learn about becoming more civically engaged. RWR is a “collaborative nonpartisan initiative to empower women to participate fully in public life and civic leadership through elected political office at all levels, appointments to boards and commissions, participation in campaigns, and engagement in the political system” (Real Women Run, n.d.).

Third, women who are interested in running for elected office at the city, county, state, or national level can also join a cohort in the Women’s Leadership Institute’s Political Development Series. This six-month interactive and instructive program teaches women the how and why of running for public office (Women’s Leadership Institute, n.d.).

Fourth, female college students can join training and development programs that provide them with tools to be more engaged in running for student body offices on their own campuses. One such program is Running Start (n.d.), which is a daylong workshop on why and how to run for public office—starting with student government. This national program, through a nonpartisan project, partners with universities around the county to host these on campuses.

Fifth, those in leadership positions can strategically recruit more women for these roles. In addition, since the majority of Utah women who run and win do so through the Democratic Party, we call on local and state Republican leaders and politicians to carefully analyze the practices, processes, culture, and opportunities that, through unconscious bias, may be preventing women from running, winning, and serving. We also call on Republican women to step forward and lead in their party as well. However, progress can be made in strengthening the impact that women can have for the state of Utah through all political parties.

This article has summarized available research on the status of women in Utah politics in Utah counties, cities (mayors and councils), and with boards of education. It was written to provide a more detailed look at the past and current state of affairs and should be beneficial as a benchmark for measuring improvement in years to come. It was also written as a call to action for Utah residents and leaders to do more to encourage and support future efforts to diversify voices on Utah’s Capitol Hill and in cities and counties around the state. Although there has been some progress in the last few years, we encourage Utah leaders and residents to do more to implement and support these efforts. We also call upon Utah women to step forward and better serve our communities by adding their important voices to govern and lead Utah and its municipalities and counties.

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Labor Force Participation Among Utah Women

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Labor Force Participation Among Utah Women

Over the past half-century or so, Utah women's participation in the labor force has steadily increased at a rate of about 8% per decade (Utah Women & Leadership Project, 2019). According to the most recent (2017) U.S. Census Bureau estimates, women in Utah make up 45% of the state workforce, which is slightly lower than the U.S. women's share of the national workforce, 47.8% (United States Census Bureau, 2017a). In general, Utah women are about as likely to be employed as U.S. women, but Utah women are less likely to work full-time year-round (Department of Workforce Services, 2014). Numerous factors influence Utah women's experiences in the labor force, including such barriers to successful employment such as trouble accessing affordable childcare and occupational segregation in lower-paying industries. Since solid employment is a key aspect of financial health, as well as a contributor to intellectual and social well-being, understanding labor force issues is critical. This research snapshot focuses on three key areas:

1. An overview of Utah women's labor force participation, broken down by demographics,
2. An exploration of the industries and occupations in which Utah women are most likely to work, and
3. A discussion of ways to increase Utah women's success in the labor force.

Demographics

A recent American Community Survey estimates that for people ages 16–65, 74.0% of Utah women worked during the previous 12 months, a slightly higher rate as compared to U.S. women (72.7%) (United States Census Bureau, 2017a). Estimates for the same time period give different numbers for the specific category of Utah women “in the labor force,” which includes those who are unemployed but looking for work, though with those data as well Utah women's rates are higher than the national average (60.9% vs. 58.3%) (United States Census Bureau, 2017b). However, Utah women were less likely than U.S. women to work full-time, year-round: 36.7% vs. 43.5%. Utah women are also considerably less likely to work than Utah men: 87.9% of Utah men had worked in the previous 12 months, and 62.6% of them had worked full-time, year-round (United States Census Bureau, 2017a). A recent report ranked Utah first in the nation for the percentage of employed women who worked part-time (40.2% vs. the national average of 29.4%) (Institute for Women's Policy Research (IWPR), 2013).

