

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

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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.

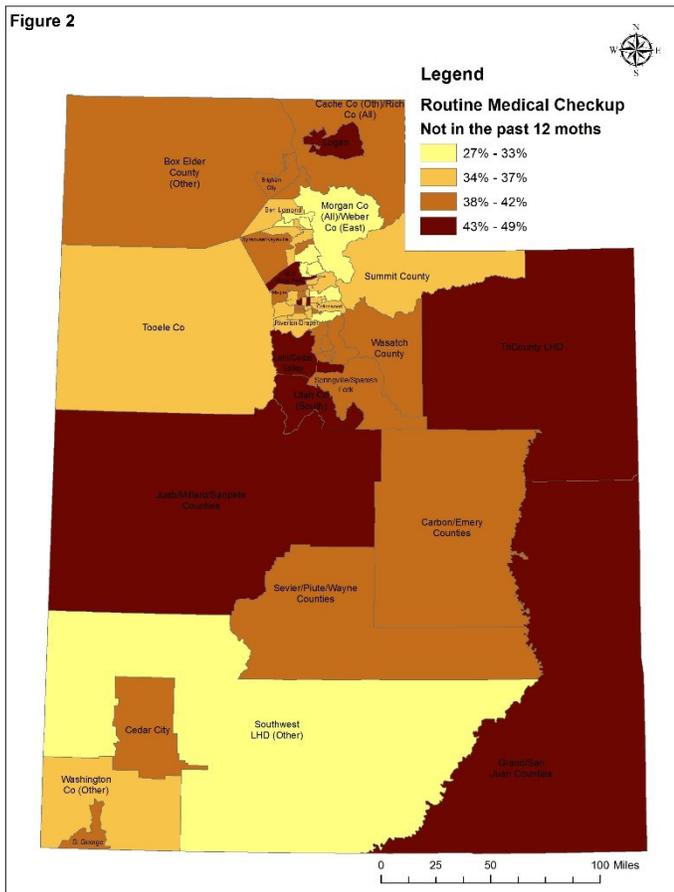
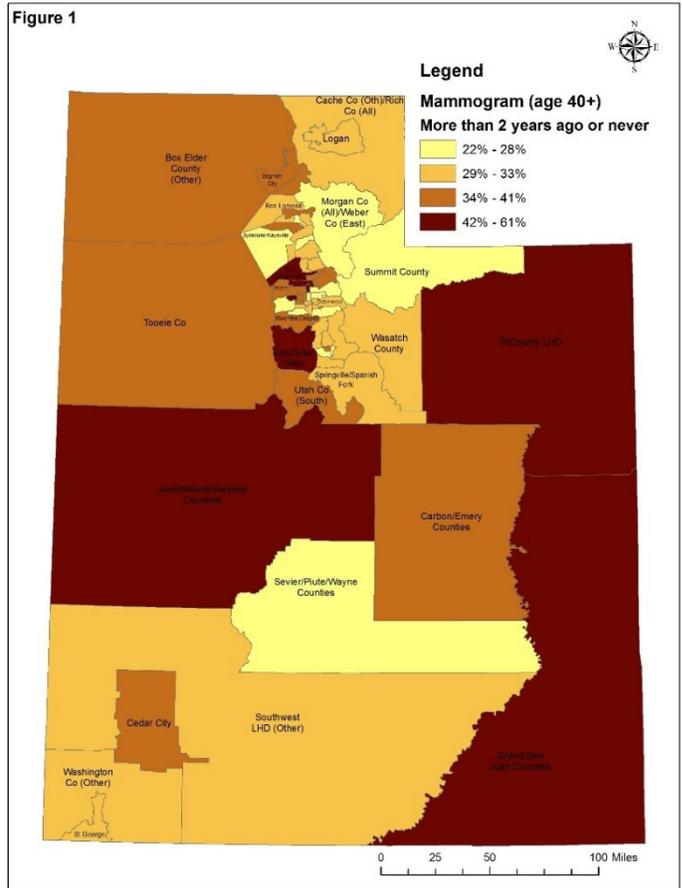
Depression and obesity percentages were both statistically significantly higher for urban areas than rural areas. Frontier areas had the highest percentages in eleven of the fifteen outcomes, and five of these differences were statistically significant. These five areas include routine medical checkup, 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.



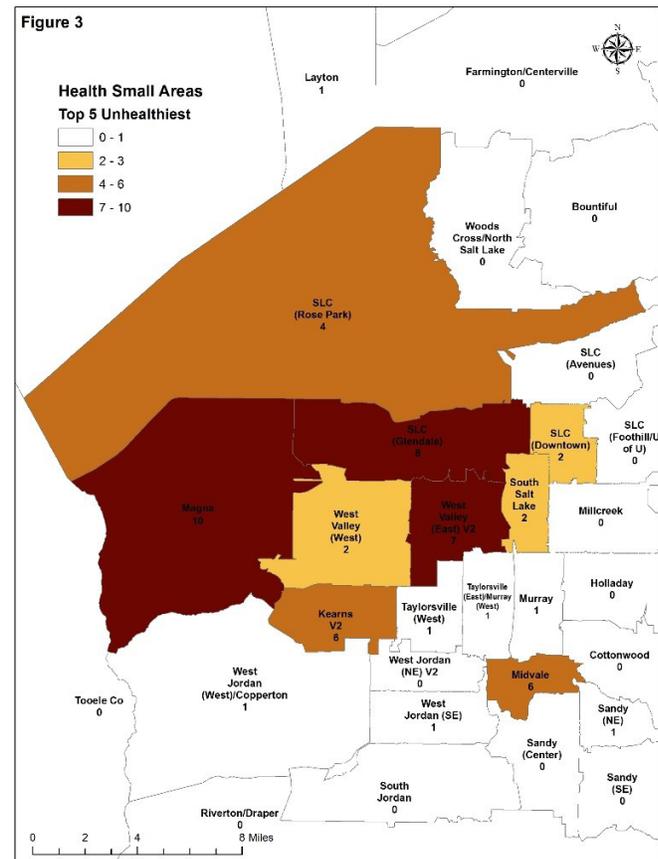
The percentage of women with poor mental health was highest in frontier areas (21.3%) followed by urban (19.4%) and rural (18.6%). On the other hand, depression was lowest in rural areas (25%) followed by frontier areas (26.9%) and then urban areas (27.9%).

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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