Various factors play a role in determining Utah women's likelihood to participate in the labor force. For example, age significantly impacts women's employment rates. In both the United States and Utah, younger women are very likely to be in the labor force. According to 2017 U.S. Census Bureau estimates, Utah women participate in the labor

force at a higher rate than the national average in their late teens and early 20s. Beginning at age 25, however, the national average for women’s labor force participation becomes higher than Utah women’s participation rate and remains higher through age 59. Utah women’s labor force par-

ticipation drops considerably below the national average from ages 25–45, the years when many women are having children. After age 45 the labor force participation rate for Utah women jumps up to levels near the national average. See Table 1 for more detail (United State Census Data, 2017c).

Table 1: Percentage of Women in the Labor Force by Age

Age	U.S. Women	Utah Women
16–19	38.9%	51.1%
20–21	68.1%	78.5%
22–24	77.0%	79.7%
25–29	78.3%	72.1%
30–34	76.4%	65.5%
35–44	76.2%	69.3%
45–54	75.3%	74.6%
55–59	67.4%	66.9%
60–61	58.1%	59.4%
62–64	46.1%	46.4%
65–69	27.5%	26.2%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates.

Marital status is another telling factor when it comes to Utah women’s employment. Married women in the state are less likely to be in the labor force than married women in the national average, but Utah women who are not currently married are more likely to be in the labor force than the average U.S. woman. Specific labor force participation rates are as follows: 57.1% of Utah married women (vs. 59.4% U.S.), 70.5% of Utah women who have never been married (vs. 66.5% U.S.), 72.7% of Utah women who are separated (vs. 66.2% U.S.), 67.8% of Utah women who are divorced (vs. 63.3% U.S.), and 21.2% of Utah women who are widowed (vs. 18.2% U.S.) (United States Census Bureau, 2017d).

Utah women’s labor force participation also varies by ethnicity: a recent report showed that 65.5% of Black women, 64.5% of Hispanic women, 64.6% of women who identified as “other” or two or more races, 60.7% of Asian women, 58.5% of White women, and 54.5% of Native American

women are in the labor force (IWPR, 2018).

Although a majority of Utah mothers do participate in the labor force, Utah mothers of young children are less likely to be employed than U.S. mothers. 2012 U.S. Census Bureau estimates show that 61% of Utah mothers with children under age 6 work (vs. 70% U.S.), 51% of Utah mothers with children under age 6 and children ages 6–17 work (vs. 64% U.S.), 73% of Utah mothers whose children are all between the ages of 6–17 work (vs. 77% U.S.), and 76% percent of Utah mothers with no children under age 18 work (this is higher than the national average of 73%) (Langston, 2014). Utah ranks last in the nation for children with both parents in the labor force: 52%, well below the national average of 65% (Langston, 2014). Utah also has the largest gap in the nation between fathers’ and mothers’ participation in the labor force, at 42.7% (IWPR, 2015b).

Women's labor force participation rates also vary somewhat according to where they live in Utah. A recent report stated that the counties with the highest female labor force participation are Summit (65.3%), Salt Lake (64.8%), Grand (64.7%), and Beaver (62.9%); the counties with the lowest rates are Washington (49.8%), Duchesne (49.3%), Piute (49.0%), and Daggett (45.0%) (Langston, 2014).

Occupational Segregation

One key aspect of understanding the female labor force in Utah is occupational segregation—the phenomenon of women holding a high percentage of jobs in certain industries as well as specific positions within those industries. Utah Department of Workforce Services Economist Lecia Langston has noted that large-scale occupational changes by gender were slow in coming. Specifically, she has observed that “detailed occupations where Utah women comprise at least 90 percent of employment include several healthcare-related occupations: occupational therapy assistants, medical transcriptionists, dental hygienists, dental assistants, dietitians/nutritionists and medical assistants. Utah females also account for more than 90 percent of employment in two occupations which relate to the care of younger children—preschool/kindergarten teachers and childcare workers. Other occupations showing 90-percent or more female employment include cosmetologists, other personal care workers, teacher assistants, tailors, billing clerks and proofreaders. This roster closely mirrors the 2000 Census list of occupations with 90-percent or greater female employment” (Langston, 2014a).

Utah women still make up a high percentage of all workers in certain occupations, many of which require relatively lower skills and receive lower pay. According to 2017 U.S. Census Bureau estimates, the three areas in which Utah women are mostly highly segregated are healthcare support occupations (79.3% of workers are women), personal care and service occupations (78.7%), and health technologists and technicians (75.4%) (United States Census Bureau, 2017e). The median incomes for all workers in these three occupational areas are, respectively, as

follows: \$21,703, \$12,369, and \$27,499. The median income for each of these three female-dominated professions is below average for all professions in the state (\$32,986) (United States Census Bureau, 2017f). In contrast, the occupations in which the lowest percentage of jobs are held by women are construction and extraction occupations (2.2%); installation, maintenance, and repair occupations (2.3%); and law enforcement workers including supervisors (11.7%) (United State Census Bureau, 2017e). The median earnings for all workers in these three male-dominated occupational areas are, respectively, as follows: \$36,259, \$44,131, and \$52,521, all above the median income for all professions in the state (United States Census Bureau, 2017f).

Not only do Utah women make up high percentages of workers in certain occupations, but a large number of all Utah working women are segregated in a few specific (and lower-paying) jobs. More than 40% of Utah women work in just two occupational groups: office and administrative support, where 24.0% of employed Utah women work; and service occupations, where 18.8% of them work (Hess & Williams, 2014). Both of these groups of jobs have median wages below the state average (United States Census Bureau, 2017f). Utah men, on the other hand, are more likely than Utah women to be concentrated in higher-paying industries and job types (Hess & Williams, 2014).

Increasing Utah Women's Employment Success

Public entities, corporations, and individual women can make efforts to increase women's success in the Utah labor force. Working women in the state face various challenges; for example, parents may have difficulty finding quality childcare, which is cost-prohibitive for many families in Utah, as it is in the rest of the nation (Economic Policy Institute, 2016). This dilemma is amplified in Utah, as we tend to have more children than the national average (Hard @ Work, 2014). Interestingly, a recent study ranked Utah 50th in the country in its “Childcare Index,” which ordered states by the relative costs of infant care, the proportion of four-year-olds in publicly funded Pre-K programs, and the policies in

place to promote quality Pre-K care (IWPR, 2019). Another barrier specific to low-income women's employment success is the "cliff effect," wherein women who have been receiving public benefits risk losing this support as they become eligible for promotions or raises at work, and the loss of public benefits occurs faster than rising incomes replace their value (The Women's Foundation of Colorado, n.d.). Various groups and policy makers are working to address these types of issues legislatively.

Utahns could also benefit from increased support for women entrepreneurs. Census estimates from 2012 show only 30.3% of firms in Utah are owned by women (compared to 35.8% nationally), and sales by women-owned businesses in Utah make up only a very small share of total sales by all firms (United States Census Bureau QuickFacts, n.d.; Langston Hard @ Work).

Corporations in the state can also do much to improve employment success for women who choose to or need to work. For example, the Women's Leadership Institute has invited companies statewide (both public and private) to participate in the ElevateHER Challenge, which has among its stated goals to increase the percentage of women in senior leadership positions and on boards, to retain women at all organizational levels, and to close gender pay gaps (<https://wliut.com/elevate-her-challenge/>). In addition, all organizations in the state would do well to reevaluate their systems and processes regarding employee recruitment,

hiring, development, and promotion to ensure they have diverse and inclusive work environments that offer flexibility and maximum potential for employee success. Finally, individual Utah women, schools, universities, and other stakeholders can work to close the education gap between genders in the state. Utah women are less likely than U.S. women to work in jobs that require higher education. As more women in Utah earn at least bachelor's degrees, specifically in high-paying, growth industries, they will have more choices and opportunities for successful employment (Department of Workforce Services, 2014). Additionally, some women might benefit from exploring training and certification in fields that are traditionally male-dominated yet may lead to careers that are relatively high-paying and flexible.

Women in Utah make up a significant proportion of the overall labor force in the state, but many are employed in low-paying jobs that have limited room for advancement. For many Utah women, the majority of whom work for pay, training for and securing successful employment can be crucial in order to ensure financial health; solid employment also affects other aspects related to overall quality of life. Finding ways to improve various factors for Utah women in the labor force will not only better their lives but also strengthen the positive impact of women in communities and the state as a whole.

